FLOW CALIBRATION RIG
Mobile Calibration of In-line Flow Meters

People - Ideas - Solutions

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“The rig runs very well and swiftly finds the various set points. It means we are able to fit in more calibrations than before.”

Calibration Technician, Danish Pharmaceutical Company.
The Flow Calibration Rig

Introduction
The Insatech Flow Calibration Rig can be used to calibrate flow meters. The mobile calibration rig is easily maneuvered into the production area and allows calibration to be carried out in-line. The in-line calibration will eliminate costs from lost production and will save you hours on the calibration process. Furthermore the flow rig will minimize the risk of contamination by Active Process Ingredients (API).

How it works
After the rig is connected to the Unit Under Test (UUT) and a power supply, it is ready to calibrate. During calibration, water will be circulated through the flow meter as well as a master meter. The calibration rig uses highly accurate and stable Coriolis mass flow meters for exact measurements of the flow. The calibration can be skewed to target a flow range with more points to test this range more rigorously. Another added bonus of the in-line calibration is that you get a check of the total test loop, which eliminates uncertainties that could occur in the lab.

Operation
The Flow Calibration Rig has been developed with a special focus on the pharmaceutical industry. The user friendly and mobile rig is easily maneuvered into the production line where it can calibrate instruments in-line. The rig can be delivered with a traceable DANAK accreditation with an accuracy of < 0.3% of the measured value and covers a flow range from 5 to 40,000 kg/h at a temperature of up to 40°C.
The rig is made with AISI 304 or AISI 316L materials and the piping is made from EN 1.4404/AISI 316L. This means, that cleaning can be performed according to industry practice and all wetted parts are CIP-able.

Service and Support
Maintenance is limited to a yearly inspection of critical parts, e. g. motor, pump, and the flow meter needs to be calibrated once a year. We can also offer training in the use of the Flow Calibration Rig as part of the delivery. If you choose to sign a service agreement with us, we will perform maintenance on the rig and ensure it functions correctly. Furthermore we will take responsibility for timely calibration of it.
A Tedious and Time Consuming Process
Traditionally when calibrating your flow meter you would first need to remove it from the production line and then bring it to the calibration laboratory for validation. This is often a tedious and time consuming process and has a number of disadvantages. First of all the production is interrupted during the removal and replacement of the flow meter, and the replacement itself introduces some uncertainties in the readings, which are critical to a successful production. Furthermore you risk contamination by Active Process Ingredients (API) of both your production line and the surroundings.

Maximizing Production Uptime and Cutting Costs
With the Flow Calibration Rig from Insatech Pharma you will be able to validate Flow meters in line, eliminating the above mentioned disadvantages. The mobile rig is easily maneuvered to the flow meter that needs to be calibrated. After being connected to a power supply as well as to the pipework the rig is ready to calibrate. This will save you hours on the calibration process - maximizing production uptime, minimizing contamination risks and cutting costs to a bare minimum!
Distance to floor: Min. 100 mm
HOW IT WORKS

Plug and Play Connection
The Flow Calibration Rig works by connecting the rig to preinstalled flanged pipework on either side of the flow meter (Unit Under Test). This can be done using either flanges or Tri-clamps. Furthermore in order to gather data from the Unit Under Test (UUT) you need to connect it to the rig using mA, pulse or Foundation Fieldbus (FF-bus). Connecting the rig to the UUT is not unlike plug and play.

Highly Accurate and Stable Calibration
After being connected to the UUT and a power supply the calibration can begin. During the calibration, water from the rig’s water tank is circulated through the flow meter as well as the Master Meter and the readings are then compared. The Flow Calibration Rig uses highly accurate and stable Coriolis mass flow meters for exact measurements of the flow.

Skewed Distribution Helps Target Certain Flow Ranges
Before calibration you can select any number of calibration points you need. The distribution of the calibration points can be skewed, which means that instead of a linear distribution you can target a flow range with more points. This is useful if you want to test e.g. the flow range you use the most.

Readings from the UUT
When connecting to the UUT via mA and Pulse the readings are only shown locally on the display. If the rig is connected via FF-bus the Flow Calibration Rig is able to sniff the FF values after which you can choose the UUT from a list. The FF-bus is not affected by this operation.

Added Bonus: Check of the Total Test Loop
As the rig is connected directly to the pipework you will get a check of the total test loop, which is made possible only under true production conditions. This means that any uncertainties created while reinstalling the flow meter after its verification are eliminated, as well as influences from inadequate straight pipework before and after the flow meter. Also the risk of contamination by Active Process Ingredients (API) is eliminated as the flow meter remains in the production string.
The Flow Calibration Rig has been developed with special focus on operating costs, user friendliness, accuracy and documentation. Furthermore, the rig is a turn-key solution and is delivered tested and calibrated, ready for use.

**User Friendliness**
Connections, instruments, and handles are to the extent possible placed ergonomically correct and allowing operation from one side. Furthermore the software is designed with usability in mind making your operator’s user experience easy and effective every time. During the calibration all results are presented on the Human Machine Interface (HMI) after each point of the calibration.

**Mobility**
The Calibration Rig is designed to be mobile and the wheels allow the rig to be moved to wherever it is needed. The compact design of the rig means it fits through standard industrial doors and elevators. Furthermore the rig can be lifted by crane using the supplied yoke. To facilitate easy attaching of straps to the yoke, lifting lugs can be mounted in each corner of the rig.

**Easy Cleaning**
The Flow Calibration Rig is built with materials that are AISI 304 or optionally AISI 316L. Flow meters are made from EN 1.4404/AISI 316L or C22, depending on flow. All piping is made from EN 1.4404/AISI 316L with a surface roughness better than Ra 0.8. This means that cleaning can be performed according to industry practice and all wetted parts are CIP-able (Cleaning-in-place).

