

# **ATEX**

## Vacuum Pumps in Accordance with the Directive 94/9/EG (ATEX 95)

Technical Information 100.90.02



# ATEX Certified Vacuum Pumps

Oerlikon Leybold Vacuum offers a selection of different types of vacuum pumps, which comply with the safety and health requirements laid down in the ATEX Directive 94/9/EG:

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

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
- 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



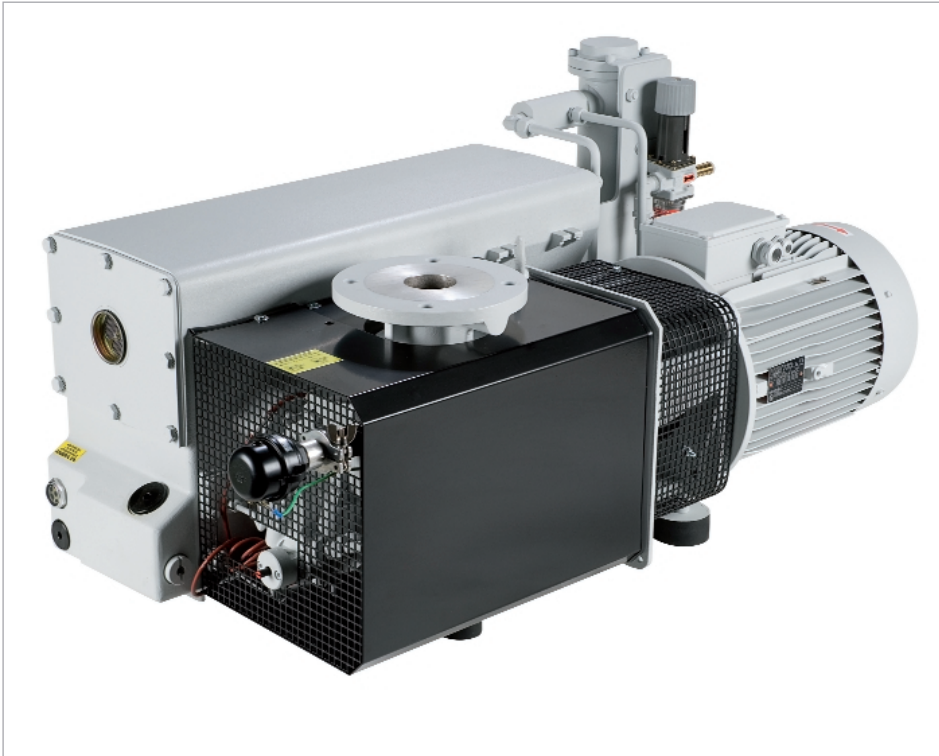
TRIVAC D 16 B ATEX with flame arresters

## Vacuum Pump Type Overview and Classification\*

Type	Model / Line	⊕ Classification inside (i)	outside (o)
TRIVAC	B, Cat. 3(i)	⊕ II (i) 3G IIC T4 (50 Hz) ⊕ II (i) 3G IIC T3 (60 Hz)	
	B, Cat. 3(i/o)	⊕ II (i) 3G IIC T4 (50 Hz)	(o) 3G IIC
	D 16 B ATEX, 1(i)/2(o)	⊕ II (i) 1G IIB3 T4 (50 Hz) ⊕ II (i) 1G IIC (no C2H2, CS2) T4 (50 Hz)	(o) 2G IIB T4 (o) 2G IIC T4
SOGEVAC	SV40 ATEX IIA	⊕ II (i) 1G IIA T3	(o) 2G IIA T3
	SV40 ATEX IIB + H2	⊕ II (i) 1G IIB+H2 T4 (50 Hz) ⊕ II (i) 1G IIB+H2 T3 (160 °C) (60 Hz)	(o) 2G IIB+H2 T4 (o) 2G IIB+H2 160 °C
	SV B ATEX Cat.3	⊕ II (i) 3G IIC T3	(o) 3GD IIC T3
RUVAC	WA/WAU	⊕ II (i) 3G IIC T3	
		⊕ II (i) 3G IIC T3 (50 Hz)	(o) 3G IIC T3
		⊕ II (i) 3G IIC T4 (50 Hz)	(o) 3G IIC T4
SCREWLINE	SP 250 (50/60 Hz)	⊕ II (i) 3GD IIC T3 (160 °C) X	
	SP 250 (50/60 Hz)	⊕ II (i) 3GD IIC T3 (160 °C)	(o) 3GD EEx nA IIC T3 (160 °C)X
	SP 250 (50 Hz)	⊕ II (i) 2Gb 3D IIC T4	(o) 3GD EEx nA IIC T3 (160 °C)X
	SP 250 (60 Hz)	⊕ II (i) 2Gb 3D IIC T3 (160 °C)	(o) 3GD EEx nA IIC T3 (160 °C)X
	SP 630 (50/60 Hz)	⊕ II (i) 3G IIC T3 (160 °C) X	
	SP 630 (50/60 Hz)	⊕ II (i) 2Gb 3D IIC T3 (160 °C)	(o) 3GD EEx nA IIC T3 (160 °C)X

\* of vacuum pumps in accordance with ATEX (extract)

## ATEX (94/9/EG) Compliant Rotary Vane Vacuum Pumps



SOGEVAC SV 300 ATEX

### TRIVAC ATEX

The inside and outside of the pump complies with the basic safety requirements of the EU Directive 94/9/EG.

