AMECA

List of Acceptable Plastics for Optical Lenses and Reflex Reflectors Used on Motor Vehicles

October 30, 2026



List of Acceptable Plastics for

Optical Lenses and Reflex Reflectors

Used on Motor Vehicles

October 30, 2026 Edition

Automotive Manufacturers Equipment Compliance Agency, Inc.
1025 Connecticut Avenue, NW Suite #1000
Washington DC 20036

www.ameca.org

1. STATUS

The following materials have been accepted by the Automotive Manufacturers Equipment Compliance Agency as meeting the 3-year weathering test of FMVSS 108 for plastics used in optical lenses and reflectors used on motor vehicles. No evaluation has been made as to the suitability of individual materials for particular automotive uses, or to the manufacturing methods.

You must contact the resin or coating manufacturer to determine the best material for your application.

Every plastics resin manufacturer has specialized products for different applications, processing conditions, manufacturing equipment, light sources and final use.

Please contact the manufacturer directly for more information.

The device manufacturers must ensure that the lenses molded from acceptable materials meet the color and plastic stability test requirements for each individual device.

2. LISTING

The material is listed by the manufacturer's name, trade name and flow formulation, type of resin, color number and color.

3. MATERIAL COATINGS AND HAZE

When these materials are used for state/provincial regulated lighting device lenses, the applicable state/provincial regulations shall be met.

The Code "#" denotes material which must be coated to pass the 7% haze requirement. This material does **not** need to be coated to meet the 30% haze requirement.

The Code "Q" denotes a coated material that must be coated to pass the 7% haze requirement. ***No information is given on uncoated performance.***

The Code "Q2" denotes a coated material that must be coated to pass the 7% haze requirement. This material **can not be used** uncoated.

The Code "$" denotes a coated material with haze values between 7% and 30%. **No information is given on uncoated performance. These cannot be used as or in front of a reflex reflector.**

The Code "@" denotes a coated material with haze values between 7% and 30%. This material **cannot be used** when uncoated. **These cannot be used as or in front of a reflex reflector.**

The Code "!" denotes a material that does not require a coating to be used as an inner lens when protected by an outer lens designated by Code "#". The inner and outer lens materials have been tested *together* as a *system* and together they will meet FMVSS 108.

Only materials tested together, may be used this way. *Not every manufacturers materials will qualify for the outer lens*. **Other manufacturers lens material may NOT be used as an outer lens** even if those materials are designated #. The inner and outer lens must be tested ***together.***

4. DISTRIBUTION

This list is updated and distributed free on a monthly basis. Any revised or pre-release editions may be obtained by contacting AMECA.

5. DEFINITIONS

Coating -- Material applied to surface of the lens to improve some aspect of performance.

Coated materials-- a material which has a coating applied to the surface of the finished sample to impart some protective properties. Coating identification means a mark of the manufacturer's name, formulation designation number, and recommendations for application.

Color bleeding -- the migration of color out of a plastic part onto the surrounding surface.

Cracking -- a separation of adjacent sections of a plastic material with penetration into the specimen.

Crazing -- a network of apparent fine cracks on or beneath the surface of materials.

Delamination -- a separation of the layers of a material including coatings.

Hard Coat -- 1) Coating which is cured by UV radiation.
2) Coating which provides additional resistance to abrasion or scratching which may be cured by thermally or by UV radiation. May contribute to long term durability of material.

Note: Both definitions are being used--please verify the intended performance when discussing hard coats.

Haze -- the cloudy or turbid appearance of an otherwise transparent specimen caused by light scattered from within the specimen or from its surface.

Inner Lens—A material covered by another material for testing. It is used interchangeably with "protected application"

Protected Application. A material covered by another material for testing. It is used interchangeably with Inner Lens.

Reflex reflectors-- devices used on vehicles to give an indication to approaching drivers using reflected light from the lamps of the approaching vehicle.

Substrate -- Base material to which all other performance enhancing materials are added.

UV-protective Coat -- Coating designed to provide additional protection from the sun's electromagnetic radiation, particularly those wavelengths in the UV bandwidth. Often used on polycarbonate substrates to improve weathering performance. Polycarbonates must be coated for use in or in front of reflex reflectors.

UV radiation -- Short wavelength, high energy radiation emitted by the sun or other object (HID lamp). Wave lengths between 10 and 380 nm.

HID Lamp -- High Intensity Discharge Lamp. Lamps produce light by the use of a stabilized arc. Lamps can produce significant UV radiation which may require special materials. See SAE J-1647

6. NOTE ON COLOR

Federally, regulated lamps must use FMVSS 108 color coordinates, which are slightly different than SAE. SAE emergency/auxiliary lamps can meet SAE J578.

The colors listed have been determined to be in compliance with SAE J-578 using the ASTM E 308-66 method required by FMVSS 108 in thicknesses specified by the resin manufacturer.

NOT EVERY COLOR LISTED WILL MEET FMVSS-108/SAE J-578 COLOR COORDINATES FOR YOUR ***INTENDED*** THICKNESS

NOT EVERY MATERIAL IN EVERY COLOR WILL MEET FMVSS-108/SAE J-578 WITH LED OR ILLUMINANT C LIGHT SOURCES

CHECK WITH THE RESIN MANUFACTURER'S COLOR SPECIALIST

The ASTM E 308-66 method uses an illuminant A light source energized to 2856k. *If you use anything other than an incandescent light source at 2856k you MUST verify that the resulting color meets the specifications of FMVSS 108 or SAE J-578 (Depending on lamp application) for your intended thickness.* Halogen light sources at 3200k, illuminant C (strobe) and LED light sources will dramatically alter the color output. In addition, some light sources do not emit color or luminous flux uniformly. Measurements should be made to verify that the emitted light using your intended light source meets the specifications of FMVSS 108 throughout its photometric range.

7. NOTE ON INNER LENS COLOR

Combinations of inner and outer lenses with various colors may not perform predictably. Output will vary markedly with different light sources. Check with the resin manufacturer's color specialist when making selections

8. NOTE ON "EQUIVALENT" FORMULATIONS.

Many companies have distributed manufacturing facilities, cooperative agreements or joint ventures. In order to list a facility or another company the company which has done the three year weathering testing must send documentation stating that the materials, processes and end products are equivalent between itself and the new applicant. Due to industry complaints, the List of Acceptable Plastics has revised the listing to more accurately reflect the test data from various parent companies. ***In addition, if the joint venture is terminated or the manufacturing facility is sold, the subsidiary or joint company must be able to provide weathering test data on its own. A company can no longer rely on the parent company data and processes if they have no relationship to the parent company who conducted the original testing.***

10. NOTE ON SUBMITTING FOR ADDITIONAL COLORS

If you plan to add an additional color number to your listing, please list the existing colors which have undergone the three year weathering that are a greater and lesser concentration. The colors listed MUST be in the same color space. See FMVSS 108 S14.4.2.1.3

11. Note on Inner Lens and Inner Coating Testing

Only inner and outer lens materials, tested together, may be registered for an inner lens system. Not every manufacturer's materials will qualify for the outer lens. Other manufacturers lens material may NOT be used as an outer lens even if those materials have successfully been used as an outer lens for a different material. The inner lens/coating and outer lens/coating must be tested *together as a system.*

Currently the DOT has issued no guidelines for inner lenses. If and when they do, they will be the requirements that everyone must follow. In the meantime, we would recommend for following guidelines for inner lens test setup.

1) You must bracket test every color combination (light/dark) you want to use—red, blue, amber, etc. The light/dark colors must be in the same color space.

2) You must bracket test molecular weight (heavy/light) for both outer lens and inner lens.
3) The test setup—airspace, ventilation, should duplicate as close as possible the conditions in an inner automotive lens including factors such as ventilation, spacing between inner and outer lens and coatings.
4) For more information, please see SAE Paper: http://papers.sae.org/2004-01-0800

Inner lens materils will be listed with their outer lens material jointly as a system. Both the inner lens and outer lens material/color will be listed with both materials specified. If you only test a limited range of lens colors, thicknesses or materials that is how they will be listed.

12. Special Note on the definition of "Protected Inner Lens" and/or "Protected Applications"

Protected Inner Lenses or Protected Applications for polycarbonate lenses refers to an outer lens which has a UV absorbing capabilities. NOT physical protection but UV protection.

Frequently Asked Questions

Q1) If someone else has weathered a polycarbonate/PMMA material, do I have to weather my polycarbonate/PMMA material?

A) Yes, every company's material stands independently from what another company has done. Each coating, pigment and additive must be tested with each company's own material. Each separate material stands alone for weathering performance unless bracketed by materials of higher and lower concentrations or molecular weights.

Q2) If someone else has weathered a pigment with another plastic do I have to weather the pigment with my plastic?

A) Yes, every company's material stands independently from what another company has done. Each coating, pigment and additive must be tested with each company's own material. Each separate material stands alone for weathering performance unless bracketed by materials of higher and lower concentrations or molecular weights.

Q3) If someone else has weathered a coating do I have to weather my material with that coating?

A) Yes, every company's material stands independently from what another company has done. Each coating, pigment and additive must be tested with each company's own material. Each separate material stands alone for weathering performance unless bracketed by materials of higher and lower concentrations or molecular weights.

Q4) Testing laboratories typically use a 1-10 numbering scale according to ASTM D660 to indicate the degree of crazing, cracking or delamination associated with weathering. What numerical value from ASTM D660 is acceptable for listing?

A) FMVSS 108 does not refer to any numerical values from ASTM D660. The numerical values are done by the test laboratory for manufacture convenience.

FMVSS 108 states:

> S14.4.2.2.4.2 After completion of the outdoor exposure test materials used for headlamp lenses must show no deterioration.
>
> S14.4.2.2.4.3 After completion of the outdoor exposure test all materials, when compared with the unexposed control samples, must not show physical changes affecting performance such as color bleeding, delamination, crazing, or cracking. ***Additionally materials used for reflex reflectors and lenses used in front of reflex reflectors must not show surface deterioration or dimensional changes.***

Your tested samples must not show any changes affecting performance. The only value which shows no change is a numerical value of 10.

Q5) How many thicknesses to I have to test?

A) FMVSS 108: S14.4.2.1.3 Samples must be furnished in thicknesses of 1.6 ± 0.25 mm, 2.3 ±

0.25 mm, 3.2 ± 0.25 mm, and 6.4 ± 0.25 mm.

Q6) Even if it's for a coating? A) Yes.

Q7) Do materials have to meet the color requirements before testing?
A) Yes: S14.4.2.1.4 All samples must conform to the applicable color test requirement of this standard prior to testing.

Q8) What about the plastics used in non-FMVSS applications such as emergency vehicle lighting which also require three year weathering?
A) Yes, those can be listed with non-standard colors as long as they are NOT used on FMVSS 108 lighting devices.

Testing outline. Note, we also recommend you send DOUBLE samples to prevent any errors.

- ► 4 Thicknesses
  - For each colour
  - For each coating
  - For each molecular weight (MW)
- ► For example for each resin type:
  - 4 thickness samples of dark red, uncoated, Lowest MW Resin A
  - 4 thickness samples of light red, uncoated, Lowest MW Resin A
  - 4 thickness samples of dark red, uncoated, Highest MW Resin A
  - 4 thickness samples of light red, uncoated, Highest MW Resin A
  - 4 thickness samples of dark red, coating 1, Lowest MW Resin A
  - 4 thickness samples of light red, coating 1, Lowest MW Resin A
  - 4 thickness samples of dark red, coating 1, Highest MW Resin A
  - 4 thickness samples of light red, coating 1, Highest MW Resin A

Each resin stands on it's own. Combinations of additives cannot be reliably predicted, especially if they are supposed to control the same issue. (such as two different UV absorbers)

- 4 thickness samples of dark red, uncoated, Lowest MW Resin B
- 4 thickness samples of light red, uncoated, Lowest MW Resin B
- 4 thickness samples of dark red, uncoated, Highest MW Resin B
- 4 thickness samples of light red, uncoated, Highest MW Resin B
- 4 thickness samples of dark red, coating 1, Lowest MW Resin B
- 4 thickness samples of light red, coating 1, Lowest MW Resin B
- 4 thickness samples of dark red, coating 1, Highest MW Resin B
- 4 thickness samples of light red, coating 1, Highest MW Resin B
- Now repeat for clear, yellow, blue, coating 2 & coating 3

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MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Asahi Kasei Corporation www.asahi-kasei.co.jp	Delmore H-350A Anhydride Acrylic	Polymethacrylic	99141 D33144 D23084	Clear Red Yellow
Asahi Kasei Corporation www.asahi-kasei.co.jp	Delpet 70H Delpet 70N Delpet 80CT Delpet 80N Delpet 80NB Delpet 80NE Delpet 80NEK Delpet 80NEN Delpet 80NET Delpet 80NF Delpet 80NP Delpet 80NR Delpet 80NS Delpet 800F Delpet 80EB Delpet 80EH Delpet 80NH Delpet 80TJ Delpet PM130N Delpet SK420N Delpet SK430N	Polymethyl Methacrylate	99141 99142 99143 LM60302 NS00165[1] NS00178[2] 31140 31141 31142 31143 31144 31145 31151 31152 31153 33140 33141 33142 33143 33144 33151 33153 33170 33232 33233 33261 33340 33402 K3140[3] K3151 K3232[3] 21102 21104 21106 21107 21108 21109 21110 21111 21207 21301 21511 21802 21803 21834	Clear Clear Clear Clear Clear Clear Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow

1 Note: NS00165 is listed with Delpet 80N for 1.6-3.2 mm Only

2 Note: NS00178 is listed with Delpet 80N for 1.6-2.3 mm Only

3 Note: K3140 and K3232 are listed for 6.4 mm only

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Asahi Kasei Corporation www.asahi-kasei.co.jp	Delpet 70H	Polymethyl Methacrylate	23080	Yellow
	Delpet 70N		23082	Yellow
	Delpet 80N		23083	Yellow
	Delpet 80NB		23084	Yellow
	Delpet 80NE		23090	Yellow
	Delpet 80NEK		23091	Yellow
	Delpet 80NEN		23100	Yellow
	Delpet 80NET		23102	Yellow
	Delpet 80NF		23103	Yellow
	Delpet 80NP		23501	Yellow
	Delpet 80NR		23502	Yellow
	Delpet 80NS		23503	Yellow
	Delpet 800F		23505	Yellow
	Delpet 80EB		23506	Yellow
	Delpet 80EH		23507	Yellow
	Delpet 80NH		9814	Gray
	Delpet 80TJ		9834	Gray
	Delpet PM130N		9870	Gray
	Delpet SK420N		90810	Gray
	Delpet SK430N		90811	Gray
			90812	Gray
			90813	Gray
			90814	Gray
			90816	Gray
			90817	Gray
			90818	Gray
			90821	Gray
			90823	Gray
			90825	Gray
			90827	Gray
			90828	Gray
			90832	Gray
			90834	Gray
			90836	Gray
			90837	Gray
			90838	Gray
			90841	Gray
			90844	Gray
			90848	Gray
			90853	Gray
			90854	Gray
			90861	Gray
			90866	Gray
			90870	Gray
			90875	Gray
			90876	Gray
			90878	Gray
			90879	Gray
			90881	Gray
			90882	Gray
			90883	Gray
			90884	Gray
			90885	Gray
			90886	Gray
			90888	Gray
			90889	Gray
			90899	Gray

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Asahi Kasei Corporation www.asahi-kasei.co.jp	Delpet SR	Polymethyl Methacrylate	99141 33151 23100 90810 90817 90817	Clear Red Yellow Gray Gray Gray
Asahi Kasei Corporation www.asahi-kasei.co.jp	Stylac-AS XT-751	Styrene/ Acrylonitrile Copolymer	SR 40501	Yellow
Asahi Kasei Corporation www.asahi-kasei.co.jp	Stylac-AS XT-753	Styrene/SR Acrylonitrile Copolymer	40113 SR 40417 SR 40418 SR 40422 SR 40429 SR 40524 SR 40525 SR 40531 SR 40536 SR 40539	Clear Red Red Red Red Yellow Yellow Yellow Yellow Yellow

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Chimei Corporation www.chimeicorp.com.tw	ACRYREX CM-205	Polymethyl Methacrylate	N-000 R-001 R-002 R-003 R-004 R-103 R-104 A-001 A-202 A-203 S-001	Clear Red Red Red Red Red Red Yellow Yellow Yellow Smoke
Note: R-002 Red is only listed in 6.3 mm (1/4") thickness Note: R-003 Red is only listed in 2.3mm to 6.3 mm (0.09" to .25") thickness				
Chimei Corporation www.chimeicorp.com.tw	ACRYREX CM-205M	Polymethyl Methacrylate	N-000 R-001 R-002 R-003 R-004 R-103 R-104 A-001 A-202 A-203 P-001 S-001	Clear Red Red Red Red Red Red Amber Amber Amber Clear/Pink Smoke
Note A-202 is only listed in 1.6-3.2mm thickness.				
Chimei Corporation www.chimeicorp.com.tw	WONDERLITE PC-110L	Polycarbonate	N-102 N-102H N-102K N-102U N-103 N-103H N-103K N-103U N-104 N-104H N-104K N-104U	Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $

Coated Chimei Corporation plastics may only be used when treated with the following coatings applied to the molded lens:

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking K-101: See Mitsubishi Chemical Corporation

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7, FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3: See Fujikura Kasei Co., Ltd.

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60: See Performance Materials Inc.

Coating Manufacturer in Alphabetical Order

FUJIKURA KASEI

Information on FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7, FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3, coating may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

MITSUBISHI CHEMICAL GROUP

Information on Mitsubishi Chemical Corporation Acryking K-101 coating may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

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Information on UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60 hard coat may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Chimei Corporation	WONDERLITE PC-115L	Polycarbonate	N-15P01	Clear $
			N-15P801	Clear $

www.chimeicorp.com.tw

Note: N-15P01 is listed is only listed in 6.4mm thickness.
Note: N-15P01 was only tested with Acryking PH-720.
Note: N-15P801 was only tested with Acryking PH-800.

Coated Chimei Corporation plastics may only be used when treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking PH-720; Acryking PH-800: See Mitsubishi Chemical Corporation

Coating Manufacturer in Alphabetical Order

MITSUBISHI CHEMICAL GROUP

Information on Mitsubishi Chemical Corporation Acryking PH-720; Acryking PH-800 coating may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Chimei Corporation Zhangzhou (China) www.chimeicorp.com.tw	ACRYREX CM-205	Polymethyl Methacrylate	N-000 R-001 R-002 R-003 R-004 R-103 R-104 A-001 A-202 A-203 S-001	Clear Red Red Red Red Red Red Yellow Yellow Yellow Smoke
Note: R-002 Red is only listed in 6.3 mm (1/4") thickness Note: R-003 Red is only listed in 2.3mm to 6.3 mm (0.09” to .25") thickness				
Chimei Corporation Zhangzhou (China) www.chimeicorp.com.tw	ACRYREX CM-205M	Polymethyl Methacrylate	N-000 R-001 R-002 R-003 R-004 R-103 R-104 A-001 A-202 A-203 P-001 S-001	Clear Red Red Red Red Red Red Amber Amber Amber Clear/Pink Smoke
Note A-202 is only listed in 1.6-3.2mm thickness.				
Chimei Corporation Zhangzhou (China) www.chimeicorp.com.tw	WONDERLITE PC-110L	Polycarbonate	N-102 N-102H N-102K N-102U N-103 N-103H N-103K N-103U N-104 N-104H N-104K N-104U	Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $

Coated Chimei Corporation plastics may only be used when treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking K-101: See Mitsubishi Chemical Corporation

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7, FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3: See Fujikura Kasei Co., Ltd.

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60: See Performance Materials Inc.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Coating Manufacturer in Alphabetical Order

FUJIKURA KASEI

Information on FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7, FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3, coating may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

MITSUBISHI CHEMICAL GROUP

Information on Mitsubishi Chemical Corporation Acryking K-101 coating may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

MOMENTIVE™ inventing possibilities

Information on UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60 hard coat may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Chimei Corporation Zhangzhou (China) www.chimeicorp.com.tw	WONDERLITE PC-115L	Polycarbonate	N-15P01 N-15P801	Clear $ Clear $

Note: N-15P01 is listed is only listed in 6.4mm thickness.
Note: N-15P01 was only tested with Acryking PH-720.
Note: N-15P801 was only tested with Acryking PH-800.

Coated Chimei Corporation plastics may only be used when treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking PH-720; Acryking PH-800: See Mitsubishi Chemical Corporation

Coating Manufacturer in Alphabetical Order

MITSUBISHI CHEMICAL GROUP

Information on Mitsubishi Chemical Corporation Acryking PH-720; Acryking PH-800 coating may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Chimei Corporation Zhenjiang China www.chimeicorp.com.tw	ACRYREX CM-205	Polymethyl Methacrylate	N-000 R-001 R-002 R-003 R-004 R-103 R-104 A-001 A-202 A-203 S-001	Clear Red Red Red Red Red Red Yellow Yellow Yellow Smoke
Note: R-002 Red is only listed in 6.3 mm (1/4") thickness Note: R-003 Red is only listed in 2.3mm to 6.3 mm (0.09" to .25") thickness				
Chimei Corporation Zhenjiang China www.chimeicorp.com.tw	ACRYREX CM-205M	Polymethyl Methacrylate	N-000 R-001 R-002 R-003 R-004 R-103 R-104 A-001 A-202 A-203 P-001 S-001	Clear Red Red Red Red Red Red Amber Amber Amber Clear/Pink Smoke
Note A-202 is only listed in 1.6-3.2mm thickness.				
Chimei Corporation Zhenjiang China www.chimeicorp.com.tw	WONDERLITE PC-110L	Polycarbonate	N-102 N-102H N-102K N-102U N-103 N-103H N-103K N-103U N-104 N-104H N-104K N-104U	Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $

Coated Chimei Corporation Zhenjiang China plastics may only be used when treated with the following coatings applied to the molded lens:

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking K-101: See Mitsubishi Chemical Corporation

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7, FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3: See Fujikura Kasei Co., Ltd.

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60: See Performance Materials Inc.

Coating Manufacturer in Alphabetical Order

FUJIKURA KASEI

Information on FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7, FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3, coating may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

MITSUBISHI CHEMICAL GROUP

Information on Mitsubishi Chemical Corporation Acryking K-101 coating may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
1-2 Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

MOMENTIVE™ inventing possibilities

Information on UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60 hard coat may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Chimei Corporation Zhenjiang China	WONDERLITE PC-115L	Polycarbonate	N-15P01 N-15P801	Clear $ Clear $

www.chimeicorp.com.tw

Note: N-15P01 is listed is only listed in 6.4mm thickness.
Note: N-15P01 was only tested with Acryking PH-720.
Note: N-15P801 was only tested with Acryking PH-800.

Coated Chimei Corporation plastics may only be used when treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking PH-720, Acryking PH-800: See Mitsubishi Chemical Corporation

Coating Manufacturer in Alphabetical Order

MITSUBISHI CHEMICAL GROUP

Information on Mitsubishi Chemical Corporation Acryking PH-720, Acryking PH-800 coating may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Covestro Deutschland AG (Europe) Covestro LLC (America) Covestro (Hong Kong) Limited (Asia Pacific) www.covestro.com	Apec® 1603	High-Heat Polycarbonate	550042	Clear Q!
	Apec® 1703		551022	Clear Q!
	Apec® 1803		550674	Clear Q!
	Apec® 1895 (Protected Applications Only)		250337	Yellow Q!
	Apec® 1897		250322	Yellow Q!
	Apec® 2097		250339	Yellow Q!
	(coated)		250196	Yellow Q!
			256866	Yellow Q!
			256894	Yellow Q!
			350056	Red Q!
			350335	Red Q!
			350340	Red Q!

Note: 250337 is for Apec® 1803 only

Coated Covestro Deutschland AG (Europe), Covestro LLC (America) and Covestro (Hong Kong) Limited (Asia Pacific) Apec plastics may only be treated with the following coatings listed below when applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101, Acryking PH-220, Acryking PH-328. Acryking PH-730, Acryking PH-740 and Acryking PH-750: See Mitsubishi Chemical Corporation

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei Co., Ltd.

MODIHARD 200S: See NOF Corporation

PHC 587C, PHC 587C2: See Momentive Performance Materials Inc.

Stanley SH-41: See Stanley Electric

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60: Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2: Momentive Performance Materials Inc

UVHC8100: Momentive Performance Materials Inc

UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7 and UVT610V8: See Red Spot

(Coating Information Continued on the Next Page)

Coating Manufacturer in Alphabetical Order

Information on Acryking F-328, Acryking K-101, Acryking PH-220, Acryking PH-328, Acryking PH-730, Acryking PH-740 and Acryking PH-750 coatings may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking K-101 is NOT suitable for use with or in front of a reflex reflector
Note: Acryking PH-328, Acryking PH-730, Acryking PH-740 and Acryking PH-750 coatings are only suitable for clear Apec® 1803, Apec® 1897 and Apec® 2097

Information on FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3 coatings may be obtained by writing:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo, 105-0011
Japan
www.fkkasei.co.jp

Note: FUJIHARD HH2551U series is only suitable for use on Apec® 1803 and Apec® 1897
Note: FUJIHARD HH2551U series data was submitted by Fujikura Kasei

Information on PHC 587C, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1, UVHC3000K-Z, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2, and UVHC8100 hard coat may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC3000 was tested on Apec 1603
Note: UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60 only Apec® 1703 and Apec® 1803
Note: PHC 587C, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1, UVHC3000K-Z, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2, and UVHC8100 test data was submitted by Momentive Performance Materials Inc.
Note: UVHC5000 was tested on clear Apec® 1603 and 1803 only.
Note: UVHC8100 was tested on clear Apec® 1603, Apec® 1697 Apec® 1803 and Apec® 1897 only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR



Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower
20-3, Ebisu 4-Chome,
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: All MODIHARD 200S data was submitted by NOF Corporation
Note: MODIHARD 200S is acceptable on AL2447 Clear in thicknesses 2.3-6.4 mm only



Information on UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7 and UVT610V8 coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: UVT200 tested on clear samples only.
Note: UVT610V tested on clear Apec® 1603 and 1803
Note: All UVT test data submitted by Red Spot.

Information on SH-41 hard coat may be obtained by writing to the following address:



Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku Meguro-Ku,
Tokyo 153,
Japan
www.stanley.co.jp

Note: Stanley SH-41 is only acceptable for use on Apec 1803

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR



Covestro Deutschland AG (Europe)
Covestro LLC (America)
Covestro (Hong Kong) Limited (Asia Pacific)
www.covestro.com

Makrolon® 2407	Polycarbonate	550012	Clear #
(UVT610V2 Coating Only)		550115	Clear #
Makrolon® 2407		550207	Clear #
Makrolon® 2607		550396	Clear #
Makrolon® 2807		550660	Clear #
Makrolon® 3107 (only available in color 550115 Clear)		551070	Clear #
Makrolon® AG2477		350037	Red $
Makrolon® AG2477 RE		350038	Red $
Makrolon® AG2477 RP(XX) CQ		350038	Red $
Makrolon® AG2677		350231	Red #
Makrolon® AG2677 RE		350232	Red #
Makrolon® AG2677 RP(XX) CQ		350391	Red #
Makrolon® AL2447		350392	Red #
Makrolon® AL2447 MAS181		350393	Red #
Makrolon® AL2447 MAS195		357866	Red #
Makrolon® AL2447 MAS402(Coated only)		357868	Red #
Makrolon® AL2447 RE		250200	Yellow #
Makrolon® AL2447 RP(XX) CQ		250337	Yellow #
Makrolon® AL2447 XT		250210	Yellow #
Makrolon® AL2647		250392	Yellow #
Makrolon® AL2647 MAS402 (Coated only)		250393	Yellow #
Makrolon® AL2647 RE		256811	Yellow #
Makrolon® AL2647 RP(XX) CQ		256866	Yellow #
Makrolon® IMC2477 (Coated only)		256894	Yellow #
		256896	Yellow #
		256908	Yellow #
		558920	Blue #
		558889	Blue #
		750029	Gray #
		750142	Gray #
		751303	Gray #
		752969	Gray #
		752970	Gray #
		755335	Gray #
		755345	Gray #
		755355	Gray #
		755365	Gray #
		755375	Gray #
		770016	Gray #
		778002	Gray #

Note: Color 250337 is available on AL2647 only
Note: Colors 750142 and 770016 are available in AG resins only
Note: The resin designation (XX) can be part of the name and represents the specific attributed chemically recycled share for the RP(XX) CQ products
Note: Colors 350037, 350038 and 350038 may not be used as a reflex reflector or in front of a reflex reflector
Note: Colors 750142, 755335, 755345, 755355, 755365, 755375, 770016, 350037, 350038, 350039 are available in AG resins only.

(Covestro materials continued on the next page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR



Covestro Deutschland AG (Europe)
Covestro LLC (America)
Covestro (Hong Kong) Limited (Asia Pacific)
www.covestro.com

LED Product Grades Protected Applications Only

Makrolon® LED2045	Polycarbonate	000000	Clear
Makrolon® LED2245		550128	Clear
Makrolon® LED2245 RE		550207	Clear
Makrolon® LED2245HP		551592	Clear
Makrolon® LED2245HP RE		551467	Clear
Makrolon® LED2245RP (XX) CQ		551056	Clear
Makrolon® LED2247			

Note: All Covestro inner lens products are tested behind clear coated 2.3 mm Makrolon AL 2647
Note: Makrolon® LED2245HP and LED2245HP RE are available in color 000000 only
Note: (XX) can be part of the name and represents the specific attributed chemically recycled share for the RP(XX) CQ products.

Edge-Lighting Product Grades Protected Applications Only

Makrolon® LED2245EL	Polycarbonate	021754	White
		021760	White
		021767	White
		021769	White

Note: Makrolon® LED2245EL may not be used as a reflex reflector.
Makrolon® LED2245EL is considered a diffused material above 3.2 mm when behind PMMA, and above 6.4 mm when behind polycarbonate.

Film Product Grades Protected Applications Only

Makrofol® DE11	Polycarbonate	Clear
Makrofol® DE248		
Makrofol® DE920		
Makrofol® UV503		

Makrofol® Films were tested behind coated Makrolon AL2447 and uncoated Roehm PMMA 8N. All Film product grades were tested in 175/500 micron thickness except UV503 which was in 250/500 micron thickness

Coated Covestro Deutschland AG (Europe), Covestro LLC (America) and Covestro (Hong Kong) Limited(Asia Pacific) Makrolon AL plasics may only be treated with the following coatings applied to the molded lens:

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328 hardcoat: see Mitsubishi Chemical Corporation

Acryking K-101, Acryking K-103 hardcoats: see Mitsubishi Chemical Corporation

Acryking PH-220, Acryking PH-328, Acryking PH-503, Acryking PH-511, Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-730, Acryking PH-740, Acryking PH-750, Acryking PH-800, Acryking PH-800N5A And Acryking PH-930 hardcoats: see Mitsubishi Chemical Corporation

Acryking PH-503, Acryking PH-511, Acryking PH-730, Acryking PH-740 and Acryking PH-750: See Mitsubishi Chemical Corporation

CD-3M12: See HIPRO Polymerials (Jiangsu) Co., Ltd.

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3372U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3401U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3: See Fujikura Kasei Co., Ltd.

KUV-1000, KUV-3000, KUV-4000, KUV-5000, KUV-6000, KUV-9100: See KCC Corporation

LHP100/LHC100: See Momentive Performance Materials, Inc.

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

PHC587, PHC 587C, PHC 587C2: See Momentive Performance Materials, Inc.

PHOLUCID No.115C, PHOLUCID No. 130C and PHOLUCID No. 180C: See Chugoku Marine Paints

Puriflow® PU992: See Votteler Lackfabrik GmbH & Co. KG

Puroclear® 4346 iT: See Rühl Puromer GmbH

RayGloss 400, RayGloss 401, RayGloss 402: See BASF Coatings GmbH

SH-41, SH-50, SH-51, and SH-61 hard coats: See Stanley Electric

SHP300/SHC3000, SHP401/AS4000, SHP401/SHC4002, SHP470FT/AS4700, SHP470FT2050/AS4700: See Momentive Performance Materials Inc

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60: See Momentive Performance Materials Inc.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

UVHC5000, UVHC5000K, UVHC5000K1, and UVHC5000K2 hard coats: See Momentive Performance Materials Inc.

UVHC5100 Hard Coat: See Momentive Performance Materials.

UVHC8100: See Momentive Performance Materials Inc.

UVT200V1, UVT200V2, UVT200V3, UVT200V5 coatings: See Red Spot

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8 coatings: See Red Spot

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

X-48-5500-A18: See Shin-Etsu Chemical Co., Ltd.

Coating Manufacturer in Alphabetical Order

Information on RayGloss 400, RayGloss 401, and RayGloss 402 coatings may be obtained by writing:

BASF Coatings GmbH
ECO/DT - C422
D-48165 Muenster
Germany
www.basf-coatings.com

Note: BASF RayGloss 400, 401 and 402 were tested on 2447 and 2647 clear only.
Note: All Raygloss data submitted by BASF

Information on PHOLUCID No. 115C, PHOLUCID No. 130C and PHOLUCID No. 180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542
www.cmp.co.jp

Note: All PHOLUCID test data submitted by Chugoku Marine Paints.
Note: PHOLUCID No. 115C and PHOLUCID No. 130C were tested on clear Makrolon AL2447 and AL2647.
Note: PHOLUCID No. 180C was tested on Makrolon AL2447, AL2447 MAS181, and AL 2647 clear.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on KUV-1000, KUV-3000, KUV-4000, KUV-5000, KUV-6000 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong, Giheung-Gu
Yongin-Si, Gyunggi-Do
South Korea
www.kccworld.co.kr

Note: KUV-1000 was tested on 6.4mm lens thickness only
Information on KUV-1000, KUV-3000, KUV-4000, KUV-5000, KUV-6000, KUV-9100 was submitted by KCC Corporation
KUV-4000, KUV-5000, KUV-6000 tested on AL2447 and AL2647 clear only.
KUV-3000 and KUV-9100 were tested on Makrolon® AL2447 clear only.

Information on FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 coatings may be obtained by writing:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo, 105-0011
Japan
www.fkkasei.co.jp

Note: FUJIHARD HH2540U-series, FUJIHARD HH2551U-series, FUJIHARD HH2561U-series, FUJIHARD HH2570U-series, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 were tested on clear Makrolon® AL2447 and Makrolon® 2647
Note: FUJIHARD HH2541U-series, FUJIHARD HH2551U-series, FUJIHARD HH2561U-series, FUJIHARD HH2570U-series, FUJIHARD HH3372U, FUJIHARD HH3482U, and FUJIHARD HH3482U-U2 data was submitted by Fujikura Kasei

Information on CD-3M12 coating may be obtained by writing to the following address:

HIPRO Polymer Materials (Jiangsu) Co., Ltd.
North Industrial Park Wuxi, Jiangsu
P.R. China
Tel.: +86-510-87855326
Website: www.hiprocoating.com

Note: HIPRO CD-3M12 is NOT suitable for use with or in front of a reflex reflector
Note: HIPRO CD-3M12 only complies with FMVSS 108 in 1.6 mm through 3.2 mm thicknesses.
Note: HIPRO CD-3M12 was only tested on Makrolon 2647 Clear.

(Coating Manufacturer Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: All data on NIPPE UVI Coat UT-1678 coating was submitted by Nippon Paint Automotive Coatings.
Note: NIPPE UVI Coat UT-1678 was tested on Makrolon AL2447 and AL2647 clear.

Information on Mitsubishi Chemical Corporation Acryking F-328, Acryking K-101, Acryking K-103, Acryking PH-220, Acryking PH-328, Acryking PH-503, Acryking PH-511, Acryking PH-700 Acryking PH-710, Acryking PH-720, Acryking PH-730, Acryking PH-740, Acryking PH-750, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 hardcoats may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: All data submitted by Mitsubishi Chemical Corporation
Note: Acryking PH-710, Acryking PH-720, Acryking Acryking PH-800 and Acryking PH-800N5A were tested on Makrolon AL2647 clear only.
Note: Acryking K-101 is NOT suitable for use with or in front of a reflex reflector
Note: Acryking PH-710 and Acryking PH-720 test data was submitted by Mitsubishi Chemical Corporation
Note: Acryking PH-710 and Acryking PH-720 were tested on clear AL-2447 only
Note: Acryking PH503, Acryking PH-511, Acryking PH-730, Acryking PH-740, Acryking PH-750, and Acryking PH-930 were tested on Makrolon AL2447 and Makrolon AL 2647 551070 clear only.
Note: Acryking PH-328, Acryking PH-800 and Acryking PH-800N5A were tested on Makrolon AL2447 551070 clear only

(Coating Manufacturer Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR



Information on LHP100/LHC100, SHP300/SHC3000, SHP401/AS4000, SHP401/SHC4002, SHP470/AS4700, SHP470FT2050/AS4700, PHC587, PHC587C, PHC587C2, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC3000K-Z, UVHC5000, UVHC5000K, UVHC5000K1, and UVHC5000K2:

Momentive Performance Materials Inc.
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: SHP3000/SHC3000 is NOT suitable for use with or in front of a reflex reflector.
Note: SHP470FT2050/AS4700 is only suitable for use on AL2447 and AL2647 in thickness 3.2 on color 751092.
Note: All UVHC3000K test data submitted by Momentive Performance Materials, Inc.
Note: UVHC3000K1, UVHC3000K-Z, PHC587C, PHC587C2, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60 and UVHC5000 was submitted by Momentive Performance Materials Inc.
Note: UVHC5000, UVHC5100 And UVHC8100 were tested on clear AL2447 and AL2647 only.
Note: Makrolon® AL2447 MAS181 was tested with Momentive UVHC3000, UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2 , UVHC3000K1-40 and UVHC3000K1-50
Note: Makrolon® AL2447 MAS402 was tested with UVHC3000.
Note: Makrolon® AL2447 MAS402 with UVHC3000 data was submitted by Momentive Performance Materials.
Note: SHP470FT/AS4700 was tested on AL2447 and AL2647 Clear
Note: All Data for SHP470FT/AS4700 and UVHC5100 was submitted by Momentive Performance Materials



Information on Red Spot UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: All UVT test data submitted by Red Spot.
Note: UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 were tested on AL 2447 and AL 2647 clear only
Note: Makrolon 2245 was tested on UVT610V2 only. Only thicknesses above 2.3 mm may be used in front of a reflex reflector.

(Coating Manufacturer Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on Puroclear® 4346 iT coating may be obtained by writing to the following address:

Rühl Puromer GmbH
Färberstraße 1,
61381 Friedrichsdorf,
Germany
E-Mail: puromer@ruehl-ag.com
Phone: +49 (0) 6172 733-0

Note: Puroclear® 4346 iT was tested on clear Makrolon® AG2477, and clear Makrolon® AG2677
Note: Puroclear® 4346 is also suitable for Makrolon® IMC2477 Polycarbonate.
Note: Puroclear® 4346 iT is not listed on clear Makrolon® AG2677 for use as a reflex reflector or in front of a reflex reflector

Information of X-48-5500-A18 hard coat may be obtained by writing to the following address:

Shin-Etsu Chemical Co., Ltd.
4-1, Marunouchi 1-Chome
Chiyoda-ku, Tokyo 100-0005,
Japan
www.shinetsu.co.jp

Note: X-48-5500-A18 was submitted by Shin-Etsu Chemical Co., Ltd.
Note: X-48-5500-A18 was tested on AL2447 clear only.

Information on SH-41, SH-50, SH-51, and SH-61 hard coats may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: Stanley SH-51 and SH-61 submitted by Stanley Electric
Note: Stanley SH-51 only tested on clear Makrolon® AL2447 and AL2647.
Note: Stanley SH-61 only tested on clear Makrolon® AL2447.

Information on Puriflow® PU992 may be obtained by writing to the following address:

Votteler Lackfabrik GmbH & Co. KG
Schwieberdinger Straße 97/102
70822 Korntal-Münchingen, Germany
E-Mail: d.info@votteler.com
www.votteler.com

Note: Puriflow® PU992 was tested on non-standard substrate thicknesses. Please verify for your application.
Note: Puriflow® PU992 was tested on Makrolon® AG2477 and AG2677 resins and is suitable for use on Makrolon® IMC2477

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Diapolyacrylate Co., Ltd. diap@anet.net.th	ACRYPET MD	Polymethyl Methacrylate	001 101 114 203 206	Clear Red Red Yellow Yellow
Diapolyacrylate Co., Ltd. diap@anet.net.th	ACRYPET V	Polymethyl Methacrylate	011 101 114 131 146 147 148 149 160 203 206 236 283 284 285 286 287 288 291 292	Clear Red Red Red Red Red Red Red Red Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow
Diapolyacrylate Co., Ltd. diap@anet.net.th	ACRYPET VE ACRYPET VES ACRYPET VH ACRYPET VH4 ACRYPET VHM ACRYPET VHS ACRYPET VG ACRYPET ZVH SHINKOLITE P VE SHINKOLITE P VES SHINKOLITE P VH SHINKOLITE P VHS	Polymethyl Methacrylate	001 361 PYR5406 007 PR5556 53260 54225 55475 55480 55485 55580 55670 57163 55780 58154 101 111 112 113 116 117 120 121	Clear Clear Clear White White White White White White White White White White White Red Red Red Red Red Red Red Red

Note:
Color 112, 120, 121 are only listed in 2.3mm, 3.2mm, 6.4mm for SAE devices.
Color 117 is only listed in 3.2mm, 6.4mm for SAE devices.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Diapolyacrylate Co., Ltd. diap@anet.net.th	ACRYPET VE	Polymethyl Methacrylate	128	Red
	ACRYPET VES		129	Red
	ACRYPET VH		141	Red
	ACRYPET VH4		143	Red
	ACRYPET VHM		151	Red
	ACRYPET VHS		5101	Red
	ACRYPET VG		5101B	Red
	ACRYPET ZVH		5111	Red
	SHINKOLITE P VE		5112	Red
	SHINKOLITE P VES		5113	Red
	SHINKOLITE P VH		5114	Red
	SHINKOLITE P VHS		5115	Red
			5116	Red
			5117	Red
			5118	Red
			5121	Red
			5131	Red
			5141	Red
			5142	Red
			5143	Red
			5151	Red
			PR5276	Red
			PR5296	Red
			5386	Red
			5456	Red
			203	Yellow
			209	Yellow
			252	Yellow
			253	Yellow
			254	Yellow
			255	Yellow
			256	Yellow
			257	Yellow
			258	Yellow
			259	Yellow
			262	Yellow
			263	Yellow
			264	Yellow
			265	Yellow
			266	Yellow
			267	Yellow
			270	Yellow
			290	Yellow
			2001	Yellow
			5203	Yellow
			5213	Yellow
			5223	Yellow
			5233	Yellow
			5253	Yellow
			5256	Yellow
			5283	Yellow
			5293	Yellow
			5303	Yellow
			5313	Yellow
			5333	Yellow

Note:
Color 128, 129, 262, 263 are only listed in 6.4mm for SAE devices.
Color 252 is only listed in 1.6mm, 2.3mm for SAE devices.
Color 253, 257, 265, 267 are only listed in 1.6mm, 2.3mm, 3.2mm for SAE devices.
Color 259, 264 is only listed in 2.3mm, 3.2mm, 6.4mm for SAE devices.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Diapolyacrylate Co., Ltd. diap@anet.net.th	ACRYPET VE	Polymethyl Methacrylate	5343	Yellow
	ACRYPET VES		5353	Yellow
	ACRYPET VH		5363	Yellow
	ACRYPET VH4		5373	Yellow
	ACRYPET VHM		5383	Yellow
	ACRYPET VHS		5393	Yellow
	ACRYPET VG		5403	Yellow
	ACRYPET ZVH		5413	Yellow
	SHINKOLITE P VE		5423	Yellow
	SHINKOLITE P VES		531	Gray
	SHINKOLITE P VH		533	Gray
	SHINKOLITE P VHS		541	Gray
			53105	Gray
			53110	Gray
			53120	Gray
			53130	Gray
			53137	Gray
			53140	Gray
			53150	Gray
			53155	Gray
			53160	Gray
			53165	Gray
			53168	Gray
			53170	Gray
			53175	Gray
			53178	Gray
			53180	Gray
			53183	Gray
			53185	Gray
			53187	Gray
			53190	Gray
			54107	Gray
			54110	Gray
			54112	Gray
			54115	Gray
			54118	Gray
			54120	Gray
			54130	Gray
			54132	Gray
			54133	Gray
			54135	Gray
			54140	Gray
			54145	Gray
			54155	Gray
			54160	Gray
			54165	Gray
			54170	Gray

(Coating Information Contained on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Coated Diapolyacrylate plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking PH-250: See Mitsubishi Chemical Corporation

FUJIHARD HH3012U-5, FUJIHARD HH3012U-6, FUJIHARD HH3012U-7, FUJIHARD HH3012U-8, FUJIHARD HH3012U-9, and FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3,: See Fujikura Kasei Co Ltd.

Stanley SH-61: See Stanley Electric

Coating Manufacturer in Alphabetical Order

FUJIKURA KASEI

Information on FUJIHARD HH3012U-5, FUJIHARD HH3012U-6, FUJIHARD HH3012U-7, FUJIHARD HH3012U-8, FUJIHARD HH3012U-9, and FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3, coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJIHARD HH3012U-5, FUJIHARD HH3012U-6, FUJIHARD HH3012U-7, FUJIHARD HH3012U-8, FUJIHARD HH3012U-9, and FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3, for use only on Acrypet VH grades.

MITSUBISHI CHEMICAL GROUP

Information on Mitsubishi Chemical Corporation PH-250, hardcoat may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-2 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Information on SH-61 hard coat may be obtained by writing to the following address:

STANLEY

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku Meguro-Ku,
Tokyo 153,
Japan
www.stanley.co.jp

Note: Stanley SH-61 was only tested on Acrypet VH 001

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
The Dow Chemical Company www.dow.com	SILASTIC™ MS-1001 SILASTIC™ MS-1002	Moldable Silicone		Clear

ATLAS
MATERIAL TESTING SOLUTIONS

ACCELERATING YOUR EXPERTISE

Helping You Put Your Products To The Test



THE GLOBAL LEADER IN PRODUCT DURABILITY, PERFORMANCE & WEATHERING TESTING INSTRUMENTS & SERVICES

AMETEK
MEASUREMENT & CALIBRATION TECHNOLOGIES

Instruments

Accelerated Weathering ❖ Corrosion ❖ Flammability ❖ Solar Environmental ❖ Technical Lighting

Ci Series Weather-Ometers



Atlas' flagship accelerated weathering instruments offer superior performance, innovative features, and large capacity.

- Water-cooled xenon arc lamps and advanced filter technology deliver the best simulation of natural sunlight
- Best-in-class uniformity for irradiance, temperature, relative humidity and spray
- Intuitive touch screen controls
- Custom testing capabilities

SUNTEST® Family



The most widely used flatbed xenon test chambers available in tabletop or free standing models to meet lower testing capacity needs. Features include:

- Optical light filters to simulate indoor/outdoor sunlight
- A variety of accessories ideal for testing realistic end-use conditions
- Best-in-class flatbed irradiance and temperature uniformity

Xenotest® Instruments



These premium air-cooled accelerated weathering instruments offer an array of options to meet virtually all global weathering and lightfastness testing requirements.

- Designed with state-of-the-art controls
- On-rack radio-controlled sensor technology for superior monitoring of light and temperature
- High water and power efficiency

UVTest



An economical fluorescent/UV weathering test instrument for product screening at lower operating costs.

- Simple touch screen operation and control in several languages
- Patented irradiance calibration safety access ports
- Remote Ethernet data acquisition application
- Recirculating spray water option

Corrosion Cabinets



The most sophisticated and versatile corrosion and salt fog cabinets available. Capable of replicating automatic cycling between several environmental conditions to reduce the need to move or otherwise handle test specimens.

- Design maximizes testing volume
- Large solution reservoir
- Optional features allow for simulation of several environmental conditions

Flammability Chambers



Atlas flammability chambers offer unmatched accuracy, repeatability and safety when determining the burn rates and resistance of various materials.

- All chambers are easy to install and operate
- Specimen holders available to accommodate a variety of material types
- Chambers are available for appliance, aircraft and automotive applications

Solar Simulation Systems



Atlas Custom Systems designs and builds custom solar simulation systems such as walk-in chambers or full-scale test facilities. These full scale test facilities use a series of highly coordinated metal halide lights to provide uniform radiant energy to meet the demanding testing needs of many industries.

Solar Environmental Chambers



A group of integrated, easy-to-use test chambers for various solar and environmental applications. These instruments combine environmental simulation with metal halide lighting technology and are ideal for testing medium to large sized automotive, plastics, electronics and 3D components, finished products as well as PV modules.

Technical Lighting Systems



Atlas/KHS technical lighting systems are designed for high-speed photography and video. These systems are ideal for crash testing and other safety experiments, custom designed to match the complex illumination requirements of various test configurations. Available with conventional HMI light sources or the latest LED technology, these lighting systems offer an array of solutions for analytical testing of high speed events.

Our mission is to help our customers worldwide provide the most reliable and durable product solutions through our combined experience and expertise in weathering instruments and testing, custom capabilities, consulting and global support.

Services

Natural & Accelerated Weathering Testing ❖ Evaluations ❖ Consulting ❖ Technical Support ❖ Client Education

Natural Weathering Services



Atlas offers outdoor weathering sites worldwide to ensure factors from a variety of climates can be tested.

- Static Exposure Testing
- Sun Tracking Exposure Testing
- EMMAQUA® Accelerated Outdoor Testing
- Ultra-Accelerated Weathering Testing
- Automotive Exposure Testing (Samples, Components, Complete Vehicles)

Accelerated Laboratory Weathering Services



Atlas Weathering Services Group operates one of the largest networks of ISO/IEC 17025 accredited accelerated weathering testing laboratories in the world. Our indoor exposure labs offer artificial accelerated weathering tests and a variety of other environmental test programs, all designed to accurately simulate true end-use conditions and meet global weathering standards.

Evaluation Services



Atlas offers a wide range of evaluation and measurement services for your specimens during and after the weathering process.

- Instrumental Color/Gloss Measurements
- Visual Evaluations
- Photography/IR Imaging
- Emittance
- Spectral Transmittance/Reflectance
- Solar Reflectance Index
- Additional Optical Property Measurements

Consulting Solutions



Atlas Consulting Solutions offers design and implementation of environmental durability testing methods, programs, and strategies. Our international group of weathering experts help you achieve your objectives through all stages of the value chain from materials to components, systems to end-use products.

Worldwide Technical Support



Proper maintenance is critical in order for your instrument to operate at peak performance. Atlas' AMECARE Performance Services Program ensures that your instrument will operate optimally at all times. Benefits include:

- Preventative maintenance inspections
- Scheduled ISO accredited calibrations (where available)
- Detailed service reports with professional assessment of key components

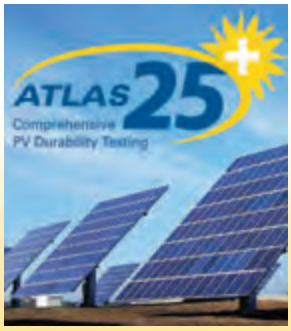
Client Education & Training



Atlas offers an array of resources designed to advance your weathering education and provide you with the knowledge you need to successfully meet your testing requirements. Events include:

- Seminars
- Workshops
- Webcasts
- In-House Programs
- Technical Conferences

Solar Industry Solutions



Atlas offers a complete portfolio of testing services to evaluate the performance, durability and reliability of solar cells, modules, complete arrays, concentrated solar power products and solar thermal collectors. Atlas also offers its proprietary Atlas 25+® long-term durability testing program for solar modules.

ATLAS
MATERIAL TESTING SOLUTIONS

Ultra-Accelerated EMMA®









AMETEK®
MEASUREMENT & CALIBRATION
TECHNOLOGIES

THE BENEFITS OF ULTRA-ACCELERATED TESTING

What is the Ultra-Accelerated EMMA®?

