

MATERIAL DATA SHEET		MDS P11	Rev. 3
TYPE OF MATERIAL: Hydrogenated Nitrile (HNBR)			
PRODUCT	O-ring	TEMPERATURE RANGE	-20°C to 150°C ^{1), 2), 3)}
1. SCOPE	This MDS specifies the technical requirements for the HNBR O-ring material.		
2. PURCHASE INFORMATION	The purchase order shall contain the following information: Product type, size, grade designation and/or referenced drawing.		
3. CHEMICAL COMPOSITION	36 – 40% acrylonitrile content (ACN)		
4. QUALIFICATION TEST REQUIREMENTS	<p>The material shall be rapid pressure reduction resistant (ED resistant) and satisfy the following minimum requirements. The qualification shall be repeated if there are changes in the production route, manufacturing procedures, specified composition or properties of the product which exceeds the limits defined from qualification testing (each manufacturer and seal type shall be qualified).</p> <p><i>ED-test:</i></p> <p>Qualification test requirements: O-ring cross section diameter 5,33 mm, 20% compression, test fixture, 70 – 85% groove fill, test medium 3% CO₂ in Methane, test temperature 100 °C, 72 hours initial soak at full pressure, followed by 5 cycles of:</p> <ul style="list-style-type: none"> - 200 bar (24h) - Depressurisation: 20-40 bar/min. - 1 hour rest time - Re-pressurisation - Leakage test <p>No leakage shall occur in a leakage test at room temperature and service pressure following the 5 decompression cycles. Further, no cracks shall be longer than 80 % of the sample thickness, based on dissection, after the leakage test.</p> <p><i>Mechanical properties:</i></p> <ul style="list-style-type: none"> - Hardness ASTM D 2240 90 ± 5 Shore A - Tensile strength ASTM D 412/1414 min. 20 MPa - Elongation at break ASTM D 412/1414 min. 100% - Compression set ASTM D 395 max. 25% (after 24 hours at 150°C) - Documentation of tensile strength and elongation at break at 150 °C. <p><i>Physical properties:</i></p> <ul style="list-style-type: none"> - Specific gravity ASTM D 792 1,2 – 1,3 g/cm³ 		
5. DIMENSIONS	According to ISO 3601-1 and -3.		
6. PRODUCTION TEST REQUIREMENTS	The production testing shall be performed according to the requirements in ISO 10423, quality level PSL 3, and satisfy requirement for hardness as stated above and for the other parameters as stated in ISO 10423.		
7. MARKING & PACKAGING	Seals shall be supplied in sealed airtight bags. Markings on the bags shall clearly indicate batch number, and such markings shall ensure traceability through the producers QC system to raw materials, formulation and manufacturing details.		
8. CERTIFICATION	<p>The material manufacturer shall have a quality system certified in accordance with ISO 9001 and the system shall have undergone a specific assessment for the relevant materials.</p> <p>Inspection certificate shall be to the requirements in ISO 10423, quality level PSL 3.</p>		
NOTES	<ol style="list-style-type: none"> 1) Short time exposure down to -46°C is acceptable. 2) Materials properties in actual application to be documented, at combined dimensioning loads (mechanical, temperature, service). 3) Mechanical properties are reduced by increasing temperature and may be degraded by service. 		