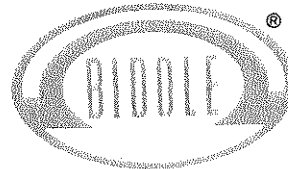


**Manual 72-35T**

Supersedes Manual 60-35T

**Thermocouple  
Temperature—Millivolt  
Conversion  
Tables**  
(**IPTS 68 Conversion**)  
**For Thermocouple Types  
B, E, J, K, R, S, and T**

Contents of this Manual  
Courtesy of Honeywell, Inc.,  
Industrial Division, Fort Washington, Pa. 19034



**Biddle Instruments**

BLUE BELL, PA. 19422



DATA	PAGE
Degrees Fahrenheit to EMF for	
Type B Thermocouples	10
Type E Thermocouples	16
Type J Thermocouples	20
Type K Thermocouples	24
Type R Thermocouples	29
Type S Thermocouples	35
Type T Thermocouples	41
Degrees Centegrade to EMF for	
Type B Thermocouples	43
Type E Thermocouples	46
Type J Thermocouples	48
Type K Thermocouples	51
Type R Thermocouples	54
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Although the information contained in this book is believed to be accurate, the James G. Biddle Co. assumes no responsibility for the results from using this data.

## INTRODUCTION

The values in these tables, based upon absolute electrical units, were developed by the National Bureau of Standards during 1971 and 1972 as required by the international adoption in 1968 of a revised International Temperature Scale (I.P.T.S. 68). These revisions also reflect the international agreement on composition changes in the positive thermoelements of the types R and S thermocouples, and provided an opportunity to refine and smooth all the temperature- $\epsilon$ m $\nu$ t relationships. The tables also appear in N.B.S. monograph 125 as well as ASTM standard E230-72.

### Earlier Calibrations

For I.P.T.S. 1948 Temperature- $\epsilon$ m $\nu$ t conversion tables, see **Manual 60-35T**. Most instruments built before 1973 are calibrated to those values.

### IDENTIFICATION OF THERMOCOUPLE TYPES

The letter symbols identifying each reference table are those recognized in American National Standard C96.1. These symbols identify the following thermocouple calibrations.

TYPE B - Platinum 30% rhodium (+) versus platinum 6% rhodium (-)

TYPE E - Nickel-Chromium (+) versus constantan (-) (See Notes 1 & 2)

TYPE J - Iron (+) versus constantan (-) (See Note 1)

TYPE K - Nickel-Chromium (+) versus nickel-aluminum (-) (See Note 3)

TYPE R - Platinum-13% rhodium (+) versus platinum (-)

TYPE S - Platinum-10% rhodium (+) versus platinum (-)

TYPE T - Copper (+) versus constantan (-) (See Note 1)

NOTE 1: Reference tables in other publications may refer to constantan as copper-nickel

NOTE 2: Originally Chromel vs Constantan

NOTE 3: Originally Chromel vs Alumel (Chromel and Alumel are trademarks of Hoskins Mfg. Co.)

### REFERENCE JUNCTION

All thermocouple tables in this handbook are based upon a reference junction temperature of 32°F (0°C); therefore, direct conversion from the tables can be made only when an ice bath is used at the reference junction.

If it is not possible to maintain the reference junction temperature at 32°F (0°C), a correction factor must be applied to the millivolt values shown in the thermocouple tables. Note that the millivoltage produced by a given thermocouple is decreased when the temperature difference between the measuring junction and the reference junction is decreased. Correct for reference junction temperatures other than 32°F (0°C) as described below.

### A. Converting Millivoltage to Equivalent Temperature

To apply the reference junction correction factor to a given potentiometer millivoltage reading, proceed as follows:

1. From the appropriate thermocouple table, obtain the millivoltage (based upon a 32°F (0°C) reference junction) corresponding to the actual temperature of the thermocouple reference junction.
2. Add algebraically the value obtained in step 1, above, to the millivoltage read on the potentiometer.
3. The corrected millivoltage may then be converted into terms of temperature directly from the same table.

#### Example 1

A potentiometer indicates a value of 13,013 m.v. when connected to a Type T thermocouple, and it is desired to convert this value to its equivalent temperature. The actual thermocouple reference junction temperature, as determined by an accurate mercury-in-glass thermometer, is 68°F. From the Type T table, 68°F = 0.789 mv, based upon a 32°F reference junction. Adding this value to the potentiometer reading,  $13,013 + 0.789 = 13,802$  mv which is the corrected value based upon a 32°F reference junction. From Type T table, 13,802 mv = 539°F.

#### Example 2

A Type T thermocouple under steady operating conditions causes a potentiometer reading of -3.370 m.v. The actual thermocouple reference junction temperature is 70°F. From the Type T table, 70°F = 0.834 mv based upon a reference junction of 32°F. Adding these two millivoltage algebraically,  $-3.370 + 0.834 = -2,546$  mv = -98°F.

### B. Converting Temperature to Equivalent Millivoltage

To determine the proper millivolt input required to check the calibration of an instrument, proceed as follows:

1. From the appropriate table, obtain the millivoltage based upon a 32°F reference junction corresponding to the actual temperature at the input terminals of the instrument to be checked.
2. From the same table, obtain the millivoltage based upon a 32°F reference junction for the temperature to be checked.
3. Subtract algebraically the value obtained in step 2, above, from the value obtained in step 1.

#### Example 1

It is desired to check the calibration of an instrument at 300°F. The instrument has a scale graduated in degrees Fahrenheit for Type T thermocouple. The actual temperature at the input terminals of the instrument to be checked, as determined by an accurate mercury-in-glass thermometer, is 70°F. From the Type T table, 70°F = 0.834 mv and 300°F = 6.647 mv based upon a reference junction temperature of 32°F. Subtracting, the corrected millivoltage input required on the basis of a 70°F reference junction is  $6.647 - 0.834 = 5.813$  mv.

#### Example 2

It is desired to determine the correct millivoltage input required to check the calibration of an instrument at -200°F. The instrument scale is graduated in degrees Fahrenheit for a Type T thermocouple. The actual temperature at the input terminals of the instrument is 68°F. From the Type T table, 68°F = 0.789 and -200°F = 4.149 mv based upon a 32°F reference junction. Subtracting algebraically, the corrected millivolt input on the basis of a 68°F reference junction is  $-4.149 - 0.789 = -4.938$  mv.

### Interpolation

Whenever you seek a value that falls between two given values, you follow the same procedures of interpolation. Let us describe the methods by example:

You have a type E thermocouple and you wish to determine the correct millivolt output at 23°F. The nearest adjacent values given are at 20°F and 30°F:

$$\begin{aligned} +20^{\circ}\text{F} &= -0.389 \text{ mv} \\ +23^{\circ}\text{F} &= ? \text{ mv} \\ +30^{\circ}\text{F} &= -0.065 \text{ mv} \end{aligned}$$

so your equivalent EMF lies somewhere between -0.389 mv and -0.065 mv. Use this fact as a guide, should you make a mathematical error with the sign of a number.

Now observe that from +20°F to +30°F there is a difference of 10°, and from 20°F to 23°F the difference is 3° or 3/10 of the way from 20°F towards 30°. Mathematically this is  $23^{\circ} = 3/10 (30^{\circ} - 20^{\circ}) + 20^{\circ}$ .

Therefore the equivalent EMF is also 3/10 of the way between the equivalent of 20°F and the equivalent of 30°F or:

$$\begin{aligned}
 \text{equivalent EMF of } 23^\circ\text{F} &= 3/10 [\text{value of } 30^\circ - \text{value of value of } 20^\circ] + \text{value of } 20^\circ \\
 &= 3/10 [(-0.065) - (-0.389)] + (-0.389) \\
 &= 3/10 (+0.324) - 0.389 \\
 &= +0.0972 - 0.389 \\
 &= -0.292 \text{ (rounded)}
 \end{aligned}$$

This says the value 3/10 of the way from -0.389 toward -0.065 is -0.292, so 23°F = -0.292 mv. The method works the same way starting with an EMF value and determining temperature.

You have an EMF of -0.944 mv, determine temperature. The table gives us

$$\begin{aligned}
 2^\circ\text{F} &= -0.963 \text{ mv} \\
 3^\circ\text{F} &= -0.944 \text{ mv} \\
 3^\circ\text{F} &= -0.931 \text{ mv}
 \end{aligned}$$

so putting all the above steps into one equation (but determining °F rather than EMF):

$$\text{temperature} = \left[ \frac{0.963 \text{ mv} - (-0.944 \text{ mv})}{(-0.963 \text{ mv}) - (-0.931 \text{ mv})} \right] (3^\circ\text{F} - 2^\circ\text{F}) + 2^\circ\text{F}$$

$$= \frac{-0.963 \text{ mv} + 0.944 \text{ mv}}{-0.963 \text{ mv} + 0.931 \text{ mv}} (1^\circ\text{F}) + 2^\circ\text{F}$$

$$= -0.19 (1^\circ\text{F}) + 2^\circ\text{F} = 0.594^\circ\text{F} + 2^\circ\text{F} = 2.594^\circ\text{F} \approx 2.6^\circ\text{F} \text{ (rounded)}$$

**In Brief**

To interpolate between two given values, add algebraically to the smaller value a proportional part of the difference between the two printed values:

Given: A = X

Value between: B = ?

Given: C = Z

To find value:

$$? = \left( \frac{A - B}{A - C} \right) (Z - X) + X$$

**LIMITS OF ERROR FOR THERMOCOUPLES**

TYPE	TEMP. RANGE DEG. F	LIMITS OF ERROR (Notes)	
		Standard	Premium
T	- 300 to - 75	—	± 1%
	- 150 to - 75	± 2%	--
	- 75 to + 200	± 1 1/2%	± 3/4°F
	+200 to + 700	± 3/4%	± 3/8%
J	0 to 800	± 4°F	--
	800 to 1400	± 1/2%	--
	0 to 600	--	± 2°F
	600 to 1000	--	± 1/3%
E	0 to 600	± 3°F	--
	600 to 1000	± 1/2%	--
K	0 to 530	± 4°F	± 2°F
	530 to 2300	± 3/4%	± 3/8%
R or S	0 to 1200	± 3°F	--
	1200 to 2700	± 1/4%	--
	1600 to 3100	± 1/2%	--

- Notes:
1. When the limit of error is given in %, the percentage applies to the temperature being measured, not the range.
  2. The limits of error for each type of thermocouple apply only over the temperature range for which the wire size in question is recommended.  
Also, these limits apply only to standard stock wire sizes.
  3. Note that limits of error apply to thermocouples as supplied. The calibration of a thermocouple may change during use. The magnitude of the change depends upon such factors as temperature, the length of time, and the conditions under which it was used.

LIMITS OF ERROR FOR EXTENSION WIRE

TYPE OF THERMOCOUPLE	TYPE OF EXTENSION WIRE	TEMP. LIMITS (°F)	LIMITS OF ERROR	
			REG. GRADE (Note 2)	PREM. GRADE
T	(Note 3) TX	-75 to +200	±3/4% or ±1 1/2°F	±1/2% or ±3/4°F
J	JX	0 to 400	±4°F or ±2%	±2°F or ±3/4%
E	EX	0 to 400	±2% or ±3°F	--
K	KX	0 to 400	±2-1/2% or ±4°F	±1-1/2% or ±2°F
R or S	SX	75 to 400	±1-1/2% or ±6°F	--
	4-Conductor Cable	75 to 400	±6% or ±9°F	--
		75 to 400	--	±1-1/2% (Note 4) or ±2-1/2% (Note 5)

Notes:

1. Limits apply to temperature at connection head and reference junction.
2. When the limit of error is given in percent, the percentage applies to the temperature differential between temperatures at the connection head and the reference junction. Use the figure when smaller than the degree Fahr. limit.
3. For measuring junction temperatures below 0°F, limits of error for regular grade may be +2%; for premium grade, ± 1 1/4% of the temperature differential.
4. Applies only when used with Type R thermocouples.
5. Applies only when used with Type S thermocouples.



**COLOR CODING AND RESISTANCE DATA  
FOR STANDARD THERMOCOUPLE EXTENSION WIRE**

THERMOCOUPLE ANSI SYMBOL	ANSI SYMBOL	EXTENSION WIRE DATA							
		CONDUCTOR MATERIAL		COLOR CODING (3)		RESISTANCE IN OHMS PER DOUBLE FOOT			
		POSITIVE	NEGATIVE	POS	OVERALL	# 14 GA	# 16 GA	# 18 GA	# 20 GA
J	JX	Iron	Constantan	White	Black(4)	0.09	0.147	—	0.360
K	KX	Nickel Chromium	Nickel Aluminum	Yellow	Yellow	0.150	0.235	—	0.600
	WX	Iron	Cupronel	Green	White(3)	—	0.078	—	—
R & S	SX	Copper	Copper- nickel alloy	Black	Green(3)	—	0.008	—	—
T	TX	Copper	Constantan	Blue	Blue(4)	—	0.122	0.193	0.300
E	EX	Nickel Chromium	Constantan	Purple	Purple	—	0.370	—	0.703
B		DATA NOT OFFICIALLY ESTABLISHED; COPPER WIRE ACCEPTABLE FOR TEMPERATURES UP TO 200°F.							

- (1) With Thermocouple extension wire red is always negative.
- (2) Except for lead or armor covered extension wire.
- (3) Except for lead or rubber covered extension wire.
- (4) Except for rubber covered extension wire.

\*ANSI = American National Standards Institute

TYPE B THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
0	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.004
10	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.003
20	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
40	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
50	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
60	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
70	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003
80	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
90	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.001
100	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	0.000
110	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002
120	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.004
130	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.006
140	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.009
150	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.012
160	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.015
170	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.019
180	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.023
190	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.027
200	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.027	0.032
210	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.032	0.037
220	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.037	0.043
230	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.043	0.049
240	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.049	0.055
250	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.055	0.061
260	0.061	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.062	0.068
270	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.068	0.075
280	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.075	0.082
290	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.089
300	0.090	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.098
310	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.099	0.105
320	0.107	0.107	0.107	0.107	0.107	0.107	0.107	0.107	0.107	0.107	0.107	0.113
330	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.116	0.123
340	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.133
350	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.135	0.144
360	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.144	0.154
370	0.154	0.154	0.154	0.154	0.154	0.154	0.154	0.154	0.154	0.154	0.154	0.165
380	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.165	0.176
390	0.176	0.176	0.176	0.176	0.176	0.176	0.176	0.176	0.176	0.176	0.176	0.187
400	0.187	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.199
410	0.199	0.199	0.199	0.199	0.199	0.199	0.199	0.199	0.199	0.199	0.199	0.210
420	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.210	0.223
430	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.223	0.235
440	0.235	0.235	0.235	0.235	0.235	0.235	0.235	0.235	0.235	0.235	0.235	0.248
450	0.249	0.249	0.249	0.249	0.249	0.249	0.249	0.249	0.249	0.249	0.249	0.261
460	0.261	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.262	0.275
470	0.275	0.276	0.276	0.276	0.276	0.276	0.276	0.276	0.276	0.276	0.276	0.288
480	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.288	0.303
490	0.303	0.303	0.303	0.303	0.303	0.303	0.303	0.303	0.303	0.303	0.303	0.317
500	0.317	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.318	0.332
510	0.332	0.332	0.332	0.332	0.332	0.332	0.332	0.332	0.332	0.332	0.332	0.347
520	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.347	0.362
530	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.378
540	0.378	0.378	0.378	0.378	0.378	0.378	0.378	0.378	0.378	0.378	0.378	0.394
550	0.394	0.394	0.394	0.394	0.394	0.394	0.394	0.394	0.394	0.394	0.394	0.410
560	0.410	0.412	0.412	0.412	0.412	0.412	0.412	0.412	0.412	0.412	0.412	0.427
570	0.427	0.427	0.427	0.427	0.427	0.427	0.427	0.427	0.427	0.427	0.427	0.444
580	0.444	0.444	0.444	0.444	0.444	0.444	0.444	0.444	0.444	0.444	0.444	0.462
590	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.462	0.479
600	0.479	0.479	0.479	0.479	0.479	0.479	0.479	0.479	0.479	0.479	0.479	0.497

\* CONVERTED FROM DEGREES CELSIUS 1968.1

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F

TYPE B THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
600	0.479	0.481	0.483	0.485	0.486	0.488	0.490	0.492	0.494	0.495	0.497	600
610	0.497	0.499	0.501	0.503	0.504	0.506	0.508	0.510	0.512	0.514	0.515	610
620	0.515	0.517	0.519	0.521	0.523	0.525	0.527	0.528	0.530	0.532	0.534	620
630	0.534	0.536	0.538	0.540	0.542	0.544	0.545	0.547	0.549	0.551	0.553	630
640	0.553	0.555	0.557	0.559	0.561	0.563	0.565	0.566	0.568	0.570	0.572	640
650	0.572	0.574	0.576	0.578	0.580	0.582	0.584	0.586	0.588	0.590	0.592	650
660	0.592	0.594	0.596	0.598	0.600	0.602	0.604	0.606	0.608	0.610	0.612	660
670	0.612	0.614	0.616	0.618	0.620	0.622	0.624	0.626	0.628	0.630	0.632	670
680	0.632	0.634	0.636	0.638	0.640	0.642	0.644	0.646	0.648	0.650	0.652	680
690	0.652	0.654	0.656	0.659	0.661	0.663	0.665	0.667	0.669	0.671	0.673	690
700	0.673	0.675	0.677	0.679	0.682	0.684	0.686	0.688	0.690	0.692	0.694	700
710	0.694	0.696	0.699	0.701	0.703	0.705	0.707	0.709	0.711	0.714	0.716	710
720	0.716	0.718	0.720	0.722	0.724	0.727	0.729	0.731	0.733	0.735	0.737	720
730	0.737	0.740	0.742	0.744	0.746	0.748	0.751	0.753	0.755	0.757	0.759	730
740	0.759	0.762	0.764	0.766	0.768	0.771	0.773	0.775	0.777	0.780	0.782	740
750	0.782	0.784	0.786	0.789	0.791	0.793	0.795	0.798	0.800	0.802	0.804	750
760	0.804	0.807	0.809	0.811	0.814	0.816	0.818	0.821	0.823	0.825	0.827	760
770	0.827	0.830	0.832	0.834	0.837	0.839	0.841	0.844	0.846	0.848	0.851	770
780	0.851	0.853	0.855	0.858	0.860	0.862	0.865	0.867	0.870	0.872	0.874	780
790	0.874	0.877	0.879	0.881	0.884	0.886	0.889	0.891	0.893	0.896	0.898	790
800	0.898	0.901	0.903	0.905	0.908	0.910	0.913	0.915	0.918	0.920	0.922	800
810	0.922	0.925	0.927	0.930	0.932	0.935	0.937	0.939	0.942	0.944	0.947	810
820	0.947	0.949	0.952	0.954	0.957	0.959	0.962	0.964	0.967	0.969	0.972	820
830	0.972	0.974	0.977	0.979	0.982	0.984	0.987	0.989	0.992	0.994	0.997	830
840	0.997	0.999	1.002	1.004	1.007	1.009	1.012	1.014	1.017	1.020	1.022	840
850	1.022	1.025	1.027	1.030	1.032	1.035	1.037	1.040	1.043	1.045	1.048	850
860	1.048	1.050	1.053	1.056	1.058	1.061	1.063	1.066	1.069	1.071	1.074	860
870	1.074	1.076	1.079	1.082	1.084	1.087	1.090	1.092	1.095	1.097	1.100	870
880	1.100	1.103	1.105	1.108	1.111	1.113	1.116	1.119	1.121	1.124	1.127	880
890	1.127	1.129	1.132	1.135	1.137	1.140	1.143	1.145	1.148	1.151	1.153	890
900	1.153	1.156	1.159	1.162	1.164	1.167	1.170	1.172	1.175	1.178	1.181	900
910	1.181	1.183	1.186	1.189	1.192	1.194	1.197	1.200	1.203	1.205	1.208	910
920	1.208	1.211	1.214	1.216	1.219	1.222	1.225	1.228	1.230	1.233	1.236	920
930	1.236	1.239	1.241	1.244	1.247	1.250	1.253	1.255	1.258	1.261	1.264	930
940	1.264	1.267	1.270	1.272	1.275	1.278	1.281	1.284	1.287	1.289	1.292	940
950	1.292	1.295	1.298	1.301	1.304	1.307	1.309	1.312	1.315	1.318	1.321	950
960	1.321	1.324	1.327	1.330	1.332	1.335	1.338	1.341	1.344	1.347	1.350	960
970	1.350	1.353	1.356	1.359	1.361	1.364	1.367	1.370	1.373	1.376	1.379	970
980	1.379	1.382	1.385	1.388	1.391	1.394	1.397	1.400	1.403	1.406	1.409	980
990	1.409	1.411	1.414	1.417	1.420	1.423	1.426	1.429	1.432	1.435	1.438	990
1,000	1.438	1.441	1.444	1.447	1.450	1.453	1.456	1.459	1.462	1.465	1.468	1,000
1,010	1.468	1.471	1.474	1.477	1.480	1.483	1.487	1.490	1.493	1.496	1.499	1,010
1,020	1.499	1.502	1.505	1.508	1.511	1.514	1.517	1.520	1.523	1.526	1.529	1,020
1,030	1.529	1.532	1.536	1.539	1.542	1.545	1.548	1.551	1.554	1.557	1.560	1,030
1,040	1.560	1.563	1.566	1.570	1.573	1.576	1.579	1.582	1.585	1.588	1.591	1,040
1,050	1.591	1.595	1.598	1.601	1.604	1.607	1.610	1.613	1.617	1.620	1.623	1,050
1,060	1.623	1.626	1.629	1.632	1.636	1.639	1.642	1.645	1.648	1.652	1.655	1,060
1,070	1.655	1.658	1.661	1.664	1.668	1.671	1.674	1.677	1.680	1.684	1.687	1,070
1,080	1.687	1.690	1.693	1.696	1.700	1.703	1.706	1.709	1.713	1.716	1.719	1,080
1,090	1.719	1.722	1.726	1.729	1.732	1.735	1.739	1.742	1.745	1.748	1.752	1,090
1,100	1.752	1.755	1.758	1.762	1.765	1.768	1.771	1.775	1.778	1.781	1.785	1,100
1,110	1.785	1.788	1.791	1.795	1.798	1.801	1.804	1.808	1.811	1.814	1.818	1,110
1,120	1.818	1.821	1.824	1.828	1.831	1.834	1.838	1.841	1.844	1.848	1.851	1,120
1,130	1.851	1.855	1.858	1.861	1.865	1.868	1.871	1.875	1.878	1.882	1.885	1,130
1,140	1.885	1.888	1.892	1.895	1.898	1.902	1.905	1.909	1.912	1.915	1.919	1,140
1,150	1.919	1.922	1.926	1.929	1.933	1.936	1.939	1.943	1.946	1.950	1.953	1,150
1,160	1.953	1.957	1.960	1.963	1.967	1.970	1.974	1.977	1.981	1.984	1.988	1,160
1,170	1.988	1.991	1.995	1.998	2.002	2.005	2.009	2.012	2.015	2.019	2.022	1,170
1,180	2.022	2.026	2.029	2.033	2.036	2.040	2.043	2.047	2.051	2.054	2.058	1,180
1,190	2.058	2.061	2.065	2.068	2.072	2.075	2.079	2.082	2.086	2.089	2.093	1,190
1,200	2.093	2.096	2.100	2.104	2.107	2.111	2.114	2.118	2.121	2.125	2.128	1,200

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F  
 \* CONVERTED FROM DEGREES C (IPITS 1968).

TYPE B THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
1200	2.096	2.100	2.104	2.107	2.111	2.114	2.118	2.121	2.125	2.128	2.128	1200
1210	2.128	2.132	2.136	2.139	2.143	2.146	2.150	2.154	2.157	2.161	2.164	1210
1220	2.168	2.172	2.176	2.179	2.182	2.186	2.190	2.194	2.197	2.201	2.205	1220
1230	2.208	2.212	2.216	2.219	2.222	2.226	2.229	2.233	2.236	2.240	2.243	1230
1240	2.248	2.252	2.256	2.259	2.262	2.266	2.269	2.273	2.276	2.280	2.283	1240
1250	2.288	2.292	2.295	2.298	2.302	2.305	2.309	2.312	2.316	2.319	2.323	1250
1260	2.328	2.332	2.335	2.338	2.342	2.345	2.349	2.352	2.356	2.359	2.363	1260
1270	2.368	2.372	2.375	2.378	2.382	2.385	2.389	2.392	2.396	2.399	2.403	1270
1280	2.412	2.416	2.419	2.422	2.426	2.429	2.433	2.436	2.440	2.443	2.447	1280
1290	2.452	2.456	2.459	2.462	2.466	2.469	2.473	2.476	2.480	2.483	2.487	1290
1300	2.492	2.496	2.499	2.502	2.506	2.509	2.513	2.516	2.520	2.523	2.527	1300
1310	2.532	2.536	2.539	2.542	2.546	2.549	2.553	2.556	2.560	2.563	2.567	1310
1320	2.572	2.576	2.579	2.582	2.586	2.589	2.593	2.596	2.600	2.603	2.607	1320
1330	2.612	2.616	2.619	2.622	2.626	2.629	2.633	2.636	2.640	2.643	2.647	1330
1340	2.652	2.656	2.659	2.662	2.666	2.669	2.673	2.676	2.680	2.683	2.687	1340
1350	2.692	2.696	2.699	2.702	2.706	2.709	2.713	2.716	2.720	2.723	2.727	1350
1360	2.732	2.736	2.739	2.742	2.746	2.749	2.753	2.756	2.760	2.763	2.767	1360
1370	2.772	2.776	2.779	2.782	2.786	2.789	2.793	2.796	2.800	2.803	2.807	1370
1380	2.812	2.816	2.819	2.822	2.826	2.829	2.833	2.836	2.840	2.843	2.847	1380
1390	2.852	2.856	2.859	2.862	2.866	2.869	2.873	2.876	2.880	2.883	2.887	1390
1400	2.892	2.896	2.899	2.902	2.906	2.909	2.913	2.916	2.920	2.923	2.927	1400
1410	2.932	2.936	2.939	2.942	2.946	2.949	2.953	2.956	2.960	2.963	2.967	1410
1420	2.972	2.976	2.979	2.982	2.986	2.989	2.993	2.996	3.000	3.003	3.007	1420
1430	3.012	3.016	3.019	3.022	3.026	3.029	3.033	3.036	3.040	3.043	3.047	1430
1440	3.052	3.056	3.059	3.062	3.066	3.069	3.073	3.076	3.080	3.083	3.087	1440
1450	3.092	3.096	3.099	3.102	3.106	3.109	3.113	3.116	3.120	3.123	3.127	1450
1460	3.132	3.136	3.139	3.142	3.146	3.149	3.153	3.156	3.160	3.163	3.167	1460
1470	3.172	3.176	3.179	3.182	3.186	3.189	3.193	3.196	3.200	3.203	3.207	1470
1480	3.212	3.216	3.219	3.222	3.226	3.229	3.233	3.236	3.240	3.243	3.247	1480
1490	3.252	3.256	3.259	3.262	3.266	3.269	3.273	3.276	3.280	3.283	3.287	1490
1500	3.292	3.296	3.299	3.302	3.306	3.309	3.313	3.316	3.320	3.323	3.327	1500
1510	3.332	3.336	3.339	3.342	3.346	3.349	3.353	3.356	3.360	3.363	3.367	1510
1520	3.372	3.376	3.379	3.382	3.386	3.389	3.393	3.396	3.400	3.403	3.407	1520
1530	3.412	3.416	3.419	3.422	3.426	3.429	3.433	3.436	3.440	3.443	3.447	1530
1540	3.452	3.456	3.459	3.462	3.466	3.469	3.473	3.476	3.480	3.483	3.487	1540
1550	3.492	3.496	3.499	3.502	3.506	3.509	3.513	3.516	3.520	3.523	3.527	1550
1560	3.532	3.536	3.539	3.542	3.546	3.549	3.553	3.556	3.560	3.563	3.567	1560
1570	3.572	3.576	3.579	3.582	3.586	3.589	3.593	3.596	3.600	3.603	3.607	1570
1580	3.612	3.616	3.619	3.622	3.626	3.629	3.633	3.636	3.640	3.643	3.647	1580
1590	3.652	3.656	3.659	3.662	3.666	3.669	3.673	3.676	3.680	3.683	3.687	1590
1600	3.692	3.696	3.699	3.702	3.706	3.709	3.713	3.716	3.720	3.723	3.727	1600
1610	3.732	3.736	3.739	3.742	3.746	3.749	3.753	3.756	3.760	3.763	3.767	1610
1620	3.772	3.776	3.779	3.782	3.786	3.789	3.793	3.796	3.800	3.803	3.807	1620
1630	3.812	3.816	3.819	3.822	3.826	3.829	3.833	3.836	3.840	3.843	3.847	1630
1640	3.852	3.856	3.859	3.862	3.866	3.869	3.873	3.876	3.880	3.883	3.887	1640
1650	3.892	3.896	3.899	3.902	3.906	3.909	3.913	3.916	3.920	3.923	3.927	1650
1660	3.932	3.936	3.939	3.942	3.946	3.949	3.953	3.956	3.960	3.963	3.967	1660
1670	3.972	3.976	3.979	3.982	3.986	3.989	3.993	3.996	4.000	4.003	4.007	1670
1680	4.012	4.016	4.019	4.022	4.026	4.029	4.033	4.036	4.040	4.043	4.047	1680
1690	4.052	4.056	4.059	4.062	4.066	4.069	4.073	4.076	4.080	4.083	4.087	1690
1700	4.092	4.096	4.099	4.102	4.106	4.109	4.113	4.116	4.120	4.123	4.127	1700
1710	4.132	4.136	4.139	4.142	4.146	4.149	4.153	4.156	4.160	4.163	4.167	1710
1720	4.172	4.176	4.179	4.182	4.186	4.189	4.193	4.196	4.200	4.203	4.207	1720
1730	4.212	4.216	4.219	4.222	4.226	4.229	4.233	4.236	4.240	4.243	4.247	1730
1740	4.252	4.256	4.259	4.262	4.266	4.269	4.273	4.276	4.280	4.283	4.287	1740
1750	4.292	4.296	4.299	4.302	4.306	4.309	4.313	4.316	4.320	4.323	4.327	1750
1760	4.332	4.336	4.339	4.342	4.346	4.349	4.353	4.356	4.360	4.363	4.367	1760
1770	4.372	4.376	4.379	4.382	4.386	4.389	4.393	4.396	4.400	4.403	4.407	1770
1780	4.412	4.416	4.419	4.422	4.426	4.429	4.433	4.436	4.440	4.443	4.447	1780
1790	4.452	4.456	4.459	4.462	4.466	4.469	4.473	4.476	4.480	4.483	4.487	1790
1800	4.492	4.496	4.499	4.502	4.506	4.509	4.513	4.516	4.520	4.523	4.527	1800

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F

\* CONVERTED FROM DEGREES CELSIUS (1988)

TYPE B THERMOCOUPLES

TEMPERATURES IN DEGREES F.*											REFERENCE JUNCTION AT 32 DEGREES F.	
DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
1800	4.672	4.677	4.682	4.687	4.692	4.697	4.702	4.707	4.712	4.717	4.722	1800
1810	4.722	4.727	4.732	4.737	4.742	4.747	4.752	4.757	4.762	4.767	4.772	1810
1820	4.772	4.777	4.782	4.787	4.792	4.797	4.802	4.807	4.812	4.817	4.822	1820
1830	4.823	4.828	4.833	4.838	4.843	4.848	4.853	4.858	4.863	4.868	4.873	1830
1840	4.873	4.878	4.883	4.888	4.894	4.899	4.904	4.909	4.914	4.919	4.924	1840
1850	4.924	4.929	4.934	4.939	4.945	4.950	4.955	4.960	4.965	4.970	4.975	1850
1860	4.975	4.980	4.985	4.991	4.996	5.001	5.006	5.011	5.016	5.021	5.027	1860
1870	5.027	5.032	5.037	5.042	5.047	5.052	5.057	5.063	5.068	5.073	5.078	1870
1880	5.078	5.083	5.088	5.094	5.099	5.104	5.109	5.114	5.119	5.125	5.130	1880
1890	5.130	5.135	5.140	5.145	5.150	5.156	5.161	5.166	5.171	5.176	5.182	1890
1900	5.182	5.187	5.192	5.197	5.202	5.208	5.213	5.218	5.223	5.229	5.234	1900
1910	5.234	5.239	5.244	5.249	5.255	5.260	5.265	5.270	5.276	5.281	5.286	1910
1920	5.286	5.291	5.297	5.302	5.307	5.312	5.318	5.323	5.328	5.333	5.339	1920
1930	5.339	5.344	5.349	5.354	5.360	5.365	5.370	5.376	5.381	5.386	5.391	1930
1940	5.391	5.397	5.402	5.407	5.413	5.418	5.423	5.428	5.434	5.439	5.444	1940
1950	5.444	5.450	5.455	5.460	5.466	5.471	5.476	5.482	5.487	5.492	5.497	1950
1960	5.497	5.503	5.508	5.513	5.519	5.524	5.529	5.535	5.540	5.545	5.551	1960
1970	5.551	5.556	5.561	5.567	5.572	5.578	5.583	5.588	5.594	5.599	5.604	1970
1980	5.604	5.610	5.615	5.620	5.626	5.631	5.637	5.642	5.647	5.653	5.658	1980
1990	5.658	5.663	5.669	5.674	5.680	5.685	5.690	5.696	5.701	5.707	5.712	1990
2000	5.712	5.717	5.723	5.728	5.734	5.739	5.744	5.750	5.755	5.761	5.766	2000
2010	5.766	5.771	5.777	5.782	5.788	5.793	5.799	5.804	5.810	5.815	5.820	2010
2020	5.820	5.826	5.831	5.837	5.842	5.848	5.853	5.859	5.864	5.869	5.875	2020
2030	5.875	5.880	5.886	5.891	5.897	5.902	5.908	5.913	5.919	5.924	5.930	2030
2040	5.930	5.935	5.941	5.946	5.951	5.957	5.962	5.968	5.973	5.979	5.984	2040
2050	5.984	5.990	5.995	6.001	6.006	6.012	6.017	6.023	6.028	6.034	6.039	2050
2060	6.039	6.045	6.051	6.056	6.062	6.067	6.073	6.078	6.084	6.089	6.095	2060
2070	6.095	6.100	6.106	6.111	6.117	6.122	6.128	6.134	6.139	6.145	6.150	2070
2080	6.150	6.156	6.161	6.167	6.172	6.178	6.184	6.189	6.195	6.200	6.206	2080
2090	6.206	6.211	6.217	6.223	6.228	6.234	6.239	6.245	6.250	6.256	6.262	2090
2100	6.262	6.267	6.273	6.278	6.284	6.290	6.295	6.301	6.306	6.312	6.318	2100
2110	6.318	6.323	6.329	6.334	6.340	6.346	6.351	6.357	6.362	6.368	6.374	2110
2120	6.374	6.379	6.385	6.391	6.396	6.402	6.408	6.413	6.419	6.424	6.430	2120
2130	6.430	6.436	6.441	6.447	6.453	6.458	6.464	6.470	6.475	6.481	6.487	2130
2140	6.487	6.492	6.498	6.504	6.509	6.515	6.521	6.526	6.532	6.538	6.543	2140
2150	6.543	6.549	6.555	6.560	6.566	6.572	6.577	6.583	6.589	6.594	6.600	2150
2160	6.600	6.606	6.612	6.617	6.623	6.629	6.634	6.640	6.646	6.651	6.657	2160
2170	6.657	6.663	6.669	6.674	6.680	6.686	6.692	6.697	6.703	6.709	6.714	2170
2180	6.714	6.720	6.726	6.732	6.737	6.743	6.749	6.755	6.760	6.766	6.772	2180
2190	6.772	6.778	6.783	6.789	6.795	6.801	6.806	6.812	6.818	6.824	6.829	2190
2200	6.829	6.835	6.841	6.847	6.852	6.858	6.864	6.870	6.876	6.881	6.887	2200
2210	6.887	6.893	6.899	6.904	6.910	6.916	6.922	6.928	6.933	6.939	6.945	2210
2220	6.945	6.951	6.957	6.962	6.968	6.974	6.980	6.986	6.991	6.997	7.003	2220
2230	7.003	7.009	7.015	7.021	7.026	7.032	7.038	7.044	7.050	7.055	7.061	2230
2240	7.061	7.067	7.073	7.079	7.085	7.090	7.096	7.102	7.108	7.114	7.120	2240
2250	7.120	7.126	7.131	7.137	7.143	7.149	7.155	7.161	7.167	7.172	7.178	2250
2260	7.178	7.184	7.190	7.196	7.202	7.208	7.213	7.219	7.225	7.231	7.237	2260
2270	7.237	7.243	7.249	7.255	7.260	7.266	7.272	7.278	7.284	7.290	7.296	2270
2280	7.296	7.302	7.308	7.314	7.319	7.325	7.331	7.337	7.343	7.349	7.355	2280
2290	7.355	7.361	7.367	7.373	7.378	7.384	7.390	7.396	7.402	7.408	7.414	2290
2300	7.414	7.420	7.426	7.432	7.438	7.444	7.450	7.456	7.461	7.467	7.473	2300
2310	7.473	7.479	7.485	7.491	7.497	7.503	7.509	7.515	7.521	7.527	7.533	2310
2320	7.533	7.539	7.545	7.551	7.557	7.563	7.569	7.575	7.581	7.587	7.592	2320
2330	7.592	7.598	7.604	7.610	7.616	7.622	7.628	7.634	7.640	7.646	7.652	2330
2340	7.652	7.658	7.664	7.670	7.676	7.682	7.688	7.694	7.700	7.706	7.712	2340
2350	7.712	7.718	7.724	7.730	7.736	7.742	7.748	7.754	7.760	7.766	7.772	2350
2360	7.772	7.778	7.784	7.790	7.796	7.802	7.808	7.814	7.820	7.827	7.833	2360
2370	7.833	7.839	7.845	7.851	7.857	7.863	7.869	7.875	7.881	7.887	7.893	2370
2380	7.893	7.899	7.905	7.911	7.917	7.923	7.929	7.935	7.941	7.947	7.953	2380
2390	7.953	7.959	7.966	7.972	7.978	7.984	7.990	7.996	8.002	8.008	8.014	2390
2400	8.014	8.020	8.026	8.032	8.038	8.044	8.051	8.057	8.063	8.069	8.075	2400

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F  
 \* CONVERTED FROM DEGREES C (IPTS 1968).

TYPE B THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F

THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
2400	8.014	8.020	8.032	8.038	8.044	8.051	8.057	8.065	8.069	8.075	8.081	2400
2410	8.075	8.081	8.093	8.098	8.105	8.111	8.118	8.125	8.130	8.136	8.142	2410
2420	8.142	8.148	8.160	8.165	8.172	8.179	8.185	8.192	8.197	8.203	8.209	2420
2430	8.209	8.215	8.227	8.232	8.239	8.245	8.252	8.258	8.264	8.270	8.276	2430
2440	8.276	8.282	8.294	8.299	8.306	8.312	8.319	8.325	8.331	8.337	8.343	2440
2450	8.343	8.349	8.361	8.366	8.373	8.379	8.385	8.392	8.398	8.404	8.410	2450
2460	8.410	8.416	8.428	8.433	8.440	8.446	8.452	8.459	8.465	8.471	8.477	2460
2470	8.477	8.483	8.495	8.500	8.507	8.513	8.520	8.526	8.532	8.538	8.544	2470
2480	8.544	8.550	8.562	8.567	8.574	8.580	8.587	8.593	8.599	8.605	8.611	2480
2490	8.611	8.617	8.629	8.634	8.641	8.647	8.654	8.660	8.666	8.672	8.678	2490
2500	8.678	8.684	8.696	8.701	8.708	8.714	8.721	8.727	8.733	8.739	8.745	2500
2510	8.745	8.751	8.763	8.768	8.775	8.781	8.788	8.794	8.800	8.806	8.812	2510
2520	8.812	8.818	8.830	8.835	8.842	8.848	8.854	8.860	8.866	8.872	8.878	2520
2530	8.878	8.884	8.896	8.901	8.908	8.914	8.921	8.927	8.933	8.939	8.945	2530
2540	8.945	8.951	8.963	8.968	8.975	8.981	8.988	8.994	8.999	9.005	9.011	2540
2550	9.011	9.017	9.029	9.034	9.041	9.047	9.054	9.060	9.066	9.072	9.078	2550
2560	9.078	9.084	9.096	9.101	9.108	9.114	9.121	9.127	9.133	9.139	9.145	2560
2570	9.145	9.151	9.163	9.168	9.175	9.181	9.188	9.194	9.200	9.206	9.212	2570
2580	9.212	9.218	9.230	9.235	9.242	9.248	9.254	9.260	9.266	9.272	9.278	2580
2590	9.278	9.284	9.296	9.301	9.308	9.314	9.321	9.327	9.333	9.339	9.345	2590
2600	9.345	9.351	9.363	9.368	9.375	9.381	9.388	9.394	9.400	9.406	9.412	2600
2610	9.412	9.418	9.430	9.435	9.442	9.448	9.454	9.460	9.466	9.472	9.478	2610
2620	9.478	9.484	9.496	9.501	9.508	9.514	9.521	9.527	9.533	9.539	9.545	2620
2630	9.545	9.551	9.563	9.568	9.575	9.581	9.588	9.594	9.600	9.606	9.612	2630
2640	9.612	9.618	9.630	9.635	9.642	9.648	9.654	9.660	9.666	9.672	9.678	2640
2650	9.678	9.684	9.696	9.701	9.708	9.714	9.721	9.727	9.733	9.739	9.745	2650
2660	9.745	9.751	9.763	9.768	9.775	9.781	9.788	9.794	9.800	9.806	9.812	2660
2670	9.812	9.818	9.830	9.835	9.842	9.848	9.854	9.860	9.866	9.872	9.878	2670
2680	9.878	9.884	9.896	9.901	9.908	9.914	9.921	9.927	9.933	9.939	9.945	2680
2690	9.945	9.951	9.963	9.968	9.975	9.981	9.988	9.994	9.999	10.005	10.011	2690
2700	10.011	10.017	10.029	10.034	10.041	10.047	10.054	10.060	10.066	10.072	10.078	2700
2710	10.078	10.084	10.096	10.101	10.108	10.114	10.121	10.127	10.133	10.139	10.145	2710
2720	10.145	10.151	10.163	10.168	10.175	10.181	10.188	10.194	10.200	10.206	10.212	2720
2730	10.212	10.218	10.230	10.235	10.242	10.248	10.254	10.260	10.266	10.272	10.278	2730
2740	10.278	10.284	10.296	10.301	10.308	10.314	10.321	10.327	10.333	10.339	10.345	2740
2750	10.345	10.351	10.363	10.368	10.375	10.381	10.388	10.394	10.400	10.406	10.412	2750
2760	10.412	10.418	10.430	10.435	10.442	10.448	10.454	10.460	10.466	10.472	10.478	2760
2770	10.478	10.484	10.496	10.501	10.508	10.514	10.521	10.527	10.533	10.539	10.545	2770
2780	10.545	10.551	10.563	10.568	10.575	10.581	10.588	10.594	10.600	10.606	10.612	2780
2790	10.612	10.618	10.630	10.635	10.642	10.648	10.654	10.660	10.666	10.672	10.678	2790
2800	10.678	10.684	10.696	10.701	10.708	10.714	10.721	10.727	10.733	10.739	10.745	2800
2810	10.745	10.751	10.763	10.768	10.775	10.781	10.788	10.794	10.800	10.806	10.812	2810
2820	10.812	10.818	10.830	10.835	10.842	10.848	10.854	10.860	10.866	10.872	10.878	2820
2830	10.878	10.884	10.896	10.901	10.908	10.914	10.921	10.927	10.933	10.939	10.945	2830
2840	10.945	10.951	10.963	10.968	10.975	10.981	10.988	10.994	10.999	11.005	11.011	2840
2850	11.011	11.017	11.029	11.034	11.041	11.047	11.054	11.060	11.066	11.072	11.078	2850
2860	11.078	11.084	11.096	11.101	11.108	11.114	11.121	11.127	11.133	11.139	11.145	2860
2870	11.145	11.151	11.163	11.168	11.175	11.181	11.188	11.194	11.200	11.206	11.212	2870
2880	11.212	11.218	11.230	11.235	11.242	11.248	11.254	11.260	11.266	11.272	11.278	2880
2890	11.278	11.284	11.296	11.301	11.308	11.314	11.321	11.327	11.333	11.339	11.345	2890
2900	11.345	11.351	11.363	11.368	11.375	11.381	11.388	11.394	11.400	11.406	11.412	2900
2910	11.412	11.418	11.430	11.435	11.442	11.448	11.454	11.460	11.466	11.472	11.478	2910
2920	11.478	11.484	11.496	11.501	11.508	11.514	11.521	11.527	11.533	11.539	11.545	2920
2930	11.545	11.551	11.563	11.568	11.575	11.581	11.588	11.594	11.600	11.606	11.612	2930
2940	11.612	11.618	11.630	11.635	11.642	11.648	11.654	11.660	11.666	11.672	11.678	2940
2950	11.678	11.684	11.696	11.701	11.708	11.714	11.721	11.727	11.733	11.739	11.745	2950
2960	11.745	11.751	11.763	11.768	11.775	11.781	11.788	11.794	11.800	11.806	11.812	2960
2970	11.812	11.818	11.830	11.835	11.842	11.848	11.854	11.860	11.866	11.872	11.878	2970
2980	11.878	11.884	11.896	11.901	11.908	11.914	11.921	11.927	11.933	11.939	11.945	2980
2990	11.945	11.951	11.963	11.968	11.975	11.981	11.988	11.994	11.999	12.005	12.011	2990
3000	12.011	12.017	12.029	12.034	12.041	12.047	12.054	12.060	12.066	12.072	12.078	3000

TYPE B THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
3,000	11.829	11.836	11.842	11.849	11.855	11.862	11.868	11.875	11.881	11.888	11.894	3,000
3,010	11.894	11.901	11.907	11.914	11.920	11.927	11.933	11.940	11.946	11.953	11.959	3,010
3,020	11.959	11.966	11.972	11.979	11.985	11.992	11.998	12.005	12.011	12.018	12.024	3,020
3,030	12.024	12.031	12.037	12.044	12.050	12.057	12.063	12.070	12.076	12.083	12.089	3,030
3,040	12.089	12.096	12.102	12.109	12.115	12.121	12.128	12.134	12.141	12.147	12.154	3,040
3,050	12.154	12.160	12.167	12.173	12.180	12.186	12.193	12.199	12.206	12.212	12.219	3,050
3,060	12.219	12.225	12.232	12.238	12.245	12.251	12.258	12.264	12.271	12.277	12.284	3,060
3,070	12.284	12.290	12.297	12.303	12.310	12.316	12.323	12.329	12.336	12.342	12.349	3,070
3,080	12.349	12.355	12.362	12.368	12.374	12.381	12.387	12.394	12.400	12.407	12.413	3,080
3,090	12.413	12.420	12.426	12.433	12.439	12.446	12.452	12.459	12.465	12.472	12.478	3,090
3,100	12.478	12.485	12.491	12.498	12.504	12.511	12.517	12.523	12.530	12.536	12.543	3,100
3,110	12.543	12.549	12.556	12.562	12.569	12.575	12.582	12.588	12.595	12.601	12.608	3,110
3,120	12.608	12.614	12.621	12.627	12.633	12.640	12.646	12.653	12.659	12.666	12.672	3,120
3,130	12.672	12.679	12.685	12.692	12.698	12.705	12.711	12.718	12.724	12.730	12.737	3,130
3,140	12.737	12.743	12.750	12.756	12.763	12.769	12.776	12.782	12.789	12.795	12.801	3,140
3,150	12.801	12.808	12.814	12.821	12.827	12.834	12.840	12.847	12.853	12.860	12.866	3,150
3,160	12.866	12.872	12.879	12.885	12.892	12.898	12.905	12.911	12.918	12.924	12.930	3,160
3,170	12.930	12.937	12.943	12.950	12.956	12.963	12.969	12.976	12.982	12.988	12.995	3,170
3,180	12.995	13.001	13.008	13.014	13.021	13.027	13.034	13.040	13.046	13.053	13.059	3,180
3,190	13.059	13.066	13.072	13.079	13.085	13.091	13.098	13.104	13.111	13.117	13.124	3,190
3,200	13.124	13.130	13.136	13.143	13.149	13.156	13.162	13.169	13.175	13.181	13.188	3,200
3,210	13.188	13.194	13.201	13.207	13.213	13.220	13.226	13.233	13.239	13.246	13.252	3,210
3,220	13.252	13.258	13.265	13.271	13.278	13.284	13.290	13.297	13.303	13.310	13.316	3,220
3,230	13.316	13.322	13.329	13.335	13.342	13.348	13.354	13.361	13.367	13.374	13.380	3,230
3,240	13.380	13.387	13.393	13.399	13.406	13.412	13.418	13.425	13.431	13.438	13.444	3,240
3,250	13.444	13.450	13.457	13.463	13.470	13.476	13.482	13.489	13.495	13.502	13.508	3,250
3,260	13.508	13.514	13.521	13.527	13.533	13.540	13.546	13.553	13.559	13.565	13.572	3,260
3,270	13.572	13.578	13.585	13.591	13.597	13.604	13.610	13.616	13.623	13.629	13.635	3,270
3,280	13.635	13.642	13.648	13.655	13.661	13.667	13.674	13.680	13.686	13.693	13.699	3,280
3,290	13.699	13.706	13.712	13.718	13.725	13.731	13.737	13.744	13.750	13.756	13.763	3,290
3,300	13.763	13.769	13.775	13.782	13.788	13.794	13.801	13.807	13.814			3,300
DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F

\* CONVERTED FROM DEGREES C (IPTS 1968).

