

# VACUUM SOLUTIONS FOR CHEMICAL PROCESS INDUSTRIES



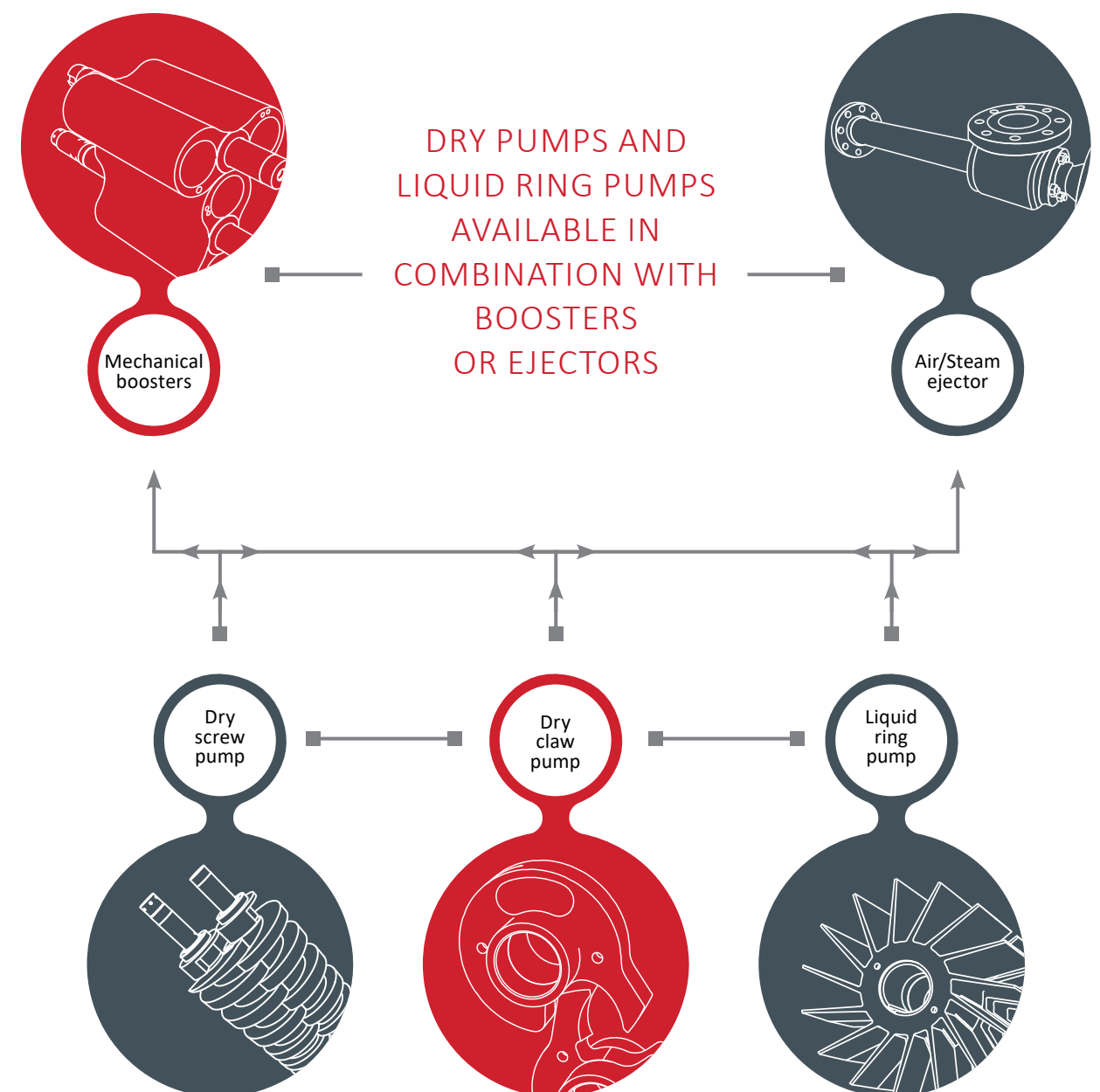
# EDWARDS THE PARTNER OF CHOICE

Edwards, a world leader in vacuum solutions and innovator in vacuum pump design and manufacturing, has been delivering solutions that bring value to manufacturing industries for more than 100 years.

