INTERNATIONAL
RECOMMENDATION

OIML R 84

Edition 2003 (E)

Platinum, copper, and nickel resistance thermometers (for industrial and commercial use)

Thermomètres à résistance de platine, de cuivre, et de nickel
(à usages techniques et commerciaux)

ORGANISATION INTERNATIONALE
DE MÉTROLOGIE LÉGALE

INTERNATIONAL ORGANIZATION
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OIML R 84 Edition 2003 (E)

Contents

Foreword

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This publication - reference OIML R 84 Edition 2003 (E) - was developed by the OIML Technical Subcommittee TC 11/SC 1 *Resistance thermometers*. It was approved for final publication by the International Committee of Legal Metrology in 2002 and will be submitted to the International Conference of Legal Metrology in 2004 for formal sanction.

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Platinum, copper, and nickel resistance thermometers (for industrial and commercial use)

1 Scope

This Recommendation specifies the metrological characteristics required for resistance thermometers having one or more sensing elements made of platinum, copper or nickel, designed for use in measuring temperatures in the range from – 200 °C to + 850 °C, or in a part of this range.

This Recommendation also sets out the methods and general specifications of the equipment for verifying resistance thermometers. It applies neither to instruments for the measurement of resistance, nor to indicating instruments.

Values of temperatures in this Recommendation correspond to the International Temperature Scale of 1990 (ITS-90) [1].

2 Terms and designations

2.1 Resistance thermometer

Temperature responsive device consisting of one or more sensing resistors with wire leads and protective sheath.

2.2 Resistance R_0 of the resistance thermometer

Resistance of the resistance thermometer at the temperature 0 °C.

2.3 Relative resistance W_t^I of the resistance thermometer at the temperature t

Ratio of the thermometer resistance at the temperature t to its resistance at the temperature 0 °C.

2.4 Nominal values of resistance R_0 and relative resistance W_{100}^I of the resistance thermometer

Those specified in 4.1 and Table 1.

2.5 Tolerance

Maximum permissible deviation of the temperature t (°C), calculated from the thermometer resistance using the relative resistance tables (Annex A), from the true (measured) temperature.

2.6 The three types of resistance thermometers have the designations, nominal values of relative resistance W_{100}^I, and tolerance classes specified in Table 1.

3 Units of measurement

3.1 The resistance of thermometers and thermometer insulation shall be measured in ohms (Ω).

3.2 The temperature shall be measured in degrees Celsius (°C).

Table 1 Designations, nominal values of relative resistance and tolerance classes of resistance thermometers

Type of thermometer	Designation	Nominal values of relative resistance W_{100}^I	Tolerance class
Platinum	PRT PRT	1.385 1.391	AA, A, B, C, D AA, A, B
Copper	CRT CRT	1.426 1.428	B, C B, C
Nickel	NRT	1.617	C

4 Metrological requirements

4.1 The preferred nominal values of resistance are: 1, 10, 25, 50, 100, 120, 200, 500, 1 000 and 10 000 Ω.

The nominal value of the resistance R_0 of the resistance thermometer at 0 °C shall be not less than 1 Ω.

For resistance thermometers of type CRT the nominal resistance at 0 °C shall be not less than 9 Ω.

4.2 The maximum permissible deviations (tolerances) of the temperature calculated from the resistance R_t of the thermometers using the tables of relative resistances (Annex A), from the true measured temperature t shall be not more than the values given in Table 2.

Note: Tolerances in the range 650 °C to 850 °C shall be established by manufacturers in the technical specifications.

4.3 After being held for 250 hours at the maximum operating temperature, and then for 250 hours at the minimum operating temperature, the resistance R_0 of the thermometer shall not change by more than the tolerances specified in Table 2 for t = 0 °C.

5 Technical specifications

5.1 The resistance thermometer shall be protected from corrosion, the ingress of moisture, and mechanical and thermal stresses.

