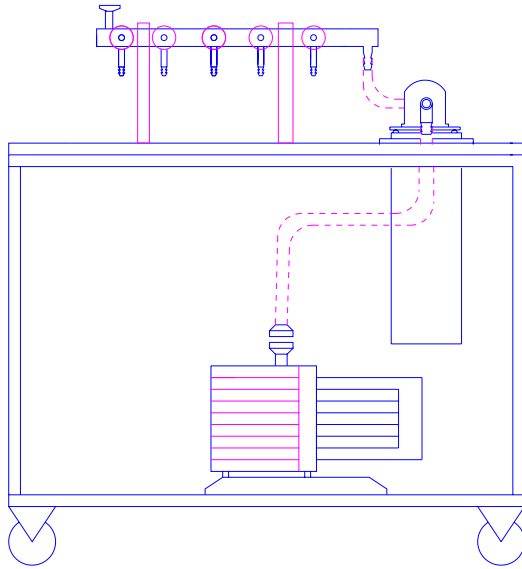
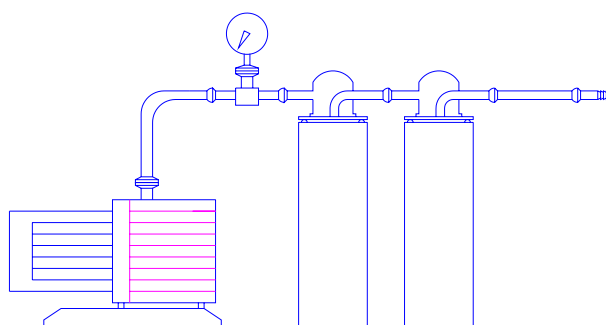


Cold trap for the vacuum technology



Cold traps: construction, operation and principles

Cold traps are used in conjunction with vacuum pumps to collect condensation produced from humidity or solvents and these cold traps can be used for many different tasks. The most common application is collecting condensation produced from humidity or solvents from rotating discs, vacuum pumps or high vacuum systems that use oil diffusion or turbo-molecular pumps. In this case a common coolant such as liquid nitrogen (LN₂) or dry-ice (CO₂) with acetone is normally used.



Another application is the production of condensation from specific substances at a constant, predefined temperature. This can be realised by using a coolant at a constant, predefined temperature, a thermostat or a cold gas system.

Cold traps can be manufactured from glass or metal. The use of glass is advantageous in the chemical sector and when producing condensation from solvents, due to its resistance to chemicals. The cold traps listed in this catalogue are produced solely from 3.3-type borosilicate glass, in compliance with DIN/ISO (DURAN made by Schott). The mechanical design takes into account the wall thickness for use under vacuum.

Material - glass

All the glassware produced by KGW - ISOTHERM are made of borosilicate glass 3.3 DIN/ISO 3585. The glass has the following characteristics:

| | | |
|--------------------------|----------------------------|--|
| Chemical characteristics | hydrolytic resistance | : according to DIN-ISO 719 (98°C) |
| | acid resistance | : according to DIN12116, acid class 1 |
| | acid resistance | : according to DIN-ISO 1776 |
| | alkaline resistance | : according to DIN 52322 alkaline |
| | resistance class | : according to DIN 52322-A2 : according to ISO 695-A2 |
| Physical characteristics | linear expansion factor | : $3,3 \times 10^{-6}$ 1/K (at 20°C-300°C) |
| | density | : 2,23 g/cm ³ |
| | specific thermal capacity | : 910 J/kg K |
| | transformation temperature | : 525 °C |

Admissible Operation Conditions for cold traps made of glass

| | |
|-------------------------|-------------------------|
| Temperature range | -200°C to +200 °C |
| Pressure range standard | vacuum to atm. pressure |

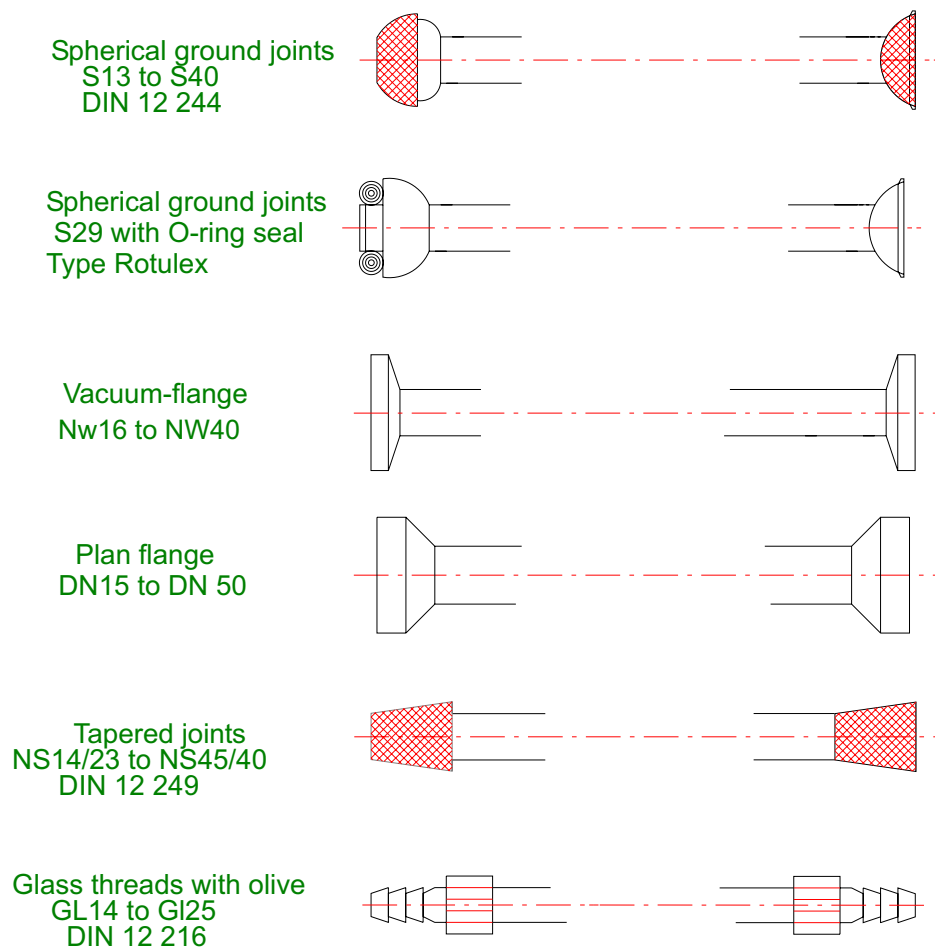
Standards and Guidelines

All of the KGW glassware are manufactured considering "Guideline of pressure devices", directive 97/23 EC and DIN 12492 "Equipment with vacuum insulation". Under the condition that there are any standards for joint parts such as spherical ground joints or conical ground joints, those will be utilised (e.g. DIN 12242-1 and DIN 12244-1).

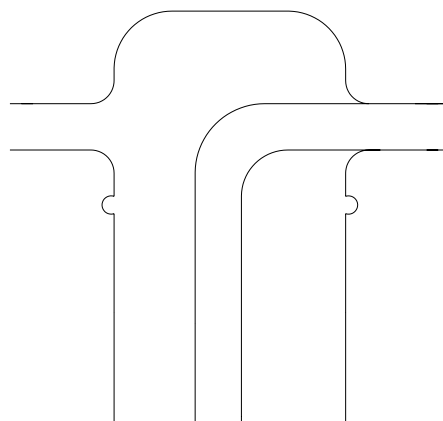
Vacuum connection Different versions

All cold traps made from glass can be manufactured with different connections. The types of connection listed here are subject to standards or norms, so that they are guaranteed to be compatible with other products and this presents the user with a variety of connection options. As the connection option product pallet is far too extensive for a standard pallet, only cold traps with a fitted connection are shown in this catalogue, however these can be altered without incurring any additional expenditure. The most common connections used in the vacuum sector with glass cold traps are small NW 16 to NW 40 flanges, glass threads with screw-on caps and GL 14 to GL 25 olives, S 19 to S 40 spherical ground joints, NS 14/23 to NS 45/40 tapered joints and a spherical ground joint with an S 29 Rotulex O-ring seal. There are standard accessory parts available for all these types of connections.

