Leybold

CFS 16-25
CFS 40-65

Chemical Filter with Safety Isolation Valve

Operating Instructions GA01399_002_C0

Part Nos.

101 76 / 77 / 77V3

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Original installation and operating instructions.

Obligation to Provide Information
Before installing and commissioning the equipment, carefully read these Operating Instructions and follow the information so as to ensure optimum and safe working right from the start.

NOTICE

The Leybold **Chemical Filters** have been designed for safe and efficient operation when used properly and in accordance with these Operating Instructions. It is the responsibility of the user to carefully read and strictly observe all safety precautions described in this section and throughout the Operating Instructions. The equipment must only be operated in the proper condition and under the conditions described in the Operating Instructions. It must be operated and maintained by trained personnel only. Consult local, state, and national agencies regarding specific requirements and regulations. Address any further safety, operation and/or maintenance questions to our nearest office.

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

DANGER

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

WARNING

CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

CAUTION

NOTICE is used to notify users of installation, operation, programming or maintenance information that is important, but not hazard related.

NOTICE

We reserve the right to alter the design or any data given in these Operating Instructions. The illustrations are not binding.

Retain the Operating Instructions for further use.

Figures
The references to figures, e.g. (4/2) consist of the consecutive Fig. No. and the Item No. in that order.

Safety Information

0 Important Safety Information

0.1 Hazards caused by materials and substances

DANGER

1 Hazardous substances may escape from the filter or the oil. Take suitable precautions (e. g. gloves, goggles or gas mask).

2 Contaminated parts can be detrimental to health and environment.
Before beginning with any work, first find out whether any parts are contaminated.
Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts; For example wear gloves, face protection or breathing protection.
If there exists a potential hazard, the filter or the separator must be decontaminated before starting with any maintenance work.
The filter elements in particular can get very hot (over 100 °C / 212 °F).
There is the danger of receiving burns.
Wear suitable protective clothing.
For professional decontamination we recommend our service.

3 The equipment must be packed in such a way, that it will not be damaged during shipping and so that any contaminants are not released from the package.

4 When disposing of used oil and spent filter and filter elements, please observe the relevant environmental protection regulations.

5 The CFS can be operated with perfluoropolyether **(PFPE)** as lubricant.
When handling PFPE you should observe the following:
During thermal decomposition at temperatures over 290 °C toxic and corrosive gases are released. When handling PFPE keep it away from open fires. Do not smoke with PFPE on your fingers.
Touch the inner sections of the pumps only while wearing clean gloves, and use clean tools;
do the necessary work in clean and dry rooms;
after having removed the pump from its packaging, start it up as quickly as possible;
as cleaning agents solvents based on hydrofluorether compounds may be used..

