



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS Z 0200 : 2023

(JPI/JSA)

Packaging — Complete, filled transport
packages — General rules for the
compilation of performance test
schedules

ICS 55.180.40

Reference number : JIS Z 0200 : 2023 (E)

PROTECTED BY COPYRIGHT

Z 0200 : 2023

HN Documents
Document Sharing Hub

Date of Establishment: 1973-02-01

Date of Revision: 2023-01-20

Date of Public Notice in Official Gazette: 2023-01-20

Investigated by: Japanese Industrial Standards Committee
Standards Board for ISO area

JIS Z 0200 : 2023, First English edition published in 2024-01

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 2024

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

HN
Documents
Document Sharing Hub

Contents

	Page
Introduction	1
1 Scope	1
2 Normative references	1
3 Terms and definitions	3
4 Hazard	4
5 Preparation of the test schedule	5
5.1 Test items	5
5.2 Preparation of performance test schedule	7
5.3 Test sequence in performance test schedule	8
5.4 Test schedule of unit load	8
6 Test method	8
6.1 Laboratory atmosphere	8
6.2 Specimens	9
6.3 Conditioning of specimen	9
6.4 Vibration test	10
6.5 Drop/impact test	15
6.6 Compression test	20
6.7 Temperature and humidity environmental test	24
6.8 Low-pressure test	25
7 Test report	25
Annex JA (informative) Preparation of test schedule and example	27
Bibliography	32
Annex JB (informative) Comparison table between JIS and corresponding International Standard	33

Foreword

This Japanese Industrial Standard has been 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 Japan Packaging Institute (JPI)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS Z 0200** : 2020), which has been technically revised.

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

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

—•••••

Packaging — Complete, filled transport packages — General rules for the compilation of performance test schedules

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 4180 : 2019**, Edition 2, with some modifications of the technical contents to reflect the local conditions in Japan.

Annex JA is unique to **JIS** and not given in the corresponding International Standard. 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 JB.

1 Scope

This Standard specifies the method for evaluating the adequacy of protection of packaging against vibration, impact and compression that transport packages are subjected to during distribution. This Standard is not applicable to the transport packages which are subject to the Fire Service Act and other related laws and regulations.

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

ISO 4180 : 2019 *Packaging — Complete, filled transport packages — General rules for the compilation of performance test schedules* (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**.

2 Normative references

Part or all of the provisions of the following standards, 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 C 60068-1 *Environmental testing — Part 1 : General and guidance*

NOTE Normative reference in the corresponding International Standard : IEC 60068-1 : 2013 *Environmental testing — Part 1 : General and guidance*

JIS Z 0108 *Packaging — Vocabulary*

NOTE Normative reference in the corresponding International Standard : ISO 21067-1 *Packaging — Vocabulary — Part 1 : General terms*

JIS Z 0170 *Unit loads — Stability testing*

NOTE The corresponding International Standard to **JIS Z 0170** is **ISO 10531** (*Packaging — Complete, filled transport packages — Stability testing of unit loads*); though **ISO 10531** is listed in bibliography in the corresponding International Standard, **JIS** lists **JIS Z 0170** as a normative reference because its contents constitute part of the provisions.

JIS Z 0201 *Methods of designating on component parts and points of containers when testing*

NOTE Normative reference in the corresponding International Standard : **ISO 2206** *Packaging — Complete, filled transport packages — Identification of parts when testing*

JIS Z 0202 *Method of drop test for packaged freights*

NOTE The corresponding International Standard to **JIS Z 0202** is **ISO 2248** (*Packaging — Complete, filled transport packages — Vertical impact test by dropping*); though **ISO 2248** is listed in bibliography in the corresponding International Standard, **JIS** lists **JIS Z 0202** as a normative reference because its contents constitute part of the provisions.

