

Our company is the world's leading manufacturer of explosion-proof safety containers from stainless steel, made for safe handling (dispensing, distributing, decanting, disposing), storage and transports of solvents (or other flammable/hazardous liquids). Our products provide safety whenever working with such substances, in labs and in industry!

Rötzmeier Sicherheitsbehälter (Rotzmeier Safety Containers) are 100% made in Germany. Most of our suppliers are our partners since decades.

Safety

Our safety products are explosion-proof due to the following features (which will be explained more in detail on the following pages):

- Flame traps
- Pressure control valves
- Self-closing devices
- Robust construction (unbreakable)

Why stainless steel, why Rotzmeier?

To protect humans, equipment and environment safety needs be the first aspect when working with flammable liquids. Liquid containers from other materials (glass, plastic, steel, aluminium, etc.) provide no safety features at all or only basic safety features. Rotzmeier safety containers provide effective and reliable safety since many decades and in nearly all industries. Besides the unique safety level our products are equal or superior for all other major aspects as well:

- Chemical resistance (stainless steel, gaskets from Teflon)
- Liquid purity (no interaction with the solvents, no diffusion)
- Total costs of ownership (product price divided by life span is low, no recurring purchasing and logistics costs)
- Sustainability (recyclability, low environmental impact, saves production and transport emissions from recurrent replacements)

Safety and purity in all processes are essential to enable you to comply with law and other regulations regarding work safety but also with norms beyond, such as GMP, ISO 14001, etc.!

Basic product information

Typical uses of our products are:

- lab containers at universities, research institutions and in industry
- storage containers
- transportation containers (UN approval)
- industrial production processes
- etc.

Features

Various features of our products provide maximum safety for users working with flammable liquids. At the same time, our products ensure effective fire and environmental protection. The use of our products is explicitly recommended by the German Occupational Safety and Health Administration (section 4.15.1 of the laboratory directive, TRGS 526).



- **Self-closing closures** (metering devices and taps): open during operation only. Close automatically by spring force after usage or when containers are dropped accidentally (e.g. in emergencies). This prevents contamination and danger due to uncontrolled spillage as well as additional fire spreading. Similarly, uncontrolled release of harmful or flammable vapors is avoided.



- **Flame arrester:** Prevents sparks from entering even when the container is open, therefore protecting the container and its content against ignition and explosion. Consists of a special stainless steel mesh (“Davy filter”) which protects liquids inside safely from sparks (e.g. coming from static electricity or mechanical strikes) and flames (e.g. from fire accidents). The flame arrester is easily removable for cleaning and/or replacement.



- **Pressure compensation:** Pressure control valves (in metering devices and screw caps) allow excess pressure inside to escape automatically and thus protect against explosion (explosion-proof containers). The mechanism is activated automatically at an excess pressure of approximately 0.3 to 0.4 barg (5 to 7 psi). Excess pressure can result from chemical reactions by the substances filled, thermal influences (e.g. solar radiation, fire) or mechanical influences (e.g. strikes). Once excess pressure escaped, the valve closes automatically again. Repairs and ongoing maintenance of other solutions (e.g. as fusible links) are not necessary.
- **Bonding / grounding:** During filling or emptying of containers electric charges can occur by static electricity. These charges can lead to sparks which cause inflammation or explosion of containers. Rotzmeier Safety Containers are fully conductive. Charges can be transferred to grounding by bonding the products.
- **Robust materials and construction:** The stainless steel used as well as the gaskets are high quality materials and very durable. If used properly, the containers can be used for decades. Our products offer high robustness and extreme breaking resistance during daily operations.
- **Overfill protection:** Whenever you use our safety funnels they prevent overfilling automatically. The funnels take only the amount of liquid that fits into the container.

Learn more about the product features? [http://www.roetzmeier.com/informations/features/!](http://www.roetzmeier.com/informations/features/)

Materials and chemical resistance of safety containers

Material:	SS 316 and SS 304 (for 20 litres +)
DIN:	X6 and X5 CrNi 18-10 CrNiMoTi 17-12-2
Certificate:	EN 10204/3.1B
Seals:	Polytetrafluoroethylene (PTFE)

For each product a technical datasheet can be downloaded from our website. It includes information on materials used, dimensions, weights, etc. The stainless steels used are characterised by particularly high resistance against nearly all substances. Our stainless steel containers allow for a much longer usage compared to containers made from other materials (e.g. steel or plas-

tic). A chromium surface of metal oxides and hydroxides (passive layer) separates and protects the stainless steel from aggressive substances ("passive layer"). The layer typically recovers itself in the event of a mechanical damage of its surface. A selection of the range of substances that can be used in our stainless steel containers can be found in the table below ("technically pure substances", i.e. no mixtures). Resistance may also be given for mixed substances - since the resulting chemical reactions depend on individual conditions, a case to case evaluation need to be done by the user.