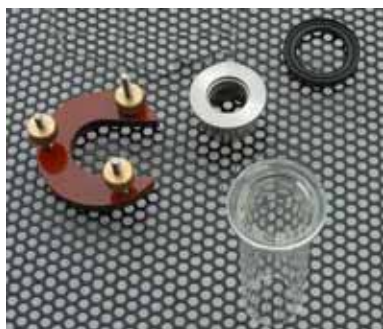
Connection program for cold traps



Cold trap



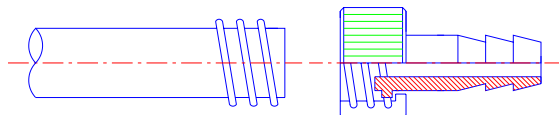
Accessories for vacuum connectors



Glass flange KF NW as vacuum connector

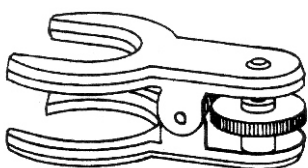
| Vacuum flange | KF 10/16 | KF 20/25 | KF 32/40 |
|-----------------------|----------|----------|----------|
| Glass flange | 17310 | 17311 | 17312 |
| Pertinax clamp | 17315 | 17316 | 17317 |
| Centering- and O-ring | 17320 | 17321 | 17322 |

Plastic lid with PTFE olive as vacuum connector



| Olive with screw-on cap | Olive diameter | Art.No. |
|-------------------------|----------------|---------|
| GL 14 | 8 | 17330 |
| GL18 | 10 | 17331 |
| GL25 | 13 | 17332 |

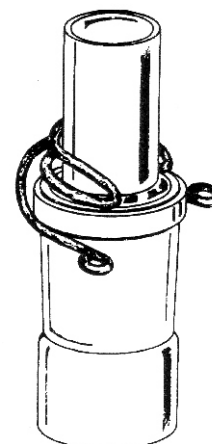
Fork clamps for spherical joints with tightening screw



| Spherical ground joints | Art.No. |
|-------------------------|---------|
| S18 | 17340 |
| S29 | 17341 |
| S40 | 17342 |

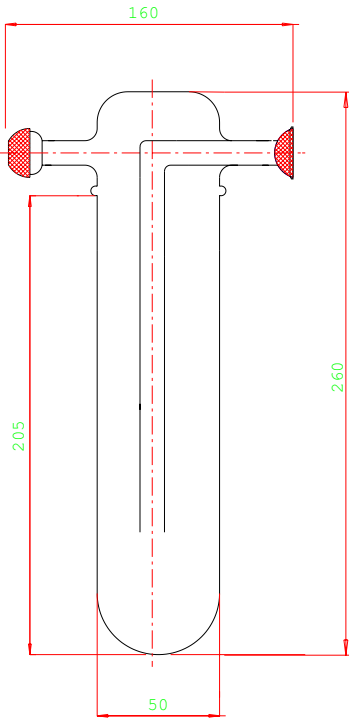
Clips for conical joints made of nichrome wire

| Tapered joints | Art.No. |
|----------------|---------|
| NS 14/23 | 17350 |
| NS 19/26 | 17351 |
| NS 29/32 | 17352 |
| NS 45/40 | 17353 |

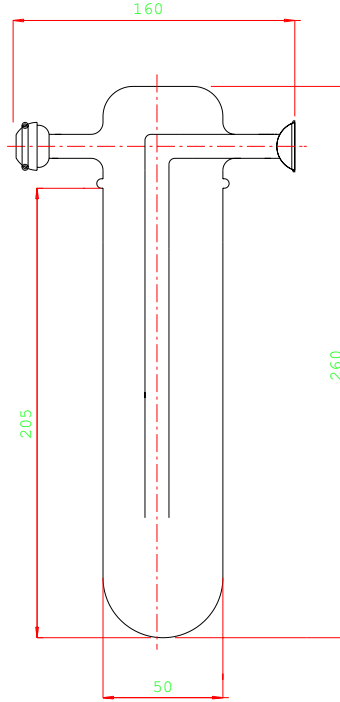


Cold Traps (cold finger condenser)

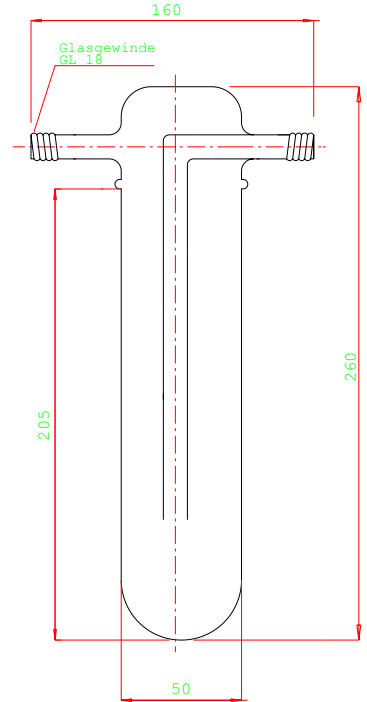
Simple cold traps, which are also known as cold finger condensers, are used in standard applications in conjunction with vacuum pumps and the condensation is forced out of the humidity or solvents used in the chemical applications. The cold trap is used to protect the vacuum pump in this case and the speciality of this type of construction is that the user does not need to use a stand to hold the cold trap. The cold trap has a rim, which is hung inside the Dewar-flask's support ring. The cold trap can be changed very quickly without any problems arising.



Cold trap S 29 with spherical joints S 29



Cold trap S 29 O with spherical joints S 29 and O-ring seal



Cold trap S 29 GL with threaded glass joint GL 18 and PTFE olive

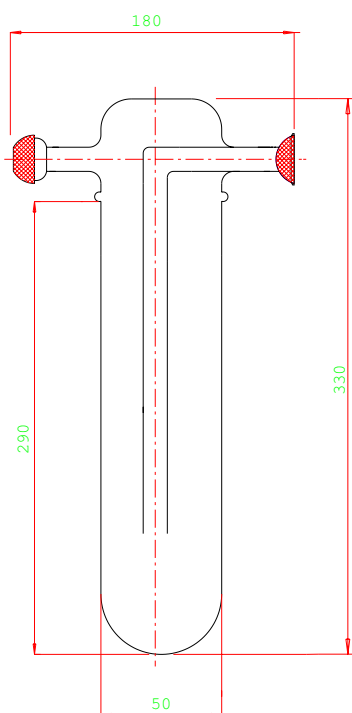
| Cold trap complete with Dewar and plastic ring | Condensate capacity | Cooling capacity | Art.No. |
|--|---------------------|------------------|----------------|
| Type KF 29-K | 150 ml | 1000 ml | 1731 |
| Type KF 29-OK | 150 ml | 1000 ml | 1735 |
| Type KF 29-GL | 150 ml | 1000 ml | 1740 |
| Components | | | Art.No. |
| Cold trap S 29 | 150 ml | | 1732 |
| Cold trap S 29 O | 150 ml | | 1736 |
| Cold trap S 29 GL | 150 ml | | 1741 |
| Plastic ring | | | 1733 |
| Dewar Type 12 C | | | 10214 |



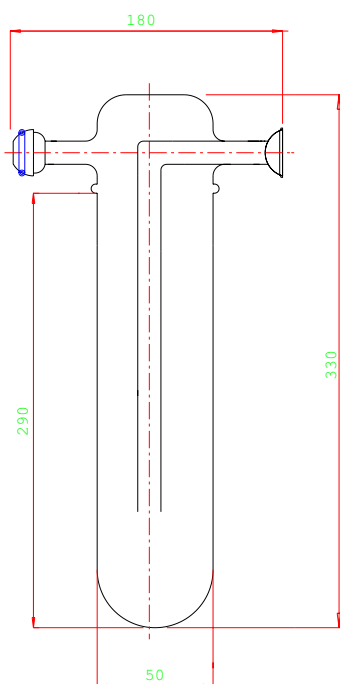
Cold trap complete Type KF 29-K

Cold traps long version (cold finger condenser)

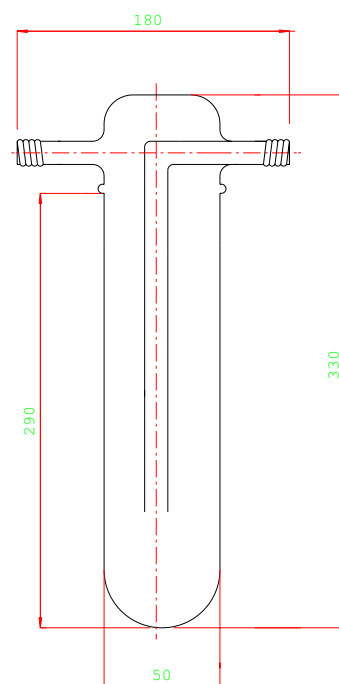
These cold traps are constructed in the same way as standard cold traps. The condensation area in these cold traps has been extended in order to trap a greater quantity of condensation. In addition to this, these complete cold traps also have a larger plastic ring and a bigger Dewar-flask.