The Ultra-Accelerated EMMA (UA-EMMA) is Atlas' latest advancement in natural exposure testing. This new outdoor testing device delivers approximately 10-12 years of equivalent radiation exposure as would be received in a standard outdoor testing rack in South Florida in a single year.

The system achieves this accelerated exposure through a patented "cool mirror" technology that has very high reflectance in the UV and near visible wavelength ranges while attenuating reflectance in the longer wavelength visible and IR portions of the solar spectrum.

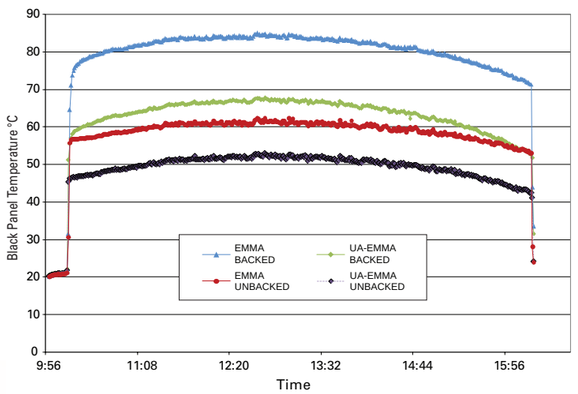


What are the Advantages?

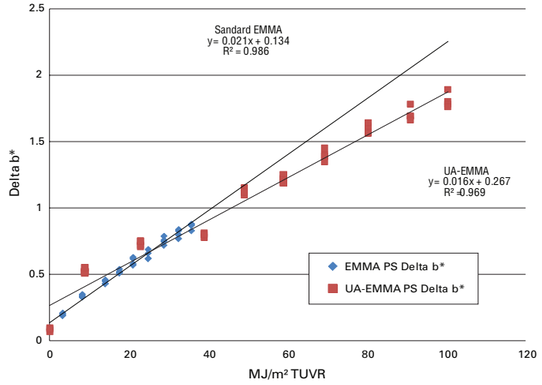
The new UA-EMMA system allows for greatly accelerated testing while fulfilling three critical testing requirements:

- Exposes many different types of materials to ultra-high UV irradiance
- Maintains high fidelity to the natural solar UV spectrum
- Keeps specimens at acceptable exposure temperatures

Black Panel Temperature Performance
UA-EMMA vs. Standard EMMA Data



Comparison of Polystyrene (PS) Reference Material in Standard EMMA and UA-EMMA by UV Radiant Exposure



Ideal Materials for UA-EMMA® Testing

- Materials that require a long service life
- Transparent and glazed materials
- Temperature sensitive materials such as PVC
- Coatings applied to metal panels
- Materials that perform well in EMMA or EMMAQUA exposure testing

EMMAQUA® Weathering Standards

The table below lists selected standards for EMMAQUA exposure. For details, refer to the individual standards. Test methods which are proprietary to individual companies and which also specify Fresnel-based exposure methods are not listed here.

EMMAQUA STANDARD	SCOPE	COUNTRY
ISO 877-3	Plastics	International
ASTM D3841	Glass-fiber reinforced polyester	USA
ASTM D4141	Coatings	USA
ASTM D4364	Plastics	USA
ASTM D5722	Coated hardboard	USA
ASTM E1596	PV modules	USA
ASTM G90	Non-metallic materials	USA
SAE J576	Optical automotive plastics	USA
SAE J1961	Automotive exterior	USA
SAE-AMS-T-22085	Preservation sealing tape	USA
JIS Z2381	General	Japan

Applications

- Adhesives
- Agricultural Films
- Automotive Exteriors
- Building Materials
- Elastomers
- Glass (Architectural & Automotive)
- Packaging
- Paints & Coatings
- Plastics
- Roofing
- Sealants



1958



The first EMMAQUA® device, constructed with a wooden frame and sheet metal skin, is patented, manufactured and placed into service.

1969

Atlas' DSET Laboratories relocates from Phoenix to New River, Arizona. The EMMAQUA device is redesigned with a steel framework and more efficient spray delivery system.



1986



EMMAQUA+®, the next generation of accelerated weathering devices, is introduced. Advancements include individual cycle programming, black panel temperature control, and altazimuth solar tracking for more efficient delivery of full-spectrum solar energy.

1999

The MQ3K is launched, utilizing state-of-the-art technology in computer-controlled cycle programming, more accurate altazimuth solar tracking, one-touch start/stop, error sensing feedback and the most-specular mirrors available.



2004



Atlas introduces four patented suites of Temperature-Controlled EMMAQUA. (Static, Night, Dynamic Temperature and Variable Irradiance Control). This breakthrough allows for the testing of materials that are sensitive to thermal buildup.

2014

Atlas introduces the UA-EMMA, the latest advancement in outdoor accelerated testing. This device couples the EMMA platform with a new patented mirror system, optimizing real-world correlation.





Global Support, Weathering Exposure Sites & Laboratories

■ Corporate Offices

Chicago, Illinois USA ■ Linsengericht, Germany ■ Shanghai, China ■ São Paulo, Brazil
Élancourt, France ■ Mörfelden-Walldorf, Germany ■ Bangalore, India ■ Leicester, United Kingdom

● Outdoor Exposure Sites & Laboratories

Miami, Florida USA • Phoenix, Arizona USA • Sanary, France • Chicago, Illinois USA• Duisburg, Germany • Leicester, United Kingdom
Hoek van Holland, The Netherlands • Chennai, India • Prescott, Arizona USA • Loveland, Colorado USA • Medina, Ohio USA
Keys, Florida USA • Jacksonville, Florida USA • Alberta, Michigan USA • Hainan, China • Guangzhou, China
Seosan, Korea • Miyakojima, Okinawa, Japan • Choshi, Japan • Kirishima, Japan
Singapore • Melbourne, Australia • Townsville, Australia • Novorossiysk, Russia
Gelendzhik, Russia • Moscow, Russia

▲ Local Sales & Service Support

To contact your local Atlas Sales representative please visit http://atlas-mts.com/contact/local-representatives/

For general inquiries please contact us at atlas.info@ametek.com

www.atlas-mts.com

Specifications and features of products and services are subject to change without notice.

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MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Formosa Idemitsu Petrochemical Corp.	TARAFLON IV1900R TARAFLON IV2200R	Polycarbonate		Clear Q

www.idemitsu.com/

Coated Formosa Idemitsu Petrochemical Corp. plastics may only be used when treated with the following acceptable coating applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328 and Acryking PH-328: See Mitsubishi Chemical Corporation

PHC587, PHC 587C, and PHC 587C2: See Momentive Performance Materials, Inc.

SH-41 and SH-50 (only IV2200R and IV2200R1): See Stanley Electric

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60 and UVHC3000K: See Momentive Performance Materials, Inc.

UVT200V1, UVT200V2, UVT200V3 and UVT200V5: See Red Spot

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

Coating Manufacturer in Alphabetical Order

MITSUBISHI CHEMICAL GROUP

Information on Mitsubishi Chemical Corporation Acryking F-328 and Acryking PH-328, may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

MOMENTIVE™
inventing possibilities

Information on UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, PHC587 and PHC587 C2 hard coat may be obtained by writing to the following:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

(Coating Manufacturer Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on Red Spot UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8, coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Information on SH-41 and SH-50 hard coats may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro, Meguro-Ku
Meguro-Ku, Tokyo 153,
Japan
www.stanley.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Idemitsu Kosan Co., Ltd.	TARFLON IV1900R TARFLON IV2200R (coated applications only)	Polycarbonate		Clear Q

www.idemitsu.com

Coated Idemitsu Kosan Co., Ltd. plastics may only be used when treated with the following acceptable coating applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, and Acryking PH-328: See Mitsubishi Chemical Corporation

PHC587: See Momentive Performance Materials, Inc.

SH-41 and SH-50 (only IV2200R): See Stanley Electric

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60 UVHC3000K, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60: See Momentive Performance Materials, Inc.

UVT200V1, UVT200V2, UVT200V3 and UVT200V5: See Red Spot

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

Coating Manufacturer in Alphabetical Order

Information on Mitsubishi Chemical Corporation Acryking F-328, and Acryking PH-328 may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Information on UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, PHC587C2, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, PHC587 and PHC 587C hard coat may be obtained by writing to the following:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on Red Spot UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Information on SH-41 and SH-50 hard coats may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Idemitsu Kosan Co., Ltd. www.idemitsu.com	LC150A LC1500 LC1500 CL10 LC1505 LC1700 LC1700 CL10 LC2200	Inner Lens Polycarbonate		Clear

Note: Idemitsu Kosan Inner Lens Materials were tested behind clear coated IV1900R

Idemitsu Kosan Co., Ltd. www.idemitsu.com/	TARFLON V1500 TARFLON V1700 TARFLON V1900 TARFLON V2200 TARFLON V2500 TARFLON V2700 TARFLON V3000 (coated or uncoated)	Polycarbonate	C901 C902 C903 R901 R902 R903 R904 R905 Y901 Y902 Y903 Y904 Y905	Clear $ Clear $ Clear $ Red $ Red $ Red $ Red $ Red $ Yellow $ Yellow $ Yellow $ Yellow $ Yellow $

(formerly Idemitsu Petrochemical Co., Ltd.)

Coated Idemitsu Kosan Co. Ltd. plastics may only be treated with the following coatings applied to the molded lens.

(Coating information contained on the next page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking K-101: See Mitsubishi Chemical Corporation

TARFLONCOAT 101 or TARFLONCOAT 201: See Idemitsu Kosan Co., Ltd.

Coating Manufacturer in Alphabetical Order

Information on Tarfloncoat 101 and Tarfloncoat 201 coatings may be obtained by writing to the following address:

Idemitsu Kosan Co., Ltd.
1-1, Marunochi 3-Chome,
Chiyoda-Ku, Tokyo 100
Japan
www.idemitsu.com/

Information on Mitsubishi Chemical Corporation Acryking K-101 coating may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
INEOS Styrolution America, LLC	NAS® XC NAS® XC UV	Styrene Methyl Methacrylate		Clear

www.ineos-styrolution.com

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
KCC Silicone Corp	ENA8520MH(LV)	Moldable Silicone		Clear

https://www.kccsilicone.com/main.do

Note: ENA8520MH(LV) is suitable for as an outer lens, and it is also suitable as an inner lens behind Samyang's TRIREX 3022L1.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Kuraray Co., Ltd. www.kuraraychemical.com	PARAPET HR	Polymethyl Methacrylate	1000	Clear
	PARAPET HR-F		11095	Clear
	PARAPET HR-G		11161	Clear
	PARAPET HR-H		12064	Clear
	PARAPET HR-L		12065	Clear
	PARAPET HR-LE		14146	Clear
	PARAPET HR-N		14148	Clear
	PARAPET HR-S		16569	Clear
	PARAPET HR-X		1103	Red
	PARAPET HR-Z		1104	Red
	PARAPET GR		1106	Red
	PARAPET HR-X		1111	Red
			1116	Red
			1173	Red
			1175	Red
			11008	Red
			11009	Red
			11010	Red
			11015	Red
			11023	Red
			11025	Red
			11028	Red
			11029	Red
			11030	Red
			11031	Red
			11035	Red
			11036	Red
			11037	Red
			11038	Red
			11039	Red
			11040	Red
			11041	Red
			11042	Red
			11046	Red
			11048	Red
			11050	Red
			11051	Red
			11052	Red
			11053	Red
			11054	Red
			11055	Red
			11056	Red
			11057	Red
			11072	Red
			11083	Red
			11107	Red
			11120	Red
			11121	Red
			11152	Red
			11153	Red
			11165	Red
			11175	Red
			11178	Red

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Kuraray Co., Ltd.	PARAPET HR	Polymethyl Methacrylate	11180	Red
	PARAPET HR-F		11181	Red
	PARAPET HR-G		11182	Red
www.kuraraychemical.com	PARAPET HR-H		11188	Red
	PARAPET HR-L		11196	Red
	PARAPET HR-LE		11194	Red
	PARAPET HR-N		11222	Red
	PARAPET HR-S		1207	Yellow
	PARAPET HR-X		1208	Yellow
	PARAPET HR-Z		1237	Yellow
	PARAPET GR		1240	Yellow
	PARAPET HR-X		1241	Yellow
			1242	Yellow
			1244	Yellow
			12008	Yellow
			12013	Yellow
			12019	Yellow
			12021	Yellow
			12062	Yellow
			12067	Yellow
			12068	Yellow
			17020	Yellow
			17021	Yellow
			17023	Yellow
			17040	Yellow
			17047	Yellow
			17048	Yellow
			17049	Yellow
			17050	Yellow
			17051	Yellow
			17052	Yellow
			17056	Yellow
			17062	Yellow
			17066	Yellow
			17071	Yellow
			17072	Yellow
			17073	Yellow
			17074	Yellow
			17075	Yellow
			17086	Yellow
			17090	Yellow
			17099	Yellow
			17101	Yellow
			17105	Yellow
			17116	Yellow
			17124	Yellow
			17185	Yellow
			17191	Yellow
			17192	Yellow
			17209	Yellow
			10247	Gray
			11161	Gray
			11176	Gray
			11198	Gray

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Kuraray Co., Ltd. www.kuraraychemical.com	PARAPET HR PARAPET HR-F PARAPET HR-G PARAPET HR-H PARAPET HR-L PARAPET HR-LE PARAPET HR-N PARAPET HR-S PARAPET HR-X PARAPET HR-Z PARAPET GR PARAPET HR-X	Polymethyl Methacrylate	12048 16072 16073 16074 16081 16333 16365 16384 16395 16396 16421 16422 16423 16424 16425 16426 16427 16428 16429 16430 16431 16432 16433 16434 16435 16456 16457 16458 16459 16460 16536 16559 16563 16565 16570 16574 17172 16071 17063 17079 17212 17213	Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Brown Brown Brown Brown Brown
Kuraray Co., Ltd. www.kuraraychemical.com	PARAPET EH PARAPET GH PARAPET HA PARAPET SH	Polymethyl Methacrylate	1000	Clear
Kuraray Co., Ltd. www.kuraraychemical.com	PARAPET SH-N	Polymethyl Methacrylate	1000 11099 11100 12042 17174 16437	Clear Red Red Yellow Yellow Grey

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
LG Chem, Ltd. www.lgchem.com	LUPOY PC 1303AH-10 LUPOY PC 1303AH-15 LUPOY PC 1303AH-22 LUPOY PC 1303AH-30 (coated only)	Polycarbonate	W00T W10T W03T W0990T W0991T W0992T W0993T R0758T Y0182T	WhiteQ White Q WhiteQ White $ White $ White $ White $ Red $ Yellow $

(formerly LG-Polycarbonate Ltd.)

Coated LG Chem Ltd. plastics are listed with only the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7, FUJIHARD HH3035U-3, and FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei Co., Ltd.

KUV-5000: See KCC Corporation

PHC587C, PHC587C2: See Momentive Performance Materials Inc.

SH-42 and SH-51 (only on W10T): See Stanley Electric

SHP401/AS4000 hard coat: See Momentive Performance Materials Inc.

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1 UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60: See Momentive Performance Materials Inc.

UVHC-5000: See Momentive Performance Materials Inc.

UVT-820: See Red Spot

Coating Manufacturer in Alphabetical Order

FUJIKURA KASEI

Information on FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7, FUJIHARD HH3035U-3, and FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shinbakeon 2-Chome
Minato-Ku Tokyo, 105-0011
Japan
www.fkkasei.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on KUV-5000 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong,
Giheung-Gu, Yongin-Si, Gyunggi-Do
South Korea
www.kccworld.co.kr

Information on SHP401/AS4000, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60 PHC587C, UVHC5000 and PHC587C2 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Inc. Building V7
51368 Lverkusen
Germany

Momentive Performance Materials
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

UVHC5000 was tested on W00T and W03T only

Information on UVT820 may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

UVT820 was tested on W00T and W03T only

Information on SH-42 and SH-51 hard coats may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

NOTE: SH-42 and SH-51 were tested on W10T only.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
LX MMA Corp.	EG-930	Polymethyl		Clear
	EG920	Methacrylate	4001	Red
	EH-910		4002	Red
www.lxmma.com	IH830		4003	Red
	IH830A		4006	Red
(Formerly LGMMA Corp.)	IH830C		4009	Red
	IH830CA		4070	Red
	IH830HF		40010	Red
	IH830HR		40020	Red
	IH830HT		40030	Red
	IH830L		40040	Red
	IH830SR		40050	Red
	IH830XT		40060	Red
	HI835MS		40061	Red
	HI835H		40070	Red
	HA020		41831	Red
	HA030		41943	Red
	HP202		41979	Red
	HR315		42001	Red
	HR323		42015	Red
	R830C3		42025	Red
	R830C5		42030	Red
	R830HFC3		42032	Red
	R830HFC5		42033	Red
			42037	Red
			42055	Red
			42066	Red
			42068	Red
			42070	Red
			42071	Red
			42087	Red
			42089	Red
			42101	Red
			42140	Red
			42142	Red
			42146	Red
			42153	Red
			2001	Yellow
			2002	Yellow
			2559	Yellow
			2561	Yellow
			20010	Yellow
			20020	Yellow
			20030	Yellow
			20040	Yellow
			30010	Yellow
			30040	Yellow
			2568	Amber
			2569	Amber
			83295	Gray
			83441	Gray
			83465	Gray
			83480	Gray
			83481	Gray
			83482	Gray
			83520	Gray
			83523	Gray
			83529	Gray

- HI532 is now HA020
- HI533 is now HA030
- Color 42140 is not listed in thickness below 2.3mm
- Note: IH830CA, EG920, IH830HR, HI835MS, HI835H, HP202 only comply with FMVSS 108 in 2.0 mm through 3.2 mm thicknesses.
- Note: HR323 complies with FMVSS 108 at 1.6 mm and from 3.2-6.4 mm
- Note: IH830L is not to be used as a reflex reflect or or in front of a reflector in thickness 6.4 mm
- Note: Colors ID191 White, 2568 Amber, 2569 Amber, 61547 Blue, 83480 Gray, 83481Gray, 83530 Gray and 42068 Red were all tested on IH830C
- Note: Color ID191 White is not to be used as a reflex reflector or in front of a reflex reflector.
- Note: Color 2569 Amber in 6.4 mm thickness is not to be used as a reflex reflector or in front of a reflex reflector.
- Note: Color 61547 Blue is not to be used as a reflex reflector or in front of a reflex reflector in any thickness

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
LX MMA Corp.	EG-930	Polymethyl	83530	Gray
	EG920	Methacrylate	83566	Gray
	EH-910		83569	Gray
www.lxmma.com	IH830		83579	Gray
	IH830A		83585	Gray
(Formerly LGMMA	IH830C		83594	Gray
Corp.)	IH830CA		8001	Gray
	IH830HF		ID191	White
	IH830HR		61547	Blue
	IH830HT			
	IH830L			
	IH830SR			
	IH830XT			
	HI835MS			
	HI835H			
	HA020			
	HA030			
	HP202			
	HR315			
	HR323			
	R830C3			
	R830C5			
	R830HFC3			
	R830HFC5			

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Lotte Chemical Corp. www.lottechem.com	LT-1100 LT-1220 (coated)	Polycarbonate		Clear Q

Coated Lotte Chemical Corp. plastics are only acceptable with the coatings listed below when properly applied to the molded lens. Lotte Chemical Corp. plastics cannot be used uncoated.

Coating in Alphabetical Order and Corresponding Manufacturer

KUV-5000: See KCC Corporation

SH-42 and SH-51: See Stanley Electric

UVHC3000, UVHC5000: See Momentive Performance Materials Inc.

UVT610V2, UVT610V3: See Red Spot

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

Coating Manufacturer in Alphabetical Order

Information on KUV-5000 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong,
Giheung-Gu, Yongin-Si, Gyunggi-Do
South Korea
www.kccworld.co.kr

Information on UVHC3000 and UVHC5000 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: Lotte Chemical Corp. *Plastics are only to be used in a production process approved and monitored by Momentive Performance Materials*

Note: Lotte Chemical Corp. LT-1100 & LT-1220 with UVHC3000 must be coated to pass 7% haze.
Note: Lotte Chemical Corp. LT-1220 with UVHC3000 over 3.2mm cannot be used as a reflex reflector or infront of a reflex reflector.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on UVT610V2, UVT610V3, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Lotte Chemical Corp. LT-1220 with UVT610V2 and UVT610V3 is not listed over 3.2 mm.
Note: UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 were tested on Lotte LT-1110 and Lotte LT-1220.

Information on Stanley Electric SH-42, and SH-51 may be obtained by writing to the following company:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: Thickness 6.4 mm of Lotte Chemical Corp. LT-1100 & SH-42, LT-1220 & SH-42, and LT-1220 & SH-51 cannot be used as a reflex reflector or in front of a reflex reflector.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Lotte Chemical Corp. www.lottechem.com	PC-1000L	Polycarbonate	100	Clear Q

Coated Lotte Chemical Corp. plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

KUV-2000, KUV-3000 and KUV-5000: See KCC Corporation

UVHC3000, UVHC5000: See Momentive Performance Materials Inc.

UVT610V2 and UVT820: See Red Spot

Coating Manufacturer in Alphabetical Order

Information on KUV-2000, KUV-3000 and KUV-5000 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong,
Giheung-Gu, Yongin-Si, Gyunggi-Do
South Korea
www.kccworld.co.kr

Information on UVHC3000 and UVHC5000 hard coat may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Information on UVT610V2 and UVT820 coating may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT610V2 was only tested on a 3.2mm lens

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Lotte MCC Corporation	ACRYPET VH	Polymethyl Methacrylate	001	Clear
	ACRYPET VHM		111	Red
	ACRYPET VG		112	Red
	ACRYPET ZVH		121	Red
www.lottemcc.com			PR5296	Red
			101	Red
(Formery Lotte MRC Corp.)			113	Red
			116	Red
			117	Red
			120	Red
			128	Red
			129	Red
			141	Red
			151	Red
			5101	Red
			5111	Red
			5112	Red
			5113	Red
			5114	Red
			5115	Red
			5117	Red
			5118	Red
			5121	Red
			5143	Red
			5151	Red
			209	Yellow
			258	Yellow
			259	Yellow
Note: Color 112, 120, 121, 259 are only listed in 2.3mm, 3.2mm, 6.4mm for SAE devices.			533	Grey
Color 117 is only listed in 3.2mm, 6.4mm for SAE devices.			53105	Grey
Color 128, 129 are only listed in 6.4mm for SAE devices.			53137	Grey
			53140	Grey
			53150	Grey
			53155	Grey
			53160	Grey
			53165	Grey
			53170	Grey
			53175	Grey
			53183	Grey

Coated Lotte MCC Corp. plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking PH-250: See Mitsubishi Chemical Corporation

Coating Manufacturer in Alphabetical Order

MITSUBISHI CHEMICAL GROUP

Information on Mitsubishi Chemical Corporation PH-250, hardcoat may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251, Japan
www.m-chemical.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Lucite	DIAKON CLG902	Polymethyl	001	Clear
International	DIAKON CLG902L	Methacrylate	006	Clear
	DIAKON CLG904		007	Clear
	DIAKON CMG302		011	Clear
www.luciteinternational.com	DIAKON CMG302S		0P11	Clear
	DIAKON CMG314		9047	Neutral
	DIAKON CMG314N		9051	Neutral
	DIAKON CMG314R		9184	Neutral
	DIAKON CMG314V		9195	Neutral
	DIAKON CMG334V		9197	Neutral
	DIAKON CMH450		9198	Neutral
	DIAKON CMH454L		405	Red
	DIAKON CMH454V		413	Red
	DIAKON HS3120		415	Red
	DIAKON MG114		416	Red
	DIAKON MH254		417	Red
	DIAKON ST10H8L		418	Red
	DIAKON ST15G8		419	Red
	DIAKON ST15H8L		421	Red
	DIAKON ST20G8		422	Red
	DIAKON ST20H8L		425	Red
	DIAKON ST25G7		428	Red
	DIAKON ST25G8		433	Red
	DIAKON ST25H8L		435	Red
	DIAKON ST35G7		436	Red
	DIAKON ST35G8		437	Red
	DIAKON ST35H8L		438	Red
	DIAKON TD5H05L		439	Red
	DIAKON TD5H10L		440	Red
	DIAKON TD5H15L		442	Red
	DIAKON TD5H25L		4088	Red
	DIAKON TD5H42L		4114	Red
	DIAKON TD510		4132	Red
	DIAKON TD515		4162	Red
	DIAKON TD525		4163	Red
	DIAKON TD542		4169	Red
	DIAKON TD825		4194	Red
	DIAKON TD842		4209	Red
			4222	Red
			4223	Red
			4232	Red
			4234	Red
			4235	Red
			4236	Red
			4237	Red
			4238	Red
			4239	Red
			4248	Red
			4249	Red
			4255	Red
			4256	Red
			4259	Red
			4260	Red
			4261	Red

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Lucite International www.lucitesolutions.com	DIAKON CLG902	Polymethyl Methacrylate	4262	Red
	DIAKON CLG902L		4263	Red
	DIAKON CLG904		4264	Red
	DIAKON CMG302		4265	Red
	DIAKON CMG302S		4266	Red
	DIAKON CMG314		4267	Red
	DIAKON CMG314N		4268	Red
	DIAKON CMG314R		4269	Red
	DIAKON CMG314V		4270	Red
	DIAKON CMG334V		4271	Red
	DIAKON CMH450		4272	Red
	DIAKON CMH454L		4273	Red
	DIAKON CMH454V		4281	Red
	DIAKON HS3120		4286	Red
	DIAKON MG114		4287	Red
	DIAKON MH254		4P01	Red
	DIAKON ST10H8L		310	Yellow
	DIAKON ST15G8		311	Yellow
	DIAKON ST15H8L		312	Yellow
	DIAKON ST20G8		314	Yellow
	DIAKON ST20H8L		316	Yellow
	DIAKON ST25G7		317	Yellow
	DIAKON ST25G8		318	Yellow
	DIAKON ST25H8L		319	Yellow
	DIAKON ST35G7		3064	Yellow
	DIAKON ST35G8		3069	Yellow
	DIAKON ST35H8L		3071	Yellow
	DIAKON TD5H05L		3080	Yellow
	DIAKON TD5H10L		3081	Yellow
	DIAKON TD5H15L		3103	Yellow
	DIAKON TD5H25L		3104	Yellow
	DIAKON TD5H42L		3150	Yellow
	DIAKON TD510		3151	Yellow
	DIAKON TD515		3152	Yellow
	DIAKON TD525		3153	Yellow
	DIAKON TD542		3154	Yellow
	DIAKON TD825		3161	Yellow
	DIAKON TD842		3162	Yellow
			3163	Yellow
			3164	Yellow
			3165	Yellow
			6150	Green
			9388	Grey

Note: Red 4281 listed in 1.6mm only.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Lucite International www.lucitesolutions.com	ACRYPET VH	Polymethyl Methacrylate	PTR0045 PTR0046 PTR0047 PTR0048 PTR0028 PTR0030 NLR0002 NLR0003	Red Red Red Red Red Red Red Red

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking PH-250: See Mitsubishi Chemical Corporation

Coating Manufacturer in Alphabetical Order

Information on Mitsubishi Chemical Corporation PH-250, hardcoat may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

For Lucite International (U.S.A.) please see Plaskolite.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Luminit	PRO10676	Inner Lens	10676	Red

www.luminitco.com

Note: Luminit PRO10676 materials were tested on LEXAN™ HP92W behind Trinseo Plexiglas V-52i Med Red outer lenses or on Covestro 503 behind Trinseo V-52i 2.3 and 3.2mm outer lenses.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Mitsubishi Chemical Corporation www.m-chemical.co.jp	DURABIO D7342R	Aliphatic Polycarbonate	06D011	Clear

Note: DURABIO D7342R 06D011 may not be used as a reflex reflector or in front of a reflex reflector

Mitsubishi Chemical Corporation www.m-chemical.co.jp	ACRYPET TN 100	Polymethyl Methacrylate	001 002	Clear Clear

Mitsubishi Chemical Corporation www.m-chemical.co.jp	ACRYPET UT 100 ACRYPET UT 200 SHINKOLITE UT 100 SHINKOLITE UT 200	Polymethyl Methacrylate	001 011 101 111 121 203 254 264 601	Clear Clear Red Red Red Yellow Yellow Yellow Grey

Note:
Colors 121, 264 are only listed in 2.3mm, 3.2mm, 6.4mm for SAE devices.

Mitsubishi Chemical Corporation www.m-chemical.co.jp	ACRYPET IR ACRYPET NAV SHINKOLITE P IR SHINKOLITE P NAV	Polymethyl Methacrylate	001 011 101 112 113 116 117 121 5101 203 254 255 256 257 258 259 264 265 5203 531 541 53160 53170 53180 53190 54115 54135 54160 54165 54170	Clear Clear Red Red Red Red Red Red Red Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray

Note:
Color 112, 121, 259, 264 are only listed in 2.3mm, 3.2mm, 6.4mm for SAE devices.
Color 117 is only listed in 3.2mm, 6.4mm for SAE devices.
Color 257, 265 are only listed in 1.6mm, 2.3mm, 3.2mm for SAE devices.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Mitsubishi Chemical Corporation www.m-chemical.co.jp	ACRYPET MD SHINKOLITE P MD	Polymethyl Methacrylate	001 101 114 203	Clear Red Red Yellow
Mitsubishi Chemical Corporation www.m-chemical.co.jp	ACRYPET V SHINKOLITE P V	Polymethyl Methacrylate	001 011 101 114 131 146 147 148 149 160 203 236 283 284 285 286 287 288 291 292	Clear Clear Red Red Red Red Red Red Red Red Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow
Mitsubishi Chemical Corporation www.m-chemical.co.jp	ACRYPET VE ACRYPET VES ACRYPET VH ACRYPET VH3F ACRYPET VH4 ACRYPET VH4F ACRYPET VHM ACRYPET VHS ACRYPET VG ACRYPET ZVH SHINKOLITE P VE SHINKOLITE P VES SHINKOLITE P VH SHINKOLITE P VHS	Polymethyl Methacrylate	PDA0010 PDA0020 PDA0030 PDA0040 PDA0050 PDA0013 PDA0023 PDA0033 PDA0043 PDA0053 001 361 PYR5406 007 PR5556 53260 54225 55475 55480 55485 55580 55670 57163 55780 58154 101	Clear Clear Clear Clear Clear Clear Clear Clear Clear Clear Clear Clear Clear White White White White White White White White White White Red

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Mitsubishi Chemical Corporation www.m-chemical.co.jp	ACRYPET VE ACRYPET VES ACRYPETVH ACRYPET VH3F ACRYPET VH4 ACRYPET VH4F ACRYPET VHM ACRYPET VHS ACRYPET VG ACRYPET ZVH SHINKOLITE P VE SHINKOLITE P VES SHINKOLITE P VH SHINKOLITE P VHS	Polymethyl Methacrylate	111 112 113 116 117 120 121 128 129 141 143 151 5101 5101B 5111 5112 5113 5114 5115 5116 5117 5118 5121 5131 5141 5142 5143 5151 PR5276 PR5296 5386 5456	Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red
			203 209 252 253 254 255 256 257 258 259 262 263 264 265 266 267 270 290 2001 5203 5213 5223	Yellow Yellow

Note:
Color 112, 120, 121, 259, 264 are only listed in 2.3mm, 3.2mm, 6.4mm for SAE devices.
Color 117 is only listed in 3.2mm, 6.4mm for SAE devices.
Color 128, 129, 262, 263 are only listed in 6.4mm for SAE devices.
Color 252 is only listed in 1.6mm, 2.3mm for SAE devices.
Color 253, 257, 265, 267 are only listed in 1.6mm, 2.3mm, 3.2mm for SAE devices.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Mitsubishi Chemical Corporation	ACRYPET VE	Polymethyl Methacrylate	5233	Yellow
www.m-chemical.co.jp	ACRYPET VES		5253	Yellow
	ACRYPET VH		5256	Yellow
	ACRYPET VH3F		5283	Yellow
	ACRYPET VH4		5293	Yellow
	ACRYPET VH4F		5303	Yellow
	ACRYPET VHM		5313	Yellow
	ACRYPET VHS		5333	Yellow
	ACRYPET VG		5343	Yellow
	ACRYPET ZVH		5353	Yellow
	SHINKOLITE P VE		5363	Yellow
	SHINKOLITE P VES		5373	Yellow
	SHINKOLITE P VH		5383	Yellow
	SHINKOLITE P VHS		5393	Yellow
	SHINKOLITE P VHS		5403	Yellow
			5413	Yellow
			5423	Yellow
			531	Gray
			533	Gray
			541	Gray
			53105	Gray
			53110	Gray
			53120	Gray
			53130	Gray
			53137	Gray
			53140	Gray
			53150	Gray
			53155	Gray
			53160	Gray
			53165	Gray
			53168	Gray
			53170	Gray
			53175	Gray
			53178	Gray
			53180	Gray
			53183	Gray
			53185	Gray
			53187	Gray
			53190	Gray
			54107	Gray
			54110	Gray
			54112	Gray
			54115	Gray
			54118	Gray
			54120	Gray
			54130	Gray
			54132	Gray
			54133	Gray
			54135	Gray
			54140	Gray
			54145	Gray
			54155	Gray
			54160	Gray
			54165	Gray
			54170	Gray

(Coating information contained on the next page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Coated Mitsubishi Chemical Corporation plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking PH-250: See Mitsubishi Chemical Corporation

FUJIHARD HH3012U-5, FUJIHARD HH3012U-6, FUJIHARD HH3012U-7, FUJIHARD HH3012U-8, FUJIHARD HH3012U-9, and FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3,: See Fujikura Kasei Co Ltd.

Coating Manufacturer in Alphabetical Order

Information on FUJIHARD HH3012U-5, FUJIHARD HH3012U-6, FUJIHARD HH3012U-7, FUJIHARD HH3012U-8, FUJIHARD HH3012U-9, FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, and FUJIHARD HH3035U-3, coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJIHARD HH3012U-5, FUJIHARD HH3012U-6, FUJIHARD HH3012U-7, FUJIHARD HH3012U-8, FUJIHARD HH3012U-9, and FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3, for use only on Acrypet VH grades.

Information on Mitsubishi Chemical Corporation PH-250, hardcoat may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Mitsubishi Chemical Corporation www.m-chemical.co.jp	CLEARLAC M100 CLEARLAC M101 CLEARLAC M102	METHYL Methacrylate/ STYRENE COPOLYMER	001 101 5101 203 5203 531 541	Clear Red Red Yellow Yellow Gray Gray

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Mitsubishi Chemical Corporation www.m-chemical.co.jp	ACRYPET XVH045	Polymethyl Methacrylate	001 101 111 112 113 116 117 120 121 128 129 143	Clear Red Red Red Red Red Red Red Red Red Red Red

Note: Color 112, 120, 121 are only listed in 2.3mm, 3.2mm, 6.4mm for SAE devices.
Color 117 is only listed in 3.2mm, 6.4mm for SAE devices.
Color 128, 129 are only listed in 6.4mm for SAE devices.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Mitsubishi Chemical Polymer Nantong Co., Ltd. www.mrpn.com.cn	ACRYPET VE	Polymethyl Methacrylate	001	Clear
	ACRYPET VES		361	Clear
	ACRYPET VH		PYR5406	Clear
	ACRYPET VH4		007	White
	ACRYPET VHM		PR5556	White
	ACRYPET VHS		53260	White
	ACRYPET VG		54225	White
	ACRYPET ZVH		55475	White
	SHINKOLITE P VE		55480	White
	SHINKOLITE P VES		55485	White
	SHINKOLITE P VH		55580	White
	SHINKOLITE P VHS		55670	White
			57163	White
			55780	White
			58154	White
			PTS0074	White
			101	Red
			111	Red
			112	Red
			113	Red
			116	Red
			117	Red
			120	Red
			121	Red
			128	Red
			129	Red
			141	Red
			143	Red
			151	Red
			5101	Red
			5101B	Red
			5111	Red
			5112	Red
			5113	Red
			5114	Red
			5115	Red
			5116	Red
			5117	Red
			5118	Red
			5121	Red
			5131	Red
			5141	Red
			5142	Red
			5143	Red
			5151	Red
			PR5276	Red
			PR5296	Red
			5386	Red
			5456	Red
			203	Yellow
			209	Yellow
			252	Yellow
			253	Yellow
			254	Yellow

Note:
Color 112, 120, 121 are only listed in 2.3mm, 3.2mm, 6.4mm for SAE devices.
Color 117 is only listed in 3.2mm, 6.4mm for SAE devices.
Color 128, 129 are only listed in 6.4mm for SAE devices.
Color 252 is only listed in 1.6mm, 2.3mm for SAE devices.
Color 253 is only listed in 1.6mm, 2.3mm, 3.2mm for SAE devices.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Mitsubishi Chemical Polymer Nantong Co., Ltd. www.mrpn.com.cn	ACRYPET VE	Polymethyl Methacrylate	255	Yellow
	ACRYPET VES		256	Yellow
	ACRYPET VH		257	Yellow
	ACRYPET VH4		258	Yellow
	ACRYPET VHM		259	Yellow
	ACRYPET VHS		262	Yellow
	ACRYPET VG		263	Yellow
	ACRYPET ZVH		264	Yellow
	SHINKOLITE P VE		265	Yellow
	SHINKOLITE P VES		266	Yellow
	SHINKOLITE P VH		267	Yellow
	SHINKOLITE P VHS		270	Yellow
			290	Yellow
			2001	Yellow
			5203	Yellow
			5213	Yellow
			5223	Yellow
			5233	Yellow
			5253	Yellow
			5256	Yellow
			5283	Yellow
			5293	Yellow
			5303	Yellow
			5313	Yellow
			5333	Yellow
			5343	Yellow
			5353	Yellow
			5363	Yellow
			5373	Yellow
			5383	Yellow
			5393	Yellow
			5403	Yellow
			5413	Yellow
			5423	Yellow
			531	Gray
			533	Gray
			541	Gray
			53105	Gray
			53110	Gray
			53120	Gray
			53130	Gray
			53137	Gray
			53140	Gray
			53150	Gray
			53155	Gray
			53160	Gray
			53165	Gray
			53168	Gray
			53170	Gray
			53175	Gray
			53178	Gray
			53180	Gray
			53183	Gray
			53185	Gray
			53187	Gray

Note:
Color 257, 265, 267 are only listed in 1.6mm, 2.3mm, 3.2mm for SAE devices.
Color 259, 264 are only listed in 2.3mm, 3.2mm, 6.4mm for SAE devices.
Color 262, 263 are only listed in 6.4mm for SAE devices.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Mitsubishi Chemical Polymer Nantong Co., Ltd. www.mrpn.com.cn	ACRYPET VE ACRYPET VES ACRYPET VH ACRYPET VH4 ACRYPET VHM ACRYPET VHS ACRYPET VG ACRYPET ZVH SHINKOLITE P VE SHINKOLITE P VES SHINKOLITE P VH SHINKOLITE P VHS	Polymethyl Methacrylate	53190 54107 54110 54112 54115 54118 54120 54130 54132 54133 54135 54140 54145 54155 54160 54165 54170	Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray

Coated Mitsubishi Chemical Polymer Nantong Co., Ltd. plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking PH-250: See Mitsubishi Chemical Corporation

FUJIHARD HH3012U-5, FUJIHARD HH3012U-6, FUJIHARD HH3012U-7, FUJIHARD HH3012U-8, FUJIHARD HH3012U-9, and FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3,: See Fujikura Kasei Co Ltd.

SH-61: See Stanley Electric Co., Ltd.

Coating Manufacturer in Alphabetical Order

FUJIKURA KASEI

Information on FUJIHARD HH3012U-5, FUJIHARD HH3012U-6, FUJIHARD HH3012U-7, FUJIHARD HH3012U-8, FUJIHARD HH3012U-9, and FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3, coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJIHARD HH3012U-5, FUJIHARD HH3012U-6, FUJIHARD HH3012U-7, FUJIHARD HH3012U-8, FUJIHARD HH3012U-9, and FUJIHARD HH3035U, FUJIHARD HH3035U-1, FUJIHARD HH3035U-2, FUJIHARD HH3035U-3, for use only on Acrypet VH grades.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR



Information on Mitsubishi Chemical Corporation Aryking PH-250, hardcoat may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Information on SH-61 hard coat may be obtained by writing to the following address:



Stanley Electric Co., Ltd.
2-9-13, Nakameguro, Meguro-Ku
Meguro-Ku, Tokyo 153,
Japan
www.stanley.co.jp

Note: Stanley SH-61 was only tested on Acrypet VH 001

Mitsubishi Chemical Polymer Nantong Co., Ltd. www.mrpn.com.cn	ACRYPET VHR	Polymethyl Methacrylate	001	Clear

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Mitsubishi Engineering Plastics Corporation www.m-ep.co.jp	IUPILON ML-100	Polycarbonate	001	Clear #
	IUPILON ML-200		0001	Clear #
	IUPILON ML-300		R591A	Clear #
	IUPILON ML-300AH		R530B	Clear #!
	IUPILON ML-350		R591B	Clear #
	IUPILON ML-400		R591C	Clear #
	IUPILON ML-100R		R591S	Clear #
	IUPILON ML-200R		101	Red #
	IUPILON ML-300R		H101T	Red #
	IUPILON ML-350R		102	Red #
	IUPILON ML-400R		103	Red #
	IUPILON HL-3003		104	Red #
	IUPILON HL-3503		R138J	Red #
			1001	Red #
			1002	Red #
			301	Yellow #
			3001	Yellow #

Note:	ML-300/R1GYH, ML-300/R1BWH, ML-400/R148A, ML-300/R265E, ML-400R/R206F, HL-3003/N414, HL-3003/N418, HL-3003/N424, HL-3003/N428 HL-3503/N414, HL-3503/N418 HL-3503/N424, HL-3503/N428 and HL-3503/N428R are for protected applications only	ML-300/R1GYH	Red!
		ML-300/R1BWH	Red!
		ML-400/R148A	Red!
		ML-300/R265E	Yellow!
		ML-400R/R206F	Yellow!
		HL-3003/N414	Clear!
		HL-3003/N418	Clear!
Note:	All Mitsubishi Engineering protected application materials were tested behind clear coated ML-300 or ML-350	HL-3003/N424	Clear!
		HL-3003/N428	Clear!
		HL-3503/N414	Clear!
		HL-3503/N418	Clear!
		HL-3503/N424	Clear!
		HL-3503/N428	Clear!
		HL-3503/N428R	Clear!

Coated Mitsubishi Engineering Plastics Corp. Iupilon plastics may only be treated with the following coatings listed below.

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101-S, Acryking PH-220, Acryking PH-328, Acryking PH-503, Acryking PH-511, Acryking PH-700, Acryking PH-710 Acryking PH-720, Acryking PH-750, Acryking PH-800, Acryking PH-800N5A, and Acryking PH-930: See Mitsubishi Chemical Corporation

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2561U-3: See Fujikura Kasei

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei

FUJIHARD HH3372U: See Fujikura Kasei

FUJIHARD HH3401U: See Fujikura Kasei

FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 : See Fujikura Kasei

IUPILON Coat UV: See Mitsubishi Engineering Plastics Corp.

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

MODIHARD 200S: See NOF Corpration

PHC587C, PHC587C2: See Momentive Performance Materials Inc.

PHOLUCID No.180C and 185C: See Chugoku Marine Paints Ltd..

SH-41, SH-50, SH-51 and SH-61: See Stanley Electric

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60: See Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2: See Momentive Performance Materials Inc.

UVHC8100: See Momentive Performance Materials Inc.

UVT200V1, UVT200V2, UVT200V3 and UVT200V5, : See Red Spot.

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

Coating Manufacturer in Alphabetical Order

Information on PHOLUCID No.180C and 185C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No.180C was tested on Clear Iupilon ML-300AH R591C, ML-300 R591B and ML-300 only.
Note: PHOLUCID No.185C was tested on Iupilon ML-300AH R591C Clear only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

FUJIKURA KASEI

Information on FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJIHARD HH2540U series, FUJIHARD HH2551U series, FUJIHARD HH2561U series and FUJIHARD HH2570U series were tested on ML-300 clear only

Note: FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U-VC2 were tested on ML-300 and ML-350 clear only.

KCC

Information on KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000 and KUV-6000 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong, Giheung-Gu,
Yongin-Si, Gyunggi-Do
South Korea
www.kccworld.co.kr

Information on IUPILON COAT UV may be obtained by writing to the following address:

Mitsubishi Engineering Plastics Corp.
Plastics Sales Department
5-2, Marunouchi 2-Chome
Chiyoda-Ku, Tokyo
Japan
www.m-ep.co.jp

MITSUBISHI CHEMICAL GROUP

Information on Acryking F-328, Acryking K-101-S, Acryking PH-220, Acryking PH-328, Acryking PH-503, Acryking PH-511, Acryking PH-700, Acryking PH-710 Acryking PH-720, Acryking PH-750, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings may be obtained by writing to the following company:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking PH-503, PH-511, PH-700, PH-710, Acryking PH-720, PH-750, Acryking PH-800 and Acryking PH-800N5A were tested on ML-300 clear only

Note: Acryking PH-930 was tested on clear ML-300 and ML-350 only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

MOMENTIVE™ inventing possibilities

Information on PHC587C, PHC587C2, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2 and UVHC8100 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC3000K, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60 only tested on Iupilon ML-300 / ML-350
Note: UVHC3000 only tested on Iupilon ML-350
Note: UVHC8100 was tested on Clear ML-300 and ML-350

NPAC NIPPON PAINT AUTOMOTIVE COATINGS

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: NIPPE UVI Coat UT-1678 was tested on Iupilon ML-300 and ML-350 clear.

NOF

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome,
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on ML-300 Clear in thicknesses 2.3-6.4 mm only

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on Stanley Electric SH-41, SH-50, SH-51 and SH-61 may be obtained by writing to the following company:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: SH-41 may be used be used in front of a reflex reflector. Material would have code Q
Note: Stanley SH-51 and SH-61 only tested on clear IUPILON ML-300

Information on UVT200V1, UVT200V2, UVT200V3 and UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 is only acceptable on clear ML-300 and ML-350

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Mitsubishi Engineering-Plastics Corporation www.m-ep.co.jp	IUPILON ML-100 IUPILON ML-200 IUPILON ML-300 IUPILON ML-400 IUPILON ML-500 IUPILON ML-100R IUPILON ML-200R IUPILON ML-300R IUPILON ML-400R IUPILON ML-500R (coated or uncoated)	Polycarbonate	001 H5102 R5RSE R5QTE R5RZE R5GSF R5KYH R329K R166J H2059 A6067 R525A R456J R526A T689R A6067 105 302 501 R5YNH	Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $! Clear $ Clear $ Red $! Yellow $! Gray Smoke $! Gray Smoke $!

Coated Mitsubishi Engineering-Plastics Corp. plastics may only be treated with the following acceptable coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101-S, Acryking PH-220, Acryking PH-328, Acryking PH-700, Acryking PH-710 Acryking PH-720, Acryking PH-750, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930: See Mitsubishi Chemical Corporation

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei.

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2561U-3: See Fujikura Kasei

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei

FUJIHARD HH3372U: See Fujikura Kasei

FUJIHARD HH3401U: See Fujikura Kasei

FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3: See Fujikura Kasei

IUPILON COAT UV: See Mitsubishi Engineering Plastics Corp.

MODIHARD 200S: See NOF Corporation

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

SH-41, SH-50, SH-51 and SH-61: See Stanley Electric

PHOLUCID No.180C: See Chugoku Marine Paints Ltd.

UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2: See Momentive Performance Materials

UVHC8100: See Momentive Performance Materials

UVT200V1, UVT200V2, UVT200V3 and UVT200V5: See Red Spot.

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

Coating Manufacturer in Alphabetical Order

CMP CHUGOKU Information on PHOLUCID No.180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No.180C was tested on clear Iupilon ML-300 R591B and ML-300 only.

FUJIKURA KASEI

Information on: FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJIHARD HH2540U series, HH2551U series, HH2561U series and HH2570U series were tested on ML-300 clear only
Note: FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, , FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 were tested on ML-300 and ML-350 clear only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Materials Inc. Building V7
51368 Leverkusen
Germany

Momentive Performance
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC5000 tested on ML-300 clear only.

Information on IUPILON COAT UV may be obtained by writing to the following address:

Mitsubishi Engineering Plastics Corp.
Plastics Sales Department
5-2, Marunouchi 2-Chome
Chiyoda-Ku, Tokyo,
Japan
www.m-ep.co.jp

Information on Mitsubishi Chemical Corporation Acryking F-328, Acryking K-101-S, Acryking PH-220, Acryking PH-328, Acryking PH-700, Acryking PH-710 Acryking PH-720, Acryking PH-750, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking PH-700, PH-710, Acryking PH-720, PH-750 Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 were tested on clear ML-300 only

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: NIPPE UVI Coat UT-1678 was tested on Iupilon ML-300 and ML-350 clear.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome,
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on ML-300 Clear in thicknesses 2.3-6.4 mm only

Information on UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8 UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 is only acceptable on clear ML-300 and ML-350

Information on Stanley Electric SH-41, SH-50, SH-51 and SH-61 may be obtained by writing to the following company:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: SH-41 may be used be used in front of a reflex reflector. Material would have code Q
Note: Stanley SH-51 and SH-61 only tested on clear IUPILON ML-300

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Mitsubishi Engineering-Plastics Corporation www.m-ep.co.jp	NOVAREX 7022L1 NOVAREX 7022L2 NOVAREX 7022L3 (coated or uncoated)	Polycarbonate	 R111 R112 R212 R213 R311 R312 R313 A114 A115 A212 A213 A306 A307 A308 A411 A412	Clear $ Red $ Red $ Red $ Red $ Red $ Red $ Red $ Yellow $ Yellow $ Yellow $ Yellow $ Yellow $ Yellow $ Yellow $ Yellow $ Yellow $

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Mitsubishi Gas Chemical Engineering-Plastics (Shanghai) Co. Ltd.	IUPILON ML-100	Polycarbonate	001	Clear #
	IUPILON ML-200		0001	Clear #
	IUPILON ML-300		R591A	Clear #
	IUPILON ML-300AH		R530B	Clear #!
	IUPILON ML-350		R591B	Clear #
	IUPILON ML-400		R591C	Clear #
	IUPILON ML-100R		R591S	Clear #
www.m-ep.co.jp	IUPILON ML-200R		101	Red #
	IUPILON ML-300R		102	Red #
	IUPILON ML-350R		103	Red #
	IUPILON ML-400R		104	Red #
	IUPILON HL-3003		R138J	Red #
	IUPILON HL-3503		1001	Red #
			1002	Red #
			301	Yellow #
			3001	Yellow #
Note: ML-300/R1GYH, ML-300/R1BWH, ML-400/R148A, ML-300/R265E, ML-400R/R206F, HL-3003/N414, HL-3003/N418, HL-3003/N424, HL-3003/N428 HL-3503/N414, HL-3503/N418 HL-3503/N424, and HL-3503/N428 are for protected applications only			ML-300/R1GYH	Red!
			ML-300/R1BWH	Red!
			ML-400/R148A	Red!
			ML-300/R265E	Yellow!
			ML-400R/R206F	Yellow!
			HL-3003/N414	Clear!
			HL-3003/N418	Clear!
Note: All Mitsubishi Engineering protected application materials were tested behind clear coated ML-300 or ML-350			HL-3003/N424	Clear!
			HL-3003/N428	Clear!
			HL-3503/N414	Clear!
			HL-3503/N418	Clear!
			HL-3503/N424	Clear!
			HL-3503/N428	Clear!

Coated Mitsubishi Gas Chemical Engineering Plastics (Shanghai) Co. Ltd. Iupilon plastics may only be treated with the following coatings listed below.

