

Unsheathed Fine Gage Thermocouples

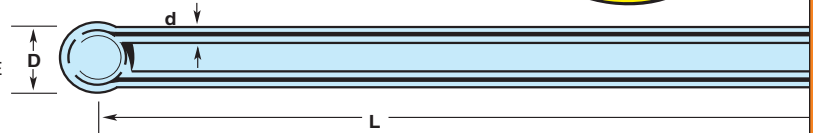
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Convenient Packages of 5

- ✓ Fast Response
- ✓ Diameters Down to 0.013 mm (0.0005")
- ✓ High Accuracy
- ✓ Pin-Point Measurements
- ✓ Low Heat Transfer

ENLARGEMENT OF BEADED THERMOCOUPLE JUNCTION



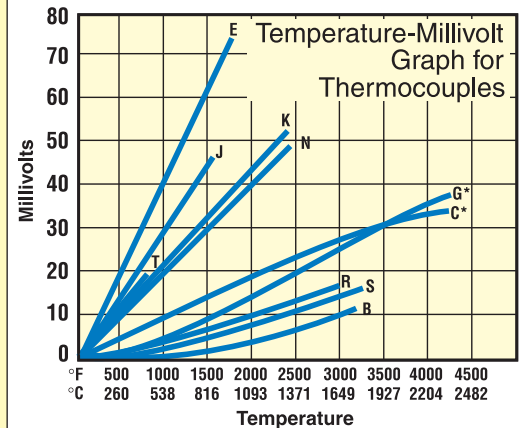
The thermocouples are of the beaded junction type as shown. The bead diameter D is about 2.5 times the wire diameter d. The thermocouples are supplied in packages containing five individually mounted elements having 300 mm (12") leads, except for platinum alloy thermocouples, which are supplied with 150 mm (6") leads. Other lead lengths are available. Consult Sales Department for details. The negative leg is slightly shorter than the positive leg for easy identification.



Small Enough to Measure the Temperature of a Bee

Applications

- biophysics
- metal cutting research
- gas chromatography
- internal combustion engine temperatures
- scientific instruments
- medical research
- chemical reactions
- space vehicles
- industrial heating and structural applications
- cryogenics
- plasma research
- calorimetry
- thermoelectric cooling
- petro-chemical research



Fine Gage Thermocouples

OMEGA® fine gage thermocouples are used whenever fast, accurate temperature measurements are required. The fine wire diameters enable accurate temperature measurements without disturbing the base temperature of the body, in which the installation is made, by keeping heat transfer via the leads to a minimum. Also, the fine junction permits accurate "pin-pointing" of the measured values. They are available in wire sized ranging from 0.0005" to 0.032" in diameter. All fine gage thermocouples are made from carefully selected materials. To insure consistent thermoelectric properties, each package contains thermocouples made from matched pairs of wire within the same lot number. When specified, several packages of thermocouples made from the same lot number can be supplied at no extra charge.

Response Time

While thermocouple response is a function of medium of submersion, wire diameter, alloy type and temperature level, it is possible to use Table 2 as a guide for comparing the various wire size thermocouples.

Maximum Service Temperature

Table 1

Thermocouple Type	0.13 mm (0.005")	0.38 mm (0.015")	0.51 mm (0.020")	0.81 mm (0.032")
J**	315°C (600°F)	371°C (700°F)	371°C (700°F)	482°C (900°F)
K	593°C (1100°F)	871°C (1600°F)	871°C (1600°F)	982°C (1800°F)
N	593°C (1100°F)	871°C (1600°F)	871°C (1600°F)	982°C (1800°F)
T	149°C (300°F)	204°C (400°F)	204°C (400°F)	260°C (500°F)
E	315°C (600°F)	426°C (800°F)	426°C (800°F)	593°C (1100°F)
R/S	—	—	1450°C (2642°F)	1450°C (2642°F)
B	—	—	1700°C (3092°F)	1700°C (3092°F)

Table 1 lists maximum service temperatures for long term exposures of bare wire thermocouples. For very short exposure times, temperatures of the fine gage thermocouples can be as high as the permissible temperatures for the 0.8 mm (0.032") diameter thermocouples.

** Do not expose to oxidizing atmospheres.

Response Time*

Table 2

Wire Size mm (in)	Still Air 427°C/38°C 800°F/100°F	60 ft/sec Air 427°C/38°C 800°F/100°F	Still H ₂ O 93°C/38°C 200°F/100°F
0.025 (0.001)	0.05 sec	0.004 sec	0.002 sec
0.125 (0.005)	1.0 sec	0.08 sec	0.04 sec
0.381 (0.015)	10.0 sec	0.80 sec	0.40 sec
0.75 (0.032)	40.0 sec	3.2 sec	1.6 sec

* The time constant is defined as the time required to reach 63.2% of an instantaneous temperature change. The data for Table 2 are obtained by measuring the time required for a Type J fine gage thermocouple to reach 63.2% of its final temperature when its junction is alternately exposed to two different temperature levels. In this case, the time constant was measured for exposures between 427°C (800°F) and 38°C (100°F) air between 93°C (200°F) and 38°C (100°F) water.



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