0.2 Risk of damaging the device

NOTICE

1 The filter element should be changed regularly, depending on the operating conditions.

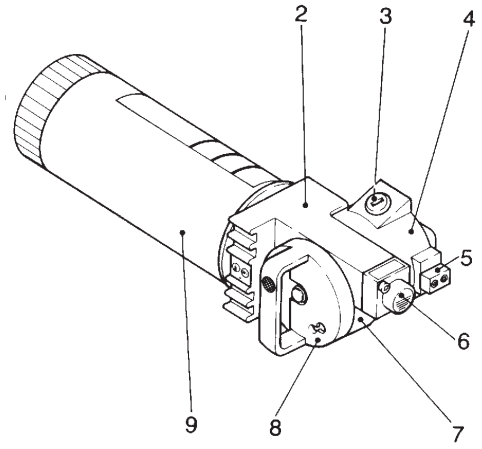


Fig. 1 CFS 16 - 25

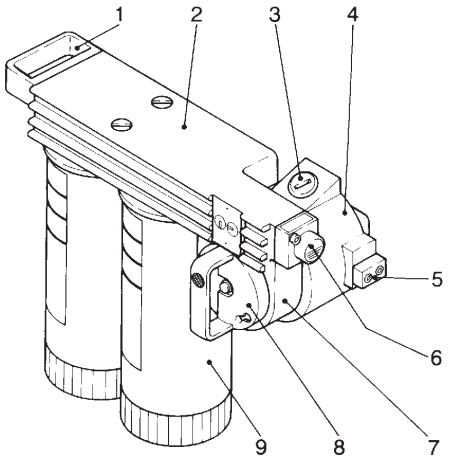


Fig. 2 CFS 40 - 65

1 Handle
2 Fiter housing
3 Connection for differential pressure switch
4 Pump-side part of isolation valve
5 Connection for pressure switch
6 Filter status indicator
7 Filter-side part of isolation valve
8 Handle
9 Quick-change filter element

1 Description

1.1 Design and Function

The CFS (chemical filter with safety isolation valve) is a full-flow oil filter for TRIVAC B and BCS pumps.

It is part of the TRIVAC system.

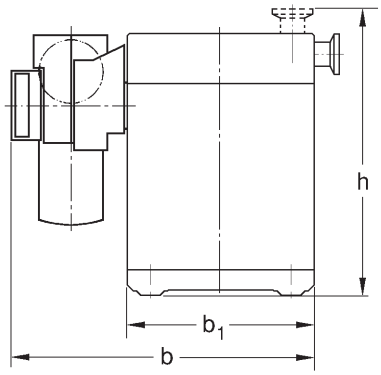
The CFS consists of a surface-protected aluminum mount, to which one (CFS 16-25) or two (CFS 40-65) quick-change filter elements can be attached, and a cast-iron isolation valve.

All oil pumped by the TRIVAC‘s oil pump first passes through the isolation valve and then through the filter elements; from there it returns to the TRIVAC B/BCS via the isolation valve.

Different types of filter element are available for the CFS: particle filters (WF) and aluminium oxide particle filters (WF Alu-Part). All filter elements have a pressure relief valve which causes them to be bypassed in the event of over-pressure.

The isolation valve is actuated using a handle. When in the «Change» position, the passages are closed. At the same time, a bypass is opened in the pump-side part of the valve so that the lubrication circuit in the pump is maintained. In addition, an internal locking device is released. After loosening two screws, the two valve parts can be separated.

Description



		b	b1	h
CFS 16-25	mm	~ 327	176	264
	in.	~ 12.9	6.9	10.4
CFS 40-65	mm	~ 390	234	356
	in.	~ 15.4	9.21	14.0

Fig. 3 Dimensional drawing of CFS, dimensions in mm

It is then possible to change the spent filter elements away from the pump. If a second CFS is used, the filter can be changed in only a few minutes without the
TRIVAC B/BCS having to be shut down.

On the housing of the CFS there is a filter status indicator.

1.2 Standard Specification

All gaskets and fittings needed for installation are supplied with the CFS.

One (CFS 16-25) or two (CFS 40-65) aluminium oxide particle filter elements (WF AluPart), sealed during shipping, are supplied.

The CFS is precleaned so that it can be used with either mineral oil (e. g. LVO 100) or perfluoropolyether (PFPE, e. g. LVO 400). For shipping it is sealed airtight in foil, together with silica gel.

The CFS has connections for an oil pressure switch and a differential pressure switch from the LSS (Limit Switch System).

1.3 Technical Data

CFS	**16-25**	**40-65**
Pump model TRIVAC B/BCS	S/D 16/25	S/D 40/65
Oil capacity when using WF Alu-Part	1.4 l (1.5 qt)	3.3 l (3.5 qt)
Weight, dry, ready for use	7.0 kg (15.4 lbs)	15.5 kg (34.1 lbs)

1.3 Ordering Data

	Part No.	**Part No.**
Chemical filter with safety isolation valve, ... FPM sealed	**101 76**	**101 77** **101 77V3**
Quick-change filter elements		
WF Alu-Part combination filter, paper and Al_2O_3, 1.6 l (1.7 qt)	189 99	189 99*
WF particle filter, paper, 1.6 l (1.7 qt)	200 09 804	200 09 804*
WFG particle filter, paper with support mesh, 1 l (1.1 qt)	189 90	189 90*

* 2 pieces are required

2 Transport and Storing

The equipment must be packed in such a way, that it will not be damaged during shipping and so that any contaminants are not released.

