
TEST CERTIFICATE

This document certifies that the material denoted

V9T22

from

TRELLEBORG SEALING SOLUTIONS

meets the requirements of

NORSOK M-710 Rev. 2 in respect of sour fluid resistance

Test fluid: 2% hydrogen sulphide/hydrocarbon oil/water

Test pressure: 90-110 bar

Passed by: Barry Thomson

Date: 22nd November 2013

Element verify that tensile specimens of FKM grade V9T22 (batch 130406101) supplied by TRELLEBORG SEALING SOLUTIONS have been exposed in a multi-phase sour fluid at three elevated temperatures.

EXPOSURE FLUID COMPOSITION AND DISTRIBUTION

FLUID	CELL VOLUME OCCUPANCY (%)
2/3/95 mol% H ₂ S/CO ₂ /CH ₄	30
70/20/10 volume% heptane/cyclohexane/toluene	60
Distilled water	10

The tensile testpieces were located in the hydrocarbon oil phase for each exposure test. Test temperatures and sampling intervals used in the NORSOK M-710¹ programme are tabulated below.

TEMPERATURE (°C)	SAMPLING INTERVALS (days)
170	7, 14, 28, 49
185	6, 14, 25, 45
200	5, 10, 20, 35

V9T22 PERFORMANCE SUMMARY

Swell ¹	50% modulus ²	Tensile strength ²	Elongation at break ²	Hardness ³	NORSOK acceptable
PASS	PASS	PASS	PASS	PASS	YES

¹ Acceptable range is -5% to +25%

² Changes within ±50% range, from as-received level

³ Acceptable range is -20 to +5 units

V9T22 swelled moderately (7-16%) early in each exposure test and this reduced the level of 50% modulus, tensile strength and elongation at break. The level of 50% modulus was then insensitive to additional exposure time at each temperature, the expected behavior for a material resistant to chemical ageing. Tensile break property levels were adversely affected in a small number of cases by the presence blisters, believed to be due to rapid gas decompression [RGD] effects.

For 50% modulus, the average change across all exposure conditions was -20%, well within the “baseline” lower limit of -50%. Despite the presence of RGD damage in many tensile specimens, overall mean changes in tensile strength and elongation at break were -29% and -6%, respectively. In only two instances did the change in tensile strength exceed the baseline lower boundary and in one case for elongation at break; in each case, RGD damage was implicated in the premature breaking of the testpiece. There was no evidence to suggest that V9T22 had been chemically aged.

Hence V9T22 is considered to meet the requirements of the NORSOK M-710 Rev. 2 standard for sour fluid exposure.

¹ NORSOK M-710, “Qualification of non-metallic sealing materials and manufacturers”, Rev. 2, October 2001.