



## THE RIGHT CHEMISTRY

### Important facts regarding the durability of chemical hoses

*As a premium industrial hose manufacturer, Semperit has a comprehensive range of chemical hoses in its portfolio. In addition to meeting the EN 12115 standard, a technical retailer and user in the chemical sector must be able to rely on the manufacturer's expert knowledge of rubber and its verifications for use. Semperit draws on more than 190 years of experience in rubber products to point out the important facts regarding the chemical resistance of rubber hoses.*



With market demands also on the rise in the chemical industry, Semperit has **expanded its overview of chemical resistance**.

The listed resistances have been extended and updated. In addition, the updated version now includes the products Flexichem UPEL, Flexichem EPDM/EPDO, TM1 and TM2.

### Influence parameters of the resistance of chemical hoses:

#### Rubber mixture of hose inner liner




The [Semperit resistance list](#) refers primarily to the product, such as e.g. Resist-E EPDM, and not directly to the base polymer, such as e.g. EPDM.

The recommendations in the resistance list are based on data from the literature, experimental data and experience with Semperit products in applications. The Semperit resistance list therefore does not necessarily coincide with other recommendations.

That is because EPDM is not always exactly the same. Every hose manufacturer has its own EPDM rubber compounds, which can vary from product to product. The reason is that a rubber

compound is made of a rubbery polymer such as EPDM or NBR, plus additives to make the mixture e.g. more weatherproof, more abrasion resistant, more durable or flame resistant.

## Medium

The question of the medium is usually not so simple to answer in practice. The **CAS number**, which defines each chemical clearly and unambiguously, is helpful. Using the **search function** , users can search for a CAS number or the name of a chemical in the [Semperit resistance list](#). In addition, the resistance list is arranged alphabetically to make searching easier.



**Chemical mixtures** are a special case when it comes to the media and **should not be used without specialist advice from Semperit**. If a Semperit chemical hose is resistant to three different chemicals, it does not automatically mean that this hose is resistant to a combination of these three chemicals. The Semperit product management team should therefore be consulted when it comes to chemical mixtures.

## Temperature of the medium

Unless a different value is given in the “Temperature” column, the current [Semperit resistance list](#) is based on a **room temperature of 25 °C**. If the user works with different temperatures that are not specified in the list, the Semperit product management team should be consulted. This is important, since the temperature of the media has a significant influence on the chemical and thus on the durability of the hose.



For example – with 20% nitric acid, the Resist E is suitable at room temperature, but at 60 °C the hose is not suitable because the chemical attacks the polymer and thus the hose lining **very quickly**. **The higher temperature greatly accelerates the chemical reaction.**

## Concentration of the medium

The concentration of the medium also has a significant influence on resistance – for example, whether sulfuric acid is used in a concentration of 2% for cleaning, or in high concentration as a process medium in the pure substance.

The following applies in the Semperit resistance list:



- **If no concentration is specified**, the resistance refers to the **pure substance** (concentration of about 100%).
- If the medium is an **aqueous solution without concentration**, it is a saturated solution with the respective medium and water. The **degree of saturation** is different for each solution. For example, the saturation for a saline solution (sodium chloride) is 36%; the solution cannot absorb more saline and is thus saturated. In the case of aqueous solutions, the resistance in the Semperit overview is up to the degree of saturation; this also means that the Semperit chemical hose is as well resistant against e.g. a 20% saline solution.

## Suitability

In the [Semperit resistance list](#), the classification for the product's suitability to the respective medium is as follows:

A ... suitable ⇒ for full and empty hose system

B ... limited suitable ⇒ e.g. only for empty hose system or short-time operation

C ... not suitable ⇒ hose material is attacked or destroyed

- ... consultation with the Semperit hose technology experts



Even with proper use, **sufficient durability does not mean unlimited durability** or retention of the original property of the hose. Exposure to many different conveyed materials can cause swelling, shrinkage and penetration of the hose material, as well as **chemical reactions** that affect the performance of the hose and conveyed material.

In general, the higher the operating temperature, the operating pressure, the flow rate, the abrasion, the duration and frequency of the exposure, the age of the hose and the contamination of the chemical product to be conveyed, the more rapid and severe these effects will be.

The information in the [Semperit resistance list](#) is only a guideline and can only be guaranteed for a limited time.

Gerhard Mahlfleisch from Semperit explains:

*“The **typical application errors** in the chemical sector are:*

- *too high temperature,*
- *too high concentration,*
- *use of a chemical mixture;*

*Users are on the safe side if they use the **Semperit resistance list** and in case of doubt, such as with the use of chemical mixtures, **consult our product management team.***

*A good piece of advice is also to use our **chemical Primus hose Resist-U UPEL P**, which can according to our resistance list be used for almost all common chemical applications.”*



## Semperit top sellers for the most important applications in the chemical industry:



### The Primus RESIST-U:

- + Premium chemical rubber hose inner liner with ultra-high-molecular-weight PE plastic film (UHMPE)
- + **suitable for most common applications in the chemical industry**
- + in compliance with EN 12115
- + **braided** reinforcements for a high degree of safety

### The proven RESIST-E:

- + Chemical rubber hose in **premium EPDM quality, available with and without spiral**
- + suitable for many applications in the chemical industry
- + in compliance with EN 12115
- + **braided** reinforcements for a high degree of safety



### The Tankmeister TM1 and TM2:

- + **Robust hoses** with (TM1) and without spiral (TM2) for fuels and oils
- + Semperit **top products for the petrochemical industry**
- + in compliance with EN 12115, EN 1761 and TRbF 131/2
- + **braided** reinforcements for a high degree of safety



There are multiple uses for chemical hoses – find the right hose for your application on our [website](#) or [contact our team](#) for expert advice.



When you choose a Semperit chemical hose, you can be sure of the **consistently high Semperit quality** and compliance with the demanding requirements of the **EN 12115 standard**.