Cold trap SL 29 with spherical joints S 29



Cold trap SL 29 O with spherical joints S 29 and O-ring seal



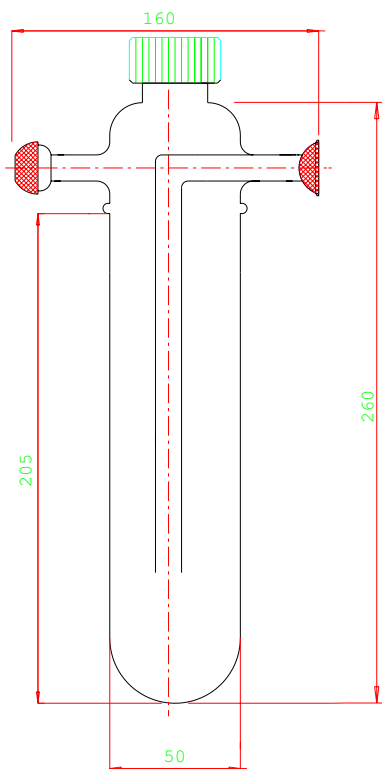
Cold trap SL 29 GL with threaded glass joint GL 18 and PTFE olive

| Cold trap complete with Dewar and plastic ring | Condensate capacity | Cooling capacity | Art.No. |
|--|---------------------|------------------|---------|
| Type KFL 29-K | 250 ml | 2000 ml | 17360 |
| Type KFL 29-OK | 250 ml | 2000 ml | 17361 |
| Type KFL 29-GL | 250 ml | 2000 ml | 17362 |
| | | | |
| Components | | | Art.No. |
| Cold trap SL 29 | 250 ml | | 17365 |
| Cold trap SL 29 O | 250 ml | | 17366 |
| Cold trap SL 29 GL | 250 ml | | 17367 |
| Plastic ring L | | | 1733-L |
| Dewar Type 18 C | | | 10220 |

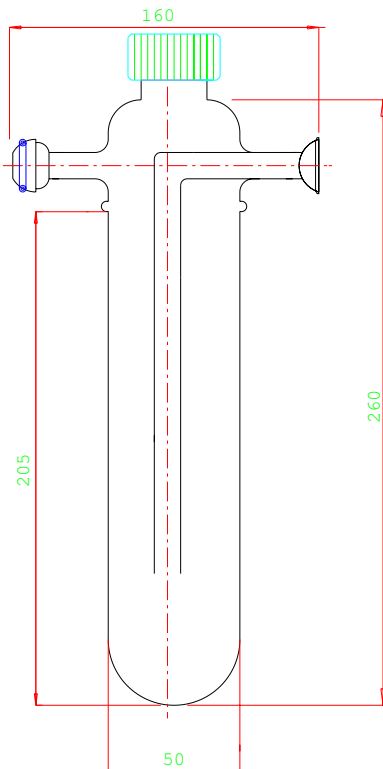


Cold traps fitted with a spout (cold finger condenser)

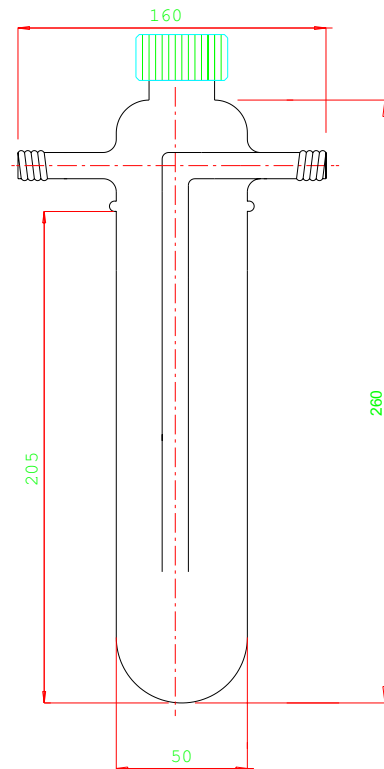
An upgraded version is a cold trap fitted with a spout. These cold traps are constructed in the same way as standard cold traps but have a GL 32 glass thread together with a screw-on cap, which is the actual spout. This spout enables the condensation to be simply poured out of the cold trap and the cold trap is also simple and easy to clean.



Cold trap S 29-A with spherical joints S 29



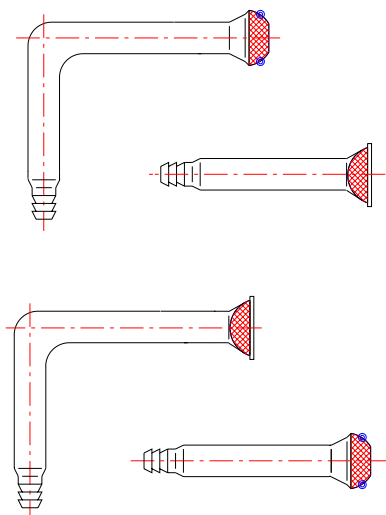
Cold trap S 29 O-A with spherical joints S 29 and O-ring seal



Cold trap S 29 GL-A with threaded glass joint GL 18 and PTFE olive

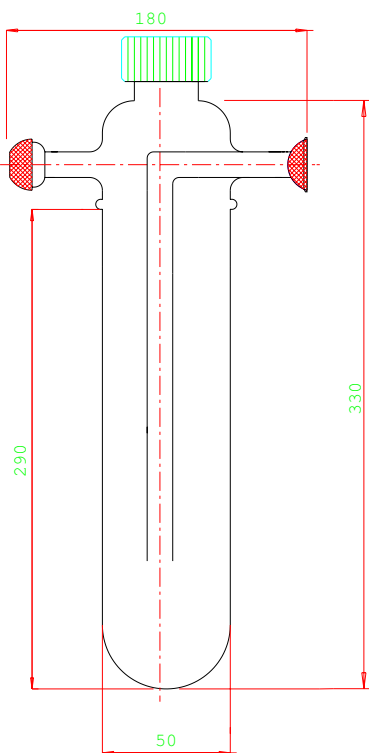
| Cold trap complete with Dewar and plastic ring | Condensate capacity | Cooling capacity | Art.No. |
|--|---------------------|------------------|----------------|
| Type KF 29-K-A | 150 ml | 1000 ml | 17370 |
| Type KF 29-OK-A | 150 ml | 1000 ml | 17371 |
| Type KF 29-GL-A | 150 ml | 1000 ml | 17372 |
| Components | | | Art.No. |
| Cold trap S 29-A | 150 ml | | 17375 |
| Cold trap S 29 O-A | 150 ml | | 17376 |
| Cold trap S 29 GL-A | 150 ml | | 17377 |
| Plastic ring | | | 1733 |
| Dewar Type 12 C | | | 10214 |

Adapters you can see on page 16

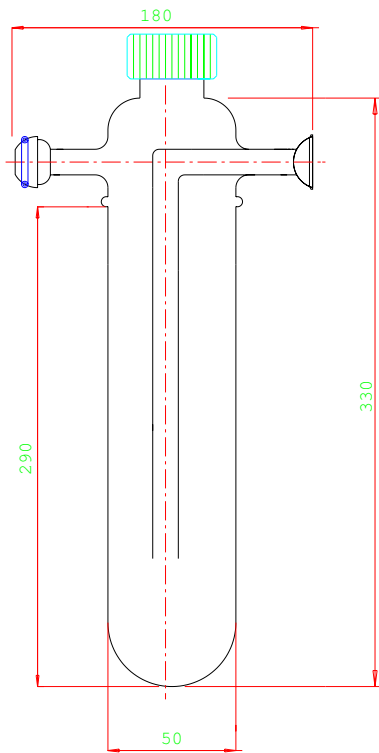


Cold traps long version with spout (cold finger condenser)

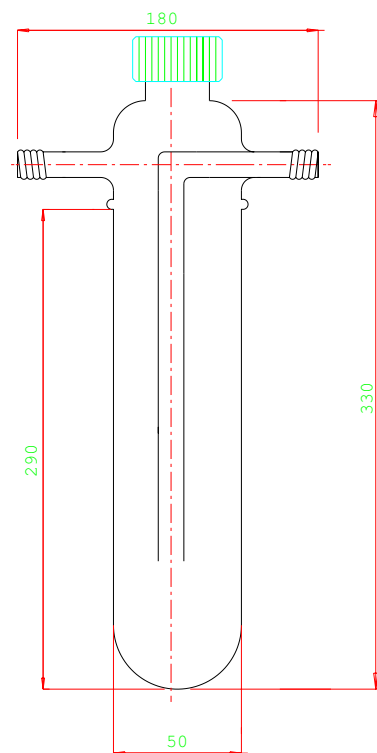
An upgraded version is a long version cold trap fitted with a spout. These cold traps are constructed in the same way as standard cold traps but have a GL 32 glass thread together with a screw-on cap, which is the actual spout. This spout enables the condensation to be simply poured out of the cold trap and the cold trap is also simple and easy to clean.



Cold trap SL 29-A with spherical joints S 29



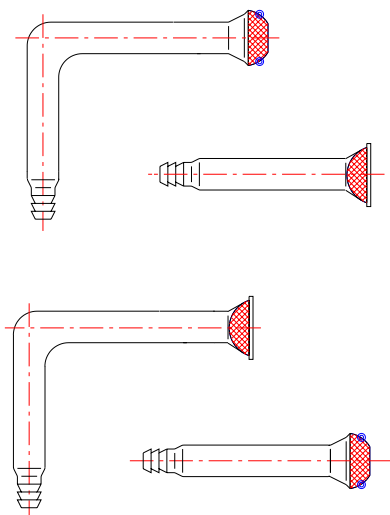
Cold trap SL 29 O-A with spherical joints S 29 and O-ring seal



