Technical Report

ISO / NORSOK Certified Elastomer Materials

To better serve our customers manufacturing high performance valves, EGC Critical Components has evaluated several elastomeric seal compounds to **ISO 23936-2.**

ISO 23936:2011, Non-Metallic Materials in Contact With Media Related to Oil and Gas Production, Part 2: Elastomers has replaced the un-balloted NORSOK M-710, Annex–B, R3 draft. Testing was conducted to Annex A: Ageing of Elastomeric Materials and to Annex B: Rapid Gas Decompression (RGD). The compounds selected are widely used in sealing solutions provided by EGC Critical Components.

The testing was contracted with an independent laboratory, Akron Rubber Development Laboratory Inc. (ARDL) located in Ohio, USA.

Annex A:

This procedure is used to qualify elastomer compounds for service in liquids and gases representative of the intended application environment. The test parameters that can be selected are the composition of the hydrocarbon liquid phase, the gas phase, and three test temperatures. The test temperatures used are intended to be above the recommended service temperature of the polymer used to compound the material. These are selected based on API 6A or ISO 10423 temperature classifications in table A.6. Based on changes in physical properties in the elastomer at different intervals, an Arrhenius plot of estimated service life can be generated.

AS568-222 O-Rings are aged in the test chamber at the specified temperature and media at 10 MPa (1450 psi). At specified intervals the chamber is depressurized, test samples are removed, and the chamber is re-pressurized with media. Aging is continued until the specimens no longer meet the standard acceptance criteria or time is expired.

Phase	Composition
Liquid	60% As Specified (Aromatic or Non-Aromatic)
Gas	30% As Specified (Sweet or Sour)
Water	10% Deionized

Test Temperature	Test Pressure	Duration
3 Intervals Specified, All Above Maximum Service Temperature For The Polymer	10 MPa (1450 psi)	As Specified For Each Temperature

Annex B:

This procedure is used to qualify elastomeric materials for service in gas environments that could subject elastomeric materials to Rapid Gas Decompression (RGD) or Explosive Decompression (ED). AS568-325 O-Rings were molded from standard compounds; the specimens were saturated in a pressurized methane/carbon dioxide environment, and then subjected to 8 decompression cycles over a period of 7 days. The O-Rings were then evaluated to the rating system outlined in the ISO 23936-2, Annex-B standard.

Mol %	Composition
10	CO_2
90	CH_4

Test Temperature	Test Pressure	Duration
100°C (212°F)	15 MPa (2176 psi)	7 days

EGC CRITICAL COMPONENTS

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The performance of the compounds is summarized in the grid below.

Compound	Description	Annex A: Chemical Ageing		Annex B: RGD
		Test Parameters	Acceptance Criteria	Visual Acceptance Criteria
803-80	80a HNBR – Resilient	A.5 Sour Multiphase A.6 Non-ISO / API	Tested	Pass
809	90a HNBR – Oilfield Service	A.5 Sour Multiphase A.6 Non-ISO / API	Tested	Pass
809LT	90a HNBR – Low Temp	A.5 Sour Multiphase A.6 TBD	Scheduled	Scheduled
801-85	85a HNBR – ED Resistant	A.5 Sour Multiphase A.6 Non-ISO / API	Tested	Pass
900-92	92a FEPM	A.5 Sour Multiphase A.6 API-X	Scheduled	Scheduled
904-92	92a FEPM	A.5 Sour Multiphase A.6 API-X	Scheduled	Scheduled
901-90	90a FKM-2 – Peroxide Cure	A.5 Sour Multiphase A.6 API-X	In Que	Pass
909HV	90a FKM-1 – Bisphenol Cure	A.5 Sour Multiphase A.6 API-X	In Que	Pass
909LT	90a FKM-3 – Low Temp	A.5 Sour Multiphase A.6 API-X	In Que	Pass
9021581	92a FKM	A.5 Sour Multiphase A.6 API-X	Scheduled	Pass
9021602	92a FKM – Low Temp	A.5 Sour Multiphase A.6 API-X	Scheduled	Pass
408	80a NBR – Sulfur Cure	A.4 Sweet Multiphase A.6 API – U,V	Tested	Pass
408LT	80a NBR – Low Temp	A.4 Sweet Multiphase A.6 API – U,V	Tested	Pass
409XR	90a NBR – Sulfur Cure	A.4 Sweet Multiphase A.6 API – U,V	Tested	Pass
9003010	90a NBR – ED Resistant	A.4 Sweet Multiphase A.6 API – U,V	Scheduled	Pass
PES-90	90a FFKM – High Temp	A.5 Sour Multiphase A.6 API-X	Scheduled	Scheduled
PLT-90	90a FFKM – Low Temp	A.5 Sour Multiphase A.6 API-X	Scheduled	Scheduled

Per *ARDL Test Reports PN102808, PN103020, PN103335, PN1034363, PN105110, PN103940, PN106090,* certification according to ISO 23936-2:2011, Annex-B applies to EGC grades listed above. See PN104751, PN104880 for Annex-A results. More detailed test information is available upon request from EGC Critical Components.

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