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101-S, Acryking PH-220, Acryking PH-328, Acryking PH-503, Acryking PH-700, Acryking PH-710 Acryking PH-720, Acryking PH-750, Acryking PH-800, Acryking PH-800N5A, and Acryking PH-930: See Mitsubishi Chemical Corporation

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2561U-3: See Fujikura Kasei

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei

(Coating Information Continued on the Next Page)

FUJIHARD HH3372U: See Fujikura Kasei

FUJIHARD HH3401U: See Fujikura Kasei

FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3: See Fujikura Kasei

IUPILON Coat UV: See Mitsubishi Engineering Plastics Corp.

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

PHC587C, PHC587C2: See Momentive Performance Materials Inc.

PHOLUCID No.180C, 185C: See Chugoku Marine Paints Ltd..

SH-41, SH-50, and SH-51: See Stanley Electric

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60: See Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2: See Momentive Performance Materials Inc.

UVHC8100: See Momentive Performance Materials Inc.

UVT200V1, UVT200V2, UVT200V3 and UVT200V5, : See Red Spot.

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

Coating Manufacturer in Alphabetical Order

CMP CHUGOKU

Information on PHOLUCID No.180C and 185C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No.180C was tested on Clear Iupilon ML-300AH R591C, ML-300 R591B and ML-300 only.
Note: PHOLUCID No.185C was tested on Iupilon ML-300AH R591C Clear only

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U, FUJIHARD HH3401U and FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJIHARD HH2540U series, HH2551U series, HH2561U series and HH2570U series were tested on ML-300 clear only.
Note: FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3were tested on ML-300 and ML-350 clear only.

Information on KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000 and KUV-6000 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong,
Giheung-Gu, Yongin-Si Gyunggi-Do,
South Korea
www.kccworld.co.kr

Information on IUPILON COAT UV may be obtained by writing to the following address:

Mitsubishi Engineering Plastics Corp.
Plastics Sales Department
5-2, Marunouchi 2-Chome
Chiyoda-Ku, Tokyo
Japan
www.m-ep.co.jp

Information on Acryking F-328, Acryking K-101-S, Acryking PH-220, Acryking PH-328, Acryking PH-503, Acryking PH-700, Acryking PH-710 Acryking PH-720, Acryking PH-750, Acryking PH-800, Acryking PH-800N5A, and Acryking PH-930 coatings may be obtained by writing to the following company:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking PH-503, PH-700, PH-710, Acryking PH-720, PH-750, Acryking PH-800 and Acryking PH-800N5A were tested on ML-300 clear only
Note: Acryking PH-930 was tested on clear ML-300 and MI-350

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

MOMENTIVE™
inventing possibilities

Information on PHC587C, PHC587C2, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2 and UVHC8100 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Materials Inc. Building V7
51368 Leverkusen
Germany

Momentive Performance
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC3000K, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60 only tested on Iupilon ML-300 / ML-350
Note: UVHC3000 only tested on Iupilon ML-350
Note: UVHC8100 was tested on clear Iupilon ML-300 and Iupilon ML-350

NPAC
NIPPON PAINT AUTOMOTIVE COATINGS

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: NIPPE UVI Coat UT-1678 was tested on Iupilon ML-300 and ML-350 clear.

NOF

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome,
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on ML-300 Clear in thicknesses 2.3-6.4 mm only

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8 UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8 UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 is only acceptable on clear ML-300 and ML-350

Information on Stanley Electric SH-41, SH-50 and SH-51 may be obtained by writing to the following company:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: SH-41 may be used be used in front of a reflex reflector. Material would have code Q
Note: Stanley SH-51 only tested on clear IUPILON ML-300

Mitsubishi Gas Chemical Engineering-Plastics (Shanghai) Co. Ltd. www.m-ep.co.jp	IUPILON ML-100 IUPILON ML-200 IUPILON ML-300 IUPILON ML-400 IUPILON ML-500 IUPILON ML-100R IUPILON ML-200R IUPILON ML-300R IUPILON ML-400R IUPILON ML-500R (coated or uncoated)	Polycarbonate	001 H5102 R5RSE R5QTE R5RZE R5GSF R5KYH R329K R166J H2059 A6067 R525A R456J R526A T689R A6067 105 302 501 R5YNH	Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Clear $ Red $ Yellow $ Gray Smoke $ Gray Smoke $

Coated Mitsubishi Gas Chemical Engineering Plastics (Shanghai) Co. Ltd. plastics may only be treated with the following coatings applied to the molded lens:

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101-S, Acryking PH-220, Acryking PH-328, Acryking PH-700, Acryking PH-710 Acryking PH-720, Acryking PH-750, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930: See Mitsubishi Chemical Corporation

FUJIHARD HH2540U, HH2540U-1, HH2540U-2: See Fujikura Kasei.

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2561U-3: See Fujikura Kasei

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei

FUJIHARD HH3372U: See Fujikura Kasei

FUJIHARD HH3401U: See Fujikura Kasei

FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3: See Fujikura Kasei

IUPILON COAT UV: See Mitsubishi Engineering Plastics Corp.

MODIHARD 200S: See NOF Corporation.

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

PHOLUCID No.180C: See Chugoku Marine Paints Ltd..

UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2: See Momentive Performance Materials

UVHC8100: See Momentive Performance Materials

UVT200V1, UVT200V2, UVT200V3 and UVT200V5: See Red Spot.

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

(Coating Information Continued on the Next Page)

Coating Manufacturer in Alphabetical Order

Information on PHOLUCID No.180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No.180C was tested on clear Iupilon ML-300 R591B and ML-300 only.

Information on: FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U, FUJIHARD HH3401U FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJIHARD HH2540U series, FUJIHARD HH2551U series, FUJIHARD HH2561U series and FUJIHARD HH2570U series were tested on ML-300 clear only
Note: FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 were tested on ML-300 and ML-350 clear only.

Information on UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC5000 tested on ML-300 clear only
Note: UVHC8100 was tested on clear Iupilon ML-300 and Iupilon ML-350

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on IUPILON COAT UV may be obtained by writing to the following address:

Mitsubishi Engineering Plastics Corp.
Plastics Sales Department
5-2, Marunouchi 2-Chome
Chiyoda-Ku, Tokyo
Japan
www.m-ep.co.jp

Information on Mitsubishi Chemical Corporation Acryking F-328, Acryking K-101-S, Acryking PH-220, Acryking PH-328, Acryking PH-700, Acryking PH-710 Acryking PH-720, Acryking PH-750, Acryking PH-800, Acryking PH-800N5A, and Acryking PH-930 may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking PH-700, PH-710, Acryking PH-720, PH-750 Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 were tested on clear ML-300 only

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: NIPPE UVI Coat UT-1678 was tested on Iupilon ML-300 and ML-350 clear.

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on ML-300 Clear in thicknesses 2.3-6.4 mm only

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

RED SPOT
PAINT & VARNISH COMPANY, INC.

Information on UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8 UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8 UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 is only acceptable on clear ML-300 and ML-350

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
	ACRYVIEWA	Polymethyl Methacrylate	RM-104-U1	Clear

Nippon Shokubai Co., Ltd.

www.shokubai.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Novacel Co., Ltd. https://novacel.co.jp/	Cevian N 080W	Styrene/ Acrylonitrile	01042 1Z026 1Z027 2Z010 2Z011 2Z012 2Z013 20385 20388	Red Red Red Yellow Yellow Yellow Yellow Yellow Yellow

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Plaskolite, Inc. www.plaskolite.com	CA-61 CA-71 CA-75 CA-82 CA-924 CA-927 CA-1000E CA-1000I CP-61 CP-71 CP-75 CP-82 CP-86 CP-86 UVA CP-924 CP-927 CP-1000E CP-1000I	Polymethyl Methacrylate	 RD 01 RD 03 RD 05 RD 10 RD 80 RD 110 RD 114 RD 117 RD 125 RD 126 RD 128 RD 145 RD 169 RD 171 RD 176 RD 180 RD 181 RD 187 RD 188 RD 189 RD 190 RD 191 RD 192 RD 195 YL 07 YL 12 YL 48 YL 64 YL 87 YL 90 YL 91 YL 99 YL 102 YL 130 YL 131 YL 133 YL 198 BL 35 BL 92 BL 142 GY 58102 GY 58200 GY 58240	Clear Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Blue Blue Blue Gray Gray Gray

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Plaskolite, Inc. www.plaskolite.com	PL-30 MS983	Polymethyl Methacrylate		Clear
			NC 10	Clear
			RD 01	Red
			RD 03	Red
			RD 05	Red
			RD 10	Red
			RD 80	Red
			RD 110	Red
			RD 114	Red
			RD 117	Red
			RD 125	Red
			RD 126	Red
			RD 128	Red
			RD 145	Red
			RD 169	Red
			RD 171	Red
			RD 176	Red
			RD 180	Red
			RD 181	Red
			RD 187	Red
			RD 188	Red
			RD 189	Red
			RD 190	Red
			RD 191	Red
			RD 192	Red
			RD 195	Red
			YL 07	Yellow
			YL 12	Yellow
			YL 48	Yellow
			YL 64	Yellow
			YL 87	Yellow
			YL 90	Yellow
			YL 91	Yellow
			YL 99	Yellow
			YL 102	Yellow
			YL 130	Yellow
			YL 131	Yellow
			YL 133	Yellow
			YL 198	Yellow
			BL 35	Blue
			BL 95	Blue
			BL 142	Blue
			GY 58102	Gray
			GY 58200	Gray
			GY 58240	Gray

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
RÖHM TRADITIONALLY INNOVATIVE Roehm America LLC Röhm GmbH Roehm Chemical (Shanghai) Co., Ltd www.roehm.com http://www.acrylite-polymers.com/ www.Plexiglas.de (Was Evonik)	PMMA ACRYLITE®/ PLEXIGLAS® unmodified base resins	7N 7M 7H H15 8N 8H		**Clear** -- 000 001 9V913 **Neutral** 543A
	PMMA ACRYLITE®/ PLEXIGLAS® Optical	HT		**Yellow** 13025
	PMMA ACRYLITE®/ PLEXIGLAS® proTerra	8N		23085 1V400 2V404
	PMMA ACRYLITE®/ PLEXIGLAS® Resist (impact modified) grades	AG100 AG100 L02 8N plus zk4BR zk5BR zk6BR zk6 zk20 zk30 zk40 zkM zk3BR zk4HC zk5HT zk6HT		**Amber** 23340 23095 23335 13115 23105 2V401 115 **Red** 3V137 3V136 3V126 3V125
	PMMA ACRYLITE®/ PLEXIGLAS® Heatresist	hw55 FT15		33661 33681 33780(901) 33721
	PMMI ACRYMID® PLEXIMID®	TT50		33711 33701 33691
	PMMA for edge lighting ACRYLITE®/ PLEXIGLAS® Edgelight	8N LD12 8N LD24 8N LD48 8N LD96 Note: 8N LD12 cannot be used on or in front of a reflex reflector		3V401 3V402 3V403 3V408 **Green** 65122 65542 **Gray** 75451 77670 7V205 7V244 7V265 7V268 7V269 7V270 7V271 7V272 7V273 7V274 7V275 7V336 7V337 7V406 7V407 7V338

MFR.	POLYMER BASE	PRODUCT NAME	COLOUR-CODE

Coated Roehm plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

PHC XH100P: See Momentive Materials

Coating Manufacturer in Alphabetical Order

Information on PHC XH100P hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: PHC XH100P tested on Acrylite Resist AG100 clear only

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Sabic USA www.sabic.com	LEXAN® LS1	Polycarbonate	111	White #!
	LEXAN® LS1A		111C	White #!
	LEXAN® LS2		111H	White #!
	LEXAN® LS2A		111J	White #!
	LEXAN® LS3		111M	White #!
	LEXAN® LSHF (HIGH FLOW)		111S	White #!
	(coated or uncoated)		112	White #!
			51073	Smoke Grey #!
			71127	Smoke Grey #!
			71194	Smoke Grey #!
			71274	Smoke Grey #!
			GY3A578T	Smoke Grey #!
			6111	Red #!
			6162	Red #!
			6164	Red #!
			61014	Red #!
			61079	Red #!
			61228	Red #!
			414	Yellow #!
			4135	Yellow #!
			4158	Yellow #!
			4168	Yellow #!
			4169	Yellow #!
			4173	Yellow #!
			4194	Yellow #!
			41105	Yellow #!
			41152	Yellow #!
			YW 5005T	Yellow #!
			21242	Clear Blue #!
			2148	Clear Blue #!
	LEXAN® XLS 1110T	Protected Application Only	11204	Natural "!"
	LEXAN® XLS 1110	Protected Application Only	11204	Natural "!"
	LEXAN® XLS 1210	Protected Application Only	NA9G165T	Clear Blue "!"
			NA9H009T	Clear Blue "!"

Note: LEXAN® Protected Applications were tested behind Coated LS2-111 Clear

Coated Sabic USA plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings: See Mitsubishi Chemical Corporation

FUJIHARD 2500: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei Co., Ltd.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3372U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3401U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3482U, , FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 : See Fujikura Kasei Co., Ltd.

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7: See Fujikura Kasei Co., Ltd.

FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, FUJISOFT 2604 coatings: See Fujikura Kasei Co., Ltd.

KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000, KUV-9100: See KCC Corporation

LHP100/LHC100, LHP100/AS4000: See Momentive Performance Materials Inc.

MODIHARD 200S: See NOF Corporation

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

PHOLUCID No. 130C and PHOLUCID No.180C: See Chugoku Marine Paints, Ltd.

PHC200, PHC587, PHC587B, PHC587C, PHC587C2: See Momentive Performance Materials Inc.

RayGloss 402: See BASF Coatings GmbH

SH-2, SH-41, SH-50, SH-51:, SH-61: See Stanley Electric Co., Ltd.

SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000: See Momentive Performance Materials Inc.

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2: See Momentive Performance Materials Inc.

UHVC5100: See Momentive Materials

UVT200V1, UVT200V2, UVT200V3 and UVT200V5: See Red Spot.

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

X-48-5500-A18: See Shin-Etsu Chemical Co., Ltd.

Coating Manufacturer in Alphabetical Order

Information on RayGloss 402 coatings may be obtained by writing:

BASF Coatings GmbH
ECO/DT - C422
D-48165 Muenster
Germany
www.basf-coatings.com

Information on PHOLUCID No. 130C and PHOLUCID No.180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No. 130C and PHOLUCID No.180C were tested on Sabic LS1 111 and Sabic LS1 111J and Sabic LS1 111J clear only.

Information on FUJIHARD 2500, FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2566U, UJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3, FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3, FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7 and FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, and FUJISOFT 2604 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJISOFT 2601 may NOT be used on lenses incorporating a reflex reflector or in front of a reflex reflector.
Note: FUJIHARD HH2566U-series and HH2567U-series were tested on clear lenses only.
Note: FUJIHARD HH2540U-series, FUJIHARD HH2570U-series, FUJIHARD HH2561U-series and FUJIHARD HH9986U-series were tested on clear LS2 plastics only
Note: FUJIHARD HH3372U, FUJIHARD HH3401U and FUJIHARD HH3482U were tested on LS1 111 and LS2 111 only.
Note: FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 was tested on clear LS1 and LS-1 only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000 and KUV-9100 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong, Giheung-Gu,
Yongin-Si, Gyunggi-Do
South Korea
www.kccworld.co.kr

Note: KUV-3000, KUV-4000, KUV-5000, KUV-6000, and KUV-9100 were tested on Sabic LS1-111 and LS2-111 clear only.
Note: KUV-1000, and KUV-2000 is suitable for over 6.4 mm LS2-111 clear lenses only.

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking PH-350 was tested on LS2 with clear lenses only
Note: Acryking PH-710 and Acryking PH-720 were tested on LS1 and LS2 with clear lenses only
Note: Acryking PH-511, Acryking PH-700, Acryking PH-800 and Acryking PH-800N5A were tested on LS1-111 and LS2-111
Note: LS1-111J was tested with Acryking PH-710, Acryking PH-720, and Acryking PH-800 only.
Note: Acryking PH-930 was tested on Clear LS1 111 and LS2 111 only

Information on LHP100/LHC100, LHP100/AS4000, SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000, PHC200, PHC587, PHC587B, PHC587C, PHC587C2, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2 and UVHC5100 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC5000 and UVHC5100 tested on LS1 and LS2 clear only

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on SABIC LS1 111 Clear in thicknesses 1.6 and 6.4 mm only

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: NIPPE UVI Coat UT-1678 was tested on Lexan LS1-111 and LS2-111.

Information on UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coating may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 were tested on clear LS1, and LS2

Information of X-48-5500-A18 hard coat may be obtained by writing to the following address:

Shin-Etsu Chemical Co., Ltd.
4-1, Marunouchi 1-Chome
Chiyoda-ku, Tokyo 100-0005,
Japan
www.shinetsu.co.jp

Note: X-48-5500-A18 was tested on SABIC LS1 clear only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on SH-2, SH-41, SH-50, SH-51 and SH-61 hard coats may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: Stanley SH-51 tested on Sabic LS2 clear only.
Note: Stanley SH-61 was tested on Sabic LS1-111S clear only

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
	LEXAN® LS1	Polycarbonate	111	White #!
	LEXAN® LS1A		111C	White #!
	LEXAN® LS2		111H	White #!
	LEXAN® LS2A		111J	White #!
	LEXAN® LS3		111M	White #!
	LEXAN® LSHF (HIGH FLOW)		111S	White #!
Sabic Brazil	(coated or uncoated)		112	White #!
			51073	Smoke Grey #!
www.sabic.com			71127	Smoke Grey #!
			71194	Smoke Grey #!
			71274	Smoke Grey #!
			GY3A578T	Smoke Grey #!
			6111	Red #!
			6162	Red #!
			6164	Red #!
			61014	Red #!
			61079	Red #!
			61228	Red #!
			414	Yellow #!
			4135	Yellow #!
			4158	Yellow #!
			4168	Yellow #!
			4169	Yellow #!
			4173	Yellow #!
			4194	Yellow #!
			41105	Yellow #!
			41152	Yellow #!
			YW 5005T	Yellow #!
			21242	Clear Blue #!
	LEXAN® XLS 1110T Protected Application Only		11204	Natural "!"
	LEXAN® XLS 1110 Protected Application Only		11204	Natural "!"
	LEXAN® XLS 1210 Protected Application Only		NA9G165T	Clear Blue "!"
			NA9H009T	Clear Blue "!"

Note: LEXAN® Protected Applications were tested behind Coated LS2-111 Clear

Coated Sabic Brazil plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings: See Mitsubishi Chemical Corporation

FUJIHARD 2500: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei Co., Ltd.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3372U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3401U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7: See Fujikura Kasei Co., Ltd.

FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, FUJISOFT 2604 coatings: See Fujikura Kasei Co., Ltd.

KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000, KUV-9100: See KCC Corporation

LHP100/LHC100, LHP100/AS4000: See Momentive Performance Materials Inc.

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

PHOLUCID No. 130C and PHOLUCID No.180C: See Chugoku Marine Paints, Ltd.

PHC200, PHC587, PHC587B, PHC587C, PHC587C2: See Momentive Performance Materials Inc.

RayGloss 402: See BASF Coatings GmbH

SH-2, SH-41, SH-50, SH-51 and SH-61 : See Stanley Electric Co., Ltd.

SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000: See Momentive Performance Materials Inc.

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60:, See Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, UVHC5000K1, and UVHC5000K2: See Momentive Performance Materials Inc.

UVHC5100: See Momentive Performance Materials Inc.

UVT200V1, UVT200V2, UVT200V3 and UVT200V5: See Red Spot.

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

X-48-5500-A18: See Shin-Etsu Chemical Co., Ltd.

Coating Manufacturer in Alphabetical Order

Information on RayGloss 402 coatings may be obtained by writing:

BASF Coatings GmbH
ECO/DT - C422
D-48165 Muenster
Germany
www.basf-coatings.com

Note: BASF RayGloss 402 was tested on LEXAN® LS1 and LEXAN® LS2 clear only.

Information on PHOLUCID No. 130C and PHOLUCID No.180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: 81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No. 130C and PHOLUCID No.180C were tested on Sabic LS1 111 and Sabic LS1 111J and Sabic LS1 111J clear only.

Information on FUJIHARD 2500, FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3, FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3, FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7 and FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, and FUJISOFT 2604 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJISOFT 2601 may NOT be used on lenses incorporating a reflex reflector or in front of a reflex reflector.
Note: FUJIHARD HH2566U-series and FUJIHARD HH2567U-series for use on clear lenses only
Note: FUJIHARD HH2540U-series, FUJIHARD HH2570U-series, FUJIHARD HH2561U-series and FUJIHARD HH9986U-series is for use on clear LS2 plastics only.
Note: FUJIHARD HH3372U, FUJIHARD HH3401U and FUJIHARD HH3482U were tested on LS1 111 and LS2 111 only.
Note: FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 was tested on clear LS1 and LS2 only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000 and KUV-9100 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong, Giheung-Gu,
Yongin-Si, Gyunggi-Do
South Korea
www.kccworld.co.kr

Note: KUV-3000, KUV-4000, KUV-5000, KUV-6000, and KUV-9100 were tested on Sabic LS1-111 and LS2-111 clear only.
Note: KUV-1000, and KUV-2000 is suitable for over 6.4 mm LS2-111 clear lenses only.

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-2 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking PH-350 was tested on LS2 with clear lenses only
Note: Acryking PH-710 and Acryking PH-720 was tested on LS1 and LS2 with clear lenses only
Note: Acryking PH-511, Acryking PH-700, Acryking PH-800 and Acryking PH-800N5A was tested on LS1-111 and LS2-111
Note: LS11-111J was tested with Acryking PH-710, Acryking PH-720, and Acryking PH-800 only.
Note: Acryking PH-930 was tested on Clear LS1 111 and LS2 111 only

Information on LHP100/LHC100, LHP100/AS4000, SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000, PHC200, PHC587, PHC587B, PHC587C, PHC587C2, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60 UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2 and UVHC5100 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC5000 and UVHC5100 were tested on LS1 and LS2 clear only

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: NIPPE UVI Coat UT-1678 was tested on Lexan LS1-111 and LS2-111.

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower
20-3, Ebisu 4-Chome
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on SABIC LS1 111 Clear in thicknesses 1.6 and 6.4 mm only

Information on UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coating may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 were tested on clear LS1, and LS2

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information of X-48-5500-A18 hard coat may be obtained by writing to the following address:

Shin-Etsu Chemical Co., Ltd.
4-1, Marunouchi 1-Chome
Chiyoda-ku, Tokyo 100-0005,
Japan
www.shinetsu.co.jp

Note: X-48-5500-A18 was tested on SABIC LS1 clear only.

Information on SH-2, SH-41, SH-50, SH-51 and SH-61 hard coats may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: Stanley SH-51 tested on Sabic LS2 clear only.
Note: Stanley SH-61 was tested on Sabic LS1-111S clear only

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
	LEXAN® LS1	Polycarbonate	111	White #!
	LEXAN® LS2		111H	White #!
	LEXAN® LS3		111HX	White #!
	LEXAN® LSHF (HIGH FLOW)		111J	White #!
	(coated or uncoated)		6162	Red #!
			GY3A578T	Smoke Grey#!
Sabic Chongqing China www.sabic.com				
	LEXAN® XLS 1110T Protected Application Only		11204	Natural "!"
	LEXAN® XLS 1110 Protected Application Only		11204	Natural "!"
	LEXAN® XLS 1210 Protected Application Only		NA9G165T	Clear Blue "!"
			NA9H009T	Clear Blue "!"

Note: LEXAN® Protected Applications were tested behind Coated LS2-111 Clear

Coated Sabic Chongqing China plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings: See Mitsubishi Chemical Corporation

FUJIHARD 2500: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3372U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3401U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7: See Fujikura Kasei Co., Ltd.

FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, FUJISOFT 2604 coatings: See Fujikura Kasei Co., Ltd.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000, KUV-9100: See KCC Corporation

LHP100/LHC100, LHP100/AS4000: See Momentive Performance Materials Inc.

MODIHARD 200S: See NOF Coatings

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

PHOLUCID No. 130C and PHOLUCID No.180C: See Chugoku Marine Paints, Ltd.

PHC200, PHC587, PHC587B, PHC587C, PHC587C2: See Momentive Performance Materials Inc.

RayGloss 402: See BASF Coatings GmbH

SH-2, SH-41, SH-50, SH-51 and SH-61: See Stanley Electric Co., Ltd.

SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000: See Momentive Performance Materials Inc.

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60: See Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, UVHC5000K1, and UVHC5000K2: See Momentive Performance Materials Inc.

UVHC5100: See Momentive Performance Materials Inc.

UVT200V1, UVT200V2, UVT200V3 and UVT200V5: See Red Spot.

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

X-48-5500-A18: See Shin-Etsu Chemical Co., Ltd.

Coating Manufacturer in Alphabetical Order

Information on RayGloss 402 coatings may be obtained by writing:

BASF Coatings GmbH
ECO/DT - C422
D-48165 Muenster
Germany
www.basf-coatings.com

Note: BASF RayGloss 402 was tested on LEXAN® LS1 and LEXAN® LS2 clear only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

CMP CHUGOKU

Information on PHOLUCID No. 130C and PHOLUCID No.180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013 Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No. 130C and PHOLUCID No.180C were tested on Sabic LS1 111 and Sabic LS1 111J and Sabic LS1 111J clear only.

FUJIKURA KASEI

Information on FUJIHARD 2500, FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3, FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3, FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7 and FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, and FUJISOFT 2604 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJISOFT 2601 may NOT be used on lenses incorporating a reflex reflector or in front of a reflex reflector.
Note: FUJIHARD HH2566U-series and FUJIHARD HH2567U-series for use on clear lenses only
Note: FUJIHARD HH2540U-series, FUJIHARD HH2570U-series, FUJIHARD HH2561U-series and FUJIHARD HH9986U-series is for use on clear LS2 plastics only
Note: FUJIHARD HH3372U, FUJIHARD HH3401U and FUJIHARD HH3482U were tested on LS1 111 and LS2 111 only.
Note: FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 was tested on clear LS1 and LS2 only.

KCC

Information on KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000 and KUV-9100 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong, Giheung-Gu,
Yongin-Si, Gyunggi-Do,
South Korea
www.kccworld.co.kr

Note: KUV-3000, KUV-4000, KUV-5000, KUV-6000, and KUV-9100 were tested on Sabic LS1-111 and LS2-111 clear only.
Note: KUV-1000, and KUV-2000 is suitable for over 6.4 mm LS2-111 clear lenses only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

MITSUBISHI CHEMICAL GROUP

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-3 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking PH-350 was tested on LS2 with clear lenses only
Note: Acryking PH-710 and Acryking PH-720 were tested on LS1 and LS2 with clear lenses only
Note: Acryking PH-511, Acryking PH-700, Acryking PH-800 and Acryking PH-800N5A were tested on LS1-111 and LS2-111
Note: LS1-111J was tested with Acryking PH-710, Acryking PH-720, and Acryking PH-800 only.
Note: Acryking PH-930 was tested on Clear LS1 111 and LS2 111 only

MOMENTIVE™ inventing possibilities

Information on LHP100/LHC100, LHP100/AS4000, SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000, PHC200, PHC587, PHC587B, PHC587C, PHC587C2, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2 and UVHC5100 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC5000 and UVHC5100 were tested on LS1 and LS2 clear only

NOF

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on SABIC LS1 111 Clear in thicknesses 1.6 and 6.4 mm only

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: NIPPE UVI Coat UT-1678 was tested on Lexan LS1-111 and LS2-111.

Information on UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coating may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 were tested on clear LS1, and LS2

Information of X-48-5500-A18 hard coat may be obtained by writing to the following address:

Shin-Etsu Chemical Co., Ltd.
4-1, Marunouchi 1-Chome
Chiyoda-ku, Tokyo 100-0005,
Japan
www.shinetsu.co.jp

Note: X-48-5500-A18 was tested on SABIC LS1 clear only.

Information on SH-2, SH-41, SH-50, SH-51 and SH-61 hard coats may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: Stanley SH-51 tested on Sabic LS2 clear only.
Note: Stanley SH-61 was tested on Sabic LS1-111S clear only

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
 Sabic Europe www.sabic.com	LEXAN® LS1	Polycarbonate	111	White #!
	LEXAN® LS1A		111C	White #!
	LEXAN® LS2		111H	White #!
	LEXAN® LS2A		111HX	White #!
	LEXAN® LS3		111J	White #!
	LEXAN® LSHF (HIGH FLOW) (coated or uncoated)		111M	White #!
			111S	White #!
			111X	White #!
			112	White #!
			51073	Smoke Grey #!
			71127	Smoke Grey #!
			71194	Smoke Grey #!
			71274	Smoke Grey #!
			GY3A578T	Smoke Grey #!
			6111	Red #!
			6162	Red #!
			6164	Red #!
			61014	Red #!
			61079	Red #!
			61228	Red #!
			414	Yellow #!
			4135	Yellow #!
			4158	Yellow #!
			4168	Yellow #!
			4169	Yellow #!
			4173	Yellow #!
			4194	Yellow #!
			41105	Yellow #!
			41152	Yellow #!
			YW 5005T	Yellow #!
			21242	Clear Blue #!
			2148	Clear Blue #!
	LEXAN® XLS 1110T Protected Application Only		11204	Natural "!"
	LEXAN® XLS 1110 Protected Application Only		11204	Natural "!"
	LEXAN® XLS 1210 Protected Application Only		NA9G165T	Clear Blue "!"
			NA9H009TClear blue	Clear Blue "!"

Note: LEXAN® Protected Applications were tested behind Coated LS2-111 Clear

Note: LS1-111J was tested with Acryking PH-710, Acryking PH-720, and Acryking PH-800 only

Coated Sabic Europe plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings: See Mitsubishi Chemical Corporation

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

FUJIHARD 2500: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3372U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3401U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7: See Fujikura Kasei Co., Ltd.

FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, FUJISOFT 2604 coatings: See Fujikura Kasei Co., Ltd.

KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000, KUV-9100: See KCC Corporation

LHP100/LHC100, LHP100/AS4000: See Momentive Performance Materials Inc.

MODIHARD 200S: See NOF Coatings

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

PHOLUCID No. 130C and PHOLUCID No.180C: See Chugoku Marine Paints, Ltd.

PHC200, PHC587, PHC587B, PHC587C, PHC587C2: See Momentive Performance Materials Inc.

RayGloss 402: See BASF Coatings GmbH

SH-2, SH-41, SH-50, SH-51 and SH-61: See Stanley Electric Co., Ltd.

SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000: See Momentive Performance Materials Inc.

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60: See Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, UVHC5000K1, and UVHC5000K2: See Momentive Performance Materials Inc.

UVHC5100: See Momentive Performance Materials Inc.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

UVT200V1, UVT200V2, UVT200V3 and UVT200V5: See Red Spot.

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

X-48-5500-A18: See Shin-Etsu Chemical Co., Ltd.

Coating Manufacturer in Alphabetical Order

Information on RayGloss 402 coatings may be obtained by writing:

BASF Coatings GmbH
ECO/DT - C422
D-48165 Muenster
Germany
www.basf-coatings.com

Note: BASF RayGloss 402 was tested on LEXAN® LS1 and LEXAN® LS2 clear only.

Information on PHOLUCID No. 130C and PHOLUCID No.180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No. 130C and PHOLUCID No.180C were tested on Sabic LS1 111 and Sabic LS1 111J and Sabic LS1 111J clear only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR



Information on FUJIHARD 2500, FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3, FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3, FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7 and FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, and FUJISOFT 2604 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJISOFT 2601 may NOT be used on lenses incorporating a reflex reflector or in front of a reflex reflector.
Note: FUJIHARD HH2566U-series and FUJIHARD HH2567U-series for use on clear lenses only
Note: FUJIHARD HH2540U-series, FUJIHARD HH2570U-series, FUJIHARD HH2561U-series and FUJIHARD HH9986U-series is for use on clear LS2 plastics only
Note: FUJIHARD HH3372U, FUJIHARD HH3401U and FUJIHARD HH3482U were tested on LS1 111 and LS2 111 only.
Note: FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 was tested on clear LS1 and LS2 only.



Information on KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000 and KUV-9100 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong, Giheung-Gu,
Yongin-Si, Gyunggi-Do
South Korea
www.kccworld.co.kr

Note: KUV-3000, KUV-4000, KUV-5000, KUV-6000, and KUV-9100 were tested on Sabic LS1-111 and LS2-111 clear only.
Note: KUV-1000, and KUV-2000 is suitable for over 6.4 mm LS2-111 clear lenses only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

MITSUBISHI CHEMICAL GROUP

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-4 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking PH-350 was tested on LS2 with clear lenses only
Note: Acryking PH-710 and Acryking PH-720 were tested on LS1 and LS2 with clear lenses only
Note: Acryking PH-511, Acryking PH-700, Acryking PH-800 and Acryking PH-800N5A were tested on LS1-111 and LS2-111
Note: LS1-111J was tested with Acryking PH-710, Acryking PH-720, and Acryking PH-800 only.
Note: Acryking PH-930 was tested on Clear LS1 111 and LS2 111 only

MOMENTIVE™ inventing possibilities

Information on LHP100/LHC100, LHP100/AS4000, SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000, PHC200, PHC587, PHC587B, PHC587C, PHC587C2, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60 UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2 and UVHC5100 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC5000 and UVHC 5100 were tested on LS1 and LS2 clear only

NPAC NIPPON PAINT AUTOMOTIVE COATINGS

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: NIPPE UVI Coat UT-1678 was tested on Lexan LS1-111 and LS2-111.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on SABIC LS1 111 Clear in thicknesses 1.6 and 6.4 mm only

Information on UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coating may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 were tested on clear LS1, and LS2

Information of X-48-5500-A18 hard coat may be obtained by writing to the following address:

Shin-Etsu Chemical Co., Ltd.
4-1, Marunouchi 1-Chome
Chiyoda-ku, Tokyo 100-0005,
Japan
www.shinetsu.co.jp

Note: X-48-5500-A18 was tested on SABIC LS1 clear only.

Information on SH-2, SH-41, SH-50, SH-51 and SH-61 hard coats may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: Stanley SH-51 tested on Sabic LS2 clear only.
Note: Stanley SH-61 was tested on Sabic LS1-111S clear only

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
www.sabic.com Sabic India	LEXAN® LS1 Polycarbonate LEXAN® LS1A LEXAN® LS2 LEXAN® LS2A (coated or uncoated)		111 111H 111J 111X 6162 414 71127 71194 71274 GY3A578T	White #! White #! White #! White #! Red #! Yellow #! Smoke Grey #! Smoke Grey #! Smoke Grey #! Smoke Grey #!
	LEXAN® XLS 1110T Protected Application Only LEXAN® XLS 1110 Protected Application Only LEXAN® XLS 1210 Protected Application Only		11204 11204 NA9G165T NA9H009T	Natural "!" Natural "!" Clear Blue "!" Clear Blue "!"

Note: LEXAN® Protected Applications were tested behind Coated LS2-111 Clear

Coated Sabic India plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings: See Mitsubishi Chemical Corporation

FUJIHARD 2500: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3372U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3401U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3482U, FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3 : See Fujikura Kasei Co., Ltd.

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7: See Fujikura Kasei Co., Ltd.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, FUJISOFT 2604 coatings: See Fujikura Kasei Co., Ltd.

KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000, KUV-9100: See KCC Corporation

LHP100/LHC100, LHP100/AS4000: See Momentive Performance Materials Inc.
MODIHARD 200S: See NOF Coatings

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

PHOLUCID No. 130C and PHOLUCID No.180C: See Chugoku Marine Paints, Ltd.

PHC200, PHC587, PHC587B, PHC587C, PHC587C2: See Momentive Performance Materials Inc.

RayGloss 402: See BASF Coatings GmbH

SH-2, SH-41, SH-50 and SH-51: See Stanley Electric Co., Ltd.

SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000: See Momentive Performance Materials Inc.

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60: See Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, UVHC5000K1, and UVHC5000K2: See Momentive Performance Materials Inc.

UVHC5100: See Momentive Performance Materials Inc.

UVT200V1, UVT200V2, UVT200V3 and UVT200V5: See Red Spot.

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

X-48-5500-A18: See Shin-Etsu Chemical Co., Ltd.

Coating Manufacturer in Alphabetical Order

Information on RayGloss 402 coatings may be obtained by writing:

BASF
We create chemistry

BASF Coatings GmbH
ECO/DT - C422
D-48165 Muenster
Germany
www.basf-coatings.com

Note: BASF RayGloss 402 was tested on LEXAN® LS1 and LEXAN® LS2 clear only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on PHOLUCID No. 130C and PHOLUCID No.180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No. 130C and PHOLUCID No.180C were tested on Sabic LS1 111 and Sabic LS1 111J clear only.

Information on FUJIHARD 2500, FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3, FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-2, FUJIHARD HH3482U-3, FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7 and FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, and FUJISOFT 2604 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJISOFT 2601 may NOT be used on lenses incorporating a reflex reflector or in front of a reflex reflector.
Note: FUJIHARD HH2566U-series and FUJIHARD HH2567U-series for use on clear lenses only
Note: FUJIHARD HH2540U-series, FUJIHARD HH2570U-series, FUJIHARD HH2561U-series and FUJIHARD HH9986U-series is for use on clear LS2 plastics only
Note: FUJIHARD HH3372U, FUJIHARD HH3401U and FUJIHARD HH3482U were tested on LS1 111 and LS2 111 only.
Note: FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3 were tested on Clear LS1 and LS2 only.

Information on KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000 and KUV-6000 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong, Giheung-Gu,
Yongin-Si, Gyunggi-Do
South Korea
www.kccworld.co.kr

Note: KUV-3000, KUV-4000, KUV-5000, KUV-6000, and KUV-9100 were tested on Sabic LS1-111 and LS2-111 clear only.
Note: KUV-1000, and KUV-2000 is suitable for over 6.4 mm LS2-111 clear lenses only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

MITSUBISHI CHEMICAL GROUP

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-5 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking PH-350 was tested on LS2 with clear lenses only
Note: Acryking PH-710 and Acryking PH-720 were tested on LS1 and LS2 with clear lenses only
Note: Acryking PH-511, Acryking PH-700, Acryking PH-800 and Acryking PH-800N5A were tested on LS1-111 and LS2-111
Note: LS1-111J was tested with Acryking PH-710, Acryking PH-720, and Acryking PH-800 only.
Note: Acryking PH-930 was tested on Clear LS1 111 and LS2 111 only

MOMENTIVE™ inventing possibilities

Information on LHP100/LHC100, LHP100/AS4000, SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000, PHC200, PHC587, PHC587B, PHC587C, PHC587C2, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60 UVHC5000, UVHC5000K, UVHC5000K1, and UVHC5000K2 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC5000 and UVHC5100 were tested on LS1 and LS2 clear only

NPAC NIPPON PAINT AUTOMOTIVE COATINGS

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: NIPPE UVI Coat UT-1678 was tested on Lexan LS1-111 and LS2-111.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on SABIC LS1 111 Clear in thicknesses 1.6 and 6.4 mm only

Information on UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coating may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 were tested on clear LS1, and LS2

Information of X-48-5500-A18 hard coat may be obtained by writing to the following address:

Shin-Etsu Chemical Co., Ltd.
4-1, Marunouchi 1-Chome
Chiyoda-ku, Tokyo 100-0005,
Japan
www.shinetsu.co.jp

Note: X-48-5500-A18 was tested on SABIC LS1 clear only.

Information on SH-2, SH-41, SH-50, SH-51 and SH-61 hard coats may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: Stanley SH-51 tested on Sabic LS2 clear only.
Note: Stanley SH-61 was tested on Sabic LS1-111S clear only

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
 www.sabic.com Sabic Japan	LEXAN® LS1	Polycarbonate	111	White #!
	LEXAN® LS1A		111J	White #!
	LEXAN® LS2		71194	Smoke Grey #!
	LEXAN® LS2A		71274	Smoke Grey #!
	LEXAN® LS3		6162	Red #!
	LEXAN® LSHF (HIGH FLOW) (coated or uncoated)		6164	Red #!
			61228	Red #!
			414	Yellow #!
			4158	Yellow#!
			2148	Yellow #!
	LEXAN® XLS 1110T Protected Application Only		11204	Natural "!"
	LEXAN® XLS 1110 Protected Application Only		11204	Natural "!"
	LEXAN® XLS 1210 Protected Application Only		NA9G165T	Clear Blue "!"
			NA9H009T	Clear Blue "!"

Note: LEXAN® Protected Applications were tested behind Coated LS2-111 Clear

Coated Sabic Japan plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings: See Mitsubishi Chemical Corporation

FUJIHARD 2500: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3372U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3401U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3482U, FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7: See Fujikura Kasei Co., Ltd.

(Coating Information Continued on the Next Page)

FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, FUJISOFT 2604 coatings: See Fujikura Kasei Co., Ltd.

KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000, KUV-9100: See KCC Corporation

LHP100/LHC100, LHP100/AS4000: See Momentive Performance Materials Inc.

MODIHARD 200S: See NOF Coatings

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

PHOLUCID No. 130C and PHOLUCID No.180C: See Chugoku Marine Paints, Ltd.

PHC200, PHC587, PHC587B, PHC587C, PHC587C2: See Momentive Performance Materials Inc.

RayGloss 402: See BASF Coatings GmbH

SH-2, SH-41, SH-50, SH-51 and SH-61: See Stanley Electric Co., Ltd.

SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000: See Momentive Performance Materials Inc.

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60: See Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, UVHC5000K1, and UVHC5000K2: See Momentive Performance Materials Inc.

UVHC5100: See Momentive Performance Materials Inc.

UVT200V1, UVT200V2, UVT200V3 and UVT200V5: See Red Spot.

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

X-48-5500-A18: See Shin-Etsu Chemical Co., Ltd.

Coating Manufacturer in Alphabetical Order

Information on RayGloss 402 coatings may be obtained by writing:

BASF
We create chemistry

BASF Coatings GmbH
ECO/DT - C422
D-48165 Muenster
Germany
www.basf-coatings.com

Note: BASF RayGloss 402 was tested on LEXAN® LS1 and LEXAN® LS2 clear only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

CHUGOKU

Information on PHOLUCID No. 130C and PHOLUCID No.180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No. 130C and PHOLUCID No.180C were tested on Sabic LS1 111 and Sabic LS1 111J clear only.

FUJIKURA KASEI

Information on FUJIHARD 2500, FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3, FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-2, FUJIHARD HH3482U-3, FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7 and FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, and FUJISOFT 2604 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJISOFT 2601 may NOT be used on lenses incorporating a reflex reflector or in front of a reflex reflector.
Note: FUJIHARD HH2566U-series and FUJIHARD HH2567U-series for use on clear lenses only
Note: FUJIHARD HH2540U-series, FUJIHARD HH2570U-series, FUJIHARD HH2561U-series and FUJIHARD HH9986U-series is for use on clear
LS2 plastics only
Note: FUJIHARD HH3372U, FUJIHARD HH3401U and FUJIHARD HH3482U were tested on LS1 111 and LS2 111 only.
Note: FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3 were tested on clear LS1 and LS2 only.

KCC

Information on KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000 and KUV-9100 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong, Giheung-Gu
Yongin-Si, Gyunggi-Do South
Korea
www.kccworld.co.kr

Note: KUV-3000, KUV-4000, KUV-5000, KUV-6000, and KUV-9100 were tested on Sabic LS1-111 and LS2-111 clear only.
Note: KUV-1000, and KUV-2000 is suitable for over 6.4 mm LS2-111 clear lenses only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-6 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking PH-350 was tested on LS2 with clear lenses only
Note: Acryking PH-710 and Acryking PH-720 were tested on LS1 and LS2 with clear lenses only
Note: Acryking PH-511, Acryking PH-700, Acryking PH-800 and Acryking PH-800N5A were tested on LS1-111 and LS2-111
Note: LS1-111J was tested with Acryking PH-710, Acryking PH-720, and Acryking PH-800 only.
Note: Acryking PH-930 was tested on Clear LS1 111 and LS2 111 only

Information on LHP100/LHC100, LHP100/AS4000, SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000, PHC 200, PHC587, PHC587B, PHC587C, PHC587C2, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2 and UVHC5100 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Materials Inc. Building V7
51368 Leverkusen
Germany

Momentive Performance
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC5000 and UVHC5100 were tested on LS1 and LS2 clear only

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: NIPPE UVI Coat UT-1678 was tested on Lexan LS1-111 and LS2-111.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on SABIC LS1 111 Clear in thicknesses 1.6 and 6.4 mm only

Information on UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coating may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 were tested on clear LS1, and LS2

Information of X-48-5500-A18 hard coat may be obtained by writing to the following address:

Shin-Etsu Chemical Co., Ltd.
4-1, Marunouchi 1-Chome
Chiyoda-ku, Tokyo 100-0005,
Japan
www.shinetsu.co.jp

Note: X-48-5500-A18 was tested on SABIC LS1 clear only.

Information on SH-2, SH-41, SH-50, SH-51 and SH-61 hard coats may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: Stanley SH-51 tested on Sabic LS2 clear only.
Note: Stanley SH-61 was tested on Sabic LS1-111S clear only

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
	LEXAN® LS1	Polycarbonate	111	White #!
	LEXAN® LS2		111H	White #!
	LEXAN® LSHF (HIGH FLOW)		111S	White #!
	(coated or uncoated)		111SL	White #!
			111J	White #!
Sabic Korea			111X	White #!
			GY3A578T	Smoke Grey#!
www.sabic.com			71127	Smoke Grey#!
			71274	Smoke Grey#!
			71194	Smoke Grey#!
			6162	Red #!
			6164	Red #!
			4158	Yellow #!
			414	Yellow #!
	LEXAN® XLS 1110T	Protected Application Only	11204	Natural "!"
	LEXAN® XLS 1110	Protected Application Only	11204	Natural "!"
	LEXAN® XLS 1210	Protected Application Only	NA9G165T	Clear Blue "!"
			NA9H009T	Clear Blue "!"

Note: LEXAN® Protected Applications were tested behind Coated LS2-111 Clear

Coated Sabic Korea plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings: See Mitsubishi Chemical Corporation

FUJIHARD 2500: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3372U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3401U: See Fujikura Kasei Co., Ltd.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

FUJIHARD HH3482U, FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7: See Fujikura Kasei Co., Ltd.

FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, FUJISOFT 2604 coatings: See Fujikura Kasei Co., Ltd.

KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000, KUV-9100: See KCC Corporation

LHP100/LHC100, LHP100/AS4000: See Momentive Performance Materials Inc.

MODIHARD 200S: See NOF Coatings.

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

PHOLUCID No. 130C and PHOLUCID No.180C: See Chugoku Marine Paints, Ltd.

PHC200, PHC587, PHC587B, PHC587C, PHC587C2: See Momentive Performance Materials Inc.

RayGloss 402: See BASF Coatings GmbH

SH-2, SH-41, SH-50, SH-51 and SH-61: See Stanley Electric Co., Ltd.

SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000: See Momentive Performance Materials Inc.

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60: See Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2: See Momentive Performance Materials Inc.

UVHC5100: See Momentive Performance Materials Inc.

UVT200V1, UVT200V2, UVT200V3 and UVT200V5: See Red Spot.

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

X-48-5500-A18: See Shin-Etsu Chemical Co., Ltd.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Coating Manufacturer in Alphabetical Order

Information on RayGloss 402 coatings may be obtained by writing:

BASF Coatings GmbH
ECO/DT - C422
D-48165 Muenster
Germany
www.basf-coatings.com

Note: BASF RayGloss 402 was tested on LEXAN® LS1 and LEXAN® LS2 clear only.

Information on PHOLUCID No. 130C and PHOLUCID No.180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No. 130C and PHOLUCID No.180C were tested on Sabic LS1 111 and Sabic LS1 111J clear only.

Information on FUJIHARD 2500, FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD, HH2566U-2, FUJIHARD HH2566U-3, FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3, FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7 and FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, and FUJISOFT 2604 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJISOFT 2601 may NOT be used on lenses incorporating a reflex reflector or in front of a reflex reflector.
Note: FUJIHARD HH2566U-series and FUJIHARD HH2567U-series for use on clear lenses only
Note: FUJIHARD HH2540U-series, FUJIHARD HH2570U-series, FUJIHARD HH2561U-series and FUJIHARD HH9986U-series is for use on clear LS2 plastics only
Note: FUJIHARD HH3372U, FUJIHARD HH3401U and FUJIHARD HH3482U were tested on LS1 111 and LS2 111 only.
Note: FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3 was tested on clear LS1 and LS2 only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000 and KUV-9100 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong, Giheung-Gu
Yongin-Si, Gyunggi-Do,
South Korea
www.kccworld.co.kr

Note: KUV-3000, KUV-4000, KUV-5000, KUV-6000, and KUV-9100 were tested on Sabic LS1-111 and LS2-111 clear only.
Note: KUV-1000, and KUV-2000 is suitable for over 6.4 mm LS2-111 clear lenses only.

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-7 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking PH-350 was tested on LS2 with clear lenses only
Note: Acryking PH-710 and Acryking PH-720 were tested on LS1 and LS2 with clear lenses only
Note: Acryking PH-511, Acryking PH-700, Acryking PH-800 and Acryking PH-800N5A were tested on LS1-111 and LS2-111
Note: LS1-111J was tested with Acryking PH-710, Acryking PH-720, and Acryking PH-800 only.
Note: Acryking PH-930 was tested on Clear LS1 111 and LS2 111 only

Information on LHP100/LHC100, LHP100/AS4000, SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000, PHC200, PHC587, PHC587B, PHC587C, PHC587C2, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2 and UVHC5100 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC5000 and UVHC5100 were tested on LS1 and LS2 clear only

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: NIPPE UVI Coat UT-1678 was tested on Lexan LS1-111 and LS2-111.

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on SABIC LS1 111 Clear in thicknesses 1.6 and 6.4 mm only

Information on UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coating may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 were tested on clear LS1, and LS2

Information on SH-2, SH-41, SH-50, SH-51 and SH-61 hard coats may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: Stanley SH-51 tested on Sabic LS2 clear only.
Note: Stanley SH-61 was tested on Sabic LS1-111S clear only

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Sabic Plastics, Nansha China	LEXAN® LS1 LEXAN® LS1A LEXAN® LS2 LEXAN® LS2A LEXAN® LS3 LEXAN® LSHF (HIGH FLOW) (coated or uncoated)	Polycarbonate	111	White #!
			111C	White #!
			111H	White #!
			111HX	White #!
			111J	White #!
			111M	White #!
			111S	White #!
			112	White #!
			51073	Smoke Grey #!
www.sabic.com			71127	Smoke Grey #!
			71194	Smoke Grey #!
			71274	Smoke Grey #!
			GY3A578T	Smoke Grey #!
			6111	Red #!
			6162	Red #!
			6164	Red #!
			61014	Red #!
			61079	Red #!
			61228	Red #!
			RD4B057T	Red #!
			414	Yellow #!
			4135	Yellow #!
			4158	Yellow #!
			4168	Yellow #!
			4169	Yellow #!
			4173	Yellow #!
			4194	Yellow #!
			41105	Yellow #!
			41152	Yellow #!
			YW 5005T	Yellow #!
			21242	Clear Blue #!
			2148	Clear Blue #!
LEXAN® XLS 1110T Protected Application Only			11204	Natural "!"
LEXAN® XLS 1110 Protected Application Only			11204	Natural "!"
LEXAN® XLS 1210 Protected Application Only			NA9G165T	Clear Blue "!"
			NA9H009T	Clear Blue "!"
Note: LEXAN® Protected Applications were tested behind Coated LS2-111 Clear				

Coated Sabic Nansha, China plastics may only be treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings: See Mitsubishi Chemical Corporation

FUJIHARD 2500: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei Co., Ltd.

