

The information contained in the following pages is intended as a guideline only for general sensor usage. The specific application and the environmental conditions may require that other sensor sheath materials, diameters, or construction styles be used to provide optimum temperature measurement results. The dimensions, temperature ratings, and response times indicated are nominal and they may vary in actual practice. For further information and recommendations on specific applications, please consult with the factory.

**Table 1  
Thermocouple Types and Sizes**

| SHEATH DIAMETER (inches) - A.W.G. WIRE SIZE |                    |          |          |          |         |        |         |        |        |
|---|--------------------|----------|----------|----------|---------|--------|---------|--------|--------|
| TYPE  | MATERIAL           | 0.020 OD | 0.032 OD | 0.040 OD | 1/16 OD | 1/8 OD | 3/16 OD | 1/4 OD | 3/8 OD |
| E   | Chromel-Constantan | 38       | 35       | 32       | 30      | 24     | 21      | 19     | 15     |
| J   | Iron-Constantan    | 38       | 35       | 32       | 30      | 24     | 21      | 19     | 15     |
| K   | Chromel-Alumel     | 38       | 35       | 32       | 30      | 24     | 21      | 19     | 15     |
| T   | Copper-Constantan  | 38       | 35       | 32       | 30      | 24     | 21      | 19     | 15     |
| N   | Nicrosil-Nisil     | 38       | 35       | 34       | -       | 29     | 21      | 19     | 15     |

**Table 2  
Sheath Materials**

| MATERIAL    | CODE | MAX TEMP. RATING  | APPLICATION DATA (Other Date Available)  |
|-------------|------|-------------------|--|
| 304 SS      | 9    | 899 °C [1650 °F]  | General purpose stainless steel - good corrosion resistance  |
| 316 SS      | 8    | 927 °C [1700 °F]  | Superior corrosion resistance  |
| 310 SS      | 4    | 1149 °C [2100 °F] | Same as 316 SS - higher temperature rating   |
| 446 SS      | 5    | 1038 °C [1900 °F] | Used in sulphur atmospheres  |
| INCONEL 600 | 3    | 1149 °C [2100 °F] | Excellent oxidation and corrosion resistance at high temperature. Not to be used in sulphur atmosphere |

**Table 3  
Recommended Upper Temperature Limits For Protected Thermocouples  
Upper Temperature Limit (F.) For Various Sheath & Diameter**

| SHEATH TYPE       | SHEATH MATERIAL | SHEATH DIAMETER (inches)              |  |  |  |  |
|-------------------|-----------------|---------------------------------------|--|--|--|--|
|                   |                 | 1/16                                  | 1/8                                    | 3/16                                   | 1/4                                    | 3/8                                    |
| TEMPERATURE RANGE |                 |                                       |  |  |  |  |
| J                 | 316 S.S.        | (0 to 441) °C<br>[32 to 825] °F       | (0 to 521) °C<br>[32 to 970] °F        | (0 to 621) °C<br>[32 to 1150] °F       | (0 to 721) °C<br>[32 to 1330] °F       | (0 to 721) °C<br>[32 to 1330] °F       |
| K                 |                 | (-200 to 921) °C<br>[-328 to 1690] °F | (-200 to 927) °C<br>[-328 to 1700] °F  | (-200 to 927) °C<br>[-328 to 1700] °F  | (-200 to 927) °C<br>[-328 to 1700] °F  | (-200 to 927) °C<br>[-328 to 1700] °F  |
| E                 |                 | (-200 to 510) °C<br>[-328 to 950] °F  | (-200 to 649) °C<br>[-328 to 1200] °F  | (-200 to 732) °C<br>[-328 to 1350] °F  | (-200 to 821) °C<br>[-328 to 1510] °F  | (-200 to 821) °C<br>[-328 to 1510] °F  |
| N                 |                 | (0 to 921) °C<br>[32 to 1690] °F      | (0 to 921) °C<br>[32 to 1700] °F       | (0 to 921) °C<br>[32 to 1700] °F       | (0 to 921) °C<br>[32 to 1700] °F       | (0 to 921) °C<br>[32 to 1700] °F       |
| T                 |                 | (-200 to 260) °C<br>[-328 to 500] °F  | (-200 to 371) °C<br>[-328 to 700] °F   | (-200 to 371) °C<br>[-328 to 700] °F   | (-200 to 371) °C<br>[-328 to 700] °F   | (-200 to 371) °C<br>[-328 to 700] °F   |
| J                 | INCONEL 600     | (0 to 441) °C<br>[32 to 825] °F       | (0 to 521) °C<br>[32 to 970] °F        | (0 to 621) °C<br>[32 to 1150] °F       | (0 to 721) °C<br>[32 to 1330] °F       | (0 to 721) °C<br>[32 to 1330] °F       |
| K                 |                 | (-200 to 921) °C<br>[-328 to 1690] °F | (-200 to 1071) °C<br>[-328 to 1960] °F | (-200 to 1149) °C<br>[-328 to 2100] °F | (-200 to 1149) °C<br>[-328 to 2100] °F | (-200 to 1149) °C<br>[-328 to 2100] °F |
| E                 |                 | (-200 to 510) °C<br>[-328 to 950] °F  | (-200 to 649) °C<br>[-328 to 1200] °F  | (-200 to 732) °C<br>[-328 to 1350] °F  | (-200 to 821) °C<br>[-328 to 1510] °F  | (-200 to 821) °C<br>[-328 to 1510] °F  |
| N                 |                 | (0 to 921) °C<br>[32 to 1690] °F      | (0 to 1071) °C<br>[32 to 1960] °F      | (0 to 1149) °C<br>[32 to 2100] °F      | (0 to 1149) °C<br>[32 to 2100] °F      | (0 to 1149) °C<br>[32 to 2100] °F      |
| T                 |                 | (-200 to 260) °C<br>[-328 to 500] °F  | (-200 to 316) °C<br>[-328 to 600] °F   | (-200 to 371) °C<br>[-328 to 700] °F   | (-200 to 371) °C<br>[-328 to 700] °F   | (-200 to 371) °C<br>[-328 to 700] °F   |

**Table 4  
Flexible Armor Tubing**

| DESCRIPTION   | DIMENSIONS (inches) | MAX TEMP. RATING |
|---|---------------------|------------------|
| 300 Series SS flexible armored tubing                 | 0.188 ID x 0.275 OD | 871 °C [1600 °F] |
| PVC covered 300 Series SS flexible armored tubing     | 0.188 ID x 0.320 OD | 100 °C [212 °F]  |
| Teflon® covered 300 Series SS flexible armored tubing | 0.188 ID x 0.313 OD | 204 °C [400 °F]  |