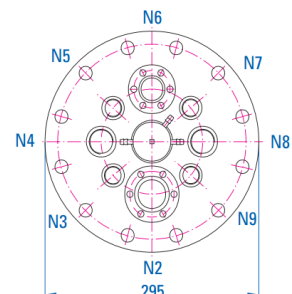
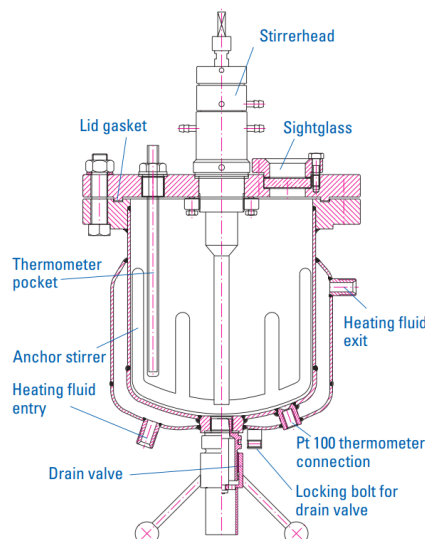


As strong as steel & as corrosion-resistant as glass



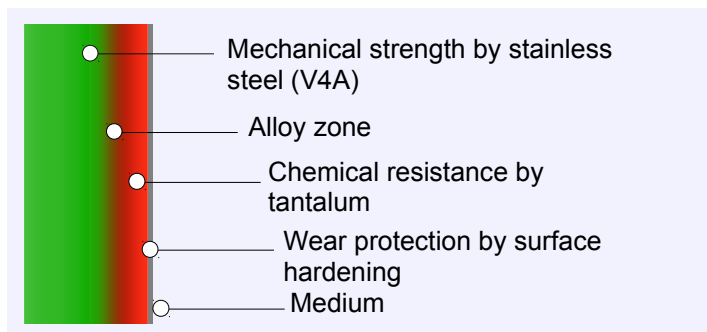
- N1 Port, central, Ø48.5 with stirrerhead
- N2 Sightglass DN48
- N3 Port, M24 x 1.5, with pressure gauge
- N4 Port, M33 x 1.5, with plug
- N5 Port, M24 x 1.5, with excess pressure valve
- N6 Illumination glass, DN30
- N7 Port, M24 x 1.5, with plug
- N8 Port, M33 x 1.5, with plug
- N9 Port, M24 x 1.5, with thermometer pocket

JUCHHEIM cocoon™ reactors are the ultimate solution for pressure reactors in the chemical and pharmaceutical research and development.

They are primarily used to control the reaction under pressure or in vacuum. The reactors are suitable for hydrogenation, polymerisation or catalyst research in chemical laboratories and small-scale production in pilot plants in the chemical and pharmaceutical industry.

cocoon™ reactors offer excellent corrosion resistance while maintaining the mechanical properties of stainless steel. The wetted surface consists of pure defect-free tantalum. Therefore, the corrosion resistance exceeds that of stainless steel, titanium, zirconium and special alloys such as Hastelloy®.

The special feature of cocoon™ is the homogeneous wall structure.



Wall construction of a cocoon™ reactor.

The figure shows a cross-section of the cocoon™ reactor wall structure. As the transition between the materials is fluent, spalling of the functional layer is not possible.

Features and advantages

- Superior corrosion-protection properties, similar to glass
- Resistant to HCL, aqua regia, chloride corrosion
- More resistant and cheaper than Hastelloy®
- Sturdier than enamel
- High abrasion resistance
- High biocompatibility
- Compatible with the JUCHHEIM classic modular reactor construction system

