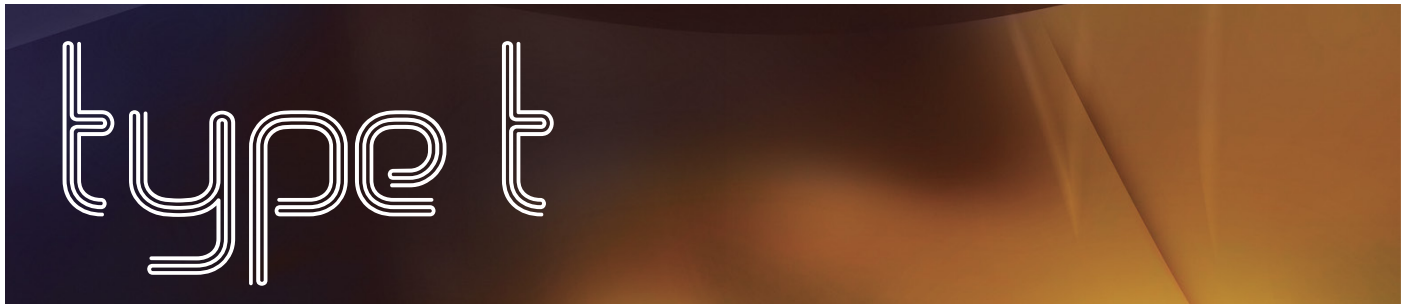


Thermocouple Alloys



Type T is used in laboratory and industry in the temperature range – 185°C to + 370°C when high temperature accuracy is required (as for temperature sensors for cars). It can be used in oxidizing or reducing atmospheres and proves to be relatively stable at lower temperatures. If you need this material for treatment below 0°C, please let us know when ordering in order for us to guide you towards a special quality. Aperam Alloys Rescal only deliver negative leg (TN). The positive leg, made of pure copper is being widely available.

1. Chemical composition and mechanical properties

Alloy	Chemical composition			Melting point. °C	Resistivity	Density g/cm ³	Temp. coef. of resistance (x10 ⁻⁶ /°C)	Linear expansion coef. x10 ⁻⁶ /°C)	Thermal Conductivity W m ⁻¹ °C ⁻¹ at 20°C
	Ni	Cu	Others						
TP (+)	100	-	-	1083	1.720	8.92	4000	16.60	388
TN (-)	44	Balance	Mn+	1210	49.00	8.90	60	14	21.20

Resistivity: micro ohm-cm at 20°C - Temperature coefficient by °C from 20 up to 100°.

2. Maximum operating temperatures

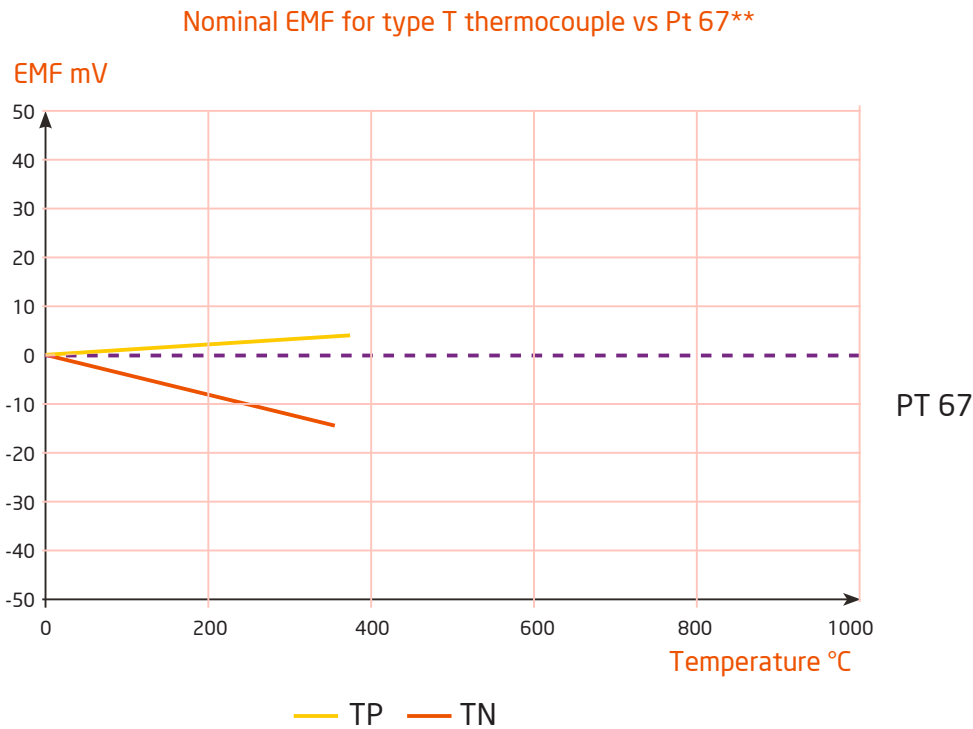
Please note that the data below are given as indicative values.

