

KOREAN INDUSTRIAL STANDARD

Indicating Resistance Thermometers

1. Scope

This Korean Industrial Standard specifies indicating resistance thermometers of analog system (including those with amplifier. Hereinafter referred to as the "thermometers") consisting of combination of a moving coil type indicator and the resistance bulb specified in KS C 1603 (Resistance Bulbs). For thermometers with a control mechanism and/or an alarm mechanism, this standard applies as practical.

2. Definitions

For the purpose of this standard, the following definition apply, and others are in accordance with KS A 3009 [Glossary of Terms Used in Instrumentation (General)].

(1) Indicator

A moving coil type indicator. For an indicator with amplifier, this term means the indicator including the amplifier.

(2) adjusting rheostat

A resistance to adjust external resistance of an indicator to the nominal value.

(3) external resistance

The resistance of the circuit consisting of conductors connected to terminals of indicator in external conductors of resistance bulb and the like. However, the resistance of the resistance element is not included.

Further, for an indicator having an adjusting rheostat inside its measuring terminals, external resistance means the above-mentioned external resistance plus the adjusting rheostat.

(4) nominal value of external resistance

The value of external resistance indicated on an indicator

(5) measuring range of indicator

All range of scale graduated on an indicator

(6) effective measuring range of indicator

The range in which the accuracy specified in this standard must be guaranteed measuring the measuring range of an indicator.

(7) scale span

The difference between the maximum scale value and minimum scale value. For example, in an indicator of -200 to 100°C , the scale span is 300°C .

Related Standards:

KS A 0006 Standard Atmospheric Conditions for Testings

KS A 3009 Glossary of Terms Used in Instrumentation (General)

KS C 1301 Insulation Resistance Testers (Magneto Generator Operated)

KS C 1302 Insulation Resistance Testers (Battery Operated)

KS C 1303 Electrical Indicating Instruments

KS C 1603 Resistance Bulbs

KS C 1606 Electrical Methods of Temperature Measurements

KS D 3503 Rolled Steel for General Structural Purposes

3. Classification

3.1 Class of Indicator

Indicators shall be classified by their accuracy as given in Table 1.

Table 1.

Class of indicator	Letter symbol
Class 0.5	0.5 or CLASS 0.5
Class 1.0	1.0 or CLASS 1.0
Class 2.0	2.0 or CLASS 2.0

Remarks 1. "CLASS" may be written in small letters.

2. Class 0.5 does not apply to indicators attached with amplifier.

3.2 Principle of Operation

The principle of operation of indicators shall be moving coil type. It may also include such system providing an amplifier.

3.3 Measuring Range of Indicator

The measuring ranges of indicators shall be given in Table 2, as a rule.

Table 2

Unit : °C	
0 to 50	100 to 300
0 to 100	200 to 400
0 to 150	300 to 500
0 to 200	− 20 to 30
0 to 300	− 50 to 50
0 to 400	− 50 to 100
0 to 500	− 200 to 50
	− 200 to 100

3.4 Effective Measuring Range of Indicator

The effective measuring range of an indicator shall be the whole measuring range of the indicator. However, the scale ranges exceeding the operating temperature range (−200 to 500°C) given in Table 5 of KS C 1603 are excluded.

4. Performances

4.1 Tolerances

4.1.1 Tolerances of Indicator Itself

The tolerances of an indicator itself shall be such that the error in indicator is within the limits given in Table 3 when the indicator is tested through its effective measuring range in accordance with 7.3.1

Table 3

Class of indicator	Tolerances (in % of scale span)
Class 0.5	± 0.5
Class 1.0	± 1.0
Class 2.0	± 2.0

4.1.2 Tolerances of Thermometer

The tolerances of a thermometer are the sum of individual tolerances of the indicator and resistance bulb which compose the thermometer.

4.2 Operation and Characteristics

4.2.1 Respose

An indicator shall be good in response and its response time shall be 5 sec. or less when test in accordance with 7.3.2

4.2.2 Hysterisis Error

The hysteresis error of an indicator shall not exceed the relevant limit of Table 4 when tested through the effective measuring range of the indicator in accordance with 7.3.3

Table 4

Class of indicator	Allowable limits of hysteresis error (in % of scale span)
Class 0.5	0.4
Class 1.0	1.0
Class 2.0	2.0

4.2.3 Influence of Position

The influence of position on an indicator shall not exceed the relevant limit of Table 5 when tested in accordance with 7.3.4 (1). In a portable indicator, the influence shall not exceed the relevant limit of Table 5 when further tested in accordance with 7.3.4 (2)

Table 5

Class of indicator	Allowable limits (in % of scale span)	
	Deviation caused by 7.3.4 (1)	Difference in indicated value caused by 7.3.4 (2)
Class 0.5	2.0	0.5
Class 1.0	2.0	1.0
Class 2.0	4.0	2.0

4.2.4 Drift of Zero Point

The drift of zero point (the minimum scale value for an indicator without zero point) of an indicator shall not exceed the relevant limit of Table 6 when the test is carried out on the indicator without amplifier in accordance with 7.3.5 (1) or on the indicator with amplifier in accordance with 7.3.5 (2)

Table 6

Class of indicator	Allowable limits (in % of scale span)	
	Indicator without amplifier	Indicator with amplifier
Class 0.5	0.2	—
Class 1.0	0.5	0.8
Class 2.0	1.0	1.5

4.2.5 Influence of Ambient Temperature

The influence of ambient temperature on an indicator shall be such that the variation of error shall not exceed the relevant limit of Table 7 when tested in accordance with 7.3.6

Table 7

Class of indicator	Allowable limits of variation of error (in % of scale span)
Class 0.5	0.3
Class 1.0	0.5
Class 2.0	1.0

4.2.6 Influence of External Magnetic Field

The influence of external magnetic field on an indicator shall be such that the variation of error shall not exceed the relevant limit of Table 8 when tested in accordance with 7.3.7

Table 8

Class of indicator	Allowable limits of variation of error (in % of scale span)
Class 0.5	2
Class 1.0	4
Class 2.0	4

4.2.7 Influence of External Steel Product

The influence of external steel product on an indicator shall be such that the variation of error shall not exceed relevant limit of Table 9 when tested in accordance with 7.3.8