TYPE E THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F

THEMROELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
0	-1.026	-1.057	-1.089	-1.120	-1.151	-1.183	-1.214	-1.245	-1.276	-1.308	-1.339	0
-10	-1.399	-1.470	-1.541	-1.612	-1.683	-1.754	-1.825	-1.896	-1.967	-2.038	-2.109	-10
-20	-2.180	-2.291	-2.402	-2.513	-2.624	-2.735	-2.846	-2.957	-3.068	-3.179	-3.290	-20
-30	-3.301	-3.452	-3.603	-3.754	-3.905	-4.056	-4.207	-4.358	-4.509	-4.660	-4.811	-30
-40	-4.832	-5.023	-5.214	-5.405	-5.596	-5.787	-5.978	-6.169	-6.360	-6.551	-6.742	-40
-50	-6.933	-7.184	-7.435	-7.686	-7.937	-8.188	-8.439	-8.690	-8.941	-9.192	-9.443	-50
-60	-9.644	-9.945	-10.246	-10.547	-10.848	-11.149	-11.450	-11.751	-12.052	-12.353	-12.654	-60
-70	-12.955	-13.306	-13.657	-14.008	-14.359	-14.710	-15.061	-15.412	-15.763	-16.114	-16.465	-70
-80	-16.816	-17.217	-17.618	-18.019	-18.420	-18.821	-19.222	-19.623	-20.024	-20.425	-20.826	-80
-90	-21.227	-21.678	-22.129	-22.580	-23.031	-23.482	-23.933	-24.384	-24.835	-25.286	-25.737	-90
-100	-26.188	-26.689	-27.190	-27.691	-28.192	-28.693	-29.194	-29.695	-30.196	-30.697	-31.198	-100
-110	-31.149	-31.690	-32.231	-32.772	-33.313	-33.854	-34.395	-34.936	-35.477	-36.018	-36.559	-110
-120	-36.520	-37.101	-37.682	-38.263	-38.844	-39.425	-40.006	-40.587	-41.168	-41.749	-42.330	-120
-130	-42.311	-42.932	-43.553	-44.174	-44.795	-45.416	-46.037	-46.658	-47.279	-47.900	-48.521	-130
-140	-48.542	-49.203	-49.864	-50.525	-51.186	-51.847	-52.508	-53.169	-53.830	-54.491	-55.152	-140
-150	-55.173	-55.874	-56.575	-57.276	-57.977	-58.678	-59.379	-60.080	-60.781	-61.482	-62.183	-150
-160	-62.194	-62.935	-63.676	-64.417	-65.158	-65.899	-66.640	-67.381	-68.122	-68.863	-69.604	-160
-170	-69.615	-70.396	-71.177	-71.958	-72.739	-73.520	-74.301	-75.082	-75.863	-76.644	-77.425	-170
-180	-77.436	-78.257	-79.078	-79.899	-80.720	-81.541	-82.362	-83.183	-84.004	-84.825	-85.646	-180
-190	-85.657	-86.518	-87.379	-88.240	-89.101	-89.962	-90.823	-91.684	-92.545	-93.406	-94.267	-190
-200	-94.278	-95.179	-96.080	-96.981	-97.882	-98.783	-99.684	-100.585	-101.486	-102.387	-103.288	-200
-210	-103.299	-104.240	-105.181	-106.122	-107.063	-108.004	-108.945	-109.886	-110.827	-111.768	-112.709	-210
-220	-112.720	-113.701	-114.682	-115.663	-116.644	-117.625	-118.606	-119.587	-120.568	-121.549	-122.530	-220
-230	-122.541	-123.562	-124.583	-125.604	-126.625	-127.646	-128.667	-129.688	-130.709	-131.730	-132.751	-230
-240	-132.772	-133.813	-134.854	-135.895	-136.936	-137.977	-139.018	-140.059	-141.100	-142.141	-143.182	-240
-250	-143.223	-144.284	-145.345	-146.406	-147.467	-148.528	-149.589	-150.650	-151.711	-152.772	-153.833	-250
-260	-153.894	-154.975	-156.056	-157.137	-158.218	-159.300	-160.381	-161.462	-162.543	-163.624	-164.705	-260
-270	-164.786	-165.887	-166.988	-168.089	-169.190	-170.291	-171.392	-172.493	-173.594	-174.695	-175.796	-270
-280	-175.897	-177.018	-178.139	-179.260	-180.381	-181.502	-182.623	-183.744	-184.865	-185.986	-187.107	-280
-290	-187.228	-188.369	-189.510	-190.651	-191.792	-192.933	-194.074	-195.215	-196.356	-197.497	-198.638	-290
-300	-198.779	-199.940	-201.101	-202.262	-203.423	-204.584	-205.745	-206.906	-208.067	-209.228	-210.389	-300
-310	-210.550	-211.731	-212.912	-214.093	-215.274	-216.455	-217.636	-218.817	-220.000	-221.181	-222.362	-310
-320	-222.543	-223.744	-224.945	-226.146	-227.347	-228.548	-229.749	-230.950	-232.151	-233.352	-234.553	-320
-330	-234.754	-235.975	-237.196	-238.417	-239.638	-240.859	-242.080	-243.301	-244.522	-245.743	-246.964	-330
-340	-247.185	-248.426	-249.667	-250.908	-252.149	-253.390	-254.631	-255.872	-257.113	-258.354	-259.595	-340
-350	-259.836	-261.097	-262.358	-263.619	-264.880	-266.141	-267.402	-268.663	-269.924	-271.185	-272.446	-350
-360	-272.707	-273.988	-275.269	-276.550	-277.831	-279.112	-280.393	-281.674	-282.955	-284.236	-285.517	-360
-370	-285.800	-287.091	-288.382	-289.673	-290.964	-292.255	-293.546	-294.837	-296.128	-297.419	-298.710	-370
-380	-299.001	-300.302	-301.603	-302.904	-304.205	-305.506	-306.807	-308.108	-309.409	-310.710	-312.011	-380
-390	-312.312	-313.623	-314.934	-316.245	-317.556	-318.867	-320.178	-321.489	-322.790	-324.091	-325.392	-390
-400	-325.693	-327.004	-328.315	-329.626	-330.937	-332.248	-333.559	-334.870	-336.181	-337.492	-338.803	-400
-410	-339.114	-340.435	-341.756	-343.077	-344.398	-345.719	-347.040	-348.361	-349.682	-351.003	-352.324	-410
-420	-352.645	-353.976	-355.307	-356.638	-357.969	-359.300	-360.631	-361.962	-363.293	-364.624	-365.955	-420
-430	-366.286	-367.627	-368.968	-370.309	-371.650	-372.991	-374.332	-375.673	-377.014	-378.355	-379.696	-430
-440	-380.037	-381.388	-382.739	-384.090	-385.441	-386.792	-388.143	-389.494	-390.845	-392.196	-393.547	-440
-450	-393.898	-395.249	-396.600	-397.951	-399.302	-400.653	-402.004	-403.355	-404.706	-406.057	-407.408	-450



TYPE E THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.\*

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
0	-1.026	-0.994	-0.963	-0.931	-0.890	-0.868	-0.836	-0.805	-0.773	-0.741	-0.709	0
10	-0.709	-0.677	-0.645	-0.613	-0.581	-0.549	-0.517	-0.485	-0.453	-0.421	-0.389	10
20	-0.389	-0.357	-0.324	-0.292	-0.260	-0.227	-0.195	-0.163	-0.130	-0.098	-0.065	20
30	-0.065	-0.033	0.000	0.033	0.065	0.098	0.131	0.163	0.196	0.229	0.262	30
40	0.262	0.295	0.327	0.360	0.393	0.426	0.459	0.492	0.525	0.558	0.591	40
50	0.591	0.624	0.656	0.691	0.724	0.757	0.790	0.824	0.857	0.890	0.924	50
60	0.924	0.957	0.990	1.024	1.057	1.091	1.124	1.158	1.192	1.225	1.259	60
70	1.259	1.292	1.326	1.360	1.394	1.427	1.461	1.495	1.529	1.563	1.597	70
80	1.597	1.631	1.665	1.699	1.733	1.767	1.801	1.835	1.869	1.903	1.937	80
90	1.937	1.972	2.006	2.040	2.075	2.109	2.143	2.178	2.212	2.247	2.281	90
100	2.281	2.316	2.350	2.385	2.419	2.454	2.489	2.523	2.558	2.593	2.627	100
110	2.627	2.662	2.697	2.732	2.767	2.802	2.837	2.872	2.907	2.942	2.977	110
120	2.977	3.012	3.047	3.082	3.117	3.152	3.187	3.223	3.258	3.293	3.329	120
130	3.329	3.364	3.399	3.435	3.470	3.506	3.541	3.577	3.612	3.648	3.683	130
140	3.683	3.719	3.755	3.790	3.826	3.862	3.898	3.933	3.969	4.005	4.041	140
150	4.041	4.077	4.113	4.149	4.185	4.221	4.257	4.293	4.329	4.365	4.401	150
160	4.401	4.437	4.474	4.510	4.546	4.582	4.619	4.655	4.691	4.728	4.764	160
170	4.764	4.801	4.837	4.874	4.910	4.947	4.983	5.020	5.056	5.093	5.130	170
180	5.130	5.166	5.203	5.240	5.277	5.314	5.350	5.387	5.424	5.461	5.498	180
190	5.498	5.535	5.572	5.609	5.646	5.683	5.720	5.757	5.794	5.832	5.869	190
200	5.869	5.906	5.943	5.981	6.018	6.055	6.092	6.130	6.167	6.205	6.242	200
210	6.242	6.280	6.317	6.355	6.392	6.430	6.467	6.505	6.543	6.580	6.618	210
220	6.618	6.656	6.693	6.731	6.769	6.807	6.845	6.882	6.920	6.958	6.996	220
230	6.996	7.034	7.072	7.110	7.148	7.186	7.224	7.262	7.300	7.339	7.377	230
240	7.377	7.415	7.453	7.491	7.530	7.568	7.606	7.645	7.683	7.721	7.760	240
250	7.760	7.798	7.837	7.875	7.914	7.952	7.991	8.029	8.068	8.106	8.145	250
260	8.145	8.184	8.222	8.261	8.300	8.338	8.377	8.416	8.455	8.494	8.532	260
270	8.532	8.571	8.610	8.649	8.688	8.727	8.766	8.805	8.844	8.883	8.922	270
280	8.922	8.961	9.000	9.039	9.078	9.118	9.157	9.196	9.235	9.274	9.314	280
290	9.314	9.353	9.392	9.432	9.471	9.510	9.550	9.589	9.629	9.668	9.708	290
300	9.708	9.747	9.787	9.826	9.866	9.905	9.945	9.984	10.024	10.064	10.103	300
310	10.103	10.143	10.183	10.223	10.262	10.302	10.342	10.382	10.421	10.461	10.501	310
320	10.501	10.541	10.581	10.621	10.661	10.701	10.741	10.781	10.821	10.861	10.901	320
330	10.901	10.941	10.981	11.021	11.061	11.101	11.142	11.182	11.222	11.262	11.302	330
340	11.302	11.343	11.383	11.423	11.464	11.504	11.544	11.585	11.625	11.665	11.706	340
350	11.706	11.746	11.787	11.827	11.868	11.908	11.949	11.989	12.030	12.070	12.111	350
360	12.111	12.152	12.192	12.233	12.273	12.314	12.355	12.396	12.436	12.477	12.518	360
370	12.518	12.559	12.599	12.640	12.681	12.722	12.763	12.804	12.844	12.885	12.926	370
380	12.926	12.967	13.008	13.049	13.090	13.131	13.172	13.213	13.254	13.295	13.336	380
390	13.336	13.378	13.419	13.460	13.501	13.542	13.583	13.624	13.666	13.707	13.748	390
400	13.748	13.789	13.831	13.872	13.913	13.955	13.996	14.037	14.079	14.120	14.161	400
410	14.161	14.203	14.244	14.286	14.327	14.368	14.410	14.451	14.493	14.534	14.576	410
420	14.576	14.618	14.659	14.701	14.742	14.784	14.826	14.867	14.909	14.950	14.992	420
430	14.992	15.034	15.076	15.117	15.159	15.201	15.243	15.284	15.326	15.368	15.410	430
440	15.410	15.451	15.493	15.535	15.577	15.619	15.661	15.703	15.745	15.787	15.829	440
450	15.829	15.871	15.912	15.954	15.996	16.038	16.080	16.123	16.165	16.207	16.249	450
460	16.249	16.291	16.333	16.375	16.417	16.459	16.501	16.544	16.586	16.628	16.670	460
470	16.670	16.712	16.755	16.797	16.839	16.881	16.924	16.966	17.008	17.051	17.093	470
480	17.093	17.135	17.178	17.220	17.262	17.305	17.347	17.389	17.432	17.474	17.517	480
490	17.517	17.559	17.602	17.644	17.687	17.729	17.772	17.814	17.857	17.899	17.942	490
500	17.942	17.984	18.027	18.070	18.112	18.155	18.197	18.240	18.283	18.325	18.368	500
510	18.368	18.411	18.453	18.496	18.539	18.581	18.624	18.667	18.710	18.752	18.795	510
520	18.795	18.838	18.881	18.924	18.966	19.009	19.052	19.095	19.138	19.181	19.223	520
530	19.223	19.266	19.309	19.352	19.395	19.438	19.481	19.524	19.567	19.610	19.653	530
540	19.653	19.696	19.739	19.782	19.825	19.868	19.911	19.954	19.997	20.040	20.083	540
550	20.083	20.126	20.169	20.212	20.256	20.299	20.342	20.385	20.428	20.471	20.514	550
560	20.514	20.558	20.601	20.644	20.687	20.730	20.774	20.817	20.860	20.903	20.947	560
570	20.947	20.990	21.033	21.076	21.120	21.163	21.206	21.250	21.293	21.336	21.380	570
580	21.380	21.423	21.466	21.510	21.553	21.597	21.640	21.683	21.727	21.770	21.814	580
590	21.814	21.857	21.901	21.944	21.987	22.031	22.074	22.118	22.161	22.205	22.248	590
600	22.248	22.292	22.336	22.379	22.423	22.466	22.510	22.553	22.597	22.640	22.684	600

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F  
 \* CONVERTED FROM DEGREES C (IPTS 1968).

TYPE T THERMOCOUPLES

TEMPERATURES IN DEGREES F. \* \*  
 REFERENCE JUNCTION AT 32 DEGREES F.  
 DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F

THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
600	22.248	22.292	22.336	22.379	22.423	22.466	22.510	22.553	22.597	22.640	22.684	600
610	22.684	22.728	22.771	22.815	22.859	22.902	22.946	22.989	23.033	23.077	23.120	610
620	23.120	23.164	23.208	23.252	23.295	23.339	23.383	23.426	23.470	23.514	23.558	620
630	23.558	23.601	23.645	23.688	23.732	23.775	23.819	23.862	23.906	23.949	23.993	630
640	23.996	24.039	24.083	24.127	24.171	24.215	24.259	24.302	24.346	24.390	24.434	640
650	24.434	24.478	24.522	24.566	24.610	24.654	24.698	24.742	24.786	24.829	24.873	650
660	24.873	24.917	24.961	25.005	25.049	25.093	25.137	25.181	25.225	25.269	25.313	660
670	25.313	25.357	25.401	25.445	25.489	25.533	25.577	25.621	25.665	25.709	25.753	670
680	25.754	25.798	25.842	25.886	25.930	25.974	26.018	26.062	26.106	26.150	26.194	680
690	26.195	26.239	26.283	26.327	26.371	26.415	26.459	26.503	26.547	26.591	26.635	690
700	26.637	26.681	26.725	26.769	26.813	26.857	26.901	26.945	26.989	27.033	27.077	700
710	27.079	27.123	27.167	27.211	27.255	27.299	27.343	27.387	27.431	27.475	27.519	710
720	27.522	27.566	27.610	27.654	27.698	27.742	27.786	27.830	27.874	27.918	27.962	720
730	27.966	28.010	28.054	28.098	28.143	28.187	28.232	28.276	28.320	28.364	28.408	730
740	28.409	28.454	28.498	28.543	28.587	28.632	28.676	28.720	28.765	28.809	28.854	740
750	28.854	28.898	28.943	28.987	29.032	29.076	29.121	29.165	29.210	29.254	29.299	750
760	29.299	29.343	29.388	29.433	29.477	29.521	29.566	29.610	29.655	29.699	29.744	760
770	29.744	29.788	29.833	29.878	29.922	29.967	30.011	30.056	30.100	30.145	30.190	770
780	30.190	30.234	30.279	30.323	30.368	30.412	30.457	30.501	30.546	30.591	30.636	780
790	30.636	30.680	30.725	30.769	30.814	30.859	30.903	30.948	30.993	31.037	31.082	790
800	31.082	31.127	31.171	31.216	31.261	31.305	31.350	31.395	31.439	31.484	31.529	800
810	31.529	31.573	31.618	31.663	31.707	31.752	31.797	31.842	31.886	31.931	31.976	810
820	31.976	32.020	32.065	32.110	32.155	32.199	32.244	32.289	32.334	32.378	32.423	820
830	32.423	32.468	32.513	32.557	32.602	32.647	32.692	32.736	32.781	32.826	32.871	830
840	32.871	32.916	32.960	33.005	33.050	33.095	33.140	33.184	33.229	33.274	33.319	840
850	33.319	33.364	33.408	33.453	33.498	33.543	33.588	33.633	33.677	33.722	33.767	850
860	33.767	33.812	33.857	33.902	33.947	33.992	34.037	34.082	34.127	34.172	34.217	860
870	34.217	34.262	34.307	34.352	34.397	34.442	34.487	34.532	34.577	34.622	34.667	870
880	34.667	34.712	34.757	34.802	34.847	34.892	34.937	34.982	35.027	35.072	35.117	880
890	35.117	35.162	35.207	35.252	35.297	35.342	35.387	35.432	35.477	35.522	35.567	890
900	35.567	35.612	35.657	35.702	35.747	35.792	35.837	35.882	35.927	35.972	36.017	900
910	36.017	36.062	36.107	36.152	36.197	36.242	36.287	36.332	36.377	36.422	36.467	910
920	36.467	36.512	36.557	36.602	36.647	36.692	36.737	36.782	36.827	36.872	36.917	920
930	36.917	36.962	37.007	37.052	37.097	37.142	37.187	37.232	37.277	37.322	37.367	930
940	37.367	37.412	37.457	37.502	37.547	37.592	37.637	37.682	37.727	37.772	37.817	940
950	37.817	37.862	37.907	37.952	37.997	38.042	38.087	38.132	38.177	38.222	38.267	950
960	38.267	38.312	38.357	38.402	38.447	38.492	38.537	38.582	38.627	38.672	38.717	960
970	38.717	38.762	38.807	38.852	38.897	38.942	38.987	39.032	39.077	39.122	39.167	970
980	39.167	39.212	39.257	39.302	39.347	39.392	39.437	39.482	39.527	39.572	39.617	980
990	39.617	39.662	39.707	39.752	39.797	39.842	39.887	39.932	39.977	40.022	40.067	990
1000	40.067	40.112	40.157	40.202	40.247	40.292	40.337	40.382	40.427	40.472	40.517	1000
1010	40.517	40.562	40.607	40.652	40.697	40.742	40.787	40.832	40.877	40.922	40.967	1010
1020	40.967	41.012	41.057	41.102	41.147	41.192	41.237	41.282	41.327	41.372	41.417	1020
1030	41.417	41.462	41.507	41.552	41.597	41.642	41.687	41.732	41.777	41.822	41.867	1030
1040	41.867	41.912	41.957	42.002	42.047	42.092	42.137	42.182	42.227	42.272	42.317	1040
1050	42.317	42.362	42.407	42.452	42.497	42.542	42.587	42.632	42.677	42.722	42.767	1050
1060	42.767	42.812	42.857	42.902	42.947	42.992	43.037	43.082	43.127	43.172	43.217	1060
1070	43.217	43.262	43.307	43.352	43.397	43.442	43.487	43.532	43.577	43.622	43.667	1070
1080	43.667	43.712	43.757	43.802	43.847	43.892	43.937	43.982	44.027	44.072	44.117	1080
1090	44.117	44.162	44.207	44.252	44.297	44.342	44.387	44.432	44.477	44.522	44.567	1090
1100	44.567	44.612	44.657	44.702	44.747	44.792	44.837	44.882	44.927	44.972	45.017	1100
1110	45.017	45.062	45.107	45.152	45.197	45.242	45.287	45.332	45.377	45.422	45.467	1110
1120	45.467	45.512	45.557	45.602	45.647	45.692	45.737	45.782	45.827	45.872	45.917	1120
1130	45.917	45.962	46.007	46.052	46.097	46.142	46.187	46.232	46.277	46.322	46.367	1130
1140	46.367	46.412	46.457	46.502	46.547	46.592	46.637	46.682	46.727	46.772	46.817	1140
1150	46.817	46.862	46.907	46.952	46.997	47.042	47.087	47.132	47.177	47.222	47.267	1150
1160	47.267	47.312	47.357	47.402	47.447	47.492	47.537	47.582	47.627	47.672	47.717	1160
1170	47.717	47.762	47.807	47.852	47.897	47.942	47.987	48.032	48.077	48.122	48.167	1170
1180	48.167	48.212	48.257	48.302	48.347	48.392	48.437	48.482	48.527	48.572	48.617	1180
1190	48.617	48.662	48.707	48.752	48.797	48.842	48.887	48.932	48.977	49.022	49.067	1190
1200	49.067	49.112	49.157	49.202	49.247	49.292	49.337	49.382	49.427	49.472	49.517	1200

TYPE E THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
1,200	49.320	49.065	49.109	49.154	49.198	49.243	49.288	49.332	49.377	49.421	49.466	1,200
1,210	49.466	49.910	49.555	49.600	49.644	49.689	49.733	49.778	49.822	49.867	49.911	1,210
1,220	49.911	49.956	50.001	50.045	50.090	50.134	50.179	50.223	50.268	50.312	50.357	1,220
1,230	50.357	50.401	50.446	50.490	50.535	50.579	50.624	50.668	50.713	50.757	50.802	1,230
1,240	50.802	50.846	50.891	50.935	50.980	51.024	51.069	51.113	51.157	51.202	51.246	1,240
1,250	51.246	51.291	51.335	51.380	51.424	51.469	51.513	51.557	51.602	51.646	51.691	1,250
1,260	51.691	51.735	51.780	51.824	51.868	51.913	51.957	52.002	52.046	52.090	52.135	1,260
1,270	52.135	52.179	52.223	52.268	52.312	52.357	52.401	52.445	52.490	52.534	52.578	1,270
1,280	52.578	52.623	52.667	52.711	52.756	52.800	52.844	52.889	52.933	52.977	53.022	1,280
1,290	53.022	53.066	53.110	53.155	53.199	53.243	53.288	53.332	53.376	53.420	53.465	1,290
1,300	53.465	53.509	53.553	53.597	53.642	53.686	53.730	53.774	53.819	53.863	53.907	1,300
1,310	53.907	53.951	53.996	54.040	54.084	54.128	54.173	54.217	54.261	54.305	54.349	1,310
1,320	54.349	54.394	54.438	54.482	54.526	54.570	54.615	54.659	54.703	54.747	54.791	1,320
1,330	54.791	54.835	54.880	54.924	54.968	55.012	55.056	55.100	55.145	55.189	55.233	1,330
1,340	55.233	55.277	55.321	55.365	55.409	55.453	55.498	55.542	55.586	55.630	55.674	1,340
1,350	55.674	55.718	55.762	55.806	55.850	55.894	55.938	55.982	56.026	56.071	56.115	1,350
1,360	56.115	56.159	56.203	56.247	56.291	56.335	56.379	56.423	56.467	56.511	56.555	1,360
1,370	56.555	56.599	56.643	56.687	56.731	56.775	56.819	56.863	56.907	56.951	56.995	1,370
1,380	56.995	57.039	57.083	57.127	57.171	57.215	57.259	57.303	57.347	57.391	57.435	1,380
1,390	57.435	57.478	57.522	57.566	57.610	57.654	57.698	57.742	57.786	57.830	57.873	1,390
1,400	57.873	57.917	57.961	58.005	58.049	58.093	58.137	58.181	58.224	58.268	58.312	1,400
1,410	58.312	58.356	58.400	58.444	58.487	58.531	58.575	58.619	58.663	58.707	58.750	1,410
1,420	58.750	58.794	58.838	58.882	58.926	58.969	59.013	59.057	59.101	59.144	59.188	1,420
1,430	59.188	59.232	59.276	59.319	59.363	59.407	59.451	59.494	59.538	59.582	59.626	1,430
1,440	59.626	59.669	59.713	59.757	59.800	59.844	59.888	59.932	59.975	60.019	60.063	1,440
1,450	60.063	60.106	60.150	60.194	60.237	60.281	60.325	60.368	60.412	60.455	60.499	1,450
1,460	60.499	60.543	60.586	60.630	60.674	60.717	60.761	60.804	60.848	60.892	60.935	1,460
1,470	60.935	60.979	61.022	61.066	61.109	61.153	61.197	61.240	61.284	61.327	61.371	1,470
1,480	61.371	61.414	61.458	61.501	61.545	61.588	61.632	61.675	61.719	61.762	61.806	1,480
1,490	61.806	61.849	61.893	61.936	61.980	62.023	62.067	62.110	62.154	62.197	62.240	1,490
1,500	62.240	62.284	62.327	62.371	62.414	62.458	62.501	62.544	62.588	62.631	62.675	1,500
1,510	62.675	62.718	62.761	62.805	62.848	62.892	62.935	62.978	63.022	63.065	63.108	1,510
1,520	63.108	63.152	63.195	63.238	63.282	63.325	63.368	63.412	63.455	63.498	63.542	1,520
1,530	63.542	63.585	63.628	63.671	63.715	63.758	63.801	63.844	63.888	63.931	63.974	1,530
1,540	63.974	64.017	64.061	64.104	64.147	64.190	64.234	64.277	64.320	64.363	64.406	1,540
1,550	64.406	64.450	64.493	64.536	64.579	64.622	64.665	64.709	64.752	64.795	64.838	1,550
1,560	64.838	64.881	64.924	64.967	65.011	65.054	65.097	65.140	65.183	65.226	65.269	1,560
1,570	65.269	65.312	65.355	65.398	65.441	65.484	65.528	65.571	65.614	65.657	65.700	1,570
1,580	65.700	65.743	65.786	65.829	65.872	65.915	65.958	66.001	66.044	66.087	66.130	1,580
1,590	66.130	66.173	66.216	66.259	66.302	66.345	66.388	66.430	66.473	66.516	66.559	1,590
1,600	66.559	66.602	66.645	66.688	66.731	66.774	66.817	66.859	66.902	66.945	66.988	1,600
1,610	66.988	67.031	67.074	67.117	67.159	67.202	67.245	67.288	67.331	67.374	67.416	1,610
1,620	67.416	67.459	67.502	67.545	67.588	67.630	67.673	67.716	67.759	67.801	67.844	1,620
1,630	67.844	67.887	67.930	67.972	68.015	68.058	68.101	68.143	68.186	68.229	68.271	1,630
1,640	68.271	68.314	68.357	68.399	68.442	68.485	68.527	68.570	68.613	68.655	68.698	1,640
1,650	68.698	68.740	68.783	68.826	68.868	68.911	68.953	68.996	69.039	69.081	69.124	1,650
1,660	69.124	69.166	69.209	69.251	69.294	69.337	69.379	69.422	69.464	69.507	69.549	1,660
1,670	69.549	69.592	69.634	69.677	69.719	69.762	69.804	69.847	69.889	69.931	69.974	1,670
1,680	69.974	70.016	70.059	70.101	70.144	70.186	70.228	70.271	70.313	70.356	70.398	1,680
1,690	70.398	70.440	70.483	70.525	70.567	70.610	70.652	70.694	70.737	70.779	70.821	1,690
1,700	70.821	70.864	70.906	70.948	70.991	71.033	71.075	71.118	71.160	71.202	71.244	1,700
1,710	71.244	71.287	71.329	71.371	71.413	71.456	71.498	71.540	71.582	71.624	71.667	1,710
1,720	71.667	71.709	71.751	71.793	71.835	71.878	71.920	71.962	72.004	72.046	72.088	1,720
1,730	72.088	72.130	72.173	72.215	72.257	72.299	72.341	72.383	72.425	72.467	72.509	1,730
1,740	72.509	72.551	72.593	72.635	72.678	72.720	72.762	72.804	72.846	72.888	72.930	1,740
1,750	72.930	72.972	73.014	73.056	73.098	73.140	73.182	73.224	73.266	73.308	73.350	1,750
1,760	73.350	73.392	73.434	73.475	73.517	73.559	73.601	73.643	73.685	73.727	73.769	1,760
1,770	73.769	73.811	73.853	73.895	73.936	73.978	74.020	74.062	74.104	74.146	74.188	1,770
1,780	74.188	74.229	74.271	74.313	74.355	74.397	74.439	74.480	74.522	74.564	74.606	1,780
1,790	74.606	74.648	74.689	74.731	74.773	74.815	74.857	74.898	74.940	74.982	75.024	1,790
1,800	75.024	75.065	75.107	75.149	75.191	75.232	75.274	75.316	75.357	75.399	75.441	1,800
1,810	75.441	75.483	75.524	75.566	75.608	75.649	75.691	75.733	75.774	75.816	75.858	1,810
1,820	75.858	75.899	75.941	75.983	76.024	76.066	76.108	76.149	76.191	76.233	76.274	1,820
1,830	76.274	76.316	76.358									1,830

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F  
 \* CONVERTED FROM DEGREES (CIPITS 1968).



TYPE J THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
300	7.947	7.977	8.008	8.039	8.069	8.100	8.131	8.161	8.192	8.223	8.253	300
310	8.253	8.284	8.315	8.345	8.376	8.407	8.437	8.468	8.499	8.530	8.560	310
320	8.560	8.591	8.622	8.652	8.683	8.714	8.745	8.775	8.806	8.837	8.867	320
330	8.867	8.898	8.929	8.960	8.990	9.021	9.052	9.083	9.113	9.144	9.175	330
340	9.175	9.206	9.236	9.267	9.298	9.329	9.359	9.390	9.421	9.452	9.483	340
350	9.483	9.513	9.544	9.575	9.606	9.636	9.667	9.698	9.729	9.760	9.790	350
360	9.790	9.821	9.852	9.883	9.914	9.944	9.975	10.006	10.037	10.068	10.098	360
370	10.098	10.129	10.160	10.191	10.222	10.252	10.283	10.314	10.345	10.376	10.407	370
380	10.407	10.437	10.468	10.499	10.530	10.561	10.592	10.622	10.653	10.684	10.715	380
390	10.715	10.746	10.777	10.807	10.838	10.869	10.900	10.931	10.962	10.992	11.023	390
400	11.023	11.054	11.085	11.116	11.147	11.177	11.208	11.239	11.270	11.301	11.332	400
410	11.332	11.363	11.393	11.424	11.455	11.486	11.517	11.548	11.578	11.609	11.640	410
420	11.640	11.671	11.702	11.733	11.764	11.795	11.825	11.856	11.887	11.918	11.949	420
430	11.949	11.980	12.010	12.041	12.072	12.103	12.134	12.165	12.196	12.226	12.257	430
440	12.257	12.288	12.319	12.350	12.381	12.411	12.442	12.473	12.504	12.535	12.566	440
450	12.566	12.597	12.627	12.658	12.689	12.720	12.751	12.782	12.813	12.843	12.874	450
460	12.874	12.905	12.936	12.967	12.998	13.029	13.059	13.090	13.121	13.152	13.183	460
470	13.183	13.214	13.244	13.275	13.306	13.337	13.368	13.399	13.430	13.460	13.491	470
480	13.491	13.522	13.553	13.584	13.615	13.645	13.676	13.707	13.738	13.769	13.800	480
490	13.800	13.830	13.861	13.892	13.923	13.954	13.985	14.015	14.046	14.077	14.108	490
500	14.108	14.139	14.170	14.200	14.231	14.262	14.293	14.324	14.355	14.385	14.416	500
510	14.416	14.447	14.478	14.509	14.539	14.570	14.601	14.632	14.663	14.694	14.724	510
520	14.724	14.755	14.786	14.817	14.848	14.878	14.909	14.940	14.971	15.002	15.032	520
530	15.032	15.063	15.094	15.125	15.156	15.186	15.217	15.248	15.279	15.310	15.340	530
540	15.340	15.371	15.402	15.433	15.464	15.494	15.525	15.556	15.587	15.617	15.648	540
550	15.648	15.679	15.710	15.741	15.771	15.802	15.833	15.864	15.894	15.925	15.956	550
560	15.956	15.987	16.018	16.048	16.079	16.110	16.141	16.171	16.202	16.233	16.264	560
570	16.264	16.294	16.325	16.356	16.387	16.417	16.448	16.479	16.510	16.540	16.571	570
580	16.571	16.602	16.633	16.663	16.694	16.725	16.756	16.786	16.817	16.848	16.879	580
590	16.879	16.909	16.940	16.971	17.001	17.032	17.063	17.094	17.124	17.155	17.186	590
600	17.186	17.217	17.247	17.278	17.309	17.339	17.370	17.401	17.432	17.462	17.493	600
610	17.493	17.524	17.554	17.585	17.616	17.646	17.677	17.708	17.739	17.769	17.800	610
620	17.800	17.831	17.861	17.892	17.923	17.953	17.984	18.015	18.046	18.076	18.107	620
630	18.107	18.138	18.168	18.199	18.230	18.260	18.291	18.322	18.352	18.383	18.414	630
640	18.414	18.444	18.475	18.506	18.537	18.567	18.598	18.629	18.659	18.690	18.721	640
650	18.721	18.751	18.782	18.813	18.843	18.874	18.905	18.935	18.966	18.997	19.027	650
660	19.027	19.058	19.089	19.119	19.150	19.180	19.211	19.242	19.272	19.303	19.334	660
670	19.334	19.364	19.395	19.426	19.456	19.487	19.518	19.548	19.579	19.610	19.640	670
680	19.640	19.671	19.702	19.732	19.763	19.793	19.824	19.855	19.885	19.916	19.947	680
690	19.947	19.977	20.008	20.039	20.069	20.100	20.131	20.161	20.192	20.222	20.253	690
700	20.253	20.284	20.314	20.345	20.376	20.406	20.437	20.467	20.498	20.529	20.559	700
710	20.559	20.590	20.621	20.651	20.682	20.713	20.743	20.774	20.804	20.835	20.866	710
720	20.866	20.896	20.927	20.958	20.988	21.019	21.049	21.080	21.111	21.141	21.172	720
730	21.172	21.203	21.233	21.264	21.295	21.325	21.356	21.386	21.417	21.448	21.478	730
740	21.478	21.509	21.540	21.570	21.601	21.631	21.662	21.693	21.723	21.754	21.785	740
750	21.785	21.815	21.846	21.877	21.907	21.938	21.968	21.999	22.030	22.060	22.091	750
760	22.091	22.122	22.152	22.183	22.214	22.244	22.275	22.305	22.336	22.367	22.397	760
770	22.397	22.428	22.459	22.489	22.520	22.551	22.581	22.612	22.643	22.673	22.704	770
780	22.704	22.735	22.765	22.796	22.826	22.857	22.888	22.918	22.949	22.980	23.010	780
790	23.010	23.041	23.072	23.102	23.133	23.164	23.194	23.225	23.256	23.286	23.317	790
800	23.317	23.348	23.378	23.409	23.440	23.471	23.501	23.532	23.563	23.593	23.624	800
810	23.624	23.655	23.685	23.716	23.747	23.777	23.808	23.839	23.870	23.900	23.931	810
820	23.931	23.962	23.992	24.023	24.054	24.085	24.115	24.146	24.177	24.207	24.238	820
830	24.238	24.269	24.300	24.330	24.361	24.392	24.423	24.453	24.484	24.515	24.546	830
840	24.546	24.576	24.607	24.638	24.669	24.699	24.730	24.761	24.792	24.822	24.853	840
850	24.853	24.884	24.915	24.946	24.976	25.007	25.038	25.069	25.099	25.130	25.161	850
860	25.161	25.192	25.223	25.254	25.284	25.315	25.346	25.377	25.408	25.438	25.469	860
870	25.469	25.500	25.531	25.562	25.593	25.623	25.654	25.685	25.716	25.747	25.778	870
880	25.778	25.809	25.840	25.870	25.901	25.932	25.963	25.994	26.025	26.056	26.087	880
890	26.087	26.118	26.148	26.179	26.210	26.241	26.272	26.303	26.334	26.365	26.396	890
900	26.396	26.427	26.458	26.489	26.520	26.551	26.582	26.613	26.644	26.675	26.705	900
910	26.705	26.736	26.767	26.798	26.829	26.860	26.891	26.922	26.953	26.984	27.015	910
920	27.015	27.046	27.077	27.108	27.139	27.170	27.201	27.232	27.263	27.294	27.325	920
930	27.325	27.356	27.387	27.418	27.449	27.480	27.511	27.542	27.573	27.604	27.635	930
940	27.635	27.666	27.697	27.728	27.759	27.790	27.821	27.852	27.883	27.914	27.945	940

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F  
 \* CONVERTED FROM DEGREES C (NIST 1968).

TEMPERATURES IN DEGREES F.\*\* REFERENCE JUNCTION AT 32 DEGREES F.

TYPE J THERMOCOUPLES

THEMROLECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
950	27.980	28.011	28.042	28.073	28.105	28.136	28.167	28.198	28.230	28.261	28.291	950
960	28.573	28.605	28.636	28.667	28.699	28.730	28.761	28.793	28.824	28.855	28.887	960
970	28.970	29.001	29.032	29.062	29.092	29.122	29.152	29.182	29.212	29.242	29.271	970
980	29.361	29.391	29.421	29.451	29.481	29.511	29.540	29.570	29.600	29.629	29.658	980
990	29.749	29.778	29.807	29.836	29.865	29.894	29.923	29.952	29.981	30.010	30.039	990
1000	30.128	30.157	30.186	30.215	30.244	30.273	30.302	30.331	30.360	30.389	30.418	1000
1010	30.506	30.535	30.564	30.593	30.622	30.651	30.680	30.709	30.738	30.767	30.796	1010
1020	30.885	30.914	30.943	30.972	31.001	31.030	31.059	31.088	31.117	31.146	31.175	1020
1030	31.264	31.293	31.322	31.351	31.380	31.409	31.438	31.467	31.496	31.525	31.554	1030
1040	31.643	31.672	31.701	31.730	31.759	31.788	31.817	31.846	31.875	31.904	31.933	1040
1050	32.022	32.051	32.080	32.109	32.138	32.167	32.196	32.225	32.254	32.283	32.312	1050
1060	32.401	32.430	32.459	32.488	32.517	32.546	32.575	32.604	32.633	32.662	32.691	1060
1070	32.780	32.809	32.838	32.867	32.896	32.925	32.954	32.983	33.012	33.041	33.070	1070
1080	33.159	33.188	33.217	33.246	33.275	33.304	33.333	33.362	33.391	33.420	33.449	1080
1090	33.538	33.567	33.596	33.625	33.654	33.683	33.712	33.741	33.770	33.800	33.829	1090
1100	33.918	33.947	33.976	34.005	34.034	34.063	34.092	34.121	34.150	34.179	34.208	1100
1110	34.297	34.326	34.355	34.384	34.413	34.442	34.471	34.500	34.529	34.558	34.587	1110
1120	34.676	34.705	34.734	34.763	34.792	34.821	34.850	34.879	34.908	34.937	34.966	1120
1130	35.055	35.084	35.113	35.142	35.171	35.200	35.229	35.258	35.287	35.316	35.345	1130
1140	35.434	35.463	35.492	35.521	35.550	35.579	35.608	35.637	35.666	35.695	35.724	1140
1150	35.813	35.842	35.871	35.900	35.929	35.958	35.987	36.016	36.045	36.074	36.103	1150
1160	36.192	36.221	36.250	36.279	36.308	36.337	36.366	36.395	36.424	36.453	36.482	1160
1170	36.571	36.600	36.629	36.658	36.687	36.716	36.745	36.774	36.803	36.832	36.861	1170
1180	36.950	36.979	37.008	37.037	37.066	37.095	37.124	37.153	37.182	37.211	37.240	1180
1190	37.329	37.358	37.387	37.416	37.445	37.474	37.503	37.532	37.561	37.590	37.619	1190
1200	37.708	37.737	37.766	37.795	37.824	37.853	37.882	37.911	37.940	37.969	37.998	1200
1210	38.087	38.116	38.145	38.174	38.203	38.232	38.261	38.290	38.319	38.348	38.377	1210
1220	38.466	38.495	38.524	38.553	38.582	38.611	38.640	38.669	38.698	38.727	38.756	1220
1230	38.845	38.874	38.903	38.932	38.961	38.990	39.019	39.048	39.077	39.106	39.135	1230
1240	39.224	39.253	39.282	39.311	39.340	39.369	39.398	39.427	39.456	39.485	39.514	1240
1250	39.603	39.632	39.661	39.690	39.719	39.748	39.777	39.806	39.835	39.864	39.893	1250
1260	39.982	40.011	40.040	40.069	40.098	40.127	40.156	40.185	40.214	40.243	40.272	1260
1270	40.361	40.390	40.419	40.448	40.477	40.506	40.535	40.564	40.593	40.622	40.651	1270
1280	40.741	40.770	40.799	40.828	40.857	40.886	40.915	40.944	40.973	41.002	41.031	1280
1290	41.120	41.149	41.178	41.207	41.236	41.265	41.294	41.323	41.352	41.381	41.410	1290
1300	41.500	41.529	41.558	41.587	41.616	41.645	41.674	41.703	41.732	41.761	41.790	1300
1310	41.879	41.908	41.937	41.966	41.995	42.024	42.053	42.082	42.111	42.140	42.169	1310
1320	42.258	42.287	42.316	42.345	42.374	42.403	42.432	42.461	42.490	42.519	42.548	1320
1330	42.637	42.666	42.695	42.724	42.753	42.782	42.811	42.840	42.869	42.898	42.927	1330
1340	43.016	43.045	43.074	43.103	43.132	43.161	43.190	43.219	43.248	43.277	43.306	1340
1350	43.395	43.424	43.453	43.482	43.511	43.540	43.569	43.598	43.627	43.656	43.685	1350
1360	43.774	43.803	43.832	43.861	43.890	43.919	43.948	43.977	44.006	44.035	44.064	1360
1370	44.153	44.182	44.211	44.240	44.269	44.298	44.327	44.356	44.385	44.414	44.443	1370
1380	44.532	44.561	44.590	44.619	44.648	44.677	44.706	44.735	44.764	44.793	44.822	1380
1390	44.911	44.940	44.969	44.998	45.027	45.056	45.085	45.114	45.143	45.172	45.201	1390
1400	45.290	45.319	45.348	45.377	45.406	45.435	45.464	45.493	45.522	45.551	45.580	1400
1410	45.670	45.699	45.728	45.757	45.786	45.815	45.844	45.873	45.902	45.931	45.960	1410
1420	46.050	46.079	46.108	46.137	46.166	46.195	46.224	46.253	46.282	46.311	46.340	1420
1430	46.430	46.459	46.488	46.517	46.546	46.575	46.604	46.633	46.662	46.691	46.720	1430
1440	46.810	46.839	46.868	46.897	46.926	46.955	46.984	47.013	47.042	47.071	47.100	1440
1450	47.190	47.219	47.248	47.277	47.306	47.335	47.364	47.393	47.422	47.451	47.480	1450
1460	47.570	47.599	47.628	47.657	47.686	47.715	47.744	47.773	47.802	47.831	47.860	1460
1470	47.950	47.979	48.008	48.037	48.066	48.095	48.124	48.153	48.182	48.211	48.240	1470
1480	48.330	48.359	48.388	48.417	48.446	48.475	48.504	48.533	48.562	48.591	48.620	1480
1490	48.710	48.739	48.768	48.797	48.826	48.855	48.884	48.913	48.942	48.971	49.000	1490
1500	49.090	49.119	49.148	49.177	49.206	49.235	49.264	49.293	49.322	49.351	49.380	1500
1510	49.470	49.499	49.528	49.557	49.586	49.615	49.644	49.673	49.702	49.731	49.760	1510
1520	49.850	49.879	49.908	49.937	49.966	49.995	50.024	50.053	50.082	50.111	50.140	1520
1530	50.230	50.259	50.288	50.317	50.346	50.375	50.404	50.433	50.462	50.491	50.520	1530
1540	50.610	50.639	50.668	50.697	50.726	50.755	50.784	50.813	50.842	50.871	50.900	1540
1550	50.990	51.019	51.048	51.077	51.106	51.135	51.164	51.193	51.222	51.251	51.280	1550
1560	51.370	51.399	51.428	51.457	51.486	51.515	51.544	51.573	51.602	51.631	51.660	1560
1570	51.750	51.779	51.808	51.837	51.866	51.895	51.924	51.953	51.982	52.011	52.040	1570
1580	52.130	52.159	52.188	52.217	52.246	52.275	52.304	52.333	52.362	52.391	52.420	1580
1590	52.510	52.539	52.568	52.597	52.626	52.655	52.684	52.713	52.742	52.771	52.800	1590
1600	52.890	52.919	52.948	52.977	53.006	53.035	53.064	53.093	53.122	53.151	53.180	1600
1610	53.270	53.299	53.328	53.357	53.386	53.415	53.444	53.473	53.502	53.531	53.560	1610
1620	53.650	53.679	53.708	53.737	53.766	53.795	53.824	53.853	53.882	53.911	53.940	1620
1630	54.030	54.059	54.088	54.117	54.146	54.175	54.204	54.233	54.262	54.291	54.320	1630
1640	54.410	54.439	54.468	54.497	54.526	54.555	54.584	54.613	54.642	54.671	54.700	1640
1650	54.790	54.819	54.848	54.877	54.906	54.935	54.964	54.993	55.022	55.051	55.080	1650
1660	55.170	55.199	55.228	55.257	55.286	55.315	55.344	55.373	55.402	55.431	55.460	1660
1670	55.550	55.579	55.608	55.637	55.666	55.695	55.724	55.753	55.782	55.811	55.840	1670
1680	55.930	55.959	55.988	56.017	56.046	56.075	56.104	56.133	56.162	56.191	56.220	1680
1690	56.310	56.339	56.368	56.397	56.426	56.455	56.484	56.513	56.542	56.571	56.600	1690
1700	56.690	56.719	56.748	56.777	56.806	56.835	56.864	56.893	56.922	56.951	56.980	1700
1710	57.070	57.099	57.128	57.157	57.186	57.215	57.244	57.273	57.302	57.331	57.360	1710
1720	57.450	57.479	57.508	57.537	57.566	57.595	57.624	57.653	57.682	57.711	57.740	1720
1730	57.830	57.859	57.888	57.917	57.946	57.975	58.004	58.033	58.062	58.091	58.120	1730
1740	58.210	58.239	58.268	58.297	58.326	58.355	58.384	58.413	58.442	58.471	58.500	1740
1750	58.590	58.619	58.648	58.677	58.706	58.735	58.764	58.793	58.822	58.851	58.880	1750
1760	58.970	58.999	59.028	59.057	59.086	59.115	59.144	59.173	59.202	59.231	59.260	1760
1770	59.350	59.379	59.408	59.437	59.466	59.495	59.524	59.553	59.582	59.611	59.640	1770
1780	59.730	59.759	59.788	59.817	59.846	59.875	59.904	59.933	59.962	59.991	60.020	1780
1790	60.110	60.139	60.168	60.197	60.226	60.255	60.284	60.313	60.342</			

