



# TEMPERATURE °CONTROLS PTY LTD

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9001:2008  
LIC 14412

REF: #1519/ #1373

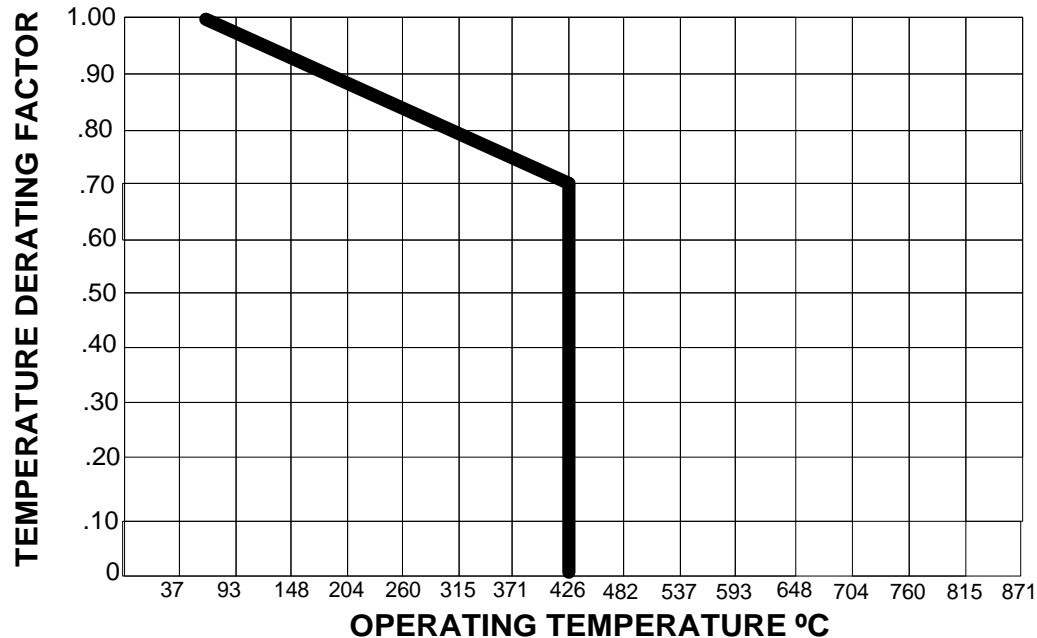
## MAXIMUM OPERATING PRESSURES (Process Connection)

Barstock – Screwed Thermowells as per drawing SD 036

Note: the smaller the process connection the higher the pressure.  BSPT/ NPT Male Process connection	316 Stainless steel BSPT/ NPT Male Process connection	
	KPa	bar
	1/16"	75,000
1/8"	68,000	690
1/4"	55,000	550
3/8"	53,000	540
1/2"	53,000	530
3/4"	50,000	500
1"	36,000	370
1.1/4"	41,000	410
1.1/2"	34,000	340

Calculations based on ASME B31.3 code for Process Piping.

### TEMPERATURE DERATING FACTOR



#### Pressure rating procedure

1. For applications at elevated temperatures, the pressure rating must be multiplied by an appropriate temperature derating factor obtained from the temperature derating chart above.

2. These working pressures are not necessarily valid for system components. Prudent system design requires that all other system components be evaluated for their specific proper pressure capabilities.

# Wake Frequency & Stress Calculation

In Accordance With ASME PTC 19.3 / Design Memo T/115

## General Details

Date : 22/01/07  
Customer Name : Temperature Controls  
Customer Ref : SAMPLE  
Supplier Ref :  
Tag Number : Sample 07-14 liquid  
Calculation Number : Revision :

## Thermowell Dimensions

Root Diameter : 22 mm  
Tip Diameter : 19 mm  
Bore : 6.5 mm  
Tip Thickness : 6 mm  
Unsupported Length : 200 mm

## Thermowell Material

Material Grade : 316 Stainless Steel  
Modulus of Elasticity : 1937460.8 kg/cm<sup>2</sup>  
Density : 7940.7 kg/m<sup>3</sup>  
Maximum Allowable Stress : 1217.4498 kg/cm<sup>2</sup>

## Fluid Properties

Phase : Liquid  
Velocity : 3 m/s  
Operating Temperature : 93 C  
Operating Pressure : 17000 kPag  
Operating Density : 1000 kg/m<sup>3</sup>

## Calculated Results

Thermowell Natural Frequency : 333.0973 Hz  
Vortex Shedding Frequency : 34.7368 Hz  
Frequency Ratio : 0.104284  
Limiting Velocity : 23.0139 m/s  
Maximum Working Pressure : 52607.67 kPag  
Maximum Velocity Length : 554.7931 mm  
Maximum Stress Length : 1638.106 mm

## Summary

Frequency Ratio - ACCEPTABLE  
Operating Pressure - ACCEPTABLE  
Unsupported Length - ACCEPTABLE  
Comments -

# Wake Frequency & Stress Calculation

In Accordance With ASME PTC 19.3 / Design Memo T/115

## General Details

Date : 22/01/07  
Customer Name : Temperature Controls  
Customer Ref : SAMPLE  
Supplier Ref :  
Tag Number : Sample 07-14 gas  
Calculation Number : Revision :

## Thermowell Dimensions

Root Diameter : 22 mm  
Tip Diameter : 19 mm  
Bore : 6.5 mm  
Tip Thickness : 6 mm  
Unsupported Length : 200 mm

## Thermowell Material

Material Grade : 316 Stainless Steel  
Modulus of Elasticity : 1877149.26 kg/cm<sup>2</sup>  
Density : 7902.858 kg/m<sup>3</sup>  
Maximum Allowable Stress : 1038.8602 kg/cm<sup>2</sup>

## Fluid Properties

Phase : Gas  
Velocity : 17 m/s  
Operating Temperature : 184.1 C  
Operating Pressure : 1000 kPag  
Operating Density : 1000 kg/m<sup>3</sup>

## Calculated Results

Thermowell Natural Frequency : 328.6558 Hz  
Vortex Shedding Frequency : 196.8421 Hz  
Frequency Ratio : 0.598931  
Limiting Velocity : 22.7071 m/s  
Maximum Working Pressure : 44875.71 kPag  
Maximum Velocity Length : 231.2198 mm  
Maximum Stress Length : 216.3899 mm

## Summary

Frequency Ratio - ACCEPTABLE  
Operating Pressure - ACCEPTABLE  
Unsupported Length - ACCEPTABLE  
Comments -