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

#### 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

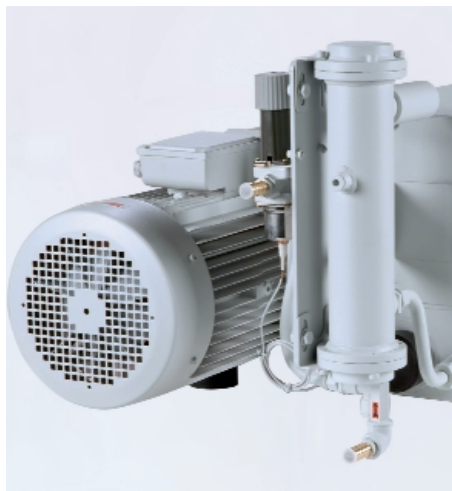
These pumps are equipped with corresponding ATEX motors. The plastic parts are antistatic as well as the exhaust oil mist separator filters.

#### SOGEVAC SV 40 ATEX

- Fitted with 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 housing
- Pt100 temperature sensor for vacuum generator monitoring
- IIB+H2 version with additional Pt100 temperature sensor for temperature monitoring at the inlet
- Connection option at the gas ballast for inerting gas

#### SOGEVAC SV 40 B to SV 750 B ATEX Cat. 3/3

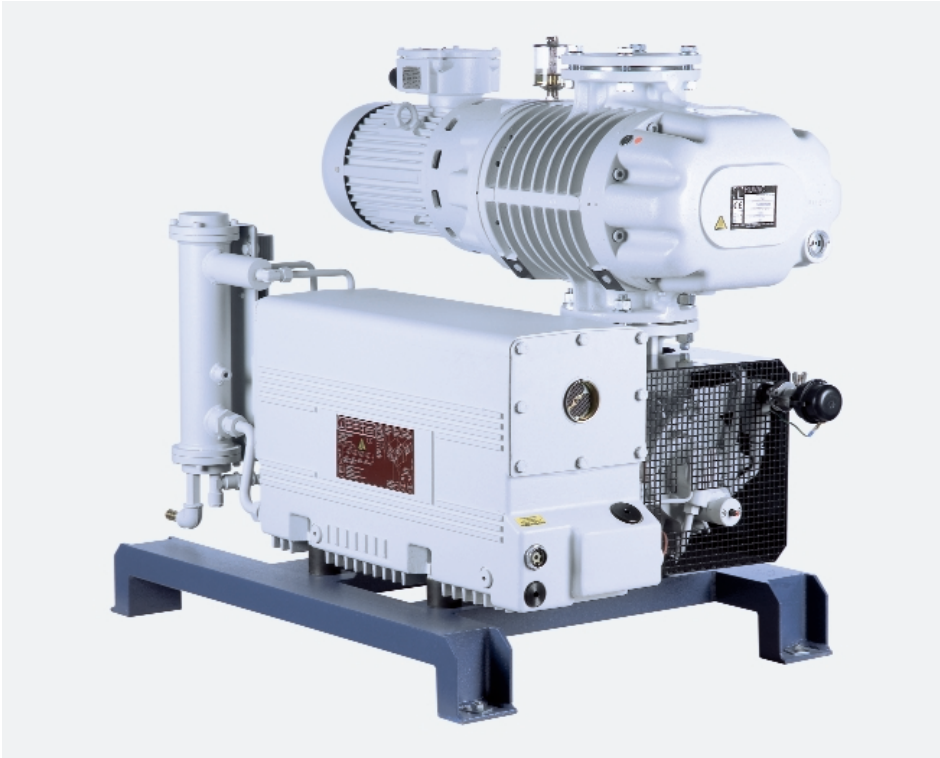
- Pt100 temperature sensor for vacuum generator monitoring
- Connection option at the gas ballast for inerting gas
- Motor fitted with PTC resistors
- Water cooled version (SV 300 to SV 750 B)
- Free of copper containing metals (SV 200 to SV 750 B)



SOGEVAC SV 300 ATEX detail

# in Accordance with Directive 94/9/EG (ATEX 95)

## ATEX (94/9/EG) Compliant Rotary Vane Vacuum Pumps



### Roots Pumps RUVAC WA / WAU

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

They 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 pumps WA/WAU can optionally be equipped with a temperature monitoring facility (Pt 100 temperature sensor)

ATEX compliant pump system with SOGEVAC SV 300 and RUVAC WAU 1001

## Screw Pumps SCREWLINE SP

The screw pumps from the lines SCREWLINE SP250 ATEX and SP630 ATEX comply with Category 3 (inside) respectively 2 inside and 3 outside.