TYPE J THERMOCOUPLES †

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
1,600	50.059	50.095	50.130	50.165	50.200	50.235	50.270	50.305	50.340	50.376	50.411	1,600
1,610	50.411	50.446	50.481	50.516	50.551	50.586	50.621	50.656	50.691	50.726	50.761	1,610
1,620	50.761	50.796	50.831	50.866	50.901	50.936	50.970	51.005	51.040	51.075	51.110	1,620
1,630	51.110	51.145	51.180	51.215	51.249	51.284	51.319	51.354	51.389	51.423	51.458	1,630
1,640	51.458	51.493	51.528	51.562	51.597	51.632	51.667	51.701	51.736	51.771	51.805	1,640
1,650	51.805	51.840	51.875	51.909	51.944	51.978	52.013	52.048	52.082	52.117	52.151	1,650
1,660	52.151	52.186	52.220	52.255	52.289	52.324	52.358	52.393	52.427	52.462	52.496	1,660
1,670	52.496	52.531	52.565	52.600	52.634	52.668	52.703	52.737	52.772	52.806	52.840	1,670
1,680	52.840	52.875	52.909	52.943	52.977	53.012	53.046	53.080	53.115	53.149	53.183	1,680
1,690	53.183	53.217	53.251	53.286	53.320	53.354	53.388	53.422	53.456	53.491	53.525	1,690
1,700	53.525	53.559	53.593	53.627	53.661	53.695	53.729	53.763	53.797	53.831	53.865	1,700
1,710	53.865	53.899	53.933	53.967	54.001	54.035	54.069	54.103	54.137	54.171	54.205	1,710
1,720	54.205	54.239	54.273	54.307	54.341	54.374	54.408	54.442	54.476	54.510	54.544	1,720
1,730	54.544	54.577	54.611	54.645	54.679	54.712	54.746	54.780	54.814	54.847	54.881	1,730
1,740	54.881	54.915	54.948	54.982	55.016	55.049	55.083	55.117	55.150	55.184	55.218	1,740
1,750	55.218	55.251	55.285	55.318	55.352	55.385	55.419	55.453	55.486	55.520	55.553	1,750
1,760	55.553	55.587	55.620	55.654	55.687	55.720	55.754	55.787	55.821	55.854	55.888	1,760
1,770	55.888	55.921	55.954	55.988	56.021	56.055	56.088	56.121	56.155	56.188	56.221	1,770
1,780	56.221	56.255	56.288	56.321	56.354	56.388	56.421	56.454	56.487	56.521	56.554	1,780
1,790	56.554	56.587	56.620	56.654	56.687	56.720	56.753	56.786	56.819	56.853	56.886	1,790
1,800	56.886	56.919	56.952	56.985	57.018	57.051	57.084	57.118	57.151	57.184	57.217	1,800
1,810	57.217	57.250	57.283	57.316	57.349	57.382	57.415	57.448	57.481	57.514	57.547	1,810
1,820	57.547	57.580	57.613	57.646	57.679	57.712	57.745	57.778	57.810	57.843	57.876	1,820
1,830	57.876	57.909	57.942	57.975	58.008	58.041	58.074	58.106	58.139	58.172	58.205	1,830
1,840	58.205	58.238	58.271	58.303	58.336	58.369	58.402	58.435	58.467	58.500	58.533	1,840
1,850	58.533	58.566	58.598	58.631	58.664	58.697	58.729	58.762	58.795	58.827	58.860	1,850
1,860	58.860	58.893	58.926	58.958	58.991	59.024	59.056	59.089	59.121	59.154	59.187	1,860
1,870	59.187	59.219	59.252	59.285	59.317	59.350	59.382	59.415	59.448	59.480	59.513	1,870
1,880	59.513	59.545	59.578	59.610	59.643	59.676	59.708	59.741	59.773	59.806	59.838	1,880
1,890	59.838	59.871	59.903	59.936	59.968	60.001	60.033	60.066	60.098	60.131	60.163	1,890
1,900	60.163	60.196	60.228	60.261	60.293	60.326	60.358	60.390	60.423	60.455	60.488	1,900
1,910	60.488	60.520	60.553	60.585	60.617	60.650	60.682	60.715	60.747	60.779	60.812	1,910
1,920	60.812	60.844	60.876	60.909	60.941	60.974	61.006	61.038	61.071	61.103	61.135	1,920
1,930	61.135	61.168	61.200	61.232	61.265	61.297	61.329	61.362	61.394	61.426	61.459	1,930
1,940	61.459	61.491	61.523	61.555	61.588	61.620	61.652	61.685	61.717	61.749	61.781	1,940
1,950	61.781	61.814	61.846	61.878	61.910	61.943	61.975	62.007	62.039	62.072	62.104	1,950
1,960	62.104	62.136	62.168	62.201	62.233	62.265	62.297	62.330	62.362	62.394	62.426	1,960
1,970	62.426	62.458	62.491	62.523	62.555	62.587	62.619	62.652	62.684	62.716	62.748	1,970
1,980	62.748	62.780	62.813	62.845	62.877	62.909	62.941	62.974	63.006	63.038	63.070	1,980
1,990	63.070	63.102	63.134	63.167	63.199	63.231	63.263	63.295	63.327	63.359	63.392	1,990
2,000	63.392	63.424	63.456	63.488	63.520	63.552	63.584	63.617	63.649	63.681	63.713	2,000
2,010	63.713	63.745	63.777	63.809	63.842	63.874	63.906	63.938	63.970	64.002	64.034	2,010
2,020	64.034	64.066	64.098	64.131	64.163	64.195	64.227	64.259	64.291	64.323	64.355	2,020
2,030	64.355	64.387	64.420	64.452	64.484	64.516	64.548	64.580	64.612	64.644	64.676	2,030
2,040	64.676	64.708	64.740	64.773	64.805	64.837	64.869	64.901	64.933	64.965	64.997	2,040
2,050	64.997	65.029	65.061	65.093	65.125	65.158	65.190	65.222	65.254	65.286	65.318	2,050
2,060	65.318	65.350	65.382	65.414	65.446	65.478	65.510	65.542	65.574	65.606	65.638	2,060
2,070	65.638	65.671	65.703	65.735	65.767	65.799	65.831	65.863	65.895	65.927	65.959	2,070
2,080	65.959	65.991	66.023	66.055	66.087	66.119	66.151	66.183	66.215	66.247	66.279	2,080
2,090	66.279	66.311	66.343	66.375	66.407	66.439	66.472	66.504	66.536	66.568	66.600	2,090
2,100	66.600	66.632	66.664	66.696	66.728	66.760	66.792	66.824	66.856	66.888	66.920	2,100
2,110	66.920	66.952	66.984	67.016	67.048	67.080	67.112	67.144	67.176	67.208	67.240	2,110
2,120	67.240	67.272	67.304	67.336	67.368	67.400	67.432	67.464	67.495	67.527	67.559	2,120
2,130	67.559	67.591	67.623	67.655	67.687	67.719	67.751	67.783	67.815	67.847	67.879	2,130
2,140	67.879	67.911	67.943	67.975	68.007	68.039	68.071	68.103	68.135	68.166	68.198	2,140
2,150	68.198	68.230	68.262	68.294	68.326	68.358	68.390	68.422	68.454	68.486	68.517	2,150
2,160	68.517	68.549	68.581	68.613	68.645	68.677	68.709	68.741	68.772	68.804	68.836	2,160
2,170	68.836	68.868	68.900	68.932	68.964	68.995	69.027	69.059	69.091	69.123	69.155	2,170
2,180	69.155	69.186	69.218	69.250	69.282	69.314	69.345	69.377	69.409	69.441	69.472	2,180
2,190	69.472	69.504	69.536									2,190

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F  
 \* CONVERTED FROM DEGREES CELSIUS (1968).

† NOTE: The maximum recommended temperature limit for Type J thermocouples is 1400°F (760°C). The extension of the Type J tables gives temperature-electromotive force data to 2192°F (1200°C). This extension is a mathematical extrapolation based on limited calibration data and caution should be exercised in its use. The basis for the extended curve is discussed in N.B.S. Monograph 125.

TEMPERATURES IN DEGREES F \*\* REFERENCE JUNCTION AT 32 DEGREES F \*  
 DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F

TYPE K THERMOCOUPLES

THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
190	3.599	3.612	3.635	3.656	3.681	3.704	3.727	3.750	3.773	3.796	3.819	190
180	3.258	3.381	3.484	3.547	3.621	3.693	3.764	3.834	3.903	3.971	4.038	180
170	3.127	3.190	3.173	3.196	3.220	3.243	3.266	3.289	3.312	3.335	3.358	170
160	2.896	2.920	2.943	2.966	2.989	3.012	3.035	3.058	3.081	3.104	3.127	160
150	2.666	2.689	2.712	2.735	2.758	2.781	2.804	2.827	2.850	2.873	2.896	150
140	2.436	2.459	2.482	2.505	2.528	2.551	2.574	2.597	2.620	2.643	2.666	140
130	2.206	2.229	2.252	2.275	2.298	2.321	2.344	2.367	2.390	2.413	2.436	130
120	1.977	2.000	2.022	2.045	2.068	2.091	2.114	2.137	2.160	2.183	2.206	120
110	1.748	1.771	1.794	1.817	1.839	1.862	1.885	1.908	1.931	1.954	1.977	110
100	1.520	1.543	1.566	1.589	1.611	1.634	1.657	1.680	1.703	1.725	1.748	100
90	1.294	1.316	1.339	1.362	1.384	1.407	1.430	1.452	1.475	1.498	1.520	90
80	1.068	1.090	1.113	1.135	1.158	1.181	1.203	1.226	1.248	1.271	1.294	80
70	0.843	0.865	0.888	0.910	0.933	0.955	0.978	1.000	1.023	1.045	1.068	70
60	0.619	0.642	0.664	0.686	0.709	0.731	0.753	0.776	0.798	0.821	0.843	60
50	0.397	0.419	0.441	0.464	0.486	0.508	0.530	0.553	0.575	0.597	0.619	50
40	0.176	0.198	0.220	0.242	0.264	0.286	0.308	0.331	0.353	0.375	0.397	40
30	-0.044	-0.022	0.000	0.022	0.044	0.066	0.088	0.110	0.132	0.154	0.176	30
20	-0.262	-0.240	-0.218	-0.197	-0.175	-0.153	-0.131	-0.109	-0.088	-0.066	-0.044	20
10	-0.478	-0.457	-0.435	-0.413	-0.392	-0.370	-0.348	-0.327	-0.305	-0.284	-0.262	10
0	-0.692	-0.671	-0.650	-0.628	-0.607	-0.585	-0.564	-0.543	-0.521	-0.500	-0.478	0
-10	-0.904	-0.925	-0.946	-0.968	-0.989	-1.010	-1.031	-1.051	-1.072	-1.093	-1.114	-10
-20	-1.114	-1.135	-1.156	-1.177	-1.197	-1.218	-1.239	-1.260	-1.280	-1.301	-1.322	-20
-30	-1.322	-1.342	-1.363	-1.383	-1.404	-1.424	-1.445	-1.465	-1.486	-1.506	-1.527	-30
-40	-1.527	-1.547	-1.567	-1.588	-1.608	-1.628	-1.648	-1.669	-1.689	-1.709	-1.729	-40
-50	-1.729	-1.749	-1.769	-1.789	-1.809	-1.829	-1.849	-1.869	-1.889	-1.909	-1.929	-50
-60	-1.929	-1.949	-1.968	-1.988	-2.008	-2.028	-2.047	-2.067	-2.087	-2.106	-2.126	-60
-70	-2.126	-2.145	-2.165	-2.184	-2.204	-2.223	-2.243	-2.262	-2.281	-2.300	-2.320	-70
-80	-2.320	-2.339	-2.358	-2.377	-2.397	-2.416	-2.435	-2.454	-2.473	-2.492	-2.511	-80
-90	-2.511	-2.530	-2.549	-2.567	-2.586	-2.605	-2.624	-2.643	-2.661	-2.680	-2.699	-90
-100	-2.699	-2.717	-2.736	-2.754	-2.773	-2.791	-2.810	-2.828	-2.847	-2.865	-2.883	-100
-110	-2.883	-2.902	-2.920	-2.938	-2.956	-2.974	-2.992	-3.010	-3.028	-3.047	-3.065	-110
-120	-3.065	-3.082	-3.100	-3.118	-3.136	-3.154	-3.172	-3.189	-3.207	-3.225	-3.242	-120
-130	-3.242	-3.260	-3.277	-3.295	-3.312	-3.330	-3.347	-3.365	-3.382	-3.399	-3.417	-130
-140	-3.417	-3.434	-3.451	-3.468	-3.485	-3.502	-3.519	-3.536	-3.553	-3.570	-3.587	-140
-150	-3.587	-3.604	-3.621	-3.637	-3.654	-3.671	-3.688	-3.704	-3.721	-3.737	-3.754	-150
-160	-3.754	-3.770	-3.787	-3.803	-3.819	-3.836	-3.852	-3.868	-3.884	-3.901	-3.917	-160
-170	-3.917	-3.933	-3.949	-3.965	-3.981	-3.997	-4.012	-4.028	-4.044	-4.060	-4.075	-170
-180	-4.075	-4.091	-4.107	-4.122	-4.138	-4.153	-4.169	-4.184	-4.200	-4.215	-4.230	-180
-190	-4.230	-4.245	-4.261	-4.276	-4.291	-4.306	-4.321	-4.336	-4.351	-4.366	-4.381	-190
-200	-4.381	-4.396	-4.410	-4.425	-4.440	-4.454	-4.469	-4.484	-4.498	-4.512	-4.527	-200
-210	-4.527	-4.541	-4.556	-4.570	-4.584	-4.598	-4.613	-4.627	-4.641	-4.655	-4.669	-210
-220	-4.669	-4.683	-4.697	-4.710	-4.724	-4.738	-4.752	-4.766	-4.779	-4.792	-4.806	-220
-230	-4.806	-4.819	-4.833	-4.846	-4.860	-4.873	-4.886	-4.899	-4.912	-4.926	-4.939	-230
-240	-4.939	-4.952	-4.965	-4.978	-4.990	-5.003	-5.016	-5.029	-5.041	-5.054	-5.067	-240
-250	-5.067	-5.079	-5.092	-5.104	-5.116	-5.129	-5.141	-5.153	-5.165	-5.178	-5.190	-250
-260	-5.190	-5.202	-5.214	-5.226	-5.238	-5.251	-5.263	-5.275	-5.287	-5.299	-5.311	-260
-270	-5.311	-5.322	-5.333	-5.344	-5.355	-5.366	-5.377	-5.388	-5.399	-5.410	-5.421	-270
-280	-5.421	-5.432	-5.443	-5.454	-5.465	-5.476	-5.487	-5.497	-5.508	-5.519	-5.529	-280
-290	-5.529	-5.540	-5.550	-5.561	-5.571	-5.581	-5.592	-5.602	-5.612	-5.622	-5.632	-290
-300	-5.632	-5.642	-5.652	-5.662	-5.672	-5.682	-5.691	-5.701	-5.711	-5.721	-5.730	-300
-310	-5.730	-5.739	-5.748	-5.757	-5.767	-5.776	-5.786	-5.795	-5.804	-5.813	-5.822	-310
-320	-5.822	-5.831	-5.839	-5.848	-5.857	-5.866	-5.874	-5.883	-5.891	-5.900	-5.908	-320
-330	-5.908	-5.917	-5.925	-5.933	-5.941	-5.949	-5.957	-5.965	-5.973	-5.981	-5.989	-330
-340	-5.989	-5.997	-6.004	-6.012	-6.020	-6.027	-6.035	-6.042	-6.049	-6.057	-6.064	-340
-350	-6.064	-6.071	-6.078	-6.085	-6.092	-6.099	-6.106	-6.113	-6.120	-6.126	-6.133	-350
-360	-6.133	-6.139	-6.146	-6.152	-6.158	-6.165	-6.171	-6.177	-6.183	-6.189	-6.195	-360
-370	-6.195	-6.201	-6.207	-6.213	-6.219	-6.224	-6.230	-6.235	-6.241	-6.246	-6.251	-370
-380	-6.251	-6.257	-6.262	-6.267	-6.272	-6.277	-6.282	-6.287	-6.292	-6.296	-6.301	-380
-390	-6.301	-6.306	-6.310	-6.315	-6.319	-6.323	-6.328	-6.332	-6.336	-6.340	-6.344	-390
-400	-6.344	-6.348	-6.352	-6.355	-6.359	-6.363	-6.366	-6.370	-6.373	-6.377	-6.380	-400
-410	-6.380	-6.383	-6.386	-6.389	-6.392	-6.395	-6.398	-6.401	-6.404	-6.407	-6.410	-410
-420	-6.410	-6.413	-6.416	-6.419	-6.421	-6.423	-6.425	-6.427	-6.429	-6.431	-6.433	-420
-430	-6.433	-6.435	-6.437	-6.439	-6.441	-6.443	-6.444	-6.445	-6.447	-6.448	-6.449	-430
-440	-6.449	-6.450	-6.451	-6.452	-6.453	-6.454	-6.455	-6.456	-6.457	-6.458	-6.459	-440
-450	-6.459	-6.459	-6.459	-6.459	-6.459	-6.459	-6.459	-6.459	-6.459	-6.459	-6.459	-450

\* CONVERTED FROM DEGREES CELSIUS 1968I



TYPE K THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
200	3.819	3.842	3.865	3.888	3.911	3.934	3.957	3.980	4.003	4.026	4.049	200
210	4.049	4.072	4.095	4.118	4.141	4.164	4.187	4.210	4.233	4.256	4.279	210
220	4.279	4.302	4.325	4.348	4.371	4.394	4.417	4.439	4.462	4.485	4.508	220
230	4.508	4.531	4.554	4.577	4.600	4.622	4.645	4.668	4.691	4.714	4.737	230
240	4.737	4.759	4.782	4.805	4.828	4.851	4.873	4.896	4.919	4.942	4.964	240
250	4.964	4.987	5.010	5.033	5.055	5.078	5.101	5.124	5.146	5.169	5.192	250
260	5.192	5.214	5.237	5.260	5.282	5.305	5.327	5.350	5.373	5.395	5.418	260
270	5.418	5.440	5.463	5.485	5.508	5.531	5.553	5.576	5.598	5.621	5.643	270
280	5.643	5.666	5.688	5.711	5.733	5.756	5.778	5.801	5.823	5.846	5.868	280
290	5.868	5.891	5.913	5.936	5.958	5.980	6.003	6.025	6.048	6.070	6.092	290
300	6.092	6.115	6.137	6.160	6.182	6.204	6.227	6.249	6.271	6.294	6.316	300
310	6.316	6.338	6.361	6.383	6.405	6.428	6.450	6.472	6.494	6.517	6.539	310
320	6.539	6.561	6.583	6.606	6.628	6.650	6.672	6.695	6.717	6.739	6.761	320
330	6.761	6.784	6.806	6.828	6.850	6.873	6.895	6.917	6.939	6.961	6.984	330
340	6.984	7.006	7.028	7.050	7.072	7.094	7.117	7.139	7.161	7.183	7.205	340
350	7.205	7.228	7.250	7.272	7.294	7.316	7.338	7.361	7.383	7.405	7.427	350
360	7.427	7.449	7.471	7.494	7.516	7.538	7.560	7.582	7.604	7.627	7.649	360
370	7.649	7.671	7.693	7.715	7.737	7.760	7.782	7.804	7.826	7.848	7.870	370
380	7.870	7.893	7.915	7.937	7.959	7.981	8.003	8.025	8.048	8.070	8.092	380
390	8.092	8.114	8.137	8.159	8.181	8.203	8.225	8.248	8.270	8.292	8.314	390
400	8.314	8.336	8.359	8.381	8.403	8.425	8.448	8.470	8.492	8.514	8.537	400
410	8.537	8.559	8.581	8.603	8.625	8.648	8.670	8.692	8.715	8.737	8.759	410
420	8.759	8.782	8.804	8.826	8.849	8.871	8.893	8.916	8.938	8.960	8.983	420
430	8.983	9.005	9.027	9.050	9.072	9.094	9.117	9.139	9.161	9.183	9.205	430
440	9.205	9.227	9.250	9.272	9.294	9.316	9.338	9.361	9.383	9.405	9.427	440
450	9.427	9.450	9.472	9.494	9.516	9.538	9.560	9.582	9.604	9.627	9.649	450
460	9.649	9.671	9.693	9.715	9.737	9.760	9.782	9.804	9.826	9.848	9.870	460
470	9.870	9.893	9.915	9.937	9.959	9.981	10.003	10.025	10.048	10.070	10.092	470
480	10.092	10.114	10.137	10.159	10.181	10.203	10.225	10.248	10.270	10.292	10.314	480
490	10.314	10.336	10.359	10.381	10.403	10.425	10.448	10.470	10.492	10.514	10.537	490
500	10.537	10.559	10.581	10.603	10.625	10.648	10.670	10.692	10.715	10.737	10.759	500
510	10.759	10.782	10.804	10.826	10.849	10.871	10.893	10.916	10.938	10.960	10.983	510
520	10.983	11.005	11.027	11.050	11.072	11.094	11.117	11.139	11.161	11.183	11.205	520
530	11.205	11.227	11.250	11.272	11.294	11.316	11.338	11.361	11.383	11.405	11.427	530
540	11.427	11.450	11.472	11.494	11.516	11.538	11.560	11.582	11.604	11.627	11.649	540
550	11.649	11.671	11.693	11.715	11.737	11.760	11.782	11.804	11.826	11.848	11.870	550
560	11.870	11.893	11.915	11.937	11.959	11.981	12.003	12.025	12.048	12.070	12.092	560
570	12.092	12.114	12.137	12.159	12.181	12.203	12.225	12.248	12.270	12.292	12.314	570
580	12.314	12.336	12.359	12.381	12.403	12.425	12.448	12.470	12.492	12.514	12.537	580
590	12.537	12.559	12.581	12.603	12.625	12.648	12.670	12.692	12.715	12.737	12.759	590
600	12.759	12.782	12.804	12.826	12.849	12.871	12.893	12.916	12.938	12.960	12.983	600
610	12.983	13.005	13.027	13.050	13.072	13.094	13.117	13.139	13.161	13.183	13.205	610
620	13.205	13.227	13.250	13.272	13.294	13.316	13.338	13.361	13.383	13.405	13.427	620
630	13.427	13.450	13.472	13.494	13.516	13.538	13.560	13.582	13.604	13.627	13.649	630
640	13.649	13.671	13.693	13.715	13.737	13.760	13.782	13.804	13.826	13.848	13.870	640
650	13.870	13.893	13.915	13.937	13.959	13.981	14.003	14.025	14.048	14.070	14.092	650
660	14.092	14.114	14.137	14.159	14.181	14.203	14.225	14.248	14.270	14.292	14.314	660
670	14.314	14.336	14.359	14.381	14.403	14.425	14.448	14.470	14.492	14.514	14.537	670
680	14.537	14.559	14.581	14.603	14.625	14.648	14.670	14.692	14.715	14.737	14.759	680
690	14.759	14.782	14.804	14.826	14.849	14.871	14.893	14.916	14.938	14.960	14.983	690
700	14.983	15.005	15.027	15.050	15.072	15.094	15.117	15.139	15.161	15.183	15.205	700
710	15.205	15.227	15.250	15.272	15.294	15.316	15.338	15.361	15.383	15.405	15.427	710
720	15.427	15.450	15.472	15.494	15.516	15.538	15.560	15.582	15.604	15.627	15.649	720
730	15.649	15.671	15.693	15.715	15.737	15.760	15.782	15.804	15.826	15.848	15.870	730
740	15.870	15.893	15.915	15.937	15.959	15.981	16.003	16.025	16.048	16.070	16.092	740
750	16.092	16.114	16.137	16.159	16.181	16.203	16.225	16.248	16.270	16.292	16.314	750
760	16.314	16.336	16.359	16.381	16.403	16.425	16.448	16.470	16.492	16.514	16.537	760
770	16.537	16.559	16.581	16.603	16.625	16.648	16.670	16.692	16.715	16.737	16.759	770
780	16.759	16.782	16.804	16.826	16.849	16.871	16.893	16.916	16.938	16.960	16.983	780
790	16.983	17.005	17.027	17.050	17.072	17.094	17.117	17.139	17.161	17.183	17.205	790
800	17.205	17.227	17.250	17.272	17.294	17.316	17.338	17.361	17.383	17.405	17.427	800
810	17.427	17.450	17.472	17.494	17.516	17.538	17.560	17.582	17.604	17.627	17.649	810
820	17.649	17.671	17.693	17.715	17.737	17.760	17.782	17.804	17.826	17.848	17.870	820
830	17.870	17.893	17.915	17.937	17.959	17.981	18.003	18.025	18.048	18.070	18.092	830
840	18.092	18.114	18.137	18.159	18.181	18.203	18.225	18.248	18.270	18.292	18.314	840
850	18.314	18.336	18.359	18.381	18.403	18.425	18.448	18.470	18.492	18.514	18.537	850
860	18.537	18.559	18.581	18.603	18.625	18.648	18.670	18.692	18.715	18.737	18.759	860
870	18.759	18.782	18.804	18.826	18.849	18.871	18.893	18.916	18.938	18.960	18.983	870
880	18.983	19.005	19.027	19.050	19.072	19.094	19.117	19.139	19.161	19.183	19.205	880
890	19.205	19.227	19.250	19.272	19.294	19.316	19.338	19.361	19.383	19.405	19.427	890
900	19.427	19.450	19.472	19.494	19.516	19.538	19.560	19.582	19.604	19.627	19.649	900
910	19.649	19.671	19.693	19.715	19.737	19.760	19.782	19.804	19.826	19.848	19.870	910
920	19.870	19.893	19.915	19.937	19.959	19.981	20.003	20.025	20.048	20.070	20.092	920
930	20.092	20.114	20.137	20.159	20.181	20.203	20.225	20.248	20.270	20.292	20.314	930
940	20.314	20.336	20.359	20.381	20.403	20.425	20.448	20.470	20.492	20.514	20.537	940
950	20.537	20.559	20.581	20.603	20.625	20.648	20.670	20.692	20.715	20.737	20.759	950
960	20.759	20.782	20.804	20.826	20.849	20.871	20.893	20.916	20.938	20.960	20.983	960
970	20.983	21.005	21.027	21.050	21.072	21.094	21.117	21.139	21.161	21.183	21.205	970
980	21.205	21.227	21.250	21.272	21.294	21.316	21.338	21.361	21.383	21.405	21.427	

TYPE K THERMOCOUPLES

TEMPERATURES IN DEGREES F. \* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
850	18.702	18.725	18.749	18.772	18.796	18.820	18.843	18.867	18.890	18.914	18.938	850
860	18.938	18.961	18.984	19.008	19.032	19.056	19.079	19.103	19.127	19.150	19.174	860
870	19.174	19.197	19.221	19.245	19.268	19.292	19.316	19.339	19.363	19.386	19.410	870
880	19.410	19.434	19.457	19.481	19.505	19.528	19.552	19.575	19.599	19.622	19.646	880
890	19.646	19.670	19.694	19.717	19.741	19.765	19.788	19.812	19.836	19.859	19.883	890
900	19.883	19.907	19.930	19.954	19.978	20.001	20.025	20.049	20.072	20.096	20.120	900
910	20.120	20.143	20.167	20.190	20.214	20.238	20.261	20.285	20.309	20.332	20.356	910
920	20.356	20.380	20.403	20.427	20.451	20.474	20.498	20.522	20.545	20.569	20.593	920
930	20.593	20.616	20.639	20.663	20.686	20.710	20.733	20.757	20.780	20.804	20.827	930
940	20.827	20.850	20.873	20.897	20.920	20.944	20.967	20.990	21.014	21.037	21.060	940
950	21.060	21.083	21.106	21.129	21.152	21.175	21.198	21.221	21.244	21.267	21.290	950
960	21.290	21.313	21.336	21.359	21.382	21.405	21.428	21.451	21.474	21.497	21.520	960
970	21.520	21.543	21.566	21.589	21.612	21.635	21.658	21.681	21.704	21.727	21.750	970
980	21.750	21.773	21.796	21.819	21.842	21.865	21.888	21.911	21.934	21.957	21.980	980
990	21.980	22.003	22.026	22.049	22.072	22.095	22.118	22.141	22.164	22.187	22.210	990
1000	22.210	22.233	22.256	22.279	22.302	22.325	22.348	22.371	22.394	22.417	22.440	1000
1010	22.440	22.463	22.486	22.509	22.532	22.555	22.578	22.601	22.624	22.647	22.670	1010
1020	22.670	22.693	22.716	22.739	22.762	22.785	22.808	22.831	22.854	22.877	22.900	1020
1030	22.900	22.923	22.946	22.969	22.992	23.015	23.038	23.061	23.084	23.107	23.130	1030
1040	23.130	23.153	23.176	23.199	23.222	23.245	23.268	23.291	23.314	23.337	23.360	1040
1050	23.360	23.383	23.406	23.429	23.452	23.475	23.498	23.521	23.544	23.567	23.590	1050
1060	23.590	23.613	23.636	23.659	23.682	23.705	23.728	23.751	23.774	23.797	23.820	1060
1070	23.820	23.843	23.866	23.889	23.912	23.935	23.958	23.981	24.004	24.027	24.050	1070
1080	24.050	24.073	24.096	24.119	24.142	24.165	24.188	24.211	24.234	24.257	24.280	1080
1090	24.280	24.303	24.326	24.349	24.372	24.395	24.418	24.441	24.464	24.487	24.510	1090
1100	24.510	24.533	24.556	24.579	24.602	24.625	24.648	24.671	24.694	24.717	24.740	1100
1110	24.740	24.763	24.786	24.809	24.832	24.855	24.878	24.901	24.924	24.947	24.970	1110
1120	24.970	24.993	25.016	25.039	25.062	25.085	25.108	25.131	25.154	25.177	25.200	1120
1130	25.200	25.223	25.246	25.269	25.292	25.315	25.338	25.361	25.384	25.407	25.430	1130
1140	25.430	25.453	25.476	25.499	25.522	25.545	25.568	25.591	25.614	25.637	25.660	1140
1150	25.660	25.683	25.706	25.729	25.752	25.775	25.798	25.821	25.844	25.867	25.890	1150
1160	25.890	25.913	25.936	25.959	25.982	26.005	26.028	26.051	26.074	26.097	26.120	1160
1170	26.120	26.143	26.166	26.189	26.212	26.235	26.258	26.281	26.304	26.327	26.350	1170
1180	26.350	26.373	26.396	26.419	26.442	26.465	26.488	26.511	26.534	26.557	26.580	1180
1190	26.580	26.603	26.626	26.649	26.672	26.695	26.718	26.741	26.764	26.787	26.810	1190
1200	26.810	26.833	26.856	26.879	26.902	26.925	26.948	26.971	26.994	27.017	27.040	1200
1210	27.040	27.063	27.086	27.109	27.132	27.155	27.178	27.201	27.224	27.247	27.270	1210
1220	27.270	27.293	27.316	27.339	27.362	27.385	27.408	27.431	27.454	27.477	27.500	1220
1230	27.500	27.523	27.546	27.569	27.592	27.615	27.638	27.661	27.684	27.707	27.730	1230
1240	27.730	27.753	27.776	27.799	27.822	27.845	27.868	27.891	27.914	27.937	27.960	1240
1250	27.960	27.983	28.006	28.029	28.052	28.075	28.098	28.121	28.144	28.167	28.190	1250
1260	28.190	28.213	28.236	28.259	28.282	28.305	28.328	28.351	28.374	28.397	28.420	1260
1270	28.420	28.443	28.466	28.489	28.512	28.535	28.558	28.581	28.604	28.627	28.650	1270
1280	28.650	28.673	28.696	28.719	28.742	28.765	28.788	28.811	28.834	28.857	28.880	1280
1290	28.880	28.903	28.926	28.949	28.972	28.995	29.018	29.041	29.064	29.087	29.110	1290
1300	29.110	29.133	29.156	29.179	29.202	29.225	29.248	29.271	29.294	29.317	29.340	1300
1310	29.340	29.363	29.386	29.409	29.432	29.455	29.478	29.501	29.524	29.547	29.570	1310
1320	29.570	29.593	29.616	29.639	29.662	29.685	29.708	29.731	29.754	29.777	29.800	1320
1330	29.800	29.823	29.846	29.869	29.892	29.915	29.938	29.961	29.984	30.007	30.030	1330
1340	30.030	30.053	30.076	30.099	30.122	30.145	30.168	30.191	30.214	30.237	30.260	1340
1350	30.260	30.283	30.306	30.329	30.352	30.375	30.398	30.421	30.444	30.467	30.490	1350
1360	30.490	30.513	30.536	30.559	30.582	30.605	30.628	30.651	30.674	30.697	30.720	1360
1370	30.720	30.743	30.766	30.789	30.812	30.835	30.858	30.881	30.904	30.927	30.950	1370
1380	30.950	30.973	30.996	31.019	31.042	31.065	31.088	31.111	31.134	31.157	31.180	1380
1390	31.180	31.203	31.226	31.249	31.272	31.295	31.318	31.341	31.364	31.387	31.410	1390
1400	31.410	31.433	31.456	31.479	31.502	31.525	31.548	31.571	31.594	31.617	31.640	1400
1410	31.640	31.663	31.686	31.709	31.732	31.755	31.778	31.801	31.824	31.847	31.870	1410
1420	31.870	31.893	31.916	31.939	31.962	31.985	32.008	32.031	32.054	32.077	32.100	1420
1430	32.100	32.123	32.146	32.169	32.192	32.215	32.238	32.261	32.284	32.307	32.330	1430
1440	32.330	32.353	32.376	32.399	32.422	32.445	32.468	32.491	32.514	32.537	32.560	1440

TYPE K THERMOCOUPLES

TEMPERATURES IN DEGREES F.*											REFERENCE JUNCTION AT 32 DEGREES F.												
DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F	0	1	2	3	4	5	6	7	8	9	
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS																							
1,450	32,775	32,798	32,821	32,843	32,866	32,889	32,912	32,935	32,958	32,980	32,980	1,450	33,003	33,026	33,049	33,072	33,094	33,117	33,140	33,163	33,186	33,208	1,450
1,460	33,003	33,026	33,049	33,072	33,094	33,117	33,140	33,163	33,186	33,208	33,231	1,460	33,231	33,254	33,277	33,300	33,322	33,345	33,368	33,391	33,413	33,436	1,460
1,470	33,231	33,254	33,277	33,300	33,322	33,345	33,368	33,391	33,413	33,436	33,458	1,470	33,458	33,482	33,504	33,527	33,550	33,573	33,595	33,618	33,641	33,664	1,470
1,480	33,458	33,482	33,504	33,527	33,550	33,573	33,595	33,618	33,641	33,664	33,686	1,480	33,686	33,709	33,732	33,754	33,777	33,800	33,823	33,845	33,868	33,891	1,480
1,490	33,686	33,709	33,732	33,754	33,777	33,800	33,823	33,845	33,868	33,891	33,913	1,490	33,913	33,936	33,959	33,981	34,004	34,027	34,049	34,072	34,095	34,117	1,490
1,500	33,913	33,936	33,959	33,981	34,004	34,027	34,049	34,072	34,095	34,117	34,140	1,500	34,140	34,163	34,185	34,208	34,231	34,253	34,276	34,299	34,321	34,344	1,500
1,510	34,140	34,163	34,185	34,208	34,231	34,253	34,276	34,299	34,321	34,344	34,366	1,510	34,366	34,389	34,412	34,434	34,457	34,480	34,502	34,525	34,547	34,570	1,510
1,520	34,366	34,389	34,412	34,434	34,457	34,480	34,502	34,525	34,547	34,570	34,592	1,520	34,592	34,615	34,638	34,660	34,683	34,705	34,728	34,751	34,773	34,796	1,520
1,530	34,592	34,615	34,638	34,660	34,683	34,705	34,728	34,751	34,773	34,796	34,818	1,530	34,818	34,841	34,863	34,886	34,909	34,931	34,954	34,976	34,999	35,021	1,530
1,540	34,818	34,841	34,863	34,886	34,909	34,931	34,954	34,976	34,999	35,021	35,044	1,540	35,044	35,066	35,089	35,111	35,134	35,156	35,179	35,201	35,224	35,246	1,540
1,550	35,044	35,066	35,089	35,111	35,134	35,156	35,179	35,201	35,224	35,246	35,269	1,550	35,269	35,291	35,314	35,336	35,359	35,381	35,404	35,426	35,449	35,471	1,550
1,560	35,269	35,291	35,314	35,336	35,359	35,381	35,404	35,426	35,449	35,471	35,494	1,560	35,494	35,516	35,539	35,561	35,583	35,606	35,628	35,651	35,673	35,696	1,560
1,570	35,494	35,516	35,539	35,561	35,583	35,606	35,628	35,651	35,673	35,696	35,718	1,570	35,718	35,741	35,763	35,785	35,808	35,830	35,853	35,875	35,897	35,920	1,570
1,580	35,718	35,741	35,763	35,785	35,808	35,830	35,853	35,875	35,897	35,920	35,942	1,580	35,942	35,965	35,987	36,009	36,032	36,054	36,077	36,099	36,121	36,144	1,580
1,590	35,942	35,965	35,987	36,009	36,032	36,054	36,077	36,099	36,121	36,144	36,166	1,590	36,166	36,188	36,211	36,233	36,256	36,278	36,300	36,323	36,345	36,367	1,590
1,600	36,166	36,188	36,211	36,233	36,256	36,278	36,300	36,323	36,345	36,367	36,390	1,600	36,390	36,412	36,434	36,457	36,479	36,501	36,524	36,546	36,568	36,590	1,600
1,610	36,390	36,412	36,434	36,457	36,479	36,501	36,524	36,546	36,568	36,590	36,613	1,610	36,613	36,635	36,657	36,680	36,702	36,724	36,746	36,769	36,791	36,813	1,610
1,620	36,613	36,635	36,657	36,680	36,702	36,724	36,746	36,769	36,791	36,813	36,836	1,620	36,836	36,858	36,880	36,902	36,925	36,947	36,969	36,991	37,014	37,036	1,620
1,630	36,836	36,858	36,880	36,902	36,925	36,947	36,969	36,991	37,014	37,036	37,058	1,630	37,058	37,080	37,103	37,125	37,147	37,169	37,191	37,214	37,236	37,258	1,630
1,640	37,058	37,080	37,103	37,125	37,147	37,169	37,191	37,214	37,236	37,258	37,280	1,640	37,280	37,303	37,325	37,347	37,369	37,391	37,413	37,436	37,458	37,480	1,640
1,650	37,303	37,325	37,347	37,369	37,391	37,413	37,436	37,458	37,480	37,502	37,524	1,650	37,524	37,547	37,569	37,591	37,613	37,635	37,657	37,679	37,702	37,724	1,650
1,660	37,524	37,547	37,569	37,591	37,613	37,635	37,657	37,679	37,702	37,724	37,746	1,660	37,746	37,769	37,791	37,813	37,836	37,858	37,881	37,903	37,925	37,947	1,660
1,670	37,746	37,769	37,791	37,813	37,836	37,858	37,881	37,903	37,925	37,947	37,969	1,670	37,969	37,991	38,013	38,036	38,058	38,081	38,103	38,125	38,147	38,169	1,670
1,680	37,969	37,991	38,013	38,036	38,058	38,081	38,103	38,125	38,147	38,169	38,191	1,680	38,191	38,213	38,236	38,258	38,281	38,303	38,325	38,347	38,369	38,391	1,680
1,690	38,191	38,213	38,236	38,258	38,281	38,303	38,325	38,347	38,369	38,391	38,413	1,690	38,413	38,436	38,458	38,481	38,503	38,525	38,547	38,569	38,591	38,613	1,690
1,700	38,413	38,436	38,458	38,481	38,503	38,525	38,547	38,569	38,591	38,613	38,636	1,700	38,636	38,658	38,681	38,703	38,725	38,747	38,769	38,791	38,813	38,836	1,700
1,710	38,636	38,658	38,681	38,703	38,725	38,747	38,769	38,791	38,813	38,836	38,858	1,710	38,858	38,881	38,903	38,925	38,947	38,969	38,991	39,013	39,036	39,058	1,710
1,720	38,858	38,881	38,903	38,925	38,947	38,969	38,991	39,013	39,036	39,058	39,081	1,720	39,081	39,103	39,125	39,147	39,169	39,191	39,213	39,236	39,258	39,280	1,720
1,730	39,081	39,103	39,125	39,147	39,169	39,191	39,213	39,236	39,258	39,280	39,303	1,730	39,303	39,325	39,347	39,369	39,391	39,413	39,436	39,458	39,481	39,503	1,730
1,740	39,303	39,325	39,347	39,369	39,391	39,413	39,436	39,458	39,481	39,503	39,525	1,740	39,525	39,547	39,569	39,591	39,613	39,636	39,658	39,681	39,703	39,725	1,740
1,750	39,525	39,547	39,569	39,591	39,613	39,636	39,658	39,681	39,703	39,725	39,747	1,750	39,747	39,769	39,791	39,813	39,836	39,858	39,881	39,903	39,925	39,947	1,750
1,760	39,747	39,769	39,791	39,813	39,836	39,858	39,881	39,903	39,925	39,947	39,969	1,760	39,969	39,991	40,013	40,036	40,058	40,081	40,103	40,125	40,147	40,169	1,760
1,770	39,969	39,991	40,013	40,036	40,058	40,081	40,103	40,125	40,147	40,169	40,191	1,770	40,191	40,213	40,236	40,258	40,281	40,303	40,325	40,347	40,369	40,391	1,770
1,780	40,191	40,213	40,236	40,258	40,281	40,303	40,325	40,347	40,369	40,391	40,413	1,780	40,413	40,436	40,458	40,481	40,503	40,525	40,547	40,569	40,591	40,613	1,780
1,790	40,413	40,436	40,458	40,481	40,503	40,525	40,547	40,569	40,591	40,613	40,636	1,790	40,636	40,658	40,681	40,703	40,725	40,747	40,769	40,791	40,813	40,836	1,790
1,800	40,636	40,658	40,681	40,703	40,725	40,747	40,769	40,791	40,813	40,836	40,858	1,800	40,858	40,881	40,903	40,925	40,947	40,969	40,991	41,013	41,036	41,058	1,800
1,810	40,858	40,881	40,903	40,925	40,947	40,969	40,991	41,013	41,036	41,058	41,081	1,810	41,081	41,103	41,125	41,147	41,169	41,191	41,213	41,236	41,258	41,280	1,810
1,820	41,081	41,103	41,125	41,147	41,169	41,191	41,213	41,236	41,258	41,280	41,303	1,820	41,303	41,325	41,347	41,369	41,391	41,413	41,436	41,458	41,481	41,503	1,820
1,830	41,303	41,325	41,347	41,369	41,391	41,413	41,436	41,458	41,481	41,503	41,525	1,830	41,525	41,547	41,569	41,591	41,613	41,636	41,658	41,681	41,703	41,725	1,830
1,840	41,525	41,547	41,569	41,591	41,613	41,636	41,658	41,681	41,703	41,725	41,747	1,840	41,747	41,769	41,791	41,813	41,836	41,858	41,881	41,903	41,925	41,947	1,840
1,850	41,747	41,769	41,791	41,813	41,836	41,858	41,881	41,903	41,925	41,947	41,969	1,850	41,969	41,991	42,013	42,036	42,058	42,081	42,103	42,125	42,147	42,169	1,850
1,860	41,969	41,991	42,013	42,036	42,058	42,081	42,103	42,125	42,147	42,169	42,191	1,860	42,191	42,213	42,236	42,258	42,281	42,303	42,325	42,347	42,369	42,391	1,860
1,870	42,191	42,213	42,236	42,258	42,281	42,303	42,325	42,347	42,369	42,391	42,413	1,870	42,413	42,436	42,458	42,481	42,503	42,525	42,547	42,569	42,591	42,613	1,870
1,880	42,413	42,436	42,458	42,481	42,503	42,525	42,547	42,569	42,591	42,613	42,636	1,880	42,636	42,658	42,681	42,703	42,725	42,747	42,769	42,791	42,813	42,836	1,880
1,890	42,636	42,658	42,681	42,703	42,725	42,747	42,769	42,791	42,813	42,836	42,858	1,890	42,858	42,881	42,903	42,925	42,947	42,969	42,991	43,013	43,036	43,058	1,890
1,900	42,858	42,881	42,903	42,925	42,947																		

TYPE K THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* \* REFERENCE JUNCTION AT 32 DEGREES F.  
DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F

THEMOCLECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
2100	46.964	47.191	47.418	47.645	47.872	48.099	48.326	48.553	48.780	49.007	49.234	2110
2110	47.171	47.398	47.625	47.852	48.079	48.306	48.533	48.760	48.987	49.214	49.441	2120
2120	47.377	47.604	47.831	48.058	48.285	48.512	48.739	48.966	49.193	49.420	49.647	2130
2130	47.583	47.810	48.037	48.264	48.491	48.718	48.945	49.172	49.399	49.626	49.853	2140
2140	47.789	48.016	48.243	48.470	48.697	48.924	49.151	49.378	49.605	49.832	50.059	2150
2150	47.993	48.220	48.447	48.674	48.901	49.128	49.355	49.582	49.809	50.036	50.263	2160
2160	48.197	48.424	48.651	48.878	49.105	49.332	49.559	49.786	50.013	50.240	50.467	2170
2170	48.401	48.628	48.855	49.082	49.309	49.536	49.763	49.990	50.217	50.444	50.671	2180
2180	48.605	48.832	49.059	49.286	49.513	49.740	49.967	50.194	50.421	50.648	50.875	2190
2190	48.808	49.035	49.262	49.489	49.716	49.943	50.170	50.397	50.624	50.851	51.078	2200
2200	49.010	49.237	49.464	49.691	49.918	50.145	50.372	50.599	50.826	51.053	51.280	2210
2210	49.212	49.439	49.666	49.893	50.120	50.347	50.574	50.801	51.028	51.255	51.482	2220
2220	49.414	49.641	49.868	50.095	50.322	50.549	50.776	51.003	51.230	51.457	51.684	2230
2230	49.616	49.843	50.070	50.297	50.524	50.751	50.978	51.205	51.432	51.659	51.886	2240
2240	49.818	50.045	50.272	50.499	50.726	50.953	51.180	51.407	51.634	51.861	52.088	2250
2250	50.020	50.247	50.474	50.701	50.928	51.155	51.382	51.609	51.836	52.063	52.290	2260
2260	50.222	50.449	50.676	50.903	51.130	51.357	51.584	51.811	52.038	52.265	52.492	2270
2270	50.424	50.651	50.878	51.105	51.332	51.559	51.786	52.013	52.240	52.467	52.694	2280
2280	50.626	50.853	51.080	51.307	51.534	51.761	51.988	52.215	52.442	52.669	52.896	2290
2290	50.828	51.055	51.282	51.509	51.736	51.963	52.190	52.417	52.644	52.871	53.098	2300
2300	51.030	51.257	51.484	51.711	51.938	52.165	52.392	52.619	52.846	53.073	53.300	2310
2310	51.232	51.459	51.686	51.913	52.140	52.367	52.594	52.821	53.048	53.275	53.502	2320
2320	51.434	51.661	51.888	52.115	52.342	52.569	52.796	53.023	53.250	53.477	53.704	2330
2330	51.636	51.863	52.090	52.317	52.544	52.771	53.000	53.227	53.454	53.681	53.908	2340
2340	51.838	52.065	52.292	52.519	52.746	52.973	53.200	53.427	53.654	53.881	54.108	2350
2350	52.040	52.267	52.494	52.721	52.948	53.175	53.402	53.629	53.856	54.083	54.310	2360
2360	52.242	52.469	52.696	52.923	53.150	53.377	53.604	53.831	54.058	54.285	54.512	2370
2370	52.444	52.671	52.898	53.125	53.352	53.579	53.806	54.033	54.260	54.487	54.714	2380
2380	52.646	52.873	53.100	53.327	53.554	53.781	54.008	54.235	54.462	54.689	54.916	2390
2390	52.848	53.075	53.302	53.529	53.756	53.983	54.210	54.437	54.664	54.891	55.118	2400
2400	53.050	53.277	53.504	53.731	53.958	54.185	54.412	54.639	54.866	55.093	55.320	2410
2410	53.252	53.479	53.706	53.933	54.160	54.387	54.614	54.841	55.068	55.295	55.522	2420
2420	53.454	53.681	53.908	54.135	54.362	54.589	54.816	55.043	55.270	55.497	55.724	2430
2430	53.656	53.883	54.110	54.337	54.564	54.791	55.018	55.245	55.472	55.699	55.926	2440
2440	53.858	54.085	54.312	54.539	54.766	54.993	55.220	55.447	55.674	55.901	56.128	2450
2450	54.060	54.287	54.514	54.741	54.968	55.195	55.422	55.649	55.876	56.103	56.330	2460
2460	54.262	54.489	54.716	54.943	55.170	55.397	55.624	55.851	56.078	56.305	56.532	2470
2470	54.464	54.691	54.918	55.145	55.372	55.599	55.826	56.053	56.280	56.507	56.734	2480
2480	54.666	54.893	55.120	55.347	55.574	55.801	56.028	56.255	56.482	56.709	56.936	2490
2490	54.868	55.095	55.322	55.549	55.776	56.003	56.230	56.457	56.684	56.911	57.138	2500