Cold trap SL 29 GL-A with threaded glass joint GL 18 and PTFE olive

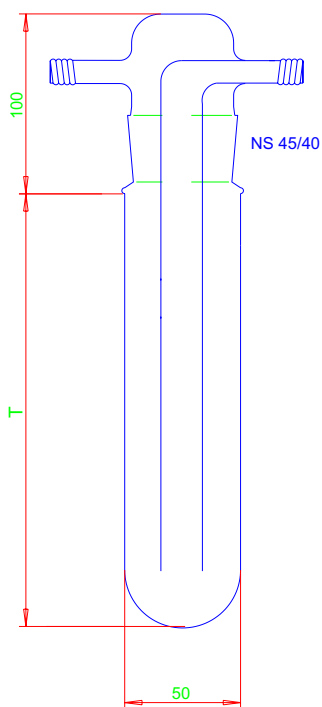
| Cold trap complete with Dewar and plastic ring | Condensate capacity | Cooling capacity | Art.No. |
|--|---------------------|------------------|----------------|
| Type KFL 29-K-A | 250 ml | 2000 ml | 17380 |
| Type KFL 29-OK-A | 250 ml | 2000 ml | 17381 |
| Type KFL 29-GL-A | 250 ml | 2000 ml | 17382 |
| Components | | | Art.No. |
| Cold trap SL 29-A | 250 ml | | 17385 |
| Cold trap SL 29 O-A | 250 ml | | 17386 |
| Cold trap SL 29 GL-A | 250 ml | | 17387 |
| Plastic ring L | | | 1733-L |
| Dewar Type 18 C | | | 10220 |

Adapters you can see on page 16

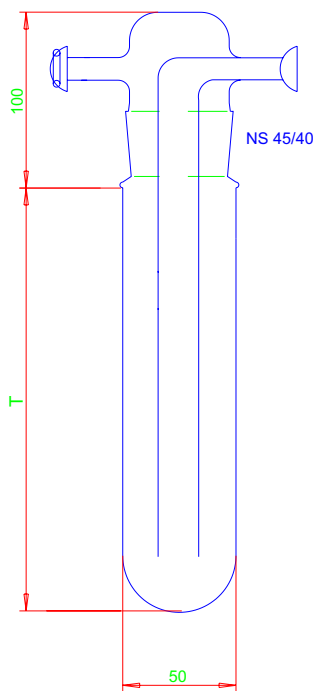


Cold traps, two sections, in standard and long versions

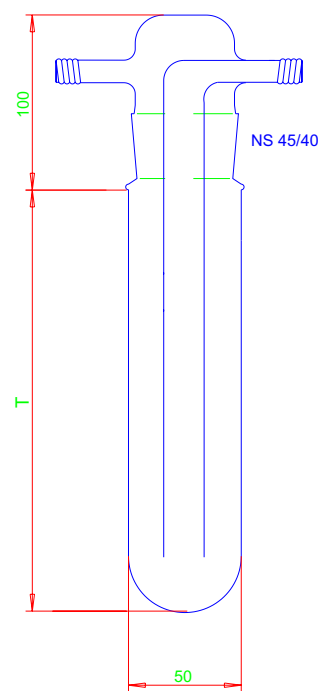
A special version is the two section cold trap that is produced in both standard and long versions and has a NS 45/40 taper joint as the connection part. This type of cold trap enables the condensation area to be separated from the upper section of the cold trap. This ensures that the removal of the condensation and the cleaning of the cold traps can be carried out very easily. This version is also suitable for when a cold trap has to be permanently installed inside an apparatus, so that only the lower section of the cold trap has to be removed in order to empty out the condensation. The NS45/40 connecting piece is secured in place using a spring steel clamp and this is included in our scope of delivery.



Cold trap S 29-Z with spherical joints S 29

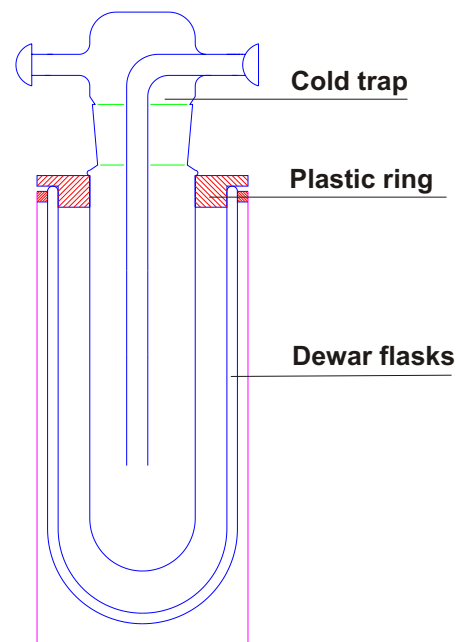


Cold trap S 29 O-Z with spherical joints S 29 and O-ring seal



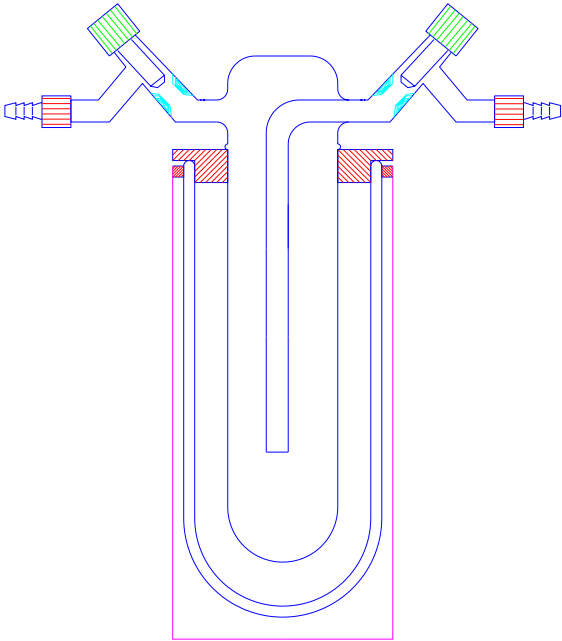
Cold trap S 29 GL-Z with threaded glass joint GL 18 and PTFE olive

| Cold traps in standard, two section with Dewar and plastic ring | length T | Condensate capacity | Cooling capacity | Art.No. |
|--|----------|---------------------|------------------|---------|
| Type KF 29-K-Z | 200 | 150 ml | 1000 ml | 17400 |
| Type KF 29-OK-Z | 200 | 150 ml | 1000 ml | 17401 |
| Type KF 29-GL-Z | 200 | 150 ml | 1000 ml | 17402 |
| Components | | | | |
| Cold trap S 29-Z | 200 | 150 ml | | 17405 |
| Cold trap S 29 O-Z | 200 | 150 ml | | 17406 |
| Cold trap S 29 GL-Z | 200 | 150 ml | | 17407 |
| Plastic ring | | | | 1733 |
| Dewar Type 12 C | | | | 10214 |
| Cold traps in long version, two section with Dewar and plastic ring | | | | |
| Type KFL 29-K-Z | 290 | 250 ml | 2000 ml | 17410 |
| Type KFL 29-OK-Z | 290 | 250 ml | 2000 ml | 17411 |
| Type KFL 29-GL-Z | 290 | 250 ml | 2000 ml | 17412 |
| Components | | | | |
| Cold trap SL 29-Z | 290 | 250 ml | | 17415 |
| Cold trap SL 29 O-Z | 290 | 250 ml | | 17416 |
| Cold trap SL 29 GL-Z | 290 | 250 ml | | 17417 |
| Plastic ring | | | | 1733-L |
| Dewar Type 18 C | | | | 10220 |

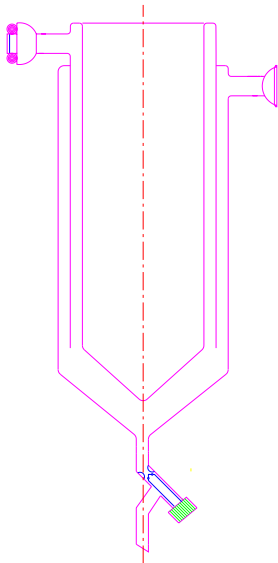


Cold traps, produced to customer specifications

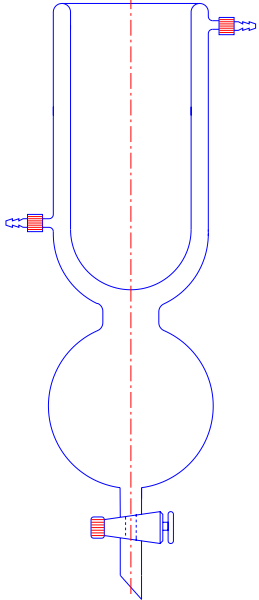
The speciality of cold traps made from glass is the number of versions available, which offer a multitude of design options when the mechanical and thermal stresses are taken into consideration and KGW-ISOTHERM specialises in producing customer specific cold traps. Please send us a drawing or a description and we will work out a proposal together with a drawing.



