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(IEC 68-2-29 : 1987)

Basic environmental testing procedures Part 2 : Tests Test Eb and guidance : Bump

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of International Trade and Industry through deliberations at Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law:

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

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JAPANESE INDUSTRIAL STANDARD

JIS C 60068-2-29:1995
(IEC 68-2-29 : 1987)

Basic environmental testing procedures

Part 2: Tests — Test Eb and guidance: Bump

Foreword as Japanese Industrial Standard

This Japanese Industrial Standard has been prepared based on the 2nd edition issued in 1987 of **IEC 68-2-29** [Basic environmental testing procedures - Part 2: Tests, Test Eb and guidance: Bump] without changing the technical contents and the structural style of the original standard.

Furthermore, the "Informative references" that are indicated by underline (dotted line) do not appear in the original international standard.

Informative references: **JIS B 0153** (Glossary of terms used in mechanical vibration and shock) (identical to **ISO 2041**)
JIS C 0010 (Environmental testing. Part 1: General and guidance) (identical to **IEC 68-1**).
JIS C 0041 (Basic environmental testing procedures, Part 2: Tests, Test Ea and guidance: Shock) (identical to **IEC 68-2-27**)
IEC 68-2-29 Basic environmental testing procedures, Part 2: Tests, Test Eb and guidance: Bump
JIS C 0043 (Environmental testing, Part 2: Tests, Test Ec: Drop and topple, primarily for equipment-type specimens) and **IEC 68-2-31** (Test Ec: Drop and topple, primarily for equipment-type specimens) are identical.
JIS C 0044 (Environmental testing, Part 2: Tests, Test Ed: Free fall) and **IEC 68-2-32** (Test Ed: Free fall) are identical.
JIS C 0047 [Basic environmental testing. Part 2: Tests, Mounting of components, equipment and other articles for dynamic tests including shock (Ea), bump (Eb), vibration (Fc and Fd) and steady-state acceleration (Ga) and guidance] (identical to **IEC 68-2-47**)

INTRODUCTION

This test is applicable to components, equipments and other electrotechnical products, hereinafter referred to as "specimens", which, during transportation or in use, may be subjected to repetitive shocks. The bump test may also be used as a means of establishing the satisfactory design of a specimen in so far as its structural integrity is concerned and as a means of quality control. It consists basically of subjecting, on a bump tester, a specimen to repetitive shocks of a standard pulse shape with specified peak acceleration and duration.

Specification writers will find in Clause 11 a list of details to be considered for inclusion in specifications and in Appendix A the necessary guidance.

1. Object

To provide a standard procedure for determining the ability of a specimen to withstand specified severities of bump.

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2. General description of test

This standard is written in terms of a prescribed number of repetitive half-sine pulses with given peak acceleration and duration.

The purpose of the test is to reveal the accumulated damage or degradation caused by repetitive shocks, and to use the information, in conjunction with the relevant specification, to decide whether a specimen is acceptable or not. It may also be used, in some cases, to determine the structural integrity of specimens or as a means of quality control (see Clause A3.)

This test is primarily intended for unpackaged specimens and for items in their transport case when the latter may be considered as part of the specimen itself.

The bumps are not intended to reproduce those encountered in practice. Wherever possible, the test severity applied to the specimen should be such as to reproduce the effects of the actual transport or operational environment to which the specimen will be subjected, or to satisfy the design requirements if the object of the test is to assess structural integrity (see Clause A3).

For the purpose of this test the specimen is always fastened to the fixture or the table of the bump tester during conditioning.

In order to facilitate the use of this standard, references are given in the main part where the reader is invited to refer to Appendix A and the clause numbers in the main part are also referred to in Appendix A.

This standard is to be used in conjunction with JIS C 0010.

3. Definitions

The terms used are generally defined in JIS B 0153 and JIS C 0010.

The following additional terms and definitions are also applicable for the purposes of this standard.

3.1 *Fixing point*

Part of the specimen in contact with the fixture or the table of the bump tester and which is normally used to fasten the specimen in service.

3.2 *Check point*

Fixing point nearest to the centre of the table surface of the bump tester, unless there is a fixing point having a more rigid connection to the table, in which case this latter point shall be used.

Note. — **This definition applies as there is only one nominated check point. Other standards in JIS C 0010 series contain definitions of "check point" applicable where provision is made for the control of the test by nomination of more than one check point.**

3.3 *Bump severity*

Combination of the peak accceleration, the duration of the nominal pulse and the number of bumps.

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3.4 *Velocity change*

Absolute value of the sudden change of speed resulting from the application of the specified acceleration.

4. Description of test apparatus

4.1 *Required characteristics*

When the bump tester and/or fixture are loaded with the specimen, the bumps applied at the check point shall have the following specified characteristics.

4.1.1 *Basic pulse shape*

The true value of each half-sine pulse shall be within the limits of tolerance shown by the solid line in Figure 1, page 13.

Note. — Where it is not practicable to achieve a pulse shape falling within the specified tolerance, the relevant specification should state the alternative procedure to be applied (see Clause A4).

4.1.2 *Repetition rate*

The repetition rate shall be such that the relative motion within the specimen between bumps shall be substantially zero and the value of acceleration at the check point shall be within the limits shown in Figure 1, page 13 (see Clause A6).

Note. — A rate of between one and three bumps per second is usually adequate.

4.1.3 *Velocity change tolerance*

The actual velocity change shall be within ±20% of the value corresponding to the nominal pulse.

Where the velocity change is determined by integration of the actual pulse, this shall be done from $0.4D$ before the pulse to $0.1D$ beyond the pulse, where D is the duration of the nominal pulse.

Note. — If the velocity change tolerance cannot be achieved without the use of elaborate facilities, the relevant specification should state the alternative procedure to be adopted (see Clauses A4 and A5).

4.1.4 *Transverse motion*

The positive or negative peak acceleration at the check point, perpendicular to the intended bump direction, shall not exceed 30% of the value of the peak acceleration of the nominal pulse in the intended direction, when determined with a measuring system in accordance with Sub-clause 4.2 (see Clause A4).

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