



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS K 6261-2 : 2017

(JRMA/JSA)

**Rubber, vulcanized or
thermoplastic—Determination of
low-temperature properties—
Part 2: Low-temperature brittleness**

ICS 83.060

Reference number : JIS K 6261-2 : 2017 (E)

PROTECTED BY COPYRIGHT



Documents

Document Sharing Hub

12 S

Date of Establishment: 2017-10-20

Date of Public Notice in Official Gazette: 2017-10-20

Investigated by: Japanese Industrial Standards Committee
Standards Board for ISO area
Technical Committee on Chemical Products and
Analytical Methods

JIS K 6261-2:2017, First English edition published in 2018-01

Translated and published by: Japanese Standards Association
Mita MT Building, 3-13-12, Mita, Minato-ku, Tokyo, 108-0073 JAPAN

In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

© JSA 2018

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Printed in Japan

PROTECTED BY COPYRIGHT

Contents

	Page
Introduction	1
1 Scope	1
2 Normative references	2
3 Terms and definitions	2
4 Apparatus	3
5 Calibration	5
6 Test pieces	5
6.1 Shape and dimensions of test piece	5
6.2 Number of test pieces	6
6.3 Measurement of test piece dimensions	6
6.4 Selection of test pieces	6
7 Preparation of test piece and time interval between conditioning and testing	6
8 Procedures	6
8.1 Procedure A (brittleness temperature)	6
8.2 Procedure B (determination of 50 % brittleness temperature)	7
8.3 Procedure C (testing at a specified temperature)	8
8.4 Expression of test results	8
9 Precision	8
10 Test report	9
Annex A (normative) Calibration schedule	10
Annex B (informative) Precision	12
Annex JA (informative) Comparison table between JIS and corresponding International Standard	14

Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal for establishment of Japanese Industrial Standard submitted by The Japan Rubber Manufacturers Association (JRMA)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law. Consequently **JIS K 6261**:2006 has been withdrawn and partially replaced with this Standard.

This **JIS** document is protected by the Copyright Law.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, applications for a patent after opening to the public or utility model rights. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying any of such patent rights, applications for a patent after opening to the public or utility model rights.

JIS K 6261 series consists of the following 4 parts under the general title “*Rubber, vulcanized or thermoplastic—Determination of low-temperature properties*”:

Part 1: General introduction and guide

Part 2: Low-temperature brittleness

Part 3: Low temperature stiffening (Gehman test)

Part 4: Low-temperature retraction (TR test)

Rubber, vulcanized or thermoplastic— Determination of low-temperature properties—Part 2: Low-temperature brittleness

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 812:2011**, Edition 3, with some modifications of the technical contents.

The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JA.

1 Scope

This Standard specifies a method for determining the brittle temperature of the rubber materials based on the state of brittle failure of test pieces when they are impacted under specified conditions.

Three procedures are described:

Procedure A: determination of the brittleness temperature

Procedure B: determination of the brittleness temperature for 50 % failure

Procedure C: determination of the number of test pieces failing when impacted at a specified temperature

NOTE 1 Procedure C is used in the classification of rubber materials and for specification purposes.

NOTE 2 The temperatures determined by this test method do not necessarily relate to the lowest temperature at which the material can be used since the brittleness will be affected by the test conditions and especially by the level of impact. Data obtained by this method are, therefore, intended to be used to predict the behaviour of rubbers at low temperatures only in applications in which the conditions of deformation are similar to those specified in the test.

The procedure most appropriate for the intended purpose of test shall be selected.

NOTE 3 The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 812:2011 *Rubber, vulcanized or thermoplastic—Determination of low-temperature brittleness* (MOD)

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 21-1**.

WARNING 1 Persons using this Standard should be familiar with normal laboratory practice. This Standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this Standard to establish appropriate safety and health practices.

WARNING 2 Certain procedures specified in this Standard might involve the use or generation of substances, or the generation of waste, that could constitute a local environmental hazard. Reference should be made to related laws and regulations on safe handling and disposal after use.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 0209-1 *ISO general purpose metric screw threads—Tolerances—Part 1: Principles and basic data*

JIS K 6200 *Rubber—Vocabulary*

JIS K 6250 *Rubber—General procedures for preparing and conditioning test pieces for physical test methods*

NOTE : Corresponding International Standard: ISO 23529 *Rubber—General procedures for preparing and conditioning test pieces for physical test methods* (MOD)

JIS Z 8401 *Guide to the rounding of numbers*

ISO 18899 *Rubber—Guide to the calibration of test equipment*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in JIS K 6200, and the following apply.

3.1 brittleness temperature

lowest temperature at which none of a set of test pieces fractures due to low-temperature embrittlement when tested under the specified conditions

3.2 50 % brittleness temperature

temperature at which 50 % of a set of test pieces fractures due to low-temperature embrittlement when tested under the specified conditions

3.3 testing speed

relative linear velocity at impact between the striking edge of the test apparatus and a clamped test piece

3.4 failure

any crack, fissure and/or hole visible to the naked eye, or complete separation into two or more pieces

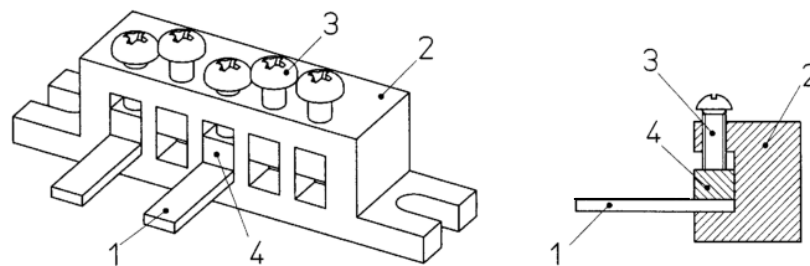
4 Apparatus

4.1 Summary

The test apparatus shall consist of a test piece clamp, a striker and a container for heat-transfer medium.

4.1.1 Test piece clamp, rigid and designed to hold the test piece(s) as cantilever beam(s), and to be fixed firmly to the test apparatus. Each individual test piece shall be held securely in the clamp by applying the same force using a torque driver or torque wrench. No excessive force deforming the test piece shall be applied. For example, when the test piece holding area is about 80 mm², the stable result can be obtained by clamping at a torque of 0.15 N·m to 0.25 N·m using the holding screw (3 in Figure 1) of which the nominal designation is M4 or M5 (in accordance with JIS B 0209-1).

An example of a suitable clamp is shown in Figure 1.



- 1 test piece
- 2 body of clamp
- 3 holding screw
- 4 test piece holder

Figure 1 Example of test piece clamp

4.1.2 Striker, with a striking edge moving at a speed of $2.0 \text{ m/s} \pm 0.2 \text{ m/s}$ in either rotational motion [Figure 2 a)] or straight-line motion [Figure 2 b)], and applying impact vertically on the upper surface of the test piece.

The speed shall be maintained within this range for at least 6 mm of travel following the impact.

In order to obtain a speed within the specified limits during and after impact, care shall be taken to ensure that the striking energy is sufficient. It has been found that a striking energy of at least 3.0 J per test piece is necessary.

4.1.3 Dimensions of apparatus The principal dimensions of the apparatus [see Figures 2 a) and b)] shall be as follows.

Positional relationship between the test piece clamp and striking edge shall be as shown in Figure 2.

- a) The striking edge shall have a radius of $1.6 \text{ mm} \pm 0.1 \text{ mm}$.
- b) The clearance between the striker and the test piece clamp at impact shall be $6.4 \text{ mm} \pm 0.3 \text{ mm}$.