

ATEX

Vacuum Pumps
in Accordance with the
Directive 2014/34/EU



ATEX Certified Vacuum Pumps

Leybold offers a selection of different types of vacuum pumps, which comply with the safety and health requirements laid down in the ATEX Directive 2014/34/EU:

- Rotary vane vacuum pumps
TRIVAC B and SOGEVAC B
- Dry compressing vacuum pumps
SCREWLINE and DRYVAC
- RUVAC Roots blowers



Custom-made, ATEX-compliant steel degassing system comprising DRYVAC 1200 and RUVAC WH 7000

ATEX Pumps Overview

Type / Models / Category

Oil-sealed rotary vane pumps:

TRIVAC

D 4 B - D 65 B: Cat. 3i, T4

D 4 B - D 65 B: Cat. 3i/3o, T4/T3

D 16 B ATEX: Cat 1i/2o, T4/T4

SOGEVAC

SV 40 ATEX: Cat 1i/2o, T4/T3

SV 40 B - SV 300 B: Cat 2i/2o, T3/T4

SV 470 B - SV 630 B: Cat 2i/3o,

T3/T3 150°C

SV 40 B - SV 630 B: Cat 3i/3o,

T3/T3 150°C

Dry compressing pumps:

SCREWLINE

SP 250: Cat 3i, T3 160°C

SP 630: Cat 3i, T3 160°C

DRYVAC

DV 650: Cat 2i, T2

DV 1200: Cat 2i, T2

RUVAC

WA(U) 251/501/1001/2001: Cat 3i, Tx

WA(U) 251/501/1001/2001: Cat 3i/3o,

Tx/Tx

WH 7000: Cat 2i, T2

These vacuum pumps have been designed for pumping explosive gas mixtures from different explosion hazardous areas.

They offer the necessary degree of safety and protection for personnel as well as the upstream and downstream process sections

Typical Applications

for ATEX certified vacuum pumps

- Evacuation of gas cylinders
- Steel degassing processes (VD, VOD, RH / RH-OB)
- Pumping of solvents in drying and filling applications
- Propane (R290), Butane (R600), Isobutane (R600a) as well as other refrigerants, which are used to fill refrigerant systems
- Pumping of solvent/air mixtures from distillation processes
- Vacuum sintering with hydrogen process step to remove binders
- Pharmaceutical freeze-drying
- Plasma coating processes with flammable precursors
- Kerosene vapor phase drying processes
- Fuel recycling
- Pumping out ammonia residues in nitriding processes



SCREWLINE SP

in Accordance with Directive 2014/34/EU

Rotary vane vacuum pumps

TRIVAC ATEX

The inside and outside of the pump complies with the basic safety requirements of the EU Directive 2014/34/EU.

For special requirements, the TRIVAC D 16 B ATEX is available for use in explosion hazard zone 1.



TRIVAC D 16 B ATEX with flame arresters

TRIVAC D 16 B ATEX

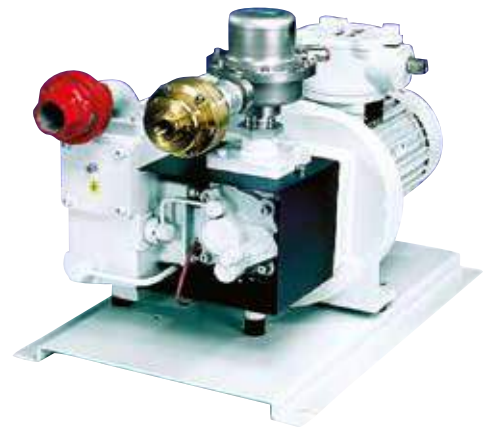
- Flame arresters on the inlet and outlet sides
- Pressure monitoring by a pressure sensor
- Temperature monitoring on the inlet and outlet sides
- Explosion-proof design of housing and motor

SOGEVAC ATEX

These pumps are equipped with corresponding ATEX motors. The plastic parts are antistatic as well as the exhaust oil mist separator filters.

SOGEVAC SV 40 ATEX

- Diaphragm pressure controller MR 40 is optionally possible
- PTB tested explosion proof design
- Flame arresters on the inlet and outlet sides
- Pressure sensor to monitor the pressure in the oil casing
- Pt100 temperature sensor for vacuum generator monitoring
- IIB+H2 version with additional Pt100 temperature sensor for inlet gas temperature monitoring



SOGEVAC SV 40 ATEX

SOGEVAC SV 40 B to SV 630 B

- Pt100 temperature sensor for vacuum generator monitoring
- Connection option at the gas ballast for inerting gas
- Motor fitted with PTC resistors
- Water cooled version available (SV 300 to SV 630 B)
- Yellow metal free (SV 200 to SV 630 B)

Vacuum pumps with oil-free compression

DRYVAC

The DRYVAC DV 650 ATEX 2i and DRYVAC DV 1200 ATEX 2i are suited for pumping the substances listed in the explosion group table.

