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

Technical Information 100.90.02
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. 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.

### Vacuum Pump Type Overview and Classification*

<table>
<thead>
<tr>
<th>Type</th>
<th>Model / Line</th>
<th>Classification inside (i)</th>
<th>Classification outside (o)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRIVAC</td>
<td>B, Cat. 3(i)</td>
<td>g, II</td>
<td>3G IIC T4 (50 Hz)</td>
</tr>
<tr>
<td></td>
<td>B, Cat. 3(i/o)</td>
<td>g, II</td>
<td>3G IIC T4 (50 Hz)</td>
</tr>
<tr>
<td></td>
<td>D 16 B ATEX, 1(i)/2(o)</td>
<td>g, II</td>
<td>1G IIB3 T4 (50 Hz)</td>
</tr>
<tr>
<td></td>
<td>SOGEVAC SV40 ATEX IIA</td>
<td>g, II</td>
<td>1G IIA T3</td>
</tr>
<tr>
<td></td>
<td>SV B ATEX Cat.3</td>
<td>g, II</td>
<td>1G IIB+H2 T3 (160 °C)</td>
</tr>
<tr>
<td></td>
<td>RUVAC WA/WAU</td>
<td>g, II</td>
<td>3G IIC T3</td>
</tr>
<tr>
<td></td>
<td>SCREWLINE SP 250 (50/60 Hz)</td>
<td>g, II</td>
<td>3G IIC T3 (160 °C) X</td>
</tr>
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<td>SP 250 (50/60 Hz)</td>
<td>g, II</td>
<td>3G IIC T3 (160 °C)</td>
</tr>
<tr>
<td></td>
<td>SP 250 (50 Hz)</td>
<td>g, II</td>
<td>2Gb 3D IIC T3 (160 °C)</td>
</tr>
<tr>
<td></td>
<td>SP 250 (60 Hz)</td>
<td>g, II</td>
<td>3G IIC T3 (160 °C)</td>
</tr>
<tr>
<td></td>
<td>SP 630 (50/60 Hz)</td>
<td>g, II</td>
<td>3G IIC T3 (160 °C) X</td>
</tr>
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<td>g, II</td>
<td>3G IIC T3 (160 °C)</td>
</tr>
</tbody>
</table>

* of vacuum pumps in accordance with ATEX (extract)

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

**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
- 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)

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

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

Roots Pumps
RUVCWA / WAU
ATEX certified Roots pumps are available for the lines RUVC 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 RUVC Roots pumps WA/WAU can optionally be equipped with a temperature monitoring facility (Pt 100 temperature sensor).

Screw Pumps
SCREWLINE SP
The screw pumps from the lines SCREWLINE SF250 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 fulfill 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.

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.


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

Ex Zones and Equipment Categories

<table>
<thead>
<tr>
<th>Explosive atmosphere</th>
<th>Zone*</th>
<th>Category*</th>
<th>Probability that the pump is an ignition source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant, long-term or frequently present</td>
<td>0</td>
<td>1</td>
<td>No ignition source, even not in the event of rare malfunctions</td>
</tr>
<tr>
<td>To be expected from time to time</td>
<td>1</td>
<td>2</td>
<td>No ignition source, also in case of malfunctions</td>
</tr>
<tr>
<td>Rarely, and even if present then only briefly</td>
<td>2</td>
<td>3</td>
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* Rating for the inside and outside of the pump, resp.

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Marking example: certified rotary vane pump TRIVAC D 16 B ATEX
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, our application consultants will be pleased to help you.

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

<table>
<thead>
<tr>
<th>Desired Vacuum Pump</th>
<th>Pumping Speed</th>
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</thead>
<tbody>
<tr>
<td>TRIVAC</td>
<td>______ m³/h</td>
</tr>
<tr>
<td>RUVAC</td>
<td>______ m³/h</td>
</tr>
<tr>
<td>SOGEVAC</td>
<td>______ m³/h</td>
</tr>
<tr>
<td>SCREWLINE</td>
<td>______ m³/h</td>
</tr>
</tbody>
</table>

Please answer the following questions:

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) 0 Danger constant, long-term, frequent
   - [ ] (o) 1 Danger from time to time
   - [ ] 2 Rare danger

3. Gas group
   - [ ] aggressive
   - [ ] corrosive
   - [ ] toxic
   - [ ] radioactive
   - [ ] 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)
   - [ ] 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.

City/date: ____________________________  Name/signature: ____________________________
Company stamp: ____________________