WARNING

3 Installation

Before installing disconnect all electrical connections. You must reliably prevent the pump from running up.

CAUTION

The CFS is freed of any oil and grease so that it can be used with either mineral oil or perfluoropolyether (PFPE). It is shipped in an airtight bag to prevent corrosion.

Touch the interior of the CFS only with clean gloves or tools.

NOTICE

Work in rooms that are as clean and dry as possible; do not open the packaging of the CFS and the filter elements until immediately before use; after opening, install the CFS as quickly as possible and start up the pump.

When using PFPE, employ only Freon®[1)]-113 or Frigen®[2)]-113 as cleaning agent.

Since mineral oil and PFPE emulsify on coming into contact with one another, the CFS has to be completely cleaned and equipped with new gaskets and filter elements when changing the type of oil. It is recommendable to let Leybold do this work.

Observe Safety Information 0.1.5.

WARNING

If a CFS and ARS are both connected to a TRIVAC B pump, it is advisable to replace the pump‘s rubber feet with anti-vibration elements. The TRIVAC BCS already has antivibration elements.

The CFS has to be installed in two steps:

First, mount the pump-side part of the isolation valve on the pump. This part can stay on the pump when the pump is run without a filter.

Then, mount the filter housing and the filter-side part of the isolation valve. This part of the CFS has to be removed and reinstalled whenever changing the filter elements.

Tools needed for installation: allen keys 6 mm, 8 mm.

®1) Registered trademark of DuPont de Nemours
®2) Registered trademark of Farbwerke Hoechst AG

Installation

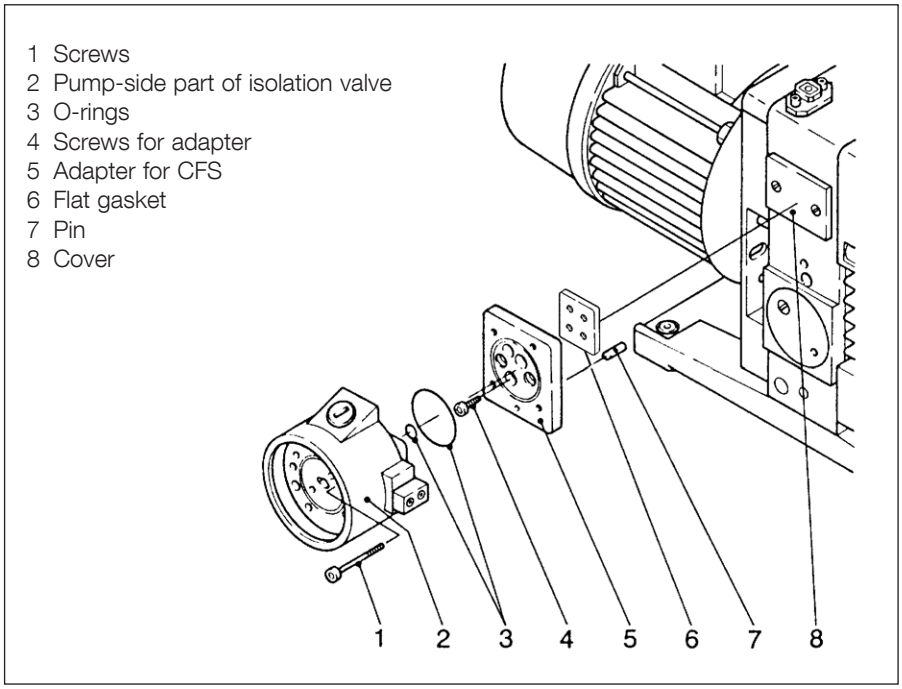


Fig. 4 Installing the pump-side part of the isolation valve

Important installation note
When working on the CFS, like installation, disassembly or possibly maintenance work, the CFS must always be set to the status CHANGE (see Fig. 10).

