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(RCJ/JSA)

Fire hazard testing— Part 11-2 : Test flames— 1 kW nominal pre-mixed flame— Apparatus, confirmatory test arrangement and guidance

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Reliability Center for Electronic Components of Japan (RCJ)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS C 60695-11-2:1995** is replaced with this Standard.

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JIS C 60695-11 consists of the following 6 parts under the general title “*Fire hazard testing*”:

JIS C 60695-11-2 *Part 11-2: Test flames—1 kW nominal pre-mixed flame—Apparatus, confirmatory test arrangement and guidance*

TS C 60695-11-3 *Part 11-3: Test flames—500 W flames—Apparatus and confirmational test methods*

TS C 60695-11-4 *Part 11-4: Test flames—50 W flame—Apparatus and confirmational test methods*

JIS C 60695-11-5 *Part 11-5: Test flames—Needle-flame test method—Apparatus, confirmatory test arrangement and guidance*

TS C 60695-11-21 *Part 11-21: Test flames—500 W vertical flame test method for tubular polymeric materials* (to be published)

TS C 60695-11-40 *Part 11-40: Test flames—Confirmatory tests—Guidance*

**Fire hazard testing—
Part 11-2 : Test flames—
1 kW nominal pre-mixed flame—
Apparatus, confirmatory test
arrangement and guidance**

Introduction

This Japanese Industrial Standard has been prepared based on the first edition of **IEC 60695-11-2** published in 2003 without modifying the technical contents.

The portions underlined with dots are the matters not stated in the original International Standard.

The test method for testing electrotechnical products with regard to fire hazard is to duplicate exactly the conditions occurring in practice. In most instances this is not possible. Accordingly, for practical reasons, the testing of electrotechnical products with regard to fire hazard is best conducted by simulating as closely as possible the actual effects occurring in practice.

This part of **JIS C 60695** provides a general description of the apparatus required to produce the test flame and a general description of the principle of a calibration procedure to check that the flame produced meets the requirements. Detailed information for the confirmation of a test flame can be found in **TS C 60695-11-40 : 2006 (IEC/TS 60695-11-40 [1]¹⁾**.

Note ¹⁾ Numbers in square brackets refer to the bibliography.

1 Scope

This part of **JIS C 60695** gives the detailed requirements for the production of a 1 kW nominal, propane based pre-mixed type test flame.

It is applicable to electrotechnical equipment, its sub-assemblies and components and to solid electrical insulating materials or other combustible materials.

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications according to **IEC Guide 104** in the preparation of its publications.

NOTE: The International Standard corresponding to this part of **JIS C 60695** is as follows.

IEC 60695-11-2:2003 *Fire hazard testing—Part 11-2: Test flames—1 kW nominal pre-mixed flame—Apparatus, confirmatory test arrangement and guidance* (IDT)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. If the indication of the year is given to these referred standards, only the edition of indicated year applies but the revision and amendments made thereafter do not apply.

JIS C 60695-2-4-0:1995 *Fire hazard testing Part 2: Test methods—Section 4 / sheet 0: Diffusion type and premixed type flame test methods*

NOTE: Corresponding International Standard: **IEC 60695-2-4/0:1991**²⁾ *Fire hazard testing—Part 2: Test methods—Section 4 / sheet 0: Diffusion type and premixed type flame test methods* (IDT)

Note ²⁾ **IEC 60695-2-4/0:1991** was withdrawn in December, 2005.

JIS C 1602:1995 *Thermocouples*

NOTE: Corresponding International Standard: **IEC 60584-1:1977** *Thermocouples—Part 1: Reference tables* and **IEC 60584-2:1982** *Thermocouples—Part 2: Tolerances* (Overall evaluation: MOD)

JIS C 60695-4:1999 *Terminology concerning fire test*

NOTE: Corresponding International Standard: **IEC 60695-4:1993**³⁾ *Fire hazard testing—Part 4: Terminology concerning fire tests* and Amendment 1: 1995 (IDT)

Note ³⁾ **IEC 60695-4:2005** *Fire hazard testing—Part 4: Terminology concerning fire tests for electrotechnical products* was published.

IEC Guide 104:1997 *The preparation of safety publications and the use of basic safety publications and group safety publications*

ISO/IEC 13943:2000 *Fire Safety—Vocabulary*

3 Term and definition

For the purposes of this document, the definitions taken from **JIS C 60695-4** and **ISO/IEC 13943**, along with the following, apply.

3.1 standardized 1 kW test flame

test flame conforming to this part of **JIS C 60695** and meeting all of the requirements given in clauses 4 to 6

4 Burner/supply arrangement

4.1 Requirements

A standardized 1 kW flame, according to this method, is one that is produced

- using hardware according to figures A.1 to A.8,
- supplied with propane gas of purity not less than 98 % at a flow rate equivalent to 650 ml/min $\pm$ 30 ml/min at 23 °C, 0.1 MPa,

- supplied with air at a flow rate equivalent to $10 \text{ L/min} \pm 0.5 \text{ L/min}$ at 23°C , 0.1 MPa . There shall be a means of measuring the ambient air temperature and pressure. The air shall be essentially free of oil and water.

The flame shall be symmetrical, stable and give a result of $45 \text{ s} \pm 5 \text{ s}$ in the confirmatory test described in clause 6.

The confirmatory test arrangement shown in figure A.8 shall be used.

The approximate dimensions of the flame, when measured in the laboratory fumehood/chamber (see 4.2.8) and viewed in subdued light, are as follows:

- blue cone height: 50 mm to 60 mm ;
- overall height: 170 mm to 190 mm .

4.2 Apparatus and fuel

4.2.1 Burner

The burner shall be in accordance with figures A.1 to A.5 inclusive.

The fuel gas shall be propane with a purity of not less than 98 %.

NOTE : The gas injector and flame stabilizer are removable for cleaning purposes.

4.2.2 Flowmeters

Flowmeters shall be appropriate

- for the measurement of the gas flow rate of 650 ml/min at 23°C , 0.1 MPa with a tolerance of $\pm 2 \%$,
- for the measurement of the air flow rate of 10 L/min at 23°C , 0.1 MPa with a tolerance of $\pm 2 \%$.

NOTE : Mass flowmeters are the preferred means of controlling accurately the input flow rates of fuel and air to the burner. Other methods may be used if they can show equivalent accuracy.

4.2.3 Manometers

Two manometers are required, appropriate for the measurement of pressures in the range of 0 MPa to 0.1 MPa . Water manometers may be used for this purpose. They shall be adapted to read 0 MPa to 0.1 MPa .

NOTE : Manometers are not required when mass flowmeters are used.

4.2.4 Control valves

Two control valves are required to set the flow of gas and air to within the required tolerances.

4.2.5 Copper block

A copper block 9 mm in diameter, with a mass of $10.00 \text{ g} \pm 0.05 \text{ g}$ in the fully machined but undrilled state, as described in figure A.7, shall be made from electrolytic tough pitch copper⁴⁾ Cu-ETP USN C11000 [2] specified in **ASTM B187**.