We believe in delivering results that bring value to our customers by using our breadth of industry experience to identify and apply solutions to your problems. Using the most innovative and up-to-date modelling techniques, we optimise the pumping configuration for customers to provide a system design giving the maximum performance in the most reliable and cost-effective way.

# MORE THAN PUMPS, COMPLETE VACUUM SYSTEMS AND SOLUTIONS

Edwards is a world leader in the design, technology and manufacture of vacuum pumps. For the chemical industry, Edwards offers a wide range of vacuum pumps and systems to meet the demanding process applications in the base and fine chemicals, specialty chemicals and pharmaceutical applications.



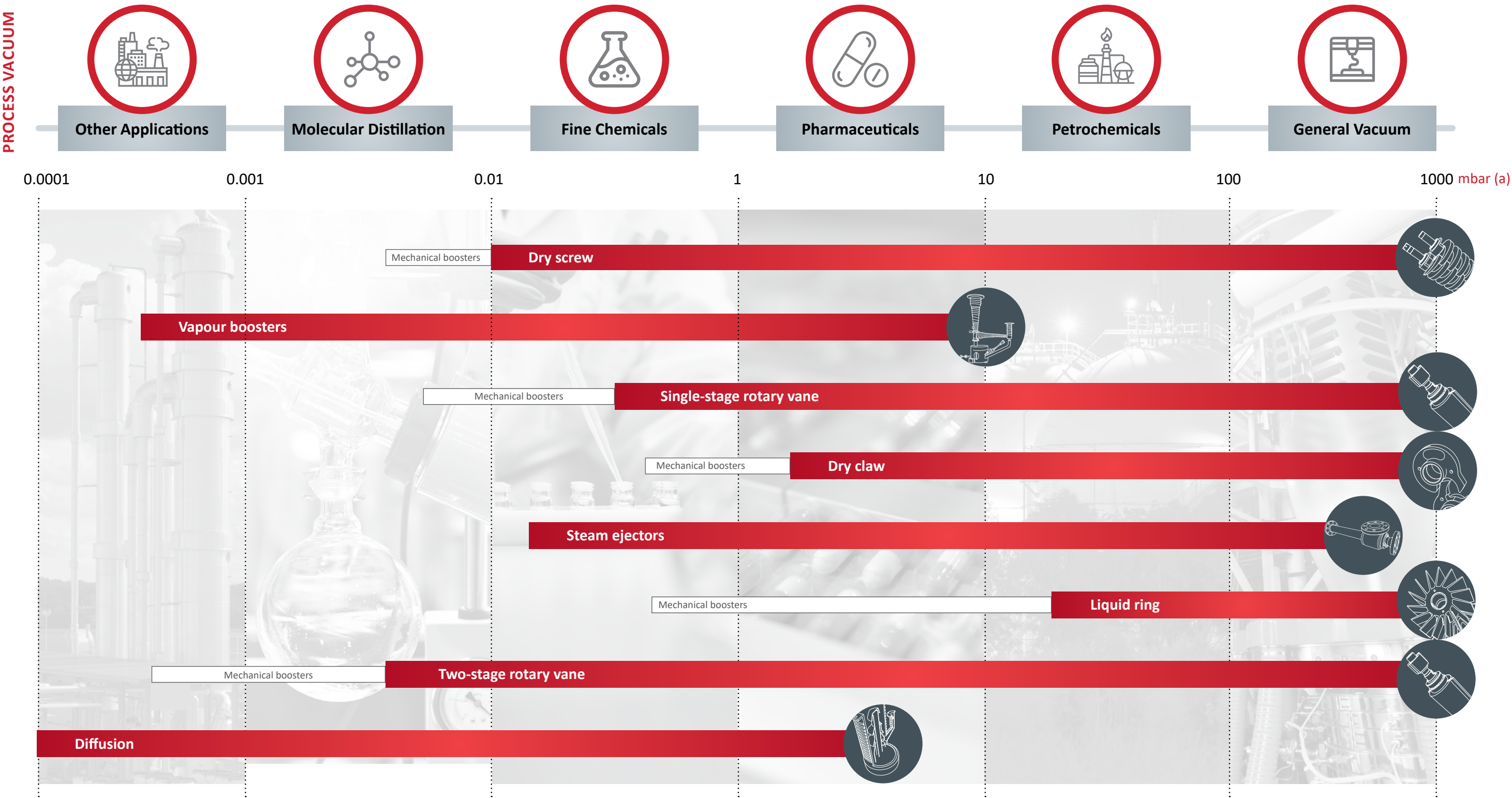


# TECHNOLOGY INTRODUCTION

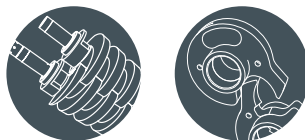
With rapid advances in technology, chemical processing industries place increasingly challenging demands on vacuum systems. As a leader in vacuum technology, Edwards has an entire portfolio of world-leading pumping technology vacuum products to meet the demanding applications in process industries.

## ENABLING QUALITY PRODUCTION

APIs | Adhesives | Aromatics | Basic chemical processing | Biofuels | Detergents  
Fertilisers and pesticides | Fibre production | Flavours and fragrances | Olefins | Oleochemicals  
Pharma end products | Pigments and paints | Refinery VDU | Resin and polymer production



## DRY PUMPS SYSTEMS



EDP system

Edwards, a world leader in dry vacuum pump technology, successfully pioneered the use of environment-friendly dry vacuum pumps in the early 1980s to meet the highest safety and performance standards. Featuring an award-winning reverse claw mechanism and patented tapered screw technologies, Edwards delivers exceptional performance and energy efficiency with our dry pumps and combinations customised for chemical applications.