JIS Z 0203 *Packaged freights — Conditioning for testing*

NOTE Normative reference in the corresponding International Standard : **ISO 2233** *Packaging — Complete, filled transport packages and unit loads — Conditioning for testing*

JIS Z 0205 *Packaged freights — Method of horizontal impact tests*

NOTE Normative reference in the corresponding International Standard : **ISO 2244** *Packaging — Complete, filled transport packages and unit loads — Horizontal impact tests*

JIS Z 0212 *Packaged freights and containers — Method of compression test*

NOTE The corresponding International Standard to **JIS Z 0212** is **ISO 12048** (*Packaging — Complete, filled transport packages — Compression and stacking tests using a compression tester*); though **ISO 12048** is listed in bibliography in the corresponding International Standard, **JIS** lists **JIS Z 0212** as a normative reference because its contents constitute part of the provisions.

JIS Z 0217 *Kraft paper sacks — Method of drop test*

JIS Z 0232 *Packaging — Complete, filled transport packages and unit loads — Method of vibration test*

NOTE Normative references in the corresponding International Standard : **ISO 8318** *Packaging — Complete, filled transport packages and unit loads — Sinusoidal vibration tests using a variable frequency* and **ISO 13355** *Packaging — Complete, filled transport packages and unit loads — Vertical random vibration test*

ISO 2234 *Packaging — Complete, filled transport packages and unit loads — Stacking tests using a static load*

NOTE **ISO 2234** is listed in bibliography in the corresponding International Standard, but listed in **JIS** as a normative reference because it consti-

tutes part of the provisions.

ISO 2873 *Packaging — Complete, filled transport packages and unit loads —
Low pressure test*

ISO 7965-2 *Sacks — Drop test — Part 2 : Sacks made from thermoplastic flexible
film*

EN 14149 *Packaging — Complete, filled transport packages and unit loads —
Impact test by rotational drop*

NOTE EN 14149 is listed in bibliography in the corresponding International Standard, but listed in JIS as a normative reference because it constitutes part of the provisions.

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions, and those given in JIS Z 0108 apply.

3.1

hazard

factor which brings a possibility of damage or deterioration of the value to the transport package or product in the distribution system

3.2

performance test schedule

test or series of tests conducted in a single laboratory to subject a transport package to various external forces assumed in logistics process to verify that it satisfies the desired packaging performance

3.3

acceleration power spectral density

limit value when the bandwidth is brought close to zero and the averaging time is brought close to infinity, expressed by per mean square value of the portion of the acceleration signal which passes the narrow band filter of a certain centre frequency

Note 1 to entry It may be referred to as PSD.

3.4

sweep cycle

scanning through the specified frequency band once in each direction, e.g. 10 Hz to 150 Hz to 10 Hz

3.5

rough road transportation

transportation on roads that are in poor condition and not allowing easy passage, such as roads with uneven surfaces

Note 1 to entry ... Rough roads are assumed to be unpaved roads, grassy areas, footpaths, gravel roads, and sandy areas.

4 Hazard

Typical hazards in the logistics process, and the related test method standards assuming those hazards are shown in Table 1.

Table 1 Expected hazard during logistics process, and test methods assuming those hazards

Basic factor in logistics	Hazard	Related test methods and standards	
Transport	Vibration during transportation	Random vibration test	JIS Z 0232
		Sinusoidal vibration test	JIS Z 0232
	Repetitive impact by bouncing	Vibration test at fixed low frequency	ISO 2247
	Horizontal impact by sudden stop or start	Horizontal impact test	JIS Z 0205
	Horizontal impact by linking work of railway freight car		
	Stacking stress during transportation	Random vibration test	JIS Z 0232
		Sinusoidal vibration test	JIS Z 0232
	Low pressure by high altitude	Low pressure test	ISO 2873
Handling	Drop impact by manual handling	Free-fall test, equivalent drop test, rotational drop test	JIS Z 0202
	Drop impact by mechanical handling		EN 14149
	Horizontal impact during handling by forklift, crane or belt conveyor as such	Horizontal impact test	JIS Z 0205
	Rough handling by rolling	Rolling test	ISO 2876
	Topple	Toppling test	ISO 8768
	Handling of unit load	Stability testing of unit loads	JIS Z 0170
Storage	Compression load in stacking storage in warehouse	Stacking load test	ISO 2234
		Compression test using a compression tester and stacking load test	JIS Z 0212
Climate	Temperature and humidity	High temperature test	JIS Z 0203
		High temperature/high humidity test	JIS C 60068-1
		Low temperature test	
	Wet, dewing	Water-spray test for transport package and container	JIS Z 0216