(Coating Information Continued on the Next Page)

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3372U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3401U: See Fujikura Kasei Co., Ltd.

FUJIHARD HH3482U, FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3: See Fujikura Kasei Co., Ltd.

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7: See Fujikura Kasei Co., Ltd.

FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, FUJISOFT 2604 coatings: See Fujikura Kasei Co., Ltd.

KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000, KUV-9100: See KCC Corporation

LHP100/LHC100, LHP100/AS4000: See Momentive Performance Materials Inc.

MODIHARD 200S: See NOF Corporation.

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

PHOLUCID No. 130C and PHOLUCID No.180C: See Chugoku Marine Paints, Ltd.

PHC200, PHC587, PHC587B, PHC587C, PHC587C2: See Momentive Performance Materials Inc.

RayGloss 402: See BASF Coatings GmbH

SH-2, SH-41, SH-50, SH-51 and SH-61: See Stanley Electric Co., Ltd.

SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000: See Momentive Performance Materials Inc.

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60: See Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, UVHC5000K1, and UVHC5000K2: See Momentive Performance Materials Inc.

UVHC5100: See Momentive Performance Materials Inc.

UVT200V1, UVT200V2, UVT200V3 and UVT200V5: See Red Spot.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

X-48-5500-A18: See Shin-Etsu Chemical Co., Ltd.

Coating Manufacturer in Alphabetical Order

Information on RayGloss 402 coatings may be obtained by writing:

BASF Coatings GmbH
ECO/DT - C422
D-48165 Muenster
Germany
www.basf-coatings.com

Note: BASF RayGloss 402 was tested on LEXAN® LS1 and LEXAN® LS2 clear only.

Information on PHOLUCID No. 130C and PHOLUCID No.180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: 81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No. 130C and PHOLUCID No.180C were tested on Sabic LS1 111 and Sabic LS1 111J and Sabic LS1 111J clear only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR



Information on FUJIHARD 2500, FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3, FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3, FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7 and FUJISOFT 2600, FUJISOFT 2601, FUJISOFT 2602, FUJISOFT 2603, and FUJISOFT 2604 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJISOFT 2601 may NOT be used on lenses incorporating a reflex reflector or in front of a reflex reflector.
Note: FUJIHARD HH2566U-series and FUJIHARD HH2567U-series for use on clear lenses only
Note: FUJIHARD HH2540U-series, FUJIHARD HH2570U-series, FUJIHARD HH2561U-series and FUJIHARD HH9986U-series is for use on clear LS2 plastics only
Note: FUJIHARD HH3372U, FUJIHARD HH3401U and FUJIHARD HH3482U were tested on LS1 111 and LS2 111 only.
Note: FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3 was tested on clear LS1 and LS2 only.



Information on KUV-1000, KUV-2000, KUV-3000, KUV-4000, KUV-5000, KUV-6000 and KUV-9100 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong, Giheung-Gu,
Yongin-Si, Gyunggi-Do
South Korea
www.kccworld.co.kr

Note: KUV-3000, KUV-4000, KUV-5000, KUV-6000, and KUV-9100 were tested on Sabic LS1-111 and LS2-111 clear only.
Note: KUV-1000, and KUV-2000 is suitable for over 6.4 mm LS2-111 clear lenses only.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

MITSUBISHI CHEMICAL GROUP

Acryking F-328, Acryking K-101, Acryking PH-328, Acryking PH-350, Acryking PH-503, Acryking PH-511 or Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-8 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking PH-350 was tested on LS2 with clear lenses only
Note: Acryking PH-710 and Acryking PH-720 was tested on LS1 and LS2 with clear lenses only
Note: Acryking PH-511, Acryking PH-700, Acryking PH-800 and Acryking PH-800N5A was tested on LS1-111 and LS2-111
Note: LS1-111J was tested with Acryking PH-710, Acryking PH-720, and Acryking PH-800 only.
Note: Acryking PH-930 was tested on Clear LS1 111 and LS2 111 only

MOMENTIVE™ inventing possibilities

Information on LHP100/LHC100, LHP100/AS4000, SHP300/SHC3000, SHP300/AS4000, SHP401/AS4000, SHP401/SHC4002, SHP470 with AS4700 topcoat, SHC6000, PHC200, PHC587, PHC587B, PHC587C, PHC587C2, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2 and UVHC5100 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC5000 and UVHC5100 tested on LS1 and LS2 clear only

NPAC NIPPON PAINT AUTOMOTIVE COATINGS

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: NIPPE UVI Coat UT-1678 was tested on Lexan LS1-111 and LS2-111.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on SABIC LS1 111 Clear in thicknesses 1.6 and 6.4 mm only

Information on UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coating may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 were tested on clear LS1, and LS2

Information of X-48-5500-A18 hard coat may be obtained by writing to the following address:

Shin-Etsu Chemical Co., Ltd.
4-1, Marunouchi 1-Chome
Chiyoda-ku, Tokyo 100-0005,
Japan
www.shinetsu.co.jp

Note: X-48-5500-A18 was tested on SABIC LS1 clear only.

Information on SH-2, SH-41, SH-50, SH-51 and SH-61 hard coats may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro,
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: Stanley SH-51 tested on Sabic LS2 clear only.
Note: Stanley SH-61 was tested on Sabic LS1-111S clear only

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
	SABIC® PC ALS01 SABIC® PC ALS02 (coated only)	Polycarbonate	GC9AT GC9AT111H	White Q White Q

Saudi Kayan Petrochemical Co.

www.sabic.com

Coated Saudi Kayan Petrochemical Co. plastics were only tested with the following coatings applied to the molded lens.

Coating in Alphabetical Order and Corresponding Manufacturer

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2: See Momentive Performance Materials Inc.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

Coating Manufacturer in Alphabetical Order



Information on UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC3000, UVHC3000K, UVHC5000 and UVHC5000K tested on clear SABIC® PC ALS01 and SABIC® PC ALS02



Information on UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coating may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 were tested on clear SABIC® PC ALS01 and SABIC® PC ALS02

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
	SABIC® PMMA 20HR SABIC® PMMA 23SP	Polymethyl Methacrylate (PMMA)	00900	Clear

Saudi Methacrylates Company (SAMAC)

www.sabic.com



Q-Lab Test Services

- Florida & Arizona Outdoor Exposures
- Accelerated Laboratory Testing
- Evaluations

Q-LAB

Weathering & Outdoor Climatic Testing

If you're concerned about your product's appearance or functional performance in the outdoor environment, you're not alone. Sunlight, heat, and moisture cause billions of dollars in product damage every year. A proper weathering testing program can help you anticipate and prevent a variety of potential product failures, meet durability specifications, and preserve your reputation for quality.

Will your product last outdoors? Don't guess when you can test!



















WHY TEST?

Reliable weathering and corrosion data can help you:

- Avoid unexpected product failures
- Make the best material selection decisions
- Validate new or less-expensive materials or additives
- Improve your competitive advantage
- Warranty your product's lifetime with confidence

Natural outdoor weathering and corrosion testing give the most realistic prediction of product performance. Accelerated testing, available both outdoors and in the laboratory, gives faster results but with some uncertainty about its accuracy. Many companies combine both approaches to ensure reliable results in the shortest time possible.

WHY CHOOSE Q-LAB?

Experienced and Reliable

Q-Lab provides the highest-quality weathering testing services. Our first natural weathering site opened in 1959. Today, our scientists and engineers participate and offer leadership in ISO, ASTM, IEC, GB, and numerous other professional organizations in creating standardized test methods and procedures.

Instant Credibility

When Q-Lab does your testing, the results have instant credibility with your customers and colleagues. Q-Lab conducts all exposure tests and evaluations in accordance with appropriate test methods from ASTM, ISO, BSI, DIN, JIS, SAE, GB, and other recognized organizations and is accredited by AMECA and AAMA.

Cost-Effective

Q-Lab's state-of-the-art test services are available at a surprisingly affordable price. In many cases, it is less costly to test with Q-Lab than to set up and run tests yourself.

Best Test Sites, Best Technology

South Florida and Arizona, where Q-Lab does most of its outdoor testing, have been recognized for over a century as harsh climates for product testing. If your products perform well in these benchmark locations, they will perform well just about anywhere. Q-Lab uses the most trusted accelerated weathering and corrosion technologies, used by thousands of companies in dozens of industries.

Natural Outdoor Testing

Location is everything. About one hundred years ago, companies in the paint and automotive industries realized that environmental conditions in South Florida and the Arizona desert were the harshest on their products. Several companies operated their own test sites in these locations, and they used what they learned to make their products durable enough to ensure generations of satisfied customers. Today, much of this testing has been consolidated at Q-Lab's sites in Florida and Arizona. Companies around the globe trust Q-Lab to perform their outdoor product testing.

FLORIDA

The subtropical climate of the Miami area has the perfect year-round combination of abundant sunlight, warm temperatures, and plentiful water. Sunshine during the summer months in Miami is quite similar to that of northern temperate regions. However, in the winter the difference is dramatic. The key point is that it is the same sun—just more of it, and for a longer duration each year. The same holds true for temperature, rainfall, dew, and humidity.

The result of this perfect combination of environmental factors is that exposures at Q-Lab Florida are accelerated compared to temperate climates. One year of Florida sunshine can produce the same weathering effects on materials as several years of weathering in most major markets around the world. Specimens that can withstand the sunlight, heat, and water in south Florida can be expected to be durable in most locations around the world.

SOUTH FLORIDA IS PERFECT FOR TESTING:

- Sunlight (UV) stability
- Moisture sensitivity
- Mildew/mold resistance
- Surface erosion
- High-temperature resistance
- Thermal shock response
- Corrosion behavior
- Moisture ingress
- Acid rain resistance



THE GLOBAL BENCHMARK
Q-Lab Florida has more specimens on test than any other outdoor weathering facility in the world.



DESERT TESTING
Arizona features even hotter temperatures and higher levels of sunlight than Florida.

ARIZONA

Arizona's desert climate is characterized by intense sunlight, very high temperatures, minimal rainfall, and very low humidity. Arizona desert exposures provide a different – in some ways harsher – exposure environment than Florida subtropical tests. Compared with Florida, Arizona is much hotter and receives about 15-20% more annual total solar and UV energy. Arizona experiences large day to night temperature variations, about 17 °C (31 °F) on average. Arizona receives little annual rainfall and has low atmospheric moisture overall. Specimens tested in the Arizona desert can be expected to have superior resistance to sunshine and elevated temperatures.

ARIZONA DESERT IS PERFECT FOR TESTING:

- Sunlight (UV) stability
- Heat aging effects
- Thermal expansion stress resistance
- Heat deflection and distortion
- Material durability in low humidity environments

OHIO

Northeast Ohio has a Northern Temperate climate, meaning it experiences four true seasons during the year. Outdoor specimens are subject to a range of exposures to UV light, temperature, and water, including regular freeze/thaw cycles during the winter.

Although Northeast Ohio testing will generally not attain the acceleration of natural outdoor testing in Florida or Arizona, it does deliver conditions experienced by much of the population of the United States and the rest of the world.

Some industries include a benchmark Northern Temperate climate in their certification programs, in addition to Florida and Arizona, to ensure a fully comprehensive program for natural weathering. Ohio is ideal for meeting these requirements.





Accelerated Laboratory Testing

Q-Lab offers a full range of accelerated laboratory weathering and corrosion testing services at our fully-equipped facilities in Florida and Germany. Q-Lab can perform most testing that utilizes xenon arc, fluorescent UV, salt spray, or cyclic corrosion chambers. Contract testing at Q-Lab is an ideal solution for companies that:

> Have a short-term need for testing but aren't ready to invest in facilities and equipment

> Need additional testing capacity that the in-house lab can't accommodate

> Have a special project with a new test cycle that can't be performed in-house

> Need third-party verification of test results

STANDARD & CUSTOM EXPOSURES

Tests and evaluations are performed to appropriate ASTM, ISO, EN, DIN, JIS, SAE, GB, AATCC, or other standard procedures.

Visit **Q-Lab.com/standards** or contact Q-Lab to discuss a particular standard.

We can also perform custom exposures to meet your individual testing needs. **More on page 13.**

TWO LABS, ONE STANDARD OF QUALITY

> Homestead, Florida USA
> Saarbrücken, Germany

Both locations follow the ISO 17025 accredited Quality System, ensuring the best care for your projects.



Homestead, Florida USA



Saarbrücken, Germany



RAPID RESULTS
Xenon arc test chambers are used to test colorants in paints and plastics.

TYPES OF ACCELERATED TESTS



XENON ARC WEATHERING

For weathering tests that require full sunlight simulation, the **Q-SUN** xenon arc weathering chamber can perform a variety of methods from the automotive, textile, building material, paint, plastics, personal care, or other industries. Xenon arc instruments are usually the best choice for applications where color change is the primary failure mode of concern.



FLUORESCENT UV WEATHERING

When changes to physical properties of polymeric materials are the concern, the **QUV** accelerated weathering tester is an effective tool for comparative testing. Fluorescent UV lamps match the most damaging portion of the sunlight spectrum (UVA and UVB), reproduce degradation from germidical treatments (UVC), or simulate indoor environments (Cool White).



SALT SPRAY/ CYCLIC CORROSION

Q-FOG cyclic corrosion chambers can perform any test from simple salt spray to tests with precise control of RH and moisture transitions, which is required by most OEM automotive standards. In addition, certain models can also perform demanding modern test protocols like CASS and JASO M609.

Q-TRAC Natural Sunlight Concentrator Testing

Faster test, natural environment. Accelerated outdoor materials testing using a Q-TRAC natural sunlight concentrator delivers the benefits of testing in a natural outdoor environment while at the same time amplifying the sunlight and heat delivered to specimens. This testing is especially useful for highly-durable materials with long expected lifetimes.

SUPER-FAST RESULTS FROM NATURAL SUNLIGHT

The Q-TRAC delivers the same amount of damaging ultraviolet energy in just one year as specimens would experience in five years of Florida sunlight. Like other accelerated tests, sunlight concentrator testing allows products to be brought to market faster, but the Q-TRAC uses natural sunlight to reduce further the risk of generating erroneous test results. In this way, the Q-TRAC delivers dual benefits – the realism of natural exposures and the speed of accelerated laboratory tests.

Q-TRAC IS PERFECT FOR TESTING:

- Roofing
- Coil coatings
- Fluoropolymers
- Geosynthetics
- Powder coatings
- Building materials
- Industrial coatings
- Hardboard coatings

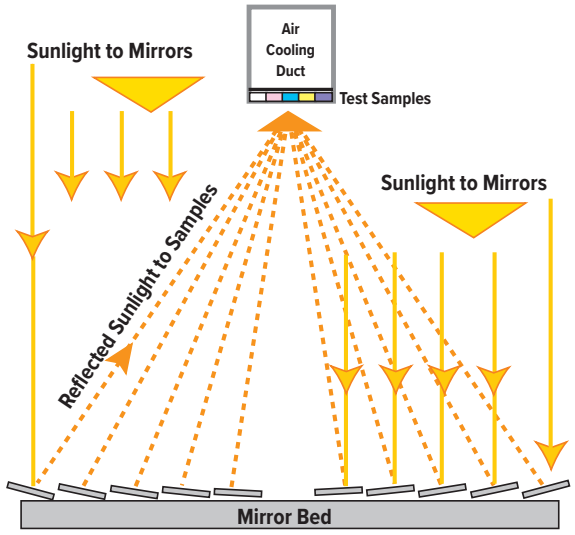
ONLY IN ARIZONA

Q-TRAC testing requires a high proportion of direct beam sunlight and low cloud cover that exists only in very dry environments.



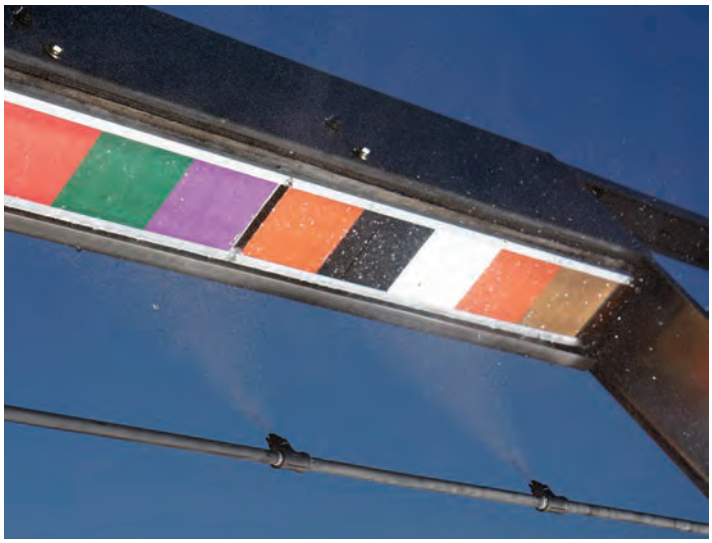
ENHANCED SUNLIGHT WITH CONCENTRATING MIRRORS

The Q-TRAC system uses an array of 10 flat mirrors to reflect and concentrate natural sunlight onto the test specimens. It further maximizes the exposure by automatically tracking the sun throughout the day in both azimuth (horizontal) and elevation (vertical).



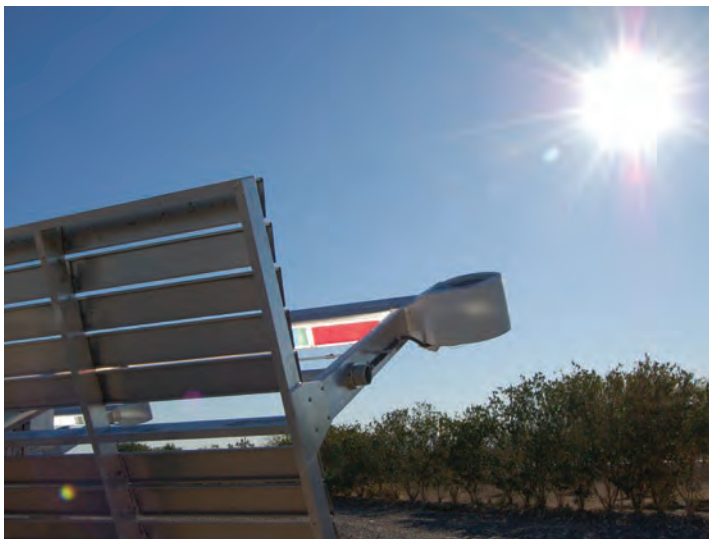
Q-TRAC WATER SPRAY & SPECIAL APPLICATIONS

Water spray during the night time can simulate the time of wetness experienced in Florida, and during the day it can simulate thermal shock associated with rain bursts. During night-time wetting, specimens are oriented facing upward to give increased wetness and realism compared to original natural sunlight concentrator testing. Q-Lab also offers temperature-controlled Q-TRAC testing for more heat-sensitive specimens.



Several standardized cycles—including desert, freeze/thaw, and spray are available to test different materials and end-use application. Standards include:

- ASTM G90
- ASTM D4141
- ASTM D4364
- ASTM D5105
- ASTM D5722
- SAE J1961
- SAE J576
- ISO 877-3
- AAMA 623, 624 and 625



Automotive Interior Testing

Accelerated testing to simulate behind-glass environments. Interior components in automobiles and other behind-glass environments can experience higher temperatures than materials in service outdoors. AIM box testing delivers high temperatures in combination with natural sunlight behind window glass for fast, realistic testing.

AIM BOX

An Automotive Interior Materials (AIM) box is an under-glass enclosure that simulates the sunlight and heat found inside an automobile. Although this technology was developed for the automotive industry, it can be very effective for many applications where glass-filtered sunlight and heat are important stressors, such as building window assemblies and electrical enclosures.

Key test standards for AIM box testing include GMW 14873, GMW 16717, GMW 3417, GM 2617M, GM 3619M, GM 7454M, GM 7455M, GM 9538P, Ford DVM 0020, and ASTM G201.

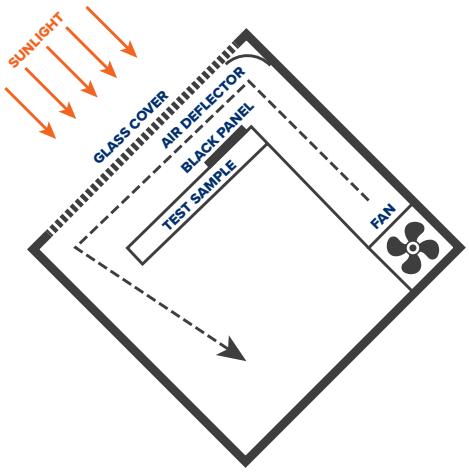
DEGRADATION MODES PRODUCED IN AIM BOX TESTING:

- Color change
- Cracking
- Peeling
- Oxidation
- Heat deflection
- Tackiness

REALISTIC SIMULATION

Testing automotive interiors can be different from testing other materials because air temperatures inside a vehicle can far exceed the temperature outside it. Materials can reach 100 °C or more in warmer climates. Furthermore, the light that reaches internal components is filtered by automotive glass, making it different from natural outdoor sunlight.

The AIM box uses tempered glass - clear or laminated - to simulate the sunlight spectrum experienced inside a car. In addition, a black panel thermometer continuously monitors the environment inside the box. A cooling fan and curtain are used to ensure that specimens are maintained at precise and realistic temperatures.





HIGH TEMPERATURE TESTING
Automotive instrument and dashboard panels are commonly tested in AIM boxes.

ACCELERATION

The AIM box in Arizona can perform precision azimuth tracking of the sun throughout the day. This boosts the total amount of solar radiation reaching the specimens for faster results without sacrificing accuracy.

TRUE AIM BOX

To increase the total amount of solar radiation exposure, Q-Lab's proprietary new TRUE (Tracking Reflecting Ultra Exposure) AIM box uses highly reflective mirrors and dual-axis tracking (azimuth and elevation) to focus more sunlight into the box interior. This technique approximately doubles the total sunlight received every day.



Standard Outdoor Exposures

True benchmarking via standardized testing. Natural outdoor testing according to international test standards gives improved consistency of results from test to test. Having a library of outdoor test data according to recognized test standards gives the best estimate for a product's service life and serves as an excellent basis for comparison to accelerated laboratory testing.

DIRECT EXPOSURE (ASTM G7, ASTM D1435)

Specimens can be securely mounted at a variety of angles for direct exposure to the sun. Various backing techniques are available to simulate the thermal environment of the specimen's intended service application. Plywood backing raises temperatures, while open- or mesh-backed specimens receive maximum natural air flow for cooler temperatures.



UNDER GLASS (ASTM G24, ISO 877-2)

These exposures are used to test interior-use materials, such as textiles and printing inks. Specimens are behind 3 mm window glass which will filter out short-wavelength (UVB) light. Exposures are typically at a 45° or 5° angle from horizontal.



BLACK BOX (ASTM D4141, GMW 14873)

These tests reproduce conditions found on the horizontal surfaces of a vehicle, including higher temperatures and longer wet times. Under glass black box exposures are used to test automotive interior materials or other applications that experience similar conditions.

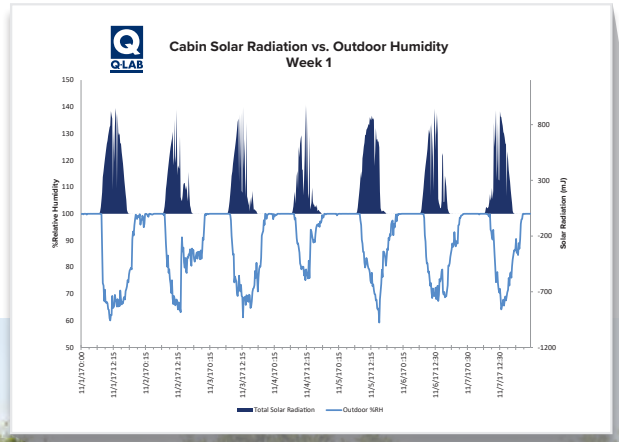


Other standard outdoor exposure test methods are available, including salt-accelerated, outdoor acid etch, and mildew-enhanced weathering.

Custom Tests & Special Projects

If you need a specialized test for a component, assembly, or complete product, Q-Lab can customize a test program to identify any problem areas quickly. Do you need to measure the temperature profile of multiple areas of your product throughout the day? Or design a test that accurately simulates your product's end use? Whatever your need, our experts can design a customized test solution to fit your budget.





Outdoor weathering testing in a replicated end use environment, like the shed shown above, can demonstrate interactions between components and give a more realistic representation of outdoor product durability.

DETAILED DATA ACQUISITION

Q-Lab can instrument your product to capture the data most important to you, and we always take care to protect confidentiality.

Evaluations & Physical Testing

Exposing your products or materials is only half of the equation. Measuring how they degrade over time is the other half. Q-Lab's engineers and technicians are worldwide experts at identifying and quantifying how your materials change when exposed to weathering or corrosion tests. We have many tools at our disposal to tell you nearly everything you need to know about your product's performance.

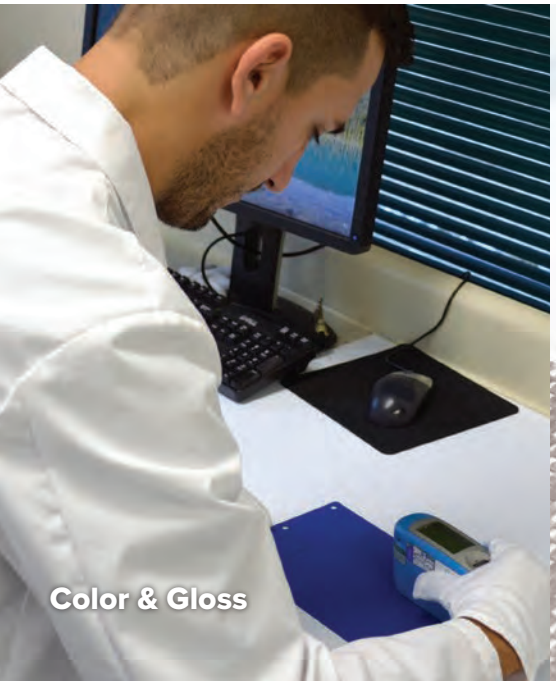
VISUAL EVALUATIONS

Visual evaluations detail all defects observed, such as cracking/checking, blistering, chalking, dirt retention, flaking, mildew growth, surface rust, or color change, according to standardized rating scales.

Q-Lab technicians are highly trained and experienced experts in the field of evaluation techniques and reporting scales. Many are actively involved in the organizations that create and maintain the standards relied upon by labs around the world.

COLOR & GLOSS MEASUREMENTS

Instrumental measurements of appearance and surface characteristics include gloss, distinctness of image, and color. These are used in place of or in addition to visual ratings, and are required by many standards. The science of color and appearance measurement can be very complex, and Q-Lab's experts can guide you through your options to ensure you get the correct data for your needs.


Color & Gloss


Mechanical


Photography



VISUAL EVALUATIONS

All visual ratings are made under standard lighting conditions to provide accurate, repeatable results.

MECHANICAL TESTS

Mechanical tests on physical properties are necessary for many products and materials. They include:

- Drop impact
- Pencil hardness
- Tape adhesion
- Mandrel bend & elongation
- Tensile strength & elongation
- Shear & peel adhesion
- Gravelometer stone chip impact
- Taber abrasion

PHOTOGRAPHY & SPECIAL HANDLING

A complete test program often includes other special services or handling. Common services include washing, polishing, scribing, and specimen weighing. Q-Lab can also photograph weathering and corrosion changes, which requires special lighting skills and equipment.



OUR GLOBAL NETWORK

We are committed to provide world-class technical, sales, and repair support in each of the over 60 countries in which we operate. Visit **Q-Lab.com/support** for contact information specific to your location and inquiry type.

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MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Samyang Corporation www.samyang.com	TRIREX 3022L1 TRIREX 3022L2 TRIREX 3022L3 (coated or uncoated)	Polycarbonate	100 R112 R212 R312 A115 A212 A307 A412	Clear $# Red $ Red $ Red $ Yellow $ Yellow $ Yellow $ Yellow $

Coated Sam Yang Corporation plastics are only acceptable with the coatings listed below when properly applied to the molded lens.

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101, or Acryking PH-503 hard coats: See Mitsubishi Chemical Corporation

KUV-3000, KUV-4000, KUV-5000, KUV-9000: See KCC Corporation.

LHP100/LHC100, LHP100/AS4000: See Momentive Performance Materials Inc. SHP401/AS4000,

SHP401/SHC4002 hard coats: See Momentive Performance Materials Inc. UVHC3000, UVHC3000K, UVHC5000

and UVHC5000K: See Momentive Performance Materials Inc.

Note: UVHC3000 and UVHC3000K series coatings were tested on TRIREX 3022L1 all had less than 7% haze and are designated by the # mark

UVT200, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7 and UVT610V8 coating: See Red Spot

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8.: See Red Spot.

Note: UVT610V and UVT820V series coatings all had less than 7% haze and are designated by the # mark.

Coating Manufacturer in Alphabetical Order

Information on KUV-3000, KUV-4000, KUV-5000, KUV-9100 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong, Giheung-Gu
Yongin-Si, Gyunggi-Do South Korea
www.kccworld.co.kr

Note: KUV-3000, KUV-4000, KUV-5000 and KUV-9100 were tested on clear Trirex3022L1 only

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on LHP100/LHC100, LHP100/AS4000, SHP401/AS4000, SHP401/SHC4002, UVHC3000, UVHC3000K, UVHC5000 and UVHC5000K hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Materials Inc. Building V7
51368 Leverkusen
Germany

Momentive Performance
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC3000, UVHC3000K, UVHC5000 and UVHC5000K tested on Trirex 3022L1 only.

Information on Mitsubishi Chemical Corporation Acryking F-328, Acryking K-101 and Acryking PH-503 coatings may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi 1-Chome
Chiyoda-Ku Tokyo 100-8251
Japan
www.m-chemical.co.jp

Information on UVT200 and UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8 UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8. coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: UVT610V and UVT820V series coatings all had less than 7% haze and are designated by the # mark.
Note: UVT610V and UVT820V series coatings were tested on Trirex 3022L1 clear only.

Samyang Corporation www.samyang.com	TRIREX UT3015L TRIREX UT3017L TRIREX UT3017LC TRIREX UT3022L (coated or uncoated)	Inner Lens Polycarbonate	100	Clear $#

Note: Samyang inner lens materials were tested behind coated 2.3 mm and 3.2 mm thick Samyang TRIREX 3022L1 and TRIREX 3022L3 only
Note: Samyang inner lens materials were tested in 2.3 mm and 6.4 mm only.
Note: Samyang UT3015L in 2.3 mm thickness when used behind a 2.3 mm TRIREX 3022L1 are not listed for use as a reflex reflector or in front of a reflex reflector.
Note: Samyang UT3022L in 6.4 mm thickness when used behind a 3.2 mm TRIREX 3022L1 are not listed for use as a reflex reflector or in front of a reflex reflector.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Sumitomo Chemical Co., Ltd.	SUMIPEX® HT	Polymethyl Methacrylate	R004	Clear
	SUMIPEX® MG		R006	Clear
	SUMIPEX® MH		011	Clear
	SUMIPEX® MHF		012	Clear
www.sumitomo-chem.co.jp	SUMIPEX® MHG		014	Clear
	SUMIPEX® MH-EXTRA		020	Clear
	SUMIPEX® MM		022	Clear
	SUMIPEX® ME		0151	Clear
	SUMIPEX® TR		0152	Clear
	SUMIPEX® MH5		0153	Clear
	SUMIPEX® EPE		0154	Clear
	SUMIPEX® EPM		0155	Clear
	SUMIPEX® K203		0161	Clear
	SUMIPEX® K610		0162	Clear
	SUMIPEX® EP		0163	Clear
	SUMIPEX® HTaaabS		0164	Clear
	SUMIPEX®Meguri® MH		0165	Clear
			0195	Clear
			0999	Clear
			418(RR)	Red
			4052	Red
Note: SUMIPEX® K202 is now known as SUMIPEX® EPM			4092	Red
Note: SUMIPEX®MHR is now known as SUMIPEX® MH-EXTRA			4152	Red
Note: SUMIPEX® MT is now known as SUMIPEX® ME			4162	Red
Note: SUMIPEX® K206 is now known as SUMIPEX® EP			4172	Red
Note: For SUMIPEX® HTaaabS, the following numbers are inserted aaa: 001-999/b:0-9 or hidden, S=Q~W			4182	Red
			4184	Red
Note: SUMIPEX® HTaaabS is only listed for lenses with thickness of 1.6 mm to 3.2 mm			4312	Red
			4312-1	Red
Note: SUMIPEX® HTaaabS is only listed in clear			4314	Red
Note: Color 4998 in thickness over 3.2mm is not for use in front a reflex reflector or as a reflex reflector			4322	Red
			4332	Red
Note: Color 0999 is only listed in thickness 6.4 mm and above			4334	Red
Note: Color 4406 is only listed in thickness 6.4 mm and above			4401	Red
			4402	Red
			4403	Red
			4404	Red
			4406	Red
			4901	Red
			4902	Red
			4903	Red
			4904	Red
			4906	Red
			4911	Red
			4912	Red
			4913	Red
			4915	Red
			4998	Red
			4999	Red
			3101	Yellow
			3111	Yellow
			3121	Yellow
			3131	Yellow

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Sumitomo Chemical Co., Ltd.	SUMIPEX® HT	Polymethyl Methacrylate	3231	Yellow
	SUMIPEX® MG		3232	Yellow
	SUMIPEX® MH		3311	Yellow
	SUMIPEX® MHF		3321	Yellow
www.sumitomo-chem.co.jp	SUMIPEX® MHG		3331	Yellow
	SUMIPEX® MH-EXTRA		3421	Yellow
	SUMIPEX® MM		3901	Yellow
	SUMIPEX® ME		3902	Yellow
	SUMIPEX® TR		3904	Yellow
	SUMIPEX® MH5		3906	Yellow
	SUMIPEX® EPE		3910	Yellow
	SUMIPEX® EPM		3911	Yellow
	SUMIPEX® K203		3914	Yellow
	SUMIPEX® K610		3916	Yellow
	SUMIPEX® EP		3917	Yellow
	SUMIPEX® HTaaabS		3918	Yellow
	SUMIPEX® Meguri® MH		3925	Yellow
			9001	Gray
			9002	Gray
			9003	Gray
			9004	Gray
			9005	Gray
			9007	Gray
			9010	Gray
			9175	Gray
			9176	Gray
			9177	Gray
			9178	Gray
			9179	Gray
			9180	Gray
			9181	Gray
			9182	Gray
			9183	Gray
			9184	Gray
			9185	Gray
			9186	Gray
			9187	Gray
			9188	Gray
			9189	Gray
			9191	Gray
			9260	Brown
			9261	Brown
			9262	Brown
			9263	Brown
			9265	Brown

Note: SUMIPEX® K202 is now known as SUMIPEX® EPM
Note: SUMIPEX® MHR is now known as SUMIPEX® MH-EXTRA
Note: SUMIPEX® MT is now known as SUMIPEX® ME
Note: SUMIPEX® K206 is now known as SUMIPEX® EP
Note: For SUMIPEX® HTaaabS, the following numbers are inserted
aaa: 001-999/b:0-9 or hidden, S=Q~W
Note: SUMIPEX® HTaaabS is only listed for lenses with thickness of 1.6 mm-3.2 mm
Note: SUMIPEX® HTaaabS is only listed in clear
Note: Color 4998 in thickness over 3.2mm is not for use in front a reflex reflector or as a reflex reflector
Note: Color 0999 is only available in thickness 6.4 mm and above
Note: Color 4406 is only listed in thickness 6.4 mm and above

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Sumitomo Chemical Asia PTE Ltd.	SUMIPEX® HT	Polymethyl Methacrylate	R004	Clear
	SUMIPEX® MG		R006	Clear
	SUMIPEX® MH		011	Clear
	SUMIPEX® MHF		012	Clear
	SUMIPEX® MHG		014	Clear
http://sumitomo-chem.com.sg	SUMIPEX® MH-EXTRA		020	Clear
	SUMIPEX® MM		022	Clear
	SUMIPEX® ME		0151	Clear
	SUMIPEX® TR		0152	Clear
	SUMIPEX® MH5		0153	Clear
	SUMIPEX® EPE		0154	Clear
	SUMIPEX® EPM		0155	Clear
	SUMIPEX® K203		0161	Clear
	SUMIPEX® K610		0162	Clear
	SUMIPEX® EP		0163	Clear
	SUMIPEX® HTaaabS		0164	Clear
	SUMIPEX® Meguri® MH		0165	Clear
			0195	Clear
			0999	Clear
			418(RR)	Red
			4052	Red
Note: SUMIPEX® K202 is now known as SUMIPEX® EPM			4092	Red
Note: SUMIPEX® MHR is now known as SUMIPEX® MH-EXTRA			4152	Red
Note: SUMIPEX® MT is now known as SUMIPEX® ME			4162	Red
Note: SUMIPEX® K206 is now known as SUMIPEX® EP			4172	Red
Note: For SUMIPEX® HTaaabS, the following numbers are inserted aaa: 001-999/b:0-9 or hidden, S=Q~W			4182	Red
			4184	Red
Note: SUMIPEX® HTaaabS is only listed for lenses with thickness of 1.6 mm-3.2 mm			4312	Red
			4312-1	Red
Note: SUMIPEX® HTaaabS is only listed in clear			4314	Red
Note: Color 4998 in thickness over 3.2mm is not for use in front a reflex reflector or as a reflex reflector			4322	Red
			4332	Red
Note: Color 0999 is only listed in thickness 6.4 mm and above			4334	Red
Note: Color 4406 is only listed in thickness 6.4 mm and above			4401	Red
			4402	Red
			4403	Red
			4404	Red
			4406	Red
			4901	Red
			4902	Red
			4903	Red
			4904	Red
			4906	Red
			4911	Red
			4912	Red
			4913	Red
			4915	Red
			4998	Red
			4999	Red
			3101	Yellow
			3111	Yellow
			3121	Yellow
			3131	Yellow
			3231	Yellow
			3232	Yellow
			3311	Yellow
			3321	Yellow
			3331	Yellow
			3421	Yellow
			3901	Yellow
			3902	Yellow

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Sumitomo Chemical Asia PTE., Ltd. http://sumitomo-chem.com.sg	SUMIPEX® HT SUMIPEX® MG SUMIPEX® MH SUMIPEX® MHF SUMIPEX® MHG SUMIPEX® MH-EXTRA SUMIPEX® MM SUMIPEX® ME SUMIPEX® TR SUMIPEX® MH5 SUMIPEX® EPE SUMIPEX® EPM SUMIPEX® K203 SUMIPEX® K610 SUMIPEX® EP SUMIPEX® HTaaabS SUMIPEX® Meguri® MH	Polymethyl Methacrylate	3904 3906 3910 3911 3914 3916 3917 3918 3925 9001 9002 9003 9004 9005 9007 9010 9175 9176 9177 9178 9179 9180 9181 9182 9183 9184 9185 9186 9187 9188 9189 9191 9260 9261 9262 9263 9265	Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Brown Brown Brown Brown Brown

Note: SUMIPEX® K202 is now known as SUMIPEX® EPM
Note: SUMIPEX® MHR is now known as SUMIPEX® MH-EXTRA
Note: SUMIPEX® MT is now known as SUMIPEX® ME
Note: SUMIPEX® K206 is now known as SUMIPEX® EP
Note: For SUMIPEX® HTaaabS, the following numbers are inserted aaa: 001-999/b:0-9 or hidden, S=Q~W
Note: SUMIPEX® HTaaabS is only listed for lenses with thickness of 1.6 mm-3.2 mm
Note: SUMIPEX® HTaaabS is only listed in clear
Note: Color 4998 in thickness over 3.2mm is not for use in front a reflex reflector or as a reflex reflector
Note: Color 0999 is only available in thickness 6.4 mm and above
Note: Color 4406 is only listed in thickness 6.4 mm and above

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Sumitomo Chemical Europe S.A./N.V.	SUMIPEX® HT	Polymethyl Methacrylate	R004	Clear
	SUMIPEX® MG		R006	Clear
	SUMIPEX® MH		011	Clear
www.sumitomo-chem.be	SUMIPEX® MHF		012	Clear
	SUMIPEX® MHG		014	Clear
	SUMIPEX® MH-EXTRA		020	Clear
	SUMIPEX® MM		022	Clear
	SUMIPEX® ME		0151	Clear
	SUMIPEX® TR		0152	Clear
	SUMIPEX® MH5		0153	Clear
	SUMIPEX® EPE		0154	Clear
	SUMIPEX® EPM		0155	Clear
	SUMIPEX® K203		0161	Clear
	SUMIPEX® K610		0162	Clear
	SUMIPEX® EP		0163	Clear
	SUMIPEX® HTaaabS		0164	Clear
	SUMIPEX® Meguri® MH		0165	Clear
			0195	Clear
			0999	Clear
			418(RR)	Red
			4052	Red
Note: SUMIPEX® K202 is now known as SUMIPEX® EPM			4092	Red
Note: SUMIPEX® MHR is now known as SUMIPEX® MH-EXTRA			4152	Red
Note: SUMIPEX® MT is now known as SUMIPEX® ME			4162	Red
Note: SUMIPEX® K206 is now known as SUMIPEX® EP			4172	Red
Note: For SUMIPEX® HTaaabS, the following numbers are inserted aaa: 001-999/b:0-9 or hidden, S=Q~W			4182	Red
			4184	Red
Note: SUMIPEX® HTaaabS is only listed for lenses with thickness of 1.6mm-3.2 mm			4312	Red
			4312-1	Red
Note: SUMIPEX® HTaaabS is only listed in clear			4314	Red
Note: Color 4998 in thickness over 3.2mm is not for use in front a reflex reflector or as a reflex reflector			4322	Red
			4332	Red
Note: Color 0999 is only available in thickness 6.4 mm and above			4334	Red
Note: Color 4406 is only listed in thickness 6.4 mm and above			4401	Red
			4402	Red
			4403	Red
			4404	Red
			4406	Red
			4901	Red
			4902	Red
			4903	Red
			4904	Red
			4906	Red
			4911	Red
			4912	Red
			4913	Red
			4915	Red
			4998	Red
			4999	Red
			3101	Yellow
			3111	Yellow
			3121	Yellow
			3131	Yellow

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Sumitomo Chemical	SUMIPEX® HT	Polymethyl	3231	Yellow
Europe S.A./N.V.	SUMIPEX® MG	Methacrylate	3232	Yellow
	SUMIPEX® MH		3241	Yellow
www.sumitomo-chem.be	SUMIPEX® MHF		3311	Yellow
	SUMIPEX® MHG		3321	Yellow
	SUMIPEX® MH-EXTRA		3331	Yellow
	SUMIPEX® MM		3421	Yellow
	SUMIPEX® ME		3901	Yellow
	SUMIPEX® TR		3902	Yellow
	SUMIPEX® MH5		3904	Yellow
	SUMIPEX® EPE		3910	Yellow
	SUMIPEX® EPM		3911	Yellow
	SUMIPEX® K203		3914	Yellow
	SUMIPEX® K610		3916	Yellow
	SUMIPEX® EP		3917	Yellow
	SUMIPEX® HTaaabS		3918	Yellow
	SUMIPEX® Meguri® MH		3925	Yellow
			9001	Gray
			9002	Gray
			9003	Gray
			9004	Gray
			9005	Gray
			9007	Gray
			9010	Gray
			9175	Gray
Note: SUMIPEX® K202 is now known as SUMIPEX® EPM			9176	Gray
Note: SUMIPEX® MHR is now known as SUMIPEX® MH-EXTRA			9177	Gray
Note: SUMIPEX® MT is now known as SUMIPEX® ME			9178	Gray
Note: SUMIPEX® K206 is now known as SUMIPEX® EP			9179	Gray
Note: For SUMIPEX® HTaaabS, the following numbers are inserted			9180	Gray
aaa: 001-999/b:0-9 or hidden, S=Q~W			9181	Gray
Note: SUMIPEX® HTaaabS is only listed for lenses with thickness			9182	Gray
of 1.6 mm-3.2 mm			9183	Gray
Note: SUMIPEX® HTaaabS is only listed in clear			9184	Gray
Note: Color 4998 in thickness over 3.2mm is not for use in front a reflex			9185	Gray
reflector or as a reflex reflector			9186	Gray
Note: Color 0999 is only available in thickness 6.4 mm and above			9187	Gray
Note: Color 4406 is only listed in thickness 6.4 mm and above			9188	Gray
			9189	Gray
			9191	Gray
			9260	Brown
			9261	Brown
			9262	Brown
			9263	Brown
			9265	Brown

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Sumika Polycarbonate Ltd. www.scpc.jp	SD POLYCA™ 303-10 SD POLYCA™ 303-30 (coated or uncoated)	Polycarbonate	30003 30004 160039 150038	White $ White $ Red $ Yellow $

Formerly Sumika Stylon Polycarbonate Limited

Coated Sumika Polycarbonate Limited plastics are only acceptable with the coatings listed below when properly applied to the molded lens.

Coating in Alphabetical Order and Corresponding Manufacturer

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7, FUJIHARD HH3035U-3, and FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei Co., Ltd.

Coating Manufacturer in Alphabetical Order

FUJIKURA KASEI

Information on FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7 and FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo, 105-0011
Japan
www.fkkasei.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Sumika Polycarbonate Ltd.	SD POLYCA™ SD2133V SD POLYCA™ SD2143V (Coated only) -	Polycarbonate Polycarbonate	AA059 AA087	White $ White $

www.scpc.jp

Formerly Sumika Stylon Polycarbonate Limited

Coated Sumika Polycarbonate Ltd. plastics are only acceptable with the coatings listed below when properly applied to the molded lens.

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking PH-328 hard coats: See Mitsubishi Chemical Corporation

Coating Manufacturer in Alphabetical Order

MITSUBISHI CHEMICAL GROUP

Information on Mitsubishi Chemical Corporation Acryking PH-328 coating may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Sumika Polycarbonate Ltd. (coated or uncoated) www.scpc.jp	SD POLYCA™ TR0601A SD POLYCA™ TR0601A4	Inner Lens Polycarbonate		Clear !

Formerly Sumika Stylon Polycarbonate Limited

Sumika Polycarbonate Limited inner lens plastics are only listed when tested behind clear coated Covestro AL2447

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
	Suzhou Double Elephant Optical Material Co., Ltd. Chongqing Double Elephant Optical Material Co., Ltd.	SX-304	PMMA	Clear

Note: Suzhou Double Elephant Optical Material Co., Ltd. and Chongqing Double Elephant Optical Material Co., Ltd. Is listed from 1.6 to 2.3 mm only.

Manufacturer contact information:

Suzhou Double Elephant Optical Material Co., Ltd.
Add: No. 18, Donghai Road
Yangtze River International Chemical Industrial Park,
Zhangjiagang, Jiangsu
P.R. China
TEL: +86-512-80152090
http://www.jiangsusx.com/en/szgxcl/

Chongqing Double Elephant Optical Material Co., Ltd.
Add: Room 1-1, No.20 Qixin Avenue, Yanjia Street,
Changshou District, Chongqing,
P.R. China
Tel: 18013601067
http://www.jiangsusx.com/en/cqgxcl/

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Taicang Huading Plastic Co., Ltd.	HDM1011	Polymethyl Methacrylate	C21812	Yellow
			C21813	Yellow
			C22570	Yellow
			B12518	Red
			B22680	Red
			B22690	Red

Note: Red B12518 is only listed from 2.3 to 6.4 mm and thickness 2.3 is only for SAE devices.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Teijin Limited	Panlite L-1225V (coated)	Polycarbonate	100-M	Clear Q2

www.teijin.co.jp

Coated Teijin Limited Panlite L-1225V plastic is only acceptable with the coatings listed below when properly applied to the molded lens.

Coating in Alphabetical Order and Corresponding Manufacturer

PH-328, PH-700, Acryking PH-720: See Mitsubishi Chemical Corporation

SH-50: See Stanley Electric Co., Ltd.

Coating Manufacturer in Alphabetical Order

Information on Mitsubishi Chemical Corporation Acryking F-328, Acryking F-700 and Acryking PH-720 coating may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking F-328, Acryking F-700 and Acryking PH-720 were tested on clear L-1225Z only.

Information on Stanley Electric SH-50 coating may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro
Meguro-Ku, Tokyo 153-8636
Japan
www.stanley.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Teijin Limited	Panlite L-1225VE (coated)	Polycarbonate	100-M	Clear Q2

www.teijin.co.jp

Coated Teijin Limited Panlite L-1225VE plastic is only acceptable with the coatings listed below when properly applied to the molded lens.

Coating in Alphabetical Order and Corresponding Manufacturer

SH-50: See Stanley Electric Co., Ltd.

Coating Manufacturer in Alphabetical Order

Information on Stanley Electric SH-50 coating may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro
Meguro-Ku, Tokyo 153-8636
Japan
www.stanley.co.jp

Teijin Limited	Panlite L-1225Z	Polycarbonate	100	Clear #
	Panlite L-1225ZA		100-C	Clear #
	Panlite L-1225ZL		100-L	Clear #
	Panlite L-1225Z U (see Note below)		100-K	Clear #
	Panlite L-1250Z		100-M	Clear #
	(coated or uncoated)		110	Clear #
www.teijin.co.jp			1000	Clear #
			1100	Clear #
Color numbers listed for Teijin Limited(other than the numbers for above already having suffixes) can have suffixes represented by the following alphabets: -L, –LM, -M, -K			1200	Clear #
			1300	Clear #
			1400	Clear #
			200	Red #
			206	Red #
			210	Red #
			216	Red #
			220	Red #
			226	Red #
			230	Red #
			236	Red #
			240	Red #
			246	Red #
			250	Red #
			260	Red #
			270	Red #
			280	Red #
			290	Red #

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Teijin Limited	Panlite L-1225Z	Polycarbonate	2000	Red #
	Panlite L-1225ZA		2100	Red #
	Panlite L-1225ZU (See Note)		2200	Red #
	Panlite L-1225ZL		2300	Red #
	Panlite L-1250Z		2400	Red #
	(coated or uncoated)		2500	Red #
www.teijin.co.jp			2600	Red #
			2700	Red #
Color numbers listed for Teijin Limited(other than the numbers for the above already having suffixes) can have suffixes represented by following alphabets: -L, –LM, -M, -K			2800	Red #
			2900	Red #
			300	Yellow #
			310	Yellow #
			320	Yellow #
			330	Yellow #
			340	Yellow #
			350	Yellow #
			360	Yellow #
			370	Yellow #
			380	Yellow #
			390	Yellow #
			400	Yellow #
			410	Yellow #
			420	Yellow #
			430	Yellow #
			440	Yellow #
			3000	Yellow #
			3100	Yellow #
			3200	Yellow #
			3300	Yellow #
			3400	Yellow #
			3500	Yellow #
			3600	Yellow #
			3700	Yellow #
			3800	Yellow #
			3900	Yellow #
			7000	Gray #
			7100	Gray #
			7200	Gray #
			7300	Gray #
			7400	Gray #
			7500	Gray #
			7600	Gray #
			7700	Gray #
			7800	Gray #
			7900	Gray #

Teijin Limited Panlite L-1225ZU must be coated to pass weathering.

Coated Teijin Limited Plastics are only acceptable with the coatings listed below when properly applied to the molded lens.

(Coating Information Continued on the Next Page)

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101S, Acryking PH-328, Acryking PH-511, Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-750 Acryking PH-800, Acryking PH-800N5A and Acryking PH-930: See Mitsubishi Chemical Corporation

CD-3M12 : See HIPRO Polymer Materials (Jiangsu) Co., Ltd.

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2605, FUJIHARD HH2610, FUJIHARD HH3176: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH3372U: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH3401U: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH3482U, FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3: See Fujikura Kasei Co., Ltd.

Fujikura NH: See Fujikura Kasei, Co., Ltd.

KUV-5000, KUV-6000: See KCC Corporation.