Our dry vacuum pumps are capable of handling increasingly complex chemicals, solvents and compounds in a reliable and safe way while ensuring the control and reduction of environmental pollution at a low cost of ownership.

- EDP, EDS, CXS, CDX
- Up to 40,000 m<sup>3</sup>/h in combination with boosters
- Ultimate vacuum up to 0.001 mbar(a) with boosters

## LIQUID RING PUMPS SYSTEMS



LRP system

The Edwards liquid ring pump (LRP) range includes single- and two-stage machines enabling optimum efficiency for processes operating across the process vacuum range. Pump capacities up to 40,000 m<sup>3</sup>/h are available in single-stage and 7,500 m<sup>3</sup>/h in two-stage models.

The Edwards LRP range of vacuum pumps is available as standard packages of once through, partial and total re-circulation operation. Liquid ring pumps offer significant advantages when pumping wet gases and vapours or when used for applications requiring special construction materials for corrosion resistance. LRPs can operate with different seal liquids, enabling operations with a liquid compatible with the process.

- HR, LR1A, LR1B, LR1C, LR1D series
- Up to 40,000 m<sup>3</sup>/h
- Ultimate vacuum up to 0.1 mbar(a) with boosters

## ROTARY VANE PUMPS SYSTEMS



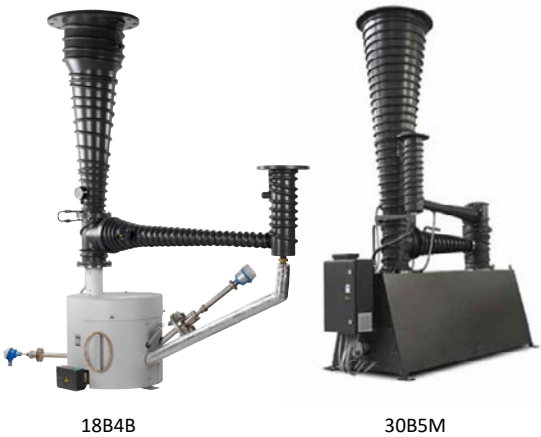
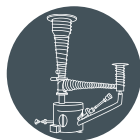
nES EX

E2M/EH Booster Combination

Our Ex series of single-stage and two-stage rotary vane pumps has been specifically designed to handle gases from potentially explosive atmospheres and to operate in environments where a potentially explosive atmosphere can be present. Designed for reliable, long-term operation, our oil-sealed rotary vane pumps are renowned for achieving high ultimate vacuum and rapid pumping speeds, with quiet operation and exceptional reliability.