5 Preparation of performance test schedule

5.1 Test items

- The selection guide corresponding to the test methods shown in Table 1 is given in Table 2.
- The test item shall be selected from Table 2 depending on the expected or existing hazard and considering logistics-related elements which affect the transport package, and also added as related to hazards recognized by the agreement of the stakeholders.
- The characteristics (vulnerability to certain hazards) of the transport package, test equipment, test results and past damage experience should be considered when selecting the test item.
- Table 3 shows for reference an example of hazards and corresponding test items.

Table 2 Selection guide for test item and correspondent test method

Basic factor in logistics	Test item	Guide for selection of test		Test method
		Type of hazard	Examples of the related product or failure	
Transport	Random vibration test in general transportation	Vertical vibration in general transportation ^{a)}	— Electric, electronics or mechanical products — High precision surfaced products — Powder or granular products	6.4.3
	Sinusoidal vibration test in general transportation			6.4.4
	Random vibration test in rough road transportation	Repetitive shock by poor road		6.4.5
	Sinusoidal vibration test in rough road transportation			6.4.6
	Vibration test at fixed low frequency			ISO 2247
	Stacked vibration test	Stacking stress during transportation		6.4.7
	Low pressure test	Low pressure	— Burst, deformation — Lack of the contents 6.8	

Table 2 (concluded)

Basic factor in logistics	Test item	Guide for selection of test		Test method
		Type of hazard	Examples of the related product or failure	
Handling	Free-fall test Equivalent drop test	Drop impact by manual handling	— Electronic component or product which has mechanical structure — Liquid or semi-liquid product — Liquid, semi-liquid, powder or granular products which are weak to sharp item — Pressure sensitive product, powder or granular products	6.5.2 6.5.3
	Rotational drop test	Drop impact by machinery handling		6.5.4
	Horizontal impact test	Horizontal impact during handling or transportation		6.5.5
	Toppling test	Toppling during handling		ISO 8768
	Rolling test	Rough handling by rolling		ISO 2876
Storage	Compression test	Stacking compression in warehouse	Products for warehouse or container storage	6.6
Climate	Temperature and humidity environmental test	High temperature	Deformation or cracking by the high temperature	6.7
		High temperature/high humidity	— Sensitive to corrosion — Hygroscopic product — Mould, spoil, degrade	6.7
		Low temperature	— Degradation by contraction or embrittlement	6.7
	Water spray test	Rain	Wet damage	JIS Z 0216^{b)}
Note ^{a)} Random vibration has priority.				
Note ^{b)} Test condition may be specified by the agreement of the stakeholders.				

Table 3 Example of selected hazard and correspondent test item

No.	Activity	Hazard	Test item	Test method
1	Unitization at factory	Mechanical handling Manual handling..	Rotational drop test Free-fall test Equivalent drop test	6.5.4 6.5.2 6.5.3
2	Container loading by forklift	Mechanical handling	Rotational drop test	6.5.4
3	Transport to port	150 km, paved road, by trailer	Random vibration test	6.4.3 , 6.4.5
4	Storage at port	Maximum stack height : 2.4 m (inside freight container)	Compression test	6.6
		Temperature/humidity	Temperature and humidity environmental test	6.7
5	Load to container ship	Mechanical handling	Rotational drop test Horizontal impact test	6.5.4 6.5.5
6	Transport by ship	Vibration	---	---
		Maximum stack height : 2.4 m	Compression test	6.6
7	Unload from container ship	Mechanical handling	Rotational drop test	6.5.4
8	Transport container to warehouse	3 000 km, paved road, by trailer	Random vibration test	6.4.3 , 6.4.5
9	Storage operation by forklift	Mechanical handling	Rotational drop test	6.5.4
	Storage at warehouse	Maximum stack height : 5 m (2-tier pallet stacking)	Compression test	6.6
		Temperature/humidity	Temperature and humidity environmental test	6.7
10	De-vanning at warehouse Reload to local distribution truck	Manual handling	Free-fall test	6.5.2
11	Transport to final destination	Partially rough road transport	Random vibration test Random vibration in rough road transportation	6.4.3 6.4.5
		Partly air cargo	Low pressure test	6.8
12	Unloading at final destination	Manual handling	Free-fall test	6.5.2

