

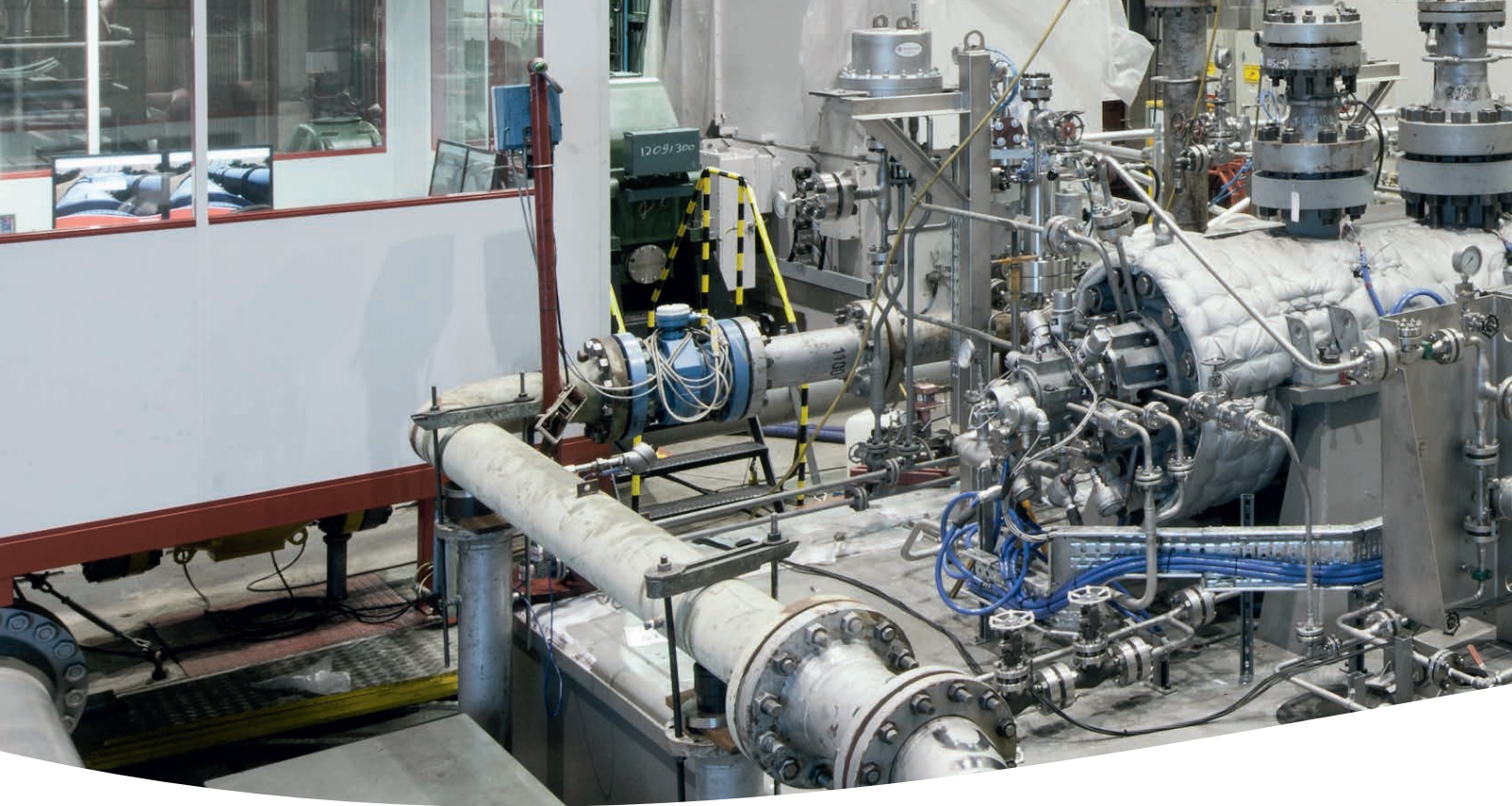


Flowserve Etten-Leur Test Center

Advanced Testing and Engineering Expertise
Serving Europe, Middle East and Africa



Experience In Motion



Providing unparalleled testing capabilities to the EMA market

Highly engineered pumps and seals are designed to meet specific requirements, but over time, their performance can decline. And as equipment performance slips, it can negatively impact your operation, causing increased downtime, higher maintenance and energy costs, lost revenue and more risk.