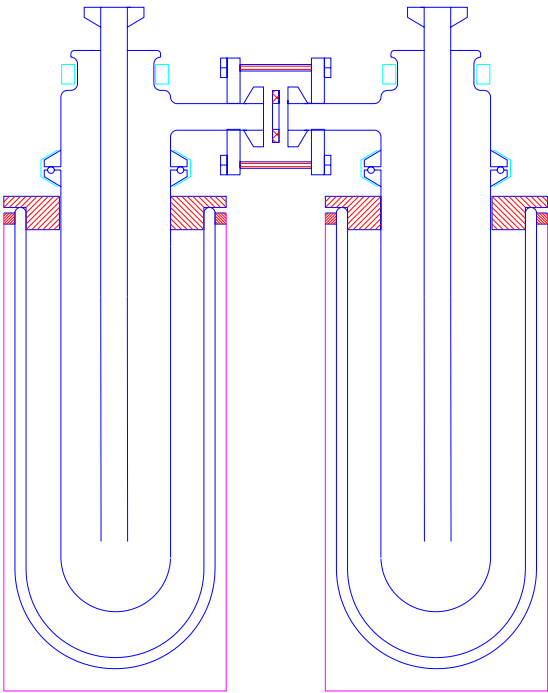
Type 1



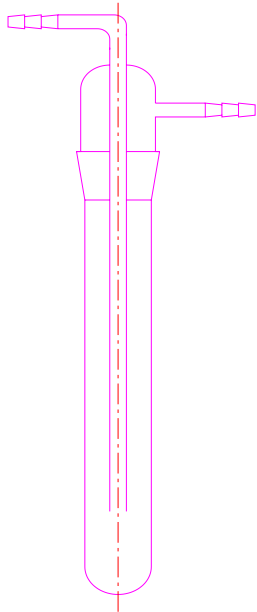
Type 2



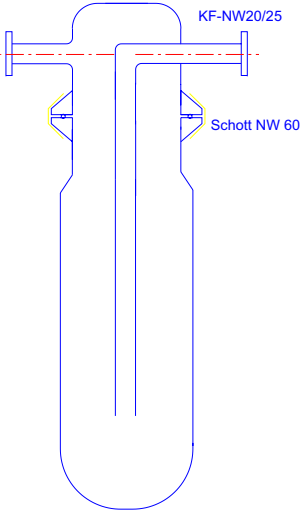
Type 3



Type 4



Type 5

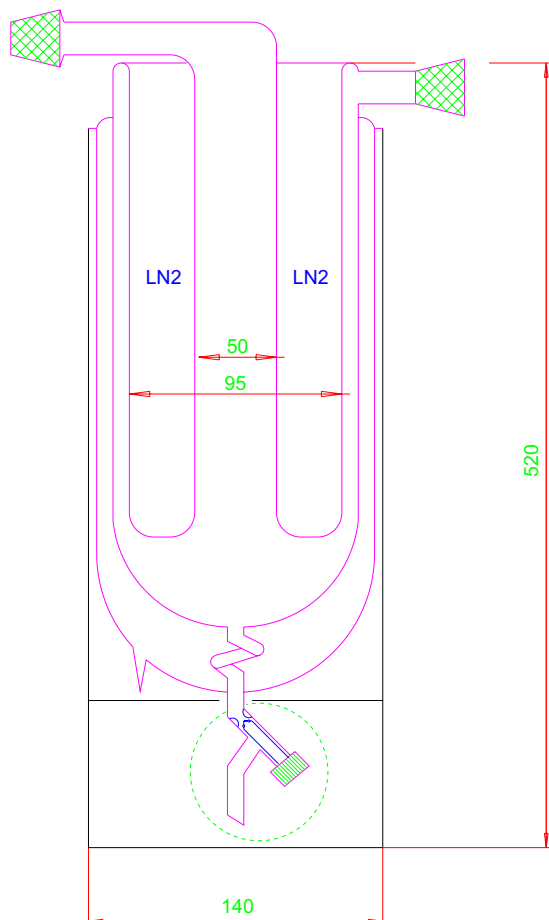


Type 6

Cold traps, with fused Dewar-flask

A GKF model cold trap is a complete version in which the Dewar-flask is bonded to the cold trap. Because of the design shape, this version has two condensation free walls and is particularly suited for producing a high level of condensation from humidity or solvents. This cold trap model is fitted with a valve for draining off the condensation. This cold trap model has an inspection strip fitted as a standard item so that the LN2 coolant level can be easily monitored. These cold traps are also fitted with an NS 29/32 tapered joint as a standard item. However, a spherical ground joint, a glass thread with screw-on cap and olive, a small NW 25 flange or a DN 25 flat flange can also be fitted if required.

Cold trap Type GKF



Construction details

- Two LN2 condensation walls
- Integrated Dewar flasks
- Viewing stripes for observation the LN2 level
- Condensate outlet with O-ring seal
- Protecting cover made of aluminium
- Standard joints NS 29/32
- On request vacuum flange, spherical joints or glass threads with olive.

Technical dates

- Joint to pump is ground cone NS29/32
- Joint to plant is socket NS 29/32
- Coolant capacity ca. 1 Litre
- Condensate capacity 250ml
- Delivery with lid

Art. No. 1702

Cold traps: with fused Dewar-flask

This type of cold trap is constructed in the same way as the GKF model and is also a complete version that has a Dewar-flask bonded to the cold trap. Because of the design shape, this version has two condensation free walls and is particularly suited for producing a high level of condensation from humidity or solvents. This cold trap model is fitted with a valve for draining off the condensate. This cold trap model has an inspection strip fitted as a standard item so that the coolant level can be easily monitored. These cold traps are also fitted with a small NW 29/32 flange as a standard item.

Cold trap Type GKF-10

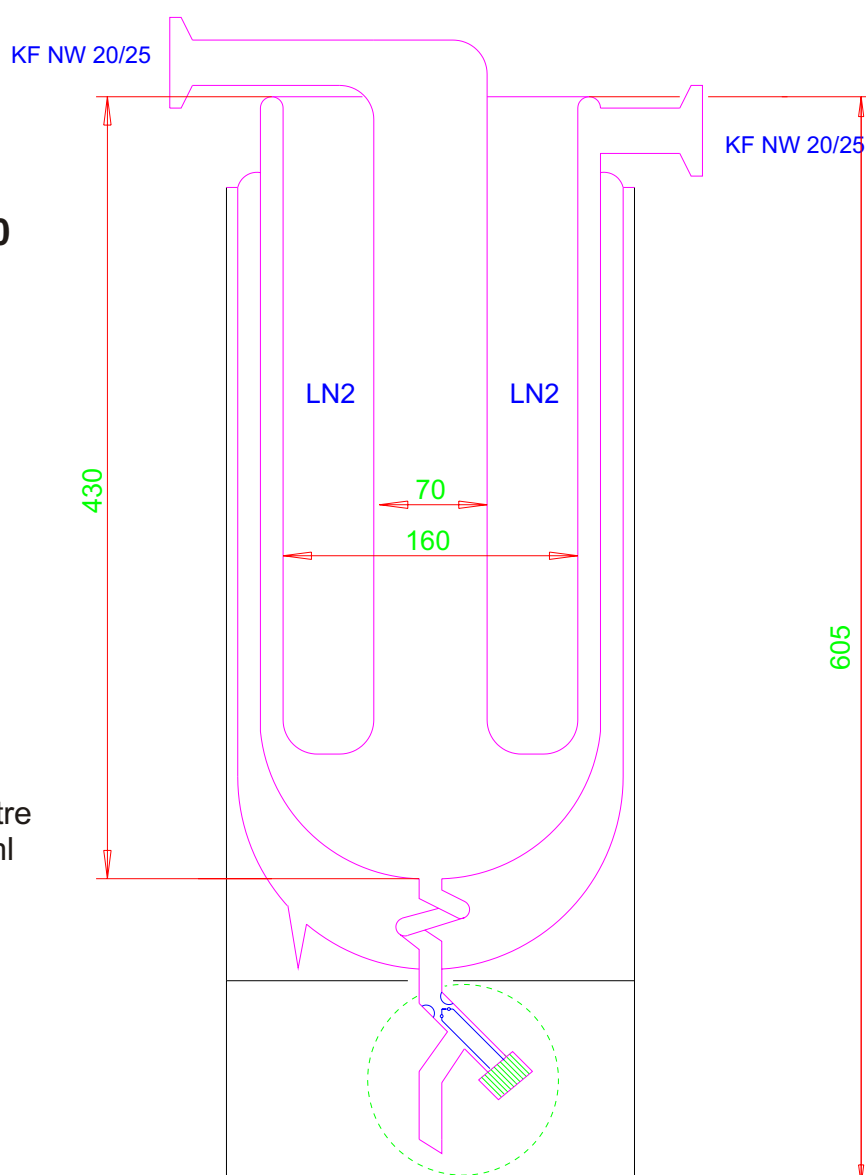
Technical dates

- Joint to pump is KF NW 25 vacuum flange
- Joint to plant is KF NW 25 Vacuum flange
- Coolant capacity ca. 4,2 Litre
- Condensate capacity 550ml
- Delivery with lid