5.2 Preparation of the test schedule

- The test schedule shall be prepared based on the hazards selected according to 5.1, as well as hazards recognized by the agreement of stakeholders. Follow Clause 6 for the selection of test level.
- The test level can be modified by the agreement of the stakeholders.

- Table 4 shows for reference an example of performance test schedule based on the hazards and correspondent test items shown in Table 3.

The method for and an example of preparation of test schedules for transport packages where distribution system is undefined and hazards unknown is shown in Annex JA.

Table 4 Example of performance test schedule based on Table 3

Test schedule	Example of test order			
	1	2	3	4
A : Sequential test using one specimen	Conditioning (6.3, Method B)	Compression test (6.6.2, Table 26, Level 2)	Random vibration test (6.4.3, Table 6, Level 1)	Free-fall test (6.5.2, Table 17)
B : Parallel test using multiple specimens (in case of four specimens)	Conditioning (6.3, Method A)	Random vibration test (6.4.3, Table 6, Level 1)	Random vibration test in rough road transportation (6.4.5, Table 12, Level 2)	Free-fall test (6.5.2, Table 17)
	Conditioning (6.3, Method B)	Compression test (6.6.2, Table 26, Level 2)	—	—
	Conditioning (6.3, Method B)	Temperature and humidity environmental test (6.7, Table 30, High temperature test)	—	—
	Conditioning (6.3, Method B)	Low pressure test (6.8, Table 31, Level 2)	—	—

5.3 Test sequence in performance test schedule

The test sequence should be decided by the agreement of the stakeholders taking into consideration the logistics process to the final destination of the transport package. Where the logistics process is unknown, one or a combination of the following tests may be conducted in any selected order based on assumed logistics process :

- compression test;
- vibration test;
- drop/impact test.

5.4 Test schedule of unit load

Refer to JIS Z 0170 for the handling and stability test of the unit load.

6 Test method

6.1 Laboratory atmosphere

The laboratory shall be in the following standard atmospheric conditions specified in

JIS C 60068-1, Table 2 :

- temperature : 15 °C to 35 °C;
- relative humidity : 25 %RH to 75 %RH;
- air pressure : 86 kPa to 106 kPa.

6.2 Specimens

6.2.1 Content of specimens

Each test specimen shall be filled with its intended content. However, where the intended content cannot be prepared, simulated or substituted content can be used, provided that the dimensions and physical properties of such content are as close as possible to those of the intended content. The specimen shall be packaged (closed, sealed, bundled as such) under shipment conditions.

6.2.2 Number of specimens

The preparation of several specimens is recommended for high reliability of test result. The number of specimens may be decided by the agreement of the stakeholders.

6.2.3 Degradation of specimen

In storing a specimen filled with contents, unless the performance of aged specimen materials is known, the effects of aged specimen on transportation should be considered (for example, replacement with a new specimen).

6.2.4 Identification of specimen

The identification of specimens shall be in accordance with **JIS Z 0201**.

6.3 Conditioning of specimen

For the vibration and drop tests, conditioning of specimen shall be applied in accordance with Table 5, depending on the purpose of test and specific conditions of transportation.

For the compression test, Method B shall be applied to control the temperature and humidity condition of the transportation environment.