These pumps comply with the basic safety requirements laid down in ATEX Directive 94/9/EG.

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



# Classification in Accordance with 94/9/EG

## 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

### Classification

The certified vacuum pumps from Oerlikon Leybold Vacuum comply as to their design and manufacture with the basic requirements laid down in the ATEX Directive (Directive 94/9/EG) 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

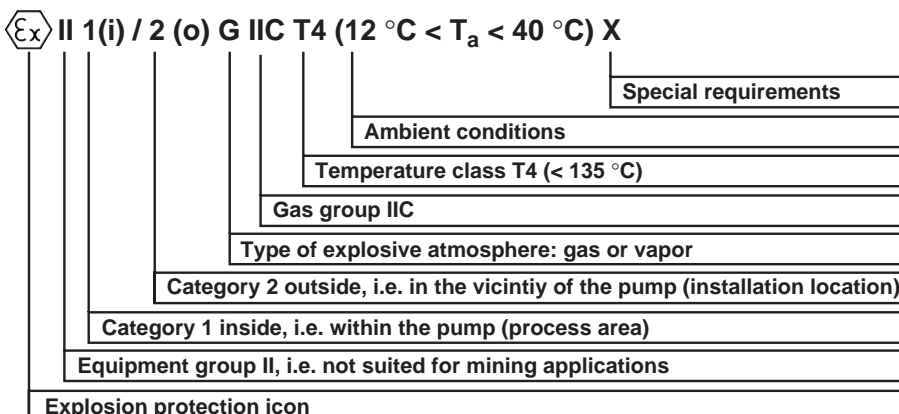
A conforming utilisation of products in connection with explosive atmospheres is a requirement for being able to ensure the highest possible degree of safety for personnel and systems.

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 overleaf 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 Oerlikon Leybold Vacuum will prepare an offer without obligation for a corresponding pump which should meet your requirements.

## ATEX Marking



Marking example: certified rotary vane pump TRIVAC D 16 B ATEX

## Ex Zones and Equipment Categories

Explosive atmosphere	Zone*	Category*	Probability that the pump is an ignition source
Constant, long-term or frequently present	0	1	No ignition source, even not in the event of rare malfunctions
To be expected from time to time	1	2	No ignition source, also in case of malfunctions
Rarely, and even if present then only briefly	2	3	No ignition source during normal operation

\* Rating for the inside and outside of the pump, resp.

# Fax Reply

+49 (0)221 347 1245

## Enquiry Regarding the Minimum Requirements According to Your Explosion Protection Document

Please send this questionnaire by fax or

E-mail to your Oerlikon Leybold Vacuum contact your local sales representative. Should you require assistance please use the general E-mail address: sales.vacuum@oerlikon.com

From company: \_\_\_\_\_

Tel.: \_\_\_\_\_

Name/department: \_\_\_\_\_

Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

Date: \_\_\_\_\_

Thank you for your interest in Oerlikon Leybold Vacuum pumps, certified in accordance with ATEX directives.

In order to select the vacuum pump best suited for your application, Oerlikon Leybold Vacuum requires the appropriate conditions for the specific application. Please take this information from the explosion protection document, the compilation of which is mandatory to you as the operator.

Please fill in this page with care. Completeness of the information is essential. The correctness of the information will decide as to the required degree of safety for personnel and systems. In case you have any questions on this topic or require the design of vacuum pump technology in accordance with your specifications, then our application consultants will be pleased to help you.

Please first propose the desired vacuum pump and the pumping speed:

TRIVAC \_\_\_\_\_ m<sup>3</sup>/h  
 RUVAC \_\_\_\_\_ m<sup>3</sup>/h

SOGEVAC \_\_\_\_\_ m<sup>3</sup>/h  
 SCREWLINE \_\_\_\_\_ m<sup>3</sup>/h

Please cross:

- 1.** There is an explosive atmosphere (no mining applications)
- (i) within the pump  
 (o) outside the pump

Please state for each of the following the explosive atmosphere.

- 2.** Zone (ignitable atmosphere)

(i) (o)

- 0 Danger constant, long-term, frequent  
  1 Danger from time to time  
  2 Rare danger

- 3.** Gas group

Gas/pumped medium: \_\_\_\_\_

- aggressive  corrosive  
 toxic  radioactive

(i) (o)

- I methane, for example  
  II A propane, for example  
  II B ethylene, for example  
 II B1  II B2  II B3  
  II C hydrogen, for example  
  Others (please state)

- 4.** Temperature class (maximum desired surface temperature of the operating agent)

(i) (o)

- T1 up to 450 °C max.  
  T2 up to 300 °C max.  
  T3 up to 200 °C max.  
  T4 up to 135 °C max.  
  T5 up to 100 °C max.  
  T6 up to 85 °C max.

(please cross; duplicates are allowed)

Please send me an offer.

Please answer the following questions:

City/date

Name/signature

Company stamp

### Headquarter Germany

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