TYPE R THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
-50	-0.210	-0.212	-0.214	-0.216	-0.218	-0.220	-0.222	-0.224	-0.226			-50
-40	-0.188	-0.190	-0.192	-0.194	-0.197	-0.199	-0.201	-0.203	-0.205	-0.207	-0.210	-40
-30	-0.165	-0.167	-0.169	-0.172	-0.174	-0.176	-0.179	-0.181	-0.183	-0.185	-0.188	-30
-20	-0.141	-0.143	-0.145	-0.148	-0.150	-0.153	-0.155	-0.158	-0.160	-0.162	-0.165	-20
-10	-0.116	-0.118	-0.121	-0.123	-0.126	-0.128	-0.131	-0.133	-0.136	-0.138	-0.141	-10
0	-0.089	-0.092	-0.095	-0.097	-0.100	-0.103	-0.105	-0.108	-0.110	-0.113	-0.116	0
0	-0.089	-0.087	-0.084	-0.082	-0.079	-0.076	-0.073	-0.071	-0.068	-0.065	-0.063	0
10	-0.063	-0.060	-0.057	-0.054	-0.051	-0.049	-0.046	-0.043	-0.040	-0.037	-0.035	10
20	-0.035	-0.032	-0.029	-0.026	-0.023	-0.020	-0.017	-0.015	-0.012	-0.009	-0.006	20
30	-0.006	-0.003	0.000	0.003	0.006	0.009	0.012	0.015	0.018	0.021	0.024	30
40	0.024	0.027	0.030	0.033	0.036	0.039	0.042	0.045	0.048	0.051	0.054	40
50	0.054	0.057	0.060	0.064	0.067	0.070	0.073	0.076	0.079	0.082	0.086	50
60	0.084	0.089	0.092	0.095	0.098	0.101	0.105	0.108	0.111	0.114	0.118	60
70	0.118	0.121	0.124	0.127	0.131	0.134	0.137	0.141	0.144	0.147	0.150	70
80	0.150	0.154	0.157	0.161	0.164	0.167	0.171	0.174	0.177	0.181	0.184	80
90	0.184	0.188	0.191	0.194	0.198	0.201	0.205	0.208	0.212	0.215	0.218	90
100	0.218	0.222	0.225	0.229	0.232	0.236	0.239	0.243	0.246	0.250	0.253	100
110	0.253	0.257	0.261	0.264	0.268	0.271	0.275	0.278	0.282	0.286	0.289	110
120	0.289	0.293	0.296	0.300	0.304	0.307	0.311	0.315	0.318	0.322	0.326	120
130	0.326	0.329	0.333	0.337	0.340	0.344	0.348	0.351	0.355	0.359	0.363	130
140	0.363	0.366	0.370	0.374	0.378	0.381	0.385	0.389	0.393	0.397	0.400	140
150	0.400	0.404	0.408	0.412	0.416	0.419	0.423	0.427	0.431	0.435	0.439	150
160	0.439	0.443	0.446	0.450	0.454	0.458	0.462	0.466	0.470	0.474	0.478	160
170	0.478	0.482	0.485	0.489	0.493	0.497	0.501	0.505	0.509	0.513	0.517	170
180	0.517	0.521	0.525	0.529	0.533	0.537	0.541	0.545	0.549	0.553	0.557	180
190	0.557	0.561	0.565	0.569	0.573	0.577	0.581	0.586	0.590	0.594	0.598	190
200	0.598	0.602	0.606	0.610	0.614	0.618	0.622	0.627	0.631	0.635	0.639	200
210	0.639	0.643	0.647	0.651	0.656	0.660	0.664	0.668	0.672	0.676	0.681	210
220	0.681	0.685	0.689	0.693	0.697	0.702	0.706	0.710	0.714	0.719	0.723	220
230	0.723	0.727	0.731	0.736	0.740	0.744	0.748	0.753	0.757	0.761	0.766	230
240	0.766	0.770	0.774	0.778	0.783	0.787	0.791	0.796	0.800	0.804	0.809	240
250	0.809	0.813	0.817	0.822	0.826	0.830	0.835	0.839	0.844	0.848	0.852	250
260	0.852	0.857	0.861	0.866	0.870	0.874	0.879	0.883	0.888	0.892	0.897	260
270	0.897	0.901	0.905	0.910	0.914	0.919	0.923	0.928	0.932	0.937	0.941	270
280	0.941	0.946	0.950	0.955	0.959	0.964	0.968	0.973	0.977	0.982	0.986	280
290	0.986	0.991	0.995	1.000	1.004	1.009	1.013	1.018	1.022	1.027	1.032	290
300	1.032	1.036	1.041	1.045	1.050	1.054	1.059	1.064	1.068	1.073	1.077	300
310	1.077	1.082	1.087	1.091	1.096	1.101	1.105	1.110	1.114	1.119	1.124	310
320	1.124	1.128	1.133	1.138	1.142	1.147	1.152	1.156	1.161	1.166	1.170	320
330	1.170	1.175	1.180	1.184	1.189	1.194	1.199	1.203	1.208	1.213	1.217	330
340	1.217	1.222	1.227	1.232	1.236	1.241	1.246	1.251	1.255	1.260	1.265	340
350	1.265	1.270	1.274	1.279	1.284	1.289	1.294	1.298	1.303	1.308	1.313	350
360	1.313	1.318	1.322	1.327	1.332	1.337	1.342	1.346	1.351	1.356	1.361	360
370	1.361	1.366	1.371	1.375	1.380	1.385	1.390	1.395	1.400	1.405	1.409	370
380	1.409	1.414	1.419	1.424	1.429	1.434	1.439	1.444	1.449	1.453	1.458	380
390	1.458	1.463	1.468	1.473	1.478	1.483	1.488	1.493	1.498	1.503	1.508	390
400	1.508	1.512	1.517	1.522	1.527	1.532	1.537	1.542	1.547	1.552	1.557	400
410	1.557	1.562	1.567	1.572	1.577	1.582	1.587	1.592	1.597	1.602	1.607	410
420	1.607	1.612	1.617	1.622	1.627	1.632	1.637	1.642	1.647	1.652	1.657	420
430	1.657	1.662	1.667	1.672	1.677	1.682	1.687	1.692	1.697	1.702	1.707	430
440	1.707	1.713	1.718	1.723	1.728	1.733	1.738	1.743	1.748	1.753	1.758	440
450	1.758	1.764	1.769	1.774	1.779	1.784	1.789	1.794	1.799	1.804	1.810	450
460	1.810	1.815	1.820	1.825	1.830	1.835	1.840	1.845	1.851	1.856	1.861	460
470	1.861	1.866	1.871	1.876	1.882	1.887	1.892	1.897	1.902	1.907	1.913	470
480	1.913	1.918	1.923	1.928	1.933	1.938	1.944	1.949	1.954	1.959	1.964	480
490	1.964	1.970	1.975	1.980	1.985	1.991	1.996	2.001	2.006	2.011	2.017	490
500	2.017	2.022	2.027	2.032	2.038	2.043	2.048	2.053	2.059	2.064	2.069	500
510	2.069	2.074	2.080	2.085	2.090	2.095	2.101	2.106	2.111	2.117	2.122	510
520	2.122	2.127	2.132	2.138	2.143	2.148	2.154	2.159	2.164	2.170	2.175	520
530	2.175	2.180	2.186	2.191	2.196	2.201	2.207	2.212	2.217	2.223	2.228	530
540	2.228	2.233	2.239	2.244	2.249	2.255	2.260	2.266	2.271	2.276	2.282	540
550	2.282	2.287	2.292	2.298	2.303	2.308	2.314	2.319	2.325	2.330	2.335	550
560	2.335	2.341	2.346	2.351	2.357	2.362	2.368	2.373	2.378	2.384	2.389	560
570	2.389	2.395	2.400	2.405	2.411	2.416	2.422	2.427	2.433	2.438	2.443	570
580	2.443	2.449	2.454	2.460	2.465	2.471	2.476	2.481	2.487	2.492	2.498	580
590	2.498	2.503	2.509	2.514	2.520	2.525	2.531	2.536	2.541	2.547	2.552	590

\* CONVERTED FROM DEGREES CELSIUS 1968.

TYPE R THERMOCOUPLES

TEMPERATURES IN DEGREES F. \*\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
600	2.552	2.558	2.563	2.567	2.574	2.580	2.585	2.591	2.596	2.602	2.607	600
610	2.607	2.613	2.618	2.625	2.629	2.635	2.640	2.646	2.651	2.657	2.662	610
620	2.718	2.723	2.728	2.734	2.740	2.745	2.751	2.756	2.762	2.767	2.772	620
630	2.828	2.833	2.838	2.844	2.849	2.854	2.860	2.865	2.871	2.876	2.881	630
640	2.941	2.946	2.951	2.957	2.962	2.968	2.973	2.979	2.984	2.989	2.994	640
650	3.008	3.013	3.018	3.023	3.029	3.034	3.039	3.044	3.049	3.054	3.059	650
660	3.097	3.102	3.107	3.112	3.117	3.122	3.127	3.132	3.137	3.142	3.147	660
670	3.186	3.191	3.196	3.201	3.206	3.211	3.216	3.221	3.226	3.231	3.236	670
680	3.226	3.231	3.236	3.241	3.246	3.251	3.256	3.261	3.266	3.271	3.276	680
690	3.281	3.286	3.291	3.296	3.301	3.306	3.311	3.316	3.321	3.326	3.331	690
700	3.336	3.341	3.346	3.351	3.356	3.361	3.366	3.371	3.376	3.381	3.386	700
710	3.391	3.396	3.401	3.406	3.411	3.416	3.421	3.426	3.431	3.436	3.441	710
720	3.446	3.451	3.456	3.461	3.466	3.471	3.476	3.481	3.486	3.491	3.496	720
730	3.501	3.506	3.511	3.516	3.521	3.526	3.531	3.536	3.541	3.546	3.551	730
740	3.556	3.561	3.566	3.571	3.576	3.581	3.586	3.591	3.596	3.601	3.606	740
750	3.611	3.616	3.621	3.626	3.631	3.636	3.641	3.646	3.651	3.656	3.661	750
760	3.666	3.671	3.676	3.681	3.686	3.691	3.696	3.701	3.706	3.711	3.716	760
770	3.721	3.726	3.731	3.736	3.741	3.746	3.751	3.756	3.761	3.766	3.771	770
780	3.776	3.781	3.786	3.791	3.796	3.801	3.806	3.811	3.816	3.821	3.826	780
790	3.831	3.836	3.841	3.846	3.851	3.856	3.861	3.866	3.871	3.876	3.881	790
800	3.886	3.891	3.896	3.901	3.906	3.911	3.916	3.921	3.926	3.931	3.936	800
810	3.941	3.946	3.951	3.956	3.961	3.966	3.971	3.976	3.981	3.986	3.991	810
820	3.996	4.001	4.006	4.011	4.016	4.021	4.026	4.031	4.036	4.041	4.046	820
830	4.051	4.056	4.061	4.066	4.071	4.076	4.081	4.086	4.091	4.096	4.101	830
840	4.106	4.111	4.116	4.121	4.126	4.131	4.136	4.141	4.146	4.151	4.156	840
850	4.161	4.166	4.171	4.176	4.181	4.186	4.191	4.196	4.201	4.206	4.211	850
860	4.216	4.221	4.226	4.231	4.236	4.241	4.246	4.251	4.256	4.261	4.266	860
870	4.271	4.276	4.281	4.286	4.291	4.296	4.301	4.306	4.311	4.316	4.321	870
880	4.326	4.331	4.336	4.341	4.346	4.351	4.356	4.361	4.366	4.371	4.376	880
890	4.381	4.386	4.391	4.396	4.401	4.406	4.411	4.416	4.421	4.426	4.431	890
900	4.436	4.441	4.446	4.451	4.456	4.461	4.466	4.471	4.476	4.481	4.486	900
910	4.491	4.496	4.501	4.506	4.511	4.516	4.521	4.526	4.531	4.536	4.541	910
920	4.546	4.551	4.556	4.561	4.566	4.571	4.576	4.581	4.586	4.591	4.596	920
930	4.601	4.606	4.611	4.616	4.621	4.626	4.631	4.636	4.641	4.646	4.651	930
940	4.656	4.661	4.666	4.671	4.676	4.681	4.686	4.691	4.696	4.701	4.706	940
950	4.711	4.716	4.721	4.726	4.731	4.736	4.741	4.746	4.751	4.756	4.761	950
960	4.766	4.771	4.776	4.781	4.786	4.791	4.796	4.801	4.806	4.811	4.816	960
970	4.821	4.826	4.831	4.836	4.841	4.846	4.851	4.856	4.861	4.866	4.871	970
980	4.876	4.881	4.886	4.891	4.896	4.901	4.906	4.911	4.916	4.921	4.926	980
990	4.931	4.936	4.941	4.946	4.951	4.956	4.961	4.966	4.971	4.976	4.981	990

\* CONVERTED FROM DEGREES C (IPITS 1968)

DEG F

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
1000	4.885	4.891	4.897	4.904	4.910	4.916	4.922	4.928	4.934	4.940	4.947	1000
1010	4.947	4.953	4.959	4.965	4.971	4.977	4.984	4.990	4.996	5.002	5.008	1010
1020	5.008	5.014	5.021	5.027	5.033	5.039	5.045	5.052	5.058	5.064	5.070	1020
1030	5.070	5.076	5.082	5.089	5.095	5.101	5.107	5.113	5.120	5.126	5.132	1030
1040	5.132	5.138	5.144	5.151	5.157	5.163	5.169	5.175	5.182	5.188	5.194	1040
1050	5.194	5.200	5.207	5.213	5.219	5.225	5.231	5.238	5.244	5.250	5.256	1050
1060	5.256	5.263	5.269	5.275	5.281	5.288	5.294	5.300	5.306	5.313	5.319	1060
1070	5.319	5.325	5.331	5.337	5.344	5.350	5.356	5.362	5.369	5.375	5.381	1070
1080	5.381	5.388	5.394	5.400	5.406	5.413	5.419	5.425	5.431	5.438	5.444	1080
1090	5.444	5.450	5.456	5.463	5.469	5.475	5.482	5.488	5.494	5.500	5.507	1090
1100	5.507	5.513	5.519	5.526	5.532	5.538	5.544	5.551	5.557	5.563	5.570	1100
1110	5.570	5.576	5.582	5.589	5.595	5.601	5.607	5.614	5.620	5.626	5.633	1110
1120	5.633	5.639	5.645	5.652	5.658	5.664	5.671	5.677	5.683	5.690	5.696	1120
1130	5.696	5.702	5.709	5.715	5.721	5.728	5.734	5.740	5.747	5.753	5.759	1130
1140	5.759	5.766	5.772	5.778	5.785	5.791	5.797	5.804	5.810	5.816	5.823	1140
1150	5.823	5.829	5.835	5.842	5.848	5.855	5.861	5.867	5.874	5.880	5.886	1150
1160	5.886	5.893	5.899	5.905	5.912	5.918	5.925	5.931	5.937	5.944	5.950	1160
1170	5.950	5.957	5.963	5.969	5.976	5.982	5.988	5.995	6.001	6.008	6.014	1170
1180	6.014	6.021	6.027	6.033	6.040	6.046	6.053	6.059	6.065	6.072	6.078	1180
1190	6.078	6.085	6.091	6.098	6.104	6.110	6.117	6.123	6.130	6.136	6.143	1190
1200	6.143	6.149	6.155	6.162	6.168	6.175	6.181	6.188	6.194	6.201	6.207	1200

## TYPE R THERMOCOUPLES

TEMPERATURES IN DEGREES F.*			REFERENCE JUNCTION AT 32 DEGREES F.																			
DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F										
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS																						
1,200	6.143	6.149	6.155	6.162	6.168	6.175	6.181	6.188	6.194	6.201	6.207	1,200										
1,210	6.207	6.213	6.220	6.226	6.233	6.239	6.246	6.252	6.259	6.265	6.272	1,210										
1,220	6.272	6.278	6.285	6.291	6.297	6.304	6.310	6.317	6.323	6.330	6.336	1,220										
1,230	6.336	6.343	6.349	6.356	6.362	6.369	6.375	6.382	6.388	6.395	6.401	1,230										
1,240	6.401	6.408	6.414	6.421	6.427	6.434	6.440	6.447	6.453	6.460	6.466	1,240										
1,250	6.466	6.473	6.479	6.486	6.492	6.499	6.505	6.512	6.518	6.525	6.532	1,250										
1,260	6.532	6.538	6.545	6.551	6.558	6.564	6.571	6.577	6.584	6.590	6.597	1,260										
1,270	6.597	6.603	6.610	6.616	6.623	6.630	6.636	6.643	6.649	6.656	6.662	1,270										
1,280	6.662	6.669	6.675	6.682	6.689	6.695	6.702	6.708	6.715	6.721	6.728	1,280										
1,290	6.728	6.735	6.741	6.748	6.754	6.761	6.767	6.774	6.781	6.787	6.794	1,290										
1,300	6.794	6.800	6.807	6.814	6.820	6.827	6.833	6.840	6.847	6.853	6.860	1,300										
1,310	6.860	6.866	6.873	6.880	6.886	6.893	6.899	6.906	6.913	6.919	6.926	1,310										
1,320	6.926	6.932	6.939	6.946	6.952	6.959	6.966	6.972	6.979	6.985	6.992	1,320										
1,330	6.992	6.999	7.005	7.012	7.019	7.025	7.032	7.039	7.045	7.052	7.059	1,330										
1,340	7.059	7.065	7.072	7.078	7.085	7.092	7.098	7.105	7.112	7.118	7.125	1,340										
1,350	7.125	7.132	7.138	7.145	7.152	7.158	7.165	7.172	7.178	7.185	7.192	1,350										
1,360	7.192	7.198	7.205	7.212	7.218	7.225	7.232	7.239	7.245	7.252	7.259	1,360										
1,370	7.259	7.265	7.272	7.279	7.285	7.292	7.299	7.305	7.312	7.319	7.326	1,370										
1,380	7.326	7.332	7.339	7.346	7.352	7.359	7.366	7.373	7.379	7.386	7.393	1,380										
1,390	7.393	7.399	7.406	7.413	7.420	7.426	7.433	7.440	7.447	7.453	7.460	1,390										
1,400	7.460	7.467	7.474	7.480	7.487	7.494	7.500	7.507	7.514	7.521	7.527	1,400										
1,410	7.527	7.534	7.541	7.548	7.554	7.561	7.568	7.575	7.582	7.588	7.595	1,410										
1,420	7.595	7.602	7.609	7.615	7.622	7.629	7.636	7.642	7.649	7.656	7.663	1,420										
1,430	7.663	7.670	7.676	7.683	7.690	7.697	7.703	7.710	7.717	7.724	7.731	1,430										
1,440	7.731	7.737	7.744	7.751	7.758	7.765	7.771	7.778	7.785	7.792	7.799	1,440										
1,450	7.799	7.805	7.812	7.819	7.826	7.833	7.840	7.846	7.853	7.860	7.867	1,450										
1,460	7.867	7.874	7.880	7.887	7.894	7.901	7.908	7.915	7.921	7.928	7.935	1,460										
1,470	7.935	7.942	7.949	7.956	7.963	7.969	7.976	7.983	7.990	7.997	8.004	1,470										
1,480	8.004	8.010	8.017	8.024	8.031	8.038	8.045	8.052	8.058	8.065	8.072	1,480										
1,490	8.072	8.079	8.086	8.093	8.100	8.107	8.113	8.120	8.127	8.134	8.141	1,490										
1,500	8.141	8.148	8.155	8.162	8.168	8.175	8.182	8.189	8.196	8.203	8.210	1,500										
1,510	8.210	8.217	8.224	8.231	8.237	8.244	8.251	8.258	8.265	8.272	8.279	1,510										
1,520	8.279	8.286	8.293	8.300	8.306	8.313	8.320	8.327	8.334	8.341	8.348	1,520										
1,530	8.348	8.355	8.362	8.369	8.376	8.383	8.390	8.397	8.403	8.410	8.417	1,530										
1,540	8.417	8.424	8.431	8.438	8.445	8.452	8.459	8.466	8.473	8.480	8.487	1,540										
1,550	8.487	8.494	8.501	8.508	8.515	8.522	8.529	8.535	8.542	8.549	8.556	1,550										
1,560	8.556	8.563	8.570	8.577	8.584	8.591	8.598	8.605	8.612	8.619	8.626	1,560										
1,570	8.626	8.633	8.640	8.647	8.654	8.661	8.668	8.675	8.682	8.689	8.696	1,570										
1,580	8.696	8.703	8.710	8.717	8.724	8.731	8.738	8.745	8.752	8.759	8.766	1,580										
1,590	8.766	8.773	8.780	8.787	8.794	8.801	8.808	8.815	8.822	8.829	8.836	1,590										
1,600	8.836	8.843	8.850	8.857	8.864	8.871	8.878	8.885	8.892	8.899	8.907	1,600										
1,610	8.907	8.914	8.921	8.928	8.935	8.942	8.949	8.956	8.963	8.970	8.977	1,610										
1,620	8.977	8.984	8.991	8.998	9.005	9.012	9.019	9.026	9.033	9.040	9.048	1,620										
1,630	9.048	9.055	9.062	9.069	9.076	9.083	9.090	9.097	9.104	9.111	9.118	1,630										
1,640	9.118	9.125	9.132	9.140	9.147	9.154	9.161	9.168	9.175	9.182	9.189	1,640										
1,650	9.189	9.196	9.203	9.210	9.218	9.225	9.232	9.239	9.246	9.253	9.260	1,650										
1,660	9.260	9.267	9.274	9.282	9.289	9.296	9.303	9.310	9.317	9.324	9.331	1,660										
1,670	9.331	9.338	9.346	9.353	9.360	9.367	9.374	9.381	9.388	9.395	9.403	1,670										
1,680	9.403	9.410	9.417	9.424	9.431	9.438	9.445	9.452	9.459	9.466	9.474	1,680										
1,690	9.474	9.481	9.488	9.495	9.503	9.510	9.517	9.524	9.531	9.538	9.546	1,690										
1,700	9.546	9.553	9.560	9.567	9.574	9.581	9.589	9.596	9.603	9.610	9.617	1,700										
1,710	9.617	9.624	9.632	9.639	9.646	9.653	9.660	9.668	9.675	9.682	9.689	1,710										
1,720	9.689	9.696	9.704	9.711	9.718	9.725	9.732	9.740	9.747	9.754	9.761	1,720										
1,730	9.761	9.768	9.776	9.783	9.790	9.797	9.804	9.812	9.819	9.826	9.833	1,730										
1,740	9.833	9.840	9.848	9.855	9.862	9.869	9.877	9.884	9.891	9.898	9.906	1,740										
1,750	9.906	9.913	9.920	9.927	9.934	9.942	9.949	9.956	9.963	9.971	9.978	1,750										
1,760	9.978	9.985	9.992	10.000	10.007	10.014	10.021	10.029	10.036	10.043	10.050	1,760										
1,770	10.050	10.058	10.065	10.072	10.079	10.087	10.094	10.101	10.109	10.116	10.123	1,770										
1,780	10.123	10.130	10.138	10.145	10.152	10.159	10.167	10.174	10.181	10.189	10.196	1,780										
1,790	10.196	10.203	10.210	10.218	10.225	10.232	10.240	10.247	10.254	10.262	10.269	1,790										
1,800	10.269	10.276	10.283	10.291	10.298	10.305	10.313	10.320	10.327	10.335	10.342	1,800										

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F  
\* CONVERTED FROM DEGREES C (IPTS 1968).

TYPE B THERMOCOUPLES

TEMPERATURES IN DEGREES F. \* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
1.800	10.229	10.276	10.298	10.298	10.313	10.320	10.327	10.335	10.342	10.349	10.356	1.800
1.810	10.342	10.357	10.364	10.371	10.379	10.386	10.393	10.400	10.408	10.415	10.421	1.810
1.820	10.415	10.422	10.430	10.437	10.444	10.452	10.459	10.466	10.474	10.481	10.488	1.820
1.830	10.488	10.496	10.503	10.511	10.518	10.525	10.533	10.540	10.547	10.555	10.562	1.830
1.840	10.562	10.569	10.577	10.584	10.591	10.598	10.606	10.613	10.621	10.628	10.636	1.840
1.850	10.636	10.643	10.650	10.658	10.665	10.672	10.680	10.687	10.695	10.702	10.709	1.850
1.860	10.709	10.717	10.724	10.731	10.739	10.746	10.754	10.761	10.768	10.776	10.783	1.860
1.870	10.783	10.791	10.798	10.805	10.813	10.820	10.828	10.835	10.842	10.850	10.857	1.870
1.880	10.857	10.865	10.872	10.879	10.887	10.894	10.902	10.909	10.917	10.924	10.931	1.880
1.890	10.931	10.939	10.946	10.954	10.961	10.968	10.976	10.983	10.991	10.998	11.006	1.890
1.900	11.006	11.013	11.021	11.028	11.035	11.043	11.050	11.058	11.065	11.073	11.080	1.900
1.910	11.080	11.088	11.095	11.102	11.110	11.117	11.125	11.132	11.140	11.147	11.155	1.910
1.920	11.155	11.162	11.170	11.177	11.184	11.192	11.199	11.207	11.214	11.222	11.229	1.920
1.930	11.229	11.237	11.244	11.252	11.259	11.267	11.274	11.282	11.289	11.297	11.304	1.930
1.940	11.304	11.312	11.319	11.327	11.334	11.342	11.349	11.357	11.364	11.372	11.379	1.940
1.950	11.379	11.387	11.394	11.402	11.409	11.417	11.424	11.432	11.439	11.447	11.454	1.950
1.960	11.454	11.462	11.470	11.477	11.484	11.492	11.499	11.507	11.514	11.522	11.529	1.960
1.970	11.529	11.537	11.544	11.552	11.559	11.567	11.574	11.582	11.590	11.597	11.605	1.970
1.980	11.605	11.612	11.620	11.627	11.635	11.642	11.650	11.657	11.665	11.672	11.680	1.980
1.990	11.680	11.688	11.695	11.703	11.710	11.718	11.725	11.733	11.740	11.748	11.756	1.990
2.000	11.756	11.764	11.771	11.778	11.786	11.793	11.801	11.808	11.816	11.824	11.831	2.000
2.010	11.831	11.839	11.846	11.854	11.861	11.869	11.877	11.884	11.892	11.899	11.907	2.010
2.020	11.907	11.914	11.922	11.930	11.937	11.945	11.952	11.960	11.968	11.975	11.983	2.020
2.030	11.983	11.990	11.998	12.005	12.013	12.021	12.028	12.036	12.043	12.051	12.059	2.030
2.040	12.059	12.066	12.074	12.081	12.089	12.097	12.104	12.112	12.119	12.127	12.135	2.040
2.050	12.135	12.142	12.150	12.157	12.165	12.173	12.180	12.188	12.196	12.203	12.211	2.050
2.060	12.211	12.218	12.226	12.234	12.241	12.249	12.257	12.264	12.272	12.279	12.287	2.060
2.070	12.287	12.295	12.302	12.310	12.318	12.325	12.333	12.340	12.348	12.356	12.363	2.070
2.080	12.363	12.371	12.379	12.386	12.394	12.402	12.410	12.417	12.425	12.432	12.440	2.080
2.090	12.440	12.447	12.455	12.463	12.470	12.478	12.486	12.493	12.501	12.509	12.516	2.090
2.100	12.516	12.524	12.532	12.539	12.547	12.555	12.562	12.570	12.577	12.585	12.593	2.100
2.110	12.593	12.600	12.608	12.616	12.623	12.631	12.639	12.646	12.654	12.662	12.669	2.110
2.120	12.669	12.676	12.684	12.692	12.700	12.708	12.716	12.723	12.731	12.739	12.746	2.120
2.130	12.746	12.754	12.762	12.769	12.777	12.785	12.792	12.800	12.808	12.815	12.823	2.130
2.140	12.823	12.831	12.838	12.846	12.854	12.862	12.869	12.877	12.885	12.892	12.900	2.140
2.150	12.900	12.908	12.915	12.923	12.931	12.938	12.946	12.954	12.962	12.969	12.977	2.150
2.160	12.977	12.985	12.992	13.000	13.008	13.016	13.023	13.031	13.039	13.047	13.054	2.160
2.170	13.054	13.062	13.069	13.077	13.085	13.093	13.100	13.108	13.116	13.123	13.131	2.170
2.180	13.131	13.139	13.147	13.154	13.162	13.170	13.178	13.185	13.193	13.201	13.208	2.180
2.190	13.208	13.216	13.224	13.232	13.239	13.247	13.255	13.263	13.270	13.278	13.286	2.190
2.200	13.286	13.293	13.301	13.309	13.317	13.324	13.332	13.340	13.348	13.355	13.363	2.200
2.210	13.363	13.371	13.379	13.386	13.394	13.402	13.409	13.417	13.425	13.433	13.440	2.210
2.220	13.440	13.448	13.456	13.464	13.471	13.479	13.487	13.495	13.502	13.510	13.518	2.220
2.230	13.518	13.526	13.534	13.542	13.550	13.557	13.565	13.572	13.580	13.588	13.595	2.230
2.240	13.595	13.603	13.611	13.619	13.627	13.634	13.642	13.650	13.658	13.665	13.673	2.240
2.250	13.673	13.681	13.689	13.696	13.704	13.712	13.720	13.727	13.735	13.743	13.751	2.250
2.260	13.751	13.759	13.766	13.774	13.782	13.790	13.797	13.805	13.813	13.821	13.828	2.260
2.270	13.828	13.836	13.844	13.852	13.860	13.867	13.875	13.883	13.891	13.898	13.906	2.270
2.280	13.906	13.914	13.922	13.930	13.937	13.945	13.953	13.961	13.968	13.976	13.984	2.280
2.290	13.984	13.992	14.000	14.007	14.015	14.023	14.031	14.039	14.046	14.054	14.062	2.290
2.300	14.062	14.070	14.078	14.085	14.093	14.101	14.109	14.116	14.124	14.132	14.140	2.300
2.310	14.140	14.148	14.155	14.163	14.171	14.179	14.187	14.194	14.202	14.210	14.218	2.310
2.320	14.218	14.226	14.233	14.241	14.248	14.257	14.265	14.272	14.280	14.288	14.296	2.320
2.330	14.296	14.304	14.311	14.319	14.327	14.335	14.343	14.350	14.358	14.366	14.374	2.330
2.340	14.374	14.382	14.389	14.397	14.405	14.413	14.421	14.429	14.436	14.444	14.452	2.340
2.350	14.452	14.460	14.468	14.475	14.483	14.491	14.499	14.507	14.514	14.522	14.530	2.350
2.360	14.530	14.538	14.546	14.554	14.561	14.569	14.577	14.585	14.593	14.600	14.608	2.360
2.370	14.608	14.616	14.624	14.632	14.640	14.647	14.655	14.663	14.671	14.679	14.686	2.370
2.380	14.686	14.694	14.702	14.710	14.718	14.726	14.733	14.741	14.749	14.757	14.765	2.380
2.390	14.765	14.772	14.780	14.788	14.796	14.804	14.812	14.819	14.827	14.835	14.843	2.390
2.400	14.843	14.851	14.859	14.866	14.874	14.882	14.890	14.898	14.906	14.913	14.921	2.400



## TYPE R THERMOCOUPLES

TEMPERATURES IN DEGREES F.*		REFERENCE JUNCTION AT 32 DEGREES F.										
DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
2,400	14.843	14.851	14.859	14.866	14.874	14.882	14.890	14.898	14.906	14.913	14.921	2,400
2,410	14.921	14.929	14.937	14.945	14.953	14.960	14.968	14.976	14.984	14.992	15.000	2,410
2,420	15.000	15.007	15.015	15.023	15.031	15.039	15.047	15.054	15.062	15.070	15.078	2,420
2,430	15.078	15.086	15.094	15.101	15.109	15.117	15.125	15.133	15.141	15.148	15.156	2,430
2,440	15.156	15.164	15.172	15.180	15.188	15.195	15.203	15.211	15.219	15.227	15.235	2,440
2,450	15.235	15.242	15.250	15.258	15.266	15.274	15.282	15.289	15.297	15.305	15.313	2,450
2,460	15.313	15.321	15.329	15.337	15.344	15.352	15.360	15.368	15.376	15.384	15.391	2,460
2,470	15.391	15.399	15.407	15.415	15.423	15.431	15.438	15.446	15.454	15.462	15.470	2,470
2,480	15.470	15.478	15.486	15.493	15.501	15.509	15.517	15.525	15.533	15.540	15.548	2,480
2,490	15.548	15.556	15.564	15.572	15.580	15.587	15.595	15.603	15.611	15.619	15.627	2,490
2,500	15.627	15.635	15.642	15.650	15.658	15.666	15.674	15.682	15.689	15.697	15.705	2,500
2,510	15.705	15.713	15.721	15.729	15.737	15.744	15.752	15.760	15.768	15.776	15.784	2,510
2,520	15.784	15.791	15.799	15.807	15.815	15.823	15.831	15.839	15.846	15.854	15.862	2,520
2,530	15.862	15.870	15.878	15.886	15.893	15.901	15.909	15.917	15.925	15.933	15.941	2,530
2,540	15.941	15.948	15.956	15.964	15.972	15.980	15.988	15.995	16.003	16.011	16.019	2,540
2,550	16.019	16.027	16.035	16.043	16.050	16.058	16.066	16.074	16.082	16.090	16.097	2,550
2,560	16.097	16.105	16.113	16.121	16.129	16.137	16.145	16.152	16.160	16.168	16.176	2,560
2,570	16.176	16.184	16.192	16.199	16.207	16.215	16.223	16.231	16.239	16.247	16.254	2,570
2,580	16.254	16.262	16.270	16.278	16.286	16.294	16.301	16.309	16.317	16.325	16.333	2,580
2,590	16.333	16.341	16.349	16.356	16.364	16.372	16.380	16.388	16.396	16.403	16.411	2,590
2,600	16.411	16.419	16.427	16.435	16.443	16.450	16.458	16.466	16.474	16.482	16.490	2,600
2,610	16.490	16.498	16.506	16.513	16.521	16.529	16.537	16.545	16.552	16.560	16.568	2,610
2,620	16.568	16.576	16.584	16.592	16.599	16.607	16.615	16.623	16.631	16.639	16.646	2,620
2,630	16.646	16.654	16.662	16.670	16.678	16.686	16.694	16.701	16.709	16.717	16.725	2,630
2,640	16.725	16.733	16.741	16.748	16.756	16.764	16.772	16.780	16.788	16.795	16.803	2,640
2,650	16.803	16.811	16.819	16.827	16.835	16.842	16.850	16.858	16.866	16.874	16.882	2,650
2,660	16.882	16.889	16.897	16.905	16.913	16.921	16.929	16.936	16.944	16.952	16.960	2,660
2,670	16.960	16.968	16.976	16.983	16.991	16.999	17.007	17.015	17.022	17.030	17.038	2,670
2,680	17.038	17.046	17.054	17.062	17.069	17.077	17.085	17.093	17.101	17.109	17.116	2,680
2,690	17.116	17.124	17.132	17.140	17.148	17.156	17.163	17.171	17.179	17.187	17.195	2,690
2,700	17.195	17.202	17.210	17.218	17.226	17.234	17.242	17.249	17.257	17.265	17.273	2,700
2,710	17.273	17.281	17.288	17.296	17.304	17.312	17.320	17.328	17.335	17.343	17.351	2,710
2,720	17.351	17.359	17.367	17.374	17.382	17.390	17.398	17.406	17.413	17.421	17.429	2,720
2,730	17.429	17.437	17.444	17.453	17.460	17.468	17.476	17.484	17.492	17.499	17.507	2,730
2,740	17.507	17.515	17.523	17.531	17.538	17.546	17.554	17.562	17.570	17.577	17.585	2,740
2,750	17.585	17.593	17.601	17.609	17.616	17.624	17.632	17.640	17.648	17.655	17.663	2,750
2,760	17.663	17.671	17.679	17.687	17.694	17.702	17.710	17.718	17.726	17.733	17.741	2,760
2,770	17.741	17.749	17.757	17.765	17.772	17.780	17.788	17.796	17.804	17.811	17.819	2,770
2,780	17.819	17.827	17.835	17.842	17.850	17.858	17.866	17.874	17.881	17.889	17.897	2,780
2,790	17.897	17.905	17.913	17.920	17.928	17.936	17.944	17.951	17.959	17.967	17.975	2,790
2,800	17.975	17.983	17.990	17.998	18.006	18.014	18.021	18.029	18.037	18.045	18.053	2,800
2,810	18.053	18.061	18.068	18.076	18.084	18.091	18.099	18.107	18.115	18.123	18.130	2,810
2,820	18.130	18.138	18.146	18.154	18.161	18.169	18.177	18.185	18.192	18.200	18.208	2,820
2,830	18.208	18.216	18.223	18.231	18.239	18.247	18.255	18.262	18.270	18.278	18.286	2,830
2,840	18.286	18.293	18.301	18.309	18.317	18.324	18.332	18.340	18.348	18.355	18.363	2,840
2,850	18.363	18.371	18.379	18.386	18.394	18.402	18.410	18.417	18.425	18.433	18.441	2,850
2,860	18.441	18.448	18.456	18.464	18.472	18.479	18.487	18.495	18.502	18.510	18.518	2,860
2,870	18.518	18.526	18.533	18.541	18.549	18.557	18.564	18.572	18.580	18.588	18.595	2,870
2,880	18.595	18.603	18.611	18.619	18.626	18.634	18.642	18.649	18.657	18.665	18.673	2,880
2,890	18.673	18.680	18.688	18.696	18.703	18.711	18.719	18.727	18.734	18.742	18.750	2,890
2,900	18.750	18.758	18.765	18.773	18.781	18.788	18.796	18.804	18.812	18.819	18.827	2,900
2,910	18.827	18.835	18.842	18.850	18.858	18.865	18.873	18.881	18.889	18.896	18.904	2,910
2,920	18.904	18.912	18.919	18.927	18.935	18.943	18.950	18.958	18.966	18.973	18.981	2,920
2,930	18.981	18.989	18.996	19.004	19.012	19.019	19.027	19.035	19.043	19.050	19.058	2,930
2,940	19.058	19.066	19.073	19.081	19.089	19.096	19.104	19.112	19.119	19.127	19.135	2,940
2,950	19.135	19.142	19.150	19.158	19.165	19.173	19.181	19.188	19.196	19.204	19.211	2,950
2,960	19.211	19.219	19.227	19.234	19.242	19.250	19.257	19.265	19.273	19.280	19.288	2,960
2,970	19.288	19.296	19.303	19.311	19.319	19.326	19.334	19.342	19.349	19.357	19.365	2,970
2,980	19.365	19.372	19.380	19.388	19.395	19.403	19.411	19.418	19.426	19.434	19.441	2,980
2,990	19.441	19.449	19.457	19.464	19.472	19.479	19.487	19.495	19.502	19.510	19.518	2,990
3,000	19.518	19.525	19.533	19.541	19.548	19.556	19.563	19.571	19.579	19.586	19.594	3,000

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F  
 \* CONVERTED FROM DEGREES C (NIST 1968).

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TEMPERATURES IN DEGREES F.\*

REFERENCE JUNCTION AT 32 DEGREES F.

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F

THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS

DEG F \* CONVERTED FROM DEGREES C (IPTS 1968)\*

3.000	19.518	19.525	19.533	19.541	19.548	19.556	19.563	19.571	19.579	19.586	19.594	3.000
3.010	19.594	19.602	19.609	19.617	19.624	19.632	19.640	19.647	19.655	19.663	19.670	3.010
3.020	19.670	19.678	19.685	19.693	19.701	19.708	19.716	19.723	19.731	19.739	19.746	3.020
3.030	19.746	19.754	19.761	19.769	19.777	19.784	19.792	19.800	19.807	19.815	19.822	3.030
3.040	19.822	19.830	19.837	19.845	19.853	19.860	19.868	19.875	19.883	19.891	19.898	3.040
3.050	19.898	19.906	19.913	19.921	19.929	19.936	19.944	19.951	19.959	19.966	19.974	3.050
3.060	19.974	19.982	19.989	19.997	20.004	20.012	20.019	20.027	20.034	20.042	20.050	3.060
3.070	20.050	20.057	20.065	20.072	20.080	20.087	20.095	20.102	20.110	20.117	20.125	3.070
3.080	20.125	20.132	20.140	20.148	20.155	20.163	20.170	20.178	20.185	20.193	20.200	3.080
3.090	20.200	20.208	20.215	20.223	20.230	20.238	20.245	20.253	20.260	20.268	20.275	3.090
3.100	20.275	20.283	20.290	20.297	20.305	20.312	20.320	20.327	20.335	20.342	20.350	3.100
3.110	20.350	20.357	20.365	20.372	20.380	20.387	20.394	20.402	20.409	20.417	20.424	3.110
3.120	20.424	20.432	20.439	20.446	20.454	20.461	20.469	20.476	20.483	20.491	20.498	3.120
3.130	20.498	20.506	20.513	20.520	20.528	20.535	20.543	20.550	20.557	20.565	20.572	3.130
3.140	20.572	20.579	20.587	20.594	20.601	20.609	20.616	20.623	20.631	20.638	20.645	3.140
3.150	20.645	20.653	20.660	20.667	20.675	20.682	20.689	20.697	20.704	20.711	20.718	3.150
3.160	20.718	20.726	20.733	20.740	20.748	20.755	20.762	20.769	20.777	20.784	20.791	3.160
3.170	20.791	20.798	20.806	20.813	20.820	20.827	20.834	20.842	20.849	20.856	20.863	3.170
3.180	20.863	20.870	20.878	20.885	20.892	20.899	20.906	20.914	20.921	20.928	20.935	3.180
3.190	20.935	20.942	20.949	20.956	20.964	20.971	20.978	20.985	20.992	20.999	21.006	3.190
3.200	21.006	21.013	21.021	21.028	21.035	21.042	21.049	21.056	21.063	21.070	21.077	3.200
3.210	21.077	21.084	21.091	21.098	21.105							3.210

TYPE S THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
-50	-0.218	-0.220	-0.222	-0.225	-0.227	-0.229	-0.231	-0.233	-0.236			-50
-40	-0.194	-0.197	-0.199	-0.202	-0.204	-0.206	-0.209	-0.211	-0.213	-0.215	-0.218	-40
-30	-0.170	-0.173	-0.175	-0.178	-0.180	-0.182	-0.185	-0.187	-0.190	-0.192	-0.194	-30
-20	-0.145	-0.148	-0.150	-0.153	-0.155	-0.158	-0.160	-0.163	-0.165	-0.168	-0.170	-20
-10	-0.119	-0.122	-0.124	-0.127	-0.129	-0.132	-0.135	-0.137	-0.140	-0.142	-0.145	-10
0	-0.092	-0.095	-0.097	-0.100	-0.103	-0.106	-0.108	-0.111	-0.114	-0.116	-0.119	0
0	-0.092	-0.089	-0.086	-0.084	-0.081	-0.078	-0.075	-0.073	-0.070	-0.067	-0.064	0
10	-0.064	-0.061	-0.058	-0.056	-0.053	-0.050	-0.047	-0.044	-0.041	-0.038	-0.035	10
20	-0.035	-0.033	-0.030	-0.027	-0.024	-0.021	-0.018	-0.015	-0.012	-0.009	-0.006	20
30	-0.006	-0.003	0.000	0.003	0.006	0.009	0.012	0.015	0.018	0.021	0.024	30
40	0.024	0.027	0.030	0.033	0.037	0.040	0.043	0.046	0.049	0.052	0.055	40
50	0.055	0.058	0.062	0.065	0.068	0.071	0.074	0.077	0.081	0.084	0.087	50
60	0.087	0.090	0.093	0.097	0.100	0.103	0.106	0.110	0.113	0.116	0.119	60
70	0.119	0.123	0.126	0.129	0.133	0.136	0.139	0.142	0.146	0.149	0.152	70
80	0.152	0.156	0.159	0.163	0.166	0.169	0.173	0.176	0.179	0.183	0.186	80
90	0.186	0.190	0.193	0.197	0.200	0.203	0.207	0.210	0.214	0.217	0.221	90
100	0.221	0.224	0.228	0.231	0.235	0.238	0.242	0.245	0.249	0.252	0.256	100
110	0.256	0.259	0.263	0.266	0.270	0.274	0.277	0.281	0.284	0.288	0.291	110
120	0.291	0.295	0.299	0.302	0.306	0.309	0.313	0.317	0.320	0.324	0.328	120
130	0.328	0.331	0.335	0.338	0.342	0.346	0.350	0.353	0.357	0.361	0.365	130
140	0.365	0.368	0.372	0.376	0.379	0.383	0.387	0.391	0.394	0.398	0.402	140
150	0.402	0.406	0.409	0.413	0.417	0.421	0.425	0.428	0.432	0.436	0.440	150
160	0.440	0.444	0.448	0.451	0.455	0.459	0.463	0.467	0.471	0.474	0.478	160
170	0.478	0.482	0.486	0.490	0.494	0.498	0.502	0.506	0.510	0.513	0.517	170
180	0.517	0.521	0.525	0.529	0.533	0.537	0.541	0.545	0.549	0.553	0.557	180
190	0.557	0.561	0.565	0.569	0.573	0.577	0.581	0.585	0.589	0.593	0.597	190
200	0.597	0.601	0.605	0.609	0.613	0.617	0.621	0.625	0.629	0.633	0.637	200
210	0.637	0.641	0.645	0.649	0.653	0.658	0.662	0.666	0.670	0.674	0.678	210
220	0.678	0.682	0.686	0.690	0.695	0.699	0.703	0.707	0.711	0.715	0.719	220
230	0.719	0.724	0.728	0.732	0.736	0.740	0.744	0.749	0.753	0.757	0.761	230
240	0.761	0.765	0.770	0.774	0.778	0.782	0.786	0.791	0.795	0.799	0.803	240
250	0.803	0.808	0.812	0.816	0.820	0.824	0.829	0.833	0.837	0.842	0.846	250
260	0.846	0.850	0.854	0.859	0.863	0.867	0.872	0.876	0.880	0.884	0.889	260
270	0.889	0.893	0.897	0.902	0.906	0.910	0.915	0.919	0.923	0.928	0.932	270
280	0.932	0.936	0.941	0.945	0.950	0.954	0.958	0.963	0.967	0.971	0.976	280
290	0.976	0.980	0.985	0.989	0.993	0.998	1.002	1.007	1.011	1.015	1.020	290
300	1.020	1.024	1.029	1.033	1.038	1.042	1.046	1.051	1.055	1.060	1.064	300
310	1.064	1.069	1.073	1.078	1.082	1.087	1.091	1.095	1.100	1.104	1.109	310
320	1.109	1.113	1.118	1.122	1.127	1.131	1.136	1.140	1.145	1.149	1.154	320
330	1.154	1.158	1.163	1.168	1.172	1.177	1.181	1.186	1.190	1.195	1.199	330
340	1.199	1.204	1.208	1.213	1.218	1.222	1.227	1.231	1.236	1.240	1.245	340
350	1.245	1.250	1.254	1.259	1.263	1.268	1.273	1.277	1.282	1.286	1.291	350
360	1.291	1.296	1.300	1.305	1.309	1.314	1.319	1.323	1.328	1.333	1.337	360
370	1.337	1.342	1.347	1.351	1.356	1.360	1.365	1.370	1.374	1.379	1.384	370
380	1.384	1.388	1.393	1.398	1.402	1.407	1.412	1.417	1.421	1.426	1.431	380
390	1.431	1.435	1.440	1.445	1.449	1.454	1.459	1.464	1.468	1.473	1.478	390
400	1.478	1.482	1.487	1.492	1.497	1.501	1.506	1.511	1.516	1.520	1.525	400
410	1.525	1.530	1.535	1.539	1.544	1.549	1.553	1.558	1.563	1.568	1.573	410
420	1.573	1.577	1.582	1.587	1.592	1.597	1.601	1.606	1.611	1.616	1.620	420
430	1.620	1.625	1.630	1.635	1.640	1.644	1.649	1.654	1.659	1.664	1.669	430
440	1.669	1.673	1.678	1.683	1.688	1.693	1.698	1.702	1.707	1.712	1.717	440
450	1.717	1.722	1.727	1.731	1.736	1.741	1.746	1.751	1.756	1.761	1.765	450
460	1.765	1.770	1.775	1.780	1.785	1.790	1.795	1.799	1.804	1.809	1.814	460
470	1.814	1.819	1.824	1.829	1.834	1.839	1.843	1.848	1.853	1.858	1.863	470
480	1.863	1.868	1.873	1.878	1.883	1.888	1.893	1.898	1.902	1.907	1.912	480
490	1.912	1.917	1.922	1.927	1.932	1.937	1.942	1.947	1.952	1.957	1.962	490
500	1.962	1.967	1.972	1.977	1.981	1.986	1.991	1.996	2.001	2.006	2.011	500
510	2.011	2.016	2.021	2.026	2.031	2.036	2.041	2.046	2.051	2.056	2.061	510
520	2.061	2.066	2.071	2.076	2.081	2.086	2.091	2.096	2.101	2.106	2.111	520
530	2.111	2.116	2.121	2.126	2.131	2.136	2.141	2.146	2.151	2.156	2.161	530
540	2.161	2.166	2.171	2.176	2.181	2.186	2.191	2.196	2.201	2.206	2.211	540
550	2.211	2.216	2.221	2.227	2.232	2.237	2.242	2.247	2.252	2.257	2.262	550
560	2.262	2.267	2.272	2.277	2.282	2.287	2.292	2.297	2.302	2.307	2.313	560
570	2.313	2.318	2.323	2.328	2.333	2.338	2.343	2.348	2.353	2.358	2.363	570
580	2.363	2.368	2.374	2.379	2.384	2.389	2.394	2.399	2.404	2.409	2.414	580
590	2.414	2.419	2.425	2.430	2.435	2.440	2.445	2.450	2.455	2.460	2.465	590
600	2.465	2.471	2.476	2.481	2.486	2.491	2.496	2.501	2.506	2.512	2.517	600

\* CONVERTED FROM DEGREES CELSIUS (NIST 1968).