MODIHARD 200S: See NOF Corporation

PHOLUCID No.150C and PHOLUCID No.180C: See Chugoku Marine Paints, Ltd.

SH-41, SH-50, SH-51 and SH-61: See Stanley Electric

SM710, SM115 hard coat: See Teijin Limited

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60: Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2: See Momentive Performance Materials.

UVHC8100: Momentive Performance Materials Inc.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8.: See Red Spot.

Coating Manufacturer in Alphabetical Order

Information on PHOLUCID No.150C and PHOLUCID No.180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542 www.cmp.co.jp

Note: PHOLUCID No.150C was tested on Panlite L-1225Z 100K clear only.
Note: PHOLUCID No.180C was tested on Panlite L-1225ZA and Panlite L-1225Z 100K clear only.

Information on FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3, FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH2605, FUJIHARD HH2610, FUJIHARD HH3176, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3, FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7 and Fujikura NH coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJIHARD coatings were tested on Panlite L-1225Z only
Note: FUJIHARD HH3401U coatings was tested on Panlite L-1225Z 100 only
Note: Panlite L-1225ZU is only available on Fujikura NH coatings
Note: FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3 were tested on clear L-1225Z

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on HIPRO Polymer Materials (Jiangsu) CD-3M12 may be obtained by writing to the following address:

HIPRO Polymer Materials (Jiangsu) Co., Ltd.
North Industrial Park Wuxi, Jiangsu
P.R. China
Tel.: +86-510-87855326
Website: www.hiprocoating.com

Note: HIPRO CD-3M12 is NOT suitable for use with or in front of a reflex reflector
Note: HIPRO CD-3M12 was only tested on Teijin L-1225Z 100K Clear.

Information on KUV-5000 and KUV-6000 coatings may be obtained by writing:

KCC Corporation
83 Mabook-Dong, Giheung-Gu,
Yongin-Si, Gyunggi-Do
South Korea
www.kccworld.co.kr

Note: KUV-5000 and KUV-6000 were tested on Panlite L-1225Z only
Note: Panlite L-1225ZU is not available with KCC Corporation coatings

Information on Mitsubishi Chemical Corporation Acryking F-328, Acryking K-101S, Acryking PH-328, Acryking PH-511, Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-750 Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coating may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking F-328, Acryking K-101S, Acryking PH-328, Acryking PH-511, Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-750, Acryking PH-800 and Acryking PH-800N5A were tested on clear L-1225Z only.
Note: Panlite L-1225ZU is available with MRC-720 only above 3.2 mm
Note: Acryking PH-930 was tested on clear Panlite L-1225Z and Panlite L-1225ZA

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2, and UVHC8100 hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Materials Inc. Building V7
51368 Leverkusen
Germany

Momentive Performance
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: Panlite L-1225ZU is not available with Momentive coatings
Note: UVHC5000 series were tested on L-1225Z clear only.
Note: UVHC8100 was tested on Panlite L-1225Z-100, l-1225-100K, L-1225Z-100M

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on Panlite L-1225V 100K Clear in thicknesses 1/11 to 1/4 inch only.

Information on Red Spot UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8 UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8. coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 were tested L-1225Z, L-1225ZL and L-1250Z clear only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on Stanley Electric SH-41, SH-50, SH-51 and SH-61 may be obtained by writing to the following company:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: Stanley SH-51 only tested on clear Panlite plastics.
Note: Stanley SH-61 only tested on clear Panlite L-1225Z 100-M.
Note: Panlite L-1225ZU is not to be used in front of a reflex reflector in lens thicknesses of 3.2mm

Information on SM710 coating or SM115 hard coat may be obtained by writing to the following address:

Teijin Limited
Plastics Sales Division
Kasumigaseki Common Gate West Tower
2-1, Kasumigaseki 3-Chome, Chiyoda-
Ku, Tokyo, 100-8585
Japan
www.teijin.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Teijin Polycarbonate China Ltd.	Panlite L-1225V (coated)	Polycarbonate	100-M	Clear &

www.teijin.co.jp

Coated Teijin Polycarbonate China Panlite L-1225V 100-M plastic is only acceptable with the coatings listed below when properly applied to the molded lens.

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking PH-328, Acryking PH-700, Acryking PH-720 : See Mitsubishi Chemical Corporation

SH-50: See Stanley Electric Co., Ltd.

Coating Manufacturer in Alphabetical Order

Information on Mitsubishi Chemical Corporation Acryking F-328, Acryking PH-700 and Acryking PH-720 coating may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking F-328, Acryking PH-700 and Acryking PH-720 were tested on clear L-1225Z only.

Information on Stanley Electric SH-50 coating may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro
Meguro-Ku, Tokyo 153-8636
Japan
www.stanley.co.jp

Teijin Polycarbonate China, Ltd.	Panlite L-1225Z	Polycarbonate	100	Clear #
	Panlite L-1225ZA		100-C	Clear #
	Panlite L-1225ZL		100-L	Clear #
	Panlite L-1250Z		100-K	Clear #
www.teijin.co.jp	(coated or uncoated)		100-M	Clear #
			110	Clear #
			1000	Clear #
			1100	Clear #
			1200	Clear #
			1300	Clear #
			1400	Clear #

Color numbers listed for Teijin Polycarbonate China, Ltd. (other than the numbers for above already having suffixes) can have suffixes represented by the following alphabets: -L, –LM, -M, -K

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Teijin Polycarbonate China, Ltd.	Panlite L-1225Z	Polycarbonate	200	Red #
	Panlite L-1225ZA		206	Red #
	Panlite L-1225ZL		210	Red #
	Panlite L-1250Z		216	Red #
	(coated or uncoated)		220	Red #
www.teijin.co.jp			226	Red #
			230	Red #
Color numbers listed for Teijin Polycarbonate China Ltd. (other than the numbers for above already having suffixes) can have suffixes represented by the following alphabets: -L, -LM, -M, -K			236	Red #
			240	Red #
			246	Red #
			250	Red #
			260	Red #
			270	Red #
			280	Red #
			290	Red #
			2000	Red #
			2100	Red #
			2200	Red #
			2300	Red #
			2400	Red #
			2500	Red #
			2600	Red #
			2700	Red #
			2800	Red #
			2900	Red #
			300	Yellow #
			310	Yellow #
			320	Yellow #
			330	Yellow #
			340	Yellow #
			350	Yellow #
			360	Yellow #
			370	Yellow #
			380	Yellow #
			390	Yellow #
			400	Yellow #
			410	Yellow #
			420	Yellow #
			430	Yellow #
			440	Yellow #
			3000	Yellow #
			3100	Yellow #
			3200	Yellow #
			3300	Yellow #
			3400	Yellow #
			3500	Yellow #
			3600	Yellow #
			3700	Yellow #
			3800	Yellow #
			3900	Yellow #
			7000	Gray #
			7100	Gray #
			7200	Gray #
			7300	Gray #
			7400	Gray #

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Teijin Polycarbonate China, Ltd.	Panlite L-1225Z	Polycarbonate	7500	Gray #
	Panlite L-1225ZA		7600	Gray #
	Panlite L-1225ZL		7700	Gray #
	Panlite L-1250Z		7800	Gray #
	(coated or uncoated)		7900	Gray #

www.teijin.co.jp

Color numbers listed for Teijin Polycarbonate China Ltd. (other than the numbers for above already having suffixes) can have suffixes represented by the following alphabets: -L, -LM, -M, -K

Coated Teijin Polycarbonate China Ltd. plastics are only acceptable with the coatings listed below when properly applied to the molded lens.

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101S, Acryking PH-328, Acryking PH-511, Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-750 Acryking PH-800, Acryking PH-800N5A and Acryking PH-930: See Mitsubishi Chemical Corporation

CD-3M12 : See HIPRO Polymer Materials (Jiangsu) Co., Ltd.

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2605, FUJIHARD HH2610, FUJIHARD HH3176: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH3372U: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH3401U: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH3482U, FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3: See Fujikura Kasei Co., Ltd.

MODIHARD 200S: See NOF Coatings

PHOLUCID No.150C and PHOLUCID No.180C: See Chugoku Marine Paints, Ltd.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

SH-41, SH-50, SH-51 and SH-61: See Stanley Electric

SM710, SM115 hard coat: See Teijin Limited

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC3000K1, UVHC3000K-Z: Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2: See Momentive Performance Materials.

UVHC8100: Momentive Performance Materials Inc.

UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

Coating Manufacturer in Alphabetical Order

Information on PHOLUCID No.150C and PHOLUCID No.180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No.150C was tested on Panlite L-1225Z 100K clear only.
Note: PHOLUCID No.180C was tested on Panlite L-1225ZA and Panlite L-1225Z 100K clear only.

Information on FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3, FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH2605, FUJIHARD HH2610, FUJIHARD HH3176, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-2, FUJIHARD HH3482U-3, FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7 and Fujikura NH coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan www.fkkasei.co.jp

Note: FUJIHARD coatings were tested on Panlite L-1225Z only
Note: FUJIHARD HH3401U coatings was tested on Panlite L-1225Z 100 only
Note: Panlite L-1225ZU is only available on Fujikura NH coatings
Note: FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3 were tested on clear Panline L-1225Z only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on HIPRO Polymer Materials (Jiangsu) CD-3M12 may be obtained by writing to the following address:

HIPRO Polymer Materials (Jiangsu) Co., Ltd.
North Industrial Park Wuxi, Jiangsu
P.R. China
Tel.: +86-510-87855326
Website: www.hiprocoating.com

Note: HIPRO CD-3M12 is NOT suitable for use with or in front of a reflex reflector
Note: HIPRO CD-3M12 was only tested on Teijin L-1225Z 100K Clear.

Information on Mitsubishi Chemical Corporation Acryking F-328, Acryking K-101S, Acryking PH-328, Acryking PH-511, Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-750, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking F-328, Acryking K-101S, Acryking PH-328, Acryking PH-511, Acryking PH-710, Acryking PH-720, Acryking PH-750 and Acryking PH-800 and Acryking PH-800N5A were tested on clear L-1225Z only.
Note: Acryking PH-930 was tested on clear Panlite L-1225Z and Panlite L-1225ZA

Information on Information on UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC3000K1, UVHC3000K-Z, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2 and UVHC8100 hard coat may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: Panlite L-1225ZU is not available with Momentive coatings
Note: UVHC5000 series were tested on L-1225Z clear only.
Note: UVHC8100 was tested on Panlite L-1225Z-100, l-1225-100K, L-1225Z-100M

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on Panlite L-1225V 100K Clear in thicknesses 1/11 to 1/4 Inch.

Information on Red Spot UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8 coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Information on Stanley Electric SH-41, SH-50, SH-51 and SH-61 coating may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro
Meguro-Ku, Tokyo 153-8636
Japan
www.stanley.co.jp

Note: Stanley SH-51 only tested on clear Panlite plastics.
Note: Stanley SH-61 only tested on clear Panlite L-1225Z 100-M.

Information on SM710 coating or SM115 hard coat may be obtained by writing to the following address:

Teijin Limited
Plastics Sales Division
Kasumigaseki Common Gate West Tower
2-1, Kasumigaseki 3-Chome,
Chiyoda-Ku, Tokyo, 100-8585
Japan
www.teijin.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Teijin Polycarbonate Singapore PTE Ltd.	Panlite L-1225V (coated)	Polycarbonate	100-M	Clear #

www.teijin.co.jp

Coated Teijin Polycarbonate Singapore PTE Panlite L-1225V 100-M plastic is only acceptable with the coatings listed below when properly applied to the molded lens.

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking PH-328, Acryking PH-700 and Acryking PH-720: See Mitsubishi Chemical Corporation

SH-50: See Stanley Electric

Coating Manufacturer in Alphabetical Order

Information on Mitsubishi Chemical Corporation Acryking F-328, Acryking PH-700 and Acryking PH-720 coating may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking F-328, and Acryking PH-720 were tested on clear L-1225Z only.

Information on Stanley Electric SH-50 coating may be obtained by writing to the following address:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro
Meguro-Ku, Tokyo 153-8636
Japan
www.stanley.co.jp

Teijin Polycarbonate Singapore PTE Ltd.	Panlite L-1225Z	Polycarbonate	100	Clear #
	Panlite L-1225ZA		100-C	Clear #
	Panlite L-1225ZL		100-L	Clear #
	Panlite L-1250Z		100-K	Clear #
	(coated or uncoated)		100-M	Clear #
www.teijin.co.jp			110	Clear #
			1000	Clear #
Color numbers listed for Teijin Polycarbonate Singapore PTE Ltd. (other than the numbers for above already having suffixes) can have suffixes represented by the following alphabets: -L, –LM, -M, -K			1100	Clear #
			1200	Clear #
			1300	Clear #
			1400	Clear #
			200	Red #
			206	Red #

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Teijin Polycarbonate Singapore PTE Ltd.	Panlite L-1225Z	Polycarbonate	210	Red #
	Panlite L-1225ZA		216	Red #
	Panlite L-1225ZL		220	Red #
	Panlite L-1250Z		226	Red #
	(coated or uncoated)		230	Red#
www.teijin.co.jp			236	Red #
			240	Red #
Color numbers listed for Teijin Polycarbonate Singapore PTE Ltd. (other than the numbers for above already having suffixes) can have suffixes represented by the following alphabets: -L, –LM, -M, -K			246	Red #
			250	Red #
			260	Red #
			270	Red #
			280	Red #
			290	Red #
			2000	Red #
			2100	Red #
			2200	Red #
			2300	Red #
			2400	Red #
			2500	Red #
			2600	Red #
			2700	Red #
			2800	Red #
			2900	Red #
			300	Yellow #
			310	Yellow #
			320	Yellow #
			330	Yellow #
			340	Yellow #
			350	Yellow #
			360	Yellow #
			370	Yellow #
			380	Yellow #
			390	Yellow #
			400	Yellow #
			410	Yellow #
			420	Yellow #
			430	Yellow #
			440	Yellow #
			3000	Yellow #
			3100	Yellow #
			3200	Yellow #
			3300	Yellow #
			3400	Yellow #
			3500	Yellow #
			3600	Yellow #
			3700	Yellow #
			3800	Yellow #
			3900	Yellow #
			7000	Gray #
			7100	Gray #
			7200	Gray #
			7300	Gray #
			7400	Gray #
			7500	Gray #
			7600	Gray #
			7700	Gray #
			7800	Gray #
			7900	Gray #

(Coating information contained on the next page)

Coated Teijin Polycarbonate Singapore PTE Ltd. are only acceptable when treated with the following coatings applied to the molded lens:

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101S, Acryking PH-328, Acryking PH-511, Acryking PH-710, Acryking PH-700, Acryking PH-720, Acryking PH-750 Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 : See Mitsubishi Chemical Corporation

CD-3M12 : See HIPRO Polymer Materials (Jiangsu) Co., Ltd.

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH2605, FUJIHARD HH2610, FUJIHARD HH3176: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH3372U: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH3401U: See Fujikura Kasei, Co., Ltd.

FUJIHARD HH3482U, FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3: See Fujikura Kasei Co., Ltd.

MODIHARD 200S: NOF Corporation

PHOLUCID No.150C and PHOLUCID No.180C: See Chugoku Marine Paints, Ltd.

SH-41, SH-50, SH-51 and SH-61: See Stanley Electric

SM710, SM115 hard coat: See Teijin Limited

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC3000K1, UVHC3000K-Z: See Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2: See Momentive Performance Materials.

UVHC8100: See Momentive Performance Materials Inc.

(Coating Information Continued on the Next Page)

UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

Coating Manufacturer in Alphabetical Order

Information on PHOLUCID No.150C and PHOLUCID No.180C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: +81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No.150C was tested on Panlite L-1225Z 100K clear only.
Note: PHOLUCID No.180C was tested on Panlite L-1225ZA and Panlite L-1225Z 100K clear only.

Information on FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2566U, FUJIHARD HH2566U-1, FUJIHARD HH2566U-2, FUJIHARD HH2566U-3, FUJIHARD HH2567U, FUJIHARD HH2567U-1, FUJIHARD HH2567U-2, FUJIHARD HH2567U-3, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH2605, FUJIHARD HH2610, FUJIHARD HH3176, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-2, FUJIHARD HH3482U-3, FUJIHARD HH9986U-N3, FUJIHARD HH9986U-N5, FUJIHARD HH9986U-N7 and Fujikura NH coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJIHARD coatings were tested on Panlite L-1225Z only.

Information on HIPRO Polymer Materials (Jiangsu) CD-3M12 may be obtained by writing to the following address:

HIPRO Polymer Materials (Jiangsu) Co., Ltd.
North Industrial Park Wuxi, Jiangsu
P.R. China
Tel.: +86-510-87855326
Website: www.hiprocoating.com

Note: HIPRO CD-3M12 is NOT suitable for use with or in front of a reflex reflector
Note: HIPRO CD-3M12 was only tested on Teijin L-1225Z 100K Clear.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on Mitsubishi Chemical Corporation Acryking F-328, Acryking K-101S, Acryking PH-328, Acryking PH-511, Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-750, Acryking PH-800 and Acryking PH-800N5A coating may be obtained by writing to the following address:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking F-328, Acryking K-101S, Acryking PH-328, Acryking PH-511, Acryking PH-700, Acryking PH-710, Acryking PH-720, Acryking PH-750 Acryking PH-800 and Acryking PH-800N5A were tested on clear L-1225Z only.
Note: Acryking PH-930 was tested on clear Panlite L-1225Z and Panlite L-1225ZA

Information on UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC3000K1, UVHC3000K-Z, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2, and UVT8100 hard coat may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: Panlite L-1225ZU is not available with Momentive coatings
Note: UVHC5000 series were tested on L-1225Z clear only.
Note: UVHC8100 was tested on Panlite L-1225Z-100, l-1225-100K, L-1225Z-100M

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on Panlite L-1225V 100K Clear in thicknesses 1/11 to 1/4 Inch only.

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

RED SPOT PAINT & VARNISH COMPANY, INC.

Information on Red Spot UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8 coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Information on Stanley Electric SH-41, SH-50 and SH-51 coating may be obtained by writing to the following address:

STANLEY

Stanley Electric Co., Ltd.
2-9-13, Nakameguro
Meguro-Ku, Tokyo 153-8636
Japan
www.stanley.co.jp

Note: Stanley SH-51 only tested on clear Panlite plastics.
Note: Stanley SH-61 only tested on clear Panlite L-1225Z 100-M.

Information on SM710 coating or SM115 hard coat may be obtained by writing to the following address:

Teijin Limited
Plastics Sales Division
Kasumigaseki Common Gate West Tower
2-1, Kasumigaseki 3-Chome,
Chiyoda-Ku, Tokyo, 100-8585
Japan
www.teijin.co.jp

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Thai Polycarbonate Co., Ltd.	IUPILON ML-100	Polycarbonate	001	Clear #
	IUPILON ML-200		0001	Clear #
	IUPILON ML-300		R591A	Clear #
www.tpcc-tpac.com	IUPILON ML-300AH		R530B	Clear #!
	IUPILON ML-350		R591C	Clear #
	IUPILON ML-400		R591B	Clear #
	IUPILON ML-100R		R591S	Clear #
	IUPILON ML-200R		101	Red #
	IUPILON ML-300R		102	Red #
	IUPILON ML-350R		103	Red #
	IUPILON ML-400R		104	Red #
	IUPILON HL-3003		R138J	Red #
	IUPILON HL-3503		1001	Red #
	(coated or uncoated)		1002	Red #
			301	Yellow #
			300	Yellow #

Note:	ML-300/R1GYH, ML-300/R1BWH, ML-400/R148A, ML-300/R265E, ML-400R/R206F, HL-3003/N414, HL-3003/N418, HL-3003/N424, HL-3003/N428 HL-3503/N414, HL-3503/N418 HL-3503/N424, and HL-3503/N428 are for protected applications only	ML-300/R1GYH	Red!
		ML-300/R1BWH	Red!
		ML-400/R148A	Red!
		ML-300/R265E	Yellow!
		ML-400R/R206F	Yellow!
		HL-3003/N414	Clear!
		HL-3003/N418	Clear!
Note:	All Mitsubishi Engineering protected application materials were tested behind clear coated ML-300 or ML-350	HL-3003/N424	Clear!
		HL-3003/N428	Clear!
		HL-3503/N414	Clear!
		HL-3503/N418	Clear!
		HL-3503/N424	Clear!
		HL-3503/N428	Clear!

Coated Thai Polycarbonate Co., Ltd. Iupilon plastics may only be treated with the following coatings listed below.

Coating in Alphabetical Order and Corresponding Manufacturer

Acryking F-328, Acryking K-101-S, Acryking PH-220, Acryking PH-328, Acryking PH-503, Acryking PH-700, Acryking PH-710 Acryking PH-720, Acryking PH-750, Acryking PH-800, Acryking PH-800N5A and Acryking PH-930: See Mitsubishi Chemical Corporation

FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2: See Fujikura Kasei

FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2561U-3: See Fujikura Kasei

FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9: See Fujikura Kasei

(Coating Information Continued on the Next Page)

FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2: See Fujikura Kasei

FUJIHARD HH3372U: See Fujikura Kasei

FUJIHARD HH3401U: See Fujikura Kasei

FUJIHARD HH3482U, FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3: See Fujikura Kasei

IUPILON Coat UV: See Mitsubishi Engineering Plastics Corp.

MODIHARD 200S: See NOF Corporation

NIPPE UVI Coat UT-1678: See Nippon Paint Automotive Coatings Co., Ltd.

PHC587C, PHC587C2: See Momentive Performance Materials Inc.

PHOLUCID No.180C and 185C: See Chugoku Marine Paints Ltd..

SH-41, SH-50, and SH-51: See Stanley Electric

UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60: See Momentive Performance Materials Inc.

UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2: See Momentive Performance Materials

UVHC8100: See Momentive Performance Materials

UVT200V1, UVT200V2, UVT200V3 and UVT200V5, : See Red Spot.

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, and UVT610V8: See Red Spot.

UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8: See Red Spot

Coating Manufacturer in Alphabetical Order

Information on PHOLUCID No.180C and 185C coatings may be obtained by writing:

Chugoku Marine Paints, Ltd.
Tokyo Club Building,
2-6, Kasumigaseki 3-Chome
Chiyoda-Ku, Tokyo, 100-0013
Japan
Telephone: 81-3-3506-3971
Facsimile: 81-3-5511-8542
www.cmp.co.jp

Note: PHOLUCID No.180C was tested on Clear Iupilon ML-300AH R591C, ML-300 R591B and ML-300 only.
Note: PHOLUCID No.185C was tested on Iupilon ML-300AH R591C Clear only

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

FUJIKURA KASEI

Information on FUJIHARD HH2540U, FUJIHARD HH2540U-1, FUJIHARD HH2540U-2, FUJIHARD HH2551U, FUJIHARD HH2551U-1, FUJIHARD HH2551U-2, FUJIHARD HH2551U-3, FUJIHARD HH2561U-6, FUJIHARD HH2561U-7, FUJIHARD HH2561U-8, FUJIHARD HH2561U-9, FUJIHARD HH2570U, FUJIHARD HH2570U-1, FUJIHARD HH2570U-2, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U and FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJIHARD HH2540U series, HH2551U series, HH2561U series and HH2570U series were tested on ML-300 clear only

Note: FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U and FUJIHARD HH3482U-U2 and FUJIHARD HH3482U-U3 were tested on ML-300 and ML-350 Clear Only

Information on IUPILON COAT UV may be obtained by writing to the following address:

Mitsubishi Engineering Plastics Corp.
Plastics Sales Department
5-2, Marunouchi 2-Chome
Chiyoda–Ku, Tokyo
Japan
www.m-ep.co.jp

MITSUBISHI CHEMICAL GROUP

Information on Acryking F-328, Acryking K-101-S, Acryking PH-220, Acryking PH-328, Acryking PH-503, Acryking PH-700, Acryking PH-710 Acryking PH-720, Acryking PH-750 Acryking PH-800, Acryking PH-800N5A and Acryking PH-930 coatings may be obtained by writing to the following company:

Mitsubishi Chemical Corporation
1-1 Marunouchi, 1-Chome
Chiyoda–Ku, Tokyo 100-8251
Japan
www.m-chemical.co.jp

Note: Acryking PH-503, PH-700, PH-710, Acryking PH-720, PH-750 Acryking PH-800 and Acryking PH-800N5A were tested on ML- 300 clear only

Note: Acryking PH-930 was tested on clear IUPILON ML-300 and IUPILON ML-300AH only

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

MOMENTIVE™ inventing possibilities

Information on PHC587C, PHC587C2, UVHC3000, UVHC3000CC, UVHC3000LS, UVHC3000K, UVHC3000K1, UVHC3000K-Z, UVHC3000K1-40, UVHC3000K1-50, UVHC3000KZ60, UVHC5000, UVHC5000K, and UVHC5000K1, UVHC5000K2hard coats may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: UVHC3000K, UVHC3000K1-40, UVHC3000K1-50, and UVHC3000KZ60 only tested on Iupilon ML-300 / ML-350
Note: UVHC3000 only tested on Iupilon ML-350
Note: UVHC8100 was tested on clear Iupilon ML-300 and Iupion ML-350

NPAC NIPPON PAINT AUTOMOTIVE COATINGS

Information on NIPPE UVI Coat UT-1678 coating may be obtained by writing to the following address:

Nippon Paint Automotive Coatings Co., Ltd.
2-14-1 Shodai-Ohtani
Hirakata-City, Osaka 573-1153
Japan
Phone: +81-72-857-5530
Fax: +81-72-857-5640
Website: www.nipponpaint-automotive.com

Note: NIPPE UVI Coat UT-1678 was tested on Iupilon ML-300 and ML-350 clear.

NOF

Information on MODIHARD 200S coatings may be obtained by writing to the following address:

NOF Corporation
Yebis Garden Place Tower 20-3, Ebisu 4-Chome,
Shibuya-Ku, Tokyo 150-6019
Japan
www.nof.co.jp

Note: MODIHARD 200S is acceptable on ML-300 Clear in thicknesses 2.3-6.4 mm only

(Coating Information Continued on the Next Page)

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR

Information on UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8 UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT200V1, UVT200V2, UVT200V3, UVT200V5, UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8 UVT820V1, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 is only acceptable on clear ML-300 and ML-350.

Information on Stanley Electric SH-41, SH-50 and SH-51 may be obtained by writing to the following company:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: SH-41 may be used be used in front of a reflex reflector. Material would have code Q
Note: Stanley SH-51 only tested on clear IUPILON ML-300

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Trinseo Altuglas Division Altuglas S.r.l. (Italy) Trinseo Polymers (Zhangjiagang) Co. Ltd. www.trinseo.com www.plexiglas.com www.altuglas.com	ALTUGLAS™/PLEXIGLAS™ ALTUGLAS™ R-Life PLEXIGLAS™ R-Life DR DRF GR 8 GR 8C GR 9D GR 9DX GR 9E H HIT HT(121) HX100 HX400 IMPLEX® MC MI-2T MI-4T MI-7 MI-7T V(022) V(040) V(052) V(052i V(415) V(811) V(811)UVA V(825) V825T CR50 V(825)T V(825)TP V(826) V(920) V(920)T V(922)	Polymethyl Methacrylate	78048 78072 770 779 48268 LPL 11 100 101 102 P2 UVA5 7082 7090 7132 7137 7155 7157 7161 7189 7191 7192 7198 7215 7280 7283 56072 56507 56101 58102 58200 58224 58225 58235 58247 58294 58308	Bronze Bronze Blue Blue Blue Clear Clear Clear Clear Clear Clear Clear Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray Gray

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR



MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Trinseo	ALTUGLAS™/PLEXIGLAS™	Polymethyl	13	Red
Altuglas Division	ALTUGLAS™ R-Life	Methacrylate	119	Red
Altuglas S.r.l. (Italy)	PLEXIGLAS™ R-Life		126	Red
Trinseo Polymers	DR		145	Red
(Zhangjiagang) Co. Ltd.	DRF		180	Red
www.trinseo.com	GR 8		366	Red
www.plexiglas.com	GR 8C		461	Red
www.altuglas.com	GR 9D		610	Red
	GR 9DX		616	Red
	GR 9E		659	Red
	H		756	Red
	HIT		868	Red
	HT(121)		908	Red
	HX100		957	Red
	HX400		1003	Red
	IMPLEX®		1025	Red
	MC		1032	Red
	MI-2T		1101	Red
	MI-4T		1108	Red
	MI-7		1110	Red
	MI-7T		1115	Red
	V(022)		1116	Red
	V(040)		1118	Red
	V(052)		1120	Red
	V(052i)		1132	Red
	V(415)		1175	Red
	V(811)		1180	Red
	V(811)UVA		1185	Red
	V(825)		1190	Red
	V825T CR50		1191	Red
	V(825)T		1195	Red
	V(825)TP		1794	Red
	V(826)		15000	Red
	V(920)		15003	Red
	V(920)T		16020	Red
	V(922)		16021	Red
			16030	Red
			16031	Red

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Trinseo Altuglas Division Altuglas S.r.l. (Italy) Trinseo Polymers (Zhangjiagang) Co. Ltd. www.trinseo.com www.plexiglas.com www.altuglas.com	ALTUGLAS™/PLEXIGLAS™ ALTUGLAS™ R-Life PLEXIGLAS™ R-Life DR DRF GR 8 GR 8C GR 9D GR 9DX GR 9E H HIT HT(121) HX100 HX400 IMPLEX® MC MI-2T MI-4T MI-7 MI-7T V(022) V(040) V(052) V(052i V(415) V(811) V(811)UVA V(825) V825T CR50 V(825)T V(825)TP V(826) V(920) V(920)T V(922)	Polymethyl Methacrylate	16048 16500 16501 18008 18016 18035 18036 18037 18039 18040 18042 18043 18044 18046 18047 18048 18134 18152 18165 18166 18175 18176 18181 18210 18213 18227 18228 18229 18241 18242 18244 18249 18250 18254 18274 18287 18301 18309 119/10 119/3 119/8 18236 18258	Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red Red White White

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR



MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Trinseo	ALTUGLAS™/PLEXIGLAS™	Polymethyl	18259	White
Altuglas Division	ALTUGLAS™ R-Life	Methacrylate	48361	White
Altuglas S.r.l. (Italy)	PLEXIGLAS™ R-Life		58335	White
Trinseo Polymers	DR		237	Yellow
(Zhangjiagang) Co. Ltd.	DRF		245	Yellow
www.trinseo.com	GR 8		263	Yellow
www.plexiglas.com	GR 8C		268	Yellow
www.altuglas.com	GR 9D		282	Yellow
	GR 9DX		283	Yellow
	GR 9E		283/3	Yellow
	H		283/8	Yellow
	HIT		283/B-3	Yellow
	HT(121)		283/B-8	Yellow
	HX100		883	Yellow
	HX400		885	Yellow
	IMPLEX®		937	Yellow
	MC		938	Yellow
	MI-2T		951	Yellow
	MI-4T		2361	Yellow
	MI-7		2820	Yellow
	MI-7T		2821	Yellow
	V(022)		2830	Yellow
	V(040)		2831	Yellow
	V(052)		2833	Yellow
	V(052i		2838	Yellow
	V(415)		25000	Yellow
	V(811)		25001	Yellow
	V(811)UVA		25004	Yellow
	V(825)		26022	Yellow
	V825T CR50		26038	Yellow
	V(825)T		26045	Yellow
	V(825)TP		26500	Yellow
	V(826)		26501	Yellow
	V(920)		26505	Yellow
	V(920)T		28019	Yellow
	V(922)		28020	Yellow
			28021	Yellow
			28029	Yellow
			28033	Yellow
			28039	Yellow
			28040	Yellow
			28041	Yellow

Note: Color 58335 is not listed as a reflex reflector or in front of a reflex reflector.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR



MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Trinseo. Altuglas Division Altuglas S.r.l. (Italy) Trinseo Polymers (Zhangjiagang) Co. Ltd. www.trinseo.com www.plexiglas.com www.altuglas.com	ALTUGLAS™/PLEXIGLAS™ ALTUGLAS™ R-Life PLEXIGLAS™ R-Life DR DRF GR 8 GR 8C GR 9D GR 9DX GR 9E H HIT HT(121) HX100 HX400 IMPLEX® MC MI-2T MI-4T MI-7 MI-7T V(022) V(040) V(052) V(052i V(415) V(811) V(811)UVA V(825) V825T CR50 V(825)T V(825)TP V(826) V(920) V(920)T V(922)	Polymethyl Methacrylate	28042 28043 28044 28090 28107 28152 28154 28161 28162 28163 28198 28209 28210 28213 28223 28226 28921 H 285	Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow Yellow

Note: Red 16021 is listed in 4 mm and 5 mm thickness only.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Unitika Ltd.	U-POLYMER P-1001	POLYARYLATE		Clear
	U-POLYMER P-1001A		1010	Clear
	U-POLYMER P-1001S		2403	Red
www.unitika.co.jp	U-POLYMER P-3001S		2410	Red
			5-2094	Red
			10-2051	Red
			3071	Yellow
			3301	Yellow
			3401	Yellow
			3410	Yellow
			4410	Yellow
			5-3091	Yellow
			05-3060	Yellow
			10-4032	Yellow
			050-3070	Yellow
			079-3070	Yellow
			P-1001A 5050	Selective Yellow

Note: Unitika U-Polymer polyarylate not to be used as a reflex reflector or in front of a reflex reflector.

MFR.	TRADE NAME AND FLOW FORMULATION	TYPE OF RESIN	NUMBER	COLOR
Wanhua Chemical Group Co., Ltd. No. 59 Chongqing Street YEDA, Yantai, Shandong, China www.whchem.com	ACRYPLAS® HD01	Polymethyl Methacrylate		Clear
			R01	Red
	ACRYPLAS® HD03	Polymethyl Methacrylate		Clear

Color R01 is listed from 2.3-6.4mm only.

Wanhua Chemical Group Co., Ltd. No. 59 Chongqing Street YEDA, Yantai, Shandong China www.whchem.com	HL6157	Polycarbonate	9103	Clear Q
	HL6227			

Wanhua Chemical Group Co., Ltd. polycarbonate plastics are only acceptable with the coatings listed below when properly applied to the molded lens.

Coating in Alphabetical Order and Corresponding Manufacturer

FUJIHARD HH2540U, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3: See Fujikura Kasei Co., Ltd.

SH-61: See Stanley Electric Co., Ltd.

UVHC3000, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2: See Momentive Performance Materials, Inc.

UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8: See Red Spot.

UVT820: See Red Spot.

Coating Manufacturer in Alphabetical Order

FUJIKURA KASEI

Information on FUJIHARD HH2540U, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3 coatings may be obtained by writing to the following address:

Fujikura Kasei Co., Ltd.
6-15 Shibakoen 2-Chome
Minato-Ku, Tokyo 105-0011
Japan
www.fkkasei.co.jp

Note: FUJIHARD HH2540U, FUJIHARD HH3372U, FUJIHARD HH3401U, FUJIHARD HH3482U, FUJIHARD HH3482U-2 and FUJIHARD HH3482U-3 were tested on HL6157 clear only
Note: FUJIHARD HH3401U is only acceptable in 1.6, 2.3 and 3.2 mm thicknesses

(Coating Information Continued on the Next Page)

Information on UVHC3000, UVHC5000, UVHC5000K, UVHC5000K1, UVHC5000K2 hard coat may be obtained by writing to the following address:

Momentive Performance Materials GmbH
Building V7
51368 Leverkusen
Germany

Momentive Performance Materials Inc.
260 Hudson River Road
Waterford, NY 12118
www.momentive.com

Note: Momentive UVHC3000 and UVHC5000 series was tested on HL6157 clear only

Information on UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8 and UVT820 coatings may be obtained by writing to the following address:

Red Spot Paint & Varnish Co., Inc.
P.O. Box 418
Evansville, IN 47703-0418
www.redspot.com

Note: Red Spot UVT610V1, UVT610V2, UVT610V3, UVT610V4, UVT610V5, UVT610V6, UVT610V7, UVT610V8, UVT820V2, UVT820V3, UVT820V4, UVT820V5, UVT820V6, UVT820V7 and UVT820V8 was tested on clear HL6157.

Information on Stanley Electric SH-61 may be obtained by writing to the following company:

Stanley Electric Co., Ltd.
2-9-13, Nakameguro
Meguro-Ku, Tokyo 153
Japan
www.stanley.co.jp

Note: Stanley SH-61 only tested on clear HL6157

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Appendix A: AMECA Accredited Laboratory Information

Atlas Weathering Services Group
DSET Laboratories
45601 N. 47th Avenue
Phoenix, Arizona 85027-7042
Tel: (623) 465-7356; (800) 255-DSET
FAX: (623) 465-9409
Website: www.atlas-mts.com

Atlas Weathering Services Group
South Florida Test Services Everglades Division
16100 S.W. 216th Street
Miami, Florida 33170
Tel: (305) 245-3659
FAX: (305) 245-9122
Website: www.atlas-mts.com

Q-Lab Arizona Test Services
21212 W Patton Rd.
Wittmann, AZ 85361
Tel: (623) 386-5140
FAX: (623) 386-5143
Website: www.q-lab.com

Q-Lab Florida Test Services and
1005 S.W. 18th Avenue, P.O.
Box 349490
Homestead, Florida 33034
Tel: (305) 245-5600
FAX: (305) 245-5656
Website: www.q-lab.com

Appendix B: Federal Standard for Plastics

Definitions in FMVSS 108

Coated materials means a material which has a coating applied to the surface of the finished sample to impart some protective properties. Coating identification means a mark of the manufacturer's name, formulation designation number, and recommendations for application.

Color Fundamental definitions of color are expressed by Chromaticity Coordinates according to the CIE 1931 Standard Colorimetric System, as described in the CIE 1931 Chromaticity Diagram (incorporated by reference, see § 571.5).

Color bleeding means the migration of color out of a plastic part onto the surrounding surface.

Cracking means a separation of adjacent sections of a plastic material with penetration into the specimen.

Crazing means a network of apparent fine cracks on or beneath the surface of materials.

Exposed means material used in lenses or optical devices exposed to direct sunlight as installed on the vehicle.

Excerpts from Section 14 from FMVSS 108

Plastic and Coating Requirements

S14.1.2 Plastic optical materials. All plastic materials used for optical parts such as lenses and reflectors on lamps or reflective devices required or allowed by this standard must conform to the material test requirements of S14.4.2.

S14.1.3 All coatings used on optical materials must have added to their formulations an optical brightener, whose presence is detectable by ultraviolet light, to aid in testing for their presence. Other equivalent industry accepted methods may be used as an alternative.

Color Specifications

S14.4.1 *Color test.* The requirement applies to the overall effective color of light emitted by the device and not to the color of the light from a small area of the lens. It does not apply to any pilot, indicator, or tell-tale lights. The color of the sample device must comply when tested by either the Visual Method or the Tristimulus Method.

S14.4.1.3 *Visual method.*

S14.4.1.3.1 *Visual method procedure.* The color of light from the sample device must be compared visually with the color of the light from a standard. The standard may consist of a filter or limit glass. In the case of white, CIE Source A is used only as a color reference. The chromaticity coordinates of the color standards must be as close as possible to the limits listed. The color of the standard filters is determined spectro-photometrically.

S14.4.1.3.2 *Visual method performance requirements.* The color must comply with the applicable requirement.

S14.4.1.3.2.1 *Red.* Red is not acceptable if it is less saturated (paler), yellower, or bluer than the limit standards.

S14.4.1.3.2.2 *Yellow (Amber).* Yellow is not acceptable if it is less saturated (paler), greener, or redder than the limit standards.

S14.4.1.3.2.3 *White.* White is not acceptable if its color differs materially from that of CIE Source A.

S14.4.1.3.2.4 Green. Green is not acceptable if it is less saturated (paler), yellower, or bluer than the limit standards.

S14.4.1.3.2.5 Blue. Blue is not acceptable if it is less saturated (paler), greener, or redder than the limit standards.

S14.4.1.4 *Tristimulus method.*

S14.4.1.4.1 *Tristimulus method procedure.*

S14.4.1.4.1.1 The color of light from the H–V point of a sample device must be measured by photoelectric receivers with spectral responses that approximate CIE standard spectral tristimulus valves.

S14.4.1.4.1.2 A sphere may be used to integrate light from a colored source provided that the color shift that results from the spectral selectivity of the sphere paint be corrected by the use of a filter, correction factor, or an appropriate calibration.

S14.4.1.4.1.3 Where the sample device does not have uniform spectral characteristics in all useful directions, color measurements must be made at as many directions of view as are required to evaluate the color for those directions that apply to the end use of the device.

S14.4.1.4.2 *Tristimulus method performance requirements.* The color must comply with the applicable requirement.

S14.4.1.4.2.1 *Red.* The color of light emitted must fall within the following boundaries:

y = 0.33 (yellow boundary)

y = 0.98 − x (purple boundary)

S14.4.1.4.2.2 *Yellow (Amber).* The color of light emitted must fall within the following boundaries:

y = 0.39 (red boundary)

y = 0.79 − 0.67x (white boundary)

y = x − 0.12 (green boundary)

S14.4.1.4.2.3 *White (achromatic).* The color of light emitted must fall within the following boundaries:

x = 0.31 (blue boundary)

y = 0.44 (green boundary)

x = 0.50 (yellow boundary)
y = 0.15 + 0.64x (green boundary)
y = 0.38 (red boundary)
y = 0.05 + 0.75x (purple boundary)

S14.4.1.4.2.4 Green. The color of light emitted must fall within the following boundaries:
y = 0.73 − 0.73x (yellow boundary)
x = 0.63y − 0.04 (white boundary)
y = 0.50 − 0.50x (blue boundary)

S14.4.1.4.2.5 Restricted Blue. The color of light emitted must fall within the following boundaries:
y = 0.07 + 0.81x (green boundary)
x = 0.40 − y (white boundary)
x = 0.13 + 0.60y (violet boundary)
S14.4.1.4.2.6 Signal Blue. The color of light emitted must fall within the following boundaries:
y = 0.32 (green boundary)
x = 0.16 (white boundary)
x = 0.40 − y (white boundary)
x = 0.13 + 0.60y (violet boundary)

Plastic optical materials tests

S14.4.2 *Plastic optical materials tests.* Accelerated weathering procedures are not permitted.

S14.4.2.1 *Samples.*
S14.4.2.1.1 Samples of materials shall be injection molded into polished metal molds to produce test specimens with two flat and parallel faces. Alternative techniques may be used to produce equivalent specimens.

S14.4.2.1.2 Test specimens shape may vary, but each exposed surface must contain a minimum uninterrupted area of 32 sq cm.

S14.4.2.1.3 Samples must be furnished in thicknesses of 1.6 +/- 0.25 mm, 2.3 +/- 0.25 mm, 3.2 +/- 0.25 mm, and 6.4 +/- 0.25 mm. S14.4.2.1.4 All samples must conform to the applicable color test requirement of this standard prior to testing.

S14.4.2.1.5 A control sample, kept properly protected from influences which may change its appearance and properties of each thickness, must be retained.

S14.4.2.2 *Outdoor exposure test.*
S14.4.2.2.1 Outdoor exposure tests of 3 years in duration must be made on samples of all materials, including coated and uncoated versions, used for optical parts of devices covered by this standard. Tests are to be conducted in Florida and Arizona.

S14.4.2.2.2 Concentrations of polymer components and additives used in plastic materials may be changed without outdoor exposure testing provided the changes are within the limits of composition represented by higher and lower concentrations of these polymer components and additives previously tested to this section and found to meet its requirements.

S14.4.2.2.3 Procedure. S14.4.2.2.3.1 One sample of each thickness of each material must be mounted at each exposure site so that at least a minimum uninterrupted area of 32 sq cm of the exposed upper surface of the sample is at an angle of 45 degrees to the horizontal facing south. The sample must be mounted in the open no closer than 30 cm (11.8 in) to its background.

S14.4.2.2.3.2 During the exposure time the samples must be cleaned once every three months by washing with mild soap or detergent and water, and then rinsing with distilled water. Rubbing must be avoided.

S14.4.2.2.4 *Performance requirements.* Plastic lenses, other than those incorporating reflex reflectors, used for inner lenses or those covered by another material and not exposed directly to sunlight must meet the optical material test requirements when covered by the outer lens or other material.

S14.4.2.2.4.1 After completion of the outdoor exposure test the haze and loss of surface luster as measured by ASTM D1003–92 (incorporated by reference, see § 571.5) must not be greater than:
(a) 30% for materials used for outer lenses, other than those incorporating reflex reflectors;
(b) 7% for materials used for reflex reflectors and lenses used in front of reflex reflectors.

S14.4.2.2.4.2 After completion of the outdoor exposure test materials used for headlamp lenses must show no deterioration.

S14.4.2.2.4.3 After completion of the outdoor exposure test all materials, when compared with the unexposed control samples, must not show physical changes affecting performance such as color bleeding, delamination, crazing, or cracking. Additionally materials used for reflex reflectors and lenses used in front of reflex reflectors must not show surface deterioration or dimensional changes.

S14.4.2.2.4.4 After completion of the outdoor exposure test all materials, when compared with the unexposed control samples, must not have their luminous transmittance changed by more than 25% when tested in accordance with ASTM E308–66 (incorporated by reference, see § 571.5) using CIE Illuminant A (2856K). S14.4.2.2.4.5 After completion of the outdoor exposure test all materials must conform to the color test of this standard in the range of thickness stated by the material manufacturer.

S14.4.2.3 *Heat test.*
S14.4.2.3.1 *Procedure.* Two samples of each thickness of each material must be supported at the bottom, with at least 51 mm of the sample above the support, in the vertical position in such a manner that, on each side, the minimum uninterrupted area of exposed surface is not less than 3225 sq mm. The samples are placed in a circulating air oven at 79 Degrees +/- 3 Degrees for Two hours.

S14.4.2.3.2 *Performance requirements.*

After completion of the heat exposure and cooling to room ambient temperature, a test specimen must show no change in shape and general appearance discernable to the naked eye when compared with an unexposed specimen and continue to conform to the applicable color test requirement of this standard.

Appendix C: DOT Interpretation Files and Supplemental Lab Information

420227

NEW FLYER

23 May, 2006

NHTSA-2006-26148-2

The Chief Counsel
National Highway Traffic Safety Administration, NCC-01
400 7th Street, SW
Washington, D.C. 20590

Subject: Interpretation Request - FMVSS 108 & Colored Destination Signs on Transit Buses

To the Chief Counsel:

Recently we had a request from a customer to have a new style of lighted destination signs installed on their upcoming order of transit buses. Previously it was believed that all lights or lighting equipment on the front of the vehicle, had to illuminate within the color spectrum of white to amber. The new signs are capable of red/green/blue and are used for route designation as well as PR messages.

Although I cannot find a specific reference in FMVSS108 indicating that these lighted signs are not allowed due to their color capability, I have seen specific reference to this in the California Vehicle Code.

> "25950. This section applies to the color of lamps and to any reflector exhibiting or reflecting perceptible light of 0.05 candela or more per foot-candle of incident illumination. Unless provided otherwise, the color of lamps and reflectors upon a vehicle shall be as follows:
>
> (a) The emitted light from all lamps and the reflected light from all reflectors, visible from in front of a vehicle, shall be white or yellow, except as follows..."

My question to you is this; are these lighted color signs contrary to FMVSS 108, or, are they only contrary to specific State Statutes?

Sincerely,

Kerry Legg
Safety & Compliance Manager
Customer Service Support

Headquarters/ Winnipeg Facility
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4202216

U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

Ms. Kerry Legg
Safety & Compliance Manager
New Flyer
25 DeBaets Street
Winnipeg, Manitoba
R2J 4G5 Canada

NHTSA-2002-12148-1

Dear Ms. Legg:

This responds to your letter regarding permissible colors for illuminated destination signs on the front of new transit buses, under Federal Motor Vehicle Safety Standard (FMVSS) No. 108, Lamps, Reflective Devices, and Associated Equipment. You state that a customer has requested installation of signs capable of illuminating route designations and other messages in a variety of colors, including red, green, and blue. You believe that lighting equipment on the front of the vehicle must illuminate within the color spectrum from white to amber, adding that you have seen specific limitations to this effect under California State law. You ask whether such red, green, and blue lighted signs are prohibited under FMVSS No. 108. As explained below, given only the description you offer of the subject lighting system, the answer to your question is yes.

By way of background, the National Highway Traffic Safety Administration (NHTSA) is authorized to issue FMVSSs that set performance requirements for new motor vehicles and items of motor vehicle equipment (see 49 U.S.C. 30111 and 49 CFR Part 571). It is the responsibility of manufacturers to certify that their products conform to all applicable safety standards before they can be offered for sale (see 49 U.S.C. 30115 and 49 CFR Part 567). FMVSS No. 108 sets forth the requirements for both new and replacement motor vehicle lighting equipment.

We note that the agency addressed the issue of color of vehicle lighting equipment in a July 29, 2002 letter of interpretation to Trooper Lawrence Richardson ("Richardson letter," copy enclosed). Our interpretation of FMVSS No. 108 has not changed from the opinion of the Richardson letter.

Under Federal law (*i.e.*, FMVSS No. 108), the only permissible colors of light that may be emitted by original required equipment lighting on new vehicles are red, amber, or white. Furthermore, the standard requires items of replacement equipment to emit the same color light as the original equipment that they are designed to replace.

Accessory equipment (*i.e.*, lighting equipment not required under the standard) is permissible on new vehicles, provided that it does not impair the effectiveness of lighting equipment required by Standard No. 108 (see S5.1.3). We interpret this as a general prohibition on lamps of colors different than red, amber, or white, because of the possibility that non-standard colors could cause confusion in other drivers, thereby diverting their attention from lamps that signal driver intention, such as stop lamps or turn signal lamps.

Turning to the specifics of the issue presented in your letter, we first note that permissible colors for lamps on the front of a bus are limited to amber or white. Use of supplemental red lamps on the front of a vehicle, such as the destination signs to which you refer, could cause confusion with brake or stop lamps. The color green typically conveys the message that one may proceed, so it could cause confusion with other red or yellow lamps that seek to warn or caution. Finally, blue is a color that some States reserve for use on emergency vehicles, so drivers unexpectedly encountering blue lamps on other types of vehicles could take potentially inappropriate actions.

Generally, if certain accessory lighting is not permissible on new vehicles, commercial entities will not be permitted to install the lighting as an aftermarket accessory for vehicles in use. The legal consideration is whether the accessory makes inoperative in any way a lamp required under and installed in accordance with Standard No. 108 (see 49 U.S.C. 30122). Usually, we equate impairing the effectiveness of a required item of lighting equipment with "making inoperative" such equipment in part, a violation of §30122.

Federal law does not prohibit a vehicle owner personally from making any safety equipment inoperative on his or her own vehicle, although the agency strongly discourages disabling any safety system. However, whether non-standard lighting equipment is allowable on vehicles in use is a matter of State law.

Based upon the above analysis and the description offered by you of the subject lighting system, under FMVSS No. 108, a manufacturer of new transit buses would not be permitted to install destination signs on the front of a vehicle that illuminate in red, green, or blue, because the lighting devices in those colors could impair the effectiveness of other frontal lighting equipment required under FMVSS No. 108.

If you have further questions, please feel free to contact Eric Stas of my staff at this address or by telephone at (202) 366-2992.

Sincerely,

Anthony M. Cooke
Chief Counsel

Enclosure

Trooper Lawrence D. Richardson
Massachusetts State Police
200 Scotland Road
Newbury, MA 01950

Dear Trooper Richardson:

This is in reply to your e-mail earlier this year to the National Highway Traffic Safety Administration Webmaster. You are concerned about several motor vehicle lighting devices that you have seen recently on vehicles in your state. These include "red, green, purple, blue and other colors that are mounted in the front or rear of the vehicle," vehicles with clear taillamp lenses, and vehicles with no rear "reflective red lenses." You asked whether these types of devices are allowable.

