

# Test procedures

for products manufactured by ITT Flygt, Sweden



# Test procedures



The general procedures for testing products manufactured by ITT Flygt at the main factory in Emmaboda, Sweden, are part of our Quality Assurance System based on the ISO 9001 Standard.

The system was first approved by Det Norske Veritas in 1992. It is re-audited on an annual basis.

In order to fulfil the Quality Policy, a large number of tests are performed on products during the manufacturing process:

- Dimensional checks, chemical analyses, tightness checks, etc, are carried out on piece parts to ensure they correspond with drawings and other specifications. Parts for standard products are checked randomly. All parts for Ex-approved products are checked, if specified in the approval documentation.
- Finished products must pass a minimum of three tests:
  - tightness test
  - dielectric test
  - performance test\*.

\*Performance tests are carried out on a random basis on some of the smaller pumps.

# Tightness test & dielectric test



Products are tested for tightness during assembly.

The most common method used is the NOLEK vacuum tightness test, which involves simultaneously evacuating air from a product and a reference unit. Leaks are indicated after a specific time by a pressure difference between the product and the reference unit.



The dielectric test, which is carried out during assembly, is done in accordance with the IEC 60034-1 standard "rotating electrical machines, part 1: rating and performance".

The standard requires that a voltage equivalent to  $2 \times \text{rated voltage} + 1000\text{V}$  is applied between the motor windings and the casing.

# Performance test & test plant



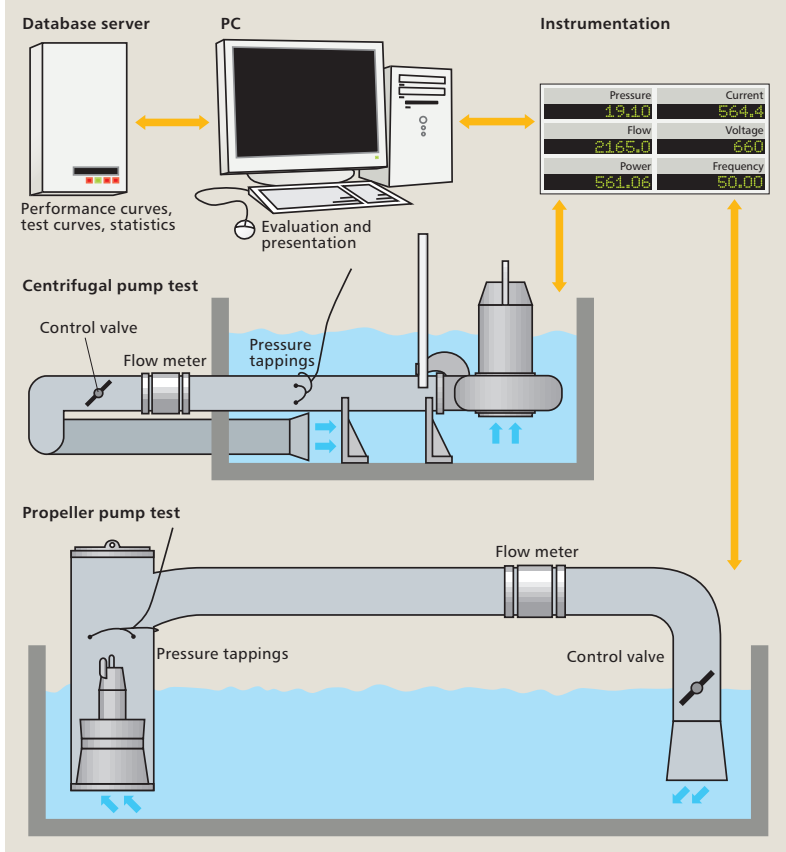
## Pumps

Pumps are performance tested in accordance with ISO 9906 or corresponding test standards.

Pumps are run in clean water under normal operating conditions in our onsite pump performance test plants.

The pumps head, rate of flow, current and power consumption are measured and checked at rated voltage and frequency. Pumps can be tested at all common voltages and frequencies. Results are measured, evaluated and logged using the latest software in most of the test plants. The results are stored by ITT Flygt for a minimum of 20 years.