TYPE S THERMOCOUPLES

TEMPERATURES IN DEGREES F.*		THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS											
DEG F		0	1	2	3	4	5	6	7	8	9	10	DEG F
600	2.465	2.471	2.476	2.481	2.486	2.491	2.496	2.501	2.506	2.512	2.517	2.521	600
610	2.511	2.522	2.527	2.532	2.537	2.542	2.548	2.553	2.558	2.563	2.568	2.572	610
620	2.568	2.578	2.584	2.589	2.594	2.599	2.604	2.609	2.614	2.619	2.624	2.628	620
630	2.620	2.630	2.636	2.641	2.646	2.651	2.656	2.661	2.666	2.671	2.676	2.680	630
640	2.672	2.682	2.687	2.692	2.697	2.702	2.707	2.712	2.717	2.722	2.727	2.731	640
650	2.723	2.729	2.734	2.739	2.744	2.749	2.754	2.759	2.764	2.769	2.774	2.778	650
660	2.775	2.781	2.786	2.791	2.796	2.801	2.807	2.812	2.817	2.822	2.827	2.832	660
670	2.829	2.835	2.840	2.845	2.850	2.855	2.860	2.865	2.870	2.875	2.880	2.885	670
680	2.882	2.887	2.892	2.897	2.902	2.907	2.912	2.917	2.922	2.927	2.932	2.937	680
690	2.932	2.937	2.942	2.947	2.952	2.957	2.962	2.967	2.972	2.977	2.982	2.987	690
700	2.985	2.990	2.995	3.000	3.005	3.010	3.015	3.020	3.025	3.030	3.035	3.040	700
710	3.037	3.042	3.047	3.052	3.057	3.062	3.067	3.072	3.077	3.082	3.087	3.092	710
720	3.090	3.095	3.100	3.105	3.110	3.115	3.120	3.125	3.130	3.135	3.140	3.145	720
730	3.143	3.148	3.153	3.158	3.163	3.168	3.173	3.178	3.183	3.188	3.193	3.198	730
740	3.196	3.201	3.207	3.212	3.217	3.222	3.227	3.232	3.237	3.242	3.247	3.252	740
750	3.249	3.254	3.260	3.265	3.270	3.275	3.280	3.285	3.290	3.295	3.300	3.305	750
760	3.302	3.308	3.313	3.318	3.324	3.329	3.334	3.339	3.344	3.349	3.354	3.359	760
770	3.356	3.361	3.366	3.372	3.377	3.382	3.387	3.392	3.397	3.402	3.407	3.412	770
780	3.409	3.414	3.420	3.425	3.430	3.435	3.440	3.445	3.450	3.455	3.460	3.465	780
790	3.463	3.468	3.473	3.478	3.483	3.488	3.493	3.498	3.503	3.508	3.513	3.518	790
800	3.516	3.522	3.527	3.532	3.537	3.542	3.547	3.552	3.557	3.562	3.567	3.572	800
810	3.570	3.575	3.581	3.586	3.592	3.597	3.602	3.607	3.612	3.617	3.622	3.627	810
820	3.629	3.634	3.639	3.644	3.649	3.654	3.659	3.664	3.669	3.674	3.679	3.684	820
830	3.683	3.689	3.694	3.699	3.704	3.709	3.714	3.719	3.724	3.729	3.734	3.739	830
840	3.732	3.737	3.743	3.748	3.753	3.758	3.763	3.768	3.773	3.778	3.783	3.788	840
850	3.786	3.791	3.797	3.802	3.807	3.812	3.817	3.822	3.827	3.832	3.837	3.842	850
860	3.840	3.846	3.851	3.857	3.862	3.867	3.872	3.877	3.882	3.887	3.892	3.897	860
870	3.895	3.900	3.906	3.911	3.916	3.922	3.927	3.932	3.937	3.942	3.947	3.952	870
880	3.949	3.955	3.960	3.965	3.970	3.975	3.980	3.985	3.990	3.995	4.000	4.005	880
890	4.004	4.009	4.015	4.020	4.025	4.031	4.036	4.041	4.046	4.051	4.056	4.061	890
900	4.058	4.064	4.069	4.075	4.080	4.086	4.091	4.096	4.102	4.107	4.112	4.117	900
910	4.113	4.119	4.124	4.129	4.135	4.140	4.145	4.150	4.155	4.160	4.165	4.170	910
920	4.168	4.173	4.179	4.184	4.189	4.194	4.199	4.204	4.209	4.214	4.219	4.224	920
930	4.223	4.228	4.234	4.239	4.245	4.250	4.255	4.260	4.265	4.270	4.275	4.280	930
940	4.278	4.283	4.289	4.294	4.299	4.304	4.309	4.314	4.319	4.324	4.329	4.334	940
950	4.333	4.338	4.344	4.349	4.355	4.360	4.365	4.371	4.376	4.381	4.386	4.391	950
960	4.388	4.393	4.398	4.404	4.409	4.414	4.419	4.424	4.429	4.434	4.439	4.444	960
970	4.443	4.448	4.453	4.458	4.463	4.468	4.473	4.478	4.483	4.488	4.493	4.498	970
980	4.496	4.501	4.506	4.511	4.516	4.521	4.526	4.531	4.536	4.541	4.546	4.551	980
990	4.549	4.554	4.559	4.564	4.569	4.574	4.579	4.584	4.589	4.594	4.599	4.604	990
1000	4.609	4.615	4.620	4.626	4.632	4.637	4.643	4.648	4.654	4.659	4.665	4.670	1000
1010	4.655	4.670	4.676	4.682	4.687	4.693	4.698	4.704	4.709	4.715	4.721	4.726	1010
1020	4.721	4.726	4.732	4.738	4.743	4.748	4.754	4.759	4.765	4.771	4.776	4.781	1020
1030	4.776	4.782	4.788	4.793	4.799	4.804	4.810	4.815	4.821	4.827	4.832	4.837	1030
1040	4.832	4.838	4.843	4.849	4.855	4.860	4.866	4.871	4.877	4.882	4.888	4.893	1040
1050	4.888	4.894	4.899	4.905	4.911	4.916	4.922	4.927	4.933	4.938	4.944	4.949	1050
1060	4.944	4.950	4.955	4.961	4.967	4.972	4.978	4.984	4.989	4.995	5.000	5.005	1060
1070	5.000	5.005	5.011	5.017	5.022	5.028	5.034	5.039	5.045	5.050	5.056	5.061	1070
1080	5.057	5.062	5.068	5.074	5.079	5.085	5.090	5.096	5.102	5.107	5.113	5.118	1080
1090	5.113	5.119	5.124	5.130	5.136	5.141	5.147	5.153	5.158	5.164	5.169	5.175	1090
1100	5.169	5.175	5.181	5.186	5.192	5.198	5.203	5.209	5.215	5.220	5.226	5.231	1100
1110	5.226	5.232	5.237	5.243	5.248	5.254	5.260	5.266	5.271	5.277	5.283	5.288	1110
1120	5.283	5.288	5.294	5.299	5.305	5.311	5.317	5.323	5.329	5.334	5.339	5.345	1120
1130	5.339	5.345	5.351	5.356	5.362	5.368	5.373	5.379	5.385	5.391	5.396	5.402	1130
1140	5.396	5.402	5.408	5.413	5.419	5.425	5.430	5.436	5.442	5.447	5.453	5.458	1140
1150	5.453	5.459	5.465	5.470	5.476	5.482	5.487	5.493	5.499	5.504	5.510	5.515	1150
1160	5.510	5.516	5.522	5.527	5.533	5.539	5.544	5.550	5.556	5.561	5.567	5.572	1160
1170	5.567	5.573	5.579	5.585	5.590	5.596	5.602	5.608	5.613	5.619	5.625	5.630	1170
1180	5.625	5.631	5.636	5.642	5.648	5.653	5.659	5.665	5.671	5.676	5.682	5.687	1180
1190	5.682	5.688	5.694	5.699	5.705	5.711	5.717	5.723	5.728	5.734	5.740	5.745	1190
1200	5.740	5.746	5.751	5.757	5.763	5.768	5.774	5.780	5.786	5.792	5.797	5.803	1200

TYPE S THERMOCOUPLES

TEMPERATURES IN DEGREES F.*											REFERENCE JUNCTION AT 32 DEGREES F.	
DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
1,200	5.740	5.746	5.751	5.757	5.763	5.769	5.774	5.780	5.786	5.792	5.797	1,200
1,210	5.747	5.803	5.809	5.815	5.821	5.826	5.832	5.838	5.844	5.849	5.855	1,210
1,220	5.850	5.861	5.867	5.873	5.878	5.884	5.890	5.896	5.902	5.907	5.913	1,220
1,230	5.913	5.919	5.925	5.931	5.936	5.942	5.948	5.954	5.960	5.965	5.971	1,230
1,240	5.971	5.977	5.983	5.989	5.994	6.000	6.006	6.012	6.018	6.023	6.029	1,240
1,250	6.029	6.035	6.041	6.047	6.052	6.058	6.064	6.070	6.076	6.082	6.087	1,250
1,260	6.087	6.093	6.099	6.105	6.111	6.117	6.122	6.128	6.134	6.140	6.146	1,260
1,270	6.146	6.152	6.157	6.163	6.169	6.175	6.181	6.187	6.192	6.198	6.204	1,270
1,280	6.204	6.210	6.216	6.222	6.227	6.233	6.239	6.245	6.251	6.257	6.263	1,280
1,290	6.263	6.268	6.274	6.280	6.286	6.292	6.298	6.304	6.309	6.315	6.321	1,290
1,300	6.321	6.327	6.333	6.339	6.345	6.350	6.356	6.362	6.368	6.374	6.380	1,300
1,310	6.380	6.386	6.392	6.397	6.403	6.409	6.415	6.421	6.427	6.433	6.439	1,310
1,320	6.439	6.445	6.450	6.456	6.462	6.468	6.474	6.480	6.486	6.492	6.498	1,320
1,330	6.498	6.503	6.509	6.515	6.521	6.527	6.533	6.539	6.545	6.551	6.557	1,330
1,340	6.557	6.562	6.568	6.574	6.580	6.586	6.592	6.598	6.604	6.610	6.616	1,340
1,350	6.616	6.622	6.627	6.633	6.639	6.645	6.651	6.657	6.663	6.669	6.675	1,350
1,360	6.675	6.681	6.687	6.693	6.699	6.704	6.710	6.716	6.722	6.728	6.734	1,360
1,370	6.734	6.740	6.746	6.752	6.758	6.764	6.770	6.776	6.782	6.788	6.794	1,370
1,380	6.794	6.800	6.805	6.811	6.817	6.823	6.829	6.835	6.841	6.847	6.853	1,380
1,390	6.853	6.859	6.865	6.871	6.877	6.883	6.889	6.895	6.901	6.907	6.913	1,390
1,400	6.913	6.919	6.925	6.931	6.937	6.943	6.948	6.954	6.960	6.966	6.972	1,400
1,410	6.972	6.978	6.984	6.990	6.996	7.002	7.009	7.014	7.020	7.026	7.032	1,410
1,420	7.032	7.038	7.044	7.050	7.056	7.062	7.068	7.074	7.080	7.086	7.092	1,420
1,430	7.092	7.098	7.104	7.110	7.116	7.122	7.128	7.134	7.140	7.146	7.152	1,430
1,440	7.152	7.158	7.164	7.170	7.176	7.182	7.188	7.194	7.200	7.206	7.212	1,440
1,450	7.212	7.218	7.224	7.230	7.236	7.242	7.248	7.254	7.260	7.266	7.272	1,450
1,460	7.272	7.278	7.285	7.291	7.297	7.303	7.309	7.315	7.321	7.327	7.333	1,460
1,470	7.333	7.339	7.345	7.351	7.357	7.363	7.369	7.375	7.381	7.387	7.393	1,470
1,480	7.393	7.399	7.405	7.411	7.417	7.423	7.429	7.436	7.442	7.448	7.454	1,480
1,490	7.454	7.460	7.466	7.472	7.478	7.484	7.490	7.496	7.502	7.508	7.514	1,490
1,500	7.514	7.520	7.526	7.533	7.539	7.545	7.551	7.557	7.563	7.569	7.575	1,500
1,510	7.575	7.581	7.587	7.593	7.599	7.605	7.612	7.618	7.624	7.630	7.636	1,510
1,520	7.636	7.642	7.648	7.654	7.660	7.666	7.672	7.679	7.685	7.691	7.697	1,520
1,530	7.697	7.703	7.709	7.715	7.721	7.727	7.733	7.740	7.746	7.752	7.758	1,530
1,540	7.758	7.764	7.770	7.776	7.782	7.788	7.795	7.801	7.807	7.813	7.819	1,540
1,550	7.819	7.825	7.831	7.837	7.843	7.850	7.856	7.862	7.868	7.874	7.880	1,550
1,560	7.880	7.886	7.892	7.899	7.905	7.911	7.917	7.923	7.929	7.935	7.942	1,560
1,570	7.942	7.948	7.954	7.960	7.966	7.972	7.978	7.985	7.991	7.997	8.003	1,570
1,580	8.003	8.009	8.015	8.021	8.028	8.034	8.040	8.046	8.052	8.058	8.065	1,580
1,590	8.065	8.071	8.077	8.083	8.089	8.095	8.101	8.108	8.114	8.120	8.126	1,590
1,600	8.126	8.132	8.138	8.145	8.151	8.157	8.163	8.169	8.176	8.182	8.188	1,600
1,610	8.188	8.194	8.200	8.206	8.213	8.220	8.226	8.233	8.239	8.246	8.252	1,610
1,620	8.252	8.258	8.264	8.268	8.275	8.281	8.287	8.293	8.299	8.305	8.312	1,620
1,630	8.312	8.318	8.324	8.330	8.336	8.343	8.349	8.355	8.361	8.368	8.374	1,630
1,640	8.374	8.380	8.386	8.392	8.399	8.405	8.411	8.417	8.423	8.430	8.436	1,640
1,650	8.436	8.442	8.448	8.455	8.461	8.467	8.473	8.479	8.486	8.492	8.498	1,650
1,660	8.498	8.504	8.511	8.517	8.523	8.529	8.536	8.542	8.548	8.554	8.560	1,660
1,670	8.560	8.567	8.573	8.579	8.585	8.592	8.598	8.604	8.610	8.617	8.623	1,670
1,680	8.623	8.629	8.635	8.641	8.648	8.654	8.660	8.667	8.673	8.679	8.685	1,680
1,690	8.685	8.692	8.698	8.704	8.711	8.717	8.723	8.729	8.736	8.742	8.748	1,690
1,700	8.748	8.754	8.761	8.767	8.773	8.780	8.786	8.792	8.798	8.805	8.811	1,700
1,710	8.811	8.817	8.823	8.829	8.836	8.842	8.849	8.855	8.861	8.867	8.874	1,710
1,720	8.874	8.880	8.886	8.893	8.899	8.906	8.912	8.918	8.924	8.930	8.937	1,720
1,730	8.937	8.943	8.949	8.956	8.962	8.968	8.975	8.981	8.987	8.993	9.000	1,730
1,740	9.000	9.006	9.012	9.019	9.025	9.031	9.038	9.044	9.050	9.057	9.063	1,740
1,750	9.063	9.069	9.076	9.082	9.088	9.095	9.101	9.107	9.114	9.120	9.126	1,750
1,760	9.126	9.133	9.139	9.145	9.152	9.158	9.164	9.171	9.177	9.183	9.190	1,760
1,770	9.190	9.196	9.202	9.209	9.215	9.221	9.228	9.234	9.240	9.247	9.253	1,770
1,780	9.253	9.259	9.266	9.272	9.278	9.285	9.291	9.298	9.304	9.311	9.317	1,780
1,790	9.317	9.323	9.329	9.336	9.342	9.348	9.355	9.361	9.368	9.374	9.380	1,790
1,800	9.380	9.387	9.393	9.399	9.406	9.412	9.419	9.425	9.431	9.438	9.444	1,800

\* CONVERTED FROM DEGREES CELSIUS (1968).

TYPES THERMOCOUPLES

TEMPERATURES IN DEGREES F.*												
REFERENCE JUNCTION AT 32 DEGREES F.												
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
1.800	9.380	9.387	9.393	9.399	9.406	9.412	9.419	9.425	9.431	9.438	9.444	1.800
1.810	9.444	9.450	9.457	9.463	9.470	9.476	9.482	9.489	9.495	9.502	9.508	1.810
1.820	9.512	9.518	9.524	9.531	9.537	9.544	9.550	9.556	9.562	9.569	9.575	1.820
1.830	9.572	9.578	9.585	9.591	9.598	9.604	9.610	9.617	9.623	9.629	9.636	1.830
1.840	9.636	9.642	9.649	9.655	9.662	9.668	9.674	9.681	9.687	9.694	9.700	1.840
1.850	9.700	9.707	9.713	9.719	9.726	9.732	9.739	9.745	9.752	9.758	9.764	1.850
1.860	9.764	9.771	9.777	9.784	9.790	9.797	9.803	9.809	9.816	9.822	9.829	1.860
1.870	9.829	9.835	9.842	9.848	9.855	9.861	9.867	9.874	9.880	9.887	9.893	1.870
1.880	9.893	9.900	9.906	9.913	9.919	9.926	9.932	9.939	9.945	9.951	9.958	1.880
1.890	9.958	9.964	9.971	9.977	9.984	9.989	9.996	9.999	9.999	9.999	9.999	1.890
1.900	10.023	10.029	10.036	10.042	10.048	10.055	10.061	10.068	10.074	10.081	10.087	1.900
1.910	10.087	10.094	10.100	10.107	10.113	10.120	10.126	10.133	10.139	10.146	10.152	1.910
1.920	10.152	10.159	10.165	10.172	10.178	10.185	10.191	10.198	10.204	10.211	10.217	1.920
1.930	10.217	10.224	10.231	10.237	10.243	10.250	10.256	10.262	10.268	10.274	10.280	1.930
1.940	10.282	10.289	10.295	10.302	10.308	10.315	10.321	10.328	10.334	10.341	10.348	1.940
1.950	10.348	10.354	10.361	10.367	10.374	10.380	10.387	10.393	10.400	10.406	10.413	1.950
1.960	10.413	10.419	10.426	10.432	10.439	10.445	10.452	10.459	10.465	10.472	10.478	1.960
1.970	10.478	10.485	10.491	10.498	10.504	10.511	10.517	10.524	10.531	10.537	10.544	1.970
1.980	10.544	10.550	10.557	10.563	10.570	10.576	10.583	10.589	10.596	10.603	10.609	1.980
1.990	10.609	10.616	10.622	10.629	10.635	10.642	10.648	10.655	10.662	10.668	10.675	1.990
2.000	10.675	10.681	10.688	10.694	10.701	10.708	10.714	10.721	10.727	10.734	10.740	2.000
2.010	10.740	10.747	10.754	10.760	10.767	10.773	10.780	10.786	10.793	10.800	10.806	2.010
2.020	10.806	10.813	10.819	10.826	10.832	10.839	10.846	10.852	10.859	10.865	10.872	2.020
2.030	10.872	10.879	10.885	10.892	10.898	10.905	10.912	10.918	10.925	10.931	10.938	2.030
2.040	10.938	10.944	10.951	10.958	10.964	10.971	10.977	10.984	10.991	10.997	11.004	2.040
2.050	11.004	11.010	11.017	11.024	11.030	11.037	11.043	11.050	11.057	11.063	11.070	2.050
2.060	11.070	11.076	11.083	11.089	11.096	11.103	11.110	11.116	11.123	11.129	11.136	2.060
2.070	11.136	11.143	11.149	11.156	11.162	11.169	11.176	11.182	11.189	11.196	11.202	2.070
2.080	11.202	11.209	11.215	11.222	11.229	11.235	11.242	11.248	11.255	11.262	11.268	2.080
2.090	11.268	11.275	11.282	11.288	11.295	11.301	11.308	11.315	11.321	11.328	11.335	2.090
2.100	11.335	11.341	11.348	11.355	11.361	11.368	11.374	11.381	11.388	11.394	11.401	2.100
2.110	11.401	11.408	11.414	11.421	11.428	11.434	11.441	11.447	11.454	11.461	11.467	2.110
2.120	11.467	11.474	11.481	11.487	11.494	11.501	11.507	11.514	11.521	11.527	11.534	2.120
2.130	11.534	11.541	11.547	11.554	11.560	11.567	11.574	11.580	11.587	11.594	11.600	2.130
2.140	11.600	11.607	11.614	11.620	11.627	11.634	11.640	11.647	11.654	11.660	11.667	2.140
2.150	11.667	11.674	11.680	11.687	11.694	11.700	11.707	11.714	11.720	11.727	11.734	2.150
2.160	11.734	11.740	11.747	11.754	11.760	11.767	11.774	11.780	11.787	11.794	11.800	2.160
2.170	11.800	11.807	11.814	11.820	11.827	11.834	11.840	11.847	11.854	11.860	11.867	2.170
2.180	11.867	11.874	11.880	11.887	11.894	11.900	11.907	11.914	11.920	11.927	11.934	2.180
2.190	11.934	11.940	11.947	11.954	11.960	11.967	11.974	11.980	11.987	11.994	12.001	2.190
2.200	12.001	12.007	12.014	12.021	12.027	12.034	12.041	12.047	12.054	12.061	12.067	2.200
2.210	12.067	12.074	12.081	12.087	12.094	12.101	12.107	12.114	12.121	12.128	12.134	2.210
2.220	12.134	12.141	12.148	12.154	12.161	12.168	12.174	12.181	12.188	12.194	12.201	2.220
2.230	12.201	12.208	12.215	12.221	12.228	12.235	12.241	12.248	12.255	12.261	12.268	2.230
2.240	12.268	12.275	12.282	12.288	12.295	12.302	12.308	12.315	12.322	12.328	12.335	2.240
2.250	12.335	12.342	12.349	12.355	12.362	12.369	12.375	12.382	12.389	12.395	12.402	2.250
2.260	12.402	12.409	12.416	12.422	12.429	12.436	12.442	12.449	12.455	12.463	12.469	2.260
2.270	12.469	12.476	12.483	12.489	12.496	12.503	12.510	12.516	12.523	12.530	12.536	2.270
2.280	12.536	12.543	12.550	12.557	12.563	12.570	12.577	12.583	12.590	12.597	12.604	2.280
2.290	12.604	12.610	12.617	12.624	12.630	12.637	12.644	12.651	12.657	12.664	12.671	2.290
2.300	12.671	12.677	12.684	12.691	12.698	12.704	12.711	12.718	12.724	12.731	12.738	2.300
2.310	12.738	12.745	12.751	12.758	12.765	12.771	12.778	12.785	12.792	12.798	12.805	2.310
2.320	12.805	12.812	12.819	12.825	12.832	12.839	12.845	12.852	12.859	12.866	12.872	2.320
2.330	12.872	12.879	12.886	12.893	12.899	12.906	12.913	12.919	12.926	12.933	12.940	2.330
2.340	12.940	12.946	12.953	12.960	12.967	12.973	12.980	12.987	12.993	13.000	13.007	2.340
2.350	13.007	13.014	13.020	13.027	13.034	13.041	13.047	13.054	13.061	13.067	13.074	2.350
2.360	13.074	13.081	13.088	13.094	13.101	13.108	13.115	13.122	13.128	13.135	13.142	2.360
2.370	13.142	13.148	13.155	13.162	13.168	13.175	13.182	13.189	13.195	13.202	13.209	2.370
2.380	13.209	13.216	13.222	13.229	13.236	13.243	13.249	13.256	13.263	13.269	13.276	2.380
2.390	13.276	13.283	13.290	13.296	13.303	13.310	13.317	13.323	13.330	13.337	13.344	2.390
2.400	13.344	13.350	13.357	13.364	13.371	13.377	13.384	13.391	13.397	13.404	13.411	2.400

\* CONVERTED FROM DEGREES CELSIUS (1981)

TYPE S THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
2,400	13.344	13.350	13.357	13.364	13.371	13.377	13.384	13.391	13.397	13.404	13.411	2,400
2,410	13.411	13.418	13.424	13.431	13.438	13.445	13.451	13.458	13.465	13.472	13.478	2,410
2,420	13.478	13.485	13.492	13.499	13.505	13.512	13.519	13.526	13.532	13.539	13.546	2,420
2,430	13.546	13.552	13.559	13.566	13.573	13.579	13.586	13.593	13.600	13.606	13.613	2,430
2,440	13.613	13.620	13.627	13.633	13.640	13.647	13.654	13.660	13.667	13.674	13.681	2,440
2,450	13.681	13.687	13.694	13.701	13.708	13.714	13.721	13.728	13.734	13.741	13.748	2,450
2,460	13.748	13.755	13.761	13.768	13.775	13.782	13.788	13.795	13.802	13.809	13.815	2,460
2,470	13.815	13.822	13.829	13.836	13.842	13.849	13.856	13.863	13.869	13.876	13.883	2,470
2,480	13.883	13.890	13.896	13.903	13.910	13.916	13.923	13.930	13.937	13.943	13.950	2,480
2,490	13.950	13.957	13.964	13.970	13.977	13.984	13.991	13.997	14.004	14.011	14.018	2,490
2,500	14.018	14.024	14.031	14.038	14.045	14.051	14.058	14.065	14.072	14.078	14.085	2,500
2,510	14.085	14.092	14.098	14.105	14.112	14.119	14.125	14.132	14.139	14.146	14.152	2,510
2,520	14.152	14.159	14.166	14.173	14.179	14.186	14.193	14.200	14.206	14.213	14.220	2,520
2,530	14.220	14.226	14.233	14.240	14.247	14.253	14.260	14.267	14.274	14.280	14.287	2,530
2,540	14.287	14.294	14.301	14.307	14.314	14.321	14.328	14.334	14.341	14.348	14.354	2,540
2,550	14.354	14.361	14.368	14.375	14.381	14.388	14.395	14.402	14.408	14.415	14.422	2,550
2,560	14.422	14.429	14.435	14.442	14.449	14.455	14.462	14.469	14.476	14.482	14.489	2,560
2,570	14.489	14.496	14.503	14.509	14.516	14.523	14.530	14.536	14.543	14.550	14.556	2,570
2,580	14.556	14.563	14.570	14.577	14.583	14.590	14.597	14.604	14.610	14.617	14.624	2,580
2,590	14.624	14.631	14.637	14.644	14.651	14.657	14.664	14.671	14.678	14.684	14.691	2,590
2,600	14.691	14.698	14.705	14.711	14.718	14.725	14.731	14.738	14.745	14.752	14.758	2,600
2,610	14.758	14.765	14.772	14.778	14.785	14.792	14.799	14.805	14.812	14.819	14.826	2,610
2,620	14.826	14.832	14.839	14.846	14.852	14.859	14.866	14.873	14.879	14.886	14.893	2,620
2,630	14.893	14.899	14.906	14.913	14.920	14.926	14.933	14.940	14.946	14.953	14.960	2,630
2,640	14.960	14.967	14.973	14.980	14.987	14.994	15.000	15.007	15.014	15.020	15.027	2,640
2,650	15.027	15.034	15.041	15.047	15.054	15.061	15.067	15.074	15.081	15.088	15.094	2,650
2,660	15.094	15.101	15.108	15.114	15.121	15.128	15.134	15.141	15.148	15.155	15.161	2,660
2,670	15.161	15.168	15.175	15.181	15.188	15.195	15.202	15.208	15.215	15.222	15.228	2,670
2,680	15.228	15.235	15.242	15.248	15.255	15.262	15.269	15.275	15.282	15.289	15.295	2,680
2,690	15.295	15.302	15.309	15.315	15.322	15.329	15.336	15.342	15.349	15.356	15.362	2,690
2,700	15.362	15.369	15.376	15.382	15.389	15.396	15.403	15.409	15.416	15.423	15.429	2,700
2,710	15.429	15.436	15.443	15.449	15.456	15.463	15.469	15.476	15.483	15.490	15.496	2,710
2,720	15.496	15.503	15.510	15.516	15.523	15.530	15.536	15.543	15.550	15.556	15.563	2,720
2,730	15.563	15.570	15.576	15.583	15.590	15.597	15.603	15.610	15.617	15.623	15.630	2,730
2,740	15.630	15.637	15.643	15.650	15.657	15.663	15.670	15.677	15.683	15.690	15.697	2,740
2,750	15.697	15.703	15.710	15.717	15.723	15.730	15.737	15.743	15.750	15.757	15.763	2,750
2,760	15.763	15.770	15.777	15.783	15.790	15.797	15.804	15.810	15.817	15.824	15.830	2,760
2,770	15.830	15.837	15.844	15.850	15.857	15.864	15.870	15.877	15.883	15.890	15.897	2,770
2,780	15.897	15.903	15.910	15.917	15.923	15.930	15.937	15.943	15.950	15.957	15.963	2,780
2,790	15.963	15.970	15.977	15.983	15.990	15.997	16.003	16.010	16.017	16.023	16.030	2,790
2,800	16.030	16.037	16.043	16.050	16.057	16.063	16.070	16.077	16.083	16.090	16.096	2,800
2,810	16.096	16.103	16.110	16.116	16.123	16.130	16.136	16.143	16.150	16.156	16.163	2,810
2,820	16.163	16.170	16.176	16.183	16.189	16.196	16.203	16.209	16.216	16.223	16.229	2,820
2,830	16.229	16.236	16.243	16.249	16.256	16.262	16.269	16.276	16.282	16.289	16.296	2,830
2,840	16.296	16.302	16.309	16.315	16.322	16.329	16.335	16.342	16.349	16.355	16.362	2,840
2,850	16.362	16.368	16.375	16.382	16.388	16.395	16.402	16.408	16.415	16.421	16.428	2,850
2,860	16.428	16.435	16.441	16.448	16.454	16.461	16.468	16.474	16.481	16.488	16.494	2,860
2,870	16.494	16.501	16.507	16.514	16.521	16.527	16.534	16.540	16.547	16.554	16.560	2,870
2,880	16.560	16.567	16.573	16.580	16.587	16.593	16.600	16.606	16.613	16.620	16.626	2,880
2,890	16.626	16.633	16.639	16.646	16.653	16.659	16.666	16.672	16.679	16.686	16.692	2,890
2,900	16.692	16.699	16.705	16.712	16.719	16.725	16.732	16.738	16.745	16.751	16.758	2,900
2,910	16.758	16.765	16.771	16.778	16.784	16.791	16.797	16.804	16.811	16.817	16.824	2,910
2,920	16.824	16.830	16.837	16.844	16.850	16.857	16.863	16.870	16.876	16.883	16.890	2,920
2,930	16.890	16.896	16.903	16.909	16.916	16.922	16.929	16.935	16.942	16.949	16.955	2,930
2,940	16.955	16.962	16.968	16.975	16.981	16.988	16.995	17.001	17.008	17.014	17.021	2,940
2,950	17.021	17.027	17.034	17.040	17.047	17.053	17.060	17.067	17.073	17.080	17.086	2,950
2,960	17.086	17.093	17.099	17.106	17.112	17.119	17.125	17.132	17.139	17.145	17.152	2,960
2,970	17.152	17.158	17.165	17.171	17.178	17.184	17.191	17.197	17.204	17.210	17.217	2,970
2,980	17.217	17.223	17.230	17.237	17.243	17.250	17.256	17.263	17.269	17.276	17.282	2,980
2,990	17.282	17.289	17.295	17.302	17.308	17.315	17.321	17.328	17.334	17.341	17.347	2,990
3,000	17.347	17.354	17.360	17.367	17.373	17.380	17.386	17.393	17.399	17.406	17.412	3,000

\* CONVERTED FROM DEGREES C (IPTS 1968).

TYPES THERMOCOUPLES

TEMPERATURES IN DEGREES F.**											
REFERENCE JUNCTION AT 32 DEGREES F.*											
DEG F	0	1	2	3	4	5	6	7	8	9	10
3.000	17.347	17.354	17.360	17.367	17.373	17.380	17.386	17.393	17.399	17.406	17.412
3.010	17.412	17.419	17.425	17.432	17.438	17.445	17.451	17.458	17.464	17.471	17.477
3.020	17.477	17.484	17.490	17.497	17.503	17.510	17.516	17.523	17.529	17.536	17.542
3.030	17.542	17.549	17.555	17.562	17.568	17.575	17.581	17.588	17.594	17.601	17.607
3.040	17.607	17.614	17.620	17.627	17.633	17.639	17.646	17.652	17.659	17.665	17.672
3.050	17.672	17.678	17.685	17.691	17.698	17.704	17.711	17.717	17.723	17.730	17.736
3.060	17.736	17.743	17.749	17.756	17.762	17.769	17.775	17.781	17.788	17.794	17.801
3.070	17.801	17.807	17.814	17.820	17.826	17.833	17.839	17.846	17.852	17.859	17.865
3.080	17.865	17.871	17.878	17.884	17.891	17.897	17.903	17.910	17.916	17.923	17.929
3.090	17.929	17.935	17.942	17.948	17.954	17.961	17.967	17.974	17.980	17.986	17.993
3.100	17.993	17.999	18.005	18.012	18.018	18.024	18.031	18.037	18.043	18.050	18.056
3.110	18.056	18.063	18.069	18.075	18.081	18.088	18.094	18.100	18.107	18.113	18.119
3.120	18.119	18.126	18.132	18.138	18.145	18.151	18.157	18.163	18.170	18.176	18.182
3.130	18.182	18.189	18.195	18.201	18.207	18.214	18.220	18.226	18.232	18.239	18.245
3.140	18.245	18.251	18.257	18.264	18.270	18.276	18.282	18.289	18.295	18.301	18.307
3.150	18.307	18.313	18.320	18.326	18.332	18.338	18.344	18.351	18.357	18.363	18.369
3.160	18.369	18.375	18.381	18.388	18.394	18.400	18.406	18.412	18.418	18.424	18.431
3.170	18.431	18.437	18.443	18.449	18.455	18.461	18.467	18.473	18.479	18.486	18.492
3.180	18.492	18.498	18.504	18.510	18.516	18.522	18.528	18.534	18.540	18.546	18.552
3.190	18.552	18.558	18.564	18.570	18.576	18.582	18.588	18.594	18.600	18.606	18.612
3.200	18.612	18.618	18.624	18.630	18.636	18.642	18.648	18.654	18.660	18.666	18.672
3.210	18.672	18.678	18.684	18.690	18.696						3.210

\* CONVERTED FROM DEGREES C (1PTS 1968).



TYPE T THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
-450	-6.254	-6.255	-6.256	-6.257	-6.258							-450
-440	-6.240	-6.242	-6.243	-6.245	-6.247	-6.248	-6.250	-6.251	-6.252	-6.253	-6.254	-440
-430	-6.217	-6.220	-6.223	-6.225	-6.227	-6.230	-6.232	-6.234	-6.236	-6.238	-6.240	-430
-420	-6.187	-6.191	-6.194	-6.197	-6.200	-6.203	-6.206	-6.209	-6.212	-6.215	-6.217	-420
-410	-6.155	-6.159	-6.158	-6.162	-6.166	-6.170	-6.173	-6.177	-6.181	-6.184	-6.187	-410
-400	-6.105	-6.110	-6.115	-6.119	-6.124	-6.128	-6.133	-6.137	-6.142	-6.146	-6.150	-400
-390	-6.053	-6.059	-6.064	-6.069	-6.075	-6.080	-6.085	-6.090	-6.095	-6.100	-6.105	-390
-380	-5.995	-6.001	-6.007	-6.013	-6.019	-6.025	-6.030	-6.036	-6.042	-6.048	-6.053	-380
-370	-5.930	-5.937	-5.943	-5.950	-5.957	-5.963	-5.969	-5.976	-5.982	-5.988	-5.995	-370
-360	-5.860	-5.867	-5.874	-5.881	-5.889	-5.896	-5.903	-5.910	-5.916	-5.923	-5.930	-360
-350	-5.785	-5.792	-5.800	-5.808	-5.815	-5.823	-5.830	-5.838	-5.845	-5.853	-5.860	-350
-340	-5.705	-5.713	-5.721	-5.729	-5.737	-5.745	-5.753	-5.761	-5.769	-5.777	-5.785	-340
-330	-5.620	-5.629	-5.638	-5.646	-5.655	-5.663	-5.672	-5.680	-5.688	-5.697	-5.705	-330
-320	-5.532	-5.541	-5.550	-5.559	-5.568	-5.576	-5.585	-5.594	-5.603	-5.612	-5.620	-320
-310	-5.439	-5.448	-5.457	-5.467	-5.476	-5.486	-5.495	-5.504	-5.513	-5.522	-5.532	-310
-300	-5.343	-5.351	-5.361	-5.371	-5.381	-5.390	-5.400	-5.410	-5.419	-5.429	-5.439	-300
-290	-5.240	-5.250	-5.261	-5.271	-5.281	-5.291	-5.301	-5.311	-5.321	-5.331	-5.341	-290
-280	-5.135	-5.145	-5.156	-5.167	-5.177	-5.188	-5.198	-5.209	-5.219	-5.230	-5.240	-280
-270	-5.025	-5.036	-5.047	-5.058	-5.069	-5.080	-5.091	-5.102	-5.113	-5.124	-5.135	-270
-260	-4.912	-4.923	-4.934	-4.945	-4.956	-4.967	-4.978	-4.989	-4.999	-5.010	-5.021	-260
-250	-4.794	-4.806	-4.818	-4.830	-4.842	-4.853	-4.865	-4.877	-4.889	-4.900	-4.912	-250
-240	-4.673	-4.685	-4.698	-4.710	-4.722	-4.734	-4.746	-4.758	-4.770	-4.782	-4.794	-240
-230	-4.548	-4.560	-4.573	-4.586	-4.598	-4.611	-4.623	-4.636	-4.648	-4.661	-4.673	-230
-220	-4.419	-4.432	-4.445	-4.458	-4.471	-4.484	-4.497	-4.509	-4.522	-4.535	-4.548	-220
-210	-4.286	-4.299	-4.313	-4.326	-4.339	-4.353	-4.366	-4.379	-4.392	-4.406	-4.419	-210
-200	-4.149	-4.163	-4.177	-4.191	-4.204	-4.218	-4.232	-4.245	-4.259	-4.272	-4.286	-200
-190	-4.009	-4.023	-4.037	-4.051	-4.065	-4.079	-4.093	-4.107	-4.121	-4.135	-4.149	-190
-180	-3.864	-3.879	-3.894	-3.908	-3.923	-3.937	-3.951	-3.966	-3.980	-3.994	-4.009	-180
-170	-3.717	-3.732	-3.746	-3.761	-3.776	-3.791	-3.806	-3.820	-3.835	-3.850	-3.864	-170
-160	-3.565	-3.580	-3.596	-3.611	-3.626	-3.641	-3.656	-3.671	-3.687	-3.702	-3.717	-160
-150	-3.410	-3.425	-3.441	-3.457	-3.472	-3.488	-3.503	-3.519	-3.534	-3.550	-3.565	-150
-140	-3.251	-3.267	-3.283	-3.299	-3.315	-3.331	-3.347	-3.362	-3.378	-3.394	-3.410	-140
-130	-3.089	-3.105	-3.121	-3.138	-3.154	-3.170	-3.186	-3.203	-3.219	-3.235	-3.251	-130
-120	-2.923	-2.939	-2.956	-2.973	-2.989	-3.006	-3.023	-3.039	-3.056	-3.072	-3.089	-120
-110	-2.753	-2.771	-2.788	-2.805	-2.822	-2.838	-2.855	-2.872	-2.889	-2.906	-2.923	-110
-100	-2.581	-2.598	-2.616	-2.633	-2.650	-2.667	-2.685	-2.702	-2.719	-2.736	-2.753	-100
-90	-2.405	-2.422	-2.440	-2.458	-2.475	-2.493	-2.511	-2.528	-2.546	-2.563	-2.581	-90
-80	-2.225	-2.243	-2.261	-2.279	-2.297	-2.315	-2.333	-2.351	-2.369	-2.387	-2.405	-80
-70	-2.042	-2.061	-2.079	-2.098	-2.116	-2.134	-2.152	-2.171	-2.189	-2.207	-2.225	-70
-60	-1.856	-1.875	-1.894	-1.912	-1.931	-1.950	-1.968	-1.987	-2.005	-2.024	-2.042	-60
-50	-1.667	-1.686	-1.705	-1.724	-1.743	-1.762	-1.781	-1.800	-1.819	-1.838	-1.856	-50
-40	-1.475	-1.494	-1.513	-1.533	-1.552	-1.571	-1.591	-1.610	-1.629	-1.648	-1.667	-40
-30	-1.279	-1.299	-1.319	-1.338	-1.358	-1.377	-1.397	-1.416	-1.436	-1.455	-1.475	-30
-20	-1.081	-1.101	-1.121	-1.141	-1.160	-1.180	-1.200	-1.220	-1.240	-1.260	-1.279	-20
-10	-0.878	-0.898	-0.918	-0.938	-0.958	-0.978	-0.998	-1.018	-1.038	-1.058	-1.081	-10
0	-0.674	-0.695	-0.716	-0.736	-0.757	-0.777	-0.798	-0.818	-0.838	-0.859	-0.879	0
0	-0.674	-0.654	-0.633	-0.613	-0.592	-0.571	-0.550	-0.529	-0.509	-0.488	-0.467	0
10	-0.547	-0.546	-0.545	-0.544	-0.543	-0.542	-0.541	-0.540	-0.539	-0.538	-0.537	10
20	-0.256	-0.235	-0.214	-0.193	-0.171	-0.150	-0.129	-0.107	-0.086	-0.064	-0.043	20
30	-0.043	-0.022	0.000	0.022	0.043	0.065	0.086	0.108	0.130	0.151	0.173	30
40	0.173	0.195	0.216	0.238	0.260	0.282	0.303	0.325	0.347	0.369	0.391	40
50	0.391	0.413	0.435	0.457	0.479	0.501	0.523	0.545	0.567	0.589	0.611	50
60	0.611	0.634	0.656	0.678	0.700	0.722	0.745	0.767	0.789	0.812	0.834	60
70	0.834	0.857	0.879	0.902	0.924	0.947	0.969	0.992	1.014	1.037	1.060	70
80	1.060	1.082	1.105	1.128	1.151	1.173	1.196	1.219	1.242	1.265	1.288	80
90	1.288	1.311	1.334	1.357	1.380	1.403	1.426	1.449	1.472	1.495	1.518	90
100	1.518	1.542	1.565	1.588	1.611	1.635	1.658	1.681	1.705	1.728	1.752	100
110	1.752	1.775	1.799	1.822	1.846	1.869	1.893	1.917	1.940	1.964	1.988	110
120	1.988	2.011	2.035	2.059	2.083	2.107	2.131	2.154	2.178	2.202	2.226	120
130	2.226	2.250	2.274	2.298	2.322	2.347	2.371	2.395	2.419	2.443	2.467	130
140	2.467	2.492	2.516	2.540	2.565	2.589	2.613	2.638	2.662	2.687	2.711	140
150	2.711	2.736	2.760	2.785	2.809	2.834	2.859	2.883	2.908	2.933	2.958	150
160	2.958	2.982	3.007	3.032	3.057	3.082	3.107	3.131	3.156	3.181	3.206	160
170	3.206	3.231	3.256	3.281	3.307	3.332	3.357	3.382	3.407	3.432	3.458	170
180	3.458	3.483	3.508	3.533	3.559	3.584	3.609	3.635	3.660	3.686	3.711	180
190	3.711	3.737	3.762	3.788	3.813	3.839	3.864	3.890	3.916	3.941	3.967	190

\* CONVERTED FROM DEGREES C (IPTS 1968).

TYPE T THERMOCOUPLES

TEMPERATURES IN DEGREES F.\* REFERENCE JUNCTION AT 32 DEGREES F.