We do not understand your reference to your motor vehicle law that "refers to part 571 as far as after market lights are concerned." Whether non-standard lighting equipment is allowable on vehicles in use is at bottom a matter of State law. The legality of modifications by vehicle owners is generally determined by laws of the jurisdiction where a vehicle is registered and/or operated. We believe, therefore, that Massachusetts law contains the answers to your questions.

Under Federal law, much of what you have observed would not be permissible as original vehicle equipment. As you realize, motor vehicles are originally manufactured with lighting equipment that emits red, amber, or white light. No other colors are permitted for original equipment lighting by the Federal motor vehicle safety standard on vehicle lighting (49 CFR 571.108, Lamps, Reflective Devices and Associated Equipment) (except that some States reserve blue for use in emergency lighting). Items of replacement lighting equipment are also required under Federal law to emit the same color light as the original equipment they are designed to replace.

Accessory equipment on new vehicles is permissible under Federal law if it does not impair the effectiveness of original equipment required by Standard No. 108. We interpret this as prohibiting lamps of colors different than red, amber, or white, because of the possibility that non-standard colors could cause momentary confusion in other drivers, diverting their attention from lamps that signal driver intention, such as stop lamps and turn signal lamps. This means that we do not allow green, purple, or blue lamps as original equipment on private vehicles. Further, we do not allow red lamps of any sort, or reflectors, to be mounted at a location other than the rear side, or rear, of a vehicle.

Generally, if accessory lighting equipment is not permissible on new vehicles, it will not be permissible as an aftermarket accessory for vehicles in use. The legal consideration in this instance is whether the accessory makes inoperative in any way a lamp installed in accordance with Standard No. 108. Usually, we conclude that, if a device impairs the effectiveness of a required item of lighting equipment, it will also make that equipment inoperative in part. However, our law does not prohibit a vehicle owner personally from making any safety equipment inoperative on his or her vehicle. In that instance, the legality of installation and use is determined under State law.

Some replacement taillamp housings are available with clear lenses, intended to be used in conjunction with a red incandescent light source. We are unaware of any original equipment lamp

required to emit the color red that consists of a clear lens and a red bulb and that is certified to comply with standard No. 108. This is not simply a design choice; we know of no red bulb now or ever in production that conforms to Standard No. 108's color specification. The combination of a clear bulb and a red lens, therefore, is the only way to design a lamp that conforms to Standard No. 108's requirement that its light be red. This means that the manufacturer of clear lenses or lamps intended to replace lenses or lamps whose original color was red is in violation of S5.8 of Standard No. 108. Many of these original equipment taillamps also incorporate the red reflex reflector that Standard No. 108 requires to be located on the rear side and rear of vehicles, whereas the replacements with clear lenses do not. This also does not comport with Standard No. 108. A similar situation exists with respect to headlamps that originally incorporated amber side reflex reflectors. If the replacement lamp does not include the reflector, this, too, would not comport with Standard No. 108.

You also mentioned "snake eyes" lights "that are displayed where the window washer fluid should be coming out, in all different colors," including purple, green, and blue. Such an accessory would appear to have an impairing effect upon original lighting equipment if its colors are other than white or amber (on the front), or red (on the rear), or if the light is of such an intensity as to distract another driver's attention from the light emitted by required lighting equipment.

If you have any questions, you may phone Taylor Vinson of this Office (202-366-5263).

Sincerely,

Jacqueline Glassman
Chief Counsel

ref:108
d.7/29/02

US 20160161642A1

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(12) **Patent Application Publication**

Dellock et al.

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(54) **HARD-COAT INFUSED POLYCARBONATE HEADLAMP LENS AND RELATED METHOD**

(71) Applicant: **FORD GLOBAL TECHNOLOGIES, LLC**, Dearborn, MI (US)

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(52) **U.S. Cl.**

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(57) **ABSTRACT**

A headlamp lens includes a polycarbonate substrate and an infused protective skin covering on at least one surface of the polycarbonate substrate.

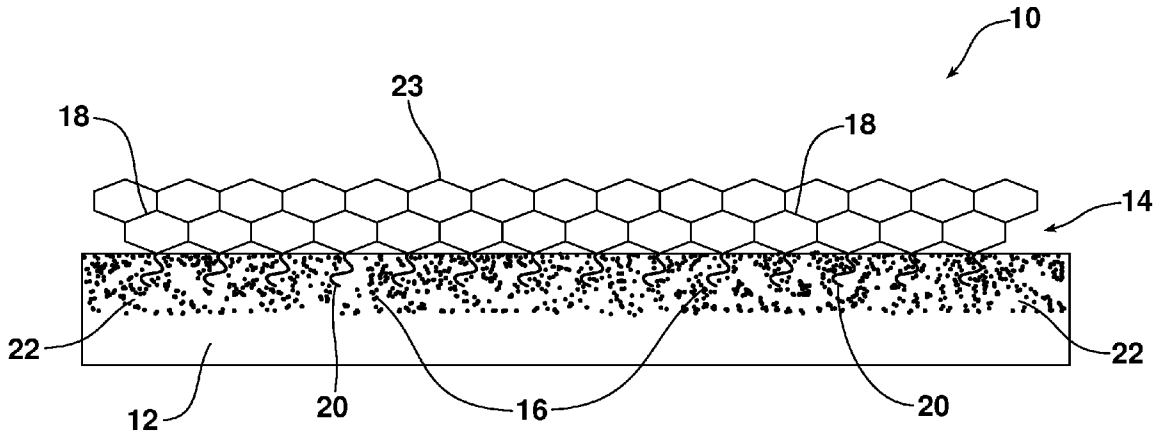
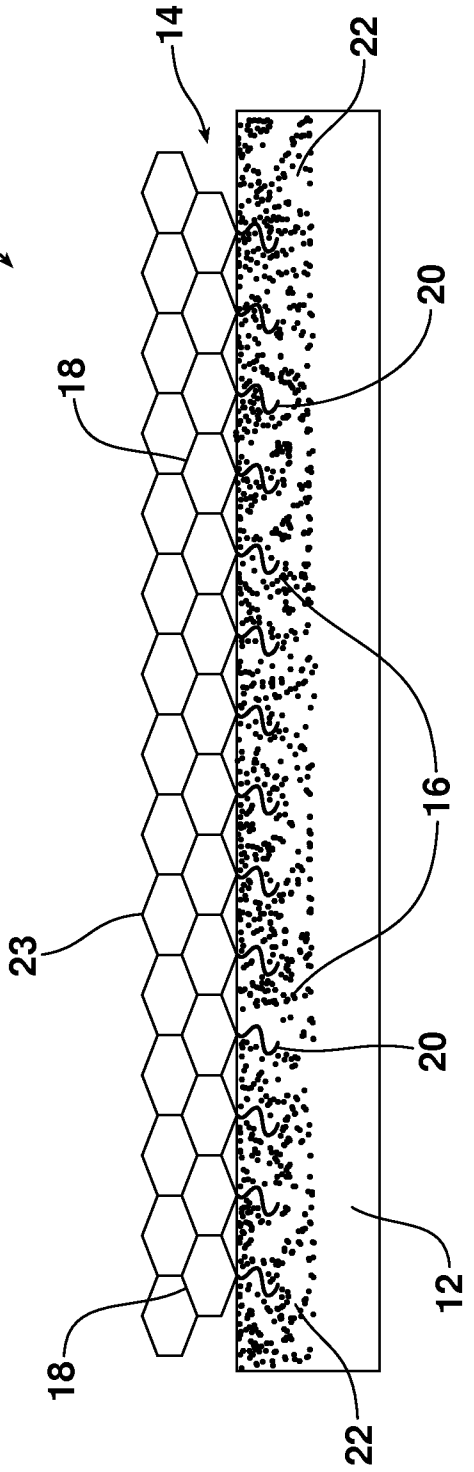


FIG. 1



HARD-COAT INFUSED POLYCARBONATE HEADLAMP LENS AND RELATED METHOD

[0001] This application claims the benefit of U.S. provisional patent application Ser. No. 62/086,965 filed on 3 Dec. 2014, the full disclosure of which is incorporated herein by reference.

TECHNICAL FIELD

[0002] This document relates generally to the vehicle equipment field and, more particularly, to a hard-coat infused polycarbonate lens that is less expensive to produce and provides better performance including, particularly, better resistance to UV degradation over time so as to remain clear for the free passage of light for the life of the vehicle.

BACKGROUND

[0003] Currently, headlamp lenses are molded from optically clear polycarbonate. In order to protect the headlamp lenses from both abrasion and ultraviolet (UV) weathering degradation, a clear silica hard-coat and anti-UV additives are applied to the forward surface of the headlamp. Silica hard-coated polycarbonate headlamp lenses provide excellent resistance to scratches and excellent impact performance. However, silica hard-coated polycarbonate headlamp lenses suffer a number of drawbacks.

[0004] More specifically, the silica hard-coating process is very expensive and typically requires large facility expense in order to implement. Further, exposure to UV radiation from the rays of the sun attacks both the coating and the lens base polycarbonate substrate. Current state-of-the-art UV protection lasts up to 3000 hours of accelerated weathering. However, it should be appreciated that many vehicles including, for example, those in the Sun Belt areas of the United States are exposed to substantial UV radiation that, over time, breaks down the substrate leading to yellowing and clouding which reduces headlamp performance. Further, as the UV rays of the sun degrade the substrate, the silica hard-coat may delaminate from the polycarbonate substrate accelerating the substrate degradation. This also leads to degradation of the impact performance of the lens. Still further, the hard-coat process relies upon volatile organic compounds (VOCs) which are an environmental concern.

[0005] This document relates to a new and improved method that provides similar or improved scratch resistance and significantly better UV performance than found in current polycarbonate headlamp lenses. As a result, impact resistance and clarity may be better maintained for the life of the vehicle. Further, the method utilized to provide this increased performance is more affordable than and does not release VOCs into the atmosphere like the prior art process.

SUMMARY

[0006] In accordance with the purposes and benefits described herein, a headlamp lens is provided. That headlamp lens comprises a polycarbonate substrate and an infused protective skin covering at least one surface of the polycarbonate substrate.

[0007] In one possible embodiment, the infused protective skin includes a scratch-resistant agent and a UV inhibitor. In one possible embodiment, the scratch-resistant agent is silicone-based. In one possible embodiment, the scratch-resistant agent is selected from a group of materials consisting of vinyl (mono-, di- and tri-alkoxysilanes), phenyl (mono-, di- and tri-alkoxysilanes), diphenyldialkoxysilanes, vinyltrialkoxysilanes, and other silicone-based molecules and mixtures thereof.

[0008] In one possible embodiment, the UV inhibitor is selected from a group of materials consisting of benzophenone, a benzotriazole and mixtures thereof. Still further, in one possible embodiment, the infused protective skin further includes a UV stabilizer. In one possible embodiment, that UV stabilizer may be a hindered amine light stabilizer.

[0009] Still further, the polycarbonate substrate in any embodiment may include a plurality of pores. Further, the scratch-resistant agent may comprise silicon-based molecules having relatively large heads and relatively narrow tails wherein the heads rest on a surface of the substrate overlying the pores and the tails penetrate the pores and act as an anchor for the heads.

[0010] In accordance with an additional aspect, a method is provided of manufacturing a polycarbonate headlamp lens with an infused skin providing scratch resistance and UV protection. That method may be described as comprising the steps of molding the headlamp lens substrate from polycarbonate material, cleaning the polycarbonate substrate following molding and infusing a surface of the polycarbonate substrate with a protective skin to produce polycarbonate infused headlamp lenses. This is then followed by rinsing and drying the lenses.

[0011] In one possible embodiment, the method further includes increasing the thickness of the protective skin following infusing. In one possible embodiment, this is done by chemically enhanced physical vapor deposition.

[0012] In one possible embodiment, the method includes incorporating a scratch resistant agent and a UV inhibitor in the protective skin. That scratch resistant agent may be selected from a group of materials consisting of vinyl (mono-, di- and tri-alkoxysilanes), phenyl (mono-, di- and tri-alkoxysilanes), diphenyldialkoxysilanes, vinyltrimethoxysilanes, other silicone-based molecules and mixtures thereof. Further, the method may include selecting the UV inhibitors from a group of materials consisting of benzophenone, a benzotriazole, other UV inhibitor compounds and mixtures thereof. Further, the method may include incorporating one or more UV stabilizers in the protective skin.

[0013] In one possible embodiment, the method includes cooling the headlamp lens substrate after molding and prior to cleaning to a temperature between 65° C. and room temperature. Further, the method includes infusing by dipping the substrate into an infusion tank including an infusion solution bath for a period of time between 10 to 60 seconds at a temperature between 65-90° C. so as to open pores in the substrate to allow superficial infusion of the protective skin to the substrate. In one possible embodiment, the scratch resistant agent and the UV inhibitor are infused in a single step. In another possible embodiment, the scratch resistant agent and the UV inhibitor are infused in multiple steps for the purposes of building up the desired thickness of the hard coating. In addition, the method may include the step of performing a scratch resistance test to select infused lenses and adjusting the concentration of additives in the infusion solution bath as required until the desired results are achieved.

[0014] In the following description there are shown and described several preferred embodiments of the headlamp lens. As should be realized, the headlamp lens is capable of other, different embodiments and its several details are

capable of modification in various, obvious aspects, all without departing from the headlamp lens as described in the following claims.

[0015] Accordingly, the drawings and descriptions should be regarded as illustrative in nature and not as restrictive.

BRIEF DESCRIPTION OF THE DRAWING FIGURE

[0016] The accompanying drawing figure incorporated herein and forming a part of the specification, illustrates several aspects of the infused headlamp lens and together with the description serves to explain certain principles thereof.

[0017] FIG. **1** is a schematic representation of the polycarbonate lens with an infused protective coating.

[0018] Reference will now be made in detail to the present preferred embodiments of the headlamp lens, an example of which is illustrated in the accompanying drawing figure.

DETAILED DESCRIPTION

[0019] Reference is now made to FIG. **1** illustrating the headlamp lens **10**. That headlamp lens **10** comprises a polycarbonate substrate **12** and an infused protective skin **14** covering at least one surface (i.e. the forward surface) of the polycarbonate substrate and an optional PECVD (Plasma Enhanced Chemical Vapor Deposition) build-up.

[0020] In one embodiment, the infused protective skin **14** includes a scratch resistance agent and a UV inhibitor. In one possible embodiment, the scratch resistance agent is silicone-based. Such a scratch resistance agent may be selected from a group of materials consisting of vinyl (mono-, di- and tri-alkoxysilanes), phenyl (mono-, di- and tri-alkoxysilanes), diphenyldialkoxysilanes, vinyltrimethoxysilanes, and other silicone-based molecules and mixtures thereof.

[0021] In one embodiment the UV inhibitor is selected from a group of materials consisting of a benzophenone, a benzotriazole, or other compounds like hydroxyphenyltriazines and mixtures thereof. Further, in one possible embodiment the infused protective skin further includes one or more UV stabilizers. The UV stabilizer may take the form of a hindered amine light stabilizer.

[0022] As illustrated in FIG. **1**, in any of the embodiments the polycarbonate substrate **12** includes a plurality of pores **16**. In one possible embodiment, the scratch resistance agent comprises silicone-based molecules having relatively large heads **18** and relatively narrow tails **20** wherein the heads rest on a surface of the substrate **12** overlying the pores **16** so as to provide a hard, impact resistant protective coating while the tails **20** penetrate the pores and act as an anchor for the heads. Advantageously, this structure provides a chemical bond between the infused protective skin **14** and the polycarbonate substrate **12** that is (a) far superior to and (b) resists the delamination characteristic of mechanically bonded hardcoats provided on headlamp lenses made in accordance with methods known in the art. It also serves to seal in the UV inhibitor **22** that has penetrated and been deposited deep in other pores **16**.

[0023] In accordance with an additional aspect, a method is provided for manufacturing a polycarbonate headlamp lens **10** having a polycarbonate substrate **12** and an infused skin **14** providing scratch resistance and UV protection. That method may be broadly described as comprising the steps of molding the headlamp lens substrate **12** from the polycarbonate material, cleaning the polycarbonate substrate following molding, infusing a surface of the polycarbonate substrate with a protective skin **14** and adding an optional PECVD layer **23** to produce an infused headlamp lens **10**, rinsing the lens and drying the lens. The method may also include incorporating a scratch resistance agent and a UV inhibitor in the protective skin **14**. Further, the method may include selecting a scratch resistance agent from a group of materials consisting of vinyl (mono-, di- and tri-alkoxysilanes), phenyl (mono-, di- and tri-alkoxysilanes), diphenyldialkoxysilanes, vinyltrimethoxysilanes, and other silicone-based molecules and mixtures thereof.

[0024] In addition the method may include the selecting of the UV inhibitor from a group of materials consisting of a benzophenone, a benzotriazole, other compounds like hydroxyphenyltriazines and mixtures thereof. Further the method may include incorporating a UV stabilizer in the protective skin **14**.

[0025] Still more specifically, the method may include cooling the headlamp lens substrate **12** after molding and prior to cleaning to a temperature of between 65° C. and room temperature. Further the infusing step may include dipping the substrate **12** into an infusion tank including an infusion solution bath for a period of time of between 10 to 60 seconds at a temperature between 65-90° C. so as to open the pores **16** in the substrate to allow superficial infusion of the protective skin **14** into the substrate. In one possible embodiment, the scratch resistance agent and the UV inhibitor are infused in a single step. In another possible embodiment, the scratch resistance agent and the UV inhibitor are infused in multiple steps. In another embodiment, the method includes performing a scratch resistance test to selected infused lenses and adjusting the concentrations of additives in the infusion solution bath as required until the desired results are achieved.

[0026] Another embodiment is to increase the depth of the silica layer by using an additional deposition process such as PECVD or other deposition process.

[0027] In yet another embodiment, the thickness of the infused skin may be further increased by appropriate physical or chemical conditioning or both. A potential way of achieving this is by chemically enhanced physical vapor deposition (CEPVD). In this technique, the infused polycarbonate is placed inside a chamber where silica and related silicon-based compounds (precursors) are ionized and vaporized under partial vacuum at moderate or near ambient temperatures and the vapors are allowed to deposit and condense onto the infused polycarbonate. Final hard coating thicknesses are controlled by the selection of the type of precursor and the chamber time/temperature/vacuum pressure to which the polycarbonate is exposed. In one possible embodiment, the thickness of the infused protection skin is between 1 and 10 microns. In another possible embodiment the protective skin has a thickness of about 7 microns. Where CEPVD is used to increase the thickness of the protective skin, the infused silica surface is receptive to chemical bonding and physical binding with the vaporized silica and related silicon-based compounds to provide a hard, scratch resistant layer.

[0028] In one possible embodiment, the polycarbonate headlamp lens substrate may be removed from the molding tool using an overhead conveyor transport. The molded lens may then be cooled to a temperature between 65° C. and room temperature by air circulation or other means prior to cleaning. Cleaning may be completed by dipping the lens **10** into a

tank filled with distilled, deionized water for 10 to 30 seconds. That water is maintained at anywhere from room temperature to 65° C.

[0029] After cleaning, the lens is dipped into an infusion tank holding an infusion solution bath for from 10 to 60 seconds wherein the bath is held at 65 the 90° C. The bath opens the pores **16** in the surface of the substrate **12** to allow superficial infusion of the additives in the infusion solution to a depth of 0.1-10μ or more as desired.

[0030] If the scratch resistance agent and the UV inhibitor are infused in a single step, the infusion solution bath includes an aqueous mixture of surface active agents including ionic and nonionic surfactants (emulsifiers). These surfactants hold two or more immiscible liquids, solids and mixtures in suspension. Proper emulsification is essential to the satisfactory performance of the carrier. Emulsifiers can be ionic (anionic, cationic, and amphoteric) and non-ionic.

[0031] Sodium stearate (a soap)—is an example of an anionic surfactant;

[0032] Trimethylhexadecyl ammonium bromide—is an example of a cationic surfactant;

[0033] Cocoamidopropylbentaine—is an example of an amphoteric surfactant; and

[0034] Polyethylene ethoxylate—is an example of a non-ionic surfactant.

[0035] Additional chemicals in the infusion solution bath may further include ethanol, other solvents, dispersants, plasticizers and leveling agents. If the scratch resistance agent and the UV inhibitor are infused in a single step, the infusion solution bath may further include hard coating materials based on the hard coating formula and the UV protection formula described below. In the event the scratch resistance agent and the UV inhibitor are to be infused in multiple steps, the first infusion path would include either the hard coating formula or the UV protection formula and a second infusion coating bath would include the other of the hard coating formula or UV protection formula.

[0036] For purposes of this document the hard coating formula may be described as comprising a number of silicone-based molecules that are suitable for the hard coating infusion of the polycarbonate lens **12**. As previously noted, these may include vinyl (mono-, di- and tri-alkoxysilanes), phenyl (mono-, di- and tri-alkoxysilanes), diphenyldialkoxysilanes, vinyltrimethoxysilane, other silicone-based molecules and mixtures thereof. Such molecules have long chain organic tails **20** that are able to penetrate the polycarbonate pores **16** and act as chemical anchor sites.

[0037] For purposes of this document the UV protection formula may be described as including UV absorbers based on conjugated compounds (containing double bonds) that absorb the UV radiation and re-emit it in the lower energy infrared range. These include benzophenones and benzotriazoles. Additionally, the UV protection, may include UV stabilizers. One of the most effective and important stabilizers are the hindered amine light stabilizers (HALS). Rather than simply absorbing the light energy, these stabilizers work by interrupting the photo degradation process before it can get destructively underway. The mechanisms used include "free radical scavenging", "peroxide decomposition" as well as energy absorption.

[0038] With the exception for water and alcohol, concentrations of the various chemicals may range from 0.01% to 10% each by weight or by volume. Concentrations of water and alcohol can range from 10 to 90% by volume.

[0039] Rinsing of the lens following infusion may comprise dipping the lens **10** in a second rinse tank of distilled ionized water for 10 to 30 seconds that has a temperature anywhere from room temperature to 65° C. The lens **10** is then removed from the tank and air dried such as by means of a drying fan. After performing any necessary scratch resistance testing on a selected test sample specimen, the remaining lenses **10** in the group of lenses being manufactured together are packaged for shipment. As should be appreciated all the steps may be performed by utilizing a robotic system with precise timing and sequencing protocol. Further, it should be appreciated that the headlamp lenses **10** may be infused at the molding site or at a remote facility any time after molding.

[0040] The foregoing has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the embodiments to the precise form disclosed. Obvious modifications and variations are possible in light of the above teachings. All such modifications and variations are within the scope of the appended claims when interpreted in accordance with the breadth to which they are fairly, legally and equitably entitled.

What is claimed:

1. A headlamp lens, comprising:

a polycarbonate substrate; and

an infused protective skin covering at least one surface of said polycarbonate substrate.

2. The lens of claim **1**, wherein said infused protective skin includes a scratch resistance agent and a UV inhibitor.

3. The lens of claim **2**, wherein said scratch resistance agent is silicone based.

4. The lens of claim **3**, wherein said scratch resistance agent is selected from a group of materials consisting of vinyl (mono-, di- and tri-alkoxysilanes), phenyl (mono-, di- and tri-alkoxysilanes), diphenyldialkoxysilanes, vinyltrimethoxysilane, other silicone-based molecules and mixtures thereof.

5. The lens of claim **4**, wherein said UV inhibitor is selected from a group of materials consisting of a benzophenone, a benzotriazole, a hydroxyphenyltriazine, and mixtures thereof.

6. The lens of claim **5**, wherein said infused protective skin further includes a UV stabilizer.

7. The lens of claim **6**, wherein said UV stabilizer is a hindered amine light stabilizer.

8. The lens of claim **3**, wherein said polycarbonate substrate includes a plurality of pores.

9. The lens of claim **8**, wherein said scratch resistance agent comprises silicone based molecules having relatively large heads and relatively narrow tails wherein said heads rest on a surface of said substrate overlying said pores and said tails penetrate said pores and act as an anchor for said heads.

10. A method of manufacturing a polycarbonate headlamp lens with an infused skin providing scratch resistance and UV protection, comprising:

molding said headlamp lens substrate from polycarbonate material;

cleaning said polycarbonate substrate following molding;

infusing a surface of polycarbonate substrate with a protective skin to produce polycarbonate infused headlamp lens;

rinsing said lens; and

drying said lens.

11. The method of claim **10**, further including increasing thickness of said protective skin following infusing.

12. The method of claim **11**, including increasing thickness of said protective skin by chemically enhanced physical vapor deposition.

13. The method of claim **11**, including incorporating a scratch resistance agent and a UV inhibitor in said protective skin.

14. The method of claim **13**, including selecting said scratch resistance agent from a group of materials consisting of vinyl (mono-, di- and tri-alkoxysilanes), phenyl (mono-, di- and tri-alkoxysilanes), diphenyldialkoxysilanes, vinyltrimethoxysilanes, and other silicone-based molecules and mixtures thereof.

15. The method of claim **14**, including selecting said UV inhibitors from a group of materials consisting of a benzophenone, a benzotriazole, a hydroxyphenyltriazine, and other UV inhibitor compounds and mixtures thereof.

16. The method of claim **15**, including incorporating a UV stabilizer in said protective skin.

17. The method of claim **11**, further including cooling said headlamp lens substrate after molding and prior to cleaning to a temperature between 65° C. and room temperature.

18. The method of claim **13**, wherein infusing includes dipping said substrate into an infusion tank including an infusion solution bath for a period of time of between 10-60 seconds at a temperature of between 65-90° C. so as to open pores in said substrate to allow superficial infusion of said protective skin into said substrate.

19. The method of claim **18**, wherein said scratch resistance agent and said UV inhibitor are infused in (a) a single step or (b) in multiple steps for the purposes of building up the desired thickness of the hard coating.

20. The method of claim **18**, including performing a scratch resistance test to selected infused lenses and adjusting concentration of additives in said infusion solution bath as required until desired results are achieved.

* * * * *

KOITO

SHIZUOKA WORKS
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SHIMIZU-SHI, SHIZUOKA-KEN
JAPAN
TEL NO. 0543-45-2573
FAX NO. 0543-45-3437

DEPT. OF TRANSPORTATION
DOCKETS

KOITO MANUFACTURING CO., LTD.

MAKERS CONTRACTORS

2005 OCT 12 A 11: 27

HEAD OFFICE
4-8-3, TAKANAWA
MINATO-KU TOKYO
JAPAN
TEL NO. 03-3443-7111
FAX NO. 03-3447-1520

4 August, 2005

U.S. Dept. of Transportation
NHTSA
Office of the Chief Counsel
400 seventh Street SW
Washington DC 20590

NHTSA-05-22709-2

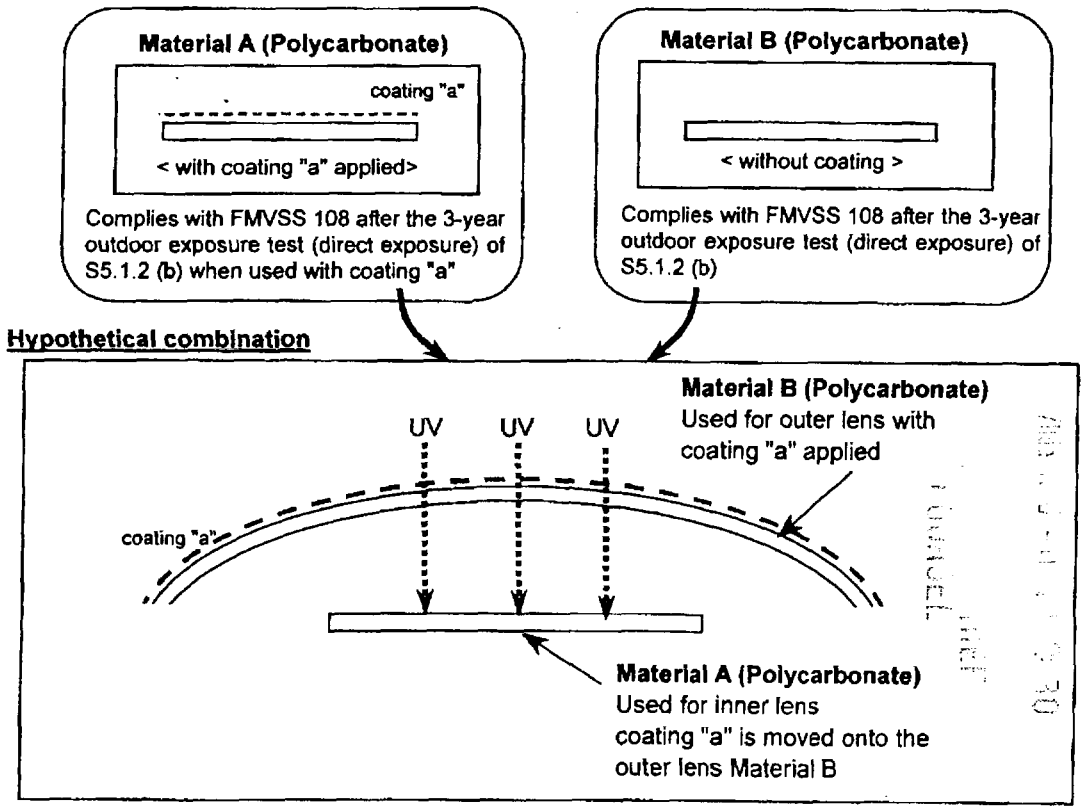
Request for Interpretation: Necessity of carrying out a 3-year outdoor exposure test

Dear Sir:

Koito would like to thank you in advance for your consideration of our request for an interpretation and clarification of the Federal Motor Vehicle Safety Standard (FMVSS) No.108 concerning the necessity of carrying out a 3-year outdoor exposure test in a certain combination of plastic and coating material as explained below.

The Question: Necessity of carrying out a 3-year outdoor exposure test when "material A",which is suitable for direct exposure of FMVSS108 S5.1.2 (b), is used with a covering lens "material B", also suitable for direct exposure of FMVSS108 S5.1.2 (b), and a coating material "a" which was originally on the exterior surface of "material A" is moved to the exterior surface of "material B".

We are contemplating a new combination of plastic lens and coating material for use in an inner lens optics of automotive lamps. In this hypothetical new combination, "material A" (polycarbonate), which is suitable for direct exposure of FMVSS108 S5.1.2 (b) after completion of the 3-year outdoor exposure test when used with coating material "a", is going to be used in the inner lens. "Material B" (polycarbonate), which is also suitable for direct exposure of FMVSS108 S5.1.2 (b), but without coating, is going to be used in the outer lens. Despite that both materials meet FMVSS108 S5.1.2(b) in direct exposure condition, coating material "a" which was originally on the exterior surface of the inner lens "material A" when performing a 3-year exposure test is going to be moved onto the exterior surface of the outer lens "material B", and material A loses the coating "a" from its own surface. (See Figure-1)



< Figure-1 >

We construe that no further testing of this hypothetical material / coating combination is required for the evaluation of the cumulative haze. Inner lens "material A" is still used with the coating material "a", although the coating itself is moved onto the exterior surface of the outer lens "material B". Also, in view of the vast reduction in ultraviolet exposure of inner lens which is afforded by the outer lens "material B", the inner lens "material A" would experience negligible haze when protected by an outer lens. This will further support the argument that haze performance of this material / coating combination is already ensured by the direct exposure of both materials A and B which were confirmed satisfactory to the FMVSS108 S5.1.2 (b) criteria after completion of the 3-year outdoor exposure tests.

Koito Manufacturing thanks you in advance for your early confirmation on this matter.

Sincerely,



Kiminori Hyodo
Deputy General Manager, Regulation & Certification
Koito Manufacturing Co., Ltd.

Docket SVC-124
Std 108

U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

DEPT. OF TRANSPORTATION
DOCKETS

2005 OCT 12 A 11:27

OCT - 4 2005

400 Seventh St., S.W.
Washington, D.C. 20590

NHTSA-05-22709-1

Mr. Kiminori Hyodo
Deputy General Manager, Regulations & Certification
Koito Manufacturing Co., Ltd.
4-8-3, Takanawa
Minato-ku Tokyo
Japan

Dear Mr. Hyodo:

This responds to your recent letter, in which you asked whether it would be necessary to carry out a three-year, outdoor exposure test on a new combination of plastic lens and coating material under Federal Motor Vehicle Safety Standard (FMVSS) No. 108, Lamps, Reflective Devices, and Associated Equipment. Specifically, your letter stated that you plan to use two existing types of polycarbonate materials, each of which independently meets the requirements of S5.1.2 of Standard No. 108 (*i.e.*, Material A with a coating, and Material B without a coating). However, we understand that you now intend to combine these materials, such that Material A is used as an inner lens without a coating, and Material B is used as an outer lens with the same coating that had been applied to Material A. In response to your question, FMVSS No. 108 does not specifically require manufacturers to conduct testing, but it is the manufacturer's responsibility to produce a product that complies with all applicable requirements of our standard when tested in accordance with the standard, and to properly certify compliance.

By way of background, the National Highway Traffic Safety Administration (NHTSA) is authorized to issue FMVSSs that set performance requirements for new motor vehicles and items of motor vehicle equipment. NHTSA does not provide approval of motor vehicles or motor vehicle equipment. Instead, it is the responsibility of manufacturers to self-certify that their products conform to all applicable safety standards that are in effect on the date of manufacture (see 49 U.S.C. 30115 and 49 CFR Part 567, Certification).

We note further that the agency's safety standards specify the test conditions and procedures that NHTSA will use to evaluate the performance of the vehicle or equipment being tested for compliance with the particular safety standard. NHTSA follows the test procedures and conditions applicable and in effect at the time of certification when conducting its compliance testing.

A manufacturer is responsible for ensuring that its product complies with applicable standards when tested in accordance with NHTSA procedures. A manufacturer may choose a valid means other than NHTSA performance test procedures for evaluating its products to determine whether the vehicle or equipment will comply with the safety standards when tested by the agency according to the procedures specified by the standard and to provide a basis for its certification of compliance.

If the agency has reason to believe that an apparent noncompliance exists in a vehicle or item of motor vehicle equipment, the manufacturer is asked to show the basis for its certification that the vehicle or equipment complies with the relevant safety standard(s). If in fact the vehicle or equipment does not comply with a Federal motor vehicle safety standard when tested according to procedures specified by the standard, the manufacturer will have to recall the product to bring it into compliance at no charge to the customer.

In addition, the manufacturer will be subject to civil penalties, unless it can establish that it had no reason to know, despite exercising "reasonable care" in the design and manufacture of the product to ensure compliance, that the product did not in fact comply with the safety standard(s) (49 U.S.C. 30115(a) and 30165). This agency has long said that it is unable to judge what efforts would constitute "reasonable care" in advance of the actual circumstances in which a noncompliance occurs.

As you are aware, the requirements for lighting equipment are contained in FMVSS No. 108, which provides in relevant part:

> S5.1.2 Plastic materials used for optical parts such as lenses and reflectors shall conform to SAE Recommended Practice J576 [Society of Automotive Engineers (SAE) Recommended Practice J576, Plastic Materials for Use in Optical Parts Such as Lenses and Reflex Reflectors of Motor Vehicle Lighting Devices] JUL91, except that:
>
> (a) Plastic lenses (other than those incorporating reflex reflectors) used for inner lenses or those covered by another material and not exposed directly to sunlight shall meet the requirements of paragraphs 3.3 and 4.2 of SAE J576 JUL91 when covered by the outer lens or other material;

(b) After the outdoor exposure test, the haze and loss of surface luster of plastic materials (other than those incorporating reflex reflectors) used for outer lenses shall not be greater than 30 percent haze as measured by ASTM D 1003-92, *Haze and Luminous Transmittance of Transparent Plastic*;

. . .

(g) All outdoor exposure tests shall be 3 years in duration, whether the material is exposed or protected. Accelerated weathering procedures are not permitted.

We note that neither SAE J576 nor Standard No. 108 specifically requires use of a coating.

Thus, the standard sets forth the test that NHTSA follows in conducting compliance testing. Specifically, under SAE J576 (incorporated by reference in FMVSS No. 108), the agency will subject plastic materials used for optical parts to an unaccelerated, three-year outdoor exposure test.

In short, Koito must ensure that its lamps as manufactured conform to all applicable requirements of FMVSS No 108, including that the plastic materials meet the exposure test requirements under S5.1.2. Again, our standards do not compel manufacturers to test the motor vehicles or motor vehicle equipment that they produce under NHTSA's test procedures, although many choose to do so in order to provide a basis for their certification. However, if the agency subjected the lamp in question to compliance testing, the lamp's plastic materials would need to meet the requirements of FMVSS No. 108, as certified.

If you have further questions, please feel free to contact Eric Stas of my staff at this address or by telephone at (202) 366-2992.

Sincerely,

for L. Guerci

Stephen P. Wood
Acting Chief Counsel

HONDA

American Honda Motor Co., In
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Torrance, CA 90501-2746
Phone (310) 783-2000

RECEIVED
NVS-215

2004 JUN -1 A 9:51

OFFICE OF
DEFECTS INVESTIGATION

May 27, 2004

04V-257
(3 pages)

Mr. Kenneth N. Weinstein,
Associate Administrator
Office of Safety Assurance
NATIONAL HIGHWAY TRAFFIC SAFETY
ADMINISTRATION
400 Seventh St., S.W.
Washington, DC 20590

Dear Mr. Weinstein:

On May 20, 2004, Honda Motor Co., Ltd. (HMC) determined the existence of a noncompliance with Federal Motor Vehicle Safety Standard No. 108, "Lamps, Reflective Devices, and Associated Equipment" in the motor vehicles listed below. The following information is submitted pursuant to the requirements of 49 CFR 573.6.

573.6(c)(1)

Name of manufacturer: Honda Motor Co., Ltd. (HMC)

Manufacturer's agent: William R. Wilen
American Honda Motor Co., Inc. (AHM)
1919 Torrance Blvd.
Torrance, CA 90501-2746

Name of tail lamp manufacturer: Koito Manufacturing Co., Ltd.

573.6(c)(2)

Identification of potentially affected vehicles:

Make/Model	Description	VIN/Dates of Manufacture
Honda S2000	Certain 2000 models	JHMAP114*YT000049 – JHMAP114*YT007115 June 8, 1999 to April 5, 2000

Description of the basis for the determination of the recall population:
The 2000 model year was the introductory year of the S2000. The affected lenses of the side marker lamp and side reflex reflector in the tail lamp assembly were identified based on manufacturing records. The VIN range and manufacturing dates are inclusive of all vehicles that could potentially have a noncomplying lens installed by the factory.

573.6(c)(3)

Total number of vehicles potentially affected: 7,067

573.6(c)(4)

Percentage of affected vehicles that contain the noncompliance: Unknown

573.6(c)(5)

Noncompliance description:

Summary

The lens of the side marker lamp and side reflex reflector in the tail lamp assembly were manufactured with incorrect dye that, under the circumstances of use, does not retain its color over time and, therefore, does not comply with the requirements of Federal Motor Vehicle Safety Standard No. 108, "Lamps, Reflective Devices, and Associated Equipment."

Detail

The lens of the side marker lamp and side reflex reflector in the tail lamp assembly were manufactured using Diazole-base dye instead of Perinone-base dye. The chemical unit of Diazole-base dye, when used in the circumstances of the S2000, is more susceptible to UV and high temperature decomposition. As a result, the red color could fade, which does not comply with the deterioration requirement of Federal Motor Vehicle Safety Standard No. 108, "Lamps, Reflective Devices, and Associated Equipment."

573.6(c)(7)

Determination of noncompliance:

On June 17, 2003, HMC received a report that the color of the tail lamp side marker lens had faded. HMC initiated an investigation. According to Koito's accelerated test, the lens was projected to comply with the deterioration requirement of FMVSS 108. On May 14, 2004, Honda and Koito met with NHTSA to discuss compliance implications. In accordance with NHTSA's opinion, HMC determined the existence of a noncompliance.

573.6(c)(8)(i)

Program for remedying the noncompliance:

The owners of all affected vehicles will be notified by mail to take their vehicle to an authorized Honda dealer. The dealer will replace all affected tail lamp assemblies, free of charge.

573.6(c)(8)(ii)

The estimated date to e-mail preliminary notification to dealers:	Jun. 4, 2004
The estimated date to provide service bulletin to dealers:	Jun. 18, 2004
The estimated date to begin sending notifications to owners:	Jul. 7, 2004
The estimated date of completion of the notification:	Jul. 7, 2004

573.6(c)(9)

Representative copies of all notices, bulletins and other communications:

A copy of the dealer service bulletin and text of the final customer notification letter will be submitted to your office as soon as possible.

573.6(c)(10)

Proposed owner notification letter submission:

A draft of the owner notification letter will be submitted to your office as soon as possible.

573.6(c)(11)

Manufacturer's campaign number:

The number will be submitted to your office as soon as possible.

Sincerely,

AMERICAN HONDA MOTOR CO., INC.

William R. Willen
Managing Counsel
Product Regulatory Office

WRW:ka

Weaverville is located within the prohibited co-channel minimum distance separation of 280.8 kilometers (174.5 miles) to the Sacramento-Stockton television market, one of the designated television markets affected by the Commission's current freeze on allotments and applications pending the outcome of an inquiry into the use of advanced television systems in broadcasting. (*See Order, Advanced Television Systems and Their Impact on Existing Television Broadcasting Service*, 52 Fed. Reg. 28346, July 29, 1987). However, Channel 32 is allotted to Weaverville in compliance with the terms of the freeze *Order* at a restricted site. Interested parties should note that any application submitted for Channel 32 at Weaverville which does not specify a site beyond the ''freeze zone'' governing the allotment will not be accepted for filing.

List of Subjects in 47 CFR Part 73

Television broadcasting.

Part 73 of title 47 of the Code of Federal Regulations is amended as follows:

PART 73—[AMENDED]

1. The authority citation for part 73 continues to read as follows:

Authority: Secs. 303, 48 Stat., as amended, 1082; 47 U.S.C. 154, as amended.

§ 73.606 [Amended]

2. Section 73.606(b), the Table of TV Allotments under California, is amended by adding Weaverville, Channel 32.

Federal Communications Commission.

John A. Karousos,

Chief, Allocations Branch, Policy and Rules Division, Mass Media Bureau.

[FR Doc. 95–21907 Filed 9–1–95; 8:45 am]

BILLING CODE 6712–01–F

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. 94–37; Notice 2]

RIN 2127–AF 22

Federal Motor Vehicle Safety Standards; Lamps, Reflective Devices and Associated Equipment

AGENCY: National Highway Traffic Safety Administration (NHTSA), DOT.

ACTION: Final rule.

SUMMARY: This notice adopts amendments to the Federal Motor Vehicle Safety Standard on lighting to replace the currently incorporated SAE J576c with the more recent SAE J576 JUL91 as the referenced standard on plastics materials, to replace ASTM D 1003–61 with the more recent ASTM D 1003–92 in the test procedures, and to allow alternative processing techniques, sample sizes and thickness tolerances to those presently specified. These amendments represent the choice of Option 1 from the notice of proposed rulemaking published in November 1994.

DATES: The effective date of the final rule is March 1, 1996.

FOR FURTHER INFORMATION CONTACT: Kenneth O. Hardie, Office of Rulemaking, NHTSA (202–366–6987).

SUPPLEMENTARY INFORMATION: Heraeus DSET Laboratories, Inc. (''DSET''), of Phoenix, Arizona, petitioned NHTSA for rulemaking to amend Federal Motor Vehicle Safety Standard No. 108, *Lamps, Reflective Devices, and Associated Equipment.* Specifically, DSET asked that paragraph S5.1.2 be amended ''to update the test specimen processing requirements of plastic material used for optical parts such as lenses and reflectors.'' Currently, these materials are required to conform to Society of Automotive Engineers (SAE) Recommended Practice J576c, May 1970. DSET wants NHTSA

> to allow alternative processing techniques besides injection molding to produce test specimens, to allow test specimen sizes other than a 3 inch diameter disc and to change the specimen thickness tolerances from ±0.005 inch to ±.010 inch.

Those requirements for injection molding and for the diameter and thickness of the test specimen are set forth in J576c, May 1970.

NHTSA granted the petition and published a notice of proposed rulemaking in response to it on November 2, 1994 (59 FR 54881). The notice proposed two alternative amendments of S5.1.2 as a means of implementing its grant of DSET's petition. The agency asked commenters for their views on each of the alternatives.

Option 1. This option would substitute SAE J576 JUL91 for SAE J576c, May 1970, and make conforming amendments in the text of S5.1.2. Option 1 would also replace American Society for Testing and Materials (ASTM) D 1003–61 with ASTM D 1003–92 with respect to measurement of haze (which, as currently specified, would not exceed 7 percent). A specimen thickness tolerance of ±0.25 mm (0.010 in.) would also be allowed as there is no technical reason to limit the test specimen thickness tolerance to ±0.005 in., and the value proposed by NHTSA as recommended by DSET appears to be a more reasonable tolerance for test specimens.

Option 2. This option would retain the current SAE and ASTM specifications but would allow processing techniques other than injection molding to produce equivalent test specimens, test specimens other than a disc of 3-inch diameter, and a test specimen thickness tolerance of ±0.010 inch.

Seven comments were received, five of which supported Option 1. These were from Flxible Corporation (''Flxible''), Transportation Safety Equipment Institute (''TSEI''), Robert Bosch, GmbH (''Bosch''), American Automobile Manufacturers Association (''AAMA''), and Ford Motor Company (''Ford''). Miles, Inc. opposed Option 1 and supported Option 2. The Plastics Division of General Electric Corporation (''GE'') did not express a preference for either alternative.

Each of the commenters supporting Option 1 had a different concern. Flxible suggested that NHTSA adopt the base number of each SAE and ASTM standard/recommended practice, with the suffix notation ''Latest Revision.'' In the company's view, this would eliminate the need to revise older materials and ensure that the safety standards reflect contemporary industry practice.

While this is an attractive notion, there are legal constraints against it. The SAE and ASTM materials per se are only guidelines and advisory in nature. Once they are incorporated into the Federal motor vehicle safety standards, they become ''the law of the land'', and a manufacturer must comply with them or face civil sanctions. Under the Administrative Procedure Act, a regulation imposing a substantive burden cannot be adopted in the absence of adequate public notice and an opportunity to comment. Under the approach suggested by Flxible, automatic updating of the safety standards to incorporate the latest SAE and ASTM revisions would occur with no prior public notice or opportunity to comment, and hence violate the Administrative Procedure Act. Further, NHTSA has found that many updated and revised materials change the previous materials in substantive ways. Some changes may not be in the interests of safety; the elimination of the heat test from SAE J576 JUL91 is one example of this. Other changes may increase, rather than reduce, a substantive burden upon industry. Regulated persons and the public must

be apprised of these changes before they are adopted.

NHTSA may, however, adopt an updated version without prior notice where there appears to be no substantive change since such an adoption is in the nature of a technical amendment. The agency is adopting an updated version in this final rule on the basis of a comment from TSEI. Under proposed paragraph S5.1.2(e), after exposure to the heat test, the samples shall conform to the color requirements of SAE J578a October 1966. TSEI pointed out that current paragraph S5.1.5 references SAE J578c February 1977. It recommended that NHTSA change both references to the specification of J578 MAY88.

NHTSA has compared the 1988 and 1977 versions of J578 with that of 1966. It finds no substantive difference between the 1966 and 1977 versions. The 1988 version, however, contains a third method of color measurement to be used ''as a referee approach when the commonly used methods produce questionable results.'' In addition, the Appendix in the latter has added a section of ''Color Measurements of Gaseous Discharge Lighting Devices.'' NHTSA ought to have comment on these changes before adopting SAE J578 MAY88, and, for this reason, has not followed TSEI's suggestion. On the other hand, because of the lack of substantive change between the other two versions, paragraph S5.1.2(e) is added with an update of the J578 reference to 1977 from the 1966 version which was proposed.

The wording of present paragraph S5.2.1 concerned Ford and AAMA. Under this paragraph, phrases such as ''It is recommended that'' and ''should be,'' which appear in materials incorporated by reference, are to be read as setting forth mandatory requirements. Ford and AAMA commented that these phrases should not be interpreted as applying to SAE J576 JUL91. In NHTSA's view, the result of adopting Ford's and AAMA's comments would be to make compliance of plastic materials used for optical parts a voluntary affair. This would defeat the purpose of the rulemaking.

Proposed paragraph S5.1.2(e) would require test samples, after the heat test, to ''show no discernable change in shape and general appearance when compared with an unexposed specimen.'' This language comes from J576 itself, with the exception that the SAE uses ''significant'' rather than ''discernable.'' Ford and AAMA objected to this substitution, arguing that it would establish a higher standard to be met by plastics, and that there is no need to change language that has been a requirement for years. They recommended use of the word ''significant.'' In their view, a change that is ''discernable'' is not necessarily one that is ''significant.''

In its proposal, NHTSA had no intention of increasing the burden on any regulated party. The agency proposed the word ''discernable'' with care, because it is objective, while ''significant'' is not. Motor vehicle safety standards are required by law to be ''objective'', 49 U.S.C. 30111(a). The agency has concluded that ''discernable'' is more appropriate for a requirement specifically expressed in the text of Standard No. 108 (as compared with one incorporated by reference). However, NHTSA wishes to make clear that it views the words as essentially synonymous in this context. If a post-test change in shape or general appearance is discernable, NHTSA considers that to be significant. Such a change indicates the potential for degradation of a lens in use, with a corresponding effect upon color and photometrics of the lamp on which it is installed. To add even greater objectivity, the final rule expresses the requirement as ''discernable to the naked eye.'' Should a change be discernable to the naked eye after testing, and a manufacturer believe that such a change is not ''significant,'' the manufacturer may file a Part 573 Noncompliance Notification Report simultaneously with an application to NHTSA for a determination that the change resulting from that testing is inconsequential to motor vehicle safety.

GE did not choose between the alternatives in its comment. It did, however, recommend the adoption of SAE J576 JUL91 in its entirety, and that NHTSA not carry over the heat test from the previous version of J576. In its view, the heat tests of SAE J575 are adequate until further work is done on thermal issues suitable for incorporation into J576.

Having considered the comments in response to the NPRM, NHTSA is amending Standard No. 108 to add the two new paragraphs proposed, maintaining the performance requirements required of plastic materials by SAE J576c for the heat test and specifying positioning of test samples during the test. These have been omitted by the SAE from J576 JUL91. NHTSA has chosen to retain the existing heat test as one that is familiar to industry and one which meets the need for motor vehicle safety. It is a minimum requirement, intended to establish a margin of safety between the temperatures at which plastic reflectors and lenses may fail from internal heat, and temperatures on the exterior surface induced by exposure to sunlight. Lamp manufacturers use J575 or similar tests to determine whether the particular design characteristics of their lamps require use of premium materials in the lenses. It is a test of the finished lens as installed on the lamp, rather than a test of the materials used in finished products. Use of material with insufficient high temperature performance can result in reflectors that lose color and reflectivity.

The positioning of test samples will allow the sample to droop if its strength is adversely affected by the test.

In order to retain the current 3-year outdoor exposure time test requirements for plastic lenses used or covered by another material and not exposed directly to sunlight, NHTSA is adding a new paragraph S5.1.2(g) to specify that paragraph 3.3.3.1 of SAE J576 JUL91 does not apply as regards protected materials. For the same reason, NHTSA is not adopting paragraph 3.3.3.2. of SAE J576 JUL91 which allows an accelerated 6-month outdoor exposure test time. New paragraph S5.1.2(g) will not change the stringency or flexibility of the standard as it exists, but will ensure that the integrity of plastic materials is maintained by not permitting a lesser exposure time for materials which may be protected when in use.