Limitations regarding the resistance of stainless steel exist with substances which destroy the passive layer, e.g. a few chlorine, chlorine compounds or reducing acids. The company ThyssenKrupp Nirosta GmbH, supplier of stainless steels our company uses, publishes lists regarding the chemical resistance of various types of stainless steel (downloadable on our website). The German Institute for Standardization also publishes a resistance list (DIN 6601, so-called positive list). The table below shows the chemical resistance of stainless steel types used for our products against major substances and is based on the two lists mentioned above. Known limitations have been added to column "Remarks".

The conical special gaskets of our safety containers are made of polytetrafluoroethylene (PTFE). PTFE provides high chemical resistance and is subject virtually only to mechanical abrasion. The following table includes the resistance of PTFE for a variety of substances.

Substance	SS316	SS304	PTFE	Remarks
2-propanol (isopropanol IPA)	0	0	0	
Acetic acid	0	0	0	K 50%, T 20%
Acetone	0	0	0	
Acetonitrile	0	0	0*	
Alcohol	0	0	0	
Ammonia (ammonium hydroxide)	0	0	0	T 50°C
Benzene	0	0	0	
Bleaching powder, dry	0	0	0	T 20°C
Boric acid	0	0	0	
Butanone (methyl ethyl ketone, MEK)	0	0	0	
Carbon tetrachloride (carbon tetrachloride)	0	0	0	Without water
Caustic potash (potassium hydroxide)	0	0	0	K < 50%
Caustic soda (sodium hydroxide, sodium hydroxide)	0	0	0	K < 25%, T 20°C
Chlorobenzene, anhydrous	0	0	0	
Chloroform (trichloromethane), anhydrous	0	0	0	
Cyclohexane	0	0	0	
Dichloroethane (ethylene chloride), anhydrous	0	0	0	
Diesel	0	0	0	
Dimethylsulfide	0	0	0*	
Ethanol	0	0	0	
Ethyl acetate	0	0	0	
Ethyl alcohol	0	0	0	
Ethyl chloride, anhydrous	0	0	k.A.	T boiling
Ethylene chloride (dichloroethane), anhydrous	0	0	0	
Ethyl ether	0	0	0	
Ethylglycol	0	0	0	T 20°C

Formaldehyde (formalin, methylaldehyd)	0	0	0	K 40%
Formalin (formaldehyde, methylaldehyd)	0	0	0	
Formic acid	0	0	0	K <10% / K >97%, T 20°C
Gasoline	0	0	0	
Isooctane	0	0	0	
Isopropanol IPA (2-propanol)	0	0	0	
Lactic acid	0	0	0	T 20°C
Methanol (methyl alcohol)	0	0	0	
Methylaldehyd (formaldehyde, formalin)	0	0	0	
Methyl alcohol (methanol)	0	0	0	
Methyl benzene (toluene)	0	0	0	
Methylene chloride, anhydrous, cooking	0	0	k.A.	
Methyl ethyl ketone, MEK (butanone)	0	0	0	
n-Hexane	0	0	0	
n-Pentane	0	0	o.A.	
Nitric acid	0	0	0	a) K <66%, T 20°C b) K <37%, T boiling
Petroleum ether	0	0	0	
Phosphoric acid	0	0	0	a) K <70%, T 20°C b) K <10%, T boiling
Potassium hydroxide (caustic potash)	0	0	0	K < 50%
Sodium chloride (table salt)	0 L	0 L	0	T 20°C
Sodium hydroxide (caustic soda)	0	0	0	K < 25%, T 20°C
Sulfur chloride (Dichlorodisulfane)	0	0	k.A.	
Sulfuric acid	1	0	0	K 7,5%, T 20°C
Table salt (sodium chloride)	0	0	0	T 20°C, L
Tannin (tannic acid)	0	0	0	K 50%
Tartaric acid	0	0	0	K < 50%, T 20°C
Tetrachloromethane (carbon tetrachloride)	0	0	0	Without water
Tetrahydrofuran THF (flashpoint <21°C)	0	0	0	T 20°C
Toluene (methyl benzene)	0	0	0	
Trichloromethane (chloroform)	0	0	0	
Vinegar	0	0	0	

0 = no restrictions, 1 = limited use, * experience based evaluation

K = Concentration, T=Temperature, L = Risk of localised corrosion (pitting)

The data is based on existing test results - unlisted concentrations or temperature conditions do not automatically imply non-resistance!

Sources: "Chemical resistance of stainless steels ®", ThyssenKrupp Nirosta GmbH
"Positive list of liquids, DIN 6601," German Institute for Standardization (DIN e.V.)

In practise, mixtures or impure substances are often used. Small impurities may significantly affect the chemical risk profile. Since the individual operating conditions are not known to us, the testing for chemical resistance is in the responsibility of the user and should always be ensured before using it.