DEG F 0 1 2 3 4 5 6 7 8 9 10 DEG F

DEG F	0	1	2	3	4	5	6	7	8	9	10	DEG F
200	3.967	3.993	4.019	4.044	4.070	4.096	4.122	4.148	4.174	4.199	4.225	200
210	4.225	4.251	4.277	4.303	4.329	4.355	4.381	4.408	4.434	4.460	4.486	210
220	4.475	4.501	4.527	4.553	4.579	4.605	4.631	4.657	4.683	4.709	4.735	220
230	4.749	4.775	4.801	4.827	4.853	4.879	4.905	4.931	4.957	4.983	5.009	230
240	5.014	5.040	5.067	5.093	5.120	5.147	5.174	5.200	5.227	5.254	5.281	240
250	5.291	5.317	5.344	5.371	5.398	5.425	5.452	5.479	5.506	5.533	5.560	250
260	5.587	5.614	5.641	5.668	5.695	5.722	5.749	5.776	5.803	5.830	5.857	260
270	5.884	5.911	5.938	5.965	5.992	6.019	6.046	6.073	6.100	6.127	6.154	270
280	6.181	6.208	6.235	6.262	6.289	6.316	6.343	6.370	6.397	6.424	6.451	280
290	6.478	6.505	6.532	6.559	6.586	6.613	6.640	6.667	6.694	6.721	6.748	290
300	6.775	6.802	6.829	6.856	6.883	6.910	6.937	6.964	6.991	7.018	7.045	300
310	7.072	7.100	7.127	7.154	7.181	7.208	7.235	7.262	7.289	7.316	7.343	310
320	7.370	7.400	7.429	7.458	7.487	7.516	7.545	7.574	7.603	7.632	7.661	320
330	7.690	7.720	7.750	7.780	7.810	7.840	7.870	7.900	7.930	7.960	7.990	330
340	8.020	8.050	8.080	8.110	8.140	8.170	8.200	8.230	8.260	8.290	8.320	340
350	8.350	8.380	8.410	8.440	8.470	8.500	8.530	8.560	8.590	8.620	8.650	350
360	8.680	8.710	8.740	8.770	8.800	8.830	8.860	8.890	8.920	8.950	8.980	360
370	9.010	9.040	9.070	9.100	9.130	9.160	9.190	9.220	9.250	9.280	9.310	370
380	9.340	9.370	9.400	9.430	9.460	9.490	9.520	9.550	9.580	9.610	9.640	380
390	9.670	9.700	9.730	9.760	9.790	9.820	9.850	9.880	9.910	9.940	9.970	390
400	10.000	10.030	10.060	10.090	10.120	10.150	10.180	10.210	10.240	10.270	10.300	400
410	10.330	10.360	10.390	10.420	10.450	10.480	10.510	10.540	10.570	10.600	10.630	410
420	10.660	10.690	10.720	10.750	10.780	10.810	10.840	10.870	10.900	10.930	10.960	420
430	10.990	11.020	11.050	11.080	11.110	11.140	11.170	11.200	11.230	11.260	11.290	430
440	11.320	11.350	11.380	11.410	11.440	11.470	11.500	11.530	11.560	11.590	11.620	440
450	11.650	11.680	11.710	11.740	11.770	11.800	11.830	11.860	11.890	11.920	11.950	450
460	11.980	12.010	12.040	12.070	12.100	12.130	12.160	12.190	12.220	12.250	12.280	460
470	12.310	12.340	12.370	12.400	12.430	12.460	12.490	12.520	12.550	12.580	12.610	470
480	12.640	12.670	12.700	12.730	12.760	12.790	12.820	12.850	12.880	12.910	12.940	480
490	12.970	13.000	13.030	13.060	13.090	13.120	13.150	13.180	13.210	13.240	13.270	490
500	13.300	13.330	13.360	13.390	13.420	13.450	13.480	13.510	13.540	13.570	13.600	500
510	13.630	13.660	13.690	13.720	13.750	13.780	13.810	13.840	13.870	13.900	13.930	510
520	13.960	13.990	14.020	14.050	14.080	14.110	14.140	14.170	14.200	14.230	14.260	520
530	14.290	14.320	14.350	14.380	14.410	14.440	14.470	14.500	14.530	14.560	14.590	530
540	14.620	14.650	14.680	14.710	14.740	14.770	14.800	14.830	14.860	14.890	14.920	540
550	14.950	14.980	15.010	15.040	15.070	15.100	15.130	15.160	15.190	15.220	15.250	550
560	15.280	15.310	15.340	15.370	15.400	15.430	15.460	15.490	15.520	15.550	15.580	560
570	15.610	15.640	15.670	15.700	15.730	15.760	15.790	15.820	15.850	15.880	15.910	570
580	15.940	15.970	16.000	16.030	16.060	16.090	16.120	16.150	16.180	16.210	16.240	580
590	16.270	16.300	16.330	16.360	16.390	16.420	16.450	16.480	16.510	16.540	16.570	590
600	16.600	16.630	16.660	16.690	16.720	16.750	16.780	16.810	16.840	16.870	16.900	600
610	16.930	16.960	16.990	17.020	17.050	17.080	17.110	17.140	17.170	17.200	17.230	610
620	17.260	17.290	17.320	17.350	17.380	17.410	17.440	17.470	17.500	17.530	17.560	620
630	17.590	17.620	17.650	17.680	17.710	17.740	17.770	17.800	17.830	17.860	17.890	630
640	17.920	17.950	17.980	18.010	18.040	18.070	18.100	18.130	18.160	18.190	18.220	640
650	18.250	18.280	18.310	18.340	18.370	18.400	18.430	18.460	18.490	18.520	18.550	650
660	18.580	18.610	18.640	18.670	18.700	18.730	18.760	18.790	18.820	18.850	18.880	660
670	18.910	18.940	18.970	19.000	19.030	19.060	19.090	19.120	19.150	19.180	19.210	670
680	19.240	19.270	19.300	19.330	19.360	19.390	19.420	19.450	19.480	19.510	19.540	680
690	19.570	19.600	19.630	19.660	19.690	19.720	19.750	19.780	19.810	19.840	19.870	690
700	19.900	19.930	19.960	19.990	20.020	20.050	20.080	20.110	20.140	20.170	20.200	700
710	20.230	20.260	20.290	20.320	20.350	20.380	20.410	20.440	20.470	20.500	20.530	710
720	20.560	20.590	20.620	20.650	20.680	20.710	20.740	20.770	20.800	20.830	20.860	720
730	20.890	20.920	20.950	20.980	21.010	21.040	21.070	21.100	21.130	21.160	21.190	730
740	21.220	21.250	21.280	21.310	21.340	21.370	21.400	21.430	21.460	21.490	21.520	740
750	21.550	21.580	21.610	21.640	21.670	21.700	21.730	21.760	21.790	21.820	21.850	750

THEMOCLECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS

\* CONVERTED FROM DEGREES CELSIUS (1968)

DEG F

TYPE B THERMOCOUPLES

TEMPERATURES IN DEGREES C (IPTS 1968). REFERENCE JUNCTION AT 0 DEGREES C.

DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
0	0.000	-0.000	-0.000	-0.001	-0.001	-0.001	-0.001	-0.001	-0.002	-0.002	-0.002	0
10	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.003	-0.003	10
20	-0.003	-0.003	-0.003	-0.003	-0.003	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	20
30	-0.002	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001	-0.001	-0.001	-0.001	-0.000	30
40	-0.000	-0.000	-0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.002	0.002	40
50	0.002	0.003	0.003	0.003	0.004	0.004	0.004	0.005	0.005	0.006	0.006	50
60	0.006	0.007	0.007	0.008	0.008	0.008	0.009	0.009	0.010	0.011	0.011	60
70	0.011	0.012	0.012	0.013	0.014	0.014	0.015	0.015	0.016	0.017	0.017	70
80	0.017	0.018	0.019	0.020	0.020	0.021	0.022	0.022	0.023	0.024	0.025	80
90	0.025	0.026	0.026	0.027	0.028	0.029	0.030	0.031	0.031	0.032	0.033	90
100	0.033	0.034	0.035	0.036	0.037	0.038	0.039	0.040	0.041	0.042	0.043	100
110	0.043	0.044	0.045	0.046	0.047	0.048	0.049	0.050	0.051	0.052	0.053	110
120	0.053	0.055	0.056	0.057	0.058	0.059	0.060	0.062	0.063	0.064	0.065	120
130	0.065	0.066	0.068	0.069	0.070	0.071	0.073	0.074	0.075	0.077	0.078	130
140	0.078	0.079	0.081	0.082	0.083	0.085	0.086	0.088	0.089	0.091	0.092	140
150	0.092	0.093	0.095	0.096	0.098	0.099	0.101	0.102	0.104	0.106	0.107	150
160	0.107	0.109	0.110	0.112	0.113	0.115	0.117	0.118	0.120	0.122	0.123	160
170	0.123	0.125	0.127	0.128	0.130	0.132	0.133	0.135	0.137	0.139	0.140	170
180	0.140	0.142	0.144	0.146	0.148	0.149	0.151	0.153	0.155	0.157	0.159	180
190	0.159	0.161	0.163	0.164	0.166	0.168	0.170	0.172	0.174	0.176	0.178	190
200	0.178	0.180	0.182	0.184	0.186	0.188	0.190	0.192	0.194	0.197	0.199	200
210	0.199	0.201	0.203	0.205	0.207	0.209	0.211	0.214	0.216	0.218	0.220	210
220	0.220	0.222	0.225	0.227	0.229	0.231	0.234	0.236	0.238	0.240	0.243	220
230	0.243	0.245	0.247	0.250	0.252	0.254	0.257	0.259	0.262	0.264	0.266	230
240	0.266	0.269	0.271	0.274	0.276	0.279	0.281	0.284	0.286	0.289	0.291	240
250	0.291	0.294	0.296	0.299	0.301	0.304	0.307	0.309	0.312	0.314	0.317	250
260	0.317	0.320	0.322	0.325	0.328	0.330	0.333	0.336	0.338	0.341	0.344	260
270	0.344	0.347	0.349	0.352	0.355	0.358	0.360	0.363	0.366	0.369	0.372	270
280	0.372	0.375	0.377	0.380	0.383	0.386	0.389	0.392	0.395	0.398	0.401	280
290	0.401	0.404	0.406	0.409	0.412	0.415	0.418	0.421	0.424	0.427	0.431	290
300	0.431	0.434	0.437	0.440	0.443	0.446	0.449	0.452	0.455	0.458	0.462	300
310	0.462	0.465	0.468	0.471	0.474	0.477	0.481	0.484	0.487	0.490	0.494	310
320	0.494	0.497	0.500	0.503	0.507	0.510	0.513	0.517	0.520	0.523	0.527	320
330	0.527	0.530	0.533	0.537	0.540	0.544	0.547	0.550	0.554	0.557	0.561	330
340	0.561	0.564	0.568	0.571	0.575	0.578	0.582	0.585	0.589	0.592	0.596	340
350	0.596	0.599	0.603	0.606	0.610	0.614	0.617	0.621	0.625	0.628	0.632	350
360	0.632	0.636	0.639	0.643	0.647	0.650	0.654	0.658	0.661	0.665	0.669	360
370	0.669	0.673	0.677	0.680	0.684	0.688	0.692	0.696	0.699	0.703	0.707	370
380	0.707	0.711	0.715	0.719	0.723	0.727	0.730	0.734	0.738	0.742	0.746	380
390	0.746	0.750	0.754	0.758	0.762	0.766	0.770	0.774	0.778	0.782	0.786	390
400	0.786	0.790	0.794	0.799	0.803	0.807	0.811	0.815	0.819	0.823	0.827	400
410	0.827	0.832	0.836	0.840	0.844	0.848	0.853	0.857	0.861	0.865	0.870	410
420	0.870	0.874	0.878	0.882	0.887	0.891	0.895	0.900	0.904	0.908	0.913	420
430	0.913	0.917	0.921	0.926	0.930	0.935	0.939	0.943	0.948	0.952	0.957	430
440	0.957	0.961	0.966	0.970	0.975	0.979	0.984	0.988	0.993	0.997	1.002	440
450	1.002	1.006	1.011	1.015	1.020	1.025	1.029	1.034	1.039	1.043	1.048	450
460	1.048	1.052	1.057	1.062	1.066	1.071	1.076	1.081	1.085	1.090	1.095	460
470	1.095	1.100	1.104	1.109	1.114	1.119	1.123	1.128	1.133	1.138	1.143	470
480	1.143	1.148	1.152	1.157	1.162	1.167	1.172	1.177	1.182	1.187	1.192	480
490	1.192	1.197	1.202	1.206	1.211	1.216	1.221	1.226	1.231	1.236	1.241	490
500	1.241	1.246	1.252	1.257	1.262	1.267	1.272	1.277	1.282	1.287	1.292	500
510	1.292	1.297	1.303	1.308	1.313	1.318	1.323	1.328	1.334	1.339	1.344	510
520	1.344	1.349	1.354	1.360	1.365	1.370	1.375	1.381	1.386	1.391	1.397	520
530	1.397	1.402	1.407	1.413	1.418	1.423	1.429	1.434	1.439	1.445	1.450	530
540	1.450	1.456	1.461	1.467	1.472	1.477	1.483	1.488	1.494	1.499	1.505	540
550	1.505	1.510	1.516	1.521	1.527	1.532	1.538	1.544	1.549	1.555	1.560	550
560	1.560	1.566	1.571	1.577	1.583	1.588	1.594	1.600	1.605	1.611	1.617	560
570	1.617	1.622	1.628	1.634	1.639	1.645	1.651	1.657	1.662	1.668	1.674	570
580	1.674	1.680	1.685	1.691	1.697	1.703	1.709	1.715	1.720	1.726	1.732	580
590	1.732	1.738	1.744	1.750	1.756	1.762	1.767	1.773	1.779	1.785	1.791	590
600	1.791	1.797	1.803	1.809	1.815	1.821	1.827	1.833	1.839	1.845	1.851	600

TYPE B THERMOCOUPLES

TEMPERATURES IN DEGREES C (POINTS 19689)  
 REFERENCE JUNCTION AT 0 DEGREES C  
 DEB C 0 1 2 3 4 5 6 7 8 9 10 DEB C

THEMOCLECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS

600	1.791	1.797	1.803	1.809	1.815	1.821	1.827	1.833	1.839	1.845	1.851	600
610	1.851	1.857	1.863	1.869	1.875	1.881	1.887	1.893	1.899	1.905	1.911	610
620	1.924	1.929	1.934	1.939	1.944	1.949	1.954	1.959	1.964	1.969	1.974	620
630	1.987	1.991	1.995	1.999	2.003	2.007	2.011	2.015	2.019	2.023	2.027	630
640	2.036	2.040	2.044	2.048	2.052	2.056	2.060	2.064	2.068	2.072	2.076	640
650	2.100	2.104	2.108	2.112	2.116	2.120	2.124	2.128	2.132	2.136	2.140	650
660	2.164	2.168	2.172	2.176	2.180	2.184	2.188	2.192	2.196	2.200	2.204	660
670	2.228	2.232	2.236	2.240	2.244	2.248	2.252	2.256	2.260	2.264	2.268	670
680	2.292	2.296	2.300	2.304	2.308	2.312	2.316	2.320	2.324	2.328	2.332	680
690	2.356	2.360	2.364	2.368	2.372	2.376	2.380	2.384	2.388	2.392	2.396	690
700	2.420	2.424	2.428	2.432	2.436	2.440	2.444	2.448	2.452	2.456	2.460	700
710	2.484	2.488	2.492	2.496	2.500	2.504	2.508	2.512	2.516	2.520	2.524	710
720	2.548	2.552	2.556	2.560	2.564	2.568	2.572	2.576	2.580	2.584	2.588	720
730	2.612	2.616	2.620	2.624	2.628	2.632	2.636	2.640	2.644	2.648	2.652	730
740	2.676	2.680	2.684	2.688	2.692	2.696	2.700	2.704	2.708	2.712	2.716	740
750	2.740	2.744	2.748	2.752	2.756	2.760	2.764	2.768	2.772	2.776	2.780	750
760	2.804	2.808	2.812	2.816	2.820	2.824	2.828	2.832	2.836	2.840	2.844	760
770	2.868	2.872	2.876	2.880	2.884	2.888	2.892	2.896	2.900	2.904	2.908	770
780	2.932	2.936	2.940	2.944	2.948	2.952	2.956	2.960	2.964	2.968	2.972	780
790	2.996	2.999	3.002	3.005	3.008	3.011	3.014	3.017	3.020	3.023	3.026	790
800	3.154	3.157	3.160	3.163	3.166	3.169	3.172	3.175	3.178	3.181	3.184	800
810	3.231	3.234	3.237	3.240	3.243	3.246	3.249	3.252	3.255	3.258	3.261	810
820	3.308	3.311	3.314	3.317	3.320	3.323	3.326	3.329	3.332	3.335	3.338	820
830	3.385	3.388	3.391	3.394	3.397	3.400	3.403	3.406	3.409	3.412	3.415	830
840	3.462	3.465	3.468	3.471	3.474	3.477	3.480	3.483	3.486	3.489	3.492	840
850	3.539	3.542	3.545	3.548	3.551	3.554	3.557	3.560	3.563	3.566	3.569	850
860	3.616	3.619	3.622	3.625	3.628	3.631	3.634	3.637	3.640	3.643	3.646	860
870	3.708	3.711	3.714	3.717	3.720	3.723	3.726	3.729	3.732	3.735	3.738	870
880	3.796	3.799	3.802	3.805	3.808	3.811	3.814	3.817	3.820	3.823	3.826	880
890	3.881	3.884	3.887	3.890	3.893	3.896	3.899	3.902	3.905	3.908	3.911	890
900	3.957	3.960	3.963	3.966	3.969	3.972	3.975	3.978	3.981	3.984	3.987	900
910	4.041	4.044	4.047	4.050	4.053	4.056	4.059	4.062	4.065	4.068	4.071	910
920	4.125	4.128	4.131	4.134	4.137	4.140	4.143	4.146	4.149	4.152	4.155	920
930	4.209	4.212	4.215	4.218	4.221	4.224	4.227	4.230	4.233	4.236	4.239	930
940	4.293	4.296	4.299	4.302	4.305	4.308	4.311	4.314	4.317	4.320	4.323	940
950	4.377	4.380	4.383	4.386	4.389	4.392	4.395	4.398	4.401	4.404	4.407	950
960	4.461	4.464	4.467	4.470	4.473	4.476	4.479	4.482	4.485	4.488	4.491	960
970	4.545	4.548	4.551	4.554	4.557	4.560	4.563	4.566	4.569	4.572	4.575	970
980	4.629	4.632	4.635	4.638	4.641	4.644	4.647	4.650	4.653	4.656	4.659	980
990	4.723	4.726	4.729	4.732	4.735	4.738	4.741	4.744	4.747	4.750	4.753	990
1000	4.833	4.836	4.839	4.842	4.845	4.848	4.851	4.854	4.857	4.860	4.863	1000
1010	4.924	4.927	4.930	4.933	4.936	4.939	4.942	4.945	4.948	4.951	4.954	1010
1020	5.016	5.019	5.022	5.025	5.028	5.031	5.034	5.037	5.040	5.043	5.046	1020
1030	5.109	5.112	5.115	5.118	5.121	5.124	5.127	5.130	5.133	5.136	5.139	1030
1040	5.202	5.205	5.208	5.211	5.214	5.217	5.220	5.223	5.226	5.229	5.232	1040
1050	5.297	5.300	5.303	5.306	5.309	5.312	5.315	5.318	5.321	5.324	5.327	1050
1060	5.391	5.394	5.397	5.400	5.403	5.406	5.409	5.412	5.415	5.418	5.421	1060
1070	5.487	5.490	5.493	5.496	5.499	5.502	5.505	5.508	5.511	5.514	5.517	1070
1080	5.583	5.586	5.589	5.592	5.595	5.598	5.601	5.604	5.607	5.610	5.613	1080
1090	5.680	5.683	5.686	5.689	5.692	5.695	5.698	5.701	5.704	5.707	5.710	1090
1100	5.777	5.780	5.783	5.786	5.789	5.792	5.795	5.798	5.801	5.804	5.807	1100
1110	5.875	5.878	5.881	5.884	5.887	5.890	5.893	5.896	5.899	5.902	5.905	1110
1120	5.973	5.976	5.979	5.982	5.985	5.988	5.991	5.994	5.997	6.000	6.003	1120
1130	6.073	6.076	6.079	6.082	6.085	6.088	6.091	6.094	6.097	6.100	6.103	1130
1140	6.172	6.175	6.178	6.181	6.184	6.187	6.190	6.193	6.196	6.199	6.202	1140
1150	6.272	6.275	6.278	6.281	6.284	6.287	6.290	6.293	6.296	6.299	6.302	1150
1160	6.374	6.377	6.380	6.383	6.386	6.389	6.392	6.395	6.398	6.401	6.404	1160
1170	6.455	6.458	6.461	6.464	6.467	6.470	6.473	6.476	6.479	6.482	6.485	1170
1180	6.571	6.574	6.577	6.580	6.583	6.586	6.589	6.592	6.595	6.598	6.601	1180
1190	6.680	6.683	6.686	6.689	6.692	6.695	6.698	6.701	6.704	6.707	6.710	1190
1200	6.783	6.786	6.789	6.792	6.795	6.798	6.801	6.804	6.807	6.810	6.813	1200

TYPE B THERMOCOUPLES

TEMPERATURES IN DEGREES C IPTS 19681.

REFERENCE JUNCTION AT 0 DEGREES C.

DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
1.200	6.782	6.794	6.806	6.814	6.825	6.835	6.846	6.856	6.866	6.877	6.887	1.200
1.210	6.887	6.898	6.908	6.918	6.929	6.939	6.950	6.960	6.971	6.981	6.991	1.210
1.220	6.991	7.002	7.012	7.023	7.033	7.044	7.054	7.065	7.075	7.086	7.096	1.220
1.230	7.096	7.107	7.117	7.128	7.138	7.149	7.159	7.170	7.181	7.191	7.202	1.230
1.240	7.202	7.212	7.223	7.233	7.244	7.255	7.265	7.276	7.286	7.297	7.308	1.240
1.250	7.308	7.318	7.329	7.339	7.350	7.361	7.371	7.382	7.393	7.403	7.414	1.250
1.260	7.414	7.425	7.435	7.446	7.457	7.467	7.478	7.489	7.500	7.510	7.521	1.260
1.270	7.521	7.532	7.542	7.553	7.564	7.575	7.585	7.596	7.607	7.618	7.628	1.270
1.280	7.628	7.639	7.650	7.661	7.671	7.682	7.693	7.704	7.715	7.725	7.736	1.280
1.290	7.736	7.747	7.758	7.769	7.780	7.790	7.801	7.812	7.823	7.834	7.845	1.290
1.300	7.845	7.855	7.866	7.877	7.888	7.899	7.910	7.921	7.932	7.943	7.953	1.300
1.310	7.953	7.964	7.975	7.986	7.997	8.008	8.019	8.030	8.041	8.052	8.063	1.310
1.320	8.063	8.074	8.085	8.096	8.107	8.118	8.128	8.139	8.150	8.161	8.172	1.320
1.330	8.172	8.183	8.194	8.205	8.216	8.227	8.238	8.249	8.261	8.272	8.283	1.330
1.340	8.283	8.294	8.305	8.316	8.327	8.338	8.349	8.360	8.371	8.382	8.393	1.340
1.350	8.393	8.404	8.415	8.426	8.437	8.449	8.460	8.471	8.482	8.493	8.504	1.350
1.360	8.504	8.515	8.526	8.538	8.549	8.560	8.571	8.582	8.593	8.604	8.616	1.360
1.370	8.616	8.627	8.638	8.649	8.660	8.671	8.683	8.694	8.705	8.716	8.727	1.370
1.380	8.727	8.739	8.750	8.761	8.772	8.783	8.795	8.806	8.817	8.828	8.839	1.380
1.390	8.839	8.851	8.862	8.873	8.884	8.896	8.907	8.918	8.929	8.941	8.952	1.390
1.400	8.952	8.963	8.974	8.986	8.997	9.008	9.020	9.031	9.042	9.053	9.065	1.400
1.410	9.065	9.076	9.087	9.099	9.110	9.121	9.133	9.144	9.155	9.167	9.178	1.410
1.420	9.178	9.189	9.201	9.212	9.223	9.235	9.246	9.257	9.269	9.280	9.291	1.420
1.430	9.291	9.303	9.314	9.326	9.337	9.348	9.360	9.371	9.382	9.394	9.405	1.430
1.440	9.405	9.417	9.428	9.439	9.451	9.462	9.474	9.485	9.497	9.508	9.519	1.440
1.450	9.519	9.531	9.542	9.554	9.565	9.577	9.588	9.599	9.611	9.622	9.634	1.450
1.460	9.634	9.645	9.657	9.668	9.680	9.691	9.703	9.714	9.726	9.737	9.748	1.460
1.470	9.748	9.760	9.771	9.783	9.794	9.806	9.817	9.829	9.840	9.852	9.863	1.470
1.480	9.863	9.875	9.886	9.898	9.909	9.921	9.933	9.944	9.956	9.967	9.979	1.480
1.490	9.979	9.990	10.002	10.013	10.025	10.036	10.048	10.059	10.071	10.082	10.094	1.490
1.500	10.094	10.106	10.117	10.129	10.140	10.152	10.163	10.175	10.187	10.198	10.210	1.500
1.510	10.210	10.221	10.233	10.244	10.256	10.268	10.279	10.291	10.302	10.314	10.325	1.510
1.520	10.325	10.337	10.349	10.360	10.372	10.383	10.395	10.407	10.418	10.430	10.441	1.520
1.530	10.441	10.453	10.465	10.476	10.488	10.500	10.511	10.523	10.534	10.546	10.558	1.530
1.540	10.558	10.569	10.581	10.593	10.604	10.616	10.627	10.639	10.651	10.662	10.674	1.540
1.550	10.674	10.686	10.697	10.709	10.721	10.732	10.744	10.756	10.767	10.779	10.790	1.550
1.560	10.790	10.802	10.814	10.825	10.837	10.849	10.860	10.872	10.884	10.895	10.907	1.560
1.570	10.907	10.919	10.930	10.942	10.954	10.965	10.977	10.989	11.000	11.012	11.024	1.570
1.580	11.024	11.035	11.047	11.059	11.070	11.082	11.094	11.105	11.117	11.129	11.141	1.580
1.590	11.141	11.152	11.164	11.176	11.187	11.199	11.211	11.222	11.234	11.246	11.257	1.590
1.600	11.257	11.269	11.281	11.292	11.304	11.316	11.328	11.339	11.351	11.363	11.374	1.600
1.610	11.374	11.386	11.398	11.409	11.421	11.433	11.444	11.456	11.468	11.480	11.491	1.610
1.620	11.491	11.503	11.515	11.526	11.538	11.550	11.561	11.573	11.585	11.597	11.608	1.620
1.630	11.608	11.620	11.632	11.643	11.655	11.667	11.678	11.690	11.702	11.714	11.725	1.630
1.640	11.725	11.737	11.749	11.760	11.772	11.784	11.795	11.807	11.819	11.830	11.842	1.640
1.650	11.842	11.854	11.866	11.877	11.889	11.901	11.912	11.924	11.936	11.947	11.959	1.650
1.660	11.959	11.971	11.983	11.994	12.006	12.018	12.029	12.041	12.053	12.064	12.076	1.660
1.670	12.076	12.088	12.099	12.111	12.123	12.134	12.146	12.158	12.170	12.181	12.193	1.670
1.680	12.193	12.205	12.216	12.228	12.240	12.251	12.263	12.275	12.286	12.298	12.310	1.680
1.690	12.310	12.321	12.333	12.345	12.356	12.368	12.380	12.391	12.403	12.415	12.426	1.690
1.700	12.426	12.438	12.450	12.461	12.473	12.485	12.496	12.508	12.520	12.531	12.543	1.700
1.710	12.543	12.555	12.566	12.578	12.590	12.601	12.613	12.624	12.636	12.648	12.659	1.710
1.720	12.659	12.671	12.683	12.694	12.706	12.718	12.729	12.741	12.752	12.764	12.776	1.720
1.730	12.776	12.787	12.799	12.811	12.822	12.834	12.845	12.857	12.869	12.880	12.892	1.730
1.740	12.892	12.903	12.915	12.927	12.938	12.950	12.961	12.973	12.985	12.996	13.008	1.740
1.750	13.008	13.019	13.031	13.043	13.054	13.066	13.077	13.089	13.100	13.112	13.124	1.750
1.760	13.124	13.135	13.147	13.158	13.170	13.181	13.193	13.204	13.216	13.228	13.239	1.760
1.770	13.239	13.251	13.262	13.274	13.285	13.297	13.308	13.320	13.331	13.343	13.354	1.770
1.780	13.354	13.366	13.378	13.389	13.401	13.412	13.424	13.435	13.447	13.458	13.470	1.780
1.790	13.470	13.481	13.493	13.504	13.516	13.527	13.539	13.550	13.562	13.573	13.585	1.790
1.800	13.585	13.596	13.607	13.619	13.630	13.642	13.653	13.665	13.676	13.688	13.699	1.800
1.810	13.699	13.711	13.722	13.733	13.745	13.756	13.768	13.779	13.791	13.802	13.814	1.810
1.820	13.814											1.820
DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C

TYPE E THERMOCOUPLES

TEMPERATURES IN DEGREES C ( IPTS 1968 ) .

REFERENCE JUNCTION AT 0 DEGREES C

DEG C 0 1 2 3 4 5 6 7 8 9 10 DEG C

DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
270	-9.835	-9.797	-9.802	-9.808	-9.813	-9.817	-9.821	-9.825	-9.828	-9.831	-9.833	-270
260	-9.797	-9.759	-9.764	-9.769	-9.773	-9.776	-9.779	-9.782	-9.784	-9.786	-9.787	-260
250	-9.759	-9.721	-9.726	-9.730	-9.733	-9.735	-9.737	-9.739	-9.740	-9.741	-9.742	-250
240	-9.721	-9.683	-9.688	-9.691	-9.693	-9.694	-9.695	-9.696	-9.696	-9.697	-9.697	-240
230	-9.683	-9.645	-9.650	-9.653	-9.655	-9.656	-9.657	-9.657	-9.657	-9.657	-9.657	-230
220	-9.645	-9.607	-9.612	-9.615	-9.617	-9.618	-9.618	-9.618	-9.618	-9.618	-9.618	-220
210	-9.607	-9.569	-9.574	-9.577	-9.578	-9.579	-9.579	-9.579	-9.579	-9.579	-9.579	-210
200	-9.569	-9.531	-9.536	-9.539	-9.540	-9.541	-9.541	-9.541	-9.541	-9.541	-9.541	-200
190	-9.531	-9.493	-9.498	-9.501	-9.502	-9.502	-9.502	-9.502	-9.502	-9.502	-9.502	-190
180	-9.493	-9.455	-9.460	-9.463	-9.464	-9.464	-9.464	-9.464	-9.464	-9.464	-9.464	-180
170	-9.455	-9.417	-9.422	-9.425	-9.426	-9.426	-9.426	-9.426	-9.426	-9.426	-9.426	-170
160	-9.417	-9.379	-9.384	-9.387	-9.388	-9.388	-9.388	-9.388	-9.388	-9.388	-9.388	-160
150	-9.379	-9.341	-9.346	-9.349	-9.350	-9.350	-9.350	-9.350	-9.350	-9.350	-9.350	-150
140	-9.341	-9.303	-9.308	-9.311	-9.312	-9.312	-9.312	-9.312	-9.312	-9.312	-9.312	-140
130	-9.303	-9.265	-9.270	-9.273	-9.274	-9.274	-9.274	-9.274	-9.274	-9.274	-9.274	-130
120	-9.265	-9.227	-9.232	-9.235	-9.236	-9.236	-9.236	-9.236	-9.236	-9.236	-9.236	-120
110	-9.227	-9.189	-9.194	-9.197	-9.198	-9.198	-9.198	-9.198	-9.198	-9.198	-9.198	-110
100	-9.189	-9.151	-9.156	-9.159	-9.160	-9.160	-9.160	-9.160	-9.160	-9.160	-9.160	-100
90	-9.151	-9.113	-9.118	-9.121	-9.122	-9.122	-9.122	-9.122	-9.122	-9.122	-9.122	-90
80	-9.113	-9.075	-9.080	-9.083	-9.084	-9.084	-9.084	-9.084	-9.084	-9.084	-9.084	-80
70	-9.075	-9.037	-9.042	-9.045	-9.046	-9.046	-9.046	-9.046	-9.046	-9.046	-9.046	-70
60	-9.037	-9.000	-9.005	-9.008	-9.009	-9.009	-9.009	-9.009	-9.009	-9.009	-9.009	-60
50	-9.000	-8.962	-8.967	-8.970	-8.971	-8.971	-8.971	-8.971	-8.971	-8.971	-8.971	-50
40	-8.962	-8.924	-8.929	-8.932	-8.933	-8.933	-8.933	-8.933	-8.933	-8.933	-8.933	-40
30	-8.924	-8.886	-8.891	-8.894	-8.895	-8.895	-8.895	-8.895	-8.895	-8.895	-8.895	-30
20	-8.886	-8.848	-8.853	-8.856	-8.857	-8.857	-8.857	-8.857	-8.857	-8.857	-8.857	-20
10	-8.848	-8.810	-8.815	-8.818	-8.819	-8.819	-8.819	-8.819	-8.819	-8.819	-8.819	-10
0	-8.810	-8.772	-8.777	-8.780	-8.781	-8.781	-8.781	-8.781	-8.781	-8.781	-8.781	0
10	0.591	0.651	0.711	0.770	0.830	0.890	0.950	1.011	1.071	1.131	1.191	10
20	1.192	1.252	1.313	1.373	1.434	1.495	1.556	1.617	1.678	1.739	1.801	20
30	1.801	1.862	1.924	1.985	2.047	2.109	2.171	2.233	2.295	2.357	2.419	30
40	2.419	2.482	2.544	2.607	2.669	2.732	2.795	2.858	2.921	2.984	3.047	40
50	3.047	3.110	3.173	3.237	3.300	3.364	3.428	3.491	3.555	3.619	3.683	50
60	3.683	3.748	3.812	3.876	3.941	4.005	4.070	4.134	4.199	4.264	4.329	60
70	4.329	4.394	4.458	4.523	4.588	4.653	4.718	4.783	4.848	4.913	4.978	70
80	4.978	5.043	5.108	5.173	5.238	5.303	5.368	5.433	5.498	5.563	5.628	80
90	5.628	5.693	5.758	5.823	5.888	5.953	6.018	6.083	6.148	6.213	6.278	90
100	6.278	6.343	6.408	6.473	6.538	6.603	6.668	6.733	6.798	6.863	6.928	100
110	6.928	7.064	7.201	7.338	7.475	7.612	7.749	7.886	8.023	8.160	8.297	110
120	8.297	8.483	8.670	8.857	9.044	9.231	9.418	9.605	9.792	9.979	10.166	120
130	10.166	10.396	10.626	10.856	11.086	11.316	11.546	11.776	12.006	12.236	12.466	130
140	12.466	12.722	13.000	13.278	13.556	13.834	14.112	14.390	14.668	14.946	15.224	140
150	15.224	15.542	15.860	16.178	16.496	16.814	17.132	17.450	17.768	18.086	18.404	150
160	18.404	18.762	19.120	19.478	19.836	20.194	20.552	20.910	21.268	21.626	21.984	160
170	21.984	22.382	22.780	23.178	23.576	23.974	24.372	24.770	25.168	25.566	25.964	170
180	25.964	26.412	26.860	27.308	27.756	28.204	28.652	29.100	29.548	29.996	30.444	180
190	30.444	30.952	31.460	31.968	32.476	32.984	33.492	34.000	34.508	35.016	35.524	190
200	35.524	36.092	36.660	37.228	37.796	38.364	38.932	39.500	40.068	40.636	41.204	200
210	41.204	41.832	42.460	43.088	43.716	44.344	44.972	45.600	46.228	46.856	47.484	210
220	47.484	48.162	48.840	49.518	50.196	50.874	51.552	52.230	52.908	53.586	54.264	220
230	54.264	54.992	55.720	56.448	57.176	57.904	58.632	59.360	60.088	60.816	61.544	230
240	61.544	62.322	63.100	63.878	64.656	65.434	66.212	66.990	67.768	68.546	69.324	240
250	69.324	70.152	70.980	71.808	72.636	73.464	74.292	75.120	75.948	76.776	77.604	250
260	77.604	78.472	79.340	80.208	81.076	81.944	82.812	83.680	84.548	85.416	86.284	260
270	86.284	87.192	88.100	89.008	89.916	90.824	91.732	92.640	93.548	94.456	95.364	270
280	95.364	96.322	97.280	98.238	99.196	100.154	101.112	102.070	103.028	103.986	104.944	280
290	104.944	105.952	106.960	107.968	108.976	109.984	110.992	111.999	113.007	114.015	115.023	290
300	115.023	116.081	117.139	118.197	119.255	120.313	121.371	122.429	123.487	124.545	125.603	300
310	125.603	126.711	127.819	128.927	130.035	131.143	132.251	133.359	134.467	135.575	136.683	310
320	136.683	137.841	139.000	140.158	141.316	142.474	143.632	144.790	145.948	147.106	148.264	320
330	148.264	149.472	150.680	151.888	153.096	154.304	155.512	156.720	157.928	159.136	160.344	330
340	160.344	161.602	162.860	164.118	165.376	166.634	167.892	169.150	170.408	171.666	172.924	340

TYPE E THERMOCOUPLES												
TEMPERATURES IN DEGREES C (IPITS 1968).												
REFERENCE JUNCTION AT 0 DEGREES C.												
DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
350	24.961	25.041	25.120	25.199	25.278	25.357	25.437	25.516	25.595	25.675	25.754	350
360	25.754	25.833	25.913	25.992	26.072	26.151	26.230	26.310	26.389	26.469	26.549	360
370	26.549	26.628	26.708	26.787	26.867	26.947	27.026	27.106	27.185	27.265	27.345	370
380	27.345	27.425	27.504	27.584	27.664	27.744	27.824	27.903	27.983	28.063	28.143	380
390	28.143	28.223	28.303	28.383	28.463	28.543	28.623	28.703	28.783	28.863	28.943	390
400	28.943	29.023	29.103	29.183	29.263	29.343	29.423	29.503	29.584	29.664	29.744	400
410	29.744	29.824	29.904	29.984	30.065	30.145	30.225	30.305	30.386	30.466	30.546	410
420	30.546	30.627	30.707	30.787	30.868	30.948	31.028	31.109	31.189	31.270	31.350	420
430	31.350	31.430	31.511	31.591	31.672	31.752	31.833	31.913	31.994	32.074	32.155	430
440	32.155	32.235	32.316	32.396	32.477	32.557	32.638	32.719	32.799	32.880	32.960	440
450	32.960	33.041	33.122	33.202	33.283	33.364	33.444	33.525	33.605	33.686	33.767	450
460	33.767	33.848	33.928	34.009	34.090	34.170	34.251	34.332	34.413	34.493	34.574	460
470	34.574	34.655	34.736	34.816	34.897	34.978	35.059	35.140	35.220	35.301	35.382	470
480	35.382	35.463	35.544	35.624	35.705	35.786	35.867	35.948	36.029	36.109	36.190	480
490	36.190	36.271	36.352	36.433	36.514	36.595	36.675	36.756	36.837	36.918	36.999	490
500	36.999	37.080	37.161	37.242	37.323	37.403	37.484	37.565	37.646	37.727	37.808	500
510	37.808	37.889	37.970	38.051	38.132	38.213	38.293	38.374	38.455	38.536	38.617	510
520	38.617	38.698	38.779	38.860	38.941	39.022	39.103	39.184	39.264	39.345	39.426	520
530	39.426	39.507	39.588	39.669	39.750	39.831	39.912	39.993	40.074	40.155	40.236	530
540	40.236	40.316	40.397	40.478	40.559	40.640	40.721	40.802	40.883	40.964	41.045	540
550	41.045	41.125	41.206	41.287	41.368	41.449	41.530	41.611	41.692	41.773	41.853	550
560	41.853	41.934	42.015	42.096	42.177	42.258	42.339	42.419	42.500	42.581	42.662	560
570	42.662	42.743	42.824	42.904	42.985	43.066	43.147	43.228	43.308	43.389	43.470	570
580	43.470	43.551	43.632	43.712	43.793	43.874	43.955	44.035	44.116	44.197	44.278	580
590	44.278	44.358	44.439	44.520	44.601	44.681	44.762	44.843	44.923	45.004	45.085	590
600	45.085	45.165	45.246	45.327	45.407	45.488	45.569	45.649	45.730	45.811	45.891	600
610	45.891	45.972	46.052	46.133	46.213	46.294	46.375	46.455	46.536	46.616	46.697	610
620	46.697	46.777	46.858	46.938	47.019	47.099	47.180	47.260	47.341	47.421	47.502	620
630	47.502	47.582	47.663	47.743	47.824	47.904	47.984	48.065	48.145	48.226	48.306	630
640	48.306	48.386	48.467	48.547	48.627	48.708	48.788	48.868	48.949	49.029	49.109	640
650	49.109	49.189	49.270	49.350	49.430	49.510	49.591	49.671	49.751	49.831	49.911	650
660	49.911	49.992	50.072	50.152	50.232	50.312	50.392	50.472	50.553	50.633	50.713	660
670	50.713	50.793	50.873	50.953	51.033	51.113	51.193	51.273	51.353	51.433	51.513	670
680	51.513	51.593	51.673	51.753	51.833	51.913	51.993	52.073	52.152	52.232	52.312	680
690	52.312	52.392	52.472	52.552	52.632	52.711	52.791	52.871	52.951	53.031	53.110	690
700	53.110	53.190	53.270	53.350	53.429	53.509	53.589	53.668	53.748	53.828	53.907	700
710	53.907	53.987	54.066	54.146	54.226	54.305	54.385	54.464	54.544	54.623	54.703	710
720	54.703	54.782	54.862	54.941	55.021	55.100	55.180	55.259	55.339	55.418	55.498	720
730	55.498	55.577	55.656	55.736	55.815	55.894	55.974	56.053	56.132	56.212	56.291	730
740	56.291	56.370	56.449	56.529	56.608	56.687	56.766	56.845	56.924	57.004	57.083	740
750	57.083	57.162	57.241	57.320	57.399	57.478	57.557	57.636	57.715	57.794	57.873	750
760	57.873	57.952	58.031	58.110	58.189	58.268	58.347	58.426	58.505	58.584	58.663	760
770	58.663	58.742	58.820	58.899	58.978	59.057	59.136	59.214	59.293	59.372	59.451	770
780	59.451	59.529	59.608	59.687	59.765	59.844	59.923	60.001	60.080	60.159	60.237	780
790	60.237	60.316	60.394	60.473	60.551	60.630	60.708	60.787	60.865	60.944	61.022	790
800	61.022	61.101	61.179	61.258	61.336	61.414	61.493	61.571	61.649	61.728	61.806	800
810	61.806	61.884	61.962	62.041	62.119	62.197	62.275	62.353	62.432	62.510	62.588	810
820	62.588	62.666	62.744	62.822	62.900	62.978	63.056	63.134	63.212	63.290	63.368	820
830	63.368	63.446	63.524	63.602	63.680	63.758	63.836	63.914	63.992	64.069	64.147	830
840	64.147	64.225	64.303	64.380	64.458	64.536	64.614	64.691	64.769	64.847	64.924	840
850	64.924	65.002	65.080	65.157	65.235	65.312	65.390	65.467	65.545	65.622	65.700	850
860	65.700	65.777	65.855	65.932	66.009	66.087	66.164	66.241	66.319	66.396	66.473	860
870	66.473	66.551	66.628	66.705	66.782	66.859	66.937	67.014	67.091	67.168	67.245	870
880	67.245	67.322	67.399	67.476	67.553	67.630	67.707	67.784	67.861	67.938	68.015	880
890	68.015	68.092	68.169	68.246	68.323	68.399	68.476	68.553	68.630	68.706	68.783	890
900	68.783	68.860	68.936	69.013	69.090	69.166	69.243	69.320	69.396	69.473	69.549	900
910	69.549	69.626	69.702	69.779	69.855	69.931	70.008	70.084	70.161	70.237	70.313	910
920	70.313	70.390	70.466	70.542	70.618	70.694	70.771	70.847	70.923	70.999	71.075	920
930	71.075	71.151	71.227	71.304	71.380	71.456	71.532	71.608	71.683	71.759	71.835	930
940	71.835	71.911	71.987	72.063	72.139	72.215	72.290	72.366	72.442	72.518	72.593	940
950	72.593	72.669	72.745	72.820	72.896	72.972	73.047	73.123	73.199	73.274	73.350	950
960	73.350	73.425	73.501	73.576	73.652	73.727	73.802	73.878	73.953	74.029	74.104	960
970	74.104	74.179	74.255	74.330	74.405	74.480	74.556	74.631	74.706	74.781	74.857	970
980	74.857	74.932	75.007	75.082	75.157	75.232	75.307	75.382	75.458	75.533	75.608	980
990	75.608	75.683	75.758	75.833	75.908	75.983	76.058	76.133	76.208	76.283	76.358	990
1,000	76.358											1,000

TYPE J THERMOCOUPLES

TEMPERATURES IN DEGREES C (PTS 1968) .

