



Ethylene-Vinyl Alcohol

1 Scope

1.1 Material Description. This specification covers the properties of a blow molding pellet form of Ethylene-Vinyl Alcohol (EVOH).

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

1.3 Applicability. Typical applications include barrier layer for fuel system components.

2 References

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

2.1 External Standards/Specifications.

ISO 294-1	ISO 1133-2	ISO 10350-1	ISO 14663-2
ISO 527-1/2	ISO 1183/A	ISO 11469	ISO 15512

2.2 GM Standards/Specifications.

GMW3013	GMW3059	GMW3221
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2.3 Additional References.

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

3 Requirements

3.1 Requirements on Test Specimens.

3.1.1 Unless otherwise specified, injection molding of test specimens shall be accomplished per ISO 294-1. Test methods and specimen dimensions are also to be in accordance with ISO 10350-1.

3.1.2 All tests shall be performed on specimens for 40 h minimum after molding and immediately following a conditioning period of 24 h minimum in a controlled atmosphere per GMW3221, Code A, unless otherwise specified. All tests shall be performed on unannealed specimens.

3.1.3 The values specified in Table 1 shall be met by test specimens in natural or black.

3.1.4 Chemical Requirements. All parts manufactured from molding compounds shall be resistant to the media they contact at their place of use.

3.2 Requirements on Materials. Materials approved to this specification shall meet the requirements of GMW3013, General Requirements for Handling of Technical Terms of Delivery for Plastics.

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.

3.4 Compound Properties. See Table 1. The following are also required for full specification approval. The minimum number of lots per test required is one (1) in natural: Tensile Modulus, Poisson's Ratio, Stress/Strain Curve at +23 °C; Differential Scanning Calorimeter Curve; and Infrared Spectroscopy Curve. See GMW3013 for the test procedures and parameters.

3.5 Performance Requirements. Performance requirements shall be specified on part drawings or in component specifications.

Table 1: Compound Properties (Natural and Black)

Property	Standard	Units	Value
Moisture Content	ISO 15512, Method A or B	%	≤0.25
Melt Flow	ISO 1133-2, Condition D	g/10 minutes	1.6 ± 0.35
Density	ISO 1183/A	g/cm ³	Target Range 1.18 ± 0.02
Tensile Stress at Break	ISO 527-1/2, 50 mm/minute	MPa	≥30
Tensile Strain at Break	ISO 527-1/2, 50 mm/minute	%	≥10
Tensile Modulus	ISO 527-1/2, 1 mm/minute	MPa	≥2500
Oxygen Transmission Rate	ISO 14663-2, Annex C	cm ³ /m ² ·24 h·atmosphere	≤0.5
Ethylene Content	ISO 14663-2, Annex B	%	33 ± 3

4 Manufacturing Process

Not applicable.

5 Rules and Regulations

5.1 Legal Regulations. All materials must satisfy applicable laws, rules, regulations and recommendations valid in the country of usage.

5.2 Language. In the event of conflict between the English and domestic language, the English language shall take precedence.

5.3 Inspection and Rejection. Samples of components or materials released to a GM material specification shall be tested for conformity with the requirements of this material specification and approved by the responsible Engineering department prior to commencement of delivery of bulk supplies.

A new approval must be received for any changes, e.g., properties, manufacturing process, location of manufacture, etc. If not otherwise agreed, all testing and documentation normally required for initial release must be completed.

It is the responsibility of the supplier to inform the customer in a timely manner, without solicitation, and to include documentation of all modifications of materials and/or processes and to apply for a new release.

If not otherwise agreed, all release tests shall be repeated and documented by the supplier prior to commencement of delivery of non-conforming bulk supplies. In individual cases, a shorter test can be agreed to between the responsible Engineering department and the supplier.

5.4 Material Safety Data Sheets/Safety Data Sheets (MSDS/SDS). For new product submissions, or when a change in chemical composition of an existing product has occurred, a complete copy of the Material Safety Data Sheet/Safety Data Sheet must be submitted in compliance with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS) requirements or other country-specific MSDS/SDS requirements. In addition, product MSDS/SDS submissions must be in compliance with specific country General Motors TMC003 Material Safety Data Sheet/Safety Data Sheet guidance documents where available.

5.5 All materials supplied to this standard must comply with the requirements of GMW3059, Restricted and Reportable Substances for Parts.

6 Approved Sources

Materials supplied to this specification must be approved by General Motors.

A list of approved materials can be found in MATSPC. This GM Material File is provided to third parties to reduce redundant testing of materials. If approved material already listed is used, the part supplier can use GM Material File reference for Production Part Approval Process (PPAP) material approval. If the decision is made to use a