



Resin, Impregnation, Anaerobic

1 Scope

1.1 Material Description. This specification describes requirements and tests for an anaerobic resin intended for the impregnation of porous metal castings and powdered metal components. See 7.1.1.

1.2 Symbols. Not applicable.

1.3 Applicability.

1.3.1 Application Limit. Intended as a **single application** to components that do not initially pass final leak test due to porosity in the metal.

1.3.2 Usage and Temperature Limits. After impregnation, under no circumstances should the continuous or excursion product temperatures of the material manufacturer be exceeded. **This is a Class B product suitable for components operating in that continuous temperature range** (shaded in Table 1). Discuss with the resin supplier the nature and frequency of the excursions before making a selection. See Table 1. Do not confuse this with storage shelf life, 3.7.5.

Table 1: Temperature Classification

Class	Maximum Continuous Temperature Limit (°C)	Maximum Excursion ^{Note 1} Temperature Limit (°C)
Class A	149	177
Class B	175	205
Class C	225	260
Class D	260	295

Note 1: Excursion time at temperature is determined by the resin manufacturer. Consult with them regarding your specific application before selecting your product.

1.3.3 Process Sequence.

1.3.3.1 The product is applied after all heat treatments and before or after final machining.

1.3.3.2 This product is only intended to seal porosity and no other process defect.

1.3.3.3 Use of impregnation product is strictly a temporary measure to resolve a porosity condition. The condition limits under which use is allowed are defined in the Component Technical Specifications or the Statement of Requirements for the part or component. If no provisions are stated, no impregnation is permitted.

1.3.3.4 Precautions. Persistent use is not recommended as a preventative measure. The long term durability of this impregnation product is not known because it is rarely used. GMW3155 testing of impregnated parts is highly recommended to assist in defining long term sealing performance.

1.3.3.5 Expired Product. Even if properly stored (see 3.7.5), do not use this product past its expiration or use before date. Do not contact GM Materials Engineering and request permission to use expired product.

1.4 Remarks.

1.4.1 This material is introduced into a cleaned part at room temperature by a wet vacuum process. It reaches a cured state with the addition of a catalyst. See 7.1.1.

1.4.2 Air leakage of the part or component determines before and after if the impregnation process is suitable. Consult the Statement of Requirements or Component Technical Specifications for the part or component.

1.4.3 Resin discoloration may occur after impregnation. This is normal and shall not be cause for rejection of the component.

1.4.4 Normally pressure penetration testing (3.8.5.5) occurs on non-machined specimens, however, since machined parts are impregnated, the testing requires machined and etched surfaces.

2 References

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

2.1 External Standards/Specifications.

ASTM D92	ASTM D1298	ISO 3104	MIL-I-17563C
ASTM D287	ASTM E1252	ISO 3675	MIL-STD-276
ASTM D445	ISO 2592		

2.2 GM Standards/Specifications.

GMW3059	GMW3221	GMW3420	GMW16076
GMW3155			

2.3 Additional References.

Metal Powder Products, 16855 Southpark Drive, Suite 100, Westfield, Indiana 46074-9373.

2.4 Document References and Changes. Use the latest published version at the time of submission for approval. Change(s) in an existing test method or procedure referenced in a GM Standard must be evaluated for compliance or non-compliant to the document limit at the time of the change. Data must be submitted to GM Powertrain Engine Materials Engineering within 180 business days of the published revision in GM Global Document Management (for GM Standards) or date document arrives at the external standard's (outside GM) contract distributor. Time limits may be extended for regulatory health and safety issues only. New or added requirements are also evaluated at the time they are published.

2.4.1 Applicability. To maintain approved source compliance as running changes occur. Typically standards' content is reviewed and revised every five years (i.e., refresh). Changes are managed at the time they occur, notably between the initial approval and the scheduled document review (refresh) event. It eliminates approved material qualified under different requirements without checking to see if they still qualify.

2.4.2 Monitoring and Frequency. GM Powertrain expects the tiered (1, 2, 3) supplier to monitor external standards documents for changes and evaluate the impact of the change to determine if it affects required limits. GM is responsible for timely notification to suppliers of its own test standards referenced in this document. Review documents every six months after initial production part approval. Less monitoring is required if the pending changes are communicated by a known committee or team release timing schedule.

2.4.3 Criteria. Test and report only the changes (existing or new) since the initial qualification. Do not make a qualification decision before sharing the information with GM Materials Engineering. Both parties must review the information before a decision is reached. All data will be kept by both parties to the limit required by their company record retention protocol. Release and Revisions section of GM documents lists the change timing. No testing is required if the latest document has no changes from the previous one or from the point of initial approval (revision date only change).

2.4.4 How Document Changes Affect Part Compliance. All product produced after the changes are published in GM Global Document Management shall meet the new requirements. Current product in the pipeline approved under the previous criteria will remain until existing supplies are expended. Decisions involving regulatory changes will be handled separately and existing product may be immediately removed as a result.

3 Requirements

3.1 Requirements on Test Specimens. Conditioning as specified in the referenced test. Reference GMW3221, Code A for unspecified conditioning.

3.1.1 Minimum Data Requirements. Compliance testing for initial approval will consist of data submitted from a minimum of three production batches. One of those batches will be at least 12 months old to evaluate compliance to 3.7.5 shelf life to the required tests in that paragraph.

3.2 Base Resin. Blend of Methacrylate monomers, see 3.8.1.

3.3 Visual Appearance. Clear, amber liquid.