

Elastomers in the gas industry: standards and requirements

Elastomers in the gas industry and DVGW standards

Elastomers play an important role in the gas industry, where two EN standards from the German Association for Gas and Water (DVGW) are applied.

EN 549 and material requirements for seals and diaphragms in the gas industry

EN 549 specifies the requirements for materials used in the manufacture of seals and diaphragms for gas appliances and equipment, such as gas meters. The standard requires testing on standardized samples made from the material sheets.

The materials are classified according to their temperature range and hardness. With the revision of EN 549 and new temperature classes, the allowable operating temperature is set between -40 °C and +150 °C

Class	Operating temperature [°C]
A1	0 to 60
B1	0 to 80
C1	0 to 100
D1	0 to 125
E1	0 to 150
A2	-20 to 60
B2	-20 to 80
C2	-20 to 100
D2	-20 to 125
E2	-20 to 150

Since 2019, additional classes have been introduced:

Class	Operating temperature [°C]
A3	-30 to 60
B3	-30 to 80
C3	-30 to 100
D3	-30 to 125
E3	-30 to 150
A4	-40 to 60
B4	-40 to 80
C4	-40 to 100
D4	-40 to 125
E4	-40 to 150

Another distinction is whether the finished parts are seals or diaphragms. Different mechanical requirements apply depending on the temperature/hardness classification and intended application area.

Gummiwerk KRAIBURG offers certified NBR-based compounds for the common temperature classes B1 and B2, as well as the relevant hardness ranges H2 and H3.

We also offer DIN EN 549 certification for the 70 Shore A hardness range, which is of significant importance for use in gas appliances. Our materials are suitable for seals and diaphragms, with the exception of PP5DEZ.

EN 682 and material requirements for supply lines

EN 682 specifies the requirements for materials used in seals for supply lines and components at operating temperatures ranging from -5 °C (in special cases -15 °C) to +50 °C. The different types and their applications are as follows:

Type	Application	Operating temperature [°C]
GA	gaseous fuels	- 5 to 50
GAL	gaseous fuels	- 15 to 50
GB	liquid hydrocarbons and gaseous fuels	- 5 to 50
GBL	liquid hydrocarbons and gaseous fuels	- 15 to 50
H	Aromatic liquid hydrocarbons and gaseous fuels with gas condensates	- 5 to 50

It is important to note that the specified operating temperature ranges do not determine the actual operating temperature of the material. Instead, they define the certified and approved operating temperatures for each specific application.

The EN 682-certified compounds are well sorted in the hardness range between 60 to 93 Shore and, with the exception of the 93 Shore material, are available for the demanding GBL type.

Compliant with DIN EN 549 and EN 682 standards, our elastomer compounds are ideal for use in gas supply systems, as well as gas appliances and equipment.

Elastomers in the hydrogen sector and ZP 5101 certification program

The concept of partial integration of hydrogen into the existing gas network is becoming more and more important, especially in light of the current uncertainties in natural gas supply. A project in Baden-Württemberg, Germany, aims to isolate a local segment of the gas network, similar to an island, from the rest of the network and gradually supply it with up to 30 percent hydrogen. In the medium to long term, this proportion is expected to increase further. Over time, it is expected that this percentage will rise even further.

However, there is currently limited experience with elastomers in the hydrogen sector, especially with regard to their actual functionality and permeation properties. Although materials for gas supply and gas appliances are certified by the DVGW according to standards EN 682 and EN 549, comparable knowledge is not yet available for the hydrogen sector.

The DVGW has developed the ZP 5101 certification to evaluate materials in contact with hydrogen. This program evaluates hydrogen permeability using suitable test methods. The results can vary considerably depending on the type of elastomer.

In preparation of future requirements, Gummiwerk KRAIBURG has submitted its proven compounds, which are already certified according to EN 682 and EN 549, to the DVGW for testing in the most important hardness range. The prototype test certificates for PP7BDZ (according to EN 682) and PP7GAZ (according to EN 549) have already been supplemented to include the notation for the hydrogen permeability test.