



Clear Paint for Hot Stamped Foil and Molded in Color Plastics

1 Scope

1.1 Material Description. Clear paint for hot stamped foil is utilized to provide improved durability for exterior automotive applications where hot stamped foil is desired. The clear paint is a two-component (2K) system, with a target cure temperature of approximately +82 °C (+180 °F). The hot stamped foil with clear paint per this specification must meet the requirements of GMW16650 Class E3. Additionally, these clear paints can be used to increase gloss and improve the weathering capability of molded in color black plastic components, such as Acrylonitrile Styrene Acrylate (ASA) grilles.

1.2 Symbols. Not applicable.

1.3 Applicability. This clear paint can be used for providing durability to hot stamped foil surfaces and molded in color black plastic for exterior components such as grilles and emblems.

1.4 Remarks. This specification covers the requirements for a clear paint for use over hot stamped foil surfaces for exterior applications. The paint shall be applied to the entire part, including the hot stamped foil surfaces as well as the black molded in color surfaces without foil. Requirements for the clear paint over plastic such as ASA without hot stamped foil are also included in this specification.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASTM D1474	ASTM D7869	SAE J2527
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2.2 GM Standards/Specifications.

9984801	GMW14700	GMW14873	GMW16650
GMW3005	GMW14701	GMW15119	GMW16745
GMW3059	GMW14729	GMW15433	GMW17103
GMW3208	GMW14797	GMW15583	
GMW14124	GMW14829	GMW15777	
GMW14333	GMW14865	GMW15919	

3 Requirements

3.1 Test Samples. Test samples shall be injection molded plaques with hot stamped foil, and also molded in color plaques without hot stamped foil. Typical substrate is ASA per GMW15583P-ASA-T3. The hot stamped foil must meet the requirements of GMW16650 Class E3. Plastic components with clear paint per this specification over molded in color plastic without hot-stamped foil must meet painted part performance requirements per GMW14797.

3.2 Surface Preparation. Power washing per 9984801 is required after hot stamping and prior to painting.

3.3 Paint Thickness. The clear paint must meet all specified appearance and durability requirements at a minimum film of 38 µm (1.5 mils).

3.4 Appearance. The paint must meet or exceed the requirements as specified in GMW15777.

3.5 Bake. For new coatings, cure latitude charts must be developed as specified in GMW3005 to define technology limits for each product. Once developed and approved, the bake chart is signed by GM Materials Engineering and is the only acceptable document for defining cure.

It is then the responsibility of the applicator to follow these GM approved cure latitude charts for bake and cure time requirements.

3.6 Performance Requirements. See Table 1.

Table 1: Test Matrix – Performance Requirements for Paint Approval
Triplicate Samples Required

Test	Test Method	Requirements	Film Build (T=Target, L=Low, H=High)	Bake (T=Target, LL=Lower Limit, UL=Upper Limit)	Hot Stamped Foil over ASA	ASA Without Foil
Hardness	ASTM D1474 or comparable method	Report	T L H	T UL LL	X	
Scratch Resistance	GMW14865	Equal to or better than control	H	LL	X	
Yellowing	GMW15433	$\Delta b < 0.8$	T	UL	X	
Sag/Pop/Strike In	GMW15119	Equal to or better than control	T	T	X	
Chemical Resistance	GMW14701	All materials rated 10 except as follows: Rating 8: - Egg Albumin - Acid Rain pH 3 and 4 - Tap Water - Sulfuric Acid pH 4 Rating 6: - Sulfuric Acid pH 0 and 2 For reference only: - Brake Fluid at +70 °C	H	LL	X	
Tape Adhesion	GMW14829 Method A	Maximum Rating of 1	T L H	T UL LL	X	X
240 h Humidity	GMW14729	No Appearance Change	T L H	T UL LL	X	X
+ Tape Adhesion	GMW14829 Method A	Maximum Rating of 1				
Chip Resistance (Low Temperature Test)	GMW14700 Method A or B	Minimum Rating of 9	T L H	T UL LL	X	X
Chip Resistance (Room Temperature Test)	GMW14700 Method C	Minimum Rating of 9	T L H	T UL LL	X	X

Test	Test Method	Requirements	Film Build (T=Target, L=Low, H=High)	Bake (T=Target, LL=Lower Limit, UL=Upper Limit)	Hot Stamped Foil over ASA	ASA Without Foil
Heat Age	168 h at +80 °C		T L H	T UL LL	X	X
+ Tape Adhesion	GMW14829 Method A	Maximum Rating of 1				
+ Chip Resistance (Low Temperature Test)	GMW14700 Method A or B	Minimum Rating of 9				
+ Chip Resistance (Room Temperature Test)	GMW14700 Method C	Minimum Rating of 9				
Thermal Shock	GMW15919	1 mm maximum paint removal along scribe lines is permissible.	T L H	T UL LL	X	X
Water Jet	GMW16745 Method B	Maximum Paint Removal of 60 mm ²	T H	T LL	X	X
Gasoline Resistance - Dip	GMW14333 Method A	Rating 2 per GMW14333	H	LL	X	X
Moisture Cold - Cycle A	GMW14124	No Appearance Change	T H	T LL	X	X
+24 h Humidity	GMW14729	No Appearance Change				
+ Tape Adhesion	GMW14829 Method A	Maximum Rating of 1				
Abrasion Resistance – 500 g Load, 300 Cycles Minimum	GMW3208 - CS-17 Abrading Wheels	No Wear Through to the Substrate	T	T	X	
Car Wash, 3 Minutes	GMW17103	No Objectionable Defects Minimal Scratches Acceptable	T	T	X	