

SMALL PUMPS AND PUMPING SYSTEMS

THE INTELLIGENT CHOICE

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Small Pumps and Pumping Systems

To meet the diverse needs of applications ranging from analytical instrumentation, wet chemistry and R&D to light industrial, Edwards offers a comprehensive range of different pumping technologies. Refer to the application and accessory guide to select pumps and accessories for your application.

Oil Free Scroll Pumps

Scroll pumps are an excellent alternative to rotary vane pumps where oil free pumping is desirable.

The innovative XDS pumps in particular use a bearing shield to isolate the vacuum environment from all forms of lubricant not only making them totally dry, but also protecting the bearing from any process gases. Vapour handling is enabled by a gas ballast; this allows the range of pumps to satisfy many applications that were previously off limits to scroll pumps.

- $\leq 2 \times 10^{-2}$ mbar / $\leq 1.5 \times 10^{-2}$ Torr
- 5 to 35 m³h⁻¹ / 2.9 to 20.6 ft³min⁻¹

Oil free scroll pumps



Oil Sealed Rotary Vane Pumps

- $\leq 10^{-3}$ mbar / $\leq 10^{-3}$ Torr
- 0.9 to 32.3 m³h⁻¹ / 0.5 to 19.5 ft³min⁻¹
- This wide range of rugged pumps offers an excellent ultimate with good pumping speed. RV pumps have superior vapour handling capabilities, while operating quietly.

Oil sealed rotary vane pumps



Oil Free Diaphragm Pumps

- ≤ 2 mbar / ≤ 1.5 Torr
- 0.6 to 2.0 m³h⁻¹ / 0.35 to 1.2 ft³min⁻¹

The D-LAB diaphragm pumps are made of corrosion resistant materials to withstand attack from chemicals. They are ideal for applications such as gel drying and other wet chemistry processes. The XDD1 diaphragm pumps provide oil free backing for compound turbomolecular pumps.

Easy to Service

All Edwards pumps are designed for easy routine maintenance. Key components are easily accessible and, with RV and XDS pumps, no special tools are required. Service kits of guaranteed parts are available for routine service by the user. Worldwide support from the Edwards service organisation is also available.

Quality Manufacture

Edwards pumps are manufactured on state of the art machine tools for high consistency of components. For example, RV rotors are manufactured in a robotic cell to remove errors and inconsistencies from the manufacturing process.

Applications

Edwards high performance pumps are used in many industrial and laboratory applications, including the following:

- Electron microscopes, mass spectrometry, residual gas analysers and surface analysis
- Epoxy degassing, powder materials processing
- Solvent concentration
- Sterilization, distillation and centrifuges
- Gel dryers and glove boxes
- Atomic emission spectrometers, nuclear physics, fusion technology and space research
- Vacuum ovens
- TV tube evacuation
- Automotive system filling
- Freeze drying
- Vacuum metallurgy

Small Pumps: Application and Accessory Information

Use the information in the list below to select the best pump and accessories for your application. The information is given as a guide only; the optimum set-up may depend on your specific method of operation. Note that you need to buy the accessories separately, unless otherwise stated.

ATEX and Flammable Gases

The following standard pump models have an internal ATEX classification of II 3 G c IIB T4:

- E2M0.7, E2M1.5
- E1M18, E2M18 & E2M28
- RV3, RV5, RV8, RV12
- nXDS6i, nXDS10i, nXDS15i, nXDS20i, XDS35i

The following standard pump models operating on hydrocarbon oil can be supplied with flameproof motors providing an external classification of II 2 G IIB T4 (or IIC):

- RV3, RV5, RV8, RV12
- E1M18, E2M18



Gel Dryers

Recommended pump: nXDS/XDS or DLAB.
Suggested accessories for DLAB: Separator.
Optional accessories for DLAB: Condenser, gas ballast valve.

Rotary Evaporation and Vacuum Ovens

Recommended pump: nXDS/XDS or DLAB.
Suggested accessories for DLAB: Separator.
Optional accessories for DLAB: Condenser, gas ballast valve.

Centrifugal Concentration

Recommended pump: nXDS/XDS.

Vacuum Filtration

Recommended pump: nXDS/XDS or DLAB.
Suggested accessories for DLAB: Separator.
Optional accessories for DLAB: Condenser, gas ballast valve.

Distillation/Extraction Apparatus

Recommended pump: nXDS/XDS or DLAB.
Suggested accessories for DLAB: Separator.
Optional accessories for DLAB: Condenser, gas ballast valve.

Freeze Dryers

Recommended pump: nXDS/XDS or Rotary pumps.
Suggested accessories: Mist filters, oil return.

MS Inlet Systems (like Electro-Spray)

Recommended pump: XDS35i or E2M28.
Suggested accessories for rotary pumps: Mist filter, oil return.
Suggested accessories for nXDS/XDS: Silencer.

Load Locks, Fume Hoods and Glove Boxes

Recommended pump: nXDS/XDS or Rotary pumps.
Suggested accessories for rotary pumps: Mist filter, oil return.
Suggested accessories for nXDS/XDS: Silencer.