- nES EX - Upto 3300 m<sup>3</sup>/h
- E2M - Upto 2800 m<sup>3</sup>/h
- Ultimate vacuum up to 4x10<sup>-3</sup> mbar
- Ultimate vacuum up to 4x10<sup>-4</sup> mbar

## VAPOUR BOOSTERS



18B4B

30B5M

When higher pumping speeds are needed, our vapour booster pumps are the ideal solution. Field-proven in various industries for more than 60 years, they provide benefits ranging from ease of use, inherent reliability, ease of maintenance and tolerance to a wide variety of inlet and exhaust pressures.

Special variants for applications, such as short path and molecular distillation of fish oils, vegetable oils and vitamins, deodorisation and refining of oils and waxes, and purification of crop protection chemicals, have been created in combination with our vacuum pumps for chemical applications.

- 18B4B, 30B5M
  - Capacities up to 15,000 l/sec
  - Up to 1x10<sup>-4</sup> mbar(a) ultimate pressure
- ATEX available on demand.

## MECHANICAL BOOSTERS



EH Boosters

HV Boosters

Stokes 6" Boosters

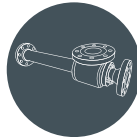
GMB40K Boosters

When coupled with our wide range of vacuum pumps, mechanical boosters increase pumping speed at working pressures, significantly reducing the pump downtime.

- EH boosters, HV boosters
- 250–40,000 m<sup>3</sup>/h
- GMB40K boosters, Stokes 6" mechanical booster

**Edwards dry vacuum systems, liquid ring pump systems and EH boosters are ATEX certified up to Zone 0 while other mechanical boosters are certified up to Zone 1.**

## EJECTORS



Multi stage ejector system



Steam ejector

Edwards has been instrumental in the development of steam ejectors from the original crude single-stage devices to the highly efficient multi-stage systems currently in use.

Edwards offers single-stage ejector systems and multi-stage systems, providing improved energy efficiency and the capability to handle high vapour loads without the risk of cavitation. They are available in various materials of construction such as carbon steel, stainless steel and a variety of corrosion-resistant alloys with a relatively low capital cost, providing an attractive return on investment.

- Pressure range
  - 1 Stage 120 mbar(a),
  - 2 Stage 25 mbar(a),
  - 3 Stage 7 mbar(a),
  - 4 Stage 1 mbar(a),
  - 5 Stage 0.1 mbar(a)
- Capacity range
  - 25 mm to 2,500 mm inlet pipes
  - Up to 1,500,000 m<sup>3</sup>/hr inlet gas flows
- Multiple elements for increased capacity
  - Standard sizes up to 1,000 mm inlet pipe