Questions about the materials? Visit [http://www.roetzmeier.com/informations/compare/!](http://www.roetzmeier.com/informations/compare/)

Or the chemical resistance? [http://www.roetzmeier.com/informations/resistance/!](http://www.roetzmeier.com/informations/resistance/)

Norms and regulations

Safety Containers made by Rötzmeier meet the technical regulations for flammable liquids (TRbF 60, german standard) which define requirements for hazardous goods packaging (transportable containers up to 450 litres volume), their transportation and the filling of flammable liquids. Our high quality production standards and quality management processes also meet other relevant norms and specifications such as of the Bundesanstalt für Materialprüfung und –forschung (BAM - Federal Institute for Materials Research and Testing, responsible for the certification of hazardous goods packagings), the TÜV (Technical Inspection Agency), FM (Factory Mutual - U.S. counterpart for TÜV), etc.

More about norms and regulations: [http://www.roetzmeier.com/informations/safetystandards/!](http://www.roetzmeier.com/informations/safetystandards/)

Transport of hazardous goods (ADR, RID, IMDG-Code, GGVSEB, etc.)

Certified packaging with UN approval has to be used for the transport of hazardous goods on public traffic routes (road, rail, ship, aircraft). The German Federal Institute for Materials Research and Testing (BAM) has certified (confirmed by annual audits) that our safety transportation containers are ideally suited for the transport of hazardous goods. The certification includes all classes of hazardous goods (packing group X). Our safety transportation containers (available with 1, 2, 5, 10 and 25 litres volume) are not equipped with a pressure control valve, since this might eventually allow liquids to drain off in the event of an accident (however, if required for your needs, we have the approval to install pressure control valves at our safety transportation containers as well).

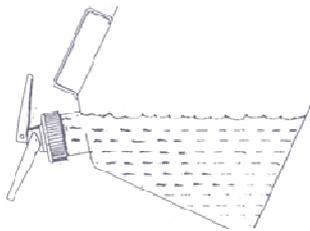
Questions about dangerous goods? [http://www.roetzmeier.com/informations/safetystandards/!](http://www.roetzmeier.com/informations/safetystandards/)

Safety transportation containers: [http://www.roetzmeier.de/products/safetycansfortransport/!](http://www.roetzmeier.de/products/safetycansfortransport/)

Note: All information in this document have been compiled carefully and to our best knowledge. The objective is to provide a short and simple overview of uses, features and advantages of stainless steel safety containers as well as to introduce and describe relevant legal standards. We would be happy to personally discuss any detailed question with you! The document raises no obligation or liability for the author. In cases of doubt, legal documents and technical rules need to be considered as prior to this document and appropriate testing need to be performed.

Handling instructions

Emptying



When emptying containers air needs to flow into the container while liquid flows out. Our safety containers ensure that both takes place. When using containers with self-closing metering device the container should be tilted only as much as shown in the illustration on the left. If the container is tilted too much (i.e. the metering device is far below the liquid level) air can not enter into the container sufficiently and liquid will flow only erratically.

In case of our safety containers with self-closing tap air can enter through an additional ventilation opening. Our taps can be below the liquid level without any problems. Therefore, safety canisters with a tap can permanently be stored horizontally, e.g. in safety cabinets, shelves, etc.

Avoid spilling

Our safety containers are designed to offer a total volume greater than the denominated volume. This additional ullage is important to serve as expansion space in the event of significant fluctuations in surrounding temperatures (e.g. when solvents stored outside in cold weather are transferred into a heated building). Do not fill the container beyond the nominal volume! The ullage could otherwise be too small - in extreme cases liquid could eject via the pressure control valve. If safety transportation containers are used, additional hazardous goods regulations regarding filling limits might be applicable.

Cleaning

If different substances should be used in the same safety container, it should be cleaned thoroughly before use. If undone, a mixture of different substances could cause uncontrolled chemical reactions. Eventually a mixture may arise, which might harm the container material.

For cleaning, an in-depth rinsing is recommended. This may include a sterilisation based on an autoclave process. To ensure the material used for the gaskets of the containers (PTFE) is not affected, temperatures well above 200°C should be avoided.

Generally, our products require no maintenance. Nevertheless, it is important, to check tightness and operability of the containers in appropriate intervals. E.g. the use of sticky substances could limit or impair the function of the gaskets or glue the flame trap. Please take care that the substances you fill do not contain hard particles. They might be shut between the gaskets of metering devices respectively taps and result in leakage. In most cases you can solve this easily. Please press the black lever and flush the device thoroughly. If available, you can also use compressed air.

Maintenance and Repair

Regular review of the container functions is inferred by the use of potentially explosive liquids. The audit cycle - if not mandatory - should depend on the risk potential and intensity of use.

If parts are damaged, they may be sent in to us for repair. If you prefer to perform a repair yourself please use our original spare parts only. When sending in containers to us they need to be fully cleaned (inside and outside) as any residual of flammable liquids would make welding work risky. Contaminated safety containers / -funnels must be cleaned at the expense of the sender.

To avoid impact of extraneous rust do not use steel tools when working with stainless steel material!