REFERENCE JUNCTION AT 0 DEGREES C

DEG C 0 1 2 3 4 5 6 7 8 9 10 DEG C

THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS

DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
-210	-8.096	-7.912	-7.936	-7.955	-7.976	-7.996	-8.017	-8.037	-8.057	-8.076	-8.096	-210
-200	-7.890	-7.707	-7.731	-7.755	-7.778	-7.801	-7.824	-7.846	-7.868	-7.890	-200	
-190	-7.659	-7.483	-7.508	-7.533	-7.558	-7.584	-7.609	-7.634	-7.659	-7.684	-190	
-180	-7.402	-7.229	-7.255	-7.281	-7.308	-7.334	-7.361	-7.388	-7.415	-7.442	-180	
-170	-7.122	-6.951	-6.980	-7.009	-7.038	-7.067	-7.097	-7.127	-7.157	-7.187	-170	
-160	-6.821	-6.652	-6.683	-6.714	-6.744	-6.774	-6.804	-6.834	-6.864	-6.894	-160	
-150	-6.499	-6.332	-6.365	-6.398	-6.431	-6.464	-6.497	-6.530	-6.563	-6.596	-150	
-140	-6.159	-5.994	-6.029	-6.063	-6.097	-6.131	-6.165	-6.199	-6.233	-6.267	-140	
-130	-5.801	-5.637	-5.674	-5.710	-5.746	-5.782	-5.818	-5.854	-5.890	-5.926	-130	
-120	-5.426	-5.264	-5.302	-5.340	-5.378	-5.415	-5.453	-5.491	-5.528	-5.566	-120	
-110	-5.036	-4.876	-4.915	-4.954	-4.993	-5.032	-5.071	-5.110	-5.149	-5.188	-110	
-100	-4.632	-4.473	-4.514	-4.555	-4.596	-4.637	-4.678	-4.719	-4.760	-4.801	-100	
-90	-4.215	-4.057	-4.099	-4.141	-4.183	-4.225	-4.267	-4.309	-4.351	-4.393	-90	
-80	-3.785	-3.628	-3.672	-3.715	-3.758	-3.801	-3.844	-3.887	-3.930	-3.973	-80	
-70	-3.344	-3.188	-3.233	-3.277	-3.321	-3.365	-3.409	-3.453	-3.497	-3.541	-70	
-60	-2.892	-2.738	-2.784	-2.829	-2.874	-2.919	-2.964	-3.009	-3.054	-3.099	-60	
-50	-2.431	-2.278	-2.324	-2.370	-2.416	-2.462	-2.508	-2.554	-2.600	-2.646	-50	
-40	-1.960	-1.808	-1.855	-1.902	-1.949	-2.000	-2.046	-2.093	-2.140	-2.187	-40	
-30	-1.481	-1.330	-1.379	-1.428	-1.477	-1.526	-1.575	-1.624	-1.673	-1.722	-30	
-20	-1.095	-0.945	-0.995	-1.045	-1.095	-1.145	-1.195	-1.245	-1.295	-1.345	-20	
-10	-0.501	-0.352	-0.403	-0.454	-0.505	-0.556	-0.607	-0.658	-0.709	-0.760	-10	
0	0.000	0.050	0.101	0.151	0.202	0.253	0.303	0.354	0.405	0.456	0	
10	0.507	0.558	0.609	0.660	0.711	0.762	0.813	0.864	0.915	0.966	10	
20	1.019	1.070	1.122	1.174	1.227	1.279	1.331	1.383	1.435	1.487	20	
30	1.586	1.638	1.691	1.744	1.797	1.850	1.903	1.956	2.009	2.062	30	
40	2.058	2.111	2.165	2.218	2.271	2.324	2.377	2.430	2.483	2.536	40	
50	2.585	2.638	2.691	2.744	2.797	2.850	2.903	2.956	3.009	3.062	50	
60	3.115	3.168	3.221	3.274	3.327	3.380	3.433	3.486	3.539	3.592	60	
70	3.649	3.702	3.755	3.808	3.861	3.914	3.967	4.020	4.073	4.126	70	
80	4.186	4.239	4.292	4.345	4.398	4.451	4.504	4.557	4.610	4.663	80	
90	4.725	4.780	4.834	4.888	4.942	4.996	5.050	5.104	5.158	5.212	90	
100	5.268	5.322	5.376	5.431	5.485	5.540	5.594	5.649	5.703	5.758	100	
110	5.812	5.867	5.921	5.976	6.031	6.085	6.140	6.194	6.249	6.303	110	
120	6.359	6.414	6.468	6.523	6.578	6.633	6.688	6.742	6.797	6.852	120	
130	6.907	6.962	7.017	7.072	7.127	7.182	7.237	7.292	7.347	7.402	130	
140	7.457	7.512	7.567	7.622	7.677	7.732	7.787	7.842	7.897	7.952	140	
150	8.008	8.063	8.118	8.174	8.229	8.284	8.339	8.394	8.449	8.504	150	
160	8.560	8.615	8.671	8.726	8.781	8.837	8.892	8.947	9.002	9.057	160	
170	9.113	9.169	9.224	9.279	9.335	9.390	9.446	9.501	9.556	9.611	170	
180	9.667	9.723	9.778	9.834	9.889	9.944	10.000	10.055	10.111	10.166	180	
190	10.222	10.277	10.333	10.388	10.444	10.499	10.555	10.610	10.666	10.721	190	
200	10.777	10.832	10.888	10.943	10.999	11.054	11.110	11.165	11.221	11.276	200	
210	11.332	11.387	11.443	11.498	11.554	11.609	11.665	11.720	11.776	11.831	210	
220	11.887	11.943	11.998	12.054	12.109	12.165	12.220	12.276	12.331	12.387	220	
230	12.442	12.498	12.553	12.609	12.664	12.720	12.776	12.831	12.887	12.942	230	
240	12.998	13.053	13.109	13.164	13.220	13.275	13.331	13.386	13.442	13.497	240	
250	13.553	13.608	13.664	13.719	13.775	13.830	13.886	13.941	13.997	14.052	250	
260	14.108	14.163	14.219	14.274	14.330	14.385	14.441	14.496	14.552	14.607	260	
270	14.663	14.718	14.774	14.829	14.885	14.940	14.995	15.051	15.106	15.162	270	
280	15.217	15.273	15.328	15.383	15.439	15.494	15.550	15.605	15.661	15.716	280	
290	15.771	15.827	15.882	15.938	15.993	16.048	16.104	16.159	16.214	16.270	290	
300	16.325	16.380	16.436	16.491	16.547	16.602	16.657	16.713	16.768	16.823	300	
310	16.879	16.934	16.989	17.044	17.100	17.155	17.210	17.266	17.321	17.376	310	
320	17.432	17.487	17.542	17.597	17.653	17.708	17.763	17.818	17.874	17.929	320	
330	17.984	18.039	18.095	18.150	18.205	18.260	18.316	18.371	18.426	18.481	330	
340	18.537	18.592	18.647	18.702	18.757	18.813	18.868	18.923	18.978	19.033	340	
350	19.089	19.144	19.199	19.254	19.309	19.364	19.420	19.475	19.530	19.585	350	
360	19.640	19.695	19.751	19.806	19.861	19.916	19.971	20.026	20.081	20.137	360	
370	20.192	20.247	20.302	20.357	20.412	20.467	20.523	20.578	20.633	20.688	370	
380	20.743	20.798	20.853	20.909	20.964	21.019	21.074	21.129	21.184	21.239	380	
390	21.295	21.350	21.405	21.460	21.515	21.570	21.625	21.680	21.735	21.791	390	



TYPE J THERMOCOUPLES †												
TEMPERATURES IN DEGREES C (IPITS 1968) †												REFERENCE JUNCTION AT 0 DEGREES C
DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
400	21.846	21.901	21.956	22.011	22.066	22.122	22.177	22.232	22.287	22.342	22.397	400
410	22.397	22.453	22.508	22.563	22.618	22.673	22.728	22.784	22.839	22.894	22.949	410
420	22.949	23.004	23.060	23.115	23.170	23.225	23.280	23.336	23.391	23.446	23.501	420
430	23.501	23.556	23.612	23.667	23.722	23.777	23.833	23.888	23.943	23.999	24.054	430
440	24.054	24.109	24.164	24.220	24.275	24.330	24.386	24.441	24.496	24.552	24.607	440
450	24.607	24.662	24.718	24.773	24.829	24.884	24.939	24.995	25.050	25.106	25.161	450
460	25.161	25.217	25.272	25.327	25.383	25.438	25.494	25.549	25.605	25.661	25.716	460
470	25.716	25.772	25.827	25.883	25.938	25.994	26.050	26.105	26.161	26.216	26.272	470
480	26.272	26.328	26.383	26.439	26.495	26.551	26.606	26.662	26.718	26.774	26.829	480
490	26.829	26.885	26.941	26.997	27.053	27.109	27.165	27.220	27.276	27.332	27.388	490
500	27.388	27.444	27.500	27.556	27.612	27.668	27.724	27.780	27.836	27.893	27.949	500
510	27.949	28.005	28.061	28.117	28.173	28.230	28.286	28.342	28.398	28.455	28.511	510
520	28.511	28.567	28.624	28.680	28.736	28.793	28.849	28.906	28.962	29.019	29.075	520
530	29.075	29.132	29.188	29.245	29.301	29.358	29.415	29.471	29.528	29.585	29.642	530
540	29.642	29.698	29.755	29.812	29.869	29.926	29.983	30.039	30.096	30.153	30.210	540
550	30.210	30.267	30.324	30.381	30.439	30.496	30.553	30.610	30.667	30.724	30.782	550
560	30.782	30.839	30.896	30.954	31.011	31.068	31.126	31.183	31.241	31.298	31.356	560
570	31.356	31.413	31.471	31.528	31.586	31.644	31.702	31.759	31.817	31.875	31.933	570
580	31.933	31.991	32.048	32.106	32.164	32.222	32.280	32.338	32.396	32.455	32.513	580
590	32.513	32.571	32.629	32.687	32.746	32.804	32.862	32.921	32.979	33.038	33.096	590
600	33.096	33.155	33.213	33.272	33.330	33.389	33.448	33.506	33.565	33.624	33.683	600
610	33.683	33.742	33.800	33.859	33.918	33.977	34.036	34.095	34.155	34.214	34.273	610
620	34.273	34.332	34.391	34.451	34.510	34.569	34.629	34.688	34.748	34.807	34.867	620
630	34.867	34.926	34.986	35.046	35.105	35.165	35.225	35.285	35.344	35.404	35.464	630
640	35.464	35.524	35.584	35.644	35.704	35.764	35.825	35.885	35.945	36.005	36.066	640
650	36.066	36.126	36.186	36.247	36.307	36.368	36.428	36.489	36.549	36.610	36.671	650
660	36.671	36.732	36.792	36.853	36.914	36.975	37.036	37.097	37.158	37.219	37.280	660
670	37.280	37.341	37.402	37.463	37.525	37.586	37.647	37.709	37.770	37.831	37.893	670
680	37.893	37.954	38.016	38.078	38.139	38.201	38.262	38.324	38.386	38.448	38.510	680
690	38.510	38.572	38.633	38.695	38.757	38.819	38.882	38.944	39.006	39.068	39.130	690
700	39.130	39.192	39.255	39.317	39.379	39.442	39.504	39.567	39.629	39.692	39.754	700
710	39.754	39.817	39.880	39.942	40.005	40.068	40.131	40.193	40.256	40.319	40.382	710
720	40.382	40.445	40.508	40.571	40.634	40.697	40.760	40.823	40.886	40.950	41.013	720
730	41.013	41.076	41.139	41.203	41.266	41.329	41.393	41.456	41.520	41.583	41.647	730
740	41.647	41.710	41.774	41.837	41.901	41.965	42.028	42.092	42.156	42.219	42.283	740
750	42.283	42.347	42.411	42.475	42.538	42.602	42.666	42.730	42.794	42.858	42.922	750
760	42.922	42.986	43.050	43.114	43.178	43.242	43.306	43.370	43.435	43.499	43.563	760 †
770	43.563	43.627	43.692	43.756	43.820	43.885	43.949	44.014	44.078	44.142	44.207	770
780	44.207	44.271	44.336	44.400	44.465	44.529	44.594	44.658	44.723	44.788	44.852	780
790	44.852	44.917	44.981	45.046	45.111	45.175	45.240	45.304	45.369	45.434	45.498	790
800	45.498	45.563	45.627	45.692	45.757	45.821	45.886	45.950	46.015	46.080	46.144	800
810	46.144	46.209	46.273	46.338	46.403	46.467	46.532	46.596	46.661	46.725	46.790	810
820	46.790	46.855	46.919	46.983	47.047	47.112	47.176	47.241	47.305	47.369	47.434	820
830	47.434	47.498	47.562	47.627	47.691	47.755	47.819	47.884	47.948	48.012	48.076	830
840	48.076	48.140	48.204	48.269	48.333	48.397	48.461	48.525	48.589	48.653	48.716	840
850	48.716	48.780	48.844	48.908	48.972	49.036	49.099	49.163	49.227	49.291	49.354	850
860	49.354	49.418	49.481	49.545	49.608	49.672	49.735	49.799	49.862	49.926	49.989	860
870	49.989	50.052	50.116	50.179	50.242	50.305	50.369	50.432	50.495	50.558	50.621	870
880	50.621	50.684	50.747	50.810	50.873	50.936	50.999	51.061	51.124	51.187	51.249	880
890	51.249	51.312	51.375	51.437	51.500	51.562	51.625	51.687	51.750	51.812	51.875	890
900	51.875	51.937	51.999	52.061	52.124	52.186	52.248	52.310	52.372	52.434	52.496	900
910	52.496	52.558	52.620	52.682	52.744	52.806	52.868	52.929	52.991	53.053	53.115	910
920	53.115	53.176	53.238	53.299	53.361	53.422	53.484	53.545	53.607	53.668	53.729	920
930	53.729	53.791	53.852	53.913	53.974	54.035	54.096	54.157	54.218	54.280	54.341	930
940	54.341	54.401	54.462	54.523	54.584	54.645	54.706	54.766	54.827	54.888	54.948	940
950	54.948	55.009	55.070	55.130	55.191	55.251	55.312	55.372	55.432	55.493	55.553	950
960	55.553	55.613	55.674	55.734	55.794	55.854	55.914	55.974	56.035	56.095	56.155	960
970	56.155	56.215	56.275	56.334	56.394	56.454	56.514	56.574	56.634	56.694	56.753	970
980	56.753	56.813	56.873	56.932	56.992	57.051	57.111	57.170	57.230	57.289	57.349	980
990	57.349	57.408	57.468	57.527	57.586	57.646	57.705	57.764	57.824	57.883	57.942	990
1.000	57.942	58.001	58.060	58.120	58.179	58.238	58.297	58.356	58.415	58.474	58.533	1.000
1.010	58.533	58.592	58.651	58.710	58.769	58.827	58.886	58.945	59.004	59.063	59.121	1.010
1.020	59.121	59.180	59.239	59.298	59.356	59.415	59.474	59.532	59.591	59.650	59.708	1.020
1.030	59.708	59.767	59.825	59.884	59.942	60.001	60.059	60.118	60.176	60.235	60.293	1.030
1.040	60.293	60.351	60.410	60.468	60.527	60.585	60.643	60.702	60.760	60.818	60.876	1.040

† Values above 1400°F (760°C) are extrapolated.  
See note on next page.

TEMPERATURES IN DEGREES C IPTS 19681\*

DEG C 0 1 2 3 4 5 6 7 8 9 10 DEG C

DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
1.050	60.876	60.935	60.993	61.051	61.109	61.168	61.226	61.284	61.342	61.400	61.459	1.050
1.060	61.459	61.517	61.575	61.633	61.691	61.749	61.807	61.865	61.923	61.981	62.039	1.060
1.070	62.039	62.097	62.156	62.214	62.272	62.330	62.388	62.446	62.504	62.562	62.619	1.070
1.080	62.619	62.677	62.735	62.793	62.851	62.909	62.967	63.025	63.083	63.141	63.199	1.080
1.090	63.199	63.257	63.314	63.372	63.430	63.488	63.546	63.604	63.662	63.719	63.777	1.090
1.100	63.777	63.835	63.893	63.951	64.009	64.066	64.124	64.182	64.240	64.298	64.355	1.100
1.110	64.355	64.413	64.471	64.529	64.586	64.644	64.702	64.760	64.817	64.875	64.933	1.110
1.120	64.933	64.991	65.048	65.106	65.164	65.222	65.279	65.337	65.395	65.453	65.510	1.120
1.130	65.510	65.568	65.626	65.683	65.741	65.799	65.856	65.914	65.972	66.029	66.087	1.130
1.140	66.087	66.145	66.202	66.260	66.318	66.375	66.433	66.491	66.548	66.606	66.664	1.140
1.150	66.664	66.721	66.779	66.836	66.894	66.952	67.009	67.067	67.124	67.182	67.240	1.150
1.160	67.240	67.297	67.355	67.412	67.470	67.527	67.585	67.643	67.700	67.758	67.815	1.160
1.170	67.815	67.873	67.930	67.988	68.045	68.103	68.160	68.217	68.275	68.332	68.390	1.170
1.180	68.390	68.447	68.505	68.562	68.619	68.677	68.734	68.792	68.849	68.906	68.964	1.180
1.190	68.964	69.021	69.078	69.135	69.193	69.250	69.307	69.364	69.422	69.479	69.536	1.190
1.200	69.536											1.200

† NOTE: The maximum recommended temperature limit for Type J thermocouples is 1400°F (760°C). The extension of the Type J tables gives temperature-electromotive force data to 2192°F (1200°C). This extension is a mathematical extrapolation based on limited calibration data and caution should be exercised in its use. The basis for the extended curve is discussed in N.B.S. Monograph 125.

TYPE J THERMOCOUPLES †

REFERENCE JUNCTION AT 0 DEGREES C.

THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS

TYPE K THERMOCOUPLES

TEMPERATURES IN DEGREES C (IPTS 1966)											REFERENCE JUNCTION AT 0 DEGREES C														
DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C	
THERMoeLECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS																									
-270	-6.458																								-270
-260	-6.441	-6.444	-6.446	-6.448	-6.450	-6.452	-6.453	-6.455	-6.456	-6.457	-6.458	-260													-260
-250	-6.404	-6.408	-6.413	-6.417	-6.421	-6.425	-6.429	-6.432	-6.435	-6.438	-6.441	-250													-250
-240	-6.344	-6.351	-6.358	-6.366	-6.371	-6.377	-6.382	-6.388	-6.394	-6.399	-6.404	-240													-240
-230	-6.262	-6.271	-6.280	-6.289	-6.297	-6.306	-6.314	-6.322	-6.329	-6.337	-6.344	-230													-230
-220	-6.158	-6.170	-6.181	-6.192	-6.202	-6.213	-6.223	-6.233	-6.243	-6.253	-6.262	-220													-220
-210	-6.035	-6.048	-6.061	-6.074	-6.087	-6.099	-6.111	-6.123	-6.135	-6.147	-6.158	-210													-210
-200	-5.891	-5.907	-5.922	-5.936	-5.951	-5.965	-5.980	-5.994	-6.007	-6.021	-6.035	-200													-200
-190	-5.730	-5.747	-5.763	-5.780	-5.796	-5.813	-5.829	-5.845	-5.860	-5.876	-5.891	-190													-190
-180	-5.550	-5.569	-5.587	-5.606	-5.624	-5.642	-5.660	-5.678	-5.695	-5.712	-5.730	-180													-180
-170	-5.354	-5.374	-5.394	-5.414	-5.434	-5.454	-5.474	-5.493	-5.512	-5.531	-5.550	-170													-170
-160	-5.141	-5.163	-5.185	-5.207	-5.228	-5.249	-5.271	-5.292	-5.313	-5.333	-5.354	-160													-160
-150	-4.912	-4.936	-4.959	-4.983	-5.006	-5.029	-5.051	-5.074	-5.097	-5.119	-5.141	-150													-150
-140	-4.669	-4.694	-4.719	-4.743	-4.768	-4.792	-4.817	-4.841	-4.865	-4.889	-4.912	-140													-140
-130	-4.410	-4.437	-4.463	-4.489	-4.515	-4.541	-4.567	-4.593	-4.618	-4.644	-4.669	-130													-130
-120	-4.138	-4.166	-4.193	-4.221	-4.248	-4.276	-4.303	-4.330	-4.357	-4.384	-4.410	-120													-120
-110	-3.852	-3.881	-3.910	-3.939	-3.968	-3.997	-4.025	-4.053	-4.082	-4.110	-4.138	-110													-110
-100	-3.553	-3.584	-3.614	-3.644	-3.674	-3.704	-3.734	-3.764	-3.793	-3.823	-3.852	-100													-100
-90	-3.242	-3.274	-3.305	-3.337	-3.368	-3.399	-3.430	-3.461	-3.492	-3.523	-3.553	-90													-90
-80	-2.920	-2.953	-2.985	-3.018	-3.050	-3.082	-3.115	-3.147	-3.179	-3.211	-3.242	-80													-80
-70	-2.586	-2.620	-2.654	-2.687	-2.721	-2.754	-2.788	-2.821	-2.854	-2.887	-2.920	-70													-70
-60	-2.243	-2.277	-2.312	-2.347	-2.381	-2.416	-2.450	-2.484	-2.518	-2.552	-2.586	-60													-60
-50	-1.889	-1.925	-1.961	-1.996	-2.032	-2.067	-2.102	-2.137	-2.173	-2.208	-2.243	-50													-50
-40	-1.527	-1.563	-1.600	-1.636	-1.673	-1.709	-1.745	-1.781	-1.817	-1.853	-1.889	-40													-40
-30	-1.156	-1.193	-1.231	-1.268	-1.305	-1.342	-1.379	-1.416	-1.453	-1.490	-1.527	-30													-30
-20	-0.777	-0.816	-0.854	-0.892	-0.930	-0.968	-1.005	-1.043	-1.081	-1.118	-1.156	-20													-20
-10	-0.392	-0.431	-0.469	-0.508	-0.547	-0.585	-0.624	-0.662	-0.701	-0.739	-0.777	-10													-10
0	0.000	-0.039	-0.079	-0.118	-0.157	-0.197	-0.236	-0.275	-0.314	-0.353	-0.392	0												0	
0	0.000	0.039	0.079	0.119	0.158	0.198	0.238	0.277	0.317	0.357	0.397	0													0
10	0.397	0.437	0.477	0.517	0.557	0.597	0.637	0.677	0.718	0.758	0.798	10													10
20	0.798	0.838	0.879	0.919	0.960	1.000	1.041	1.081	1.122	1.162	1.203	20													20
30	1.203	1.244	1.285	1.325	1.366	1.407	1.448	1.489	1.529	1.570	1.611	30													30
40	1.611	1.652	1.693	1.734	1.776	1.817	1.858	1.899	1.940	1.981	2.022	40													40
50	2.022	2.064	2.105	2.146	2.188	2.229	2.270	2.312	2.353	2.394	2.436	50													50
60	2.436	2.477	2.519	2.560	2.601	2.643	2.684	2.726	2.767	2.809	2.850	60													60
70	2.850	2.892	2.933	2.975	3.016	3.058	3.100	3.141	3.183	3.224	3.266	70													70
80	3.266	3.307	3.349	3.390	3.432	3.473	3.515	3.556	3.598	3.639	3.681	80													80
90	3.681	3.722	3.764	3.805	3.847	3.888	3.930	3.971	4.012	4.054	4.095	90													90
100	4.095	4.137	4.178	4.219	4.261	4.302	4.343	4.384	4.426	4.467	4.508	100													100
110	4.508	4.549	4.590	4.632	4.673	4.714	4.755	4.796	4.837	4.878	4.919	110													110
120	4.919	4.960	5.001	5.042	5.083	5.124	5.164	5.205	5.246	5.287	5.327	120													120
130	5.327	5.368	5.409	5.450	5.490	5.531	5.571	5.612	5.652	5.693	5.733	130													130
140	5.733	5.774	5.814	5.855	5.895	5.936	5.976	6.016	6.057	6.097	6.137	140													140
150	6.137	6.177	6.218	6.258	6.298	6.338	6.378	6.419	6.459	6.499	6.539	150													150
160	6.539	6.579	6.619	6.659	6.699	6.739	6.779	6.819	6.859	6.899	6.939	160													160
170	6.939	6.979	7.019	7.059	7.099	7.139	7.179	7.219	7.259	7.299	7.338	170													170
180	7.338	7.378	7.418	7.458	7.498	7.538	7.578	7.618	7.658	7.697	7.737	180													180
190	7.737	7.777	7.817	7.857	7.897	7.937	7.977	8.017	8.057	8.097	8.137	190													190
200	8.137	8.177	8.216	8.256	8.296	8.336	8.376	8.416	8.456	8.497	8.537	200													200
210	8.537	8.577	8.617	8.657	8.697	8.737	8.777	8.817	8.857	8.898	8.938	210													210
220	8.938	8.978	9.018	9.058	9.099	9.139	9.179	9.220	9.260	9.300	9.341	220													220
230	9.341	9.381	9.421	9.462	9.502	9.543	9.583	9.624	9.664	9.705	9.745	230													230
240	9.745	9.786	9.826	9.867	9.907	9.948	9.989	10.029	10.070	10.111	10.151	240													240
250	10.151	10.192	10.233	10.274	10.315	10.355	10.396	10.437	10.478	10.519	10.560	250													250
260	10.560	10.600	10.641	10.682	10.723	10.764	10.805	10.846	10.887	10.928	10.969	260													260
270	10.969	11.010	11.051	11.093	11.134	11.175	11.216	11.257	11.298	11.339	11.381	270													270
280	11.381	11.422	11.463	11.504	11.546	11.587	11.628	11.669	11.711	11.752	11.793	280													280
290	11.793	11.835	11.876	11.918	11.959	12.000	12.042	12.083	12.125	12.166	12.207	290													290
300	12.207	12.249	12.290	12.332	12.373	12.415	12.456	12.498	12.539	12.581	12.623	300													300
310	12.623	12.664	12.706	12.747	12.789	12.831	12.872	12.914	12.955	12.997	13.039	310													310
320	13.039	13.080	13.122	13.164	13.205	13.247	13.289	13.331	13.372	13.414	13.456	320													320
330	13.456	13.497	13.539	13.581	13.623	13.665	13.706	13.748	13.790	13.832	13.874	330													330
340	13.874	13.915	13.957	13.999	14.041	14.083	14.125	14.167	14.208	14.250	14.292	340													340

TEMPERATURES IN DEGREES C (PTS 19681)  
 REFERENCE JUNCTION AT 0 DEGREES C

DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
350	14.292	14.334	14.376	14.418	14.460	14.502	14.544	14.586	14.628	14.670	14.712	350
360	14.712	14.754	14.796	14.838	14.880	14.922	14.964	15.006	15.048	15.090	15.132	360
370	15.132	15.174	15.216	15.258	15.300	15.342	15.384	15.426	15.468	15.510	15.552	370
380	15.552	15.594	15.636	15.678	15.720	15.762	15.804	15.846	15.888	15.930	15.972	380
390	15.974	16.016	16.058	16.098	16.140	16.182	16.224	16.266	16.308	16.350	16.392	390
400	16.395	16.438	16.480	16.522	16.564	16.607	16.649	16.691	16.733	16.776	16.818	400
410	16.818	16.860	16.902	16.945	16.987	17.029	17.072	17.114	17.156	17.199	17.241	410
420	17.241	17.283	17.325	17.368	17.410	17.452	17.495	17.537	17.579	17.622	17.664	420
430	17.664	17.707	17.749	17.792	17.834	17.877	17.919	17.961	18.004	18.046	18.088	430
440	18.088	18.131	18.173	18.216	18.258	18.301	18.343	18.385	18.428	18.470	18.513	440
450	18.513	18.555	18.598	18.640	18.683	18.725	18.768	18.810	18.853	18.895	18.938	450
460	18.938	18.980	19.022	19.065	19.108	19.150	19.193	19.235	19.278	19.320	19.363	460
470	19.363	19.405	19.448	19.490	19.533	19.575	19.618	19.661	19.703	19.746	19.788	470
480	19.788	19.831	19.873	19.916	19.959	20.001	20.044	20.087	20.130	20.172	20.215	480
490	20.214	20.257	20.299	20.342	20.385	20.427	20.470	20.512	20.555	20.598	20.640	490
500	20.640	20.683	20.725	20.768	20.811	20.853	20.896	20.938	20.981	21.024	21.066	500
510	21.066	21.109	21.152	21.194	21.237	21.280	21.322	21.365	21.407	21.450	21.493	510
520	21.493	21.535	21.578	21.621	21.663	21.706	21.749	21.791	21.834	21.876	21.919	520
530	21.919	21.962	22.004	22.047	22.090	22.132	22.175	22.218	22.260	22.303	22.345	530
540	22.345	22.388	22.431	22.473	22.516	22.559	22.601	22.644	22.687	22.729	22.772	540
550	22.772	22.815	22.857	22.900	22.942	22.985	23.028	23.070	23.113	23.156	23.198	550
560	23.198	23.241	23.284	23.326	23.369	23.411	23.454	23.497	23.539	23.582	23.624	560
570	23.624	23.667	23.710	23.752	23.795	23.837	23.880	23.923	23.965	24.008	24.050	570
580	24.050	24.093	24.136	24.178	24.221	24.263	24.306	24.348	24.391	24.434	24.476	580
590	24.476	24.519	24.561	24.604	24.646	24.689	24.731	24.774	24.817	24.859	24.902	590
600	24.902	24.944	24.987	25.029	25.072	25.114	25.157	25.199	25.242	25.284	25.327	600
610	25.327	25.369	25.412	25.454	25.497	25.539	25.582	25.624	25.667	25.709	25.751	610
620	25.751	25.794	25.836	25.879	25.921	25.964	26.006	26.049	26.091	26.134	26.176	620
630	26.176	26.219	26.261	26.303	26.345	26.387	26.430	26.472	26.515	26.557	26.599	630
640	26.599	26.642	26.684	26.726	26.769	26.811	26.853	26.896	26.938	26.980	27.022	640
650	27.022	27.065	27.107	27.149	27.192	27.234	27.277	27.319	27.361	27.403	27.445	650
660	27.445	27.488	27.530	27.573	27.615	27.658	27.700	27.743	27.785	27.828	27.870	660
670	27.870	27.913	27.955	28.000	28.042	28.084	28.126	28.168	28.210	28.253	28.295	670
680	28.295	28.338	28.380	28.423	28.465	28.508	28.550	28.593	28.635	28.677	28.720	680
690	28.720	28.763	28.805	28.848	28.890	28.933	28.975	29.018	29.060	29.103	29.145	690
700	29.145	29.188	29.230	29.273	29.315	29.358	29.400	29.443	29.485	29.528	29.570	700
710	29.570	29.613	29.655	29.698	29.740	29.783	29.825	29.868	29.910	29.953	29.995	710
720	29.995	30.038	30.080	30.123	30.165	30.208	30.250	30.293	30.335	30.378	30.420	720
730	30.420	30.463	30.505	30.548	30.590	30.633	30.675	30.718	30.760	30.803	30.845	730
740	30.845	30.888	30.930	30.973	31.015	31.058	31.100	31.143	31.185	31.228	31.270	740
750	31.270	31.313	31.355	31.398	31.440	31.483	31.525	31.568	31.610	31.653	31.695	750
760	31.695	31.738	31.780	31.823	31.865	31.908	31.950	31.993	32.035	32.078	32.120	760
770	32.120	32.163	32.205	32.248	32.290	32.333	32.375	32.418	32.460	32.503	32.545	770
780	32.545	32.588	32.630	32.673	32.715	32.758	32.800	32.843	32.885	32.928	32.970	780
790	32.970	33.013	33.055	33.098	33.140	33.183	33.225	33.268	33.310	33.353	33.395	790
800	33.395	33.438	33.480	33.523	33.565	33.608	33.650	33.693	33.735	33.778	33.820	800
810	33.820	33.863	33.905	33.948	33.990	34.033	34.075	34.118	34.160	34.203	34.245	810
820	34.245	34.288	34.330	34.373	34.415	34.458	34.500	34.543	34.585	34.628	34.670	820
830	34.670	34.713	34.755	34.798	34.840	34.883	34.925	34.968	35.010	35.053	35.095	830
840	35.095	35.138	35.180	35.223	35.265	35.308	35.350	35.393	35.435	35.478	35.520	840
850	35.520	35.563	35.605	35.648	35.690	35.733	35.775	35.818	35.860	35.903	35.945	850
860	35.945	35.988	36.030	36.073	36.115	36.158	36.200	36.243	36.285	36.328	36.370	860
870	36.370	36.413	36.455	36.498	36.540	36.583	36.625	36.668	36.710	36.753	36.795	870
880	36.795	36.838	36.880	36.923	36.965	37.008	37.050	37.093	37.135	37.178	37.220	880
890	37.220	37.263	37.305	37.348	37.390	37.433	37.475	37.518	37.560	37.603	37.645	890
900	37.645	37.688	37.730	37.773	37.815	37.858	37.900	37.943	37.985	38.028	38.070	900
910	38.070	38.113	38.155	38.198	38.240	38.283	38.325	38.368	38.410	38.453	38.495	910
920	38.495	38.538	38.580	38.623	38.665	38.708	38.750	38.793	38.835	38.878	38.920	920
930	38.920	38.963	39.005	39.048	39.090	39.133	39.175	39.218	39.260	39.303	39.345	930
940	39.345	39.388	39.430	39.473	39.515	39.558	39.600	39.643	39.685	39.728	39.770	940
950	39.770	39.813	39.855	39.898	39.940	39.983	40.025	40.068	40.110	40.153	40.195	950
960	40.195	40.238	40.280	40.323	40.365	40.408	40.450	40.493	40.535	40.578	40.620	960
970	40.620	40.663	40.705	40.748	40.790	40.833	40.875	40.918	40.960	41.003	41.045	970
980	41.045	41.088	41.130	41.173	41.215	41.258	41.300	41.343	41.385	41.428	41.470	980
990	41.470	41.513	41.555	41.598	41.640	41.683	41.725	41.768	41.810	41.853	41.895	990

TYPE K THERMOCOUPLES

TEMPERATURES IN DEGREES C (IPITS 1968)*												REFERENCE JUNCTION AT 0 DEGREES C*	
DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C	DEG C
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS													
1.000	41.269	41.308	41.347	41.385	41.424	41.463	41.502	41.541	41.580	41.619	41.657	1.000	
1.010	41.657	41.696	41.735	41.774	41.813	41.851	41.890	41.929	41.968	42.006	42.045	1.010	
1.020	42.045	42.084	42.123	42.161	42.200	42.239	42.277	42.316	42.355	42.393	42.432	1.020	
1.030	42.432	42.470	42.509	42.548	42.586	42.625	42.663	42.702	42.740	42.779	42.817	1.030	
1.040	42.817	42.856	42.894	42.933	42.971	43.010	43.048	43.087	43.125	43.164	43.202	1.040	
1.050	43.202	43.240	43.279	43.317	43.356	43.394	43.432	43.471	43.509	43.547	43.585	1.050	
1.060	43.585	43.624	43.662	43.700	43.739	43.777	43.815	43.853	43.891	43.930	43.968	1.060	
1.070	43.968	44.006	44.044	44.082	44.121	44.159	44.197	44.235	44.273	44.311	44.349	1.070	
1.080	44.349	44.387	44.425	44.463	44.501	44.539	44.577	44.615	44.653	44.691	44.729	1.080	
1.090	44.729	44.767	44.805	44.843	44.881	44.919	44.957	44.995	45.033	45.070	45.108	1.090	
1.100	45.108	45.146	45.184	45.222	45.260	45.297	45.335	45.373	45.411	45.448	45.486	1.100	
1.110	45.486	45.524	45.561	45.599	45.637	45.675	45.712	45.750	45.787	45.825	45.863	1.110	
1.120	45.863	45.900	45.938	45.975	46.013	46.051	46.088	46.126	46.163	46.201	46.238	1.120	
1.130	46.238	46.275	46.313	46.350	46.388	46.425	46.463	46.500	46.537	46.575	46.612	1.130	
1.140	46.612	46.649	46.687	46.724	46.761	46.799	46.836	46.873	46.910	46.948	46.985	1.140	
1.150	46.985	47.022	47.059	47.096	47.134	47.171	47.208	47.245	47.282	47.319	47.356	1.150	
1.160	47.356	47.393	47.430	47.468	47.505	47.542	47.579	47.616	47.653	47.689	47.726	1.160	
1.170	47.726	47.763	47.800	47.837	47.874	47.911	47.948	47.985	48.021	48.058	48.095	1.170	
1.180	48.095	48.132	48.169	48.205	48.242	48.279	48.316	48.352	48.389	48.426	48.462	1.180	
1.190	48.462	48.499	48.536	48.572	48.609	48.645	48.682	48.718	48.755	48.792	48.828	1.190	
1.200	48.828	48.865	48.901	48.937	48.974	49.010	49.047	49.083	49.120	49.156	49.192	1.200	
1.210	49.192	49.229	49.265	49.301	49.338	49.374	49.410	49.446	49.483	49.519	49.555	1.210	
1.220	49.555	49.591	49.627	49.663	49.700	49.736	49.772	49.808	49.844	49.880	49.916	1.220	
1.230	49.916	49.952	49.988	50.024	50.060	50.096	50.132	50.168	50.204	50.240	50.276	1.230	
1.240	50.276	50.311	50.347	50.383	50.419	50.455	50.491	50.526	50.562	50.598	50.633	1.240	
1.250	50.633	50.669	50.705	50.741	50.776	50.812	50.847	50.883	50.919	50.954	50.990	1.250	
1.260	50.990	51.025	51.061	51.096	51.132	51.167	51.203	51.238	51.274	51.309	51.344	1.260	
1.270	51.344	51.380	51.415	51.450	51.486	51.521	51.556	51.592	51.627	51.662	51.697	1.270	
1.280	51.697	51.733	51.768	51.803	51.838	51.873	51.908	51.943	51.979	52.014	52.049	1.280	
1.290	52.049	52.084	52.119	52.154	52.189	52.224	52.259	52.294	52.329	52.364	52.398	1.290	
1.300	52.398	52.433	52.468	52.503	52.538	52.573	52.608	52.642	52.677	52.712	52.747	1.300	
1.310	52.747	52.781	52.816	52.851	52.886	52.920	52.955	52.989	53.024	53.059	53.093	1.310	
1.320	53.093	53.128	53.162	53.197	53.232	53.266	53.301	53.335	53.370	53.404	53.439	1.320	
1.330	53.439	53.473	53.507	53.542	53.576	53.611	53.645	53.679	53.714	53.748	53.782	1.330	
1.340	53.782	53.817	53.851	53.885	53.920	53.954	53.988	54.022	54.057	54.091	54.125	1.340	
1.350	54.125	54.159	54.193	54.228	54.262	54.296	54.330	54.364	54.398	54.432	54.466	1.350	
1.360	54.466	54.501	54.535	54.569	54.603	54.637	54.671	54.705	54.739	54.773	54.807	1.360	
1.370	54.807	54.841	54.875									1.370	
DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C	DEG C

TEMPERATURES IN DEGREES C (IPITS 1968).  
 REFERENCE JUNCTION AT 0 DEGREES C.  
 TYPE B THERMOCOUPLES

DEG C 0 1 2 3 4 5 6 7 8 9 10 DEG C  
 THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS

DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
-50	-0.226	-0.192	-0.166	-0.146	-0.129	-0.115	-0.102	-0.090	-0.080	-0.071	-0.063	50
-40	-0.188	-0.166	-0.146	-0.129	-0.115	-0.102	-0.090	-0.080	-0.071	-0.063	-0.056	60
-30	-0.148	-0.132	-0.118	-0.106	-0.095	-0.085	-0.076	-0.068	-0.061	-0.055	-0.050	70
-20	-0.108	-0.100	-0.093	-0.087	-0.081	-0.076	-0.071	-0.066	-0.061	-0.057	-0.053	80
-10	-0.068	-0.063	-0.058	-0.054	-0.050	-0.046	-0.042	-0.038	-0.034	-0.030	-0.026	90
0	0.000	0.005	0.011	0.016	0.021	0.027	0.032	0.038	0.043	0.049	0.054	100
10	0.054	0.060	0.066	0.071	0.077	0.082	0.088	0.094	0.100	0.105	0.111	110
20	0.111	0.117	0.123	0.129	0.135	0.141	0.147	0.152	0.158	0.165	0.171	120
30	0.171	0.177	0.183	0.189	0.195	0.201	0.207	0.214	0.220	0.226	0.232	130
40	0.232	0.239	0.245	0.251	0.258	0.264	0.271	0.277	0.283	0.290	0.296	140
50	0.296	0.303	0.310	0.316	0.323	0.329	0.336	0.343	0.349	0.356	0.363	150
60	0.363	0.369	0.376	0.383	0.390	0.397	0.403	0.410	0.417	0.424	0.431	160
70	0.431	0.438	0.445	0.452	0.459	0.466	0.473	0.480	0.487	0.494	0.501	170
80	0.501	0.508	0.515	0.523	0.530	0.537	0.544	0.552	0.559	0.566	0.573	180
90	0.573	0.581	0.588	0.595	0.603	0.610	0.617	0.625	0.632	0.640	0.647	190
100	0.647	0.655	0.662	0.670	0.677	0.685	0.692	0.700	0.707	0.715	0.723	200
110	0.723	0.730	0.738	0.746	0.754	0.761	0.769	0.777	0.784	0.792	0.800	210
120	0.800	0.808	0.816	0.824	0.831	0.839	0.847	0.855	0.863	0.871	0.879	220
130	0.879	0.887	0.895	0.903	0.911	0.919	0.927	0.935	0.943	0.951	0.959	230
140	0.959	0.967	0.975	0.983	0.992	1.000	1.008	1.016	1.024	1.032	1.041	240
150	1.041	1.049	1.057	1.065	1.074	1.082	1.090	1.099	1.107	1.115	1.124	250
160	1.124	1.132	1.140	1.149	1.157	1.166	1.174	1.183	1.191	1.199	1.207	260
170	1.208	1.217	1.225	1.234	1.242	1.251	1.259	1.268	1.276	1.285	1.294	270
180	1.294	1.302	1.311	1.319	1.328	1.337	1.345	1.354	1.363	1.372	1.380	280
190	1.380	1.389	1.398	1.407	1.415	1.424	1.433	1.442	1.450	1.459	1.468	290
200	1.468	1.477	1.486	1.495	1.504	1.512	1.521	1.530	1.539	1.548	1.557	300
210	1.557	1.566	1.575	1.584	1.593	1.602	1.611	1.620	1.629	1.638	1.647	310
220	1.647	1.656	1.665	1.674	1.683	1.692	1.701	1.711	1.720	1.729	1.738	320
230	1.738	1.747	1.756	1.765	1.775	1.784	1.793	1.802	1.812	1.821	1.830	330
240	1.830	1.839	1.849	1.858	1.867	1.876	1.886	1.895	1.904	1.914	1.923	340
250	1.923	1.932	1.942	1.951	1.960	1.970	1.979	1.988	1.998	2.007	2.017	350
260	2.017	2.026	2.036	2.045	2.054	2.064	2.073	2.083	2.092	2.102	2.111	360
270	2.111	2.121	2.130	2.140	2.149	2.159	2.169	2.178	2.188	2.197	2.207	370
280	2.207	2.216	2.226	2.235	2.245	2.255	2.264	2.274	2.284	2.293	2.303	380
290	2.303	2.313	2.322	2.332	2.342	2.351	2.361	2.371	2.381	2.390	2.400	390
300	2.400	2.410	2.420	2.429	2.439	2.449	2.459	2.468	2.478	2.488	2.498	400
310	2.498	2.508	2.517	2.527	2.537	2.547	2.557	2.567	2.577	2.586	2.596	410
320	2.596	2.606	2.616	2.626	2.636	2.646	2.656	2.666	2.676	2.685	2.695	420
330	2.695	2.705	2.715	2.725	2.735	2.745	2.755	2.765	2.775	2.785	2.795	430
340	2.795	2.805	2.815	2.825	2.835	2.845	2.855	2.865	2.876	2.886	2.896	440
350	2.896	2.906	2.916	2.926	2.936	2.946	2.956	2.966	2.977	2.987	2.997	450
360	2.997	3.007	3.017	3.027	3.037	3.048	3.058	3.068	3.078	3.088	3.099	460
370	3.099	3.109	3.119	3.129	3.139	3.150	3.160	3.170	3.180	3.191	3.201	470
380	3.201	3.211	3.221	3.232	3.242	3.252	3.263	3.273	3.283	3.293	3.304	480
390	3.304	3.314	3.324	3.335	3.345	3.355	3.366	3.376	3.386	3.397	3.407	490
400	3.407	3.418	3.428	3.439	3.449	3.459	3.470	3.480	3.490	3.501	3.511	500
410	3.511	3.522	3.532	3.543	3.553	3.563	3.574	3.584	3.595	3.605	3.616	510
420	3.616	3.626	3.637	3.647	3.658	3.668	3.679	3.689	3.700	3.710	3.721	520
430	3.721	3.731	3.742	3.752	3.763	3.774	3.784	3.795	3.805	3.816	3.826	530
440	3.826	3.837	3.848	3.858	3.869	3.879	3.890	3.901	3.911	3.922	3.933	540
450	3.933	3.943	3.954	3.964	3.975	3.986	3.996	4.007	4.018	4.028	4.039	550
460	4.039	4.050	4.061	4.071	4.082	4.093	4.103	4.114	4.125	4.136	4.146	560
470	4.146	4.157	4.168	4.178	4.189	4.200	4.211	4.222	4.232	4.243	4.254	570
480	4.254	4.265	4.275	4.286	4.297	4.308	4.319	4.329	4.340	4.351	4.362	580
490	4.362	4.373	4.384	4.394	4.405	4.416	4.427	4.438	4.449	4.460	4.471	590
500	4.471	4.481	4.492	4.503	4.514	4.525	4.536	4.547	4.558	4.569	4.580	510
510	4.580	4.591	4.601	4.612	4.623	4.634	4.645	4.656	4.667	4.678	4.689	520
520	4.689	4.700	4.711	4.722	4.733	4.744	4.755	4.766	4.777	4.788	4.799	530
530	4.799	4.810	4.821	4.832	4.843	4.854	4.865	4.876	4.888	4.899	4.910	540
540	4.910	4.921	4.932	4.943	4.954	4.965	4.976	4.987	4.998	5.009	5.021	550
550	5.021	5.032	5.043	5.054	5.065	5.076	5.087	5.099	5.110	5.121	5.132	560
560	5.132	5.143	5.154	5.166	5.177	5.188	5.199	5.210	5.221	5.233	5.244	570
570	5.244	5.255	5.266	5.278	5.289	5.300	5.311	5.322	5.334	5.345	5.356	580
580	5.356	5.368	5.379	5.390	5.401	5.413	5.424	5.435	5.446	5.458	5.469	590
590	5.469	5.480	5.492	5.503	5.514	5.526	5.537	5.548	5.560	5.571	5.582	590

TYPE R THERMOCOUPLES

TEMPERATURES IN DEGREES C (IPTS 1968).											REFERENCE JUNCTION AT 0 DEGREES C.													
DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS																								
600	5.582	5.594	5.605	5.616	5.628	5.639	5.650	5.662	5.673	5.685	5.696	600	5.582	5.594	5.605	5.616	5.628	5.639	5.650	5.662	5.673	5.685	5.696	600
610	5.696	5.707	5.719	5.730	5.742	5.753	5.764	5.776	5.787	5.799	5.810	610	5.696	5.707	5.719	5.730	5.742	5.753	5.764	5.776	5.787	5.799	5.810	610
620	5.810	5.821	5.833	5.844	5.856	5.867	5.879	5.890	5.902	5.913	5.925	620	5.810	5.821	5.833	5.844	5.856	5.867	5.879	5.890	5.902	5.913	5.925	620
630	5.925	5.936	5.948	5.959	5.971	5.982	5.994	6.005	6.017	6.028	6.040	630	5.925	5.936	5.948	5.959	5.971	5.982	5.994	6.005	6.017	6.028	6.040	630
640	6.040	6.051	6.063	6.074	6.086	6.098	6.109	6.121	6.132	6.144	6.155	640	6.040	6.051	6.063	6.074	6.086	6.098	6.109	6.121	6.132	6.144	6.155	640
650	6.155	6.167	6.179	6.190	6.202	6.213	6.225	6.237	6.248	6.260	6.272	650	6.155	6.167	6.179	6.190	6.202	6.213	6.225	6.237	6.248	6.260	6.272	650
660	6.272	6.283	6.295	6.307	6.318	6.330	6.342	6.353	6.365	6.377	6.388	660	6.272	6.283	6.295	6.307	6.318	6.330	6.342	6.353	6.365	6.377	6.388	660
670	6.388	6.400	6.412	6.423	6.435	6.447	6.458	6.470	6.482	6.494	6.505	670	6.388	6.400	6.412	6.423	6.435	6.447	6.458	6.470	6.482	6.494	6.505	670
680	6.505	6.517	6.529	6.541	6.552	6.564	6.576	6.588	6.599	6.611	6.623	680	6.505	6.517	6.529	6.541	6.552	6.564	6.576	6.588	6.599	6.611	6.623	680
690	6.623	6.635	6.647	6.658	6.670	6.682	6.694	6.706	6.718	6.729	6.741	690	6.623	6.635	6.647	6.658	6.670	6.682	6.694	6.706	6.718	6.729	6.741	690
700	6.741	6.753	6.765	6.777	6.789	6.800	6.812	6.824	6.836	6.848	6.860	700	6.741	6.753	6.765	6.777	6.789	6.800	6.812	6.824	6.836	6.848	6.860	700
710	6.860	6.872	6.884	6.895	6.907	6.919	6.931	6.943	6.955	6.967	6.979	710	6.860	6.872	6.884	6.895	6.907	6.919	6.931	6.943	6.955	6.967	6.979	710
720	6.979	6.991	7.003	7.015	7.027	7.039	7.051	7.063	7.074	7.086	7.098	720	6.979	6.991	7.003	7.015	7.027	7.039	7.051	7.063	7.074	7.086	7.098	720
730	7.098	7.110	7.122	7.134	7.146	7.158	7.170	7.182	7.194	7.206	7.218	730	7.098	7.110	7.122	7.134	7.146	7.158	7.170	7.182	7.194	7.206	7.218	730
740	7.218	7.231	7.243	7.255	7.267	7.279	7.291	7.303	7.315	7.327	7.339	740	7.218	7.231	7.243	7.255	7.267	7.279	7.291	7.303	7.315	7.327	7.339	740
750	7.339	7.351	7.363	7.375	7.387	7.399	7.412	7.424	7.436	7.448	7.460	750	7.339	7.351	7.363	7.375	7.387	7.399	7.412	7.424	7.436	7.448	7.460	750
760	7.460	7.472	7.484	7.496	7.509	7.521	7.533	7.545	7.557	7.569	7.582	760	7.460	7.472	7.484	7.496	7.509	7.521	7.533	7.545	7.557	7.569	7.582	760
770	7.582	7.594	7.606	7.618	7.630	7.642	7.655	7.667	7.679	7.691	7.703	770	7.582	7.594	7.606	7.618	7.630	7.642	7.655	7.667	7.679	7.691	7.703	770
780	7.703	7.716	7.728	7.740	7.752	7.765	7.777	7.789	7.801	7.814	7.826	780	7.703	7.716	7.728	7.740	7.752	7.765	7.777	7.789	7.801	7.814	7.826	780
790	7.826	7.838	7.850	7.863	7.875	7.887	7.900	7.912	7.924	7.937	7.949	790	7.826	7.838	7.850	7.863	7.875	7.887	7.900	7.912	7.924	7.937	7.949	790
800	7.949	7.961	7.973	7.986	7.998	8.010	8.023	8.035	8.047	8.060	8.072	800	7.949	7.961	7.973	7.986	7.998	8.010	8.023	8.035	8.047	8.060	8.072	800
810	8.072	8.085	8.097	8.109	8.122	8.134	8.146	8.159	8.171	8.184	8.196	810	8.072	8.085	8.097	8.109	8.122	8.134	8.146	8.159	8.171	8.184	8.196	810
820	8.196	8.208	8.221	8.233	8.246	8.258	8.271	8.283	8.295	8.308	8.320	820	8.196	8.208	8.221	8.233	8.246	8.258	8.271	8.283	8.295	8.308	8.320	820
830	8.320	8.333	8.345	8.358	8.370	8.383	8.395	8.408	8.420	8.433	8.445	830	8.320	8.333	8.345	8.358	8.370	8.383	8.395	8.408	8.420	8.433	8.445	830
840	8.445	8.458	8.470	8.483	8.495	8.508	8.520	8.533	8.545	8.558	8.570	840	8.445	8.458	8.470	8.483	8.495	8.508	8.520	8.533	8.545	8.558	8.570	840
850	8.570	8.583	8.595	8.608	8.621	8.633	8.646	8.658	8.671	8.683	8.696	850	8.570	8.583	8.595	8.608	8.621	8.633	8.646	8.658	8.671	8.683	8.696	850
860	8.696	8.709	8.721	8.734	8.746	8.759	8.772	8.784	8.797	8.810	8.822	860	8.696	8.709	8.721	8.734	8.746	8.759	8.772	8.784	8.797	8.810	8.822	860
870	8.822	8.835	8.847	8.860	8.873	8.885	8.898	8.911	8.923	8.936	8.949	870	8.822	8.835	8.847	8.860	8.873	8.885	8.898	8.911	8.923	8.936	8.949	870
880	8.949	8.961	8.974	8.987	9.000	9.012	9.025	9.038	9.050	9.063	9.076	880	8.949	8.961	8.974	8.987	9.000	9.012	9.025	9.038	9.050	9.063	9.076	880
890	9.076	9.089	9.101	9.114	9.127	9.140	9.152	9.165	9.178	9.191	9.203	890	9.076	9.089	9.101	9.114	9.127	9.140	9.152	9.165	9.178	9.191	9.203	890
900	9.203	9.216	9.229	9.242	9.254	9.267	9.280	9.293	9.306	9.319	9.331	900	9.203	9.216	9.229	9.242	9.254	9.267	9.280	9.293	9.306	9.319	9.331	900
910	9.331	9.344	9.357	9.370	9.383	9.395	9.408	9.421	9.434	9.447	9.460	910	9.331	9.344	9.357	9.370	9.383	9.395	9.408	9.421	9.434	9.447	9.460	910
920	9.460	9.473	9.485	9.498	9.511	9.524	9.537	9.550	9.563	9.576	9.589	920	9.460	9.473	9.485	9.498	9.511	9.524	9.537	9.550	9.563	9.576	9.589	920
930	9.589	9.602	9.614	9.627	9.640	9.653	9.666	9.679	9.692	9.705	9.718	930	9.589	9.602	9.614	9.627	9.640	9.653	9.666	9.679	9.692	9.705	9.718	930
940	9.718	9.731	9.744	9.757	9.770	9.783	9.796	9.809	9.822	9.835	9.848	940	9.718	9.731	9.744	9.757	9.770	9.783	9.796	9.809	9.822	9.835	9.848	940
950	9.848	9.861	9.874	9.887	9.900	9.913	9.926	9.939	9.952	9.965	9.978	950	9.848	9.861	9.874	9.887	9.900	9.913	9.926	9.939	9.952	9.965	9.978	950
960	9.978	9.991	10.004	10.017	10.030	10.043	10.056	10.069	10.082	10.095	10.109	960	9.978	9.991	10.004	10.017	10.030	10.043	10.056	10.069	10.082	10.095	10.109	960
970	10.109	10.122	10.135	10.148	10.161	10.174	10.187	10.200	10.213	10.227	10.240	970	10.109	10.122	10.135	10.148	10.161	10.174	10.187	10.200	10.213	10.227	10.240	970
980	10.240	10.253	10.266	10.279	10.292	10.305	10.319	10.332	10.345	10.358	10.371	980	10.240	10.253	10.266	10.279	10.292	10.305	10.319	10.332	10.345	10.358	10.371	980
990	10.371	10.384	10.398	10.411	10.424	10.437	10.450	10.464	10.477	10.490	10.503	990	10.371	10.384	10.398	10.411	10.424	10.437	10.450	10.464	10.477	10.490	10.503	990
1.000	10.503	10.516	10.530	10.543	10.556	10.569	10.583	10.596	10.609	10.622	10.636	1.000	10.503	10.516	10.530	10.543	10.556	10.569	10.583	10.596	10.609	10.622	10.636	1.000
1.010	10.636	10.649	10.662	10.675	10.689	10.702	10.715	10.729	10.742	10.755	10.768	1.010	10.636	10.649	10.662	10.675	10.689	10.702	10.715	10.729	10.742	10.755	10.768	1.010
1.020	10.768	10.782	10.795	10.808	10.822	10.835	10.848	10.862	10.875	10.888	10.902	1.020	10.768	10.782	10.795	10.808	10.822	10.835	10.848	10.862	10.875	10.888	10.902	1.020
1.030	10.902	10.915	10.928	10.942	10.955	10.968	10.982	10.995	11.009	11.022	11.035	1.030	10.902	10.915	10.928	10.942	10.955	10.968	10.982	10.995	11.009	11.022	11.035	1.030
1.040	11.035	11.049	11.062	11.076	11.089	11.102	11.116	11.129	11.143	11.156	11.170	1.040	11.035	11.049	11.062	11.076	11.089	11.102	11.116	11.129	11.143	11.156	11.170	1.040
1.050	11.170	11.183	11.196	11.210	11.223	11.237	11.250	11.264	11.277	11.291	11.304	1.050	11.170	11.183	11.196	11.210	11.223	11.237	11.250	11.264	11.277	11.291	11.304	1.050
1.060	11.304	11.318	11.331	11.345	11.358	11.372	11.385	11.399	11.412	11.426	11.439	1.060	11.304	11.318	11.331	11.345	11.358	11.372	11.385	11.399	11.412	11.426	11.439	1.060
1.070	11.439	11.45																						