## Typical design of test plant for performance testing



## Mixers

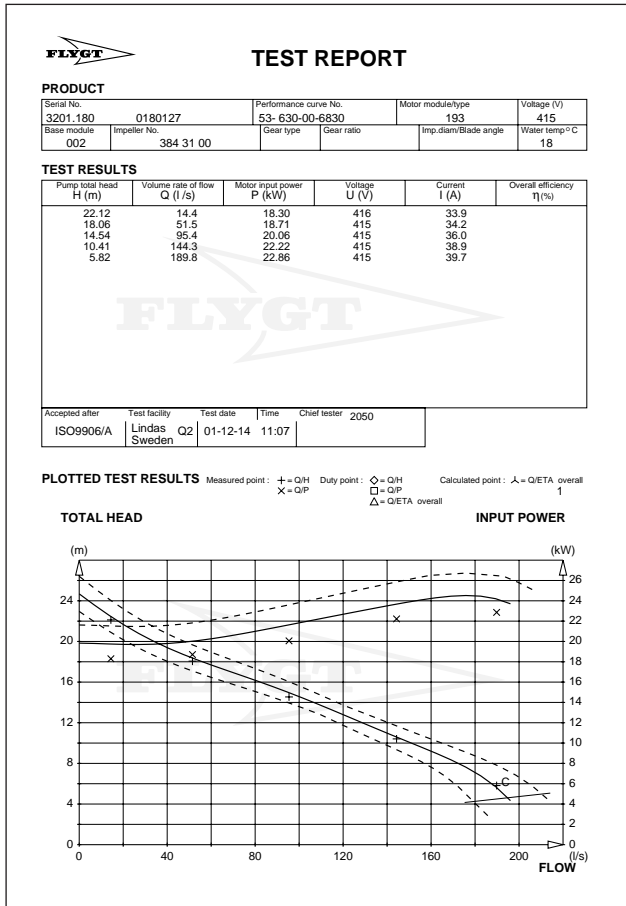
Mixers are dry run tested to check mechanical integrity, current and power consumption at rated voltage and frequency, under no load conditions.

Units are also randomly tested under normal operating conditions in ITT Flygt's specially designed mixer test plant. Thrust, current and power consumption are checked at rated voltage and frequency.

## Monitoring sensors

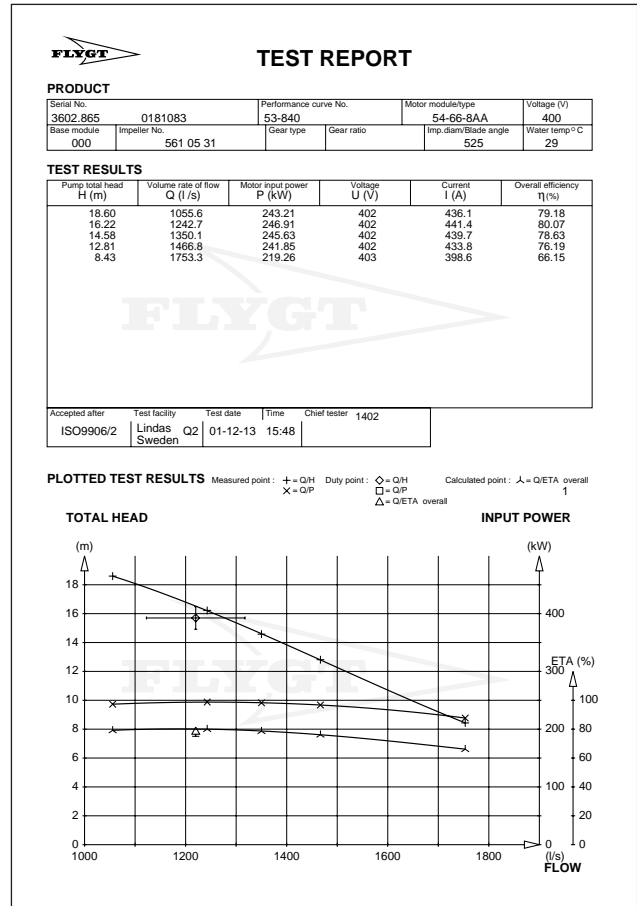
Monitoring sensors built into the products are connected to an ITT Flygt standard monitoring system and checked during the performance test.

# Documentation & calibration



Test report with five measured points plotted together with a standard performance curve.

Results from performance tests are recorded in test reports. The information in the reports corresponds with the requirements in ISO, DIN and HI test standards.



Test report with a measured curve based on five measured points together with a duty point with its ISO tolerances.

## Calibration

All measuring and test equipment is periodically calibrated and values are traceable to international measuring standards.

The equipment for testing pump and mixer performance corresponds to the most common pump test standards ISO 2548, ISO 3555, ISO 9906, HI and DIN 1944 Class II and III.

ITT Flygt is the world's leading provider of submersible pumping and mixing solutions.

ITT Flygt's submersible pumps and mixers are used in wastewater plants, process industries, mines, construction sites and numerous other applications.

Our experience is used by engineers, planners and consultants to ensure reliable and cost-effective utilisation of our systems. ITT Flygt has service and sales facilities in more than 130 countries.



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