The Flowserve Etten-Leur campus is a one-stop shop for all sorts of aftermarket services. Engineers at the facility can respond rapidly to identify and correct issues related to pump and seal performance and reliability, regardless of the OEM.

Fully equipped with machinery and expertise

The Etten-Leur Test Center is part of the Etten-Leur campus. The campus is fully equipped, including high-end, five-axis CNC machines and a state-of-the-art warehousing system. It is staffed with about 100 engineers with CFD, FEA and CAD expertise to test, modify and repair pumps, seals and other equipment.

Some campus numbers

- 22,500 m² of floor area
- 100 dedicated engineers
- 450 operational employees
- 20 nationalities
- 35 high-end, five-axis CNC machines
- 20,000 different parts in stock

Testing capabilities

The Etten-Leur facility is designed to quickly meet the needs of customers in Europe, Middle East and Africa. With access to advanced testing capabilities, engineers can evaluate the performance of pumps and seals under real-world conditions. In addition, other equipment can be tested, such as gearboxes, valves and electric motors.

Pump testing capabilities

- 11 different loops
- Capacities to 30,000 m³/h
- Pressures to 400 bar (5802 psi)
- Speeds to 9000 rpm (VFD)
- Horizontal, vertical and submersible pump hydraulic testing
- String testing, field test simulation
- Measurements according to API 610/ISO and Hydraulic Institute standards (head/pressure/flow rate, power and efficiency, NPSH, vibration, noise)





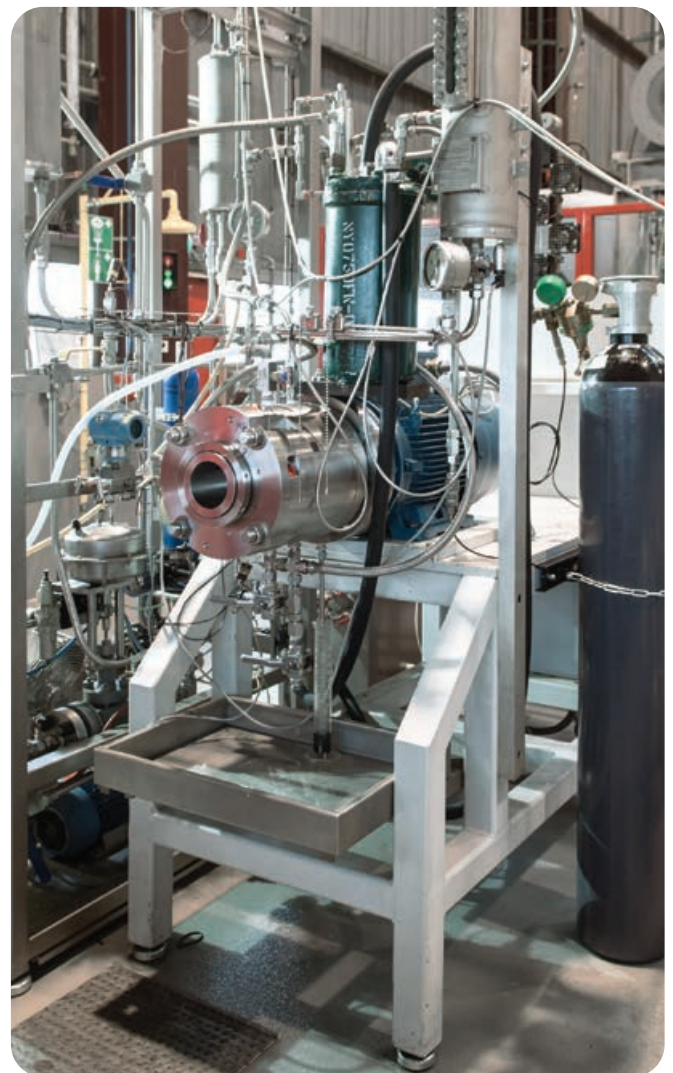
Seal testing capabilities

- Four test units
- Speeds to 7000 rpm
- Pressures to 200 bar (2901 psi)
- Temperatures to 150°C (302°F)
- Water, oil and caustic fluid condition testing
- Clean-room facilities for seal inspections and maintenance
- Face profile measuring
- Microscope
- Measurements according to API 682 (leakage, temperatures, lifetime)

