

# Adsorption Traps

Operating Instructions GA04197\_002\_C0

Cat. No.

854 14/15/16

Main dimension in mm

DN	a	a <sub>1</sub>	Ø d	h	h <sub>1</sub>
16 KF	82	82	135	147	32
25 KF	102	102	175	155	33
40 KF	132	65	235	160	20

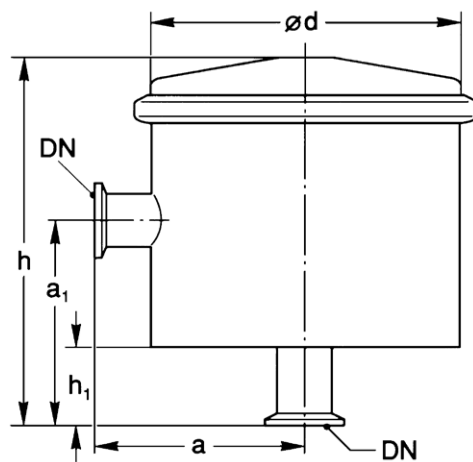


Fig.1 Dimensioned drawing of adsorption trap

## 1 Description

### 1.1 Utilisation and Design

Adsorption traps are used whenever oil-sealed backing pumps are to produce oil-free vacuum.

They prevent backstreaming of oil vapor from backing pumps into vacuum chambers or high-vacuum pumps. They are fitted into the forevacuum line.

The adsorption traps exploit the high adsorption capacity of certain adsorbents for gases such as hydrocarbons, water vapor and carbon dioxide. If adsorption traps are connected to oil-sealed backing or roughing pumps, in addition to practically hydrocarbon-free vacuum low ultimate pressures can be obtained.

Depending on the specific application, the following adsorbents can principally be used: activated  $\text{Al}_2\text{O}_3$  in the form of globules, zeolite in the form of pellets or activated charcoal.

Activated charcoal fillings serve in the first place to protect the vacuum pump from contamination by vapors of high-molecular substances.

Activated  $\text{Al}_2\text{O}_3$  and zeolite are used to produce oil vapor free vacua. Hydrocarbon chains of high molecular weight are more firmly adsorbed by alumina than by zeolite so that molecules once they are captured are no more driven out by other vapors (e.g. water vapor). Even in applications where simultaneously water vapor is pumped over longer periods of time a nearly hydrocarbon-free vacuum can be produced. Adsorbed water vapor, however, deteriorates the ultimate pressure.

Adsorption traps are very efficient due to the fact that all the gas is flowing through the insert. Due to the more compact packing, the conductance of a zeolite-filled trap is lower than that of an alumina-filled trap.

The adsorption traps consist of a stainless steel housing with small flanges and an insert for the adsorbent. The removable lid is sealed with an O-ring gasket of NBR and held by a clamp strap.

### 1.2 Standard Specification

The adsorbent is not included in the delivery specification but can be supplied packed as separate catalogue item in hermetically sealed tins.

Alumina adsorbent is supplied in activated state whereas zeolite and activated charcoal are supplied undried and not degassed. The zeolite and activated charcoal fillings must in any case be baked and dried prior to initial operation.

### 1.3 Technical Data

Adsorption trap	DN	16 KF	25 KF	40 KF
Conductance at $10^{-2}$ mbar	$\text{mbar}\cdot\text{l}\cdot\text{s}^{-1}$	4	6	12
Effective life of alumina adsorbent	Month	3	3	3
Adsorbent filling	l	0,5	1,0	2,0
Weight, trap for alumina	approx. kg	1,3	1,3	4

### 1.4 Ordering Data

	DN	16 KF	25 KF	40 KF
Adsorption trap	Cat.No.	854 14	854 15	854 16
Activated $\text{Al}_2\text{O}_3$ , 1.3 kg (2 ltr.approx.)	Cat.No.	854 10	854 10	854 10
Zeolithe, 1 kg	Cat.No.	854 20	854 20	854 20
Activated charcoal, 5 kg	Cat.No.	178 10	178 10	178 10

## 2 Operation

### Warning



If the pump has previously pumped hazardous gases determine the nature of hazard prior to opening the intake line or the adsorption trap and take the appropriate safety precautions, i.e.gloves, safety mask or breathing mask.



### 2.1 Installation

The adsorption trap is fitted into the intake line of the oil-sealed vacuum pump. It can be mounted in any position. The horizontal mounting position is preferable, however, to allow the condensed oil to flow back into the pump.

### 2.2 Use of alumina or zeolite

Every now and then the adsorbent filling should be regenerated. The intervals depend on operating conditions. The adsorbing capacity for oil vapors holds approx. 3 months if only the oil vapors diffusing back from the intake port of the gas ballast pump are adsorbed.

If low pressures are to be obtained, the time of regeneration is determined by the adsorbed quantity of water vapor. In this case the filling must be regenerated when a noticeable pressure rise is observed.

When venting the adsorption traps, make sure that the air stream does not flow through the filling toward the gauge heads which otherwise may contaminate.

#### Regeneration

The adsorbents used should be regenerated outside the trap to prevent the removed vapors from condensing in the vacuum system. The O-ring gasket of the lid NBR must not be baked above 80°C (176 °F).

For filling the adsorption trap, the clamp strap at the lid is opened and the insert pulled from its center in the trap bottom. The housing of the adsorption trap remains in the pipe line.

The filling supplied by us is practically free from dust. If in exceptional cases dust should have deposited at the bottom of the spare charge, under no circumstances should it be filled into the trap. Before filling in the alumina adsorbent, check whether it is free from dust. If necessary, remove the dust by a gas stream.

