



materials engineering research
laboratory

TEST CERTIFICATE

This document certifies that

FKM compound Endura[®] V91K

from

PRECISION POLYMER ENGINEERING LTD.

meets the requirements of

NORSOK M-710 in respect of sour fluid resistance

Test fluid: 25% hydrogen sulphide/hydrocarbon oil/water
Test pressure: 30 bar
Passed by : Barry Thomson
Date: 14th December 2012

MERL verify that specimens of the PPE FKM compound Endura[®] V91K have been subjected to a series of sour multi-phase fluid exposures at three elevated temperatures.

Test Conditions

Exposure fluid composition and distribution

VOLUME (%)	COMPOSITION
30	25/3/72 mol% H ₂ S/CO ₂ /CH ₄
10	Distilled water
60	70% heptane, 20% cyclohexane, 10% toluene

The FKM tensile testpieces were placed in the hydrocarbon oil phase for the exposure tests.

Test temperatures and exposure periods used in the NORSOK M-710 programme are shown in the table below; test pressure was 25-35 bar.

Exposure test conditions

TEMPERATURE (°C)	SAMPLING INTERVALS (days)
150	7, 14, 28, 42, 56
162	10, 15, 32, 42, 57
175	7, 15, 28, 42, 54

Summary for Endura[®] V91K

TYPE	Swell¹	Hardness	50/100% modulus²	Tensile strength²	Elongation at break²	NORSOK acceptable
FKM	PASS	PASS	PASS	PASS	PASS	YES

¹ <12%

² changes within ±50% range, from oil-saturated level

FKM grade Endura[®] V91K behaves as expected when immersed in a low viscosity hydrocarbon oil with a high level of H₂S present in the gas phase. Swelling is moderate and tensile property levels do not show evidence of chemical ageing having occurred under the worst case exposure conditions: 2 months at 175 °C. The changes in room temperature tensile property levels are within the allowable range, but trends linked to time and temperature are not discernible; hence life estimation calculations are not possible. However, it is known that many FKM-based compounds will chemically deteriorate eventually under such conditions; increasing temperature is one way to quicken this process.

FKM grade Endura[®] V91K meets the requirements of the NORSOK M-710 standard for multi-phase fluid exposure with up to 25 mol% H₂S in the gas phase; this is applicable for at least 2 months at 175 °C, and for longer intervals at lower temperatures.