**Specifications and Accuracy**
As a benchmark, the Flow Calibration Rig can calibrate a water flow ranging from 5 to 40,000 kg/h at a pressure of up to 5 bars and temperature of up to 40°C. Ambient temperature must be between +10 °C and 40 °C. The rig needs a power supply of 400 VAC, 16 A. Other design parameters can be specified.

The Flow Calibration Rig can be delivered with a traceable DANAK accreditation with an accuracy of < 0.3 % of the measured value.

**Is the Standard Solution Insufficient?**
If the standard solution is insufficient for your specific use we can, as a pre-order, work out a User Requirements Specification (URS) in accordance with your requirements.

**Documentation from Basic to Full Validation**
Insatech documents the various components, the interaction between the components and the total delivery as agreed to with the customer. We work according to well recognized standards, e. g. Good Automation Manufacturing Practice (GAMP) and the rig is designed according to both the machinery directive and the low voltage directive.

The extent of our documentation is as per agreement with the customer, and goes from the basic operations manual to full validation in accordance with common practice of the pharmaceutical industry.
000 – 40,000 kg/h

Distance to floor:
Min. 100 mm
Minimal Maintenance
The Flow Calibration Rig is developed for pharmaceutical use and therefore easy maintenance and cleaning are of the essence and can be done according to industry standards. Maintenance is limited to a yearly inspection of critical parts, e. g. motor, pump, and the flow meter needs to be calibrated once a year.

Maintenance and recommended spare parts may differ depending on the specifications, but will always be described in the delivered documentation.

Service and Support is Readily Available
We know that the after sales experience is important to you and your total product experience. This is why we have a well staffed service department ready to help you if challenges should arise. We perform repairs on location or at our workshop depending on what is most beneficial in the given situation. We also perform calibration on site as well as accredited calibration.

The rig is built with standard components which makes spare parts easily obtainable. If you choose to sign a service agreement with us, we will perform maintenance on the rig and ensure it functions correctly. Furthermore we will take responsibility for timely calibration of it.

Training
The ever increasing complexity of measuring equipment makes proper training very useful. Insatech Pharma can offer equipment and application training either at your or our facilities. Furthermore the training will be targeted towards your various working situations ensuring that you get the highest benefit possible.
Over the years Insatech has become a trustworthy and competent partner, supplying technical solutions and giving advice to the process industry. We have great experience with the particular applications and high requirements for documentation in our primary market pharma, biotech, and food industry.
Our customers consist of a broad range of pharmaceutical production companies with both small and large capacity. Our main customers are Danish based, but our solutions have also reached different parts of Europe and South America.
At Insatech Pharma we develop, produce and sell products within the fields of measuring and calibration. Our products are highly customizable and we are certain that we can meet your User Requirements Specification (URS). We have, for example, delivered products with DANAK Accreditation, for use in hazardous areas (ATEX) as well as meeting Functional Safety requirements IEC 61508 and IEC 61511. If you want to know more please contact us and let us know what we can do for you.

In addition to the Flow Calibration Rig you might be interested in the products below.

**Insacal and Insacacal mk. II**
The Insacal Conductivity Master is primarily used in the pharmaceutical industry to validate and accurately document conductivity sensors in-line. Insacal can be used for in-situ calibration in closed loop, weighing only 4 kg, it is easily transported and saves you hours on total calibration time.
Insacal is cleanable for cleanroom use according to industry standards, all wetted parts are CIP (Cleaning-In-Place) and SIP-able (Steam-In-Place). It is calibrated under our accreditation CAL Reg. No. 484 issued by DANAK (Danish Accreditation and Metrology Fund).
The Insacal is used by our customers and calibration technicians alike.
Further product development and 20 years of experience has been pored into the Insacal mk. II providing you with the same handy instrument, but focuses on validating low conductivity, with intelligent software that aids decision making. Further the mk. II makes it possible to reach an uncertainty that is 4 times better than the 2% specified in United States Pharmacopeia (USP).

**Pressure Calibration Rig**
The Pressure Calibration Rig is the cost effective alternative to traditional calibration of transmitters in the laboratory. Use of the Pressure Calibration Rig eliminates costly transportation time between production and laboratory. It reduces calibration time to about half an hour while the accuracy of the in-situ calibration is increased to laboratory level.
The rig is a plug and play solution: After being connected to the pressure gas, Unit Under Test (UUT) and a power supply, the rig is ready to calibrate. The highly accurate and stable pressure controller prevents over- and undershooting.
The Pressure Calibration Rig, -1...20 Barg / 0...21 Barg has an accuracy of 0.2835 mBarg and 0.2838 mBara (K2) and assures one year stability of the calibration. The rig is build with materials that are AISI 304 or optionally AISI 316L which allows cleaning according to industry practice.

**Quantity Calibration Rig**
The Quantity Calibration Rig can be used for calibration of loading cells for level measurement equipment in e.g. production and fermentation tanks, by dispersing a pre-defined batch of fluid on the basis of volume or weight. The calibration is highly accurate and stable, the skewed distribution of calibration points helps target certain flow ranges.
The rig is user friendly, mobile, and is easily maneuverable for in-line calibration, thereby reducing down time and the risk of contamination by Active Process Ingredients (API).
The flow rig can be delivered with a traceable DANAK accreditation, accuracy of < 0.3% of the measured value, and covers a flow range from 5 to 17,000 kg/h. Cleaning can be performed according to industry practice and all wetted parts are CIP-able. The rig can be produced to operate in hazardous areas (ATEX Zone 1).
Insatech Pharma has delivered several rigs to various pharmaceutical sites in Denmark, Brazil and France.