As per norm ASTM

Thermocouple	Dia 3.26 mm	Dia 1.63 mm	Dia 0.81 mm	Dia 0.51 mm	Dia 0.25 mm
TP - TN	-	360° C	260° C	200° C	150° C

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3. TP and TN vs Platinum *



* Rescal does not supply the TP leg

** For extension cables EMF values: please refer to thermocouple graphics until 200°C

4. Couple TP/TN EMF reference table (mV)

°C	0	10	20	30	40	50	60	70	80	90	100
-200	-5.603	-5.439	-5.261	-5.07	-4.865	-4.6481	-4.4191	-4.1771	-3.923	-3.657	-3.379
-100	-3.379	-3.089	-2.788	-2.476	-2.153	-1.819	-1.475	-1.121	-0.757	-0.383	0
0	0	0.391	0.789	1.196	1.612	2.036	2.468	2.909	3.358	3.814	4.279
100	4.279	4.75	5.228	5.714	6.206	6.704	7.209	7.72	8.235	8.76	9.288
200	9.288	9.822	10.362	10.908	11.458	12.013	12.574	13.139	13.709	14.283	14.862
300	14.8621	15.445	16.032	16.624	17.219	17.819	18.422	19.03	19.6411	20.255	20.872

5. Recommendations for use

It is recommended not to exceed 370°C. At this temperature, the copper (positive leg) would oxidize.

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6. Conversion tables

TN wire

B&S or AWG					SWG					Metric			
B&S or AWG	Dia mm	Ohm/m	Length m / kg	Weight g / m	SWG	Dia mm	Ohm/m	Length m / kg	Weight g / m	Diameter mm	Ohm/m	Length m / kg	Weight g / m
										4	0.039	8.94	111
8	3.251	0.059	13.5	73.9	10	3.251	0.059	13.5	73.9	3.26	0.059	13,5	73,9
10	2.591	0.0929	21.3	46.9	13	2.337	0.114	26.2	38.2	3	0.0693	15,9	62,9
11	2.311	0.116	26.8	37.3	14	2.032	0.151	34.6	28.8	2.5	0.0998	22,9	43,7
12	2.057	0.147	33.8	29.6	15	1.829	0.186	42.7	23.4	2.05	0.148	34,0	29,3
13	1.829	0.186	42.7	23.4	16	1.626	0.236	54.1	18.5	1.8	0.192	44,1	22,6
14	1.626	0.236	54.1	18.5	18	1.219	0.419	96.2	10.4	1.63	0.235	53,2	18,6
16	1.295	0.372	85.3	11.7	19	1.016	0.604	138.6	7.21	1.29	0.375	85,9	11,6
20	0.813	0.943	216.4	4.62	21	0.813	0.943	216.4	4.62	0.81	0.951	218,0	4,58
24	0.311	2.389	548	1.82	25	0.508	2.417	554	1.8	0.5	5.092	572	1,75
28	0.32	6.092	1397	0.715	30	0.315	6.287	1441	0.693	0.3	6.932	1589	0,629
32	0.203	15.14	3471	0.288	35	0.213	13.75	3153	0.317	0.2	15.59	3576	0,279

Any intermediate diameter non above listed can be supplied upon request.

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