PERFORMANCE OF ELASTOMERIC SEALS IN ENGINE OIL **WSS-M9P12-A1**

PERFORMANCE OF ELASTOMERIC SEALS IN ENGINE COOLANT **WSS-M9P12-A2**

1. SCOPE

The specification defines the basic seal retention requirements for elastomeric materials used as seals for engine oil and engine coolant.

2. APPLICATION

This specification was released originally to cover the basic requirements for all elastomeric engine seal materials. This specification covers only engine oil and engine coolant applications; the testing will be different for other fluids or for hot air.

3. REQUIREMENTS

3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements for Production Materials (WSS-M99P1111-A).

3.2 COMPRESSION STRESS RELAXATION

3.2.1 Sealing Against Oil (A1 only) ≥10% RSF
(SAE J2979, 3000 h at 150 °C +/- 2 °C (Residual Sealing Force)
25% compression, with the procedure as noted below).

Residual sealing force readings:
Per SAE J2979 – take readings initially at 1 hour ± 5 minutes, 24 hours, then at weeks 1, 3, 6, 9, 12, 15 and 18. Initial readings at 1 hour ± 5 minutes, are taken before the samples are immersed in fluid.

Fluid Changes:
Perform fluid changes at weeks 3, 6, 9, 12 and 15 (after sealing force readings)

Test Fluids

Engine oil: Factory fill engine oil (Use oil specified for each region of use)
Engine oil: Full synthetic engine oil
Reference oil: ASTM D471 SF 105

For recommended regional factory fill and full synthetic engine oils for the Compression Stress Relaxation test, contact Ford Materials Engineering at gmfs@ford.com .

Format for data collection must follow Appendix A. An Excel file for Appendix A is available through Ford Materials Engineering.

Date	Action	Revisions	Rev. 02
2015 06 19	Revised	See Summary of revisions	A. Reaume, NA
2015 03 17	Released	Added 'A2' for engine coolant applications	P.Addis,, EU and A.Reaume, NA
2014 02 26	Released		P.Addis, EU and A.Reaume, NA

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3.2.2 Sealing Against Coolant (A2 only) ≥10% RSF
(SAE J2979, 3000 h at 120 °C +/- 2 °C (Residual Sealing Force)
25% compression, with the procedure as noted below).

Residual sealing force readings:
Per SAE J2979 – take readings initially at 1 hour ± 5 mins, 24 hours, then at weeks 1, 3, 6, 9, 12, 15 and 18. Initial readings at 1 hour ± 5 minutes, are taken before the samples are immersed in fluid.

Use a ratio of 25±5% coolant to 75±5% air in the pressure vessel; completely immerse CSR fixtures in coolant.

Fluid Change:
Perform fluid change at week 9 of the test

Test Fluids
Coolant: (50/50 with water)
Factory fill engine coolant (Use coolant specified for each region of use)
Local service fill engine coolant (if different)

For recommended regional factory and service fill engine coolants for the Compression Stress Relaxation test, contact Ford Materials Engineering at gmfs@ford.com .

Format for data collection must follow Appendix A. An Excel file for Appendix A is available through Ford Materials Engineering.

3.3 TRANSITION TEMPERATURE

3.3.1 Glass Transition Temperature -15°C max
(ASTM D7426, DSC Method, 20 °C/minute
heating rate, nitrogen atmosphere)

or use alternate method:

3.3.2 Low Temperature Brittleness Point -25°C max
(ISO 812, Type B specimen / ASTM D 2137, Method A)

4. GENERAL INFORMATION

The information given below is provided for clarification and assistance in meeting the requirements of this specification. Contact gmfs@ford.com for questions concerning Engineering Material Specifications.
An Excel file of appendix A is available through Ford Materials Engineering.

5. SUMMARY OF REVISIONS

2015 06 19
- Changed title in 3.2.1 and 3.2.2
- Added initial reading explanation and appendix A reference in 3.2.1 and 3.2.2
- Added Appendix A

2015 03 17:
- Released A2 Suffix added for seal applications with engine coolant
- Updated wording for Scope and Application.

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