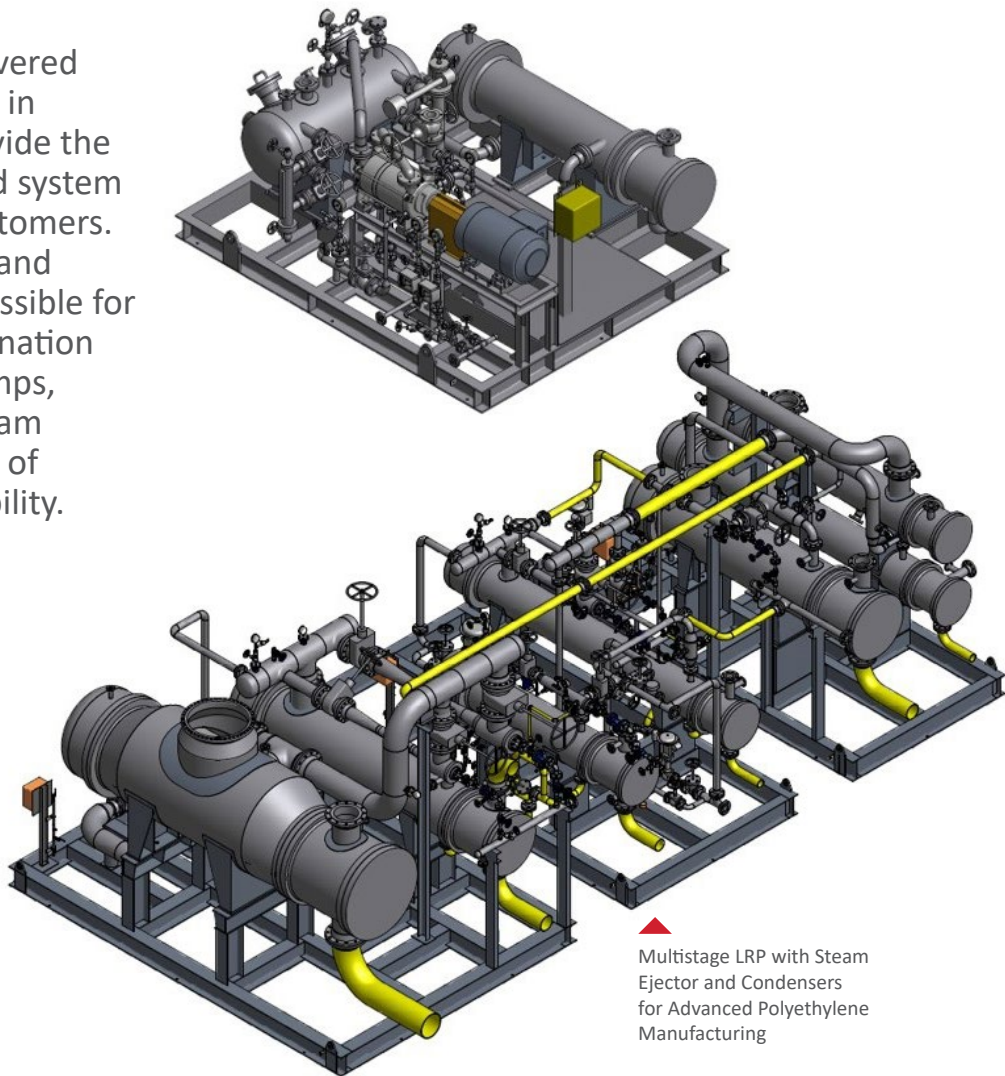


# HYBRID SYSTEMS

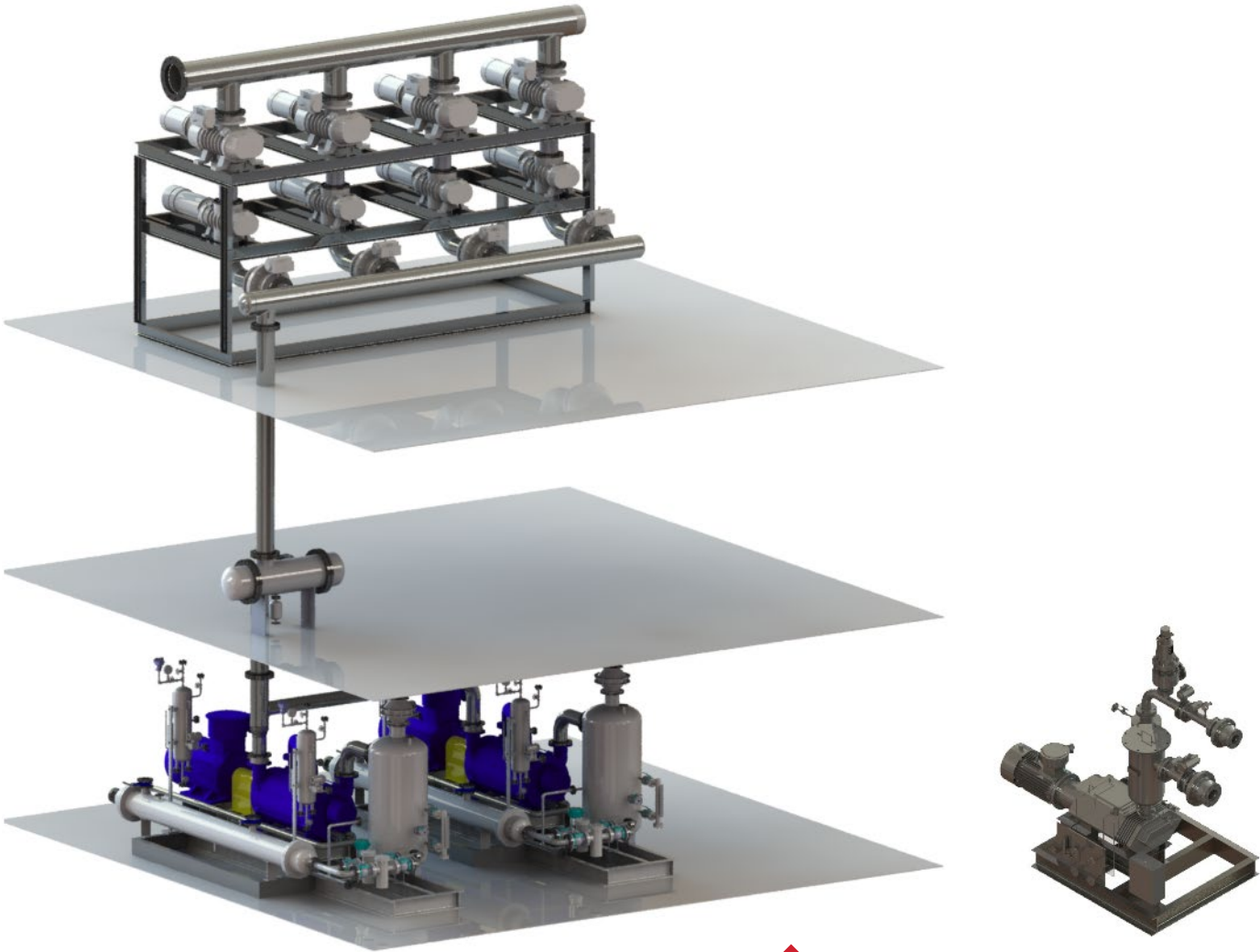
## END-TO-END TURNKEY PROJECTS FOR PROCESS IMPROVEMENT

We have developed and delivered state-of-the-art technologies in various combinations to provide the most reliable and customised system solutions for our process customers. Our applications knowledge and vacuum expertise make it possible for us to provide the best combination of dry pumps, liquid ring pumps, mechanical boosters and steam ejectors with the lowest cost of ownership and highest reliability.

