MACWELD machining

Revised (04/12/2022)

Helical Thermowell

Helical thermowell will outperform the standard thermowell in HIGH VELOCITY SERVICES.

If your thermowell failed ASME PTC-19.3 TW-2016 wake frequency calculations, use helical thermowell.

Featuring VE Technology

Helical strakes design advantages:

- Reduces amplitude of oscillation by more than 90% compared to standard round bar design.
- Wake frequency calculations are no longer required for helical thermowell. Steady state stress and pressure calculations are sufficient.
- Fewer limitations due to immersion length.
- Standard installation allows for quick install or replacement.
- The small root and tip diameters allow for fast response to temperature variations.
- Perfect for nozzles with small ID and high standoff length.
- Accuracy and response time of temperature measurement is greatly improved as compared to standard thermowells with increased root-tip diameters and shortened immersion length.

Standard thermowells exposed to high velocity flows often fail requirements of ASME PTC-19.3.

To remedy the situation, diameters of the root and the tip are increased or the immersion length is shortened. The resultant modifications to the thermowell appear to make it short and bulky and often inaccurate. A significant increase in the root and tip leads to a longer response time and heat dissipation into the nozzle and pipe. It also allows for vibrations to transfer to the nozzle, instruments and piping. Shortened immersion length does not provide enough volume for heat transfer and the result is significant, unacceptable error in temperature measurement.

Velocity Collar Concerns

Thermowells with velocity collars are not a good option as the rigid support at the collar could only be obtained with interference fit between the collar and the piping. Interference fit between the collar and the nozzle is hard to achieve If such installation is undertaken, it is extremely time consuming.

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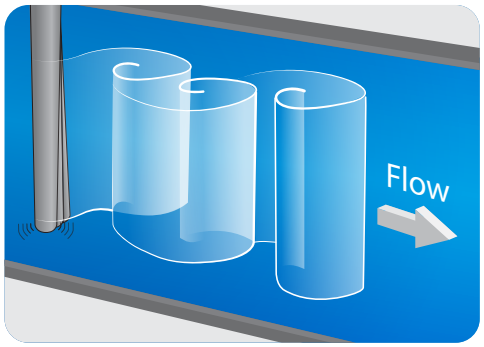
Vortex Induced Vibrations

A straight cylindrical thermowell immersed in the flowing fluid, experiences shedding of vortices, which creates an oscillating lift force and an oscillating drag force. As the linear velocity increases, so does the rate of vortex shedding. The magnitude of oscillating forces increases with the square root of velocity. If the vortex shedding frequency approaches natural frequency of thermowell the resonance occurs with extreme increase in dynamic bending stresses. This could lead to a failure of the thermowell.

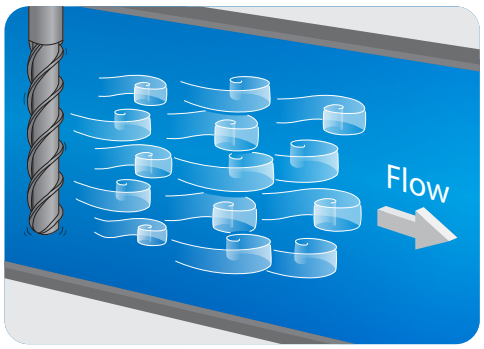
Since the 1950's, helical designs have proven to overcome the problem of vortex induced vibrations.



Standard Thermowell

Reducing vibrations with the helical thermowell

Vortex-induced vibrations (VIV) are not an issue for helical thermowells. The strakes reduce the amplitude of oscillation as compared to plain cylindrically shaped thermowells. A variety of laboratory tests have proven beyond any doubt that helical strakes lower VIV by more than 90% as compared to a standard thermowell. The sharp edges of the three helical strakes separate the flow, and the helical shape redistributes the vortices. As a result, the lift and the drag forces are greatly minimized. Illustrations to the right show the drastic difference between vortex formation for a standard thermowell compared to a helical thermowell.



Helical Thermowell

Mac-Weld Machining Ltd. is now TSSA certified
We are now certified for fabrication, assembly and repair of Welded & Non-Welded category A,B,C,E,F and H type fittings in accordance with CSA Standard B51 Boiler, Pressure Vessel and Pressure Piping Code, ASME B31.1 Power Piping and ASME B31.3 Process Piping.

North America's Leading Instrumentation Hardware Manufacturer


Thermowells


Orifice Plates


Bleed & Flush Rings


Pressure Vessels


Valves & Manifolds


Specialty Products

Recognized globally for our quality, service and the ability to deliver!

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