Alumina adsorbent has higher mechanical stability than zeolite. The danger of single globules breaking is low. But for safety reasons the rotary vane pump should always be operated with the dirt filter supplied as a standard with the pump.

If in addition to hydrocarbon-free vacuum a low ultimate pressure is desired, care should be taken that the adsorbent does not become saturated by water vapor from the vacuum chamber or from the venting air.

Low pressures can be obtained over longer period of time using a roughing line to pump down to a pressure of approx. 1 mbar, thus removing most of the water vapor, and by venting with dry air.

#### Regeneration of alumina

Bake filling to 250°C (482°F) at atmospheric pressure, evacuate after one to two hours. Total time of regeneration: 6 hours. In view of the low price of the alumina filling, it is often more economical to use a new charge.

#### Caution

Opened spare charges should be stored air-tight.

#### Regeneration of zeolite

Bake filling at atmospheric pressure to 300-350°C (572-662 °F) for one to two hours, then evacuate. Total regeneration time 24 hours.

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### 2.3 Use of activated charcoal

Prior to use, the activated charcoal must be dried in the filter insert. This can be made outside the trap. It will also be sufficient, however, if the vacuum pump is operated for some hours with gas ballast open and the inlet of the trap closed. Thereupon weigh the dry filling, as a certain degree of saturation, if any, can practically only be ascertained by weighing. The activated charcoal is capable of adsorbing vapors of high molecular weight (solvents) upto 25% of its own weight. We recommend to determine the admissible increase in weight for each specific use right from the beginning by weighing the filling of activated charcoal.

When the admissible degree of saturation is reached, the activated charcoal must be replaced.

### 3 Spare Parts

O-ring	Ref. No.
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DN 16 KF	239 50 723
DN 25 KF	239 50 727
DN 40 KF	239 50 735

### 4 Service at LEYBOLD's

If you send an appliance to LEYBOLD indicate whether the appliance is free of substances damaging to health or whether it is contaminated. If it is contaminated also indicate the nature of hazard. To do you must use a pre-printed form which we shall send to you upon request.

A copy of this form is printed at the end of the Operating Instructions: „Declaration of Contamination of Vacuum Equipment and Components“.

Another suitable form is available from [www.leybold.com](http://www.leybold.com)  
→ Documents → Download Documents.

Either fasten this form at the appliance or simply enclose it to the appliance.

This declaration of contamination is necessary to comply with legal requirements and to protect our staff.

LEYBOLD must return any appliance without a declaration of contamination to the sender's address.

## Declaration of Contamination of Compressors, Vacuum Pumps and Components

The repair and / or servicing of compressors, vacuum pumps and components will be carried out only if a correctly completed declaration has been submitted. Non-completion will result in delay. The manufacturer can refuse to accept any equipment without a declaration.

**A separate declaration has to be completed for each single component.**

This declaration may be completed and signed only by authorized and qualified staff.

Customer/Dep./Institute : _____ Address : _____ _____ Person to contact: _____ Phone : _____ Fax: _____ End user: _____	Reason for return: <input checked="" type="checkbox"/> applicable please mark <b>Repair:</b> <input type="checkbox"/> chargeable <input type="checkbox"/> warranty <b>Exchange:</b> <input type="checkbox"/> chargeable <input type="checkbox"/> warranty <input type="checkbox"/> Exchange already arranged / received <b>Return only:</b> <input type="checkbox"/> rent <input type="checkbox"/> loan <input type="checkbox"/> for credit <b>Calibration:</b> <input type="checkbox"/> DKD <input type="checkbox"/> Factory-calibr. <input type="checkbox"/> Quality test certificate DIN 55350-18-4.2.1
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<b>A. Description of the Leybold product:</b> Material description : _____ Catalog number: _____ Serial number: _____ Type of oil (ForeVacuum-Pumps) : _____	<b>Failure description:</b> _____ <b>Additional parts:</b> _____ <b>Application-Tool:</b> _____ <b>Application- Process:</b> _____
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B. Condition of the equipment	No <sup>1)</sup>	Yes	No		Contamination :	No <sup>1)</sup>	Yes
1. Has the equipment been used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	→	toxic	<input type="checkbox"/>	<input type="checkbox"/>
2. Drained (Product/service fluid)	↓	<input type="checkbox"/>	<input type="checkbox"/>		corrosive	<input type="checkbox"/>	<input type="checkbox"/>
3. All openings sealed airtight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		flammable	<input type="checkbox"/>	<input type="checkbox"/>
4. Purged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		explosive <sup>2)</sup>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, which cleaning agent					radioactive <sup>2)</sup>	<input type="checkbox"/>	<input type="checkbox"/>
and which method of cleaning					microbiological <sup>2)</sup>	<input type="checkbox"/>	<input type="checkbox"/>
1) If answered with "No", go to D. ←					other harmful substances	<input type="checkbox"/>	<input type="checkbox"/>

**C. Description of processed substances (Please fill in absolutely)**

1. What substances have come into contact with the equipment ?  
 Trade name and / or chemical term of service fluids and substances processed, properties of the substances  
 According to safety data sheet (e.g. toxic, inflammable, corrosive, radioactive)

X	Tradename:	Chemical name:
a)		
b)		
c)		
d)		

2. Are these substances harmful ?  No  Yes ←

3. Dangerous decomposition products when heated ?  No  Yes  
 If yes, which ? \_\_\_\_\_

<sup>2)</sup> Components contaminated by microbiological, explosive or radioactive products/substances will not be accepted without written evidence of decontamination.

**D. Legally binding declaration**

I / we hereby declare that the information supplied on this form is accurate and sufficient to judge any contamination level.

Name of authorized person (block letters) : \_\_\_\_\_

\_\_\_\_\_

Date signature of authorized person

firm stamp