5.2 The electrical insulation resistance between the sensing element and the protective sheath, and between the electrical circuits of thermometers with more than one sensing element, shall be not less than the following:

a) at temperatures between 15 °C and 35 °C (with relative humidity of ambient air between 45 % and 85 %): 100 MΩ,

b) at maximum operating temperature the electrical insulation resistance shall be not less than the values given in Table 3.

Table 3 Minimum values of electrical insulation resistance

Maximum operating temperature, °C	Minimum value of the insulation resistance, MΩ
from 100 to 250	20
from 251 to 450	2
from 451 to 650	0.5
from 651 to 850	0.2

5.3 The resistance thermometer may have two, three or four leads, according to the circuitry intended for the measurement of resistance.

5.4 Resistance thermometers to be used under particular conditions must meet the requirements for stability as well as for technical and metrological

Table 2 Tolerances

Type of thermometer	Tolerance class	Temperature range of validity of tolerances, °C	Tolerance value °C
PRT	AA	– 50 ... + 250	$(0.1\ °C + 1.7 \times 10^{-3}\ \lvert t \rvert)$
	A	– 100 ... + 450	$(0.15\ °C + 2.0 \times 10^{-3}\ \lvert t \rvert)$
	B	– 196 ... + 650	$(0.30\ °C + 5.0 \times 10^{-3}\ \lvert t \rvert)$
	C	– 196 ... + 650	$(0.6\ °C + 1.0 \times 10^{-2}\ \lvert t \rvert)$
	D	– 196 ... + 650	$(1.2\ °C + 1.2 \times 10^{-2}\ \lvert t \rvert)$
CRT	B	– 180 ... + 200	$(0.25\ °C + 3.5 \times 10^{-3}\ \lvert t \rvert)$
	C	– 180 ... + 200	$(0.5\ °C + 6.5 \times 10^{-3}\ \lvert t \rvert)$
NRT	C	0 ... + 180	$(0.2\ °C + 8.0 \times 10^{-3}\ \lvert t \rvert)$
	C	– 60 ... 0	$(0.2\ °C + 16.5 \times 10^{-3}\ \lvert t \rvert)$

Note: $\lvert t \rvert$ is the temperature in °C without a sign

characteristics prescribed by the national standards or technical specifications for those types of resistance thermometers.

6 Markings

6.1 Each resistance thermometer shall bear the following markings on the protective sheath or on a label attached to it:

- type designation,
- serial number,
- nominal value of R_0,
- range of operating temperatures,
- nominal value of W^{I}_{100},
- tolerance class,
- manufacturer's trade mark,
- month and year of manufacture.

Note: If this information is presented in the form of symbols, they shall be presented in the above order.

6.2 A resistance thermometer may also bear other markings.

6.3 The official verification mark shall be placed on the protective sheath of the resistance thermometer or on a label attached to it.

7 Metrological controls

When, in any country, resistance thermometers are subject to state metrological controls, the latter shall include the controls in 7.1 through 7.4.

7.1 The type of the resistance thermometer shall meet the requirements of the present Recommendation (type approval). A special authorization shall be given to modify the type approved based on type evaluation. The list of examinations and tests of type evaluation is given in Table 4.

7.2 New resistance thermometers shall be subject to initial verification. The list of examinations and tests for initial verification is given in Table 4.

7.3 Resistance thermometers in use shall be subject to subsequent verification to ensure that their metrological

Table 4 List of tests for metrological controls of resistance thermometers

Type of examinations and tests	**Clause of the Recommendation**	**Examination & test procedure**	**Mandatory execution**		
			For type evaluation	*For initial verification*	*For subsequent verification*
External examination (inspection)	5.1, 5.3, 6.1, 6.2, 6.3	9.1	+	+	+
Measurement of the electrical insulation resistance	5.2	9.2	+	+	-
Checking of stability	4.3	9.3	+	-	-
Measurement of the thermometer resistance at 0 °C	4.1, 4.2	9.3	+	+	+
Measurement of the thermometer resistance at a temperature t in the range 80 °C to 250 °C, at the lower limit of the operating range (if below 0 °C), and at the upper limit of the operating range (if above 450 °C)	4.2	9.4	+	+	-

characteristics are maintained. The list of examinations and tests for subsequent verification is given in Table 4.