Checking proper installation
During operation of the TRIVAC, i.e. after the pump has warmed up, the filter cartridges must - when correctly installed - also warm up.

3.1 Installing the Pump-Side Part of the Isolation Valve

Remove the filter housing (6/3) from the pump-side part of the isolation valve by loosening the screws (6/4).

Remove the cover (4/8 and 5/8) with gasket from the coupling housing.

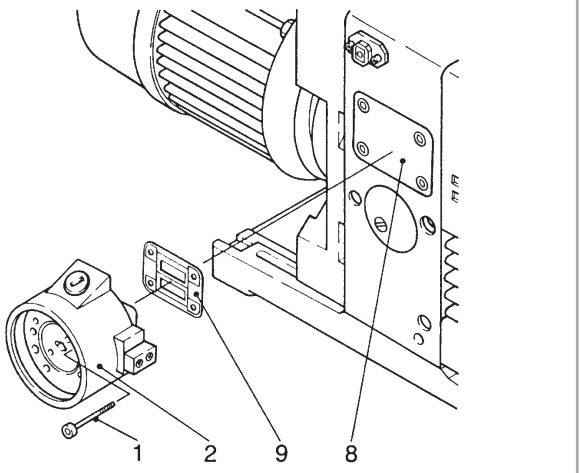
Check the sealing surfase on the pump and clean it, if nesessary.

CFS 16-25:
Push the pin (4/7) into the pump.

Mount the adapter (4/5) with gasket (4/6) and secure it with the screws (4/4).

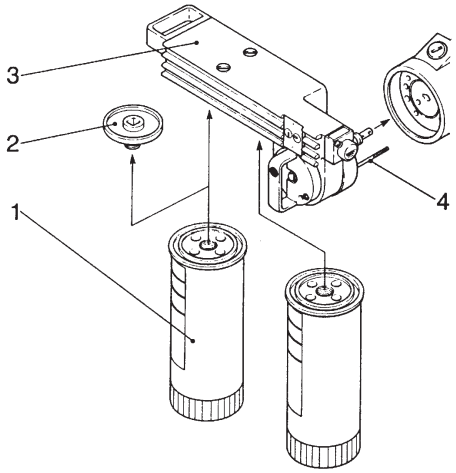
Insert the O-rings (4/3).

Fasten the pump-side part of the isolation valve (4/2) with the aid of two screws (4/1). Use the holes that have recesses for the screw heads.



1 Screws
2 Pump-side part of isolation valve
8 Cover
9 Gasket

Fig. 5 Installing the pump-side part of the isolation valve



1 Filter element
2 Cap
3 Filter housing
4 Screws

Fig. 6 Installing the filter elements and filter housing

CFS 40-65:
Insert the gasket with crossbar (5/9). Make sure that the gasket is correctly positioned: The distances for the screw holes differ.

Fasten the pump-side part of the isolation valve (5/2) with the aid of two screws (5/1). Use the holes that have recesses for the screw heads.

3.2 Installing the Filter Elements and Filter Housing

Remove the cap (6/2) from the filter element (6/1). It is advisable to keep the cap for sealing the filter element later on.

