thermo sensors corporation

A Leading Manufacturer of Quality Thermocouple and RTD Assemblies Since 1972

Address: P.O. Box 461947 Garland, TX 75046
Phone: 972-494-1566 **Toll Free:** 1-800-889-5478
Website: www.thermosensors.com

Thermowells

Thermowells are used to provide an isolation between a temperature sensor and the environment, either liquid, gas or slurry. A thermowell allows the temperature sensor to be removed and replaced without compromising either the ambient region or the process.

Care must be taken in determining the material used for the thermowell as well as other factors.Thermo Sensors offers design assistance that includes pressure, temperature and or corrosion as well as vibration effects of the fluids. This vibration can cause well stem failure.

Thermo Sensors thermowell materials include:

- Carbon Steel
- 304 & 316 Stainless Steel
- Monel
- Brass

Please refer to our order guide to assist in determining your needs. We can also provide technical design assistance and application suggestions. Give us a call.

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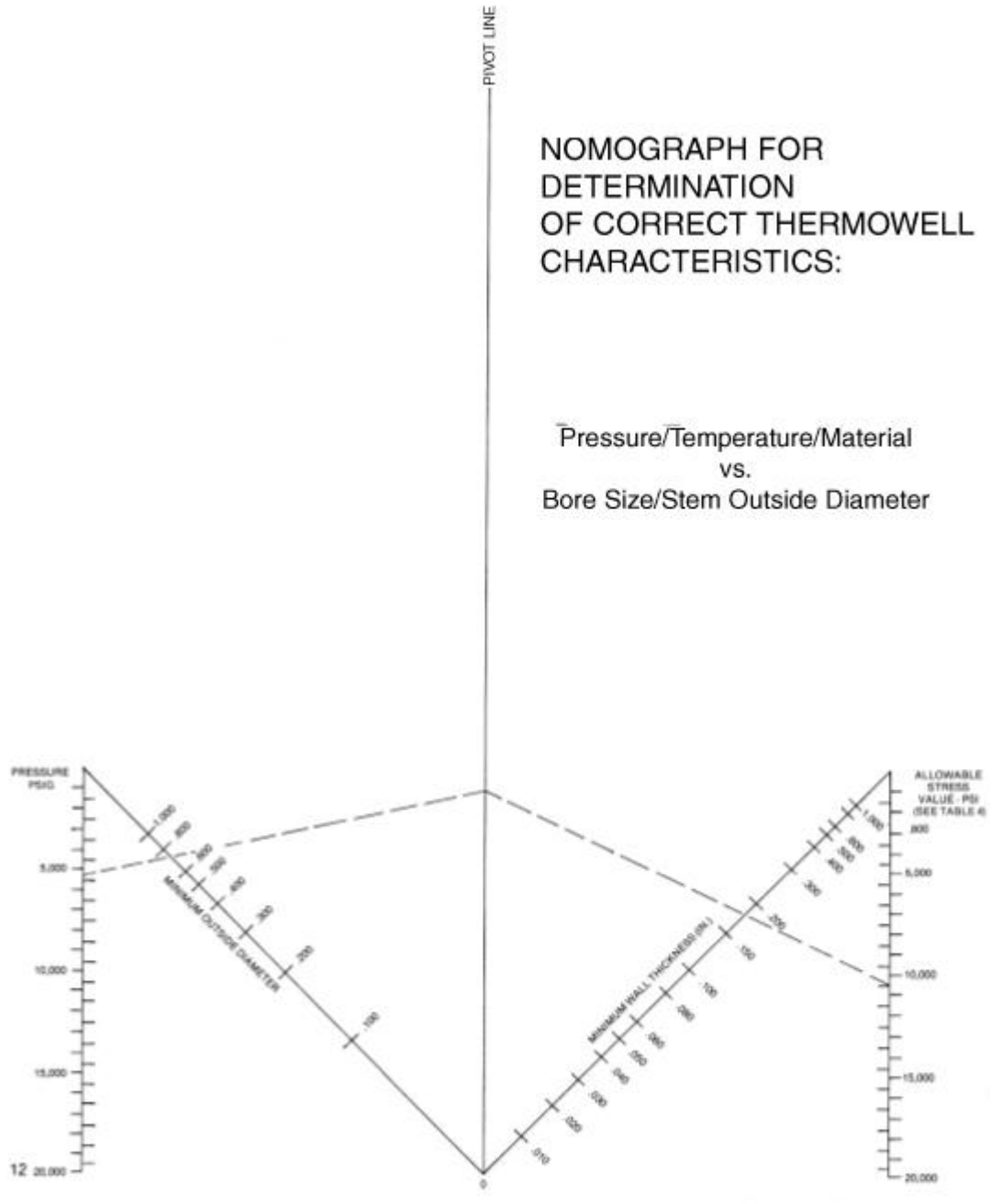
Nomograph



The Nomograph and Table 4 below may be applied in calculating wall thickness. The following example demonstrates the use of the nomograph in a typical problem situation.

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Problem: To find maximum operating pressure of a thermowell, 304 stainless steel material, with a .385 inch bore and .750 minimum outside diameter whose maximum operating temperature will be 700°F.

Solution: Maximum allowable stress (Table 4) 10,500 PSI.Wall thickness (Min.) = .182.
A) Align 10,500 on right scale with .182 on wall thickness scale and mark intersection on pivot line.
B) Align pivot point intersection with correct outside diameter.
C) Read maximum pressure on left scale (5100 PSIG).

Table 4 - Allowable Stress Values (PSI)[1]

Material	Temperature °F						
	0	300	500	700	900	1100	1300
Aluminum (1100)	2,350	1,850	-	-	-	-	-
Aluminum (6061-T6)	6,000	5,000	-	-	-	-	-
Nickel	10,000	10,000	9,500	-	-	-	-
Steel[2]	11,250	11,000	10,250	9,000	7,750	6,500	-
304 S. Stl.	18,750	13,750	11,400	10,500	10,000	8,250	3,400
316 S. Stl.	18,750	16,400	15,500	15,100	11,650	8,500	3,500
310 S. Stl .	18,750	14,600	12,600	11,300	10,300	9,450	4,000
321 - 347 S. Stl.	18,750	15,300	13,500	12,200	11,300	9,100	2,200
410 S. Stl .	15,000	13,800	12,850	12,050	9,650	2,900	-
446 S. Stl.	17,500	16,100	15,000	-	-	-	-
A182-F11	16,150	16,150	16,150	16,150	13,100	4,000	-
A182-F22	17,500	17,500	17,500	17,500	14,000	4,200	-
Copper	6,000	5,000	-	-	-	-	-
Admiralty Brass	10,000	10,000	-	-	-	-	-
Monel 400	16,600	13,600	13,100	13,100	8,000	-	-
Inconel 600	20,000	18,800	18,500	18,500	16,000	3,000	-
Incoloy 8003	15,600	12,100	10,400	9,600	9,100	8,800	4,150
Hastelloy B[4]	25,000	24,750	21,450	-	-	-	-
Hastelloy X[5]	23,350	18,850	16,000	15,500	15,500	15,500	9,500

1. Values from ASME Boiler and Pressure Vessel Code Section VIII - Unfired Pressure Vessels,1965.
2. ASME Spec. Min. Tensile = 45,000 PSI
3. ASME Code (See Note 1), Case 1325 (special ruling)
4. ASME Code (See Note 1), Case 1323 (special ruling)
5. ASME Code (See Note 1), Case 1321 (special ruling)