Miles, Inc., a manufacturer of polycarbonate resin used as a material in lenses and reflectors, objected to Option 1. In its view, this alternative places an additional testing burden on the resin manufacturer, as compared with the present requirements. For this reason, it supported Option 2. Specifically, Miles opposes SAE J576 JUL91 because of Section 3.1 *Materials to be Tested.* This section reads:

> Outdoor exposure tests shall be made on each material * * * offered for use in optical parts * * *. Concentrations of polymer components and additives such as plasticizer, lubricants, colorants, weathering stabilizers, and antioxidants in plastic materials and/or coatings may be changed without outdoor exposure testing if: the changes are within the limits of composition represented by higher and lower concentrations of these polymer components and additives have been tested in accordance with 3.3 and found to meet the requirements of Section 4.

Miles interprets this language to mean that changes in dye concentrations would only be permissible if samples containing lower and higher concentrations of dye had been exposure tested. Miles believes that this, in effect, would double the samples to

be tested when compared with the present requirements.

The present requirements are those of section 3.1 of SAE J576c, May 1970. These state, in pertinent part, that ''[a] test of one color and formulation shall cover variations in dye concentration, but shall not cover changes in dye materials or changes in polymers.'' Miles interprets this as meaning that a new exposure test need not be conducted under the 1970 version if the only change in the product is a variation in dye concentration. Its present practice is to test for exposure materials incorporating new dyes only at the expected concentration level of the dye. One exposure test covers each new dye, but Miles will accept the test results as valid when there are small variations in dye concentration.

Miles is correct that SAE J576c allows a single test to cover variations in dye concentration. SAE J576 JUL91 may be interpreted as calling for the testing of two samples by specifying that dye concentrations in material to be used in motor vehicle optical parts must fall within the upper and lower limits of dye concentrations tested if there are variations in dye concentration. Miles believes the newer requirement will double its testing burden.

NHTSA does not agree that this is the inevitable result of the adoption of this portion of SAE J576 JUL 91. What paragraph S5.1.2 is intended to ensure is that lenses and reflectors, as manufactured for use on motor vehicles, are fabricated from plastic materials that meet SAE J576. The key issue is whether the equipment satisfies the performance requirements of the standard, not the number of tests conducted on the materials used in the equipment. Ultimately, the manufacturer of the vehicle in certifying compliance with all applicable Federal motor vehicle safety standards, is certifying that the lenses and reflectors on the vehicle are made from plastics materials that meet J576. If the lens or reflector is manufactured as replacement equipment, the certification responsibility is that of the manufacturer of the equipment. Thus, it is incumbent upon the vehicle or equipment manufacturer to assure itself that the materials it obtains from the plastics manufacturer comply with SAE J576 (and, furthermore, not to change the composition of the plastics materials so obtained in a manner that would cause it to be noncomplying). The documentation needed for such assurance, including the quantum of testing performed by the plastics manufacturer and by the vehicle or equipment manufacturer, is a decision that each equipment or vehicle manufacturer must make under the particular circumstances. NHTSA, of course, expects manufacturers to exercise reasonable care in certifying their products, and, in the event of a noncompliance, the manufacturer may claim that it had no reason to know, despite exercising reasonable care, that the vehicle or equipment failed to comply. However, the allocation of that responsibility is a matter of contract between the manufacturer with the Federal certification responsibility and its plastic materials supplier. Plastic materials are not completed items of motor vehicle equipment subject to Standard No. 108 so the Federal certification responsibility does not fall upon Miles. If Miles or other materials manufacturers are satisfied, based on their extensive experience with dyes, that changes in dye concentration would not cause the plastic material to fail the specified performance requirements, they may be able to persuade their purchasers that additional testing is not needed.

Effective Date

The effective date of the final rule is March 1, 1996.

Rulemaking Analyses and Notices

Executive Order 12866 and DOT Regulatory Policies and Procedures. This final rule was not reviewed under Executive Order 12866. It has been determined that the rulemaking action is not significant under Department of Transportation regulatory policies and procedures. The purpose of the rulemaking action is to update testing procedures. Since the final rule will have no significant cost or other impacts, preparation of a full regulatory evaluation is not warranted.

National Environmental Policy Act. NHTSA has analyzed this rulemaking action for the purposes of the National Environmental Policy Act. The final rule will not have a significant effect upon the environment. The composition of plastic materials used in optical parts will not change from those presently in production.

Regulatory Flexibility Act. The agency has also considered the impacts of this rulemaking action in relation to the Regulatory Flexibility Act. I certify that this rulemaking action does not have a significant economic impact upon a substantial number of small entities. Accordingly, no regulatory flexibility analysis has been prepared. Manufacturers of motor vehicles and motor vehicle equipment, those affected by the rulemaking action, are generally not small businesses within the meaning of the Regulatory Flexibility Act. Further, small organizations and governmental jurisdictions will not be significantly affected because the price of new vehicles and vehicle equipment will not be impacted.

Executive Order 12612 (Federalism). This rulemaking action has also been analyzed in accordance with the principles and criteria contained in Executive Order 12612, and NHTSA has determined that this rulemaking action does not have sufficient Federalism implications to warrant the preparation of a federalism Assessment.

Civil Justice. The final rule will not have any retroactive effect. Under 49 U.S.C. 30103, whenever a Federal motor vehicle safety standard is in effect, a state may not adopt or maintain a safety standard applicable to the same aspect of performance which is not identical to the Federal standard. 49 U.S.C. 30161 sets forth a procedure for judicial review of final rules establishing, amending or revoking Federal motor vehicle safety standards. That section does not require submission of a petition for reconsideration or other administrative proceedings before parties may file suit in court.

List of Subjects in 49 CFR Part 571

Imports, Motor vehicle safety, Motor vehicles

PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

In consideration of the foregoing, 49 CFR part 571 is amended as follows:

1. The authority citation for part 571 continues to read as follows:

Authority: 49 U.S.C. 322, 30111, 30115, 30117 and 30166; delegation of authority at 49 CFR 1.50.

2. Section 571.108 is amended by revising paragraph S5.1.2, to read as follows:

§ 571.108 Motor Vehicle Safety Standard No. 108; Lamps, reflective devices, and associated equipment.

* * * * *

S5.1.2 Plastic materials used for optical parts such as lenses and reflectors shall conform to SAE Recommended Practice J576 JUL91, except that:

(a) Plastic lenses (other than those incorporating reflex reflectors) used for inner lenses or those covered by another material and not exposed directly to sunlight shall meet the requirements of paragraphs 3.3 and 4.2 of SAE J576 JULY91 when covered by the outer lens or other material;

(b) After the outdoor exposure test, the haze and loss of surface luster of

plastic materials (other than those incorporating reflex reflectors) used for outer lenses shall not be greater than 30 percent haze as measured by ASTM D 1003–92, *Haze and Luminous Transmittance of Transparent Plastic;*

(c) After the outdoor exposure test, plastic materials used for reflex reflectors and for lenses used in front of reflex reflectors shall not show surface deterioration, crazing, dimensional changes, color bleeding, delamination, loss of surface luster, or haze that exceeds 7 percent as measured under ASTM D 1003–92.

(d) The thickness of the test specimens specified in paragraph 3.2.2 of SAE J576 JUL91 may vary by as much as ±0.25 mm.

(e) After exposure to the heat test as specified in subparagraph (f) of this paragraph, and after cooling to room ambient temperature, a test specimen shall show no change in shape and general appearance discernable to the naked eye when compared with an unexposed specimen. The trichromatic coefficients of the samples shall conform to the requirements of SAE J578c, ''Color Specification for Electric Signal Lighting Devices'', February 1977.

(f) Two samples of each thickness of each plastic material are used in the heat test. Each sample is supported at the bottom, with at least 51 mm. of the sample above the support, in the vertical position in such a manner that, on each side, the minimum uninterrupted area of exposed surface is not less than 3225 sq. mm. The samples are placed for two hours in a circulating air oven at 79 ± 3 degrees C.

(g) All outdoor exposure tests shall be 3 years in duration, whether the material is exposed or protected. Accelerated weathering procedures are not permitted.

* * * * *

Issued on August 29, 1995.

Ricardo Martinez,

Administrator.

[FR Doc. 95–21865 Filed 9–1–95; 8:45 am]

BILLING CODE 4910–59–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 672

[Docket No. 950206041–5041–01; I.D. 082895A]

Groundfish of the Gulf of Alaska; Pacific Cod with Jig and Pot Gear for Processing by the Inshore Component in the Central Regulatory Area

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Modification of a closure.

SUMMARY: NMFS is opening directed fishing for Pacific cod by vessels catching Pacific cod with jig and pot gear for processing by the inshore component in the Central Regulatory Area of the Gulf of Alaska (GOA). This action is necessary to use the total allowable catch (TAC) for Pacific cod in this area.

EFFECTIVE DATE: 12 noon, Alaska local time (A.l.t.), September 1, 1995, until 12 midnight, A.l.t., December 31, 1995.

FOR FURTHER INFORMATION CONTACT: Andrew N. Smoker, 907–586-7228.

SUPPLEMENTARY INFORMATION: The groundfish fishery in the GOA exclusive economic zone is managed by NMFS according to the Fishery Management Plan for Groundfish of the Gulf of Alaska (FMP) prepared by the North Pacific Fishery Management Council under authority of the Magnuson Fishery Conservation and Management Act. Fishing by U.S. vessels is governed by regulations implementing the FMP at 50 CFR parts 620 and 672.

In accordance with § 672.20(c)(1)(ii)(B), the allocation of Pacific cod for the inshore component in the Central Regulatory Area of the GOA was established by the Final 1995 Harvest Specifications of Groundfish (60 FR 8470, February 14, 1995) as 41,085 metric tons (mt). The directed fishery for Pacific cod by vessels catching Pacific cod for processing by the inshore component in the Central Regulatory Area of the GOA was closed under § 672.20(c)(2)(ii) on March 22, 1995, in order to reserve amounts anticipated to be needed for incidental catch in other fisheries (60 FR 15521, March 24, 1995). NMFS has determined that as of August 8, 1995, 4,313 mt remain unharvested.

The Director, Alaska Region, NMFS, has determined that the 1995 TAC for Pacific cod for processing by the inshore component in the Central Regulatory Area of the GOA has not been reached. Therefore, NMFS is terminating the previous closure and is opening directed fishing for Pacific cod by vessels catching Pacific cod for processing by the inshore component in the Central Regulatory Area of the GOA. All other closures remain in full force and effect.

This action opens the directed fishery for Pacific cod by vessels catching Pacific cod with jig and pot gear for processing by the inshore component in the Central Regulatory Area of the GOA. Directed fishing for groundfish with hook-and-line and trawl gear is currently prohibited (60 FR 26694, May 18, 1995; 60 FR 37600, July 21, 1995; 60 FR 37601, July 21, 1995).

Classification

This action is taken under 50 CFR 672.20 and is exempt from review under E.O. 12866.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: August 29, 1995.

Richard H. Schaefer,

Director, Office of Fisheries Conservation and Management, National Marine Fisheries Service.

[FR Doc. 95–21948 Filed 8–30–95; 3:43 pm]

BILLING CODE 3510–22–F

50 CFR Part 672

[Docket No. 950206041–5041–01; I.D. 082995A]

Groundfish of the Gulf of Alaska; Trawling in the Western Regulatory Area

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Inseason adjustment; request for comments.

SUMMARY: NMFS issues an inseason adjustment closing the season for all groundfish by vessels using trawl gear, except fishing for pollock by vessels using pelagic trawl gear, in the Western Regulatory Area of the Gulf of Alaska (GOA). This action is necessary to prevent overfishing of Pacific ocean perch (POP).

DATES: Effective 12 noon, Alaska local time (A.l.t.), September 1, 1995, until 12 midnight, A.l.t., December 31, 1995. Comments must be received no later than 4:30 p.m., A.l.t., September 18, 1995.

ADDRESSES: Comments may be sent to Ronald J. Berg, Chief, Fisheries Management Division, Alaska Region, NMFS, P.O. Box 21668, Juneau, AK 99802, Attn. Lori Gravel, or be delivered

Mr. Shigeyoshi Aihara
Project Manager
Regulation and Compliance
Engineering Administration Department
Ichikoh Industries, Ltd.
80 Itado Ishehara City
Kanagawa Pref.
250-1192 Japan

Dear Mr. Aihara:

This is in reply to your letter of June 10, 1999, presented at a meeting with NHTSA representatives that day, asking for an interpretation of S5.1.2 of Federal Motor Vehicle Safety Standard No. 108. I am sorry that we were unable to provide you a response by July 6 as you requested in your letter of June 28 to Taylor Vinson of this Office.

Your company has developed a new rear turn signal lamp, consisting of an outer plastic lens, an inner cap, and an uncolored filament bulb. The color of the lens is "pale (light) pink color, and, this plastic material complies with the requirements of SAE J576c . . . excluding the color requirement." You tell us that the trichromaticity coordinates of the plastic material used in the outer lens do not fall within either the red or the white areas of the chromaticity chart of SAE J578c. However, when illuminated, the lamp provides an amber color that fall within the coordinates specified in SAE J578c. You have asked whether this design is acceptable under S5.1.2 relating to plastic materials used in optical parts of motor vehicle lighting devices.

Although this does not affect our answer to your question, please note, in Standard No. 108, that SAE Recommended Practice J576c of 1970 has been replaced by SAE J576 JUL91 as the applicable standard for plastic materials used in lighting devices. However, J578c remains the Federal standard for color.

We regret to inform you that this design is not acceptable. Although S1, *Scope,* of SAE J578c states that "The specification applies to the overall effective color of light emitted by the device," regardless of the color of its lens, both SAE J576 JUL91 and Standard No. 108 apply the color requirement to plastic components of lamps as well. S5.1.2(e) of Standard No. 108 requires the trichromatic coordinates of the plastic samples, tested according to that paragraph, to conform to the requirements of SAE J578c. Paragraphs 4.1 and 4.2.2 of SAE J576 JUL91 also require conformance of plastic samples to the chromaticity coordinate requirements of SAE J578c. This standard specifies color coordinates only for red, white, yellow (amber), green, and blue. Because the lens of your lamp does not meet any of the coordinates of SAE J578c, Standard No. 108 does not permit its use.

At the meeting, we noted that the iner lens was a greenish color. It, too, must comply with the color coordinate requirements of paragraphs 4.1 and 4.2.2 of SAE J576 JUL91.

At that time, you also asked if it were acceptable to use a plastic fabricated from the mix of two resins, each of which complied with the requirements of SAE J576. You cannot assume, when two complying resins are blended, that the resulting plastic will also comply with SAE J576 JUL91, and we recommend that you test the blended plastic to ensure that it meets all the specifications of S5.1.2 and SAE J576 JUL91. This would be the case whether it was the intent to create a new color, or whether the rejected molded parts are reground and plastics of differing compositions are mixed and recycled into newly-molded lamp lenses. As we said in the preamble to the 1995 final rule amending S5.1.2, "it is incumbent upon the vehicle or equipment manufacturer . . . not to change the composition of the plastics materials [obtained from the plastics manufacturer] in a manner that would cause it to be noncomplying." 60 FR 46066, copy enclosed.

Sincerely,
Frank Seales, Jr.
Chief Counsel
Enclosure
ref:108
d.8/27/99

Docket SVC-124
Std 108

U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

MAR 27 2009

1200 New Jersey Avenue SE.
Washington, DC 20590

09 MAY 01 AM 10:10
DEPT OF TRANSPORTATION
DOCKETS

Mr. Kiminori Hyodo
Deputy General Manager, Regulation & Certification
Koito Manufacturing Co., Ltd.
4-8-3, Takanawa
Minato-Ku Tokyo
Japan

Dear Mr. Hyodo:

This responds to your letter, in which you ask about test requirements for plastic materials for use in lenses under Federal Motor Vehicle Safety Standard (FMVSS) No. 108, Lamps, Reflective Devices, and Associated Equipment. Specifically, you asked whether you could exclude the presence of metal particles contained within a plastic lens from the outdoor exposure test incorporated by reference into Standard No. 108. You also asked what the term "lens" means under S5.1.2 of FMVSS No. 108. Our responses are presented below.

By way of background, the National Highway Traffic Safety Administration (NHTSA) is authorized to issue FMVSSs that set performance requirements for new motor vehicles and items of motor vehicle equipment (see 49 U.S.C. Chapter 301). NHTSA does not provide approvals of motor vehicles or motor vehicle equipment. Instead, manufacturers are required to self-certify that their products conform to all applicable safety standards that are in effect on the date of manufacture. NHTSA selects a sampling of new vehicles and regulated equipment each year to determine their compliance with applicable FMVSSs. If our testing or examination reveals an apparent noncompliance, we may require the manufacturer to remedy the noncompliance, and may initiate an enforcement proceeding if necessary to ensure that the manufacturer takes appropriate action.

Do the metal particles need to be included in the "haze test?"

Your first question relates to the presence of a layer of metal particles on the lens. According to your letter, a process called "half-metalization" allows you to create a semitransparent metallic layer on your lens, between the lens and a protective coating. This half-metalized layer effectively reduces light transmission to about 30% of a non-metalized lens.

As you state in your letter, FMVSS No. 108 requires that optical parts be certified to comply with the testing procedures in SAE Recommended Practice J576 (JUL 91), "Plastic Materials for use in Optical Parts such as Lenses and Reflex Reflectors of Motor Vehicle Lighting Devices," incorporated by reference into paragraph S5.1.2 of the standard. Part of this practice specifies that materials be subject to a three year outdoor exposure test. Your specific question asked if you could exclude the presence of the metal particles from the three year exposure test. In asking this question, you state that metals are inorganic and do not excite plastics and also, since half-metalization is applied on the inner surface and protected by the coating, it would not be oxidized.

In responding to your question as to whether you can exclude the metal particles from the test, we note that each of this agency's safety standards specifies the test conditions and procedures that this agency will use to evaluate the performance of the vehicle or equipment being tested for compliance with the particular safety standard. NHTSA follows these specified test procedures and conditions when conducting its compliance testing.

Manufacturers are not required to test their products in the manner specified in the relevant safety standard, or even to test the product at all, as their basis for certifying that the product complies with all relevant standards. A manufacturer may choose any valid means of evaluating its products to determine whether the vehicle or equipment will comply with the safety standards when tested by the agency according to the procedures specified in the standard and to provide a basis for its certification of compliance.

If we tested this product, the outdoor exposure test would include the presence of the metal particles. There is nothing in FMVSS No. 108, including the relevant items incorporated by reference, that specifies excluding the particles. We also note that much like protective coatings, these particles have a substantial effect on the transparency and endurance of the lens, and we therefore believe they should be included as part of the lens in all relevant test requirements.

Definition of the term "lens"

Your second question concerned the definition of the term "lens" under S5.1.2 of FMVSS No. 108, and whether that definition would include a half-metalized area surrounding the effective projected luminous lens area. You stated that the non-metalized portion of the lens would meet all photometric requirements of the standard, and that it would be surrounded by a half-metalized portion of the lens, which would emit only a small amount of light for decorative purposes.

The term "lens," while not explicitly defined in Standard No. 108, is commonly understood within automotive lighting lamp applications as a component of a lamp that as installed allows light to pass through it. For the purposes of S5.1.2, all plastic portions of this component that allow light to pass through it are part of the "lens," subject to the haze test, including the half-metalized area that you state would emit a small amount of light.

Are the non-EPLLA portions of the lens subject to the S5.1.2 requirements?

You followed up your second question by asking, "when half-metalization is applied only to the part surrounding the effective projected luminous lens area, would it be excluded from [the] S5.1.2 requirement?" Our answer is no.

It is our opinion that all portions of the lens, including the half-metalized areas that only emit small amounts of light for decorative purposes, are subject to the requirements of S5.1.2, which specify haze and weathering requirements similar to those described in SAE Recommended Practice J576.

The language of S5.1.2 reads, "Plastic materials used for optical parts such as lenses and reflectors shall conform to [SAE J576]...." When testing plastic materials, however, the agency does not simply test a plastic plaque alone. Instead, the plastic plaque is tested with its coating, which frequently is necessary to protect the plastic from the effects of weathering. The coating on the plastic is an integral feature in protecting the plastic from moisture, ultraviolet light, and other agents.

You described your lens as having a semitransparent metallic layer between the lens and the coating. In addition to the effect this has on the transparency of that portion of the lens, it may also affect the weathering aspects. For example, if the metal layer affected the bonding of the coating to the plastic, it could have substantial affect on whether the lens could tolerate weathering.

Because, as described above, the lens is a single piece, if even a decorative, half-metalized portion of the lens were to fail the weathering requirements in S5.1.2, it could have a substantial affect on the entire lens. For example, moisture could enter the lens, affecting the non-metalized portion's transparency.

For these reasons, when testing the lens you described, the half-metalized portion of the lamp design described in your letter would be included as an item subject to the testing requirements of S5.1.2 of FMVSS No. 108.

If you have any further questions, please contact Ari Scott of my staff at (202) 366-2992.

Sincerely yours,



Stephen P. Wood
Acting Chief Counsel

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DEPT OF TRANSPORTATION
DOCKETS

12 October, 2007

U.S. Dept. of Transportation
NHTSA
Office of the Chief Counsel
400 seventh Street SW
Washington DC 20590

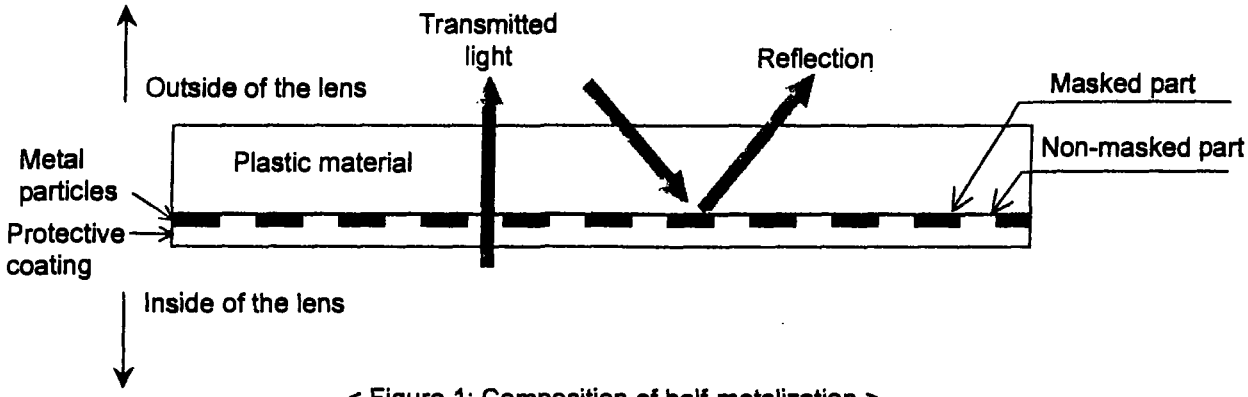
Request for Interpretation

Dear Mr. Anthony M. Cooke,

Koito would like to thank you in advance for your consideration of our request for an interpretation and clarification of the Federal Motor Vehicle Safety Standard (FMVSS) No.108 concerning the necessity of carrying out a 3-year outdoor exposure test in a certain combination of plastic and protective coating material with metal particles in between.

Description:

We are contemplating a new technique called "half-metalization (evapolization)", which is to be applied on the inner surface of a plastic lens of automotive lamps. "Half-metalization" is an expanded application of metal evaporation which is widely used for the surface treatment of lamp reflectors. In this new technique, careful conditioning of the metal density enables us to make a specular appearance of the lens surface, where the light transmission would be lowered to e.g. 30% of a non-metalized lens.



< Figure 1: Composition of half-metalization >

As you see in the figure above, in a microscopic view, the metal particles placed between the plastic and protective coating create partial maskings on the lens, whereas the light passes from the non-masked part only. However, when used in a lamp, this reduced transmission will be balanced out by other designing factors so that the lamp satisfies all the FMVSS108 requirements (e.g. photometric, color) applicable to it.

Question No.1: Can we exclude the presence of metal particles from the target of SAE J576 3-year outdoor exposure test?

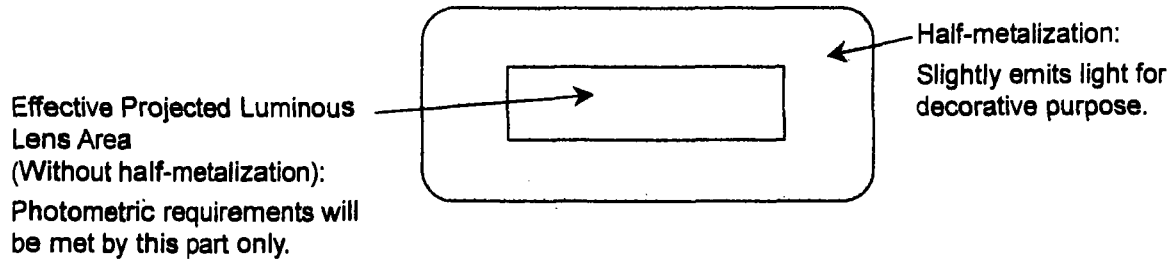
FMSSS 108 requires that plastic materials used for optical parts must be in compliance with SAE J576 JUL91 (S5.1.2.) including the 3-year outdoor exposure test. We basically understand that the target of 3-year outdoor exposure test (i.e. measurement of luminous transmittance, haze, and compliance with SAE J578 chromaticity and appearance requirement as required under S4.2 of SAE J576 JUL91) is a combination of plastic and coating, whereas if they comply with the 3-year outdoor exposure requirement, the metal particles on the lens (where the light does not pass) can be excluded from the test. In this case, however, the lamp using half-metalized lens must be designed to satisfy all the applicable requirements (e.g. photometric and color) required by FMVSS108.

Supporting this discussion, we can say that metals are inorganic and do not excite plastics. Also, since half-metalization is applied on the inner surface and protected by the coating, it would not be oxidized.

Question No.2: What the term "lens" means under S5.1.2. of FMVSS108?

S5.1.2. of FMVSS108 requires that plastic materials used for optical parts such as lenses and reflectors shall conform to SAE J576 JUL91. Does the term "lens" under S5.1.2. indicate the effective part of the lens (corresponding to the effective projected luminous lens area) only, or whole part of the lens?

In conjunction with above question, when half-metalization is applied only to the part surrounding the effective projected luminous lens area, would it be excluded from S5.1.2. requirement? (In this case, of course, photometric requirements will be met by the effective projected luminous lens area only, and the half-metalized part slightly emits light for decorative purpose.)



< Figure 2: Half-metalization outside EPLLA >

Koito Manufacturing thanks you in advance for your early confirmation on this matter.

Sincerely,

Kiminori Hyodo
Deputy General Manager, Regulation & Homologation
Koito Manufacturing Co., Ltd.

were amended in 2005. Reinstating the specific language in the regulations will therefore not increase the paperwork burden on those manufacturers.

H. Executive Order 13045

Executive Order 13045 applies to any rule that (1) is determined to be ''economically significant'' as defined under E.O. 12866, and (2) concerns an environmental, health, or safety risk that NHTSA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, we must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned rule is preferable to other potentially effective and reasonably feasible alternatives considered by us. This rulemaking is not economically significant and does not concern an environmental, health, or safety risk.

I. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (NTTAA), Public Law 104–113, section 12(d) (15 U.S.C. 272) directs NHTSA to use voluntary consensus standards in its regulatory activities unless doing so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies, such as the Society of Automotive Engineers (SAE). The NTTAA directs the agency to provide Congress, through the OMB, with explanations when we decide not to use available and applicable voluntary consensus standards.

In this final rule, we are adding to 49 CFR 576.4(g)(5) the requirement that manufacturers include in the certification labels that they affix to certain types of motor vehicles a statement certifying that the vehicle conforms to all applicable FMVSS. This language was inadvertently omitted from the regulation in 2005 and we are adopting no substantive changes to the regulation nor do we propose any technical standards. For these reasons, Section 12(d) of the NTTAA would not apply.

J. Regulation Identifier Number (RIN)

The Department of Transportation assigns a regulation identifier number (RIN) to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. You may use the RIN contained in the heading at the beginning of this document to find this action in the Unified Agenda.

List of Subjects in 49 CFR Part 567

Labeling, Motor vehicle safety, Motor vehicles.

In consideration of the foregoing, Part 567, Certification, in Title 49 of the Code of Federal Regulations is amended as follows:

PART 567—CERTIFICATION

■ 1. The authority citation for part 567 is revised to read as follows:

Authority: 49 U.S.C. 322, 30111, 30115, 30117, 30166, 32502, 32504, 33101–33104, 33108, and 33109; delegation of authority at 49 CFR 1.95.

■ 2. Amend § 567.4 by adding paragraph (g)(5)(iv) to read as follows:

§ 567.4 Requirements for manufacturers of motor vehicles.

* * * * *

(g) * * *

(5) * * *

(iv) For all other vehicles, the statement: ''This vehicle conforms to all applicable Federal motor vehicle safety standards in effect on the date of manufacture shown above.'' The expression ''U.S.'' or ''U.S.A.'' may be inserted before the word ''Federal''.

* * * * *

Issued on: November 28, 2012.

Daniel C. Smith,

Senior Associate Administrator for Vehicle Safety.

[FR Doc. 2012–29132 Filed 12–3–12; 8:45 am]

BILLING CODE 4910–59–P

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. NHTSA–2012–0171]

RIN 2127–AK99

Federal Motor Vehicle Safety Standards; Lamps, Reflective Devices, and Associated Equipment

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation (DOT).

ACTION: Final rule.

SUMMARY: NHTSA is amending the Federal motor vehicle safety standard (FMVSS) on lamps, reflective devices, and associated equipment to restore the blue and green color boundaries that were removed when the agency published a final rule reorganizing that standard on December 4, 2007.

DATES: *Effective date:* December 4, 2012.

Petitions for reconsideration: Petitions for reconsideration of this final rule must be received not later than January 18, 2013.

ADDRESSES: Any petitions for reconsideration should refer to the docket number of this document and be submitted to: Administrator, National Highway Traffic Safety Administration, 1200 New Jersey Avenue SE, West Building, Ground Floor, Docket Room W12–140, Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT: For technical issues: Ms. Marisol Medri, Office of Crash Avoidance Standards, NHTSA, 1200 New Jersey Avenue SE, West Building, Washington, DC 20590 (Telephone: (202) 366–6987) (Fax: (202) 366–7002).

For legal issues: Mr. Thomas Healy, Office of the Chief Counsel, NHTSA, 1200 New Jersey Avenue SE, West Building, Washington, DC 20590 (Telephone: (202) 366–2992) (Fax: (202) 366–3820).

SUPPLEMENTARY INFORMATION:

I. Background

FMVSS No. 108, *Lamps, Reflective Devices and Associated Equipment,* has been in existence since 1968. The standard had been amended on an *ad hoc* basis over time resulting in a patchwork organization of the standard. NHTSA published a final rule on December 4, 2007,[1] amending FMVSS No. 108 by reorganizing the regulatory text so that it provides a more straightforward and logical presentation of the applicable regulatory requirements; incorporating important agency interpretations of the existing requirements; and reducing reliance on third-party documents incorporated by reference. The preamble of the final rule stated that the rewrite of FMVSS No. 108 was administrative in nature and would have no impact on the substantive requirements of the standard. The December 4, 2007 final rule made several changes to the proposal contained in the Notice of Proposed Rulemaking for that rule including removing the blue and green color boundary requirements from paragraph S14.4.1.3.2 and eliminating references to three additional SAE documents.

[1] 72 FR 68234, (Dec. 4, 2007). The agency published the Notice of Proposed Rulemaking proposing to reorganize the standard on December 30, 2005. 70 FR 77454, (Dec. 30, 2005).

SABIC Innovative Plastics US LLC (SABIC–IP) sent a letter to NHTSA on August 11, 2008, after the final rule comment period was over. In this letter, SABIC–IP stated that the agency did not allow for public comment when it made the decision to remove the blue and green color boundaries from the standard. SABIC–IP further stated that in removing the blue and green color boundaries from paragraph S14.4.1.3.2, the agency substantively changed the requirements of FMVSS No. 108 during the rewrite process. On July 13, 2011, NHTSA published a NPRM [2] initiating this rulemaking to replace the color boundaries that were removed during the administrative rewrite of the standard.

In the NPRM, the agency explained that while neither blue nor green are directly permitted by the standard, it is possible to use these color boundaries to certify a material to the outdoor exposure test. Once individually certified to the three year outdoor exposure test, the blue and clear material could be mixed to produce a clear material with a blue tint, which could then be used in a lamp lens provided the lamp itself emits light within the white color boundary. Under the standard, the mixed material can be certified to the outdoor exposure test without an additional three years of testing. The pre-rewrite version of the standard contained two tests for determining compliance with the color requirements in the standard, the Visual Method or the Tristimulus Method. The blue and green color boundary definitions that were removed are part of the color requirements of the Tristimulus method procedure. The NPRM proposed to amend FMVSS No. 108 to restore the color boundary definitions for green, restricted blue and signal blue so that the requirements of the rewrite coincide with those of the old standard.

II. Public Comments on NPRM

NHTSA received four public comments in response to the Notice of Proposed Rulemaking for this rulemaking.[3] All of the comments supported reinstating the color boundary definitions for green, restricted blue and signal blue to FMVSS No. 108.

The Alliance of Automobile Manufacturers (the ''Alliance'') supported the rulemaking but stated that the agency omitted the color requirements for green and blue when tested according to the visual method. The Alliance claimed that these requirements from SAE J578c *Color Specification for Electric Signal Lighting Devices,* (FEB 1977) (the third party standard from which the color boundaries were derived) were incorporated into the NPRM proposing the reorganization of the standard but were not incorporated into the December 4, 2007 Final Rule. The Alliance recommended that these requirements be reinstated into the standard as sections 14.4.1.3.2.4 and 14.4.1.3.2.5.

SABIC–IP submitted a comment urging the agency to restore the green and blue color boundaries to FMVSS No. 108. SABIC–IP also requested that the agency clarify that polymers and additives would not have to be retested to the three year outdoor exposure test after the effective date of the administrative rewrite before being combined to create new materials. SABIC–IP stated that the rewrite of the standard creates ambiguity as to whether combinations of individually certified materials can continue to be mixed to create new material and then certified to the outdoor exposure test without an additional three years of testing as was permitted under the pre-write version of the standard. SABIC–IP requested that NHTSA amend paragraph S14.4.2.2.2 to state that materials and additives used in plastics could be changed without outdoor exposure testing if the materials had previously been tested to FMVSS No. 108 and found to meet the requirements. Paragraph S14.4.2.2.2 currently states that materials and additives used in plastics can be changed without outdoor exposure testing if the materials have previously been tested to ''this section'' and found to meet the requirements. SABIC–IP believes that it is possible to interpret the use of the words ''this section'' in paragraph S14.4.2.2.2 to require that materials be retested to the outdoor exposure test in the new paragraph S14.4.2.2.2, published in December 2007, before they can be used to create new materials. SABIC–IP stated that this interpretation would go against the stated goal of the rewrite of the standard to refrain from making any substantive change to the requirements.

SABIC–IP also asked the agency to clarify that the lower concentration of additive of previously tested materials used to create a new material according to S14.4.2.2.2 paragraph can be represented by a composition of zero.

III. Agency Decision

Since it was not the agency's intention to create any substantive modifications to the standard, we have decided to amend FMVSS No. 108 to add the color boundary definitions for green, restricted blue and signal blue to the Tristimulus method procedure as proposed in the NPRM and to include the two missing color requirements from the visual method procedure so that the requirements of the rewrite coincide with those of the old standard.

We have decided not to amend paragraph S14.4.2.2.2 of FMVSS No. 108 as requested by SABIC–IP over the course of the rewrite rulemaking. We attempted, where ever possible, to avoid changes to the language of the standard. We note that the phrase ''this section'' refers to the requirements of paragraph S14.4.2.2 in general, not to a specific version of the standard. Thus, so long as the additives and polymers have previously been tested to and found to comply with the same substantive requirements as they appear in FMVSS No. 108, they can be added to create new materials without additional outdoor exposure testing. However, if the requirements of S14.4.2.2 were changed, previously tested additives and polymers would no longer have been tested to ''this section'' and would have to be retested to the outdoor exposure test before being used to create new materials under paragraph S14.4.2.2.2.

The agency will respond to SABIC–IP's comment about the lower concentration of additive used to create new materials being represented by a composition of zero in a letter of interpretation from the NHTSA Office of Chief Counsel.

IV. Effective Date

The National Highway and Motor Vehicle Safety Act states that an FMVSS issued by NHTSA cannot become effective before 180 days after the standard is issued unless the agency makes a good cause finding that a different effective date is in the public interest. Additionally, the Administrative Procedure Act (5 U.S.C. 553(d)) requires that a rule be published 30 days prior to its effective date unless one of three exceptions applies. One of these exceptions is when the agency finds good cause for a shorter period. We have determined that it is in the public interest for this final rule to have an immediate effective date so that the effective date of this final rule coincides as closely as possible with the effective date of the 2007 rewrite of the standard. An effective date for this final rule that

[2] 76 FR 41181, (July 13, 2011).

[3] The Alliance of Automobile Manufacturers, SABIC–IP and two private individuals submitted comments in response to the NPRM.

closely coincides with the 2007 rewrite of the standard will ensure that the requirements of FMVSS No. 108 remain consistent so as to avoid unnecessary changes in the requirements of the standard that would force regulated parties to change their compliance strategies, potentially imposing costs on manufacturers while not improving safety.

V. Regulatory Notices and Analyses

A. Executive Order 12866, Executive Order 13563, and DOT Regulatory Policies and Procedures

NHTSA has considered the impact of this rulemaking action under Executive Order 12866, Executive Order 13563, and the DOT's regulatory policies and procedures. This final rule was not reviewed by the Office of Management and Budget (OMB) under E.O. 12866, ''Regulatory Planning and Review.'' It is not considered to be significant under E.O. 12866 or the Department's regulatory policies and procedures.

This Final Rule restores existing requirements to the standard thereby maintaining flexibility in compliance for manufacturers who choose to use these colors to certify materials to the outdoor exposure test. Because this Final Rule merely restores existing requirements it is not expected to have any costs. The agency expects some minor unquantifiable benefits to manufacturers due to the continued availability of the green and blue color boundaries to certify to the outdoor exposure test. Because there are not any costs associated with this rulemaking and only minor unquantifiable benefits, we have not prepared a separate economic analysis for this rulemaking.

B. Executive Order 13609: Promoting International Regulatory Cooperation

The policy statement in section 1 of Executive Order 13609 provides, in part:

> The regulatory approaches taken by foreign governments may differ from those taken by U.S. regulatory agencies to address similar issues. In some cases, the differences between the regulatory approaches of U.S. agencies and those of their foreign counterparts might not be necessary and might impair the ability of American businesses to export and compete internationally. In meeting shared challenges involving health, safety, labor, security, environmental, and other issues, international regulatory cooperation can identify approaches that are at least as protective as those that are or would be adopted in the absence of such cooperation. International regulatory cooperation can also reduce, eliminate, or prevent unnecessary differences in regulatory requirements.

NHTSA is not aware of any conflicting regulatory approach taken by a foreign government concerning the subject matter of this rulemaking.

C. Regulatory Flexibility Act

In compliance with the Regulatory Flexibility Act, 5 U.S.C. 60l *et seq.,* NHTSA has evaluated the effects of this action on small entities. I hereby certify that this rule would not have a significant impact on a substantial number of small entities. The final rule would affect manufacturers of motor vehicle light equipment, but the entities that qualify as small businesses would not be significantly affected by this rulemaking because the agency is restoring requirements that previously existed in an older version of the regulation. This rulemaking is not expected to affect the cost of manufacturing motor vehicle lighting equipment.

D. Executive Order 13132

NHTSA has examined today's rule pursuant to Executive Order 13132 (64 FR 43255, August 10, 1999) and concluded that no additional consultation with States, local governments or their representatives is mandated beyond the rulemaking process. The agency has concluded that the rulemaking would not have sufficient federalism implications to warrant consultation with State and local officials or the preparation of a federalism summary impact statement. The final rule would not have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.''

NHTSA rules can preempt in two ways. First, the National Traffic and Motor Vehicle Safety Act contains an express preemption provision: ''When a motor vehicle safety standard is in effect under this chapter, a State or a political subdivision of a State may prescribe or continue in effect a standard applicable to the same aspect of performance of a motor vehicle or motor vehicle equipment only if the standard is identical to the standard prescribed under this chapter.'' 49 U.S.C. 30103(b)(1). It is this statutory command by Congress that preempts any non-identical State legislative and administrative law addressing the same aspect of performance.

The express preemption provision set forth above is subject to a savings clause under which ''[c]ompliance with a motor vehicle safety standard prescribed under this chapter does not exempt a person from liability at common law.'' 49 U.S.C. 30103(e) Pursuant to this provision, State common law tort causes of action against motor vehicle manufacturers that might otherwise be preempted by the express preemption provision are generally preserved. However, the Supreme Court has recognized the possibility, in some instances, of implied preemption of such State common law tort causes of action by virtue of NHTSA's rules, even if not expressly preempted. This second way that NHTSA rules can preempt is dependent upon there being an actual conflict between an FMVSS and the higher standard that would effectively be imposed on motor vehicle manufacturers if someone obtained a State common law tort judgment against the manufacturer, notwithstanding the manufacturer's compliance with the NHTSA standard. Because most NHTSA standards established by an FMVSS are minimum standards, a State common law tort cause of action that seeks to impose a higher standard on motor vehicle manufacturers will generally not be preempted. However, if and when such a conflict does exist—for example, when the standard at issue is both a minimum and a maximum standard—the State common law tort cause of action is impliedly preempted. See *Geier* v. *American Honda Motor Co.,* 529 U.S. 861 (2000).

Pursuant to Executive Order 13132 and 12988, NHTSA has considered whether this rule could or should preempt State common law causes of action. The agency's ability to announce its conclusion regarding the preemptive effect of one of its rules reduces the likelihood that preemption will be an issue in any subsequent tort litigation.

To this end, the agency has examined the nature (e.g., the language and structure of the regulatory text) and objectives of today's rule and finds that this rule, like many NHTSA rules, prescribes only a minimum safety standard. As such, NHTSA does not intend that this rule preempt state tort law that would effectively impose a higher standard on motor vehicle manufacturers than that established by today's rule. Establishment of a higher standard by means of State tort law would not conflict with the minimum standard announced here. Without any conflict, there could not be any implied preemption of a State common law tort cause of action.

E. National Environmental Policy Act

NHTSA has analyzed this final rule for the purposes of the National Environmental Policy Act. The agency has determined that implementation of this action would not have any

significant impact on the quality of the human environment.

F. Paperwork Reduction Act

Under the procedures established by the Paperwork Reduction Act of 1995, a person is not required to respond to a collection of information by a Federal agency unless the collection displays a valid OMB control number. This final rule would not establish any new information collection requirements.

G. National Technology Transfer and Advancement Act

Under the National Technology Transfer and Advancement Act of 1995 (NTTAA) (Public Law 104–113), ''all Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities determined by the agencies and departments.'' This Final Rule would not adopt or reference any new industry or consensus standards that were not already present in FMVSS No. 108.

H. Civil Justice Reform

With respect to the review of the promulgation of a new regulation, section 3(b) of Executive Order 12988, ''Civil Justice Reform'' (61 FR 4729, February 7, 1996) requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) Clearly specifies the preemptive effect; (2) clearly specifies the effect on existing Federal law or regulation; (3) provides a clear legal standard for affected conduct, while promoting simplification and burden reduction; (4) clearly specifies the retroactive effect, if any; (5) adequately defines key terms; and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. This document is consistent with that requirement.

Pursuant to this Order, NHTSA notes as follows. The preemptive effect of this final rule is discussed above. NHTSA notes further that there is no requirement that individuals submit a petition for reconsideration or pursue other administrative proceeding before they may file suit in court.

I. Unfunded Mandates Reform Act

The Unfunded Mandates Reform Act of 1995 requires agencies to prepare a written assessment of the costs, benefits and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local or tribal governments, in the aggregate, or by the private sector, of more than $100 million annually (adjusted for inflation with base year of 1995). This final rule would not result in expenditures by State, local or tribal governments, in the aggregate, or by the private sector in excess of $100 million annually.

J. Executive Order 13211

Executive Order 13211 (66 FR 28355, May 18, 2001) applies to any rulemaking that: (1) Is determined to be economically significant as defined under E.O. 12866, and is likely to have a significantly adverse effect on the supply of, distribution of, or use of energy; or (2) that is designated by the Administrator of the Office of Information and Regulatory Affairs as a significant energy action. This rulemaking is not subject to E.O. 13211.

K. Regulation Identifier Number (RIN)

The Department of Transportation assigns a regulation identifier number (RIN) to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. You may use the RIN contained in the heading at the beginning of this document to find this action in the Unified Agenda.

L. Privacy Act

Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (70 FR 19477–19478).

List of Subjects in 49 CFR Part 571

Imports, Motor vehicle safety, Motor vehicles, and Tires.

In consideration of the foregoing, NHTSA amends 49 CFR part 571 as set forth below.

PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

■ 1. The authority citation for Part 571 continues to read as follows:

Authority: 49 U.S.C. 322, 30111, 30115, 30117 and 30166; delegation of authority at 49 CFR 1.50.

■ 2. Section 571.108 is amended by adding paragraphs S14.4.1.3.2.4, S14.4.1.3.2.5, S14.4.1.4.2.4, S14.1.4.2.5, and S14.4.1.4.2.6 to read as follows:

§ 571.108 Standard No.108; Lamps, reflective devices, and associated equipment.

* * * * *

S14.4.1.3.2.4 Green. Green is not acceptable if it is less saturated (paler), yellower, or bluer than the limit standards.

S14.4.1.3.2.5 Blue. Blue is not acceptable if it is less saturated (paler), greener, or redder than the limit standards.

* * * * *

S14.4.1.4.2.4 Green. The color of light emitted must fall within the following boundaries:

y = 0.73 − 0.73x (yellow boundary)
x = 0.63y − 0.04 (white boundary)
y = 0.50 − 0.50x (blue boundary)

S14.4.1.4.2.5 Restricted Blue. The color of light emitted must fall within the following boundaries:

y = 0.07 + 0.81x (green boundary)
x = 0.40 − y (white boundary)
x = 0.13 + 0.60y (violet boundary)

S14.4.1.4.2.6 Signal Blue. The color of light emitted must fall within the following boundaries:

y = 0.32 (green boundary)
x = 0.16 (white boundary)
x = 0.40 − y (white boundary)
x = 0.13 + 0.60y (violet boundary)

* * * * *

Issued on: November 28, 2012.

David L. Strickland,

Administrator.

[FR Doc. 2012–29284 Filed 12–3–12; 8:45 am]

BILLING CODE 4910–59–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 648

[Docket No. 120321209–2643–02]

RIN 0648–BC08

Fisheries of the Northeastern United States; Atlantic Mackerel, Squid, and Butterfish Fisheries; Framework Adjustment 5

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Final rule.

SUMMARY: NMFS is broadening the scope of individuals and entities approved to complete vessel fish hold capacity certifications for vessels issued Tier 1 and 2 limited access Atlantic mackerel permits under the Atlantic

List of Subjects in 48 CFR Parts 2, 11, 23, and 52

Government procurement.

Dated: July 6, 2011.

Laura Auletta,

Acting Director, Office of Governmentwide Acquisition Policy, Office of Acquisition Policy.

Therefore, DoD, GSA, and NASA propose amending 48 CFR parts 2, 11, 23, and 52 as set forth below:

1. The authority citation for 48 CFR parts 2, 11, 23, and 52 continues to read as follows:

Authority: 40 U.S.C. 121(c); 10 U.S.C. chapter 137; and 42 U.S.C. 2473(c).

PART 2—DEFINITIONS OF WORDS AND TERMS

§ 2.101 [Amended]

2. Amend section 2.101 by removing from paragraph (b)(2), in the definition ''biobased product'', the words ''(including plant, animal, and marine materials) or'' and adding ''and'' in its place.

PART 11—DESCRIBING AGENCY NEEDS

3. Amend section 11.302 by revising paragraph (c)(2) to read as follows:

§ 11.302 Policy.

* * * * *

(c) * * *

(2) For biobased products, agencies may not require, as a condition of purchase of such products, the vendor or manufacturer to provide more data than would typically be provided by other business entities offering products for sale to the agency, other than data confirming the biobased content of a product (see 7 CFR 2902.8).

PART 23—ENVIRONMENT, ENERGY AND WATER EFFICIENCY, RENEWABLE ENERGY TECHNOLOGIES, OCCUPATIONAL SAFETY, AND DRUG-FREE WORKPLACE

§ 23.404 [Amended]

4. Amend section 23.404 by removing from paragraph (e)(1) the words ''(including plant, animal, and marine materials)''.

5. Amend section 23.405 by revising paragraph (a)(2) and adding (a)(3) to read as follows:

§ 23.405 Procedures.

(a) * * *

(2) *Biobased products.* Contracting officers should refer to USDA's list of USDA-designated items (available through the Internet at *http://www.biopreferred.gov*) and to their agencies' affirmative procurement program when purchasing supplies that contain biobased material or when purchasing services that could include supplies that contain biobased material.

(3) When acquiring recovered material or biobased products, the contracting officer may request information or data on such products, including on the recycled or biobased content or related standards of the products (see 11.302(c)).

* * * * *

§ 23.406 [Amended]

6. Amend section 23.406 by removing from paragraph (b) ''*http://www.usda.gov/biopreferred*'' and adding ''*http://www.biopreferred.gov*'' in its place.

PART 52—SOLICITATION PROVISIONS AND CONTRACT CLAUSES

7. Amend section 52.223–2 by—

a. Revising the date of the clause;

b. Removing from paragraph (b) ''*http://www.usda.gov/biopreferred*'' and adding *http://www.biopreferred.gov* in its place; and

c. Adding paragraphs (c) and (d) to read as follows:

52.223–2 Affirmative Procurement of Biobased Products Under Service and Construction Contracts

* * * * *

Affirmative Procurement of Biobased Products Under Service and Construction Contracts (Date)

* * * * *

(c) In the performance of this contract, the Contractor shall—

(1) Report to the cognizant Contracting Officer and the agency environmental manager on the product types and dollar value of any USDA-designated biobased products purchased by the Contractor during the previous year, between October 1 and September 30, in this contract;

(2) Submit this report no later than—

(i) October 31 of each year during contract performance; and

(ii) At the end of contract performance; and

(iii) Contact the cognizant environmental manager to obtain the preferred submittal format, if that format is not specified in this contract.

(d) The cognizant environmental manager for this contract is: _____. [*Contracting Officer shall insert full name, phone number, and email address or Web site for reporting.*]

[FR Doc. 2011–17453 Filed 7–12–11; 8:45 am]

BILLING CODE 6820–EP–P

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. NHTSA–2011–0101]

RIN 2127–AK99

Federal Motor Vehicle Safety Standards; Lamps, Reflective Devices, and Associated Equipment

AGENCY: Department of Transportation (DOT), National Highway Traffic Safety Administration (NHTSA).

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: NHTSA is proposing to restore the blue and green color boundaries to Federal Motor Vehicle Safety Standard (FMVSS) No. 108, *Lamps, Reflective Devices and Associated Equipment,* that were removed when the agency published a final rule reorganizing the standard on December 4, 2007.

DATES: Comments to this proposal must be received on or before September 12, 2011.

ADDRESSES: You may submit comments, identified by the docket number in the heading of this document, by any of the following methods:

- *Federal eRulemaking Portal:* Go to *http://www.regulations.gov.* Follow the instructions for submitting comments on the electronic docket site by clicking on ''Help'' or ''FAQ.''
- *Mail:* Docket Management Facility, M–30, U.S. Department of Transportation, 1200 New Jersey Avenue, SE., West Building, Ground Floor, Room W12–140, Washington, DC 20590.
- *Hand Delivery:* U.S. Department of Transportation, 1200 New Jersey Avenue, SE., West Building, Ground Floor, Room W12–140, between 9 a.m. and 5 p.m. Eastern Time, Monday through Friday, except Federal holidays.
- *Fax:* 202–493–2251.

Regardless of how you submit comments, you should mention the docket number of this document.

You may call the Docket Management Facility at 202–366–9826.