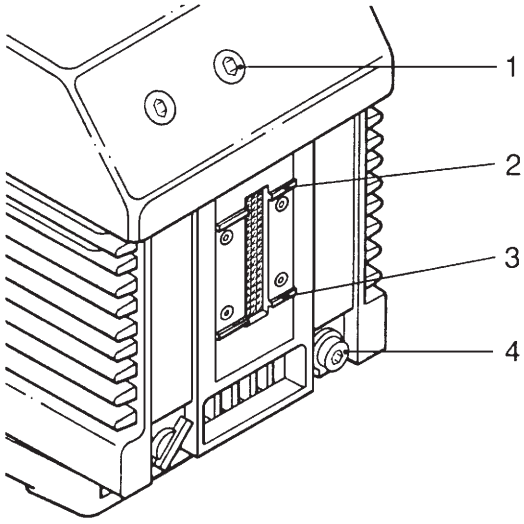
Moisten the sealing rings of the filter elements with oil and insert the filter elements until handtight.

Check whether the handle on the filter housing is in the CHANGE position (cf. Fig. 10).

Check the fit of the gasket in the valve.

Slide the filter housing (6/3) with filter-side part of the valve onto the pump-side part of the valve. Tighten the two screws (6/4) through the handle.

Turn the handle to the Operation position.



1 Oil-fill plug
2 Max. oil level
3 Min. oil level
4 Oil-drain plug

Fig. 7 Filling in oil

3.3 Oil Charge

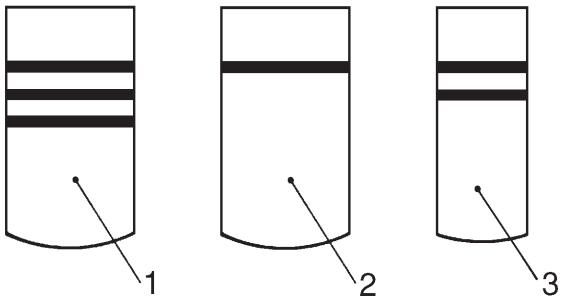
Start the pump. When the pump is running, the filter elements are filled with oil and the pump‘s oil level drops.

Once the pump‘s oil level has dropped to the min mark (7/3), shut down the pump, remove the plug (7/1) and add oil.

Repeat this procedure until the filter elements are full.

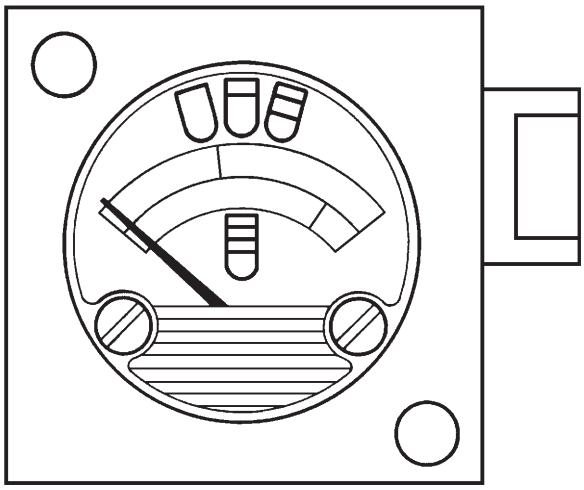
If hazardous substances can escape from the pump, it is advisable to install an oil-fill line with shut-off valve.

Alternatively, the CFS can be prefilled on another pump having a suitable connection port. It is not possible to fill the filter elements without connecting them to a pump.



1 Aluminium oxide particle filter (WF Alu-Part)
2 Particle filter (WFG)
3 Aluminium oxide filter (WF Alu)

Fig. 8 Markings of filter elements



top scale for WF particle filters or WF Alu
bottom scale for WF Alu-Part

Fig. 9 Filter status indicator

4 Maintenance: Filter Change

(Description for CFS 40-65; CFS 16-25 similar, only one filter element).

The filter elements have to be replaced when the filter status indicator (cf. Fig. 9) changes from green to red or when the differential or oil pressure switch of the LSS (Limit Switch System) switches over.

The top scale of the indicator is for particle filters or aluminium oxide filters; at the start of the red scale range, the pressure is approx. 2.2 bar (32 psi).

