

TEST REPORT

This document certifies that

E1005 [HNBR 90A]

from

FCS Fluoro Carbon Seals Private Limited

has been tested according to the requirements of

**ISO 10423 Appendix F.1.13.5.2/API 6A (Appendix F) in respect of
sour fluid (FF/HH) resistance**

Test fluid: 10% Hydrogen sulphide/hydrocarbon oil/water

Test pressure: 1,000 psi

Passed by: Dr Michael Lewan

Date: 8th July 2020

Element Hitchin has been assessed to BS EN ISO 9001 by the British Standards Institution (BSI) and is a registered firm under the BSI Quality Assurance scheme for the provision of professional and technical services



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Element Hitchin verify that tensile specimens of E1005 (HNBR 90A) by FCS Fluoro Carbon Seals Private Limited have been tested according to ISO 10423:2009, annex F.1.13.5.2 (immersion).

Test Conditions

Five replicate tensile dumbbells of E1005 (HNBR 90A) were exposed in the hydrocarbon liquid phase to the following conditions for 160 hours. The test was run between 16th and 24th June 2020.

Temperature	180 ± 2 °C
Pressure	1000 psi (69 bar)
Gas phase (35%)	10/80/10 mol% H ₂ S/CO ₂ /CH ₄
Liquid phases (65%)	60% vessel volume 70/20/10 heptane/cyclohexane/toluene 5% vessel volume water

Changes in physical and mechanical property levels were measured at room temperature, with non-exposed material serving as the point of reference. The material was not altered by the exposure conditions.

The acceptance criteria given in section 8.2.2 of the Norsok M-710 standard¹ were applied. The results are tabulated below.

PROPERTY	ACCEPTABLE CHANGE RANGE	ACTUAL CHANGE AFTER IMMERSION
Volume change (swelling)	-5%/+25%	+19%
Hardness	-20/+5 units	-13
Modulus at 50% Elongation	±50%	-46%
Modulus at 100% Elongation	±50%	-43%
Tensile Strength	±50%	-47%
Elongation at Break	±50%	-18%

FCS Fluoro Carbon Seals Private Limited elastomeric grade E1005 meets the acceptance criteria applied after an immersion test undertaken according to ISO 10423:2009, annex F.1.13.5.2.

Element report reference number C5195-1 issued dated on 8th July 2020 covers all work undertaken.

¹ Norsok M-710, "Qualification of Non-Metallic Sealing Materials and Manufacturers", Edition 3, September 2014.

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