7.4 Resistance thermometers to be used under particular conditions shall be subject to additional types of tests according to the technical specifications of a resistance thermometer.

8 Conditions of testing and applicable equipment

8.1 The conditions of testing shall be the following:

- ambient temperature: 25 °C ± 10 °C,
- relative humidity: from 30 % to 80 %,
- atmospheric pressure: from 84 kPa to 106.7 kPa.

8.2 The resistance of the thermometer under test in a thermally controlled bath, shall be measured under the following conditions:

- the depth of immersion shall be such as to ensure negligible heat loss during verification, related to the maximum permissible tolerances in 4.2;
- the value of the measurement current in the resistance thermometer shall be such that the power dissipation does not cause a rise in temperature which exceeds 20 % of the tolerance value of the declared tolerance class (4.2).

8.3 The thermometer resistance at 0 °C is measured using a bath filled with finely crushed pure ice (or snow) made from distilled water and flooded with distilled water (10 to 20 mm below the level of ice). The water used to prepare the ice and the water added to the ice must be pure. The mixture of ice and water must be well packed in order to eliminate air bubbles. The mixture must be packed before measurement and, from time to time, between measurements. The resistance thermometer must be surrounded by a layer of the mixture, the thickness of which is not less than 30 mm.

An alternative method would be to use a thermally controlled bath as described in 8.4 except for the temperature which shall be 0 °C. The calibration uncertainty at 0 °C must not exceed ± 0.04 °C.

8.4 The thermometer resistance at a temperature t in the range 80 °C to 250 °C, at the lower limit of the operating range (if below 0 °C), and at the upper limit of the operating range (if above 450 °C) is measured using a thermally controlled bath and a reference resistance thermometer. The expanded calibration uncertainty must not exceed either ± 0.04 °C or 10 % of the tolerance value, whichever is larger.

9 Procedures for metrological controls

9.1 External examination (inspection)

The protective sheath shall be examined externally to check that it shows no trace of deterioration visible to the naked eye. This inspection also verifies that the resistance thermometer complies with administrative requirements (marking, verification mark, etc.).

9.2 Measurement of the electrical insulation resistance

To measure insulation resistance, the terminals of the resistance thermometer shall be shorted to each other and connected to one of the terminals of a megohmmeter, having the operating DC voltage range from 10 V to 100 V. The conductor of the second terminal of the megohmmeter shall be clamped to the protective sheath of the resistance thermometer.

The insulation resistance at the maximum operating temperature of the thermometer shall be measured at a DC voltage not exceeding 10 V, the thermometer having been held at the maximum operating temperature for 2 hours.

Note: If the sheath of the resistance thermometer is made of insulating material, resistance of the electrical insulation between the sheath and the sensing element does not need to be checked.

9.3 Checking the stability of a resistance thermometer

To check the stability of a resistance thermometer, its resistance shall be measured at the temperature 0 °C (meeting the conditions of 8.2 and 8.3), then the thermometer is held for 250 hours at the maximum operating temperature and then for the other 250 hours at the minimum operating temperature. After that the measurement of resistance at 0 °C shall be repeated. The resistance R_0 of the thermometer shall satisfy the requirements for stability specified in 4.3.

9.4 Measurement of the resistance of a thermometer at a temperature *t* in the range 80 °C to 250 °C, at the lower limit of the operating range (if below 0 °C) and at the upper limit of the operating range (if above 450 °C)

The thermometer resistance at a temperature t is measured in a thermally controlled bath by comparison with a reference resistance thermometer (conditions in 8.2 and 8.4 shall be met). If the temperature t is above 500 °C, the thermometer should not be removed quickly from the bath to ambient air, but should be cooled slowly with the rate less than 1 °C/min to 500 °C, and then removed from the thermally controlled bath.

