



Resistance to Crankcase Ventilation Gases

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. Testing the resistance of polymer materials in the form of finished parts and test sheets to components of crankcase ventilation gases, e.g., cylinder crankcase ventilation (CCCV) hoses, connection hoses and intake hoses to pipe fittings, gaskets, etc.

1.2 Applicability. Engine cover designs that integrate oil sealing and/or crankcase systems. These dual function gaskets are required to resist both media without functional loss over the design life of the component. Contains immersion requirements for gas (G) and diesel (D) engine applications.

1.3 Remarks. This document is referenced in various GMWs for materials, where direct exposure to crankcase vapor occurs, e.g., engine cover gaskets, blow-by hoses, etc.

1.3.1 Elastomeric compounds must pass a four (4) cycle minimum, unless otherwise specified.

1.3.2 Compounds selected without resistance to crankcase ventilation gases may be prone to distortion, hardening and cracking.

2 References

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

2.1 External Standards/Specifications.

ASTM D412	ASTM D5423	ISO 188	ISO 5893
ASTM D471	ISO 37	ISO 1817	ISO/IEC 811
ASTM D1415	ISO 48	ISO 2393	
ASTM D3182			

2.2 GM Standards/Specifications.

GMW14914	GMW16955
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2.3 Additional References.

- Chemical Abstract Service (CAS), based in Columbus, Ohio, www.cas.org, Numbers 7697-37-2, 64-19-7
- Molecular Design Limited (MDL) Information Systems, based in Hayward, California, Numbers MFCD00011349, MFCD00036152
- PubChem Substance Database, www.ncbi.nlm.nih.gov/pcsubstance, Identification (ID) Numbers 24861807, 24859135 3 Resources

3 Resources

3.1 Facilities. A suitable area or room for conducting testing with a stable and known environment.

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

3.1.2 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 their physical definition.

3.2 Equipment.

3.2.1 Testing machine. Conforms to the ASTM D412 and ISO 37 equipment requirements. ISO 5893 Class D accuracy for ISO 37, Type 2 and Class E for ISO 37, Type 4 dumbbells.

3.2.2 Air Circulating Oven. Cabinet temperature control obtained through air exchange and circulation uniformity (in time and space) is important to measurement repeatability and reproducibility at isothermal temperatures. Small units capable of obtaining ± 2.0 °C around a set temperature are best. Select ovens with air exchange rates of 3 changes/h to 20 changes/h, meeting ISO 188 and ISO/IEC 811 or ASTM D5423 Type I requirements.

3.2.3 Fume Hood or Vent. Appropriate industry approved construction and ventilation performance to remove vapors.

3.2.4 Brackets and Mounting Plates. Corrosion resistant, sample holder and support fixturing to accommodate vehicle orientation effects. Sized to fit into beaker.

3.2.5 Analytical balance with an accuracy of ± 0.1 mg.

3.2.6 Laboratory Glassware. Sealed glassware is required to minimize volatile test fluid evaporative loss and incidental contact to acid. Watch glass covers are sufficient for oil immersions as some air exchange is desired.

3.2.6.1 Two (2) acid resistant 200 mL Erlenmeyer flasks with glass fritted stopper to accommodate the ISO 37 Type 4 specimens. Two (2) 500 mL Erlenmeyer flasks with 24/40 joint glass fritted stopper to accommodate the ISO 37 Type 2 specimens.

3.2.6.2 One (1) tall form 250 mL beaker to accommodate the ISO 37 Type 4 specimen. One (1) 400 mL tall form beaker to accommodate the ISO 37 Type 2 specimens.

3.2.6.3 Watch glass to cover beaker top.

3.2.6.4 Other media resistant containers may be used for testing purposes, including ASTM D471 test tubes for simultaneously testing volume change and ISO 37 Type 2 or 4 dumbbell specimens.

3.2.6.5 Glass vessel with a ground planar flange. Size and volume must be sufficient to totally immerse test specimens at the volume to specimen ratio in 4.3.1. The vessel is closed by a suitable lid fixed with a spring loaded clamp applied to a rubber stopper to provide tension keeping the cover in place. See Figure 1.



Figure 1: Beaker with Wire Mounting

3.2.6.6 Very thin (0.12 mm diameter) ignition wire (used for bomb calorimetry) is used for mounting and suspending test specimens in Erlenmeyer flask. The wire is pinched with the glass stopper. As the walls of the Erlenmeyer flask are conical, the test pieces hang free and do not touch each other or the wall. The thin wire helps removal of the flask top after heat immersion, but is fine enough so no air exchange occurs.

3.2.6.7 Heavy gauge wire for specimen mounting of beaker specimens. Wire must not be reactive with captive test solutions. See Figure 1.

3.2.7 Fluids.