



Glass Fiber Reinforced Polyester/Polyethylene Terephthalate (PET) Composite Laminate

1 Scope

1.1 Material Description. This specification covers the sandwich construction process and the physical and mechanical properties of the resulting laminate. The skin consists of a glass reinforced unsaturated polyester composite per GMW17277. The core consists of Polyester/Polyethylene Terephthalate (PET) foam per GMW17276.

1.2 Symbols. Not applicable.

1.3 Applicability. Floor panels.

2 References

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

2.1 External Standards/Specifications.

ASTM C273	ASTM C297	ISO 178	SAE J400
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2.2 GM Standards/Specifications.

GMW3059	GMW14270	GMW17276	GMW17277
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3 Requirements

3.1 Construction Requirements.

3.1.1 Cut and form the PET foam core per GMW17276.

3.1.2 Apply two layers of 600 g/m² (2.0 oz/yd²) continuous strand glass mat to both sides of the PET foam core forming a sandwich construction.

3.1.3 Cover the bottom of the mold with a weighed amount of compounded polyester resin per GMW17277. Then lay in the sandwich construction from 3.1.2. Pour a second measured amount of the polyester compounded resin on the sandwich, then close the mold and cure the laminate.

3.1.4 The molding conditions will be determined by Design of Experiments (DOE) and then posted on the press as a Standard Operating Procedure (SOP) for the operator. The procedure and critical molding conditions will be controlled by Statistical Process Control (SPC) techniques.

3.1.5 The overall thickness of the composite laminate shall be in the range of 14.5 mm to 15.5 mm.

3.2 General Compound Properties. See Table 1.

Table 1: General Compound Properties

Property	Test Methods	Test Values
Tensile Strength	ASTM C297 (flatwise)	1.74 MPa to 2.68 MPa
Shear Strength in Flatness Plane	ASTM C273	1.07 MPa to 2.21 MPa
Flexural Modulus	ISO 178, Secant at 2.5 mm, 3 Point Loading	6500 MPa to 9100 MPa
Flexural Strength	ISO 178, Method 1	99 MPa to 165 MPa
Gravelometer	SAE J400, 50 Cycles at 22 °C	No penetration to the core

3.3 All materials supplied to this standard must comply with GMW3059, **Restricted and Reportable Substances**, including the requirement to obtain a GM-approved International Material Data System (IMDS) submission.

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.

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.

6 Approved Sources

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

A list of approved materials can be found in the GM Materials Approved Source List. To access this list, reference GMW14270 for latest location. This GM material file is provided to third parties to reduce redundant testing of materials. If an approved material is used, the part supplier can use the GM material file reference for Production Part Approval Process (PPAP) material approval. If the decision is made to use a not yet approved material, contact the Composites Global Subsystem Leadership Team (GSSLT) for details on the approval process. The material approval process must be completed prior to PPAP start date of the part supplied to General Motors.

7 Notes

7.1 Glossary. Not applicable.

7.2 Acronyms, Abbreviations, and Symbols.

DOE	Design of Experiments
GHS	Globally Harmonized System of Classification and Labeling of Chemicals
GSSLT	Global Subsystem Leadership Team
IMDS	International Material Data System
MSDS	Material Safety Data Sheet
PET	Polyester/Polyethylene Terephthalate
PPAP	Production Part Approval Process
RH	Relative Humidity
SDS	Safety Data Sheet
SOP	Standard Operating Procedure
SPC	Statistical Process Control