To verify the conformity to the requirements of 4.2, the value of $W_t^I = R_t/R_0$, where R_t and R_0 are the thermometer resistance values at temperatures t and 0 °C, shall be calculated. Then the calculated value of the temperature t shall be determined using Tables A.1–A.5 in Annex A. The calculated value and that measured by a reference thermometer shall not differ from each other by more than the tolerances specified in Table 2.

To determine the relative resistance W_{100}^I, the resistance R_{100} can be calculated by interpolation using the extrapolation equations or the tables given in Annex A.

9.5 A test report is presented on the basis of the test results. Its format is given in Annex B.

9.6 A verification certificate is issued or a verification mark is put on a resistance thermometer by a metrological organization on the basis of the verification results.

References

[1] H. Preston-Thomas, "The International Temperature Scale of 1990 (ITS-90)", *Metrologi*a, Vol. 27, pp. 3–10, (1990); *ibi*d. p. 107.

[2] IEC 60751 (1983.01), -am1 (1986.01), -am2 (1995.07): Industrial Platinum Resistance Thermometer Sensors. *International Electrotechnical Commission, Geneva*

Annex A
Tables of relative resistances
(Mandatory)

Table A.1 R_t/R_0 Ratios for platinum resistance thermometers with $R_{100}/R_0 = 1.385$

(Correspond to IEC 60751 [2])

Interpolation equation for the temperature range from – 200 °C to 0 °C: $R_t/R_0 = 1 + At + Bt^2 + C(t - 100)\,t^3$

from 0 °C to 850 °C: $R_t/R_0 = 1 + At + Bt^2$

where $A = 3.9083 \times 10^{-3}$ °C^{-1}

$B = -5.7750 \times 10^{-7}$ °C^{-2}

$C = -4.1830 \times 10^{-12}$ °C^{-4}

R_t/R_0

°C	0	– 5	– 10	– 15	– 20	– 25	– 30	– 35	– 40	– 45	– 50	– 55	– 60	– 65	– 70	– 75	– 80	– 85	– 90	– 95	– 100
– 100	0.6026	0.5823	0.5619	0.5415	0.5211	0.5006	0.4800	0.4594	0.4388	0.4180	0.3972	0.3764	0.3554	0.3344	0.3134	0.2922	0.2710	0.2497	0.2283	0.2068	0.1852
0	1.0000	0.9804	0.9609	0.9412	0.9216	0.9019	0.8822	0.8625	0.8427	0.8229	0.8031	0.7832	0.7633	0.7433	0.7233	0.7033	0.6833	0.6631	0.6430	0.6228	0.6026