VARIETY OF DRY PUMP AND LIQUID RING PUMP COMBINATIONS TO PROVIDE THE MOST RELIABLE SYSTEM FOR YOUR PROCESS



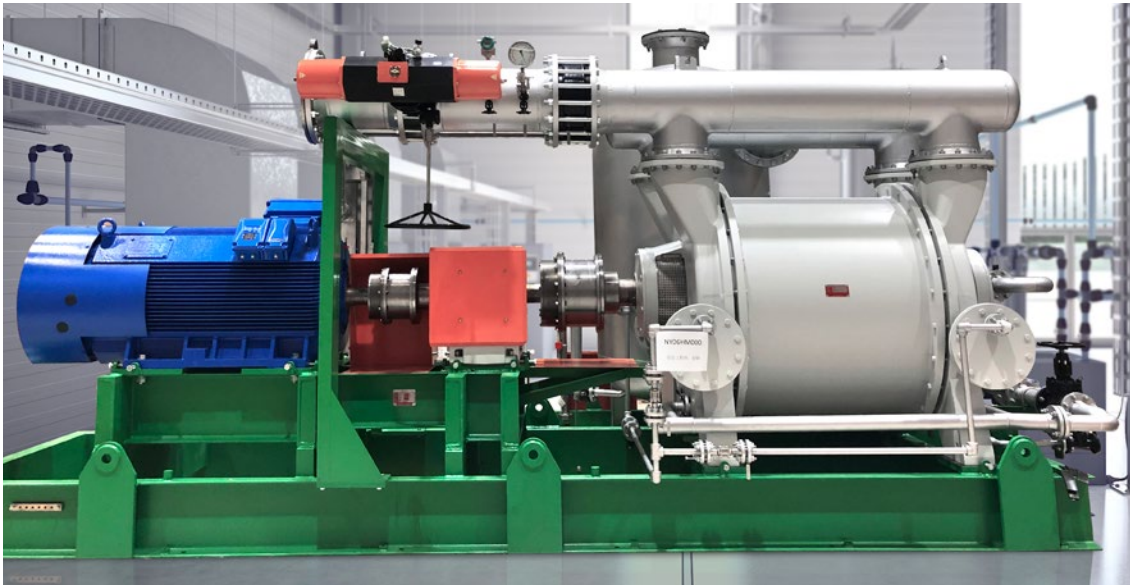
Multistage LRP with Steam Ejector and Condensers for Advanced Polyethylene Manufacturing



Hybrid system with Stokes Booster, CDX Dry screw pump and Liquid Ring Pump combination for DPC Polycarbonate application



CDX100 Dry screw pump with EH2600 Booster package for chemical application



Single-stage Liquid Ring Package



Double Stage LRP for Condenser Air Extraction



# APPLICATION ENGINEERING, DESIGN AND SYSTEMISATION

Edwards' application expertise and in-depth knowledge of the chemical process industry, based on thousands of installations, enable a comprehensive package of design and systemisation solutions.

- **Optimisation of vacuum system design**
- **Focus on safety, reliability, durability, efficiency and environmental considerations**
- **Equipment selection, specification and integration into the process plant**
- **Compliance with user requirements and specifications**
- **Vacuum system integration with user control systems**
- **Supervision of commissioning, installation and operator training**

Our highly experienced team of Application and Proposal Engineers, located in regions close to our customers, will assist with the selection, sizing and design of your vacuum pumping system to meet your vacuum needs. Meanwhile, our Engineers in the product companies will handle the order execution of your vacuum system from the receipt of order to the design, assembly and testing. Further, our team of Commissioning Engineers can support the installation on site.

# EXPLOSION-PROOF COMPLIANCE

Edwards offers a wide range of products for use in and with explosive atmospheres certified for ATEX, relevant American and other applicable global standards.

ATEX certification has been achieved for all of Edwards' Chemical range vacuum pumps up to Zone 1, and with a wide range of pumps going up to Zone 0. By using constructional safety as a protection strategy combined, wherever appropriate, with flame arresters on the inlet and outlet of the pump, the Edwards chemical pumps achieve a very high level of safety (Zone 0) suitable for the most demanding applications.

For the American market, electrical components such as valves and motors for hazardous locations to suit the customer requirements can be chosen and combined with the Edwards chemical pump range to achieve compliance with NEC500 and NEC505. In addition, the pumps used are designed and manufactured to the same high requirements as demanded by the ATEX directive.



# SERVICE SOLUTIONS

Edwards understands the importance of local support. We have a number of major service facilities located around the world, each location supported by an extensive team of engineers and technicians to provide local, rapid response and great value service.

- **Comprehensive service**
- **Extended warranties**
- **Repair**
- **Managed maintenance**
- **Certified products**

All our service operations are conducted at the highest international standards in accordance with ISO 9001 (quality), ISO 14001 (environmental) and OHSAS 18001 (workplace safety).





## GLOBAL CONTACTS

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