



HYDROGEN SEALING TECHNOLOGIES

REPORT ON TYPE TEST

for the certification of the sealing material
according to DVGW CERT ZP 5101:2021-12



The test was carried out according to the **ZP 5101 specification**.

The material slabs are inserted into a chamber containing pure hydrogen at room temperature. The objective is to check how much hydrogen permeates through the compound.

This project by the German certification body was born with the aim of creating a real specification that regulates these applications, probably added as an optional test within the **EN549 standard**.

There is currently no acceptance limit in the legislation yet.

100% TESTED HYDROGEN COMPATIBILITY – LEAKAGE – PERMEABILITY

The table shows the results of test ZP 5101, conducted on the NBR 80 BLACK 01/ D80NBR compound to evaluate hydrogen permeation.

Property DVGW CERT ZP 5101:2021	Unit	Actual value
Thickness	mm	2,286 / 2,241
Gas	---	H ₂
Duration of evacuation (degassing)	h	> 15
Specimen temperature	°C	23
Assessed pressure range permeate-sided	MbarAbs	250- 350
Delay time	s	12.420/12.992
Permeability	(cm ³ x mm) / (m ² x24 h x bar)	88/ 83
Mean permeability	(cm ³ x mm) / (m ² x24 h x bar)	86

DVGW CERT ZP 5101 01/12/2021

Certification program:

Compatibility and permeation properties of elastomer materials for seals and diaphragms in gas appliances and installations against hydrogen for a content of up to 100 vol. % H₂. ZP 5101.

Over 20 materials tested in 100% hydrogen



FKM

FVMQ

HNBR

NBR

VMQ

LAV.EL. Gomma materials list H2 (100% Hydrogen) EN549 - ZP5101 approved

MATERIAL	HARDNESS COLOR	CODE	PERMEABILITY	CERTIFICATION n°
FKM	60 GREEN	01/T60FKM	(173 cm ³ mm / m2 24 h bar)	NG-5112CQ0367
FKM	70 BLACK	01/G70FKM	(185 cm ³ mm /m25 24 h bar)	NG-5112BS0364
FKM	70 GREEN	01/S70FKM	(172 cm ³ mm /m25 24 h bar)	NG-5112BS0365
FKM	70 GREEN	01/T70FKM	(125 cm ³ mm /m25 24 h bar)	DG-5112CQ0195
FKM	80 BLACK	01/E80FKM	(168 cm ³ mm /m25 24 h bar)	DG-5112BO0409
FVMQ	60 BLUE	01/A60FMQ	6759 cm ³ mm /m25 24 h bar)	NG-5112CQ0120
HNBR	50 BLACK	01/B50HNBR	(797 cm ³ mm /m25 24 h bar)	DG-5112DN0090
HNBR	55 BLACK	01/D55HNBR	(834 cm ³ mm /m25 24 h bar)	DG-5139CS0327
HNBR	70 BLACK	01/D70HNBR	(619 cm ³ mm /m25 24 h bar)	DG-5112CS0103
HNBR	70 YELLOW	01/I70HNBR	(425 cm ³ mm /m25 24 h bar)	NG-5112BN0160
NBR	50 BLACK	01/E50NBR	(744 cm ³ mm /m25 24 h bar)	DG-5139CR0466
NBR	60 BLACK	01/AN60NBR	(365 cm ³ mm /m25 24 h bar)	NG-5139CQ0142
NBR	60 BLACK	01/D60NBR	(414 cm ³ mm /m25 24 h bar)	DG-5112BT0579
NBR	70 BLACK	01/AS70NBR	(289 cm ³ mm /m25 24 h bar)	DG-5139CS0062
NBR	70 BLACK	01/AS70NBR	(289 cm ³ mm /m25 24 h bar)	DG-5139CS0062
NBR	70 BLACK	01/H70NBR	(387 cm ³ mm /m25 24 h bar)	NG-5112BM0548
NBR	75 BLACK	01/AM75NBR	(326 cm ³ mm /m25 24 h bar)	DG-5112CR0014
NBR	80 BLACK	01/D80NBR	(86 cm ³ mm /m25 24 h bar)	NG-5112DM0121
NBR	80 BLACK	01/AS80NBR	(265 cm ³ mm /m25 24 h bar)	DG-5112CQ0203
NBR	80 BROWN	01/AAL80NBR	(540 cm ³ mm /m25 24 h bar)	NG-5139DM0086
VMQ	70 RED	01/A70VMQ	(18282 cm ³ mm /m25 24 h bar)	NG-5112DL0442

Aware of the ever-increasing importance of reducing carbon dioxide emissions into the atmosphere and of how much the market is moving in this direction LAV.EL. Gomma has decided to undertake a test path in collaboration with the DVGW to verify the permeability/leakage of the materials currently approved for gas.



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