R_t/R_0

°C	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
0	1.0000	1.0195	1.0390	1.0585	1.0779	1.0973	1.1167	1.1361	1.1554	1.1747	1.1940	1.2132	1.2324	1.2516	1.2708	1.2899	1.3090	1.3280	1.3471	1.3661	1.3851
100	1.3851	1.4040	1.4229	1.4418	1.4607	1.4795	1.4983	1.5171	1.5358	1.5546	1.5733	1.5919	1.6105	1.6291	1.6477	1.6663	1.6848	1.7033	1.7217	1.7402	1.7586
200	1.7586	1.7769	1.7953	1.8136	1.8319	1.8501	1.8684	1.8866	1.9047	1.9229	1.9410	1.9591	1.9771	1.9951	2.0131	2.0311	2.0490	2.0670	2.0848	2.1027	2.1205
300	2.1205	2.1383	2.1561	2.1738	2.1915	2.2092	2.2268	2.2445	2.2621	2.2796	2.2972	2.3147	2.3321	2.3496	2.3670	2.3844	2.4018	2.4191	2.4364	2.4537	2.4709
400	2.4709	2.4881	2.5053	2.5225	2.5396	2.5567	2.5738	2.5908	2.6078	2.6248	2.6418	2.6587	2.6756	2.6925	2.7093	2.7261	2.7429	2.7597	2.7764	2.7931	2.8098
500	2.8098	2.8264	2.8430	2.8596	2.8762	2.8927	2.9092	2.9256	2.9421	2.9585	2.9749	2.9912	3.0075	3.0238	3.0401	3.0563	3.0725	3.0887	3.1049	3.1210	3.1371
600	3.1371	3.1531	3.1692	3.1852	3.2012	3.2171	3.2330	3.2489	3.2648	3.2806	3.2964	3.3122	3.3279	3.3436	3.3593	3.3750	3.3906	3.4062	3.4218	3.4373	3.4528
700	3.4528	3.4683	3.4838	3.4992	3.5146	3.5300	3.5453	3.5606	3.5759	3.5912	3.6064	3.6216	3.6367	3.6519	3.6670	3.6821	3.6971	3.7121	3.7271	3.7421	3.7570
800	3.7570	3.7719	3.7868	3.8017	3.8165	3.8313	3.8460	3.8608	3.8755	3.8902	3.9048										

Table A.2 R_t/R_0 Ratios for platinum resistance thermometers with $R_{100}/R_0 = 1.391$

Interpolation equation for the temperature range from – 200 °C to 0 °C: $R_t/R_0 = 1 + At + Bt^2 + C(t - 100)\,t^3$

from 0 °C to 850 °C: $R_t/R_0 = 1 + At + Bt^2$

where $A = 3.9690 \times 10^{-3}$ °C^{-1}

$B = -5.8410 \times 10^{-7}$ °C^{-2}

$C = -4.1830 \times 10^{-12}$ °C^{-4}

R_t/R_0

°C	0	– 5	– 10	– 15	– 20	– 25	– 30	– 35	– 40	– 45	– 50	– 55	– 60	– 65	– 70	– 75	– 80	– 85	– 90	– 95	– 100
– 100	0.5964	0.5758	0.5552	0.5345	0.5137	0.4929	0.4720	0.4511	0.4301	0.4091	0.3880	0.3668	0.3456	0.3242	0.3028	0.2814	0.2598	0.2382	0.2165	0.1947	0.1728
0	1.0000	0.9801	0.9603	0.9403	0.9204	0.9004	0.8804	0.8603	0.8403	0.8202	0.8000	0.7798	0.7596	0.7394	0.7191	0.6987	0.6784	0.6579	0.6375	0.6170	0.5964

R_t/R_0

°C	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
0	1.0000	1.0198	1.0396	1.0594	1.0791	1.0989	1.1185	1.1382	1.1578	1.1774	1.1970	1.2165	1.2360	1.2555	1.2750	1.2944	1.3138	1.3331	1.3525	1.3718	1.3911
100	1.3911	1.4103	1.4295	1.4487	1.4679	1.4870	1.5061	1.5252	1.5442	1.5632	1.5822	1.6012	1.6201	1.6390	1.6578	1.6767	1.6955	1.7143	1.7330	1.7517	1.7704
200	1.7704	1.7891	1.8077	1.8263	1.8449	1.8635	1.8820	1.9005	1.9189	1.9373	1.9557	1.9741	1.9925	2.0108	2.0290	2.0473	2.0655	2.0837	2.1019	2.1200	2.1381
300	2.1381	2.1562	2.1743	2.1923	2.2103	2.2282	2.2462	2.2641	2.2819	2.2998	2.3176	2.3354	2.3531	2.3709	2.3886	2.4062	2.4239	2.4415	2.4591	2.4766	2.4941
400	2.4941	2.5116	2.5291	2.5465	2.5639	2.5813	2.5987	2.6160	2.6333	2.6505	2.6678	2.6850	2.7021	2.7193	2.7364	2.7535	2.7705	2.7876	2.8046	2.8215	2.8385
500	2.8385	2.8554	2.8723	2.8891	2.9059	2.9227	2.9395	2.9562	2.9729	2.9896	3.0063	3.0229	3.0395	3.0560	3.0726	3.0891	3.1055	3.1220	3.1384	3.1548	3.1711
600	3.1711	3.1874	3.2037	3.2200	3.2363	3.2525	3.2686	3.2848	3.3009	3.3170	3.3331	3.3491	3.3651	3.3811	3.3970	3.4129	3.4288	3.4447	3.4605	3.4763	3.4921
700	3.4921	3.5078	3.5235	3.5392	3.5549	3.5705	3.5861	3.6017	3.6172	3.6327	3.6482	3.6636	3.6791	3.6945	3.7098	3.7251	3.7405	3.7557	3.7710	3.7862	3.8014
800	3.8014	3.8165	3.8317	3.8468	3.8618	3.8769	3.8919	3.9069	3.9218	3.9367	3.9516										

