



PVC - Flexible, Heat Stabilized, 60 to 90 Shore A, Mineral Filled, Extrusion or Injection Molding Compound

1 Scope

1.1 Material Description. This specification covers the properties of a flexible, heat stabilized, mineral filled, Polyvinyl Chloride (PVC) Homopolymer, pellet form, extrusion or injection molding compound. Materials are delineated by "Type" indicating Shore A or D hardness and "Grade", indicating the intended molding process.

1.2 Symbols. The material abbreviation according to ISO 11469 is > PVC <.

1.3 Applicability. Typical applications include, but are not restricted to, automotive roof and moveable roof drain hoses, drain hose connectors and paintable grade PVCs.

1.4 Remarks. PVC materials approved to this specification will be called out on the engineering drawing indicating both attributes shown in Appendix A, Tables A1 and A2, e.g., GMW16575P-PVC-Type X-Grade X. In addition, if the nominal production Shore hardness for a component is different than the nominal Type stated herein, it shall be called out specifically on the engineering drawing or in the math data, e.g., Type 1 = 60 ± 5 Shore A, but 62 Shore A is being used, 62 ± X Shore A hardness shall be called out.

2 References

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

2.1 External Standards/Specifications.

ISO 37	ISO 527	ISO 1183	ISO 11469
ISO 176	ISO 868	ISO 3451-1	SAE J323
ISO 188			

2.2 GM Standards/Specifications.

GMW3013	GMW3221	GMW14270	GMW14797
GMW3059	GMW3235	GMW14650	

3 Requirements

3.1 Requirements on Test Specimens. Reference GMW3221. Tests shall be conducted using the latest issue of the test procedures indicated. Suitable precautions should be taken to ensure that applicable safe limits are not exceeded when conducting test procedures, processes, and/or handling the materials required by this specification.

3.1.1 Test specimens shall be die cut from fan gated injection or compression molded plaques having a nominal thickness of 3.2 mm ± 0.2 mm. If injection molded, die cut specimens are to be tested with the long axis of the test specimen perpendicular to the direction of flow. Plaque dimensions must be sufficient to permit this.

3.1.2 Test samples shall be aged a minimum of 40 h after molding and 24 h immediately following a conditioning period per GMW3221, Code A, unless otherwise specified. All tests shall be performed on unannealed specimens. In addition, tests specified at temperatures below or above 22 °C ± 3 °C shall be conducted at the specified temperature using specimens conditioned at the specified temperature for 4 h minimum.

3.1.3 The minimum values specified in the property tables must be met by test specimens in natural, black, or in a standard sampled color if natural or black are not available. For colored grades where other pigment and additive systems (e.g., stabilizer) are used, the impact values shall not decrease more than 10% from the specified minimum value.

3.2 All materials supplied to this standard must comply with GMW3059, **Restricted and Reportable Substances**, including the requirement to submit a full material composition disclosure to GM via the International Material Data System (IMDS) or via a completed GMW3059 report form.

3.3 Requirements on Delivery. Important physical, mechanical, and thermal properties that characterize the material are summarized in Table 1.

Note: For each product, the requirements to Table 1 shall be documented by Certification Statement according to GMW3013. The color and gloss shall be specified on drawings, in material specifications and otherwise.

3.4 Compound Properties. See Table 1.

Table 1: Compound Properties (Black) ^{Note 1}

Property	Test Procedure	Unit	Type 1	Type 2	Type 3	Type 4	Type 5
Shore Hardness	ISO 868, 15 s delay	Shore A or D	60 ± 5 A	70 ± 5 A	85 ± 5 A	40 ± 5 D	50 ± 5 D
Density	ISO 1183	g/cm ³	Target Range 1.15 to 1.25	Target Range 1.20 to 1.40	Target Range 1.30 to 1.40	Target Range 1.30 to 1.40	Target Range 1.30 to 1.40
Tensile Stress at Break	ISO 37, Type 1 dumbbell, 500 mm/minute	MPa	≥ 10	≥ 12	≥ 16	NA	NA
Tensile Stress at Break	ISO 527, Type 1A dumbbell, 500 mm/minute	MPa	NA	NA	NA	≥ 18	≥ 20
Elongation at Break	ISO 37, Type 1 dumbbell, 500 mm/minute	%	≥ 250	≥ 225	≥ 200	NA	NA
Elongation at Break	ISO 527, Type 1A dumbbell, 500 mm/minute	%	NA	NA	NA	≥ 200	≥ 200
Ash	ISO 3451-1, Method A	%	0 to 20	0 to 20	10 to 25	9 to 15	0 to 25
Volatile Loss	ISO 176	%	≤ 5.0	≤ 5.0	≤ 5.0	≤ 3.0	≤ 3.0
Fogging	GMW3235-B at 85 °C ± 5 °C	mg	≤ 2.0	≤ 2.0	≤ 2.0	N/A	N/A
Cold Flexibility Mandrel Test	SAE J323, Method A. Use Table 2 for mandrel size selection based upon hardness. 3.2 mm ± 0.2 mm sample thickness	N/A	No Cracks				
Properties After Heat Age Exposure	ISO 188 Method B. 168 h at 85 °C followed by indicated property testing	%	Use original mechanical property test procedures. Perform indicated property testing at 22 °C ± 3 °C. Requirement: ± 25% maximum of Hardness, Tensile Stress at Break and Elongation at Break. No tackiness allowed.				

Note 1: Properties shown are guidelines for each type material. Nominal values are defined in the material certification submission package at the time of approval.

N/A = Not applicable

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