The ATEX approval has been issued only for the inside chamber of the pump and T2 gases.



DRYVAC DV 650

SCREWLINE SP

The screw pumps from the lines SCREWLINE SP 250 ATEX and SP 630 ATEX comply with Category 3 (inside).

These pumps comply with the basic safety requirements laid down in ATEX Directive 2014/34/EU.

- As standard, all SCREWLINE ATEX pumps are equipped with a barrier gas control unit

RUVAC Roots Blowers

ATEX certified Roots pumps are available for the lines RUVAC WA / WAU 251/501/1001/2001 and RUVAC WH 7000 models.

RUVAC WA(U) comply with ATEX Category 3 (inside), as well as Category 3 (inside) and (outside) and are equipped with motors which comply with temperature classes T3 or T4.

- The RUVAC Roots blowers can optionally be equipped with a temperature monitoring facility (Pt 100 temperature sensor)

Classification in Accordance with 2014/34/EU

Vacuum pumps for pumping flammable gases or vapors and explosive gas mixtures or vapors - gas explosion protection - in accordance with the EU ATEX Directive

Areas of Application

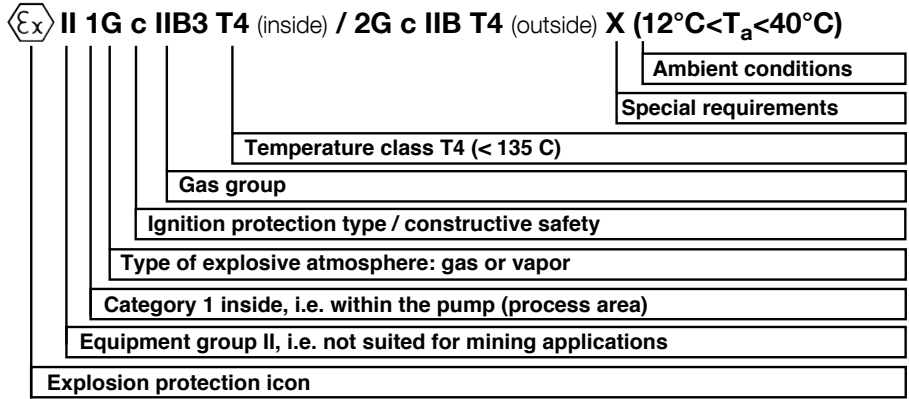
Vacuum pumps which shall be used for pumping flammable or explosive gas mixtures must fulfil special safety requirements.

Most vacuum processes are running below the minimum ignition pressure (< 50 mbar). For this reason the systems are safe even in the case of malfunctions. However, there exists a risk in the vacuum pump, where the pressure of the ignitable gas mixture is above the minimum ignition pressure.

Ignition Sources

Potential ignition sources in vacuum pumps:

- Hot surfaces
- Compression heat
- Mechanically produced sparks
- Sparks caused by static electricity
- Electrically produced sparks
- Chemical reactions



ATEX marking example: TRIVAC D 16 B ATEX

Classification

The certified vacuum pumps from Leybold comply as to their design and manufacture with the basic requirements laid down in the ATEX Directive (Directive 2014/34/EU) which “applies to equipment and protective systems intended for use in potentially explosive atmospheres”, specifically belonging to Equipment Group II, Category 3 to Category 1.

If the category differs between the inside (i), i.e. the process side and the outside (o) - pump sections which do not come into contact with the process gas - then this is stated separately.

Moreover, a classification is effected according to gas groups and temperature classes.

The Operator Directive

A conforming utilisation of products in connection with explosive atmospheres is a requirement for being able to ensure the highest possible degree of safety for personnel and systems.

The European Directive 99/92/EG - also called ATEX Operator Directive - demands the compilation of an explosion protection document.

In this document the operator defines the minimum requirements regarding the safety engineering aspects for his particular application.

For the purpose of fulfilling the requirements of the ATEX Operator Directive, the questionnaire opposite has been included to assist you in selecting the vacuum pump best suited for your purpose. Please state your specific requirements there.

Based on this information Leybold will prepare an offer without obligation for a corresponding pump which should meet your requirements.

