



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS B 8942 : 2004
(JSIM/JSA)

**Automated storage and retrieval
system—General specifications**

ICS 55.220

Reference number : JIS B 8942 : 2004 (E)

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Health, Labour and Welfare, and 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 The Japan Society of Industrial Machinery Manufacturers (JSIM)/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 B 8942 : 1994** is replaced with this Standard.

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Date of Establishment: 1994-12-01

Date of Revision: 2004-02-25

Date of Public Notice in Official Gazette: 2004-02-25

Investigated by: Japanese Industrial Standards Committee

Standards Board

Technical Committee on Logistics and
Distribution of Goods

JIS B 8942:2004, First English edition published in 2004-12

Translated and published by: Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

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the original JIS is to be the final authority.

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Printed in Japan

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Automated storage and retrieval system— General specifications

1 Scope This Standard specifies the automated storage and retrieval system (hereafter referred to as “AS/RS”) which is composed of the rackings which mainly store cargos handled by pallet⁽¹⁾ (hereafter referred to as “unit-load”) among various handling forms of goods or packed cargos, the S/R machines and the storage and retrieval stations to load and unload the S/R machines.

Note (1) Following are Japanese Industrial Standards relating to pallets:

JIS Z 0106 *Glossary of terms relating to pallets*

JIS Z 0601 *Pool pallets—Flat pallets for through transit*

JIS Z 0602 *Test methods for flat pallets*

JIS Z 0604 *Wooden flat pallets*

JIS Z 0605 *Metal flat pallets*

JIS Z 0606 *Plastic flat pallets*

JIS Z 0610 *Box pallets*

JIS Z 0616 *Post pallets*

2 Normative reference The following standard contains provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent edition of the standard indicated below shall be applied.

JIS B 8941 *Automated storage and retrieval system—Vocabulary*

3 Definitions For the purpose of this Standard, the definitions given in **JIS B 8941** and the following definitions apply.

3.1 pallet supporting width length of the area of the pallet supported by the load support

3.2 clearance between columns dimension of clearance between the columns of adjacent rackings

3.3 entry prevention fence fence provided to separate persons from the dangerous area

3.4 shelf position storage position within a racking (lane, location for deep, travelling position and level)

3.5 boarded operation operation with the operator on the S/R machine

4 Classification AS/RS is classified as follows.

4.1 Classification by usage

4.1.1 Raw materials AS/RS

4.1.2 Parts AS/RS

4.1.3 In process AS/RS

4.1.4 Finished goods AS/RS

4.1.5 Distribution AS/RS

4.1.6 Other AS/RS

4.2 Classification by use environment

4.2.1 AS/RS

4.2.2 Low temperature AS/RS

4.2.3 High temperature AS/RS

4.2.4 Explosion-protected AS/RS

4.2.5 AS/RS under other environment

4.3 Classification by storage method

4.3.1 Single-deep storage

4.3.2 Double-deep storage

4.3.3 Multi-deep storage

4.4 Classification by the rail arrangement

4.4.1 Straight travelling type

4.4.2 U-turn travelling type

4.4.3 Aisle transfer type

4.5 Classification by planar arrangement of storage and retrieval stations

4.5.1 One side station type

4.5.2 Both sides station type

4.5.3 Middle side station type

4.6 Classification by hierarchical arrangement of storage and retrieval stations

4.6.1 Single-level station type

4.6.2 Multi-level station type

4.7 Classification by racking structure

4.7.1 Racking with roof and wall

4.7.2 Racking

4.8 Classification by the operation of AS/RS

4.8.1 Classification by the operation mode

- On-line mode operation
- Off-line mode operation

4.8.2 Classification by the operation condition

- Normal operation
- Maintenance operation

4.9 Classification by the operation of S/R machines

4.9.1 Classification by the boarding method

- Boarded operation
- Non-boarded operation

4.9.2 Classification by the operation mode of S/R machines

- Automatic operation
- Remote operation
- Semiautomatic operation
- Manual operation

5 Pallet, type of unit-load and load

5.1 Pallet Pallets of the unit-load handled by the AS/RS shall have sufficient strength and following items shall be considered.

5.1.1 Shape

- Shape, colour, size and its tolerances
- Shape of the pallet part in contact with the load supports of the racking
- Dimensional prioritization between pallet size tolerances and the pallet supporting width

5.1.2 Deflection

- Deflection of the pallet at the storage and retrieval stations
- Deflection of the pallet when stored in the racking
- Deflection of the pallet when lifted by the forklift
- Deflection of the pallet when supported at the both ends

5.1.3 Materials

- Dimensional change of pallets by thermal contraction coefficient
- Slipping caused by the pallet material

5.2 Type of unit-load Unit-load acceptable to AS/RS shall be specified by the practical unit-load size (figure 1), and shall be determined considering following items.

5.2.1 Case size

- Dimension of cases or bags
- Dimensional error of cases or bags

5.2.2 Stacking pattern

- Stacking pattern of pallets
- Number of stacking levels and stacking height of pallets
- Displacement caused by the stacking method
- Clearances between cases and between bags when stacked

5.2.3 Deformation

- The way the goods are contained in the case, or the condition of contents of bags
- Expansion of cases or bags when stacked
- Deformation of cases or bags during long time storage
- Offset load caused by the displacement of the centre of gravity
- Displacement of unit-loads caused by such as the forklift before the delivery to the AS/RS

5.2.4 Projection of secondary materials

- Projection of packing tape, tag sheets, etc.

5.2.5 Materials

- Materials and surface treatment of cases or bags

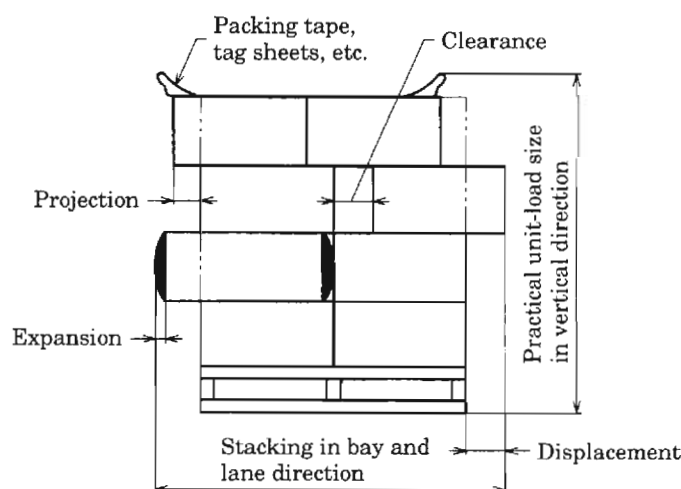


Figure 1 Practical unit-load size

5.3 Load Load used for designing the AS/RS shall be classified as follows.

5.3.1 Maximum load