Art. No. 1702/G

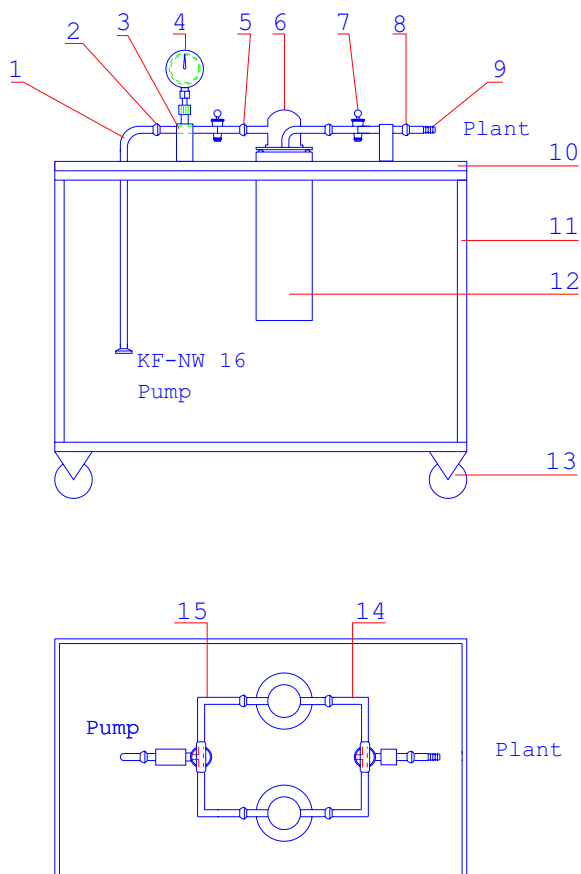
Construction details

- Two LN2 condensation walls
- Integrated Dewar flasks
- Viewing stripes for observation the LN2 level
- Condensate outlet with O-ring seal
- Protecting cover made of aluminium
- Standard KF NW 25 vacuum flange
- Delivery are two clamps and two O-rings



CP 1 and CP 2 pump stands with two cold traps

The CP1 and CP 2 pump stands are portable chemical pump stands fitted with two model S29-OK cold traps and the associated special Dewar-flasks, which enables the cold traps to be used in alternate as well as in parallel operation. Turning the three-way tap through its three positions enables the left one to be switched in first and then right one afterwards or both cold traps can operate in parallel. The pump stand's carriage is made from aluminium with plastic plates used as the table supports. The CP 1 model also has a small NW 16 flange with a manometer and the CP 2 model does not have a vacuum display. The pump stand is supplied as a standard item without a vacuum pump.



Components

- 1) Vacuum tube with pump flange KF-NW16
- 2) Plastic screw on cap GL 18 with PTFE olive
- 3) Holding device
- 4) Vacuum metre
- 5) Glass pipe with spherical joint and three way valve
- 6) Cold trap with Rotulex - joints and holding device
- 7) Three way valve made of glass for switch the cold traps
- 8) Spherical joints
- 9) Plastic screw on cap GL 18 with PTFE olive
- 10) PE-table plate
- 11) Aluminium profile rack
- 12) Dewar flasks
- 13) Four lockable guide rolls
- 14) Glass pipe with three way valve for plant
- 15) Glass pipe with three way valve for pump

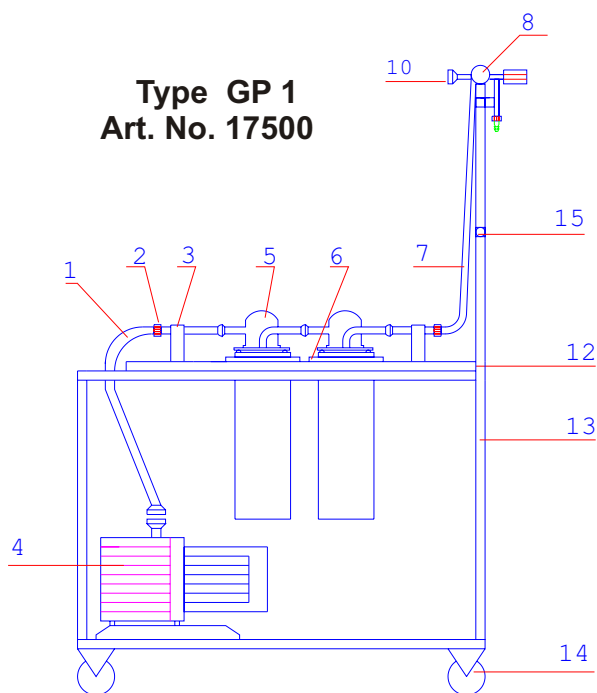
**Type CP 1 with
pressure gauge (Nr.4)
Art. No. 1707**

**Typ CP 2 without
pressure gauge (Nr.4)
Art. No. 1708**

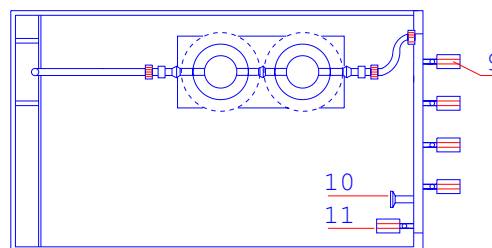
Portable pump stand with two cold traps and a pumping fork

The GP1 and GP 2 pump stands are portable chemical pump stands fitted with two model S29-OK cold traps and the associated special Dewar-flasks, which are aligned in series. The pump fork, which is mounted on the carriage, enables the user to drain off the condensation using any one of five valves, all of which operate independently of one another. The construction and the connections can be altered without any problems. The pump stand's carriage is made from aluminium with plastic plates used as the table supports. The GP 1 model has a transversely fitted pump fork and the GP 2 model has a longitudinally fitted pump fork. The pump stand is supplied as a standard item without a vacuum pump.

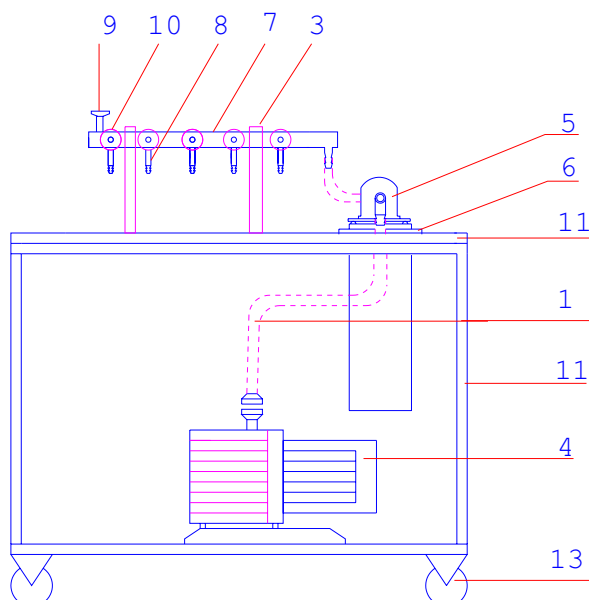
Type GP 1
Art. No. 17500



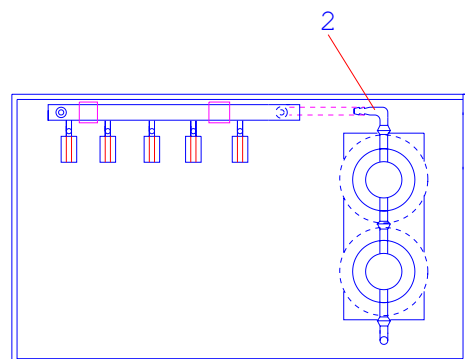
- 1) Rubber vacuum tube D.i.=8mm
- 2) GL18 - screw cap
- 3) Holding device for glass pipe
- 4) Vacuum pump
- 5) Cold finger KF 29 - OK
- 6) Plastic ring for Dewar 12-S with longitudinal shift
- 7) Rubber tube with GL18 - screw cap
- 8) Pompe fork with ventilating valve
- 9) Glass valve Produran with O-ring seal and GL18-Olive
- 10) Vacuum flange NW 16 for pressure gauge
- 11) Ventilating valve with 6mm O-ring seal
- 12) V2A table plate
- 13) Aluminium profil rack
- 14) Four lockable guide rolls
- 15) Tube



Type GP 2
Art. No. 17505



- 1) Rubber vacuum tube D.i.=8mm
- 2) Adapter 90° to glass olive 10-16mm
- 3) Holding device for glass pipe
- 4) Vacuum pump
- 5) Cold finger KF 29 - OK
- 6) Plastic ring for Dewar 12-S with longitudinal shift
- 7) Pump fork Da=40 mm
- 8) Four glass valve Produran DN 10 with O-ring seal and Olive
- 9) Vacuum flange NW 16 for pressure gauge
- 10) Ventilating valve with 6mm O-ring seal and olive 6mm
- 11) V2A table plate
- 12) Aluminium profil rack
- 13) Four lockable guide rolls



Pump stands, produced to customer specifications

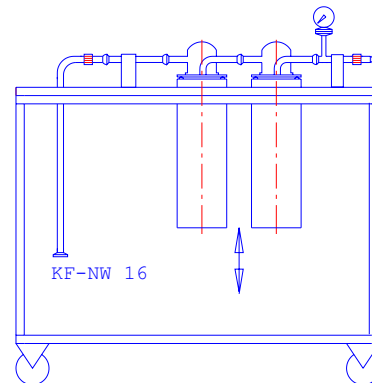
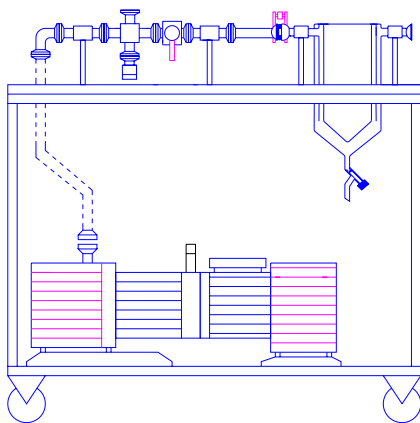
The speciality of KGW-ISOTHERM pump stands is the number of versions available, which offer a multitude of design options when the mechanical and thermal stresses are taken into consideration and KGW-ISOTHERM specialises in producing customer specific pump stands. Our great depth of manufacturing options (glass forming, metal construction and sheet-metal working) enables virtually all requirements to be met without incurring great expenditure and additional costs.

