GM WORLDWIDE ENGINEERING STANDARDS	**Material Specification**	**GMW17277**

Polyester SMC – Hand Poured, Compression Molded, 30% Continuous Strand Fiberglass Mat

1 Scope

1.1 Material Description. This specification covers the properties of a composite compound that is formulated using a structural grade unsaturated polyester. The cured material shall be reinforced 30% (by mass) with a continuous strand mat glass fiber preform. This material must meet the bondability requirements of GMW15921.

1.2 Symbols. The material abbreviation according to ISO 11469 is >UP-GF30<.

1.3 Applicability. Typical applications include the following: Floor panels.

2 References

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

2.1 External Standards/Specifications.

ISO 62	ISO 527	ISO 1183
ISO 178	ISO 1172	ISO 11469

2.2 GM Standards/Specifications.

GMW3059	GMW14270	GMW15921
GMW3221	GMW14444	GMW16853

3 Requirements

3.1 Requirements on Test Specimens. Reference GMW3221, Code A.

3.2 Emissions Testing of Interior Materials and Parts. For all Code E designated parts per GMW14444, reference GMW16853 for emissions testing of interior materials and parts.

3.3 Test Procedures. Tests shall be conducted using the latest issue of the test methods 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.

3.3.1 Properties shall be determined using test specimens router cut from sheet molding compound (SMC) test plaques. Plaques shall be molded as shown in Appendix A, Figure A1. Plaques shall be molded using the mold temperatures, mold pressure and cure cycle that will be used to mold production parts. Each material vendor shall define these molding conditions in this certifiable data package. The length and width of the test mold, as well as the gate configuration, shall be included in the certification package. Plaques shall be 2.5 mm ± 0.1 mm thick. Weight variation between plaques shall not exceed ± 3.0%.

3.3.2 Raw materials used for compounding shall be within their vendor defined shelf life. Plaques shall be molded seven days maximum after compounding. Plaques shall be uniform in appearance and free from blisters, pregels, knit lines, cracks, and surface contamination. Porosity shall be one pit maximum per 625 mm^2. Surfaces shall also be free of external mold release. (Mold and scrap a minimum of three plaques after using external mold release.)

3.3.3 An equal number of specimens shall be cut from both the longitudinal and transverse plaque directions for each mechanical property. The specimens shall be tested and the results averaged. The average value is the material property value. This value is compared to the required value shown in Table 1.

3.3.4 Tests shall be conducted 40 h minimum after molding and immediately following a conditioning period of 24 h minimum at 22 °C ± 3 °C and 50% ± 5% relative humidity (RH) unless otherwise specified. All testing shall be done on unannealed samples.

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3.4 Compound Properties.

3.4.1 Compound Properties (Natural, Gray and Black). See Table 1.

Table 1: Compound Properties

Properties	Test Values	Test Methods
Glass Fiber Reinforcement	26% to 36%	ISO 1172
Moisture Absorption	0.6% maximum	ISO 62, Method 1
Density	1.6 g/cm^3 to 1.72 g/cm^3 maximum	ISO 1183, Method A
Flexural Modulus At +22 °C 0.5 mm deflection 2.5 mm deflection At 150 °C 0.5 mm deflection 2.5 mm deflection	 6100 MPa minimum 6000 MPa minimum 2000 MPa minimum 1400 MPa minimum	ISO 178, Method 1, Three point loading 1.3 mm/minute, 70 mm length 10 mm wide, thickness 2.5 mm to 3.0 mm, 60 mm span, secant calculations at 0.5 mm and 2.5 mm deflection
Flexural Strength	100 MPa minimum	ISO 178, Method 1
Tensile Strength at Break	600 MPa minimum	ISO 527
Tensile Modulus	6600 MPa minimum	ISO 527

3.5 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.

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