Ultra High Speed Centrifuges

Recommended pump: nXDS/XDS or Rotary pumps.
Suggested accessories: Mist filter
Suggested accessories for rotary pumps: Mist filters, oil return.

Leak Detection, Electron Microscopes, Mass Spectrometers and Lasers

Recommended pump: nXDS/XDS or Rotary pumps.
Suggested accessories for rotary pumps: FL20K, Mist filter.
Suggested accessories for nXDS/XDS: Silencer.

Surface Science and Particle Size Analysers

Recommended pump: nXDS/XDS or Rotary pumps.
Suggested accessories for rotary pumps: FL20K, Mist filter.
Suggested accessories for nXDS/XDS: Silencer.

High Energy Physics

Recommended pump: nXDS/XDS or Rotary pumps.
Suggested accessories for rotary pumps: FL20K, Mist filter.
Suggested accessories for nXDS/XDS: Silencer.

Helium or Rare Gas Recirculation

Recommended pumps: nXDS/XDS

Backing Turbomolecular Pumps

Recommended pump: nXDS/XDS, XDD1 or Rotary pumps.
Suggested accessories for rotary pumps: FL20K, Mist filter.
Suggested accessories for nXDS/XDS: Silencer.

Backing Diffusion Pumps

Recommended pump: nXDS/XDS or Rotary pumps.
Suggested accessories for rotary pumps: FL20K, Mist filter.
Suggested accessories for nXDS/XDS: Silencer.

Notes

- FL20K is an inlet trap, to prevent oil back-streaming.
- ITF20K is an inlet trap, to capture dust particles.
- The gas ballast facility allows atmospheric air into the pump, minimising the formation of condensates (which contaminate the oil in rotary pumps).
- An oil return kit is available for E2M0.7, E2M1.5, RV, EM18 and E2M28 pumps to allow oil to be returned from the mist filter to the pump. A gas ballast oil return is also available to allow oil to return and have gas ballast flow.

Refrigeration, Air Conditioning Systems

Recommended pump: nXDS/XDS or Rotary pumps.
Suggested accessories for rotary pumps: FL20K, Mist filter.
Suggested accessories for nXDS/XDS: Silencer.

Vacuum Furnace

Recommended pump: nXDS/XDS or Rotary pumps.
Suggested accessories for rotary pumps: ITF20K, Mist filter.
Suggested accessories for nXDS/XDS: Silencer.

Azide Forming Applications

Recommended pump: nXDS/XDS or Rotary pumps.
Suggested accessories for rotary pumps: Mist filter.
Suggested accessories for nXDS/XDS: Silencer.

Small Pumps and Accessories: Frequently Asked Questions

Oil Mist

Question: What accessory do I use to trap oil mist (which all oil sealed pumps emit during pump down or with gas ballast)?

Answer: To meet regulations and preserve pump oil, fit a recommended Edwards oil mist filter (EMF) to the pump outlet, and connect the exhaust to an exhaust line.

Question: If I operate an RV pump continuously or with high inlet pressure, what accessories do I need?

Answer: Fit an Edwards mist filter (EMF) and a gas ballast oil return (GBOR) kit. Then the pump can be operated with the mode switch open and gas ballast oil return. The oil condensed in the filter will be continuously returned to the pump oil box.

Vapour Processes

Question: Which pump and accessories should I use if my process generates vapours which could condense in the pump?

Answer: You can choose either an nXDS/XDS pump, or rotary pump. Gas ballast should be used with both pumps; to sweep the vapour through the pump. This prevents condensation and oil contamination. Operate the pump with gas ballast for at least an hour before and after use. Choose the size of pump taking into account the vapour pumping rate. If you selected a rotary pump, then you should fit a gas ballast oil return kit and mist filter. Change the oil frequently and keep an oil change reminder tag on the pump. DLAB would also be a suitable alternative depending on required pumping speed.

Dust and Particle Processes

Question: Which pump and accessory should I use if my process generates dust or grit, which could clog or damage the pump?

Answer: Use a rotary pump fitted with an inlet dust filter. We do not recommend the use of scroll pumps or XDD1 pumps for these applications.

Special Chemical Cleaning Processes

Question: Which pump and accessory should I use if my process generates oxygen or ozone?

Answer: Use a rotary pump adapted to run with Fomblin® oil or nXDS/ XDS. Contact Edwards for more information.

Question: Are there any special considerations if my pump will be used in the vicinity of organic gases, like propane?

Answer: Use a rotary pump fitted with a flameproof motor. Contact Edwards for more information.

Contamination

Question: Which pump and accessories should I use if I must ensure that my process and process chamber (operated below 0.1) are not contaminated with oil from the pump?

Answer: Use an nXDS/XDS scroll pump. Alternatively, you can use a rotary pump with a FL20K foreline trap fitted to the system inlet. The trap contains activated alumina which traps the oil molecules. To maintain the alumina charge, bake the charge basket or replace as required.

Question: How can I reduce the noise level of my pump?

Answer: If the noise is only obvious during pumping down then fitting the exhaust with a silencer (nXDS/XDS pumps), or fitting an exhaust line will reduce the level. An alternative is to fit an acoustic enclosure. Contact Edwards for more information.

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