The bottom scale is for aluminium oxide particle filters; at the start of the red scale range, the pressure is approx. 4.0 bar (58 psi).

Tools needed: filter key LS 9 or LS 11, allen key 6 mm.

Set the handle (11/1) to the Change position.

The pump can carry on running during the filter change.

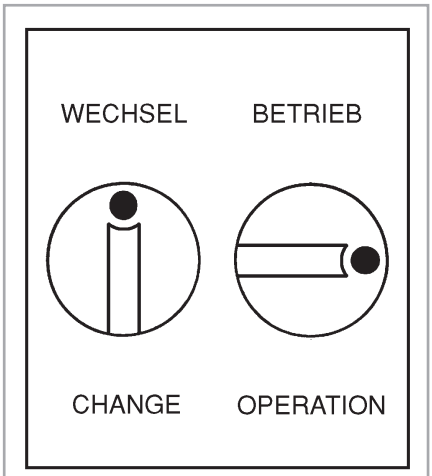
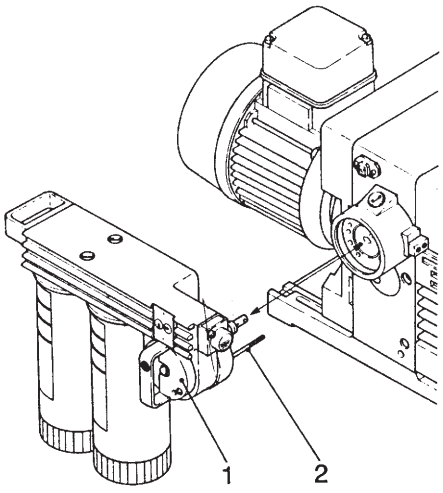


Fig. 10 Handle positions

The filter elements in particular can get very hot (over 100 °C / 212 °F). There is the danger of receiving burns.

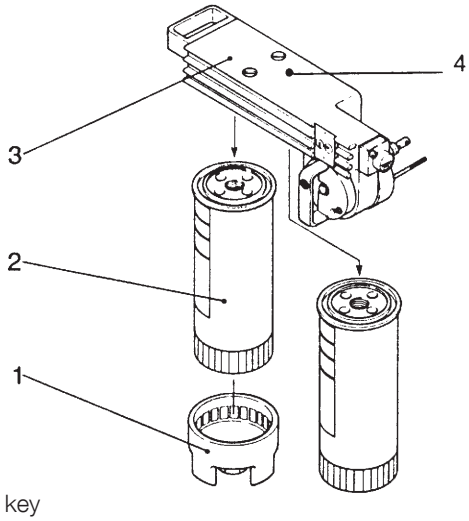
CAUTION

Maintenance



1 Handle
2 Screws

Fig. 11 Removing filter housing



1 Filter key
2 Filter element
3 Filter housing
4 Plug screws

Fig. 12 Removing the filter elements

Loosen the screws (11/2) through the handle and pull off the filter housing with filter elements and filter-side part of the isolation valve. Approx. 2 cm^3 (1/10 fl oz) of oil will run out of the valve. If the IGS (Inert Gas System) is also connected, the oil passes via a discharge channel.

DANGER

The lubricant may emit toxic gases and vapors. Take suitable precautions.

All further work on the filter should be done under a fume hood and over an oil tray.

Observe the safety regulations.

CFS 40-65 only: Put down the filter housing (12/3) with the top side downward.

Remove and seal the filter element (12/2).

When disposing of oil and spent filter elements, please observe the relevant environmental protection regulations.

Open the new filter elements, moisten the sealing ring with oil and mount them so that they are **handtight**.

On the CFS 40-65 part of the lubricant can be poured in via the plug screws (12/4). The filter elements must, however, be topped up on a running pump.

Reinstall the filter housing on the pump (cf. Section 3.2).

