



Polyether Ether Ketone

1 Scope

1.1 Material Description. This standard covers the properties of general purpose, injection moldable Polyether Ether Ketone (PEEK).

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

1.3 Applicability. Typical applications include: Connectors.

2 References

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

2.1 External Standards/Specifications.

ISO 75-1/2	ISO 294	ISO 3146	ISO 11357-3
ISO 179/1eA	ISO 527-1/2	ISO 3167	ISO 11469
ISO 188	ISO 1183		

2.2 GM Standards/Specifications.

GMW3013	GMW3059
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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. Unless otherwise specified, injection molding of test specimens shall be accomplished per ISO 294 with the conditions for injection molding per the resin manufacturer.

All tests shall be performed on unannealed specimens in a controlled atmosphere of $22\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ and $50\% \pm 5\%$ relative humidity (RH) unless otherwise specified. In addition, tests specified at temperatures below or above $22\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ shall be conducted at the specified temperature using specimens conditioned at the specified temperature for 4 h minimum.

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.

3.2 Requirements on Delivery. Important physical, mechanical, and thermal properties that characterize the material are summarized in charts. The color shall be specified on drawings, in material specifications, and otherwise.

3.2.1 Compound Properties (Natural and Black). See Table 1. The following are also required for full standard approval. The minimum number of lots per test required is one in natural: Poisson's Ratio, Coefficient of Linear Thermal Expansion (CLTE), Mold Shrinkage, Stress/Strain Curve. See GMW3013 for all test procedures and parameters.

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

Table 1: Compound Properties (Natural and Black)

Property	Standard	Units	Range
Density	ISO 1183/A	g/cm ³	Target Range 1.27 to 1.32
Tensile Modulus	ISO 527-1/2, 1 mm/minute, between 0.05% and 0.25% strain. ISO 3167, 4 mm thick, Type A bar	MPa	3500 to 4100
Tensile Stress at Yield	ISO 527-1/2, 5 mm/minute, ISO 3167, 4 mm thick Type A bar	MPa	≥87
Stress at Yield after Heat Aging	ISO 188 ISO 527 1000 h at 300 °C	% Retention	≥75
Strain at Break	ISO 527-1/2, 1 mm/minute, between 0.05 and 0.25% strain. ISO 3167, 4 mm thick, Type A bar	%	≥20
Notched Charpy Impact Strength At +23 °C At -30 °C	ISO 179/1eA, Machined V-Notch, r = 0.25 mm, 80 mm x 10 mm x 4 mm	kJ/m ²	≥4.5
Notched Charpy Impact Strength after Heat Aging	ISO 188 ISO 179/1eA 1000 h at 300 °C	% Retention	≥50
Melting Temperature	ISO 3146 or ISO 11357-3	°C	Target Range 335 to 350
Heat Deflection Temperature under Load 1.8 MPa	ISO 75-1/2	°C	≥145

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.