

CALIBRATION INTERVALS AND SHELF LIFE OF HOFFER TURBINE FLOW METERS

All flow meters, regardless of type, construction, or manufacture are subject to drift with time due to the internal wear, environmental effects and interaction with measured media. Changes in flow meter performance may occur even without any visible signs of meter deterioration. That is why periodic re-calibration of a flow meter is required to insure accuracy of flow measurement.

Determining re-calibration intervals is a challenging task because flow meter performance is affected by many environmental, installation and application related factors. Therefore, it is not possible to provide standard calibration intervals applicable to all installation cases.

In some industries calibration intervals are determined by regulatory, contractual or internal Quality System requirements. Otherwise, calibration interval must be determined by the operator based on manufacturer recommendation and historical data. In general, calibration intervals should be chosen as of compromise between the risk of an incorrect meter reading making a significant impact on the process and the cost of calibration.

Some factors that need to be considered when determining the calibration intervals include the following:

Required Accuracy of Measurement – Higher accuracy requires more frequent calibrations to insure the meter remains within specified accuracy range.

Continuous Versus Intermittent Flow – Intermittent flow results in lower run time and may extend calibration intervals.

Flow Rate as Percentage of Meter Range – Operating meter at reduced low flow rate (typically at 50-80% of meter range) substantially reduces wear on moving parts of the meter and extends calibration interval.

Cleanness of the Fluid – Any abrasive contamination of fluid increases wear of the meter and reduces calibration interval.

Fluid Lubricity – Lubricating fluid reduces wear on moving parts of the meter and extends calibration interval.

High Wear/Corrosion Rate Applications

There are certain applications for specific types of turbine flow meters that require the measurement of exceptionally abrasive fluids. In some cases the fluids may also be corrosive to most metals. Applications in this category include high pressure sand-based fracking and cementing fluids used in the oil and gas industry which may also include strong acids such as HCL, cement slurry measurement on construction pumper trucks, produced water flows that often contain brine and hydrogen sulfide and fluids loaded with sand or dust sprayed against products under test for resistance to harsh environments. In all of these applications the life expectancy of every component in the fluid system is considerably shorter than the same or similar components in more conventional applications. The same would hold true for the turbine meters used as described above. As a result the wear rates are so high that there is no repair or re-calibration of the meter internal components. Instead, they are replaced with new internal components that come from the manufacturer pre-calibrated.

Clean Non-Abrasive Applications

For clean non-abrasive fluids Hoffer recommends performing the first re-calibration within 12 months of service. The following re-calibration can be performed based on the recommendation outlined below.

1. Conduct the first calibration of the flow meter within 12 months of use without making any attempts to disassemble the meter, clean or replace any part of the meter.
2. Compare the results of this to the original calibration.
3. If the meter remains within tolerance and not borderline to becoming out of tolerance, the customer may, at their option, either return the meter to service and mark the calibration report "as received as left" or they may choose to disassemble, inspect and clean the meter.
4. If the meter is returned to service with no changes having been made, the customer should plan to conduct the next calibration check on the meter at a period 6 to 9 months later.
5. At the end of the 6 to 9 month period of service the meter should be removed and the calibration procedures described in steps #1 through #3 above should be performed.
6. If the meter is disassembled and cleaned, and there are no signs of damage found, the customer should conduct a second calibration with the meter reassembled and compare that to the prior two calibrations. Assuming the calibration aligns with the prior two then this calibration should be marked "as left" and the meter returned to service for a period of no more than 12-months.

7. At the end of this service period the meter should be removed and the calibration procedures described in steps #1 through #3 should be performed.
8. If the calibration remains in tolerance, the customer may elect then to follow steps #4 and #5 above or #6 and #7 above until such time as the meter calibration for any "as received" test falls outside the allowable tolerance. At that time, the meter should be disassembled, serviced and re-calibrated to assure it is within tolerance and then returned to service.

It is always good practice to keep calibration data, and control charts of the meter performance. This will aid in selecting calibration intervals and to also show changes in performance indicating degradation of meter performance.

Shelf Life of Hoffer Turbine Flow Meters

There is no significant degradation in turbine meter performance when meter is sealed from environment and stored at ambient condition. Because of possible unforeseen influences, after 3 years of storage Hoffer recommends recalibration of the meter prior to service.