GM WORLDWIDE ENGINEERING STANDARDS	**Material Specification**	**GMW16924**

Interior Low Emission Polyoxymethylene Copolymer, UV Stabilized, and Heat Stabilized

1 Scope

1.1 Material Description. Polyoxymethylene copolymer designed to meet the global emission requirements for interior materials.

1.2 Symbols. All plastic parts must have legible plastic compound identification symbol per GMW3116 and ISO 11469 requirements. Mark must appear on the surface and must not affect form, fit, or function.

1.3 Typical Applications. Parts located within the refreshable air space of the vehicle interior.

1.4 Remarks. Not applicable.

1.5 Types. The following types apply to this specification:

- **C1** - low melt flow
- **C2** - medium low melt flow
- **C3** - medium high flow
- **C4** - high melt flow

2 References

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

2.1 External Standards/Specifications.

ISO 75-1/2	ISO 294-3/4	ISO 1183	ISO 3795
ISO 179/1eA	ISO 527-1/2	ISO 3146	ISO 9988-2
ISO 188	ISO 1133	ISO 3167	ISO 11469
ISO 294			

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW3417	GMW15634
GMW3059	GMW3232	GMW14162	GMW15635
GMW3116	GMW3235	GMW14334	

2.3 Additional References.

TMC003 Material Safety Data Sheet guidance documents (available at www.gmsupplypower.com).

3 Requirements

Materials approved to this specification shall meet the standard requirements of GMW3013.

3.1 Requirements on Delivery. Important physical, mechanical, and thermal properties that characterize the material are summarized in charts.

3.2 Requirements on Test Specimens. Reference GMW3221. Unless otherwise specified, injection molding of test specimens shall be accomplished per ISO 294 with the conditions for injection molding from ISO 9988-2. Unless otherwise specified, test methods and specimen dimensions are to be in accordance with GMW3013.

All tests shall be performed on unannealed specimens immediately following a conditioning period of 24 h minimum in a controlled atmosphere per GMW3221, Code A unless otherwise specified. In addition, tests specified at temperatures below or above 23 °C shall be conditioned at the specified temperature for 4 h minimum and tested at the specified temperature.

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3.2.1 Compound Properties (Natural, Black, and Integrally Colored). The following are also required for full standard approval. The minimum number of lots per test required is one in natural: Stress Strain at multiple temperatures (for example -30 °C, 23 °C, and 85 °C), Shear Modulus Curve, Differential Scanning Calorimeter Curve, and Infrared Spectroscopy Curve. See GMW3013 for the test procedures.

3.3 Chemical Requirements. All parts manufactured from molding compounds shall be resistant to the media they contact, such as aliphatic and aromatic hydrocarbons, fuels, lubricants, oils, greases and alcohols, at their places of use.

3.4 Compound Properties. See Table 1.

3.5 Integrally Colored Properties Requirements. See Table 2.

Table 1: Compound Properties (Natural and Black)

Property	Standard	Units	C1	C2	C3	C4
Density	ISO 1183, Method A, ≥ 10 mm x ≥ 10 mm x 4 mm	g/cm^3	1.41 ± 0.03	1.41 ± 0.03	1.41 ± 0.03	1.41 ± 0.03
Tensile Modulus	ISO 527-1/2, Specimen ISO 3167, 4 mm thick Type A bar, Test speed 1 mm/minute; between 0.05 to 0.25% strain	MPa	2200 to 3100	2350 to 3250	2450 to 3350	2450 to 3350
Tensile Stress at Yield	ISO 527-1/2, Specimen ISO 3167, 4 mm thick Type A bar, Test speed 50 mm/minute	MPa	56 to 70	55 to 70	59 to 73	59 to 73
Poisson's Ratio (one lot only)	ISO 527-1/2 Specimen ISO 3167, 4 mm thick Type A bar, Tensile method, Test speed 1 mm/minute	No units	Report			
Notched Charpy Impact Strength at 22 °C	ISO 179/1eA, Specimen Machined V-notch, r = 0.25 mm, 80 mm x 10 mm x 4 mm	kJ/m^2	≥5	≥4	≥3	≥3
Notched Charpy Impact Strength at -30 °C	ISO 179/1eA, Specimen Machined V-notch, r = 0.25 mm, 80 mm x 10 mm x 4 mm	kJ/m^2	≥4	≥3	≥2	≥2
Melt Volume Rate (MVR) 190C/2.16kg Or Melt Volume-Flow Rate (MFR) 190C/2.16kg	ISO 1133	g/10 minute or cm^3/10 minute	1 to 5	4 to 11	9 to 17	15 to 29
			1.2 to 6.0	4.8 to 13.2	10.8 to 20.4	18 to 34.8
Mold Shrink - longitudinal - 48 h after Molding (one lot only)	ISO 294-3/4, plaque size 60 mm x 60 mm x 2mm, Type D2 preferred or larger with maximum thickness 4 mm	%	Report			
Mold Shrink - transverse - 48 h after Molding (one lot only)	ISO 294-3/4, plaque size 60 mm x 60 mm x 2 mm, Type D2 preferred or larger with maximum thickness 4 mm	%	Report			
Melting Temperature	ISO 3146, Method A, Method B, Method C 10 K/minute	°C	160 to 172			
Heat Deflection Temperature (HDT) 1.8 MPa	ISO 75-1/2, Method A, Specimen 80 mm x 10 mm x 4 mm, test flatwise, unannealed	°C	≥80	≥80	≥80	≥80

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