Instructions: For detailed instructions on submitting comments and additional information on the rulemaking process, see the Public Participation heading of the Supplementary Information section of this document. Note that all comments received will be posted without change to *http://www.regulations.gov,* including any personal information provided.

Privacy Act: Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, *etc.*). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (65 FR 19477–78) or you may visit *http://www.dot.gov/privacy.html.*

Docket: For access to the docket to read background documents or comments received, go to *http://www.regulations.gov,* or the street address listed above. Follow the online instructions for accessing the dockets.

FOR FURTHER INFORMATION CONTACT: For technical issues: Mr. Markus Price, Office of Crash Avoidance Standards, NHTSA, 1200 New Jersey Avenue, SE., West Building, Washington, DC 20590 (*Telephone:* (202) 366–0098) (*Fax:* (202) 366–7002).

For legal issues: Mr. Thomas Healy, Office of the Chief Counsel, NHTSA, 1200 New Jersey Avenue, SE., West Building, Washington, DC 20590 (*Telephone:* (202) 366–2992) (*Fax:* (202) 366–3820).

SUPPLEMENTARY INFORMATION:

I. Background

NHTSA published a NPRM on December 30, 2005 [1] to reorganize FMVSS No. 108 and improve the clarity of the standard's requirements thereby increasing its utility for regulated parties. It was the agency's goal during the rewrite process to make no substantive changes to the requirements of the standard.

FMVSS No. 108 has been in existence since 1968. The standard had been amended on an *ad hoc* basis over time resulting in a patchwork organization of the standard. Regulated parties had stated that the standard was difficult to interpret because of its organization. In response to these concerns the agency sought to rewrite the standard to make it more understandable by adopting a simplified numbering scheme, to improve organization by grouping related materials in a more logical and consistent sequence, and to reduce the certification burden of regulated parties who previously needed to review a few dozen third-party documents. The agency issued the December 30, 2005, NPRM in an attempt to address these concerns.

Based on the comments received in response to the NPRM, NHTSA published a final rule on December 4, 2007,[2] amending FMVSS No. 108 by reorganizing the regulatory text so that it provides a more straightforward and logical presentation of the applicable regulatory requirements; incorporating important agency interpretations of the existing requirements; and reducing reliance on third-party documents incorporated by reference. The preamble of the final rule again stated that the rewrite of FMVSS No. 108 was administrative in nature and would have no impact on the substantive requirements of the standard. The final rule made several changes to the proposal contained in the NPRM including removing the blue and green color boundary requirements from paragraph S14.4.1.3.2.

On August 11, 2008, SABIC Innovative Plastics sent a letter to NHTSA claiming that the agency did not allow for public comment when it made the decision to remove the blue and green color boundaries from the standard. SABIC further argued that in removing the blue and green color boundaries from paragraph S14.4.1.3.2, the agency substantively changed the requirements of FMVSS No. 108 during the rewrite process.

II. Green and Blue Color Boundaries

Previous to the rewrite of the standard, paragraph S5.1.5 of FMVSS No. 108 required that the color of all lamps required by the standard comply with SAE J578c, *Color Specification for Electric Signal Lighting Devices,* (FEB 1977). SAE J578c contained color boundary definitions for red, yellow, white, green, restricted blue, and signal blue light. The NPRM included the boundary definition for the colors blue and green, but left out restricted blue. In the final rule the agency removed the color boundary definitions for green and blue from paragraph S14.4.1.3.2, retaining only the definitions for the red, yellow, and white color boundaries.

The agency is aware that, although neither blue nor green are directly used within the standard, it is possible to use these color boundaries to certify a material to the outdoor exposure test located in the paragraphs of S14.4.2.2. Prior to the reorganization final rule, a manufacturer could separately certify both a clear (white) material and a blue material to the haze test. The blue material alone could not be used in a lamp because the lamp itself would not emit the color of light required by the standard (only white, amber, and red lights are permitted). Once individually certified to the three year haze test, however, the blue and clear material could be mixed to produce a clear material with a blue tint, which could then be used in a lamp lens provided the lamp itself emits light within the white color boundary. Under the standard, the mixed material can be certified to the haze test without an additional three years of testing.

The agency recognizes that removing the color definitions for blue and green creates a substantive change to the requirements of FMVSS No. 108. Since it was not the agency's intention to create any substantive modifications to the standard, as stated in the NPRM and preamble of the final rule, the agency is proposing to amend FMVSS No. 108 to add color boundary definitions for green, restricted blue and signal blue so that the requirements of the rewrite coincide with those of the old standard. Further, the agency notes that these additional color boundary definitions have no impact on color that any lamp must emit. The agency is not proposing to change the color requirements for any lamp mandated by FMVSS No. 108.

III. Costs, Benefits, and the Proposed Compliance Date

Because this proposal only restores an existing requirement to the standard, the agency does not anticipate that there would be any costs or benefits associated with this rulemaking action. Accordingly, the agency did not conduct a separate economic analysis for this rulemaking.

The agency proposes an effective date of December 1, 2012, should a final rule be issued, to coincide with the effective date of the FMVSS No. 108 administrative rewrite.

IV. Public Participation

How do I prepare and submit comments?

Your comments must be written and in English. To ensure that your comments are correctly filed in the Docket, please include the docket number of this document in your comments. Your comments must not be more than 15 pages long.[3] We established this limit to encourage you to write your primary comments in a concise fashion. However, you may attach necessary additional documents to your comments. There is no limit on the length of the attachments.

Please submit your comments by any of the following methods:

- *Federal eRulemaking Portal:* go to *http://www.regulations.gov.* Follow the instructions for submitting comments on the electronic docket site by clicking on ''Help'' or ''FAQ.''

[1] 70 FR 77454, (Dec. 30, 2005).

[2] 72 FR 68234, (Dec. 4, 2007).

[3] *See* 49 CFR 553.21.

• *Mail:* Docket Management Facility, M–30, U.S. Department of Transportation, West Building, Ground Floor, Rm. W12–140, 1200 New Jersey Avenue, SE., Washington, DC 20590.
• *Hand Delivery or Courier:* West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue, SE., between 9 a.m. and 5 p.m. Eastern Time, Monday through Friday, except Federal holidays.
• *Fax:* (202) 493–2251.

If you are submitting comments electronically as a PDF (Adobe) file, we ask that the documents submitted be scanned using an Optical Character Recognition (OCR) process, thus allowing the agency to search and copy certain portions of your submissions.[4]

Please note that pursuant to the Data Quality Act, in order for substantive data to be relied upon and used by the agency, it must meet the information quality standards set forth in the Office of Management and Budget (OMB) and DOT Data Quality Act guidelines. Accordingly, we encourage you to consult the guidelines in preparing your comments. OMB's guidelines may be accessed at *http://www.whitehouse.gov/omb/fedreg/reproducible.html.* DOT's guidelines may be accessed at *http://dmses.dot.gov/submit/DataQualityGuidelines.pdf.*

How can I be sure that my comments were received?

If you submit your comments by mail and wish Docket Management to notify you upon its receipt of your comments, enclose a self-addressed, stamped postcard in the envelope containing your comments. Upon receiving your comments, Docket Management will return the postcard by mail.

How do I submit confidential business information?

If you wish to submit any information under a claim of confidentiality, you should submit three copies of your complete submission, including the information you claim to be confidential business information, to the Chief Counsel, NHTSA, at the address given above under **FOR FURTHER INFORMATION CONTACT**. When you send a comment containing information claimed to be confidential business information, you should include a cover letter setting forth the information specified in our confidential business information regulation.[5]

In addition, you should submit a copy, from which you have deleted the claimed confidential business information, to the Docket by one of the methods set forth above.

Will the agency consider late comments?

We will consider all comments received before the close of business on the comment closing date indicated above under **DATES**. To the extent possible, we will also consider comments received after that date. Therefore, if interested persons believe that any new information the agency places in the docket affects their comments, they may submit comments after the closing date concerning how the agency should consider that information for the final rule.

If a comment is received too late for us to consider in developing a final rule (assuming that one is issued), we will consider that comment as an informal suggestion for future rulemaking action.

How can I read the comments submitted by other people?

You may read the materials placed in the docket for this document (*e.g.,* the comments submitted in response to this document by other interested persons) at any time by going to *http://www.regulations.gov.* Follow the online instructions for accessing the dockets. You may also read the materials at the Docket Management Facility by going to the street address given above under **ADDRESSES**. The Docket Management Facility is open between 9 a.m. and 5 p.m. Eastern Time, Monday through Friday, except Federal holidays.

V. Regulatory Notices and Analyses

A. Executive Order 12866, Executive Order 13563, and DOT Regulatory Policies and Procedures

NHTSA has considered the impact of this rulemaking action under Executive Order 12866, Executive Order 13563, and the Department of Transportation's regulatory policies and procedures. This rulemaking document was not reviewed by the Office of Management and Budget under E.O. 12866, ''Regulatory Planning and Review.'' It is not considered to be significant under E.O. 12866 or the Department's regulatory policies and procedures.

B. National Environmental Policy Act

We have reviewed this proposal for the purposes of the National Environmental Policy Act and determined that it would not have a significant impact on the quality of the human environment.

C. Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.,* as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (*i.e.,* small businesses, small organizations, and small governmental jurisdictions). The Small Business Administration's regulations at 13 CFR part 121 define a small business, in part, as a business entity ''which operates primarily within the United States.'' 13 CFR 121.105(a). No regulatory flexibility analysis is required if the head of an agency certifies the rule will not have a significant economic impact on a substantial number of small entities.

NHTSA has considered the effects of the proposed rule under the Regulatory Flexibility Act. I certify that this proposed rule would not have a significant economic impact on a substantial number of small entities. This proposal restores the green and blue color boundaries contained in the currently applicable version of FMVSS No. 108 to the administrative rewrite of FMVSS No. 108 which has not yet taken effect. Accordingly, we do not anticipate that this proposal would have a significant economic impact on a substantial number of small entities.

D. Executive Order 13132 (Federalism)

NHTSA has examined today's final rule pursuant to Executive Order 13132 (64 FR 43255, August 10, 1999) and concluded that no additional consultation with States, local governments or their representatives is mandated beyond the rulemaking process. The agency has concluded that the rulemaking would not have sufficient federalism implications to warrant consultation with State and local officials or the preparation of a federalism summary impact statement. The final rule would not have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.''

E. Executive Order 12988 (Civil Justice Reform)

Pursuant to Executive Order 12988, ''Civil Justice Reform,'' [6] NHTSA has

[4] Optical character recognition (OCR) is the process of converting an image of text, such as a scanned paper document or electronic fax file, into computer-editable text.

[5] *See* 49 CFR part 512.

[6] 61 FR 4729 (Feb. 7, 1996).

considered whether this rulemaking would have any retroactive effect. This proposed rule does not have any retroactive effect.

F. Unfunded Mandates Reform Act

Section 202 of the Unfunded Mandates Reform Act of 1995 (UMRA) requires Federal agencies to prepare a written assessment of the costs, benefits, and other effects of a proposed or final rule that includes a Federal mandate likely to result in the expenditure by State, local, or tribal governments, in the aggregate, or by the private sector, of more than $100 million in any one year (adjusted for inflation with base year of 1995).

Before promulgating a rule for which a written statement is needed, section 205 of the UMRA generally requires NHTSA to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective, or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows NHTSA to adopt an alternative other than the least costly, most cost-effective, or least burdensome alternative if the agency publishes with the final rule an explanation why that alternative was not adopted.

This proposed rule is not anticipated to result in the expenditure by state, local, or tribal governments, in the aggregate, or by the private sector in excess of $100 million annually. The cost impact of this proposed rule is expected to be $0. Therefore, the agency has not prepared an economic assessment pursuant to the Unfunded Mandate Reform Act.

G. Paperwork Reduction Act

Under the procedures established by the Paperwork Reduction Act of 1995 (PRA), a person is not required to respond to a collection of information by a Federal agency unless the collection displays a valid OMB control number. This proposed rule does not contain any collection of information requirements requiring review under the PRA.

H. Executive Order 13045

Executive Order 13045 [7] applies to any rule that: (1) Is determined to be economically significant as defined under E.O. 12866, and (2) concerns an environmental, health or safety risk that NHTSA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, we must evaluate the environmental health or safety effects of the proposed rule on children, and explain why the proposed regulation is preferable to other potentially effective and reasonably feasible alternatives considered by us.

This proposed rule does not pose such a risk for children. The primary effects of this proposal are to amend the lighting standard to restore the green and blue color boundaries.

I. National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act (NTTAA) requires NHTSA to evaluate and use existing voluntary consensus standards in its regulatory activities unless doing so would be inconsistent with applicable law (*e.g.,* the statutory provisions regarding NHTSA's vehicle safety authority) or otherwise impractical.

Voluntary consensus standards are technical standards developed or adopted by voluntary consensus standards bodies. Technical standards are defined by the NTTAA as ''performance-based or design-specific technical specification and related management systems practices.'' They pertain to ''products and processes, such as size, strength, or technical performance of a product, process or material.''

Examples of organizations generally regarded as voluntary consensus standards bodies include the American Society for Testing and Materials (ASTM), the Society of Automotive Engineers (SAE), and the American National Standards Institute (ANSI). If NHTSA does not use available and potentially applicable voluntary consensus standards, we are required by the Act to provide Congress, through OMB, an explanation of the reasons for not using such standards.

This proposal would not adopt or reference any new industry or consensus standards that were not already present in FMVSS No. 108.

J. Executive Order 13211

Executive Order 13211 [8] applies to any rule that: (1) Is determined to be economically significant as defined under E.O. 12866, and is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (2) that is designated by the Administrator of the Office of Information and Regulatory Affairs as a significant energy action. If the regulatory action meets either criterion, we must evaluate the adverse energy effects of the proposed rule and explain why the proposed regulation is preferable to other potentially effective and reasonably feasible alternatives considered by NHTSA.

This proposal restores the green and blue color boundaries contained in the currently applicable version of FMVSS No. 108 to the administrative rewrite of FMVSS No. 108 which has not yet taken effect. Therefore, this proposed rule will not have any adverse energy effects. Accordingly, this proposed rulemaking action is not designated as a significant energy action.

K. Regulation Identifier Number (RIN)

The Department of Transportation assigns a regulation identifier number (RIN) to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. You may use the RIN contained in the heading at the beginning of this document to find this action in the Unified Agenda.

L. Plain Language

Executive Order 12866 requires each agency to write all rules in plain language. Application of the principles of plain language includes consideration of the following questions:

- Have we organized the material to suit the public's needs?
- Are the requirements in the rule clearly stated?
- Does the rule contain technical language or jargon that isn't clear?
- Would a different format (grouping and order of sections, use of headings, paragraphing) make the rule easier to understand?
- Would more (but shorter) sections be better?
- Could we improve clarity by adding tables, lists, or diagrams?
- What else could we do to make the rule easier to understand?

If you have any responses to these questions, please include them in your comments on this proposal.

M. Privacy Act

Anyone is able to search the electronic form of all comments received into any of our dockets by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an organization, business, labor union, *etc.*). You may review DOT's complete Privacy Act statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477–78) or you

[7] 62 FR 19885 (Apr. 23, 1997).

[8] 66 FR 28355 (May 18, 2001).

may visit *http://www.dot.gov/privacy.html*.

In consideration of the foregoing, NHTSA proposes to amend 49 CFR part 571 as set forth below.

PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

1. The authority citation for part 571 continues to read as follows:

Authority: 49 U.S.C. 322, 30111, 30115, 30117, 30166; delegation of authority at 49 CFR 1.50.

§ 571.108 [Amended]

Section 571.108 is amended effective December 1, 2012 by adding paragraphs S14.4.1.4.2.4, S14.1.4.2.5, and S14.4.1.4.2.6 to read as follows:

* * * * *

S14.4.1.4.2.4 Green. The color of light emitted must fall within the following boundaries:

$y = 0.73 - 0.73x$ (yellow boundary);

$y = 0.50 - 0.50x$ (blue boundary);

$x = 0.63y - 0.04$ (white boundary).

S14.4.1.4.2.5 Restricted Blue. The color of light emitted must fall within the following boundaries:

$y = 0.07 + 0.81x$ (green boundary);

$x = 0.40 - y$ (white boundary);

$x = 0.13 + 0.60y$ (violet boundary).

S14.4.1.4.2.6 Signal Blue. The color of light emitted must fall within the following boundaries:

$y = 0.32$ (green boundary);

$x = 0.40 - y$ (white boundary);

$x = 0.16$ (white boundary);

$x = 0.13 + 0.60y$ (violet boundary).

* * * * *

Issued on: July 7, 2011.

Christopher J. Bonanti,

Associate Administrator for Rulemaking.

[FR Doc. 2011–17658 Filed 7–12–11; 8:45 am]

BILLING CODE 4910–59–P

October 22, 2013

The Honorable David L. Strickland
Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue S.E., West Building
Washington D.C. 20590-0001

RE: Notice of update of SAE J576 to include specification for Diffusion Polymers for automotive lighting applications

Dear Administrator Strickland:

The purpose of this letter is to provide notification of an update to SAE J576-*Plastic Material or Materials for Use in Optical Parts Such as Lenses and Reflex Reflectors of Motor Vehicle Lighting Devices*, effective February 2010. This updated version of J576 includes a method to evaluate "degradation in performance caused by weathering exposure of diffusion material(s) that cannot be measured by current test methods."

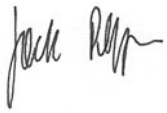
The changes in SAE J576 (FEB 2010) provide for the use of controlled light scattering plastic materials, herein referred to as Diffusing Plastic Materials. Diffusing Plastic Materials intentionally scatter transmitted light to specific intended levels as defined in SAE J576 (FEB 2010) as having an initial unexposed haze value greater than 30% when measured in accordance with ASTM D1003. The ASTM D1003 scope does not allow for materials with measured values greater than 30%. Diffusing Plastic Materials cannot be evaluated for durability using the conventional "increase of haze" methodology since measurement of haze of Diffusing Plastic Materials is not within the scope of ASTM D1003. This new evaluation methodology is limited to Diffusing Plastic Materials only and requires a more stringent maintenance of luminous transmittance. All other existing exposure, testing and requirements remain unchanged for all materials. No other changes have been made or allowed in the February 2010 revision for transparent plastic materials. Definitions have been incorporated as necessary to define this Diffusing Plastic Materials.

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SAE and the SAE Lighting Systems Group believe that this revised document strives to maintain the relevance of standards within the context of changing technologies in the automotive lighting field that could not be anticipated or addressed at the time of the publication of the existing text (SAE J576 JUL91). SAE and the SAE Lighting Systems Group further believe that if and when NHTSA amends the current FMVSS lighting standard, referencing SAE J576 (FEB 2010) would benefit the safety of the public as well as that of the automotive industry.

Sincerely,



Jack Pokrzywa
Business Unit Leader
Global Ground Vehicle Standards

cc: Mr. Timothy P. Mellon, Director, Government Affairs, SAE International
Mr. Bart P. Terburg, Chairman, SAE Lighting Systems Group

U.S. Department
of Transportation
**National Highway
Traffic Safety
Administration**

NOV 6 2009

1200 New Jersey Avenue SE.
Washington, DC 20590

Mr. Jim Wilson
Marketing Director, Lighting
Sabic Innovative Plastics
Two Towne Square
Southfield, MI 48076

Dear Mr. Wilson:

This responds to your letter regarding requirements for inner lenses in Federal Motor Vehicle Safety Standard (FMVSS) No. 108, Lamps, Reflective Devices, and Associated Equipment. Specifically, you asked whether inner lenses are subject to certain performance requirements of the version of FMVSS No. 108 that are scheduled to take effect on December 1, 2009. The answer is that inner lenses are required to meet the haze test requirements, similar to the way they are in the currently applicable version of FMVSS No. 108.

By way of background, the National Highway Traffic Safety Administration (NHTSA) is authorized by the National Traffic and Motor Vehicle Safety Act (Safety Act) to issue FMVSSs that set performance requirements for new motor vehicles and new items of motor vehicle equipment (see 49 U.S.C. Chapter 301). NHTSA does not provide approvals of motor vehicles or motor vehicle equipment. Instead, manufacturers are required to self-certify that their products conform to all applicable safety standards that are in effect on the date of manufacture. NHTSA selects a sampling of new vehicles and equipment each year to determine their compliance with applicable FMVSSs. If our testing or examination reveals an apparent noncompliance, we may require the manufacturer to remedy the noncompliance, and may initiate an enforcement proceeding if necessary to ensure that the manufacturer takes appropriate action.

In your letter, you state you seek confirmation that FMVSS No. 108 does not require plastic materials used for inner lenses to meet the performance requirements in S14.4.2.2.4 when they are covered by outer material meeting the requirements of that section and not exposed directly to sunlight. Neither the currently applicable version of FMVSS No. 108, nor the version of the standard that becomes effective on December 1, 2009 (hereinafter, "the rewrite)," supports that position.

For reference, paragraph S5.1.2 of FMVSS No. 108 reads as follows:

> S5.1.2 Plastic materials used for optical parts such as lenses and reflectors shall conform to SAE Recommended Practice J576 JUL91, except that:
> (a) Plastic lenses (other than those incorporating reflex reflectors) used for inner lenses or those covered by another material and not exposed directly to sunlight *shall meet the requirements* of paragraphs 3.3 and 4.2 of SAE J576 JUL91 *when covered by the outer lens or other material*; [emphasis added][1] . . . .

We interpret this requirement as follows. The requirement in S5.1.2 which states that plastic materials shall conform to SAE J576 JUL91 is the general requirement. The subparagraphs ((a) through (g)), are exceptions to this requirement. Therefore, the exception described in subparagraph (a) requires plastic lenses used for inner lenses to meet the specifications of paragraphs 3.3 and 4.2 of SAE J576 JUL91 *while covered by the outer lens*. This is instead of being required to meet these specifications while directly exposed to sunlight.[2] The inner lenses are not, as you suggest, fully excluded from the general test requirements in S5.1.2.

We believe that the relevant paragraph S14.4.2.2.4 in the rewrite is substantively identical. For reference, that paragraph reads as follows:

> S14.4.2.2.4 *Performance requirements.* Plastic lenses, other than those incorporating reflex reflectors, used for inner lenses or those covered by another material and not exposed directly to sunlight must meet the optical material test requirements when covered by the outer lens or other material.

We interpret this paragraph to establish the same requirements as paragraph S5.1.2 and S5.1.2(a) in the current standard. With regard to plastic used for inner lenses, and not exposed directly to sunlight, they must "meet the optical material test requirements" when covered by the outer lens. This is the same as is currently required by FMVSS No. 108.

You also provide an analysis as to why you believe that inner lenses are not required to be certified to the specifications of S5.1.2. We respond to that analysis below.

In your letter, you state that in a 1970 final rule (35 FR 16840, October 31, 1970), NHTSA "made clear that inner lenses would be considered to be protected when covered by an outer lens and not directly exposed to sunlight." We have reviewed the final rule at

---

[1] For reference, paragraphs 3.3 and 4.2 of SAE Recommended Practice J576, "Plastic Materials for Use in Optical Parts such as Lenses and Reflex Reflectors of Motor Vehicle Lighting Devices," revised July 1991, relate to the "Outdoor Exposure Tests" and the "After Outdoor Exposure" requirements, respectively. SAE J576 has been incorporated by reference into FMVSS No. 108.

[2] The language in paragraph 3.3 of SAE J576 JUL91 does not specify that protected inner lenses can be covered by the outer lens during the outdoor exposure tests. It specifies a shorter, but otherwise similar, outdoor exposure test than the one for exposed outer lenses.

issue and have not found a relevant difference between that version and the current version. It too states that "[p]lastic materials used as inner lenses... and not exposed directly to sunlight shall meet the requirements of paragraphs 3.4 and 4.2 of SAE J576b when covered by the outer lens or other material."[3]

Finally, we note you argued that "the fact that inner lenses are 'protected' is critical when applying the SAE Recommended Practice upon which the standard is based." We agree that the lenses you describe in this letter would be considered "protected." However, merely because a lens is protected does not mean it is not subject to a weathering test. Instead, according to the SAE Recommended Practice referenced in FMVSS No. 108 (SAE J576 JUL91), protected lenses are subject to test requirements – albeit less stringent requirements than "exposed" lenses (a 6-month weathering period, instead of 3 years).

If you have any further questions, please contact Ari Scott of my staff at (202) 366-2992.

Sincerely,

O. Kevin Vincent
Chief Counsel

[3] 70 FR 16843.

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Atlas' flagship accelerated weathering instruments offer superior performance, innovative features, and large capacity.

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- Custom testing capabilities

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The most widely used flatbed xenon test chambers available in tabletop or free standing models to meet lower testing capacity needs. Features include:

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Atlas offers outdoor weathering sites worldwide to ensure factors from a variety of climates can be tested.

- Static Exposure Testing
- Sun Tracking Exposure Testing
- EMMAQUA® Accelerated Outdoor Testing
- Ultra-Accelerated Weathering Testing
- Automotive Exposure Testing (Samples, Components, Complete Vehicles)

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Atlas Weathering Services Group operates one of the largest networks of ISO/IEC 17025 accredited accelerated weathering testing laboratories in the world. Our indoor exposure labs offer artificial accelerated weathering tests and a variety of other environmental test programs, all designed to accurately simulate true end-use conditions and meet global weathering standards.

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Atlas offers a wide range of evaluation and measurement services for your specimens during and after the weathering process.

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- Spectral Transmittance/Reflectance
- Solar Reflectance Index
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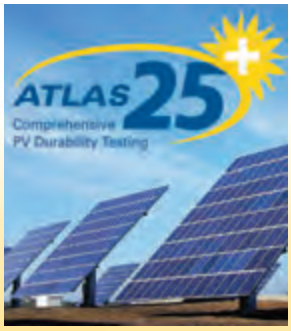
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- Seminars
- Workshops
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THE BENEFITS OF ULTRA-ACCELERATED TESTING

What is the Ultra-Accelerated EMMA®?

The Ultra-Accelerated EMMA (UA-EMMA) is Atlas' latest advancement in natural exposure testing. This new outdoor testing device delivers approximately 10-12 years of equivalent radiation exposure as would be received in a standard outdoor testing rack in South Florida in a single year.

The system achieves this accelerated exposure through a patented "cool mirror" technology that has very high reflectance in the UV and near visible wavelength ranges while attenuating reflectance in the longer wavelength visible and IR portions of the solar spectrum.

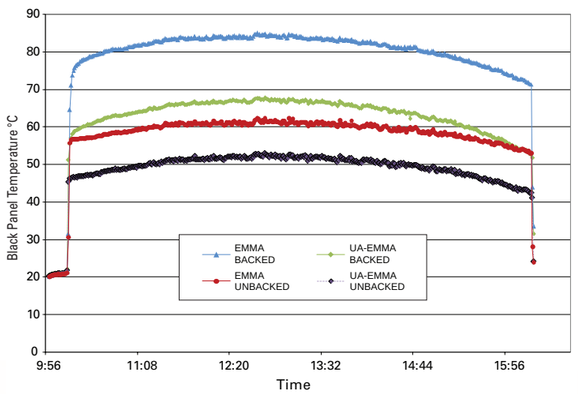


What are the Advantages?

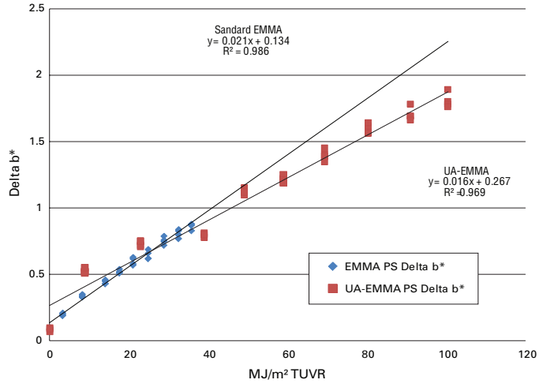
The new UA-EMMA system allows for greatly accelerated testing while fulfilling three critical testing requirements:

- Exposes many different types of materials to ultra-high UV irradiance
- Maintains high fidelity to the natural solar UV spectrum
- Keeps specimens at acceptable exposure temperatures

Black Panel Temperature Performance
UA-EMMA vs. Standard EMMA Data



Comparison of Polystyrene (PS) Reference Material in Standard EMMA and UA-EMMA by UV Radiant Exposure



Ideal Materials for UA-EMMA® Testing

- Materials that require a long service life
- Transparent and glazed materials
- Temperature sensitive materials such as PVC
- Coatings applied to metal panels
- Materials that perform well in EMMA or EMMAQUA exposure testing

EMMAQUA® Weathering Standards

The table below lists selected standards for EMMAQUA exposure. For details, refer to the individual standards. Test methods which are proprietary to individual companies and which also specify Fresnel-based exposure methods are not listed here.

EMMAQUA STANDARD	SCOPE	COUNTRY
ISO 877-3	Plastics	International
ASTM D3841	Glass-fiber reinforced polyester	USA
ASTM D4141	Coatings	USA
ASTM D4364	Plastics	USA
ASTM D5722	Coated hardboard	USA
ASTM E1596	PV modules	USA
ASTM G90	Non-metallic materials	USA
SAE J576	Optical automotive plastics	USA
SAE J1961	Automotive exterior	USA
SAE-AMS-T-22085	Preservation sealing tape	USA
JIS Z2381	General	Japan

Applications

- Adhesives
- Agricultural Films
- Automotive Exteriors
- Building Materials
- Elastomers
- Glass (Architectural & Automotive)
- Packaging
- Paints & Coatings
- Plastics
- Roofing
- Sealants



1958



The first EMMAQUA® device, constructed with a wooden frame and sheet metal skin, is patented, manufactured and placed into service.

1969

Atlas' DSET Laboratories relocates from Phoenix to New River, Arizona. The EMMAQUA device is redesigned with a steel framework and more efficient spray delivery system.



1986



EMMAQUA+®, the next generation of accelerated weathering devices, is introduced. Advancements include individual cycle programming, black panel temperature control, and altazimuth solar tracking for more efficient delivery of full-spectrum solar energy.

1999

The MQ3K is launched, utilizing state-of-the-art technology in computer-controlled cycle programming, more accurate altazimuth solar tracking, one-touch start/stop, error sensing feedback and the most-specular mirrors available.



2004



Atlas introduces four patented suites of Temperature-Controlled EMMAQUA. (Static, Night, Dynamic Temperature and Variable Irradiance Control). This breakthrough allows for the testing of materials that are sensitive to thermal buildup.

2014

Atlas introduces the UA-EMMA, the latest advancement in outdoor accelerated testing. This device couples the EMMA platform with a new patented mirror system, optimizing real-world correlation.





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Élancourt, France ■ Mörfelden-Walldorf, Germany ■ Bangalore, India ■ Leicester, United Kingdom

● Outdoor Exposure Sites & Laboratories

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Hoek van Holland, The Netherlands • Chennai, India • Prescott, Arizona USA • Loveland, Colorado USA • Medina, Ohio USA
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Will your product last outdoors? Don't guess when you can test!



















WHY TEST?

Reliable weathering and corrosion data can help you:

- Avoid unexpected product failures
- Make the best material selection decisions
- Validate new or less-expensive materials or additives
- Improve your competitive advantage
- Warranty your product's lifetime with confidence

Natural outdoor weathering and corrosion testing give the most realistic prediction of product performance. Accelerated testing, available both outdoors and in the laboratory, gives faster results but with some uncertainty about its accuracy. Many companies combine both approaches to ensure reliable results in the shortest time possible.

WHY CHOOSE Q-LAB?

Experienced and Reliable

Q-Lab provides the highest-quality weathering testing services. Our first natural weathering site opened in 1959. Today, our scientists and engineers participate and offer leadership in ISO, ASTM, IEC, GB, and numerous other professional organizations in creating standardized test methods and procedures.

Instant Credibility

When Q-Lab does your testing, the results have instant credibility with your customers and colleagues. Q-Lab conducts all exposure tests and evaluations in accordance with appropriate test methods from ASTM, ISO, BSI, DIN, JIS, SAE, GB, and other recognized organizations and is accredited by AMECA and AAMA.

Cost-Effective

Q-Lab's state-of-the-art test services are available at a surprisingly affordable price. In many cases, it is less costly to test with Q-Lab than to set up and run tests yourself.

Best Test Sites, Best Technology

South Florida and Arizona, where Q-Lab does most of its outdoor testing, have been recognized for over a century as harsh climates for product testing. If your products perform well in these benchmark locations, they will perform well just about anywhere. Q-Lab uses the most trusted accelerated weathering and corrosion technologies, used by thousands of companies in dozens of industries.

Natural Outdoor Testing

Location is everything. About one hundred years ago, companies in the paint and automotive industries realized that environmental conditions in South Florida and the Arizona desert were the harshest on their products. Several companies operated their own test sites in these locations, and they used what they learned to make their products durable enough to ensure generations of satisfied customers. Today, much of this testing has been consolidated at Q-Lab's sites in Florida and Arizona. Companies around the globe trust Q-Lab to perform their outdoor product testing.

FLORIDA

The subtropical climate of the Miami area has the perfect year-round combination of abundant sunlight, warm temperatures, and plentiful water. Sunshine during the summer months in Miami is quite similar to that of northern temperate regions. However, in the winter the difference is dramatic. The key point is that it is the same sun—just more of it, and for a longer duration each year. The same holds true for temperature, rainfall, dew, and humidity.

The result of this perfect combination of environmental factors is that exposures at Q-Lab Florida are accelerated compared to temperate climates. One year of Florida sunshine can produce the same weathering effects on materials as several years of weathering in most major markets around the world. Specimens that can withstand the sunlight, heat, and water in south Florida can be expected to be durable in most locations around the world.

SOUTH FLORIDA IS PERFECT FOR TESTING:

- Sunlight (UV) stability
- Moisture sensitivity
- Mildew/mold resistance
- Surface erosion
- High-temperature resistance
- Thermal shock response
- Corrosion behavior
- Moisture ingress
- Acid rain resistance



THE GLOBAL BENCHMARK
Q-Lab Florida has more specimens on test than any other outdoor weathering facility in the world.



DESERT TESTING
Arizona features even hotter temperatures and higher levels of sunlight than Florida.

ARIZONA

Arizona's desert climate is characterized by intense sunlight, very high temperatures, minimal rainfall, and very low humidity. Arizona desert exposures provide a different – in some ways harsher – exposure environment than Florida subtropical tests. Compared with Florida, Arizona is much hotter and receives about 15-20% more annual total solar and UV energy. Arizona experiences large day to night temperature variations, about 17 °C (31 °F) on average. Arizona receives little annual rainfall and has low atmospheric moisture overall. Specimens tested in the Arizona desert can be expected to have superior resistance to sunshine and elevated temperatures.

ARIZONA DESERT IS PERFECT FOR TESTING:

- Sunlight (UV) stability
- Heat aging effects
- Thermal expansion stress resistance
- Heat deflection and distortion
- Material durability in low humidity environments

OHIO

Northeast Ohio has a Northern Temperate climate, meaning it experiences four true seasons during the year. Outdoor specimens are subject to a range of exposures to UV light, temperature, and water, including regular freeze/thaw cycles during the winter.

Although Northeast Ohio testing will generally not attain the acceleration of natural outdoor testing in Florida or Arizona, it does deliver conditions experienced by much of the population of the United States and the rest of the world.

Some industries include a benchmark Northern Temperate climate in their certification programs, in addition to Florida and Arizona, to ensure a fully comprehensive program for natural weathering. Ohio is ideal for meeting these requirements.





Accelerated Laboratory Testing

Q-Lab offers a full range of accelerated laboratory weathering and corrosion testing services at our fully-equipped facilities in Florida and Germany. Q-Lab can perform most testing that utilizes xenon arc, fluorescent UV, salt spray, or cyclic corrosion chambers. Contract testing at Q-Lab is an ideal solution for companies that:

> Have a short-term need for testing but aren't ready to invest in facilities and equipment

> Need additional testing capacity that the in-house lab can't accommodate

> Have a special project with a new test cycle that can't be performed in-house

> Need third-party verification of test results

STANDARD & CUSTOM EXPOSURES

Tests and evaluations are performed to appropriate ASTM, ISO, EN, DIN, JIS, SAE, GB, AATCC, or other standard procedures.

Visit **Q-Lab.com/standards** or contact Q-Lab to discuss a particular standard.

We can also perform custom exposures to meet your individual testing needs. **More on page 13.**

TWO LABS, ONE STANDARD OF QUALITY

> Homestead, Florida USA
> Saarbrücken, Germany

Both locations follow the ISO 17025 accredited Quality System, ensuring the best care for your projects.



Homestead, Florida USA



Saarbrücken, Germany



RAPID RESULTS
Xenon arc test chambers are used to test colorants in paints and plastics.

TYPES OF ACCELERATED TESTS



XENON ARC WEATHERING

For weathering tests that require full sunlight simulation, the **Q-SUN** xenon arc weathering chamber can perform a variety of methods from the automotive, textile, building material, paint, plastics, personal care, or other industries. Xenon arc instruments are usually the best choice for applications where color change is the primary failure mode of concern.



FLUORESCENT UV WEATHERING

When changes to physical properties of polymeric materials are the concern, the **QUV** accelerated weathering tester is an effective tool for comparative testing. Fluorescent UV lamps match the most damaging portion of the sunlight spectrum (UVA and UVB), reproduce degradation from germidical treatments (UVC), or simulate indoor environments (Cool White).



SALT SPRAY/ CYCLIC CORROSION

Q-FOG cyclic corrosion chambers can perform any test from simple salt spray to tests with precise control of RH and moisture transitions, which is required by most OEM automotive standards. In addition, certain models can also perform demanding modern test protocols like CASS and JASO M609.

Q-TRAC Natural Sunlight Concentrator Testing

Faster test, natural environment. Accelerated outdoor materials testing using a Q-TRAC natural sunlight concentrator delivers the benefits of testing in a natural outdoor environment while at the same time amplifying the sunlight and heat delivered to specimens. This testing is especially useful for highly-durable materials with long expected lifetimes.

SUPER-FAST RESULTS FROM NATURAL SUNLIGHT

The Q-TRAC delivers the same amount of damaging ultraviolet energy in just one year as specimens would experience in five years of Florida sunlight. Like other accelerated tests, sunlight concentrator testing allows products to be brought to market faster, but the Q-TRAC uses natural sunlight to reduce further the risk of generating erroneous test results. In this way, the Q-TRAC delivers dual benefits – the realism of natural exposures and the speed of accelerated laboratory tests.

Q-TRAC IS PERFECT FOR TESTING:

- Roofing
- Coil coatings
- Fluoropolymers
- Geosynthetics
- Powder coatings
- Building materials
- Industrial coatings
- Hardboard coatings

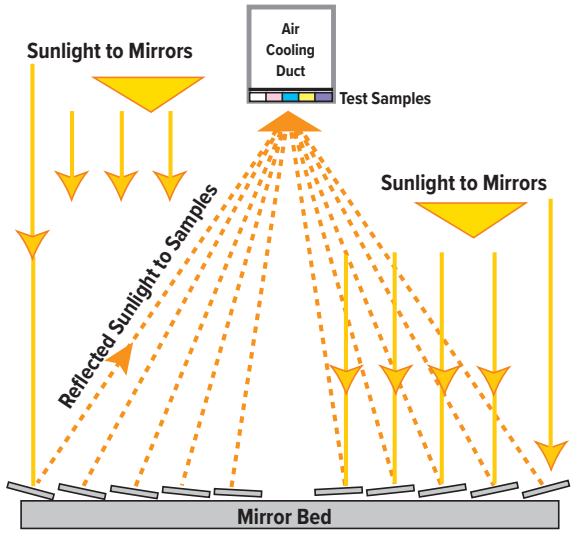
ONLY IN ARIZONA

Q-TRAC testing requires a high proportion of direct beam sunlight and low cloud cover that exists only in very dry environments.



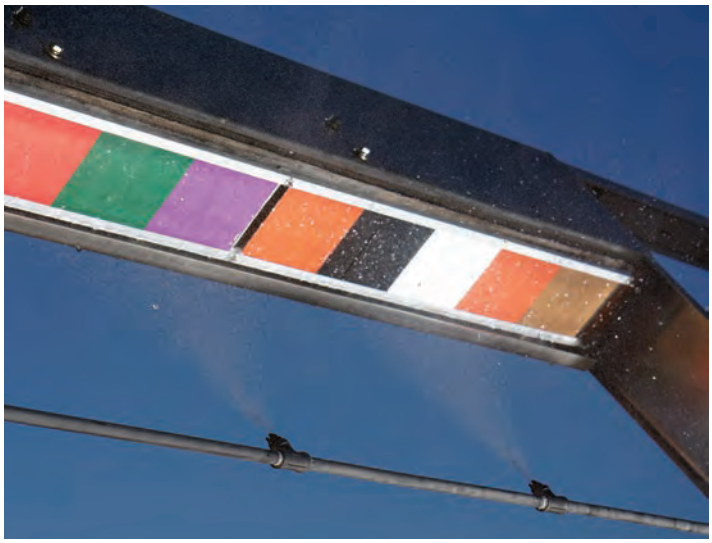
ENHANCED SUNLIGHT WITH CONCENTRATING MIRRORS

The Q-TRAC system uses an array of 10 flat mirrors to reflect and concentrate natural sunlight onto the test specimens. It further maximizes the exposure by automatically tracking the sun throughout the day in both azimuth (horizontal) and elevation (vertical).



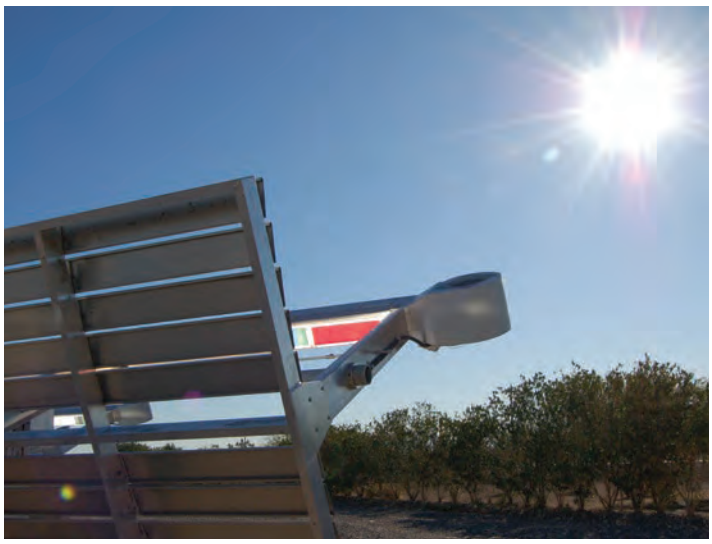
Q-TRAC WATER SPRAY & SPECIAL APPLICATIONS

Water spray during the night time can simulate the time of wetness experienced in Florida, and during the day it can simulate thermal shock associated with rain bursts. During night-time wetting, specimens are oriented facing upward to give increased wetness and realism compared to original natural sunlight concentrator testing. Q-Lab also offers temperature-controlled Q-TRAC testing for more heat-sensitive specimens.



Several standardized cycles—including desert, freeze/thaw, and spray are available to test different materials and end-use application. Standards include:

- ASTM G90
- ASTM D4141
- ASTM D4364
- ASTM D5105
- ASTM D5722
- SAE J1961
- SAE J576
- ISO 877-3
- AAMA 623, 624 and 625



Automotive Interior Testing

Accelerated testing to simulate behind-glass environments. Interior components in automobiles and other behind-glass environments can experience higher temperatures than materials in service outdoors. AIM box testing delivers high temperatures in combination with natural sunlight behind window glass for fast, realistic testing.

AIM BOX

An Automotive Interior Materials (AIM) box is an under-glass enclosure that simulates the sunlight and heat found inside an automobile. Although this technology was developed for the automotive industry, it can be very effective for many applications where glass-filtered sunlight and heat are important stressors, such as building window assemblies and electrical enclosures.

Key test standards for AIM box testing include GMW 14873, GMW 16717, GMW 3417, GM 2617M, GM 3619M, GM 7454M, GM 7455M, GM 9538P, Ford DVM 0020, and ASTM G201.

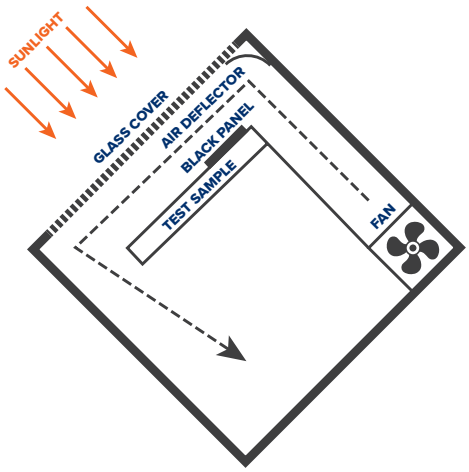
DEGRADATION MODES PRODUCED IN AIM BOX TESTING:

- Color change
- Cracking
- Peeling
- Oxidation
- Heat deflection
- Tackiness

REALISTIC SIMULATION

Testing automotive interiors can be different from testing other materials because air temperatures inside a vehicle can far exceed the temperature outside it. Materials can reach 100 °C or more in warmer climates. Furthermore, the light that reaches internal components is filtered by automotive glass, making it different from natural outdoor sunlight.

The AIM box uses tempered glass - clear or laminated - to simulate the sunlight spectrum experienced inside a car. In addition, a black panel thermometer continuously monitors the environment inside the box. A cooling fan and curtain are used to ensure that specimens are maintained at precise and realistic temperatures.





HIGH TEMPERATURE TESTING
Automotive instrument and dashboard panels are commonly tested in AIM boxes.

ACCELERATION

The AIM box in Arizona can perform precision azimuth tracking of the sun throughout the day. This boosts the total amount of solar radiation reaching the specimens for faster results without sacrificing accuracy.

TRUE AIM BOX

To increase the total amount of solar radiation exposure, Q-Lab's proprietary new TRUE (Tracking Reflecting Ultra Exposure) AIM box uses highly reflective mirrors and dual-axis tracking (azimuth and elevation) to focus more sunlight into the box interior. This technique approximately doubles the total sunlight received every day.



Standard Outdoor Exposures

True benchmarking via standardized testing. Natural outdoor testing according to international test standards gives improved consistency of results from test to test. Having a library of outdoor test data according to recognized test standards gives the best estimate for a product's service life and serves as an excellent basis for comparison to accelerated laboratory testing.

DIRECT EXPOSURE (ASTM G7, ASTM D1435)

Specimens can be securely mounted at a variety of angles for direct exposure to the sun. Various backing techniques are available to simulate the thermal environment of the specimen's intended service application. Plywood backing raises temperatures, while open- or mesh-backed specimens receive maximum natural air flow for cooler temperatures.



UNDER GLASS (ASTM G24, ISO 877-2)

These exposures are used to test interior-use materials, such as textiles and printing inks. Specimens are behind 3 mm window glass which will filter out short-wavelength (UVB) light. Exposures are typically at a 45° or 5° angle from horizontal.



BLACK BOX (ASTM D4141, GMW 14873)

These tests reproduce conditions found on the horizontal surfaces of a vehicle, including higher temperatures and longer wet times. Under glass black box exposures are used to test automotive interior materials or other applications that experience similar conditions.

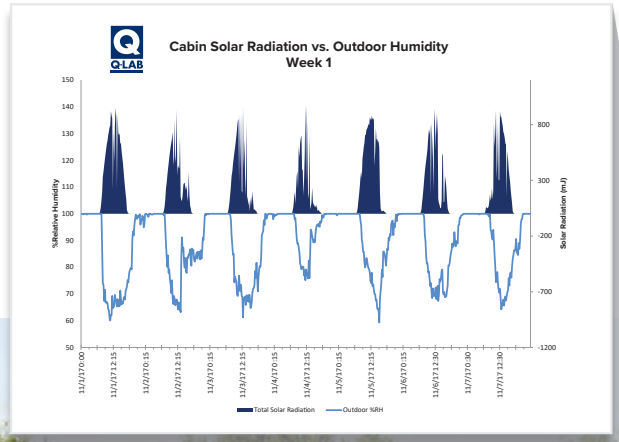


Other standard outdoor exposure test methods are available, including salt-accelerated, outdoor acid etch, and mildew-enhanced weathering.

Custom Tests & Special Projects

If you need a specialized test for a component, assembly, or complete product, Q-Lab can customize a test program to identify any problem areas quickly. Do you need to measure the temperature profile of multiple areas of your product throughout the day? Or design a test that accurately simulates your product's end use? Whatever your need, our experts can design a customized test solution to fit your budget.





Outdoor weathering testing in a replicated end use environment, like the shed shown above, can demonstrate interactions between components and give a more realistic representation of outdoor product durability.

DETAILED DATA ACQUISITION

Q-Lab can instrument your product to capture the data most important to you, and we always take care to protect confidentiality.

Evaluations & Physical Testing

Exposing your products or materials is only half of the equation. Measuring how they degrade over time is the other half. Q-Lab's engineers and technicians are worldwide experts at identifying and quantifying how your materials change when exposed to weathering or corrosion tests. We have many tools at our disposal to tell you nearly everything you need to know about your product's performance.

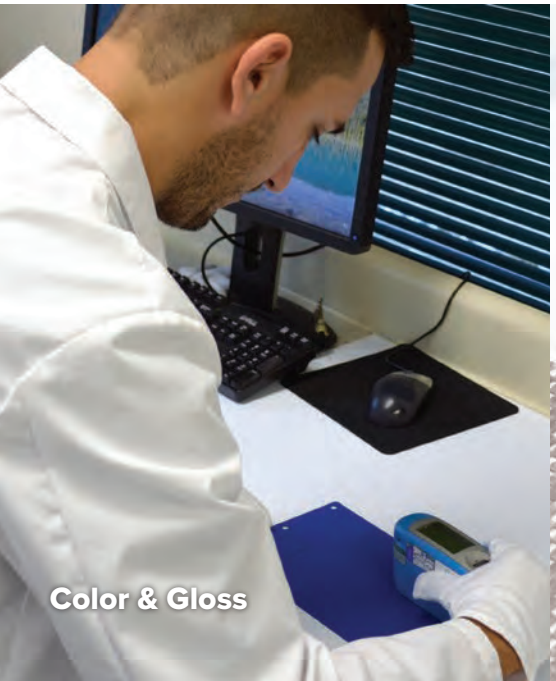
VISUAL EVALUATIONS

Visual evaluations detail all defects observed, such as cracking/checking, blistering, chalking, dirt retention, flaking, mildew growth, surface rust, or color change, according to standardized rating scales.

Q-Lab technicians are highly trained and experienced experts in the field of evaluation techniques and reporting scales. Many are actively involved in the organizations that create and maintain the standards relied upon by labs around the world.

COLOR & GLOSS MEASUREMENTS

Instrumental measurements of appearance and surface characteristics include gloss, distinctness of image, and color. These are used in place of or in addition to visual ratings, and are required by many standards. The science of color and appearance measurement can be very complex, and Q-Lab's experts can guide you through your options to ensure you get the correct data for your needs.


Color & Gloss


Mechanical


Photography



VISUAL EVALUATIONS

All visual ratings are made under standard lighting conditions to provide accurate, repeatable results.

MECHANICAL TESTS

Mechanical tests on physical properties are necessary for many products and materials. They include:

- Drop impact
- Pencil hardness
- Tape adhesion
- Mandrel bend & elongation
- Tensile strength & elongation
- Shear & peel adhesion
- Gravelometer stone chip impact
- Taber abrasion

PHOTOGRAPHY & SPECIAL HANDLING

A complete test program often includes other special services or handling. Common services include washing, polishing, scribing, and specimen weighing. Q-Lab can also photograph weathering and corrosion changes, which requires special lighting skills and equipment.



OUR GLOBAL NETWORK

We are committed to provide world-class technical, sales, and repair support in each of the over 60 countries in which we operate. Visit **Q-Lab.com/support** for contact information specific to your location and inquiry type.

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