High-energy testing

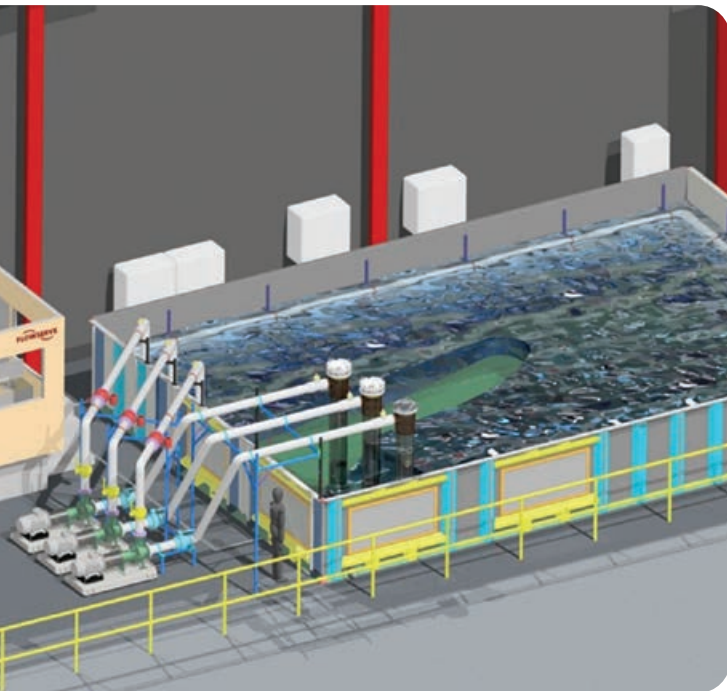
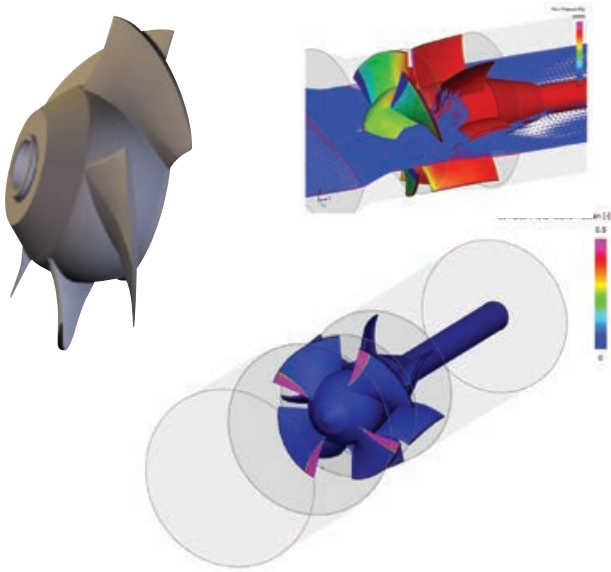
Testing highly engineered equipment under real-world conditions requires a huge amount of power as well as the ability to cool rapidly. To meet these needs, the Etten-Leur facility features the following:

- 28 MW (38,000 hp) of electrical power (largest electrical driver: 18 MW)
- 30 MW (42,000 hp) of cooling capacity
- Direct power supply of 150 kV; transformed to 3, 6, 6.6 or 10 kV
- 6 MW variable frequency drive electric motors to 13.8 kV
- Cutting-edge data collection
- Lifting capacity to 120 metric tons at 13 m (42.7 ft) height



Scaled model testing

For large, high specific speed pumps and critical NPSH applications, the Etten-Leur facility provides cavitation visualization and scaled model testing. Scaled model testing includes a dedicated loop for product and experimental tests as well as fully stainless steel piping and a vacuum tank to ensure the highest cleanliness level and visibility.



Pump intake testing

The facility provides Froude scaled pump intake testing for cooling water intake channels and sumps, surface water pumping stations and drainage stations. Free surface intakes are prone to issues related to submergence, air entrainment and vortex formation, directly impacting operational reliability.

Hydraulic engineers can improve performance and reliability by analyzing and addressing adverse approach flow conditions, free surface and submerged vortices, overall hydraulic conditions and local areas of high turbulence.

Conveniently located

The Etten-Leur campus is easily accessible. It's centrally located near Europe's main seaports (Rotterdam, Antwerp and Hamburg) and airports (Amsterdam, Brussels, Paris, London and Frankfurt).



Testing Center

① Etten-Leur

Seaports

② Rotterdam

③ Antwerp

④ Hamburg

Airports

⑤ Amsterdam

⑥ London

⑦ Paris

⑧ Frankfurt

⑨ Brussels



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