Please send us a drawing or a description of the pump stand that you need and we will work out a proposal together with a drawing.

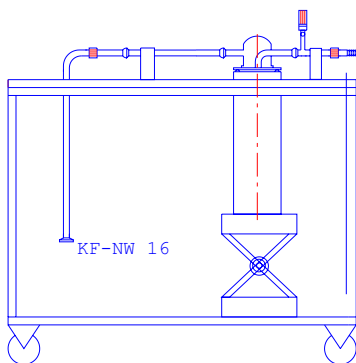
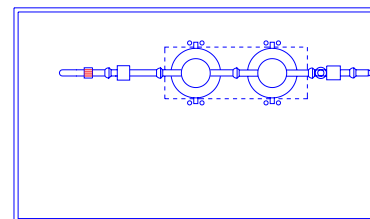
Fax: 0049 721 95897-77 oder per Email info@kgw-isotherm.de

Examples

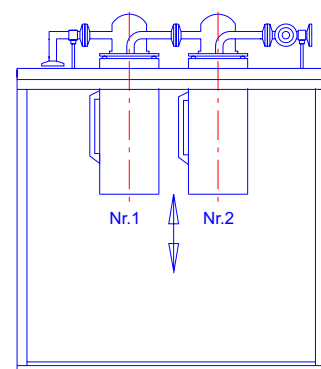
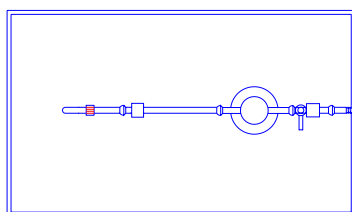
Type CP GKL 1
Art.No. 17510



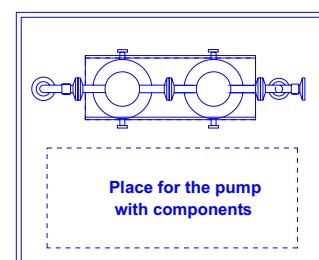
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Art.No. 17520



Type CP2-S2
Art.No. 17515



Type CP2-S5
Art.No. 17525

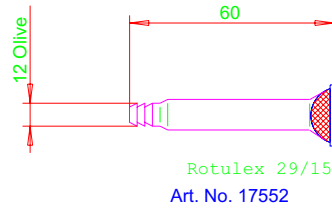
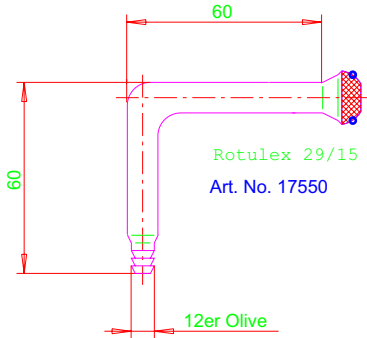


Cold trap adapters

In addition to the standard cold trap adapters offered here, KGW-ISOTHERM is able to provide you with a variety of adapter options for use as special connecting parts and there are also a wealth of connecting options that cannot be listed here and KGW -ISOTHERM specialises in producing customer specific adapters and pump forks.

Please send us a drawing or a description of the part that you need and we will work out a proposal together with a drawing.

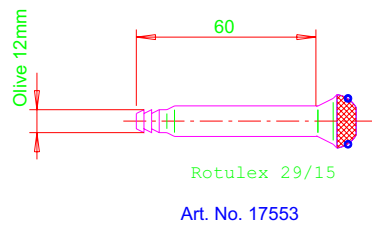
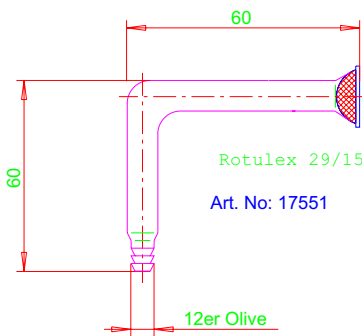
Fax: 0049 721 95897-77 oder per Email info@kgw-isotherm.de



System generating program for adapter with Rotulex

- Rotulex to KF NW 16
- Rotulex to DN 15
- Rotulex to spherical joint S 29
- Rotulex to GL 18 with PTFE Olive
- Rotulex to glass Olive 6,7,8,9, oder 10er
- Rotulex to tapered joint NS 29/32

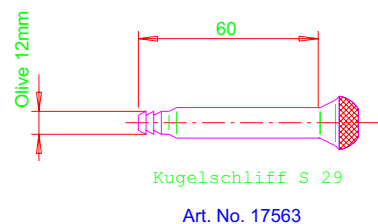
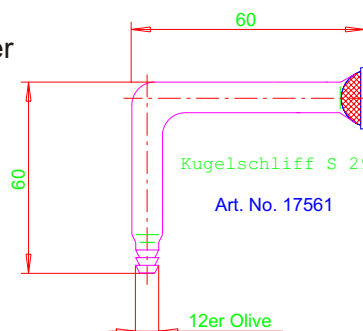
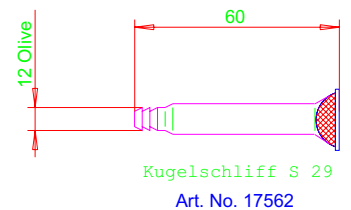
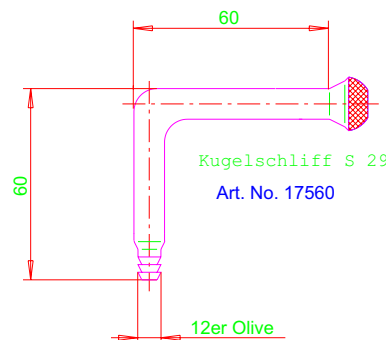
or adapter modification on customer request