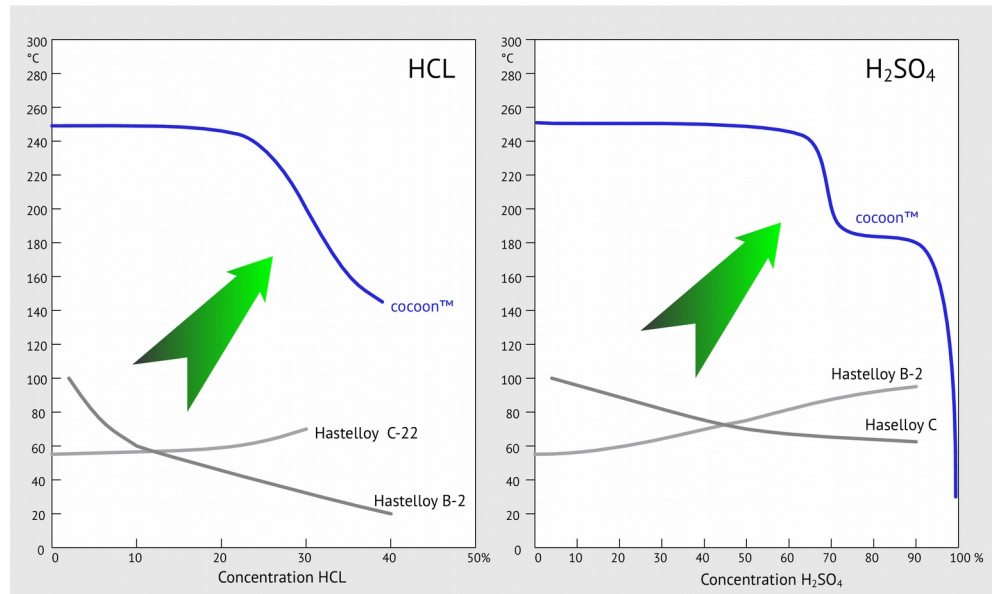
cocoon™ reactors are resistant to sulphuric acid in concentrations up to 99% below 150°C and they are used at temperatures up to 260°C. The corrosion below 205°C is insignificant. The reactors are far superior to any other available material in H₂SO₄ concentrations of 0 to 90% and temperatures of 0 to 250°C. The reactors are resistant to hydrochloric acid at 150°C up to 35% and at 200°C up to 25%.

cocoon™ reactors are extremely robust against nitric acid as well, in concentrations up to 98% and temperatures up to 100°C.

The resistance to bases is similar to that of borosilicate glass.

Fields of application

- Reactions under pressure and vacuum
- Polymerisation
- Organic synthesis
- Crystallisation and precipitation
- Catalytic research
- Gas injection reactions, hydrogenation
- Chemical process development and scale-up
- Formulation and product development
- Small-scale production in the chemical and pharmaceutical industry



Acid resistance of JUCHHEIM cocoon™ in comparison to Hastelloy® reactors

The smooth all-metal surface does not absorb or retain any organic compounds and is easy to clean. Optimum wear resistance, similar to that of ceramics, is ensured by an optionally surface hardening coating.

cocoon™ reactors are the preferred solution for processes in the food and pharmaceutical industry, where even the smallest amount of metallic contaminants is unacceptable and a cross-contamination of products from different batches has to be prevented.

The optimal heat transfer facilitates rapid temperature cycles in order to improve process cycle time and throughput.

cocoon™ reactors with their extremely good corrosion-protection properties (due to the most corrosion resistant metal commercially available), define the Gold Standard of reactor technology.

Class	Medium	Concentration	Temperature range	Chemical resistant
Inorganic acids	Hydrochloric acid	< 30 %	< 190 °C	✓
	Sulphuric acid	< 98 %	< 190 °C	✓
	Nitric acid	< 65%	< 190 °C	✓
	Phosphoric acid	< 85 %	< 150 °C	✓
	Hydrofluoric acid	< 60 %	-	-
Organic acids	Acetic acid	< 100 %	< 150 °C	✓
	Oxalic acid	< 10 %	< 100 °C	✓
	Lactic acid	< 85 %	< 150 °C	✓
	Tartaric acid	< 20 %	< 150 °C	✓
Bases	Sodium hydroxide solution	< 5 %	< 100 °C	✓
	Caustic potash	< 5 %	< 100 °C	✓
	Ammonia solution	< 17 %	< 50 °C	✓
	Sodium carbonate	< 20 %	< 100 °C	✓

Corrosion behaviour towards acids and bases

No existing material is resistant to all substances under any circumstances. This, by all means is also true for our reactors. The following limitations are known:

Strong alkaline solutions, molten salts, fuming sulphuric acid (oleum), fluorine, hydrogen fluoride, acidic solutions containing fluoride ions, hydrofluoric acid, molten sodium hydroxide, potassium hydroxide. In case of doubt, please consult us or request a test sample.

Corrosion resistance to gases is also excellent.

Gas	Temperature	Chemical resistant
Ammonia	< 700 °C	✓
Noble gases	-	✓
Carbon monoxide	< 1.100 °C	✓
Carbon dioxide	< 500 °C	✓
Hydrocarbons	< 800 °C	✓
Oxygen and air	< 300 °C	✓
Nitrogen	< 700 °C	✓
Steam	< 200 °C	✓
Hydrogen	< 340 °C	✓

Corrosion behaviour towards gases

The cocoon™ reactors are available in volumes of 1, 2, 5, 10, 20 and 30 litres. Custom designs are possible.

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