Table A.3 R_t/R_0 Ratios for copper resistance thermometers with $R_{100}/R_0 = 1.426$

Interpolation equation for the temperature range from – 50 °C to 200 °C: $R_t/R_0 = 1 + At$

where $A = 4.26 \times 10^{-3}$ °C^{-1}

R_t/R_0																				
°C	0	– 5	– 10	– 15	– 20	– 25	– 30	– 35	– 40	– 45	– 50	– 55	– 60	– 65	– 70	– 75	– 80	– 85	– 90	– 95	– 100
0	1.0000	0.9787	0.9574	0.9361	0.9148	0.8935	0.8722	0.8509	0.8296	0.8083	0.7870										

R_t/R_0																				
°C	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
0	1.0000	1.0213	1.0426	1.0639	1.0852	1.1065	1.1278	1.1491	1.1704	1.1917	1.2130	1.2343	1.2556	1.2769	1.2982	1.3195	1.3408	1.3621	1.3834	1.4047	1.4260
100	1.4260	1.4473	1.4686	1.4899	1.5112	1.5325	1.5538	1.5751	1.5964	1.6177	1.6390	1.6603	1.6816	1.7029	1.7242	1.7455	1.7668	1.7881	1.8094	1.8307	1.8520

Table A.4 R_t/R_0 Ratios for copper resistance thermometers with $R_{100}/R_0 = 1.428$

Interpolation equation for the temperature range from – 180 °C to 0 °C: $R_t/R_0 = 1 + At + Bt(t + 6.7) + Ct^3$

from 0 °C to 200 °C: $R_t/R_0 = 1 + At$

where $A = 4.28 \times 10^{-3}$ °C^{-1}

$B = – 6.2032 \times 10^{-7}$ °C^{-2}

$C = 8.5154 \times 10^{-10}$ °C^{-3}

R_t/R_0																					
°C	0	– 5	– 10	– 15	– 20	– 25	– 30	– 35	– 40	– 45	– 50	– 55	– 60	– 65	– 70	– 75	– 80	– 85	– 90	– 95	– 100
–100	0.5654	0.5432	0.5210	0.4988	0.4765	0.4542	0.4318	0.4094	0.3869	0.3644	0.3418	0.3192	0.2965	0.2738	0.2510	0.2282	0.2053				
0	1.0000	0.9786	0.9572	0.9357	0.9142	0.8927	0.8711	0.8495	0.8279	0.8063	0.7846	0.7628	0.7410	0.7192	0.6974	0.6755	0.6535	0.6315	0.6095	0.5875	0.5654