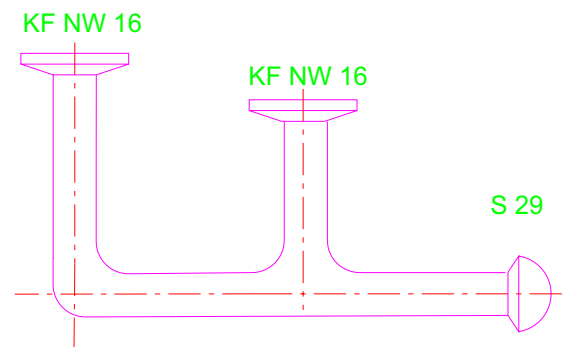
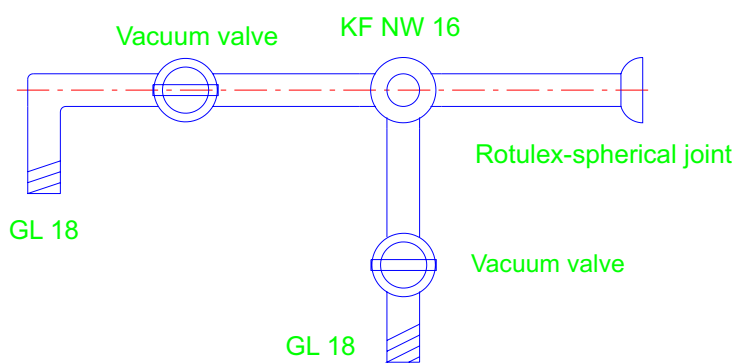
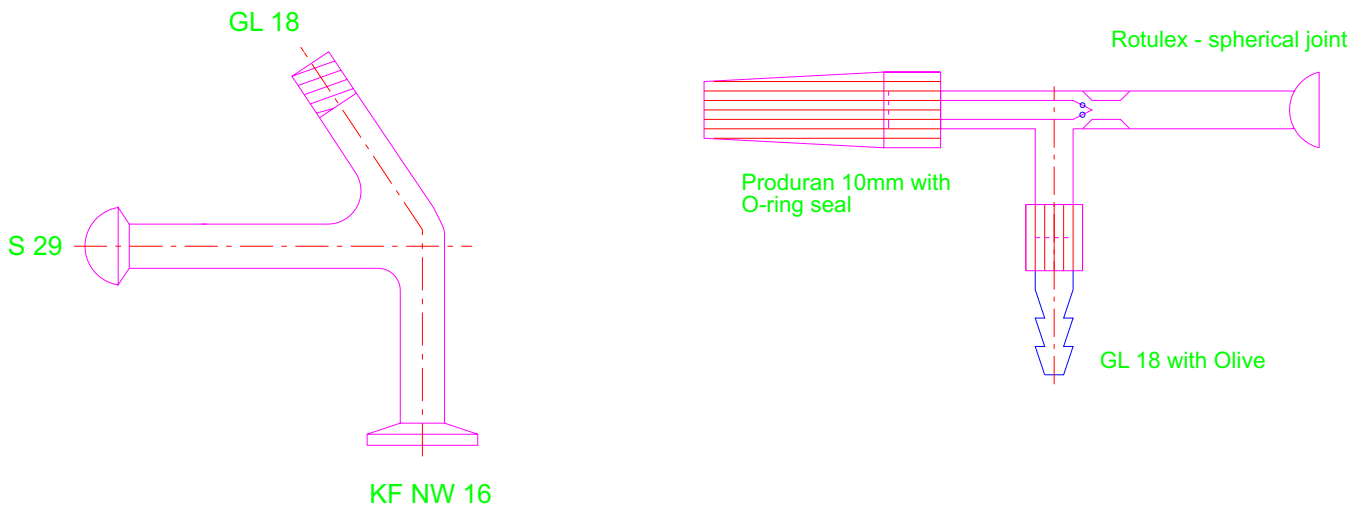
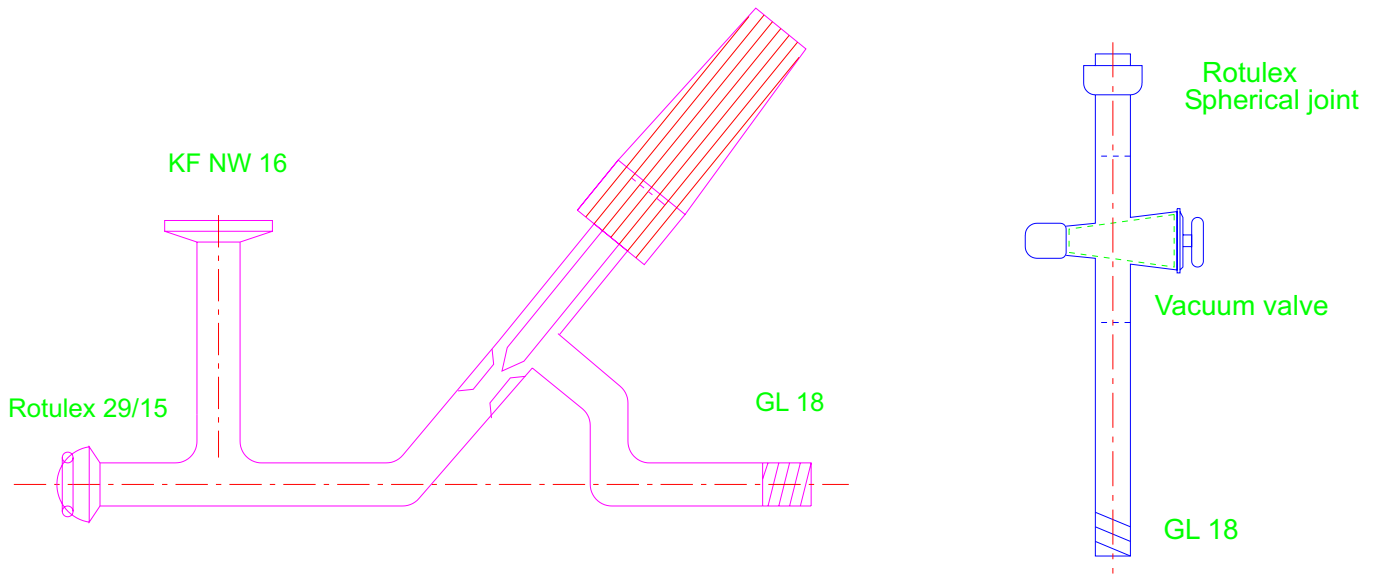
System generating program for adapter with spherical joints

- Spherical joint to KF NW 16
- Spherical joint to DN 15
- Spherical joint to GL 18 with PTFE Olive
- Spherical joint to glass Olive 6,7,8,9, oder 10er
- Spherical joint to tapered joint NS 29/32

or adapter modification on customer request



Example of a cold trap adapter produced in accordance with a customer's specifications



Pump fork for chemical pumps

Pump forks for chemical pump stands are customer specific accessories, the construction of which depends on the user's requirements. The user stipulates the number of drainage valves as well as the position of the vacuum-measuring flange and fumigating or ventilation valves can also be fitted. Normal 'Produran' valves made by Schott are used as the valves. This valve can have an additional O-ring seal fitted in the valve seat in order to increase the vacuum sealing. Vacuum stopcocks can also be used as an alternative to valves but sometimes the use of a sliding part between the stopcock seating and the stopcock taper plug can interfere with the vacuum stopcocks.

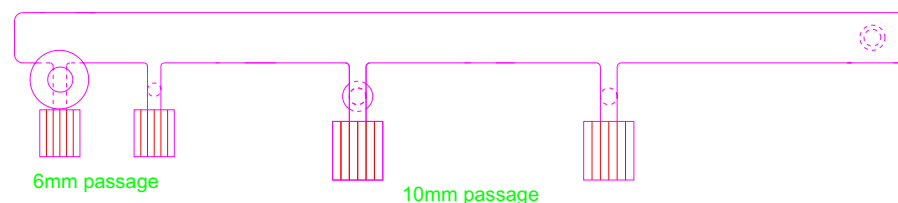
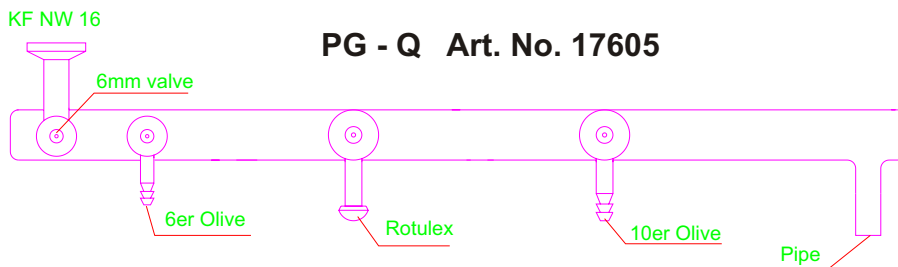
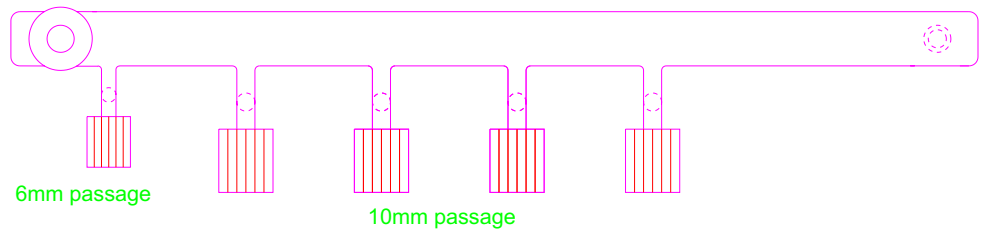
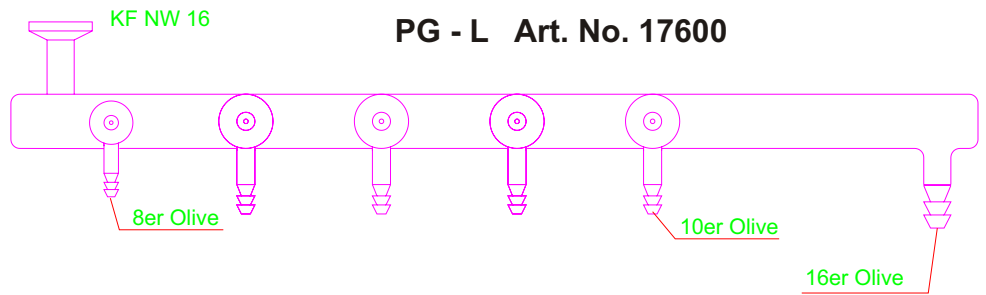
Please send us a drawing or a description of the part that you need and we will work out a proposal together with a drawing.

Fax: 0049 721 95897-77 oder per Email info@kgw-isotherm.de

Example for a pump fork

Connection components

- Vacuum flange KFNW 16
- Spherical joints
- Rotulex - spherical joints
- Flange DN 15
- Tapered joint
- Oliven
- Glass tube



vacuum valve or vacuum stopcocks

- A) Produran-valve with 6 or 10mm passage
- B) Produran - valve with O - ring seal
- C) Vacuum stopcock

Questionnaire concerning the technical requirements of a cold trap

Please answer the questions and fax the filled out questionnaire to us. In consideration of your information we will work out an offer with a drawing and send it to you as soon as possible.

1) Condensate

- a) Condensate material
- b) Condensate temperature max.°C
- c) Amount of condensate ml

2) Kind of cold trap

- a) Cold trap with Dewar ()
- b) Cold trap (similar to type GKF) ()

3) Joints

- a) Spherical joint () Size b) Spherical joint with O-ring (Rotulex) () Size
- c) Standard ground joint () Size d) Glass olive () Size
- e) GL with plastic olive () Size f) Schott flange () Size
- g) Small size flange NW () Size h) Saddle flange DN () Size

4) Coolant

- a) Liquid nitrogen () b) Dry ice ()
- c) Other coolant ()

5) Frame

- a) Driveable pump device () b) Stationary frame ()

6) Room for notes or additional customer requirements

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Sender: Company

Street

Town

Contactperson

Division

Phone Fax

Please fax to KGW-ISOTHERM, your contact-person is Mr. Wolfgang Schieder.

Fax Number: 00 49 / 721 / 958 97-77