

WAKE FREQUENCY CALCULATION INFORMATION

PIP #: TH-PI-1

Applicable to:
Thermowells

Wake frequency calculations are performed on thermowells for assurance the designed well can withstand the stresses applied to it without failure. Thermowells that are exposed to flow can fail if the wake frequency comes within 20% of the natural frequency. If the wake frequency (the turbulent wake created by the flow of the process media past the thermowell) is too close to the natural frequency (the frequency at which the thermowell will oscillate/vibrate without external forces) the vortex shedding that occurs will destroy the thermowell. Other forces and stresses that can cause serious failures are also considered with this calculation.

Wake frequency calculations are executed per the ASME PTC 19.3 TW-2016 standard. These calculations can also be referred to as Von Karman, velocity or vibration calculations. Ashcroft Inc. uses variation code XW5 within the thermowell part number to identify this variation. This process is performed prior to the manufacture of the well. Should the thermowell fail, shortening of the “U” dimension or increasing the wall thickness are just a couple of the recommended solutions. The calculation is then rerun to determine if the design change is acceptable. Once approved, the well is manufactured. In order to run the calculations six pieces of information are mandatory.

1. Thermowell part number or complete thermowell details
2. Maximum operating temperature
3. Maximum operating pressure
4. Velocity of the process media in feet or meters per second
5. Density of the process media
6. Viscosity of the process media

The attached form providing this information, must be completed for each thermowell requiring a wake frequency calculation (XW5) and submitted to your Inside Sales Rep at Ashcroft Inc. along with the purchase order. Pricing for this variation can be found in the Thermowell portion of the Ashcroft Price List, within the Tests and Certifications section. Ashcroft also offers a wake frequency calculator on our website under the tools tab so you can run your own precheck to verify the thermowell you choose is acceptable in your application.

Wake Frequency Calculation
Information Request Form
(Required for each XW5)

Date: _____ Tag No. _____

Completed by: _____

(Must include name and company)

Complete Thermowell PN: _____

Application Conditions	Definite Conditions	Units Of Measure Must Be As Specified Below
Maximum Operating Temperature:		°F, °C, K
Maximum Operating Pressure:		psi, bar, Pa, MPa, KPa, Kg/cm ²
Velocity of the process media:		ft/s, m/s, mm/s, cm/s
Density of the process media:		lb/ft ³ , kg/cm ³ , g/cm ³ , lb/in ³ , kg/m ³
Viscosity of the process media:		cP

Acceptable Units of measure

Any other reference numbers: _____

Additional Information:

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