Leybold

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ATEX TELEFAX Inquiry

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Enquiry regarding the minimum requirements according to your Explosion Protection Document



Necessary information for flame proof vacuum pumps to EU ATEX directive 2014/34/EU

Thank you for your interest in our vacuum pumps certified to the ATEX-directive. In order to select a vacuum pump best suited for your application and for legal reasons Leybold needs the following information.

Please answer the questions with care and completely. Please fill in the required information or mark the answers as appropriate. Send the questionnaire by fax or E-Mail to your contact person at Leybold or to your local sales representative. In case of uncertainties or questions please use the following contact data:

Phone: +49 (0)221 347 1112

Fax: +49 (0)221 347 1245

E-Mail: sales@leybold.com

Information on the required pump

Please select the required pump type and the needed pumping speed first:

- | | | |
|--|-------|-------------------|
| <input type="checkbox"/> TRIVAC - two stage rotary vane pump | _____ | m ³ /h |
| <input type="checkbox"/> SOGEVAC - single stage rotary vane pump | _____ | m ³ /h |
| <input type="checkbox"/> DRYVAC - dry compressing screw type pump | _____ | m ³ /h |
| <input type="checkbox"/> SCREWLINE - dry compressing screw type pump | _____ | m ³ /h |
| <input type="checkbox"/> RUVAC - roots pump | _____ | m ³ /h |

Information on operating conditions

For this information please refer to your explosion protection document. According to the ATEX-workplace directive (1999/92/EC) the user of a plant is obliged to create such a document. In this the zoning has to be specified.

Please consider that zoning has to be made separately for the outer environment (installation location) (o) and also for the inside (i) of your plant.

The pump will be installed in an outer environment (o) which is for gases specified as

- non potentially explosive atmosphere
- potentially explosive atmosphere of zone 0 zone 1 zone 2
- In addition a certification for dust zone 2 (cat. 22) is required

Inside the pump (i) the gas atmosphere is specified as

- non-potentially explosive atmosphere
- potentially explosive atmosphere of zone 0 zone 1 zone 2
- In addition a certification for dust zone 22 (cat. 3) is required

please turn over ...



ATEX TELEFAX Inquiry



Information on pumped products and pump environment

For information about gas class and temperature class please refer to your explosion protection document, the relevant material data sheet or data from the internet. For mixtures of different gases or substances please always cross the gas class with the lowest experimental safe gap height and the temperature class with the lowest auto ignition temperature.

The pump will be installed in an outer environment (o) with the following gas and temperature classes:

- | | | | |
|------------|---|--------------------|--|
| Gas class: | <input type="checkbox"/> IIA | Temperature class: | <input type="checkbox"/> T1 to max. 450 °C |
| | <input type="checkbox"/> IIB | | <input type="checkbox"/> T2 to max. 300 °C |
| | <input type="checkbox"/> IIB3 | | <input type="checkbox"/> T3 to max. 200 °C |
| | <input type="checkbox"/> IIB+H ₂ | | <input type="checkbox"/> T4 to max. 135 °C |
| | <input type="checkbox"/> IIC | | <input type="checkbox"/> T5 to max. 100 °C |
| | | | <input type="checkbox"/> T6 to max. 85 °C |

With the pump the following gases (i) will be pumped.

(Name and/or chemical formula - also CAS-No., if available):

The products have a classification of:

- | | | | |
|------------|---|--------------------|--|
| Gas class: | <input type="checkbox"/> IIA | Temperature class: | <input type="checkbox"/> T1 to max. 450 °C |
| | <input type="checkbox"/> IIB | | <input type="checkbox"/> T2 to max. 300 °C |
| | <input type="checkbox"/> IIB3 | | <input type="checkbox"/> T3 to max. 200 °C |
| | <input type="checkbox"/> IIB+H ₂ | | <input type="checkbox"/> T4 to max. 135 °C |
| | <input type="checkbox"/> IIC | | <input type="checkbox"/> T5 to max. 100 °C |
| | | | <input type="checkbox"/> T6 to max. 85 °C |

Please check if the material of construction of the pump is compatible with the pumped products. This is very important for aggressive and corrosive media. It is also important for the outer environment of the pump. Please refer for material of construction in contact with pumped products to the actual Leybold catalog, pump data sheets and information in the quotation.

Sender: _____

Date: _____

Name: _____

Phone: _____

Company: _____

Fax: _____

Dept.: _____

E-Mail: _____

ZIP/City: _____

Street: _____

City, sign, company stamp