R_t/R_0																				
°C	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
0	1.0000	1.0214	1.0428	1.0642	1.0856	1.1070	1.1284	1.1498	1.1712	1.1926	1.2140	1.2354	1.2568	1.2782	1.2996	1.3210	1.3424	1.3638	1.3852	1.4066	1.4280
100	1.4280	1.4494	1.4708	1.4922	1.5136	1.5350	1.5564	1.5778	1.5992	1.6206	1.6420	1.6634	1.6848	1.7062	1.7276	1.7490	1.7704	1.7918	1.8132	1.8346	1.8560

Table A.5 R_t/R_0 Ratios for nickel resistance thermometers with $R_{100}/R_0 = 1.617$

Interpolation equation for the temperature range from – 60 °C to 100 °C: $R_t/R_0 = 1 + At + Bt^2$

from 100 °C to 180 °C: $R_t/R_0 = 1 + At + Bt^2 + C\,(t - 100)\,t^3$

where $A = 5.4963 \times 10^{-3}\ °C^{-1}$

$B = 6.7556 \times 10^{-6}\ °C^{-2}$

$C = 9.2004 \times 10^{-9}\ °C^{-3}$

R_t/R_0																				
°C	0	– 5	– 10	– 15	– 20	– 25	– 30	– 35	– 40	– 45	– 50	– 55	– 60	– 65	– 70	– 75	– 80	– 85	– 90	– 95	– 100
0	1.0000	0.9727	0.9457	0.9191	0.8928	0.8668	0.8412	0.8159	0.7910	0.7663	0.7421	0.7181	0.6945								

R_t/R_0																				
°C	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
0	1.0000	1.0277	1.0556	1.0840	1.1126	1.1416	1.1710	1.2006	1.2307	1.2610	1.2917	1.3227	1.3541	1.3858	1.4178	1.4502	1.4829	1.5160	1.5494	1.5831	1.6172
100	1.6172	1.6521	1.6874	1.7232	1.7595	1.7962	1.8334	1.8710	1.9091	1.9477	1.9868	2.0264	2.0665	2.1071	2.1482	2.1899	2.2321				

Annex B

Test Report Format

Note: This Annex is informative with regard to implementation of this Recommendation in national regulations; however, use of the Test Report Format is mandatory for the application of the Recommendation within the *OIML Certificate System for Measuring Instruments*.

Report on testing a resistance thermometer

Reference: OIML R 84 (2003) No. of report:.....

Type of thermometer: ..... Serial number: .....

Temperature range:..... Tolerance class: .....

Measuring current: .....

Manufacturer:.....

Address: .....

.....

.....

Customer: .....

Address: .....

.....

.....

Additional parameters (if specified by the Manufacturer):.....

.....

.....

.....

Type of examinations and tests	Test procedure (clause of OIML R 84)	Reference value	Actual value	Pass / fail
1 External examination (inspection)	9.1			
2 Electrical insulation resistance between the sensing element and the protective sheath	9.2			
3* Electrical insulation resistance between the sensing elements of the sensors having two sensing elements	9.2			
4 Thermometer stability	9.3			
5 Thermometer resistance at the temperature 0 °C (R_0)	9.3			
6 Thermometer resistance at a temperature t in the range 80 °C to 250 °C	9.4			
7 Thermometer resistance at the lower limit of the operating range (if below 0 °C)	9.4			
8 Thermometer resistance at the upper limit of the operating range (if above 450 °C)	9.4			
9 Calculated value of the relative resistance at the temperature 100 °C (W^{I}_{100})	9.4			
10* Resistance of the connecting wires in two-wire thermometers	Specified by the manufacturer			
11* Thermal response time	Specified by the manufacturer			
12* Resistance to vibration, mechanical shock and shaking	Specified by the manufacturer			
13* Resistance to variations of temperature and humidity of the environment	Specified by the manufacturer			

**Note:* Tests 3 and 10–13 are performed if there are relevant requirements given in the thermometer specifications. Additional tests also can be performed for thermometers operating in particular conditions.

Conclusion: ☐ PASS ☐ FAIL

Date: ..... Evaluator: .....

Notes, comments and remarks (if any) in addition to the examination and test results

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