VOGELSANG & BENNING

Test Systems
Automation Solutions
Quality Control Systems

RHEINHÜTTE PUMPEN

Production Test Field

An application report

RHEINHÜTTE Pumpen: New test facility sets the standards

As a specialist in corrosion- and wear-resistant materials, "RHEINHÜTTE Pumpen GmbH" is the expert for challenging pumping tasks on an international level. The company develops innovative pump technologies for the most demanding applications. The comprehensive pump range includes horizontal and vertical pumps for nearly all industries and made from metallic, plastic and ceramic materials.

All "RHEINHÜTTE Pumpen" centrifugal pumps and vacuum pumps as well as compact vacuum systems are tested in the factory prior to shipping. A new 4.200 m² test facility with a 24 m high pump test tower and a 20 m deep basin had become necessary in order to manage the constantly growing volume of orders and, in particular the testing of long shafted, vertical pumps with a submersion depth of up to 18 m. These find their way in the solar industry where they circulate molten salt mixtures at temperatures exceeding 500°C, an environment that requires reliable, robust and proven supply pump technology.

With the new test facility, "RHEINHÜTTE Pumpen" positions itself at the top as one of the most advanced and most innovative test locations in the world. The technology sets a new benchmark: set-up times will be considerably shorter, which allows "RHEINHÜTTE Pumpen" to respond faster and more efficiently to the needs of their many customers around the world.

"Vogelsang & Benning" supplied the first test field to "RHEINHÜTTE Pumpen" back in 1992. The many years of positive experience and cooperation prompted the company to plan and implement the new test facility with "Vogelsang & Benning" too.

General equipment

The new test facility has 6 horizontal modules and 5 vertical modules. There is also a ring circuit module and a supply to the Unit Test available.

The complete system is controlled by a central PLC with de-centralised substations. Each module has a computer which is linked to the latest generation of this PLC.

Each test program can be selected to run with a fully automatic or semi-automatic test sequence. In addition, there is also a connection with the central company network for order data administration and measurement data logging.

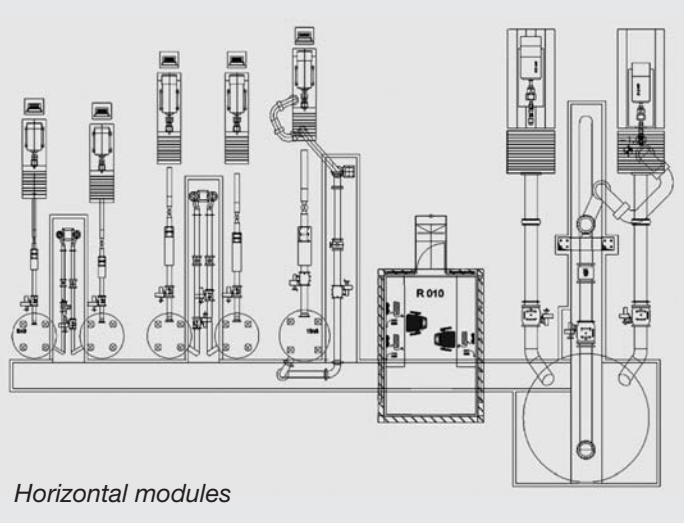
Operation takes place in the measurement control room. Mobile terminals enable special measurements to be taken locally, directly at the test station. The customer can follow the product inspection online. There are two presentation rooms with large monitors available for this on the first floor – with a view to the test facility. Three vibration velocity sensors, two temperature sensors and one vibration sensor are connected at each test bench for FFT analyses.

Horizontal modules

Each horizontal module consists of a mobile lift table with attached drive motor and associated inverter supply. The drive power can be varied from 11 to 600 kW. The drive motors are equipped with rotary encoders and the adaptation of the pumps to be tested is implemented with torque measurement flanges and couplings.

A total of 6 horizontal modules have a separate vacuum-tight tank with piping and loading arm. A concept of staged nominal diameters from DN 80 to DN 400 is realised here.

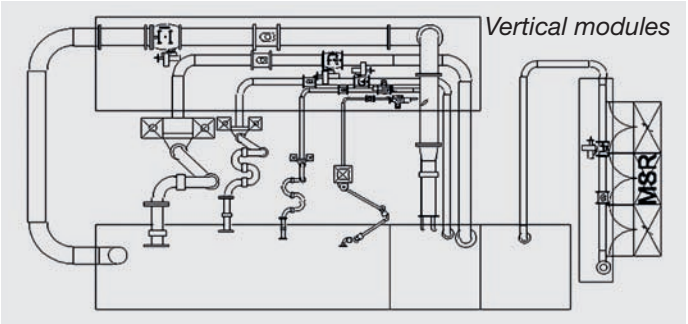
All tanks are connected to a central vacuum pump station with valves, in order to allow NPSH tests at all stations. To adjust the operating points plunger valves have been specially optimised for this particular application. The flow sensors and pressure sensors in the sensory system are incorporated via ProfiBus.



Horizontal modules

Vertical modules

All the vertical modules have an inverter supply with associated drive motor, integrated rotational speed sensor and a torque transducer. However, in contrast to the horizontal modules, the drives here are directly flange-mounted to the pumps to be tested. The graduated power of the permanently installed motors varies between 11 kW and 450 kW.



Vertical modules

All 5 modules use a common basin located below the hall floor. Each module has a loading arm with piping in stepped nominal diameters from DN 50 to DN 400 and an integrated sensory system. The adjustment of the operating points is implemented here too using plunger valves.

Ring main

The DN 1000 ring main module has two different drives with 110 kW or 200 kW and a 200 kW inverter supply. The actuators and sensors are identical in design to the other modules. Pumps with nominal diameters from DN 125 to DN 700 can be measured. An expansion to DN 1000 is planned.

Unit Test

The Unit Test is used for testing complete power units with customer-specific equipment, e.g. their own motor, frequency converters etc.

The supply for this is based on a frequency converter with downstream sinusoidal filter and transformer with multiple secondary taps. This design enables voltages of 400 V, 460 V, 500 V and 690 V to be set along with frequencies between 30 and 70 Hz. For power units with customer-provided inverters, a bypass is activated as an alternative primary feed for the transformer. This enables the fixed voltages of the secondary taps to be available on the transformer as corresponding power supply voltages for the power unit.

Pump testing per DIN EN ISO 9906

The complete test system is designed for testing per DIN EN 9906. For the purpose of pump testing it is possible to acquire and log the efficiency tests (QH), NPSH tests as well as endurance runs, vibrations and temperature. The software is based on the application for pumps developed over several years by Vogelsang & Benning and is enhanced by customer-specific tools for additional evaluations. Alongside rotational speed and viscosity conversion, it is also possible to create characteristic curves on the basis of the existing data pool.

Advantages at a glance

The variety of different test stations and the flexible concept of the individual modules can take even unusual requirements into account and thus realise very individual customer specifications.

The new acceptance and production test facility with a total power of 1000 kW enables multiple pumps to be tested simultaneously at multiple test stations. This results in significantly faster set-up times and shorter acceptance intervals. The high degree of automation of each test station contributes to the shortening of the equipping times: Important prerequisites for significant improvements in the delivery times and thus maximisation of the delivery reliability.

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