# HNBR H2 90P

**HNBR-H2-90P-01** · HNBR · 90 Shore A · Peroxide cure · −25 °C to +150 °C ○ NO POLE MARK

87.5 MPa, thousands of cycles, and hydrogen that wants out.

**READ THE CODE** HNBR-H2-90P-01 = HNBR, H2 duty (hydrogen service), 90 Shore A, P for peroxide cure, recipe 01.

**DEVELOPMENT TARGETS: NOT MEASURED RESULTS.** Every value on this sheet is a design target or a release limit for development. Replace targets with measured typical values (mean of production lots, with the number of lots) and the test report reference before external use.

## Description

A 90 Shore A high-modulus HNBR for high-pressure hydrogen: compressor head and valve seals, station storage and high-pressure valves. Designed for rapid decompression in 100 % hydrogen at up to 87.5 MPa, for extrusion resistance with back-up rings, and for low permeation among the hydrocarbon rubbers.

| | |
|---|---|
| POLYMER | HNBR (hydrogenated nitrile) |
| DUTY | H2: Hydrogen |
| CHEMISTRY | Peroxide-cured hydrogenated nitrile, high modulus, hydrogen grade |
| CURE | Peroxide |
| HARDNESS | 90 Shore A nominal |
| DESIGN RANGE | −25 °C to +150 °C |
| COLOUR | Black |
| PORTFOLIO | Wave 3, probable |
| POLE MARKS | None |

## Applications

- Hydrogen compressor head, valve and static seals
- High-pressure station storage and manifold valves
- Pressure regulators and high-pressure fittings
- Tube-trailer and cylinder valves

## Properties: targets and release limits

| PROPERTY | TARGET | RELEASE LIMIT | UNIT | TEST METHOD |
|---|---|---|---|---|
| Hardness | **90** | **85 to 95** | Shore A | ASTM D2240 / ISO 48-4, 1 s |
| Specific gravity | **1.22** | **±0.02 of approved value** | — | ASTM D297 / ISO 2781 |
| Tensile strength | **22** | **min 18** | MPa | ASTM D412 die C / ISO 37 type 2 |
| Elongation at break | **160** | **min 120** | % | ASTM D412 die C / ISO 37 type 2 |
| Modulus at 100 % | **12** | **9 to 15** | MPa | ASTM D412 die C / ISO 37 type 2 |
| Compression set, 22 h at 150 °C | **18** | **max 25** | % | ASTM D395 method B, button |
| TR10 | **−22** | **max −20** | °C | ASTM D1329 / ISO 2921 |
| IRM 903, 168 h at 125 °C, volume change | **+8** | **max +15** | % | ASTM D471 / ISO 1817 |
| Hydrogen permeability, 23 °C | **To report** | **Reported, no limit yet** | — | ISO 2782-1 |

## Qualification plan

The grade code says what this compound is designed for. This table says what it has passed: a duty is claimed only once its report is on file. Evidence for the H2 duty: Hydrogen decompression or permeation data at the stated conditions, and the stack maker's ageing tests for fuel cells and electrolysers.

| TEST | STANDARD OR METHOD | CONDITIONS | STATUS |
|---|---|---|---|
| **Rapid decompression in hydrogen** | ISO 23936-2 Annex B adapted to 100 % H2 | 100 % H2 at 15, 30 and 87.5 MPa, 100 °C, 8 cycles at about 2 MPa/min; 5.33 mm section; target rating 0000 to 1111 | Planned |
| **Hydrogen ageing** | ISO 23936-2 Annex A method in 100 % H2 | At 100 °C and 150 °C: volume, hardness and tensile change | Planned |
| **Hydrogen permeability** | ISO 2782-1 | Hydrogen at 23 °C and 85 °C | Planned |
| **Pressure cycling** | CSA/ANSI CHMC 2 test methods, with a compressor or valve maker | 10,000 cycles between 45 and 87.5 MPa (target) | Planned |
| **Extrusion** | In-house fixture, method published with results | With and without PEEK back-up rings at 87.5 MPa | Planned |

## Processing

Press cure guide: 10 min at 180 °C. Post-cure guide: 4 h at 150 °C (optional, for lowest compression set).

## Storage and lot record

Target 4 months at or below 25 °C. Every lot ships with its Passport: results against these limits, the rheometer cure curve and the raw-material lots.

## How to read this sheet

**Target:** the value the compound is designed to reach, used until measured data exists.

**Typical:** the mean of measured production lots, stated with the number of lots. Replaces the target.

**Release limit:** the window every lot is tested against. A lot outside it does not ship.

**Method:** the standard, specimen and conditions behind each number.

## Supply

Supplied as uncured compound by the batch, with the lot Passport. Test slabs, buttons and trial quantities are available for qualification.

Tell us the fluid, the temperature range, the pressure and the seal design, and we will say whether this grade fits, and which one does if it does not.

## Pole marks

This is a reference or general grade and carries no pole mark. The red HPHT mark is for high-pressure duty at 160 °C or above; the blue HPLT mark is for sealing under pressure at −30 °C or below.

**Typical values are indicative and are not a warranty.** Targets are design values, not measured results. The user is responsible for confirming suitability in the actual application. Pascalor · Compounds with a paper trail.