



Sealings in Turbo Charger Applications

1 Scope

This specification covers the materials of elastomeric sealings in turbocharger applications.

1.1 Material Description. Materials covered by this standard are divided into the following types.

1.1.1 Type A. Ethylene Acrylate Elastomer (AEM) gasket for use in quick-connects for +160 °C permanent and +185 °C peak temperatures.

1.1.2 Type B. Fluoroelastomer (FKM) gasket for use in quick-connects for +200 °C permanent and +225 °C peak temperatures.

1.1.3 Type C. FKM sealings for static applications for +200 °C permanent and +225 °C peak temperatures.

1.1.4 Type D. Silicone Elastomer (VMQ) sealings for static applications for +200 °C permanent and +225 °C peak temperatures.

1.1.5 Type E. Drawing defined (e.g., using SAE J200 or ASTM D2000 line callout). If no type of material is indicated, material of Type A is sufficient.

1.1.6 Type F. Ethylene Acrylate Elastomer (AEM) gasket for use in quick-connects for +135 °C permanent and +150 °C peak temperatures.

1.1.7 Type G. Fluoroelastomer (FKM) gasket for use in quick-connects for +150 °C permanent and +175 °C peak temperatures.

1.2 Symbols. Not applicable.

1.3 Typical Applications. Elastomeric sealings in turbocharger applications.

2 References

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

2.1 External Standards/Specifications.

ASTM D2000	ISO 48	ISO 1817
ISO 34-1	ISO 188	ISO 23529
ISO 37	ISO 815	SAE J200

2.2 GM Standards/Specifications.

GME L0005	GMW3059	GMW15803
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2.3 Additional References.

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

3 Requirements

3.1 Resources

3.1.1 Test Samples. Unless otherwise specified, the shape and size of test pieces shall be in accordance with the relevant test procedure. Minimum six (6) test samples (gaskets) are required for initial sample testing. Minimum three (3) test samples are required for inspection testing.

3.1.1.1 Samples are finished parts or to be taken from finished parts. Where the dimensions on the finished parts do not allow preparing of test pieces, tests are to be performed on sheet material of the same production batch. The same state of cure between slabs or buttons and finished parts must be assured by appropriate tests, which must be described in the test report. When presenting a new quality, sheet material of the same batch is recommended.

3.1.1.2 If not otherwise stated, mechanical properties in delivery state and after heat or fluid immersion are to be tested at $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ and with the same test methods. Unless otherwise stated, ambient temperature test conditions shall be held to $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$. Unless otherwise stated, all other temperatures except $+23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ shall be held to $\pm 3\text{ }^{\circ}\text{C}$.

3.1.2 Conditioning. Conditioning shall be as specified in the relevant test procedure.

3.1.3 Equipment. Conforming to the relevant test procedures.

3.1.4 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.5 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to its physical definition.

3.1.6 Facilities. Conforming to the relevant test procedures.

3.1.7 Deviations. Deviations from the requirements of this standard shall have been agreed upon. Such deviations shall be specified on component drawings, test certificates, reports, etc.

3.2 Material and Performance Requirements.

3.2.1 Design or Product Validation Testing. Material and Performance Properties are summarized in Table 1. For full approval of a sealing, compliance to the requirements of Table 1 is needed. Six (6) samples of material shall be tested to each of the requirements for Design or Product Validation Testing.

3.2.2 Audit/Inspection Testing. If not defined otherwise, the following testing should be done for production audit testing. Three (3) samples of material shall be tested to each of the requirements for Audit/Inspection Testing.

- All tests per Table 1, except Long Term Aging Resistance.

Table 1: Material and Performance Properties

Property	Test Procedure	Unit	Value
Hardness			
Type A, F	ISO 48 Method M	IRHD	65 - 5 + 10
Type B, C, G	ISO 48 Method M	IRHD	60 ± 5
Type D	ISO 48 Method M	IRHD	65 ± 5
Type E	As specified on drawing/math data file		As specified on drawing
Elongation at Break			
Type A ,B, C, D	ISO 37, Type 2 or Type 4 dumbbell, 200 mm/minute ± 20 mm/minute	%	200 minimum
Type E	As specified on drawing/math data file	%	As specified on drawing
Type F, G	ISO 37, Type 2 or Type 4 dumbbell, 200 mm/minute ± 20 mm/minute	%	150 minimum
Tensile Strength			
Type A, F	ISO 37, Type 2 or Type 4 dumbbell, 200 mm/minute ± 20 mm/minute	MPa	8.5 minimum
Type B, C, G	ISO 37, Type 2 or Type 4 dumbbell, 200 mm/minute ± 20 mm/minute	MPa	9 minimum
Type D	ISO 37, Type 2 or Type 4 dumbbell, 200 mm/minute ± 20 mm/minute	MPa	4 minimum
Type E	As specified on drawing/math data file	MPa	As specified on drawing
Tear Strength ^{Note 1}			
Type A, F	Tear strength to ISO 34-1 Method A (trouser test piece)	N/mm	4 minimum
Type B, C, G	Tear strength to ISO 34-1 Method A (trouser test piece)	N/mm	3 minimum
Type D	Tear strength to ISO 34-1 Method A (trouser test piece)	N/mm	2.5 minimum
Type E	As specified on drawing/math data file		As specified on drawing
Age Resistance (Heat Aging)			
Type A	ISO 188 Method B, 168 h - 2 h at +185 °C ± 3 °C Change in Hardness Change in Elongation at Break Elongation at Break Change in Tensile Strength Tensile Strength Tear Strength	IRHD % % % MPa N/mm	+15 maximum -50 maximum 125 minimum -20 maximum 8.5 minimum 2.5 minimum