TYPE R THERMOCOUPLES

TEMPERATURES IN DEGREES C (FIPS 146B1). REFERENCE JUNCTION AT 0 DEGREES C. DEG C

DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
1,200	13,224	13,238	13,252	13,266	13,280	13,293	13,307	13,321	13,335	13,349	13,363	1,200
1,210	13,363	13,377	13,391	13,405	13,419	13,433	13,447	13,461	13,475	13,489	13,502	1,210
1,220	13,502	13,516	13,530	13,544	13,558	13,572	13,586	13,600	13,614	13,628	13,642	1,220
1,230	13,642	13,656	13,670	13,684	13,698	13,712	13,726	13,740	13,754	13,768	13,782	1,230
1,240	13,782	13,796	13,810	13,824	13,838	13,852	13,866	13,880	13,894	13,908	13,922	1,240
1,250	13,922	13,936	13,950	13,964	13,978	13,992	14,006	14,020	14,034	14,048	14,062	1,250
1,260	14,062	14,076	14,090	14,104	14,118	14,132	14,146	14,160	14,174	14,188	14,202	1,260
1,270	14,202	14,216	14,230	14,244	14,258	14,272	14,286	14,301	14,315	14,329	14,343	1,270
1,280	14,343	14,357	14,371	14,385	14,399	14,413	14,427	14,441	14,455	14,469	14,483	1,280
1,290	14,483	14,497	14,511	14,525	14,539	14,554	14,568	14,582	14,596	14,610	14,624	1,290
1,300	14,624	14,638	14,652	14,666	14,680	14,694	14,708	14,722	14,737	14,751	14,765	1,300
1,310	14,765	14,779	14,793	14,807	14,821	14,835	14,849	14,863	14,877	14,891	14,906	1,310
1,320	14,906	14,920	14,934	14,948	14,962	14,976	14,990	15,004	15,018	15,032	15,047	1,320
1,330	15,047	15,061	15,075	15,089	15,103	15,117	15,131	15,145	15,159	15,173	15,188	1,330
1,340	15,188	15,202	15,216	15,230	15,244	15,258	15,272	15,286	15,300	15,314	15,329	1,340
1,350	15,329	15,343	15,357	15,371	15,385	15,399	15,413	15,427	15,441	15,456	15,470	1,350
1,360	15,470	15,484	15,498	15,512	15,526	15,540	15,554	15,568	15,582	15,597	15,611	1,360
1,370	15,611	15,625	15,639	15,653	15,667	15,682	15,696	15,710	15,724	15,738	15,752	1,370
1,380	15,752	15,766	15,780	15,794	15,809	15,823	15,837	15,851	15,865	15,879	15,893	1,380
1,390	15,893	15,907	15,922	15,936	15,950	15,964	15,978	15,992	16,006	16,021	16,035	1,390
1,400	16,035	16,049	16,063	16,077	16,091	16,105	16,119	16,134	16,148	16,162	16,176	1,400
1,410	16,176	16,190	16,204	16,218	16,232	16,247	16,261	16,275	16,289	16,303	16,317	1,410
1,420	16,317	16,331	16,345	16,360	16,374	16,388	16,402	16,416	16,430	16,444	16,458	1,420
1,430	16,458	16,472	16,487	16,501	16,515	16,529	16,543	16,557	16,571	16,585	16,599	1,430
1,440	16,599	16,614	16,628	16,642	16,656	16,670	16,684	16,698	16,712	16,726	16,741	1,440
1,450	16,741	16,755	16,769	16,783	16,797	16,811	16,825	16,839	16,853	16,867	16,882	1,450
1,460	16,882	16,896	16,910	16,924	16,938	16,952	16,966	16,980	16,994	17,008	17,022	1,460
1,470	17,022	17,037	17,051	17,065	17,079	17,093	17,107	17,121	17,135	17,149	17,163	1,470
1,480	17,163	17,177	17,192	17,206	17,220	17,234	17,248	17,262	17,276	17,290	17,304	1,480
1,490	17,304	17,318	17,332	17,346	17,360	17,374	17,388	17,402	17,417	17,431	17,445	1,490
1,500	17,445	17,459	17,473	17,487	17,501	17,515	17,529	17,543	17,557	17,571	17,585	1,500
1,510	17,585	17,599	17,613	17,627	17,641	17,655	17,669	17,684	17,698	17,712	17,726	1,510
1,520	17,726	17,740	17,754	17,768	17,782	17,796	17,810	17,824	17,838	17,852	17,866	1,520
1,530	17,866	17,880	17,894	17,908	17,922	17,936	17,950	17,964	17,978	17,992	18,006	1,530
1,540	18,006	18,020	18,034	18,048	18,062	18,076	18,090	18,104	18,118	18,132	18,146	1,540
1,550	18,146	18,160	18,174	18,188	18,202	18,216	18,230	18,244	18,258	18,272	18,286	1,550
1,560	18,286	18,299	18,313	18,327	18,341	18,355	18,369	18,383	18,397	18,411	18,425	1,560
1,570	18,425	18,439	18,453	18,467	18,481	18,495	18,509	18,523	18,537	18,550	18,564	1,570
1,580	18,564	18,578	18,592	18,606	18,620	18,634	18,648	18,662	18,676	18,690	18,703	1,580
1,590	18,703	18,717	18,731	18,745	18,759	18,773	18,787	18,801	18,815	18,828	18,842	1,590
1,600	18,842	18,856	18,870	18,884	18,898	18,912	18,926	18,939	18,953	18,967	18,981	1,600
1,610	18,981	18,995	19,009	19,023	19,036	19,050	19,064	19,078	19,092	19,106	19,119	1,610
1,620	19,119	19,133	19,147	19,161	19,175	19,188	19,202	19,216	19,230	19,244	19,257	1,620
1,630	19,257	19,271	19,285	19,299	19,313	19,326	19,340	19,354	19,368	19,382	19,395	1,630
1,640	19,395	19,409	19,423	19,437	19,450	19,464	19,478	19,492	19,505	19,519	19,533	1,640
1,650	19,533	19,547	19,560	19,574	19,588	19,602	19,615	19,629	19,643	19,656	19,670	1,650
1,660	19,670	19,684	19,698	19,711	19,725	19,739	19,752	19,766	19,780	19,793	19,807	1,660
1,670	19,807	19,821	19,834	19,848	19,862	19,875	19,889	19,903	19,916	19,930	19,944	1,670
1,680	19,944	19,957	19,971	19,985	19,998	20,012	20,025	20,039	20,053	20,066	20,080	1,680
1,690	20,080	20,093	20,107	20,120	20,134	20,148	20,161	20,175	20,188	20,202	20,215	1,690
1,700	20,215	20,229	20,242	20,256	20,269	20,283	20,296	20,309	20,323	20,336	20,350	1,700
1,710	20,350	20,363	20,377	20,390	20,403	20,417	20,430	20,443	20,457	20,470	20,483	1,710
1,720	20,483	20,497	20,510	20,523	20,537	20,550	20,563	20,576	20,590	20,603	20,616	1,720
1,730	20,616	20,629	20,642	20,656	20,669	20,682	20,695	20,708	20,721	20,734	20,748	1,730
1,740	20,748	20,761	20,774	20,787	20,800	20,813	20,826	20,839	20,852	20,865	20,878	1,740
1,750	20,878	20,891	20,904	20,916	20,929	20,942	20,955	20,968	20,981	20,994	21,006	1,750
1,760	21,006	21,019	21,032	21,045	21,057	21,070	21,083	21,096	21,108			1,760



TYPE S THERMOCOUPLES

TEMPERATURES IN DEGREES C (IPITS 1968)\* REFERENCE JUNCTION AT 0 DEGREES C.

DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS												
-40	-0.194	-0.199	-0.203	-0.207	-0.211	-0.215	-0.220	-0.224	-0.228	-0.232	-0.236	-40
-30	-0.150	-0.155	-0.159	-0.164	-0.168	-0.173	-0.177	-0.181	-0.186	-0.190	-0.194	-30
-20	-0.103	-0.108	-0.112	-0.117	-0.122	-0.127	-0.132	-0.136	-0.141	-0.145	-0.150	-20
-10	-0.053	-0.058	-0.063	-0.068	-0.073	-0.078	-0.083	-0.088	-0.093	-0.098	-0.103	-10
0	0.000	0.005	0.011	0.016	0.021	0.027	0.032	0.037	0.042	0.048	0.053	0
0	0.000	0.005	0.011	0.016	0.022	0.027	0.033	0.038	0.044	0.050	0.055	0
10	0.055	0.061	0.067	0.072	0.078	0.084	0.090	0.095	0.101	0.107	0.113	10
20	0.113	0.119	0.125	0.131	0.137	0.142	0.148	0.154	0.161	0.167	0.173	20
30	0.173	0.179	0.185	0.191	0.197	0.203	0.210	0.216	0.222	0.228	0.235	30
40	0.235	0.241	0.247	0.254	0.260	0.266	0.273	0.279	0.286	0.292	0.299	40
50	0.299	0.305	0.312	0.318	0.325	0.331	0.338	0.345	0.351	0.358	0.365	50
60	0.365	0.371	0.378	0.385	0.391	0.398	0.405	0.412	0.419	0.425	0.432	60
70	0.432	0.439	0.446	0.453	0.460	0.467	0.474	0.481	0.488	0.495	0.502	70
80	0.502	0.509	0.516	0.523	0.530	0.537	0.544	0.551	0.558	0.566	0.573	80
90	0.573	0.580	0.587	0.594	0.602	0.609	0.616	0.623	0.631	0.638	0.645	90
100	0.645	0.653	0.660	0.667	0.675	0.682	0.690	0.697	0.704	0.712	0.719	100
110	0.719	0.727	0.734	0.742	0.749	0.757	0.764	0.772	0.780	0.787	0.795	110
120	0.795	0.802	0.810	0.818	0.825	0.833	0.841	0.848	0.856	0.864	0.872	120
130	0.872	0.879	0.887	0.895	0.903	0.910	0.918	0.926	0.934	0.942	0.950	130
140	0.950	0.957	0.965	0.973	0.981	0.989	0.997	1.005	1.013	1.021	1.029	140
150	1.029	1.037	1.045	1.053	1.061	1.069	1.077	1.085	1.093	1.101	1.109	150
160	1.109	1.117	1.125	1.133	1.141	1.149	1.158	1.166	1.174	1.182	1.190	160
170	1.190	1.198	1.207	1.215	1.223	1.231	1.240	1.248	1.256	1.264	1.273	170
180	1.273	1.281	1.289	1.297	1.306	1.314	1.322	1.331	1.339	1.347	1.356	180
190	1.356	1.364	1.373	1.381	1.389	1.398	1.406	1.415	1.423	1.432	1.440	190
200	1.440	1.448	1.457	1.465	1.474	1.482	1.491	1.499	1.508	1.516	1.525	200
210	1.525	1.534	1.542	1.551	1.559	1.568	1.576	1.585	1.594	1.602	1.611	210
220	1.611	1.620	1.628	1.637	1.645	1.654	1.663	1.671	1.680	1.689	1.698	220
230	1.698	1.706	1.715	1.724	1.732	1.741	1.750	1.759	1.767	1.776	1.785	230
240	1.785	1.794	1.802	1.811	1.820	1.829	1.838	1.846	1.855	1.864	1.873	240
250	1.873	1.882	1.891	1.899	1.908	1.917	1.926	1.935	1.944	1.953	1.962	250
260	1.962	1.971	1.979	1.988	1.997	2.006	2.015	2.024	2.033	2.042	2.051	260
270	2.051	2.060	2.069	2.078	2.087	2.096	2.105	2.114	2.123	2.132	2.141	270
280	2.141	2.150	2.159	2.168	2.177	2.186	2.195	2.204	2.213	2.222	2.232	280
290	2.232	2.241	2.250	2.259	2.268	2.277	2.286	2.295	2.304	2.314	2.323	290
300	2.323	2.332	2.341	2.350	2.359	2.368	2.378	2.387	2.396	2.405	2.414	300
310	2.414	2.424	2.433	2.442	2.451	2.460	2.470	2.479	2.488	2.497	2.506	310
320	2.506	2.516	2.525	2.534	2.543	2.553	2.562	2.571	2.581	2.590	2.599	320
330	2.599	2.608	2.618	2.627	2.636	2.646	2.655	2.664	2.674	2.683	2.692	330
340	2.692	2.702	2.711	2.720	2.730	2.739	2.748	2.758	2.767	2.776	2.786	340
350	2.786	2.795	2.805	2.814	2.823	2.833	2.842	2.852	2.861	2.870	2.880	350
360	2.880	2.889	2.899	2.908	2.917	2.927	2.936	2.946	2.955	2.965	2.974	360
370	2.974	2.984	2.993	3.003	3.012	3.022	3.031	3.041	3.050	3.059	3.069	370
380	3.069	3.078	3.088	3.097	3.107	3.117	3.126	3.136	3.145	3.155	3.164	380
390	3.164	3.174	3.183	3.193	3.202	3.212	3.221	3.231	3.241	3.250	3.260	390
400	3.260	3.269	3.279	3.288	3.298	3.308	3.317	3.327	3.336	3.346	3.356	400
410	3.356	3.365	3.375	3.384	3.394	3.404	3.413	3.423	3.433	3.442	3.452	410
420	3.452	3.462	3.471	3.481	3.491	3.500	3.510	3.520	3.529	3.539	3.549	420
430	3.549	3.558	3.568	3.578	3.587	3.597	3.607	3.616	3.626	3.636	3.645	430
440	3.645	3.655	3.665	3.675	3.684	3.694	3.704	3.714	3.723	3.733	3.743	440
450	3.743	3.752	3.762	3.772	3.782	3.791	3.801	3.811	3.821	3.831	3.840	450
460	3.840	3.850	3.860	3.870	3.879	3.889	3.899	3.909	3.919	3.928	3.938	460
470	3.938	3.948	3.958	3.968	3.977	3.987	3.997	4.007	4.017	4.027	4.036	470
480	4.036	4.046	4.056	4.066	4.076	4.086	4.095	4.105	4.115	4.125	4.135	480
490	4.135	4.145	4.155	4.164	4.174	4.184	4.194	4.204	4.214	4.224	4.234	490
500	4.234	4.244	4.253	4.263	4.273	4.283	4.293	4.303	4.313	4.323	4.333	500
510	4.333	4.343	4.352	4.362	4.372	4.382	4.392	4.402	4.412	4.422	4.432	510
520	4.432	4.442	4.452	4.462	4.472	4.482	4.492	4.502	4.512	4.522	4.532	520
530	4.532	4.542	4.552	4.562	4.572	4.582	4.592	4.602	4.612	4.622	4.632	530
540	4.632	4.642	4.652	4.662	4.672	4.682	4.692	4.702	4.712	4.722	4.732	540
550	4.732	4.742	4.752	4.762	4.772	4.782	4.792	4.802	4.812	4.822	4.832	550
560	4.832	4.842	4.852	4.862	4.873	4.883	4.893	4.903	4.913	4.923	4.933	560
570	4.933	4.943	4.953	4.963	4.973	4.984	4.994	5.004	5.014	5.024	5.034	570
580	5.034	5.044	5.054	5.065	5.075	5.085	5.095	5.105	5.115	5.125	5.136	580
590	5.136	5.146	5.156	5.166	5.176	5.186	5.197	5.207	5.217	5.227	5.237	590
600	5.237	5.247	5.258	5.268	5.278	5.288	5.298	5.309	5.319	5.329	5.339	600
DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C

TEMPERATURES IN DEGREES C (LEFTS 1968).

DEG C 0 1 2 3 4 5 6 7 8 9 10 DEG C

DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
600	5.237	5.247	5.258	5.268	5.278	5.288	5.298	5.309	5.319	5.329	5.339	600
610	5.339	5.350	5.360	5.370	5.380	5.391	5.401	5.411	5.421	5.431	5.442	610
620	5.442	5.452	5.462	5.473	5.483	5.493	5.503	5.514	5.524	5.534	5.544	620
630	5.544	5.555	5.565	5.575	5.586	5.596	5.606	5.617	5.627	5.637	5.648	630
640	5.648	5.658	5.668	5.679	5.689	5.700	5.710	5.720	5.731	5.741	5.751	640
650	5.751	5.762	5.772	5.782	5.793	5.803	5.814	5.824	5.834	5.845	5.855	650
660	5.855	5.866	5.876	5.887	5.897	5.907	5.918	5.928	5.939	5.949	5.959	660
670	5.959	5.970	5.980	5.991	6.001	6.012	6.022	6.033	6.043	6.054	6.064	670
680	6.064	6.075	6.085	6.096	6.106	6.117	6.127	6.138	6.148	6.159	6.169	680
690	6.169	6.180	6.190	6.201	6.211	6.222	6.232	6.243	6.253	6.264	6.274	690
700	6.274	6.285	6.295	6.306	6.316	6.327	6.338	6.348	6.359	6.369	6.380	700
710	6.380	6.390	6.401	6.412	6.422	6.433	6.443	6.454	6.465	6.475	6.486	710
720	6.486	6.496	6.507	6.518	6.528	6.539	6.549	6.560	6.571	6.581	6.592	720
730	6.592	6.603	6.613	6.624	6.635	6.645	6.656	6.667	6.677	6.688	6.699	730
740	6.699	6.709	6.720	6.731	6.741	6.752	6.763	6.773	6.784	6.795	6.805	740
750	6.805	6.816	6.827	6.838	6.848	6.859	6.870	6.880	6.891	6.902	6.913	750
760	6.913	6.923	6.934	6.945	6.956	6.966	6.977	6.988	6.999	7.009	7.020	760
770	7.020	7.031	7.042	7.053	7.063	7.074	7.085	7.096	7.107	7.117	7.128	770
780	7.128	7.139	7.150	7.161	7.171	7.182	7.193	7.204	7.215	7.225	7.236	780
790	7.236	7.247	7.258	7.269	7.280	7.291	7.301	7.312	7.323	7.334	7.345	790
800	7.345	7.356	7.367	7.377	7.388	7.399	7.410	7.421	7.432	7.443	7.454	800
810	7.454	7.465	7.476	7.486	7.497	7.508	7.519	7.530	7.541	7.552	7.563	810
820	7.563	7.574	7.585	7.596	7.607	7.618	7.629	7.640	7.651	7.661	7.672	820
830	7.672	7.683	7.694	7.705	7.716	7.727	7.738	7.749	7.760	7.771	7.782	830
840	7.782	7.793	7.804	7.815	7.825	7.837	7.848	7.859	7.870	7.881	7.892	840
850	7.892	7.904	7.915	7.926	7.937	7.948	7.959	7.970	7.981	7.992	8.004	850
860	8.004	8.015	8.025	8.036	8.047	8.058	8.069	8.081	8.092	8.103	8.114	860
870	8.114	8.125	8.136	8.147	8.158	8.169	8.180	8.192	8.203	8.214	8.225	870
880	8.225	8.236	8.247	8.258	8.270	8.281	8.292	8.303	8.314	8.325	8.336	880
890	8.336	8.348	8.359	8.370	8.381	8.392	8.404	8.415	8.426	8.437	8.448	890
900	8.448	8.460	8.471	8.482	8.493	8.504	8.516	8.527	8.538	8.549	8.560	900
910	8.560	8.572	8.583	8.594	8.605	8.617	8.628	8.639	8.650	8.662	8.673	910
920	8.673	8.684	8.695	8.707	8.718	8.729	8.741	8.752	8.763	8.774	8.786	920
930	8.786	8.797	8.808	8.820	8.831	8.842	8.854	8.865	8.876	8.888	8.899	930
940	8.899	8.910	8.922	8.933	8.944	8.956	8.967	8.978	8.989	9.001	9.012	940
950	9.012	9.024	9.035	9.047	9.058	9.069	9.081	9.092	9.103	9.115	9.126	950
960	9.126	9.138	9.149	9.160	9.172	9.183	9.195	9.206	9.217	9.229	9.240	960
970	9.240	9.252	9.263	9.275	9.286	9.298	9.309	9.320	9.332	9.343	9.355	970
980	9.355	9.366	9.378	9.389	9.401	9.412	9.424	9.435	9.447	9.458	9.470	980
990	9.470	9.481	9.493	9.504	9.516	9.527	9.539	9.550	9.562	9.573	9.585	990
1000	9.585	9.596	9.608	9.619	9.631	9.642	9.654	9.665	9.677	9.689	9.700	1000
1010	9.700	9.712	9.723	9.735	9.746	9.758	9.770	9.781	9.793	9.804	9.816	1010
1020	9.816	9.828	9.839	9.851	9.862	9.874	9.886	9.897	9.909	9.920	9.932	1020
1030	9.932	9.944	9.955	9.967	9.979	9.990	10.002	10.013	10.025	10.037	10.048	1030
1040	10.048	10.060	10.072	10.083	10.095	10.107	10.118	10.130	10.142	10.154	10.165	1040
1050	10.165	10.177	10.189	10.200	10.212	10.224	10.235	10.247	10.259	10.271	10.282	1050
1060	10.282	10.294	10.306	10.318	10.329	10.341	10.353	10.364	10.376	10.388	10.400	1060
1070	10.400	10.411	10.423	10.435	10.447	10.459	10.470	10.482	10.494	10.506	10.517	1070
1080	10.517	10.529	10.541	10.553	10.565	10.576	10.588	10.600	10.612	10.624	10.635	1080
1090	10.635	10.647	10.659	10.671	10.683	10.694	10.706	10.718	10.730	10.742	10.754	1090
1100	10.754	10.766	10.777	10.789	10.801	10.813	10.825	10.836	10.848	10.860	10.872	1100
1110	10.872	10.884	10.896	10.908	10.919	10.931	10.943	10.955	10.967	10.979	10.991	1110
1120	10.991	11.003	11.014	11.026	11.038	11.050	11.062	11.074	11.086	11.098	11.110	1120
1130	11.110	11.122	11.134	11.146	11.158	11.170	11.182	11.194	11.206	11.218	11.229	1130
1140	11.229	11.241	11.252	11.264	11.276	11.288	11.300	11.312	11.324	11.336	11.348	1140
1150	11.348	11.360	11.372	11.384	11.396	11.408	11.420	11.432	11.443	11.455	11.467	1150
1160	11.467	11.479	11.491	11.503	11.515	11.527	11.539	11.551	11.563	11.575	11.587	1160
1170	11.587	11.599	11.611	11.623	11.635	11.647	11.659	11.671	11.683	11.695	11.707	1170
1180	11.707	11.719	11.731	11.743	11.755	11.767	11.779	11.791	11.803	11.815	11.827	1180
1190	11.827	11.839	11.851	11.863	11.875	11.887	11.899	11.911	11.923	11.935	11.947	1190
1200	11.947	11.959	11.971	11.983	11.995	12.007	12.019	12.031	12.043	12.055	12.067	1200

TYPE S THERMOCOUPLES

TEMPERATURES IN DEGREES C (IPTS 1968).											REFERENCE JUNCTION AT 0 DEGREES C.													
DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
THERMOELECTRIC VOLTAGE IN ABSOLUTE MILLIVOLTS																								
1.200	11.947	11.959	11.971	11.983	11.995	12.007	12.019	12.031	12.043	12.055	12.067	1.200	11.947	11.959	11.971	11.983	11.995	12.007	12.019	12.031	12.043	12.055	12.067	1.200
1.210	12.067	12.079	12.091	12.103	12.115	12.128	12.140	12.152	12.164	12.176	12.188	1.210	12.067	12.079	12.091	12.103	12.115	12.128	12.140	12.152	12.164	12.176	12.188	1.210
1.220	12.188	12.200	12.212	12.224	12.236	12.248	12.260	12.272	12.284	12.296	12.308	1.220	12.188	12.200	12.212	12.224	12.236	12.248	12.260	12.272	12.284	12.296	12.308	1.220
1.230	12.308	12.320	12.332	12.344	12.356	12.368	12.380	12.392	12.404	12.416	12.428	1.230	12.308	12.320	12.332	12.344	12.356	12.368	12.380	12.392	12.404	12.416	12.428	1.230
1.240	12.429	12.441	12.453	12.465	12.477	12.489	12.501	12.513	12.525	12.537	12.549	1.240	12.429	12.441	12.453	12.465	12.477	12.489	12.501	12.513	12.525	12.537	12.549	1.240
1.250	12.550	12.562	12.574	12.586	12.598	12.610	12.622	12.634	12.646	12.658	12.670	1.250	12.550	12.562	12.574	12.586	12.598	12.610	12.622	12.634	12.646	12.658	12.670	1.250
1.260	12.671	12.683	12.695	12.707	12.719	12.731	12.743	12.755	12.767	12.780	12.792	1.260	12.671	12.683	12.695	12.707	12.719	12.731	12.743	12.755	12.767	12.780	12.792	1.260
1.270	12.792	12.804	12.816	12.828	12.840	12.852	12.864	12.876	12.888	12.901	12.913	1.270	12.792	12.804	12.816	12.828	12.840	12.852	12.864	12.876	12.888	12.901	12.913	1.270
1.280	12.913	12.925	12.937	12.949	12.961	12.973	12.985	12.997	13.010	13.022	13.034	1.280	12.913	12.925	12.937	12.949	12.961	12.973	12.985	12.997	13.010	13.022	13.034	1.280
1.290	13.034	13.046	13.058	13.070	13.082	13.094	13.107	13.119	13.131	13.143	13.155	1.290	13.034	13.046	13.058	13.070	13.082	13.094	13.107	13.119	13.131	13.143	13.155	1.290
1.300	13.155	13.167	13.179	13.191	13.203	13.216	13.228	13.240	13.252	13.264	13.276	1.300	13.155	13.167	13.179	13.191	13.203	13.216	13.228	13.240	13.252	13.264	13.276	1.300
1.310	13.276	13.288	13.300	13.313	13.325	13.337	13.349	13.361	13.373	13.385	13.397	1.310	13.276	13.288	13.300	13.313	13.325	13.337	13.349	13.361	13.373	13.385	13.397	1.310
1.320	13.397	13.410	13.422	13.434	13.446	13.458	13.470	13.482	13.495	13.507	13.519	1.320	13.397	13.410	13.422	13.434	13.446	13.458	13.470	13.482	13.495	13.507	13.519	1.320
1.330	13.519	13.531	13.543	13.555	13.567	13.579	13.592	13.604	13.616	13.628	13.640	1.330	13.519	13.531	13.543	13.555	13.567	13.579	13.592	13.604	13.616	13.628	13.640	1.330
1.340	13.640	13.652	13.664	13.677	13.689	13.701	13.713	13.725	13.737	13.749	13.761	1.340	13.640	13.652	13.664	13.677	13.689	13.701	13.713	13.725	13.737	13.749	13.761	1.340
1.350	13.761	13.774	13.786	13.798	13.810	13.822	13.834	13.846	13.859	13.871	13.883	1.350	13.761	13.774	13.786	13.798	13.810	13.822	13.834	13.846	13.859	13.871	13.883	1.350
1.360	13.883	13.895	13.907	13.919	13.931	13.943	13.956	13.968	13.980	13.992	14.004	1.360	13.883	13.895	13.907	13.919	13.931	13.943	13.956	13.968	13.980	13.992	14.004	1.360
1.370	14.004	14.016	14.028	14.040	14.053	14.065	14.077	14.089	14.101	14.113	14.125	1.370	14.004	14.016	14.028	14.040	14.053	14.065	14.077	14.089	14.101	14.113	14.125	1.370
1.380	14.125	14.138	14.150	14.162	14.174	14.186	14.198	14.210	14.222	14.235	14.247	1.380	14.125	14.138	14.150	14.162	14.174	14.186	14.198	14.210	14.222	14.235	14.247	1.380
1.390	14.247	14.259	14.271	14.283	14.295	14.307	14.319	14.332	14.344	14.356	14.368	1.390	14.247	14.259	14.271	14.283	14.295	14.307	14.319	14.332	14.344	14.356	14.368	1.390
1.400	14.368	14.380	14.392	14.404	14.416	14.429	14.441	14.453	14.465	14.477	14.489	1.400	14.368	14.380	14.392	14.404	14.416	14.429	14.441	14.453	14.465	14.477	14.489	1.400
1.410	14.489	14.501	14.513	14.526	14.538	14.550	14.562	14.574	14.586	14.598	14.610	1.410	14.489	14.501	14.513	14.526	14.538	14.550	14.562	14.574	14.586	14.598	14.610	1.410
1.420	14.610	14.622	14.635	14.647	14.659	14.671	14.683	14.695	14.707	14.719	14.731	1.420	14.610	14.622	14.635	14.647	14.659	14.671	14.683	14.695	14.707	14.719	14.731	1.420
1.430	14.731	14.744	14.756	14.768	14.780	14.792	14.804	14.816	14.828	14.840	14.852	1.430	14.731	14.744	14.756	14.768	14.780	14.792	14.804	14.816	14.828	14.840	14.852	1.430
1.440	14.852	14.865	14.877	14.889	14.901	14.913	14.925	14.937	14.949	14.961	14.973	1.440	14.852	14.865	14.877	14.889	14.901	14.913	14.925	14.937	14.949	14.961	14.973	1.440
1.450	14.973	14.985	14.998	15.010	15.022	15.034	15.046	15.058	15.070	15.082	15.094	1.450	14.973	14.985	14.998	15.010	15.022	15.034	15.046	15.058	15.070	15.082	15.094	1.450
1.460	15.094	15.106	15.118	15.130	15.143	15.155	15.167	15.179	15.191	15.203	15.215	1.460	15.094	15.106	15.118	15.130	15.143	15.155	15.167	15.179	15.191	15.203	15.215	1.460
1.470	15.215	15.227	15.239	15.251	15.263	15.275	15.287	15.299	15.311	15.324	15.336	1.470	15.215	15.227	15.239	15.251	15.263	15.275	15.287	15.299	15.311	15.324	15.336	1.470
1.480	15.336	15.348	15.360	15.372	15.384	15.396	15.408	15.420	15.432	15.444	15.456	1.480	15.336	15.348	15.360	15.372	15.384	15.396	15.408	15.420	15.432	15.444	15.456	1.480
1.490	15.456	15.468	15.480	15.492	15.504	15.516	15.528	15.540	15.552	15.564	15.576	1.490	15.456	15.468	15.480	15.492	15.504	15.516	15.528	15.540	15.552	15.564	15.576	1.490
1.500	15.576	15.589	15.601	15.613	15.625	15.637	15.649	15.661	15.673	15.685	15.697	1.500	15.576	15.589	15.601	15.613	15.625	15.637	15.649	15.661	15.673	15.685	15.697	1.500
1.510	15.697	15.709	15.721	15.733	15.745	15.757	15.769	15.781	15.793	15.805	15.817	1.510	15.697	15.709	15.721	15.733	15.745	15.757	15.769	15.781	15.793	15.805	15.817	1.510
1.520	15.817	15.829	15.841	15.853	15.865	15.877	15.889	15.901	15.913	15.925	15.937	1.520	15.817	15.829	15.841	15.853	15.865	15.877	15.889	15.901	15.913	15.925	15.937	1.520
1.530	15.937	15.949	15.961	15.973	15.985	15.997	16.009	16.021	16.033	16.045	16.057	1.530	15.937	15.949	15.961	15.973	15.985	15.997	16.009	16.021	16.033	16.045	16.057	1.530
1.540	16.057	16.069	16.080	16.092	16.104	16.116	16.128	16.140	16.152	16.164	16.176	1.540	16.057	16.069	16.080	16.092	16.104	16.116	16.128	16.140	16.152	16.164	16.176	1.540
1.550	16.176	16.188	16.200	16.212	16.224	16.236	16.248	16.260	16.272	16.284	16.296	1.550	16.176	16.188	16.200	16.212	16.224	16.236	16.248	16.260	16.272	16.284	16.296	1.550
1.560	16.296	16.308	16.319	16.331	16.343	16.355	16.367	16.379	16.391	16.403	16.415	1.560	16.296	16.308	16.319	16.331	16.343	16.355	16.367	16.379	16.391	16.403	16.415	1.560
1.570	16.415	16.427	16.439	16.451	16.462	16.474	16.486	16.498	16.510	16.522	16.534	1.570	16.415	16.427	16.439	16.451	16.462	16.474	16.486	16.498	16.510	16.522	16.534	1.570
1.580	16.534	16.546	16.558	16.569	16.581	16.593	16.605	16.617	16.629	16.641	16.653	1.580	16.534	16.546	16.558	16.569	16.581	16.593	16.605	16.617	16.629	16.641	16.653	1.580
1.590	16.653	16.664	16.676	16.688	16.700	16.712	16.724	16.736	16.747	16.759	16.771	1.590	16.653	16.664	16.676	16.688	16.700	16.712	16.724	16.736	16.747	16.759	16.771	1.590
1.600	16.771	16.783	16.795	16.807	16.819	16.830	16.842	16.854	16.866	16.878	16.890	1.600	16.771	16.783	16.795	16.807	16.819	16.830	16.842	16.854	16.866	16.878	16.890	1.600
1.610	16.890	16.901	16.913	16.925	16.937	16.949	16.960	16.972	16.984	16.996	17.008	1.610	16.890	16.901	16.913	16.925	16.937	16.949	16.960	16.972	16.984	16.996	17.008	1.610
1.620	17.008	17.019	17.031	17.043	17.055	17.067	17.078	17.090	17.102	17.114	17.125	1.620	17.008	17.019	17.031	17.043	17.055	17.067	17.078	17.090	17.102	17.114	17.125	1.620
1.630	17.125	17.137	17.149	17.161	17.173	17.184	17.196	17.208																

TEMPERATURES IN DEGREES C (IP15 1988)\*

REFERENCE JUNCTION AT 0 DEGREES C

TYPE T THERMOCOUPLES

THERMOCUPRIC VOLTAGE IN ABSOLUTE MILLIVOLTS

DEG C	0	1	2	3	4	5	6	7	8	9	10	DEG C
-270	-6.298	-6.236	-6.187	-6.139	-6.092	-6.046	-6.001	-5.957	-5.914	-5.872	-5.831	-270
-260	-6.232	-6.187	-6.143	-6.099	-6.056	-6.014	-5.972	-5.931	-5.890	-5.850	-5.810	-260
-250	-6.165	-6.122	-6.079	-6.037	-5.995	-5.954	-5.913	-5.873	-5.833	-5.793	-5.753	-250
-240	-6.105	-6.114	-6.122	-6.130	-6.138	-6.146	-6.153	-6.160	-6.167	-6.174	-6.181	-240
-230	-6.047	-6.018	-6.028	-6.039	-6.049	-6.058	-6.068	-6.078	-6.087	-6.096	-6.105	-230
-220	-5.992	-5.988	-5.994	-5.999	-6.004	-6.009	-6.014	-6.019	-6.024	-6.029	-6.034	-220
-210	-5.939	-5.953	-5.967	-5.981	-5.995	-6.009	-6.023	-6.037	-6.051	-6.065	-6.079	-210
-200	-5.889	-5.923	-5.957	-5.991	-6.025	-6.059	-6.093	-6.127	-6.161	-6.195	-6.229	-200
-190	-5.842	-5.896	-5.950	-6.004	-6.058	-6.112	-6.166	-6.220	-6.274	-6.328	-6.382	-190
-180	-5.799	-5.873	-5.947	-6.021	-6.095	-6.169	-6.243	-6.317	-6.391	-6.465	-6.539	-180
-170	-5.760	-5.854	-5.948	-6.042	-6.136	-6.230	-6.324	-6.418	-6.512	-6.606	-6.700	-170
-160	-5.725	-5.839	-5.953	-6.067	-6.181	-6.295	-6.409	-6.523	-6.637	-6.751	-6.865	-160
-150	-5.694	-5.828	-5.962	-6.096	-6.230	-6.364	-6.498	-6.632	-6.766	-6.900	-7.034	-150
-140	-5.667	-5.821	-5.975	-6.129	-6.283	-6.437	-6.591	-6.745	-6.899	-7.053	-7.207	-140
-130	-5.644	-5.818	-5.992	-6.166	-6.340	-6.514	-6.688	-6.862	-7.036	-7.210	-7.384	-130
-120	-5.625	-5.819	-6.013	-6.207	-6.401	-6.595	-6.789	-6.983	-7.177	-7.371	-7.565	-120
-110	-5.611	-5.825	-6.039	-6.253	-6.467	-6.681	-6.895	-7.109	-7.323	-7.537	-7.751	-110
-100	-5.602	-5.836	-6.070	-6.304	-6.548	-6.792	-7.036	-7.280	-7.524	-7.768	-8.012	-100
-90	-5.600	-5.854	-6.108	-6.372	-6.636	-6.900	-7.164	-7.428	-7.692	-7.956	-8.220	-90
-80	-5.605	-5.878	-6.161	-6.435	-6.709	-6.983	-7.257	-7.531	-7.805	-8.079	-8.353	-80
-70	-5.625	-5.911	-6.214	-6.487	-6.761	-7.035	-7.309	-7.583	-7.857	-8.131	-8.405	-70
-60	-5.659	-5.965	-6.277	-6.560	-6.843	-7.126	-7.409	-7.692	-7.975	-8.258	-8.541	-60
-50	-5.707	-6.033	-6.344	-6.637	-6.930	-7.223	-7.516	-7.809	-8.102	-8.395	-8.688	-50
-40	-5.768	-6.115	-6.416	-6.719	-7.022	-7.325	-7.628	-7.931	-8.234	-8.537	-8.840	-40
-30	-5.841	-6.208	-6.509	-6.812	-7.115	-7.418	-7.721	-8.024	-8.327	-8.630	-8.933	-30
-20	-5.926	-6.303	-6.605	-6.908	-7.211	-7.514	-7.817	-8.120	-8.423	-8.726	-9.029	-20
-10	-6.024	-6.411	-6.714	-7.017	-7.320	-7.623	-7.926	-8.229	-8.532	-8.835	-9.138	-10
0	-6.135	-6.522	-6.825	-7.128	-7.431	-7.734	-8.037	-8.340	-8.643	-8.946	-9.249	0
10	-6.258	-6.645	-6.948	-7.251	-7.554	-7.857	-8.160	-8.463	-8.766	-9.069	-9.372	10
20	-6.393	-6.780	-7.083	-7.386	-7.689	-7.992	-8.295	-8.598	-8.901	-9.204	-9.507	20
30	-6.540	-6.927	-7.230	-7.533	-7.836	-8.139	-8.442	-8.745	-9.048	-9.351	-9.654	30
40	-6.700	-7.087	-7.390	-7.693	-7.996	-8.299	-8.602	-8.905	-9.208	-9.511	-9.814	40
50	-6.873	-7.260	-7.563	-7.866	-8.169	-8.472	-8.775	-9.078	-9.381	-9.684	-9.987	50
60	-7.060	-7.447	-7.750	-8.053	-8.356	-8.659	-8.962	-9.265	-9.568	-9.871	-10.174	60
70	-7.261	-7.648	-7.951	-8.254	-8.557	-8.860	-9.163	-9.466	-9.769	-10.072	-10.375	70
80	-7.476	-7.863	-8.166	-8.469	-8.772	-9.075	-9.378	-9.681	-9.984	-10.287	-10.590	80
90	-7.705	-8.092	-8.395	-8.698	-9.001	-9.304	-9.607	-9.910	-10.213	-10.516	-10.819	90
100	-7.948	-8.335	-8.638	-8.941	-9.244	-9.547	-9.850	-10.153	-10.456	-10.759	-11.062	100
110	-8.205	-8.592	-8.895	-9.198	-9.501	-9.804	-10.107	-10.410	-10.713	-11.016	-11.319	110
120	-8.476	-8.863	-9.166	-9.469	-9.772	-10.075	-10.378	-10.681	-10.984	-11.287	-11.590	120
130	-8.761	-9.148	-9.451	-9.754	-10.057	-10.360	-10.663	-10.966	-11.269	-11.572	-11.875	130
140	-9.060	-9.447	-9.750	-10.053	-10.356	-10.659	-10.962	-11.265	-11.568	-11.871	-12.174	140
150	-9.373	-9.760	-10.063	-10.366	-10.669	-10.972	-11.275	-11.578	-11.881	-12.184	-12.487	150
160	-9.700	-10.087	-10.390	-10.693	-10.996	-11.299	-11.602	-11.905	-12.208	-12.511	-12.814	160
170	-10.043	-10.430	-10.733	-11.036	-11.339	-11.642	-11.945	-12.248	-12.551	-12.854	-13.157	170
180	-10.402	-10.789	-11.092	-11.395	-11.698	-11.999	-12.302	-12.605	-12.908	-13.211	-13.514	180
190	-10.777	-11.164	-11.467	-11.770	-12.073	-12.376	-12.679	-12.982	-13.285	-13.588	-13.891	190
200	-11.168	-11.555	-11.858	-12.161	-12.464	-12.767	-13.070	-13.373	-13.676	-13.979	-14.282	200
210	-11.575	-11.962	-12.265	-12.568	-12.871	-13.174	-13.477	-13.780	-14.083	-14.386	-14.689	210
220	-12.000	-12.387	-12.690	-12.993	-13.296	-13.599	-13.902	-14.205	-14.508	-14.811	-15.114	220
230	-12.443	-12.830	-13.133	-13.436	-13.739	-14.042	-14.345	-14.648	-14.951	-15.254	-15.557	230
240	-12.905	-13.292	-13.595	-13.898	-14.201	-14.504	-14.807	-15.110	-15.413	-15.716	-16.019	240
250	-13.387	-13.774	-14.077	-14.380	-14.683	-14.986	-15.289	-15.592	-15.895	-16.198	-16.501	250
260	-13.889	-14.276	-14.579	-14.882	-15.185	-15.488	-15.791	-16.094	-16.397	-16.700	-17.003	260
270	-14.412	-14.800	-15.103	-15.406	-15.709	-16.012	-16.315	-16.618	-16.921	-17.224	-17.527	270
280	-14.955	-15.342	-15.645	-15.948	-16.251	-16.554	-16.857	-17.160	-17.463	-17.766	-18.069	280
290	-15.518	-15.905	-16.208	-16.511	-16.814	-17.117	-17.420	-17.723	-18.026	-18.329	-18.632	290
300	-16.101	-16.488	-16.791	-17.094	-17.397	-17.700	-18.003	-18.306	-18.609	-18.912	-19.215	300
310	-16.704	-17.091	-17.394	-17.697	-17.999	-18.302	-18.605	-18.908	-19.211	-19.514	-19.817	310
320	-17.327	-17.714	-18.017	-18.320	-18.623	-18.926	-19.229	-19.532	-19.835	-20.138	-20.441	320
330	-17.970	-18.357	-18.660	-18.963	-19.266	-19.569	-19.872	-20.175	-20.478	-20.781	-21.084	330
340	-18.633	-19.020	-19.323	-19.626	-19.929	-20.232	-20.535	-20.838	-21.141	-21.444	-21.747	340
350	-19.316	-19.703	-20.006	-20.309	-20.612	-20.915	-21.218	-21.521	-21.824	-22.127	-22.430	350
360	-20.020	-20.407	-20.710	-21.013	-21.316	-21.619	-21.922	-22.225	-22.528	-22.831	-23.134	360
370	-20.745	-21.132	-21.435	-21.738	-22.041	-22.344	-22.647	-22.950	-23.253	-23.556	-23.859	370
380	-21.492	-21.879	-22.182	-22.485	-22.788	-23.091	-23.394	-23.697	-24.000	-24.303	-24.606	380
390	-22.261	-22.648	-22.951	-23.254	-23.557	-23.860	-24.163	-24.466	-24.769	-25.072	-25.375	390
400	-23.053	-23.440	-23.743	-24.046	-24.349	-24.652	-24.955	-25.258	-25.561	-25.864	-26.167	400