The filter elements are now filled with oil from the running pump. Once the pump‘s oil level has dropped to the min mark (7/3), shut down the pump and add oil (cf. Section 3.3).

If hazardous substances can escape from the pump, it is advisable to install an oil-fill line with shut-off valve.

If the pump is not to be shut down, the CFS has to be prefilled on another pump having asuitable connection port.

If a second CFS is used, the pump need run without a filter for only a few minutes.

4.1 Leybold Service

Whenever you send a pump to Leybold, indicate whether the pump is contaminated or is free of substances which could pose a health hazard. If it is contaminated, specify exactly which substances are involved. You must use the form we have prepared for this purpose; we will forward the form on request.

A copy of the form is printed at the end of these operating instructions: „Declaration of contamination of vacuum equipment and components“. Another suitable form is available from www.leybold.com → Documents → Download Documents.

Connect the form at the device or lay it to the device.

This statement detailing the contamination is required to satisfy legal requirements and for the protection of our employees.

Pumps which are not accompanied by a contamination statement will be returned to the sender.

CAUTION

Use secure shipping packaging
Package the equipment such that it will not suffer any damage when being shipped and so that no oil or hazardous materials can escape from the packaging.

Disposal

5 Waste Disposal

The equipment may have been contaminated by the process or by environmental influences. In this case the equipment must be decontaminated in accordance with the relevant regulations. We offer this service at fixed prices. Further details are available on request.

WARNING

Risk of injury and environmental damage

Contaminated parts can be detrimental to health and environment. Before beginning with any work, first find out whether any parts are contaminated.

Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts; For example wear gloves, face protection or breathing protection.

Separate clean components according to their materials, and dispose of these accordingly. We offer this service. Further details are available on request.

When sending us any equipment, observe the regulations given in Section “Leybold Service”.

Disposal of Waste Oil

Owners of waste oil are entirely self-responsible for proper disposal of this waste.

Waste oil from vacuum pumps must not be mixed with other substances or materials.

Waste oil from vacuum pumps (Leybold oils which are based on mineral oils) which are subject to normal wear and which are contaminated due to the influence of oxygen in the air, high temperatures or mechanical wear must be disposed of through the locally available waste oil disposal system.

Waste oil from vacuum pumps which is contaminated with other substances must be marked and stored in such a way that the type of contamination is apparent. This waste must be disposed of as special waste.

European, national and regional regulations concerning waste disposal need to be observed. Waste must only be transported and disposed of by an approved waste disposal vendor.

Leybold

Declaration of Contamination of Compressors, Vacuum Pumps and Components

The repair and / or servicing of compressors, va cuum 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: ☒ applicable please mark
Repair: ☐ chargeable ☐ warranty
Exchange: ☐ chargeable ☐ warranty
☐ Exchange already arranged / received
Return only: ☐ rent ☐ loan ☐ for credit
Calibration: ☐ DKD ☐ Factory-calibr.
☐ Quality test certificate DIN 55350-18-4.2.1

A. Description of the Leybold product:
Material description :
Catalog number:
Serial number:
Type of oil (ForeVacuum-Pumps) :

Failure description:
Additional parts:
Application-Tool:
Application- Process:

B. Condition of the equipment

	No [1]	Yes	No
1. Has the equipment been used	☐	☐	
2. Drained (Product/service fluid)		☐	☐
3. All openings sealed airtight		☐	
4. Purged		☐	☐

If yes, which cleaning agent
and which method of cleaning

[1] If answered with "No", go to **D**.

Contamination :	No [1]	Yes
toxic	☐	☐
corrosive	☐	☐
flammable	☐	☐
explosive [2]	☐	☐
radioactive [2]	☐	☐
microbiological [2]	☐	☐
other harmful substances	☐	☐

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)		

	No	Yes
2. **Are these substances harmful ?**	☐	☐
3. **Dangerous decomposition products when heated ?**	☐	☐

If yes, which ?

[2] **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

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