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Australia



Steel storage racking

Part 2: Operation and maintenance



AS 4084.2:2023

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- Australian Steel Institute
- Better Regulation Division (Fair Trading, SafeWork NSW, TestSafe)
- Consult Australia
- Engineers Australia
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Preface

This Standard was prepared by the Standards Australia Committee BD-062, Steel Storage Racking, to supersede in part AS 4084:2012, *Steel storage racking*.

The objective of this document is to provide requirements for the safe operation, inspection and maintenance of steel storage racking. Storage racking invariably coexists with material handling equipment. This document aims to minimize the risks associated with the unsafe use of steel storage racking.

AS 4084:2012 has been revised and divided into two parts. This document forms part of the AS 4084 series on steel storage racking.

The terms “normative” and “informative” are used in Standards to define the application of the appendices to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is only for information and guidance.

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Australian Standard®

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Part 2: Operation and maintenance

Section 1 Scope and general

1.1 Scope

This document sets out minimum requirements for the installation, operation, inspection and maintenance of steel storage racking.

This document covers racking —

- (a) made of cold-formed or hot-rolled steel structural members installed as a free-standing structure within a building; and
- (b) subjected to operational interactions with material handling equipment (MHE) such as industrial trucks.

This document does not cover —

- (i) other types of racking such as drive-in racking, cantilever racking, mobile racking or racking made of materials other than steel; or
- (ii) low-rise shelving-type racking which is loaded and unloaded by hand.

NOTE For guidance on the operation and maintenance of racking systems not covered by this document, refer to EN 15620 and EN 15635.

1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS 1319, *Safety signs for the occupational environment*

AS 4068, *Flat pallets for materials handling*

AS 2312.1, *Guide to the protection of structural steel against atmospheric corrosion by use of protective coatings, Part 1: Paint coatings*

AS/NZS 2312.2, *Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings, Part 2: Hot dip galvanizing*

AS 4084.1, *Steel Storage Racking — Design*

1.3 Terms and definitions

For the purposes of this document, the terms and definitions in AS 4084.1 and the following apply.

1.3.1

aisle length

total length of all bays (1.3.3) in a continuous run of racking

1.3.2**aisle width**

distance between pallet faces

Note 1 to entry: This area is used for access by pedestrians or material handling equipment.

Note 2 to entry: See [Figure 2.1\(D\)](#).

1.3.3**bay**

space between adjacent racking frames used to store *unit loads* ([1.3.25](#))

1.3.4**bay height**

distance from the ground to the highest point of the *unit loads* ([1.3.25](#))

Note 1 to entry: See [Figure 2.1\(E\)](#).

1.3.5**bay load**

aggregate of all *unit loads* ([1.3.25](#)) in a *bay* ([1.3.3](#)) of racking

Note 1 to entry: This excludes unit loads stored on the concrete floor.

1.3.6**bay width**

distance between the inner faces of adjacent *upright frames* ([1.3.32](#))

Note 1 to entry: See [Figure 2.1\(E\)](#).

1.3.7**clearance**

distance between any two items

1.3.7.1**ceiling clearance**

distance between the top of the uppermost *unit load* ([1.3.25](#)) and the ceiling or steelwork above

Note 1 to entry: See [Figure 2.1\(E\)](#).

1.3.7.2**operating clearance**

distance between static and moving parts to enable equipment to operate as specified

1.3.8**competent person**

person who has acquired through training, qualification or experience the knowledge and skills to carry out the task effectively and safely

Note 1 to entry: A competent person may include the manufacturer, supplier or racking designer.

1.3.8.1**competent person for formal inspections**

competent person ([1.3.8](#)) who carries out formal inspections as specified by the manufacturer, supplier or racking designer

Note 1 to entry: The competent person should —

- (a) have worked in the industry as a racking designer, engineer or installer or have similar experience with steel storage racking;
- (b) understand the requirements for the relevant brand and type of storage racking being inspected; and

(c) possess the skills to oversee racking installation and repair.

1.3.9

cross-aisle

perpendicular to an operating aisle or parallel to an *upright frame* ([1.3.32](#))

1.3.10

down-aisle

parallel to an operating aisle or perpendicular to an *upright frame* ([1.3.32](#))

1.3.11

finished tolerance

tolerance ([1.3.24](#)) of the unloaded racking after fabrication and erection prior to initial loading

1.3.12

frame bracing

system of bracing or batten members used to link a pair of *uprights* ([1.3.31](#)) in the vertical plane to provide frame stability in the *cross-aisle* ([1.3.9](#)) direction

Note 1 to entry: Frame bracing typically involves both horizontal and diagonal members.

Note 2 to entry: See [Figure 2.1\(B\)](#).

1.3.13

frame depth

distance between two *uprights* ([1.3.31](#)) separated and supported by *frame bracing* ([1.3.12](#))

Note 1 to entry: See [Figure 2.1\(D\)](#).

1.3.14

may

indicates the existence of an option

1.3.15

plan horizontal bracing

bracing system that is typically used with *spine bracing* ([1.3.23](#)) to stabilize an unbraced *upright* ([1.3.31](#)) in front

Note 1 to entry: See [Figure 2.1\(C\)](#).

1.3.16

pallet beam

horizontal member that is locked into the *upright frame* ([1.3.32](#)) by pallet beam connectors and designed to support vertical loads and resist horizontal loads

1.3.17

pallet beam safety lock

positive locking device that is secured to the pallet beam connector to prevent dislodgement of the pallet beam from the upright frame when subject to upward forces

1.3.18

rack length

length of continuously connected *bays* ([1.3.3](#))

Note 1 to entry: This is equal to the sum of the widths of uprights and bays.

Note 2 to entry: See [Figure 2.1\(E\)](#).

1.3.19**racking designer**

competent person ([1.3.8](#)) responsible for the structural design of the storage racking

Note 1 to entry: Refer to AS 4084.1 for structural design requirements.

1.3.20**row depth**

distance across the depth of *unit loads* ([1.3.25](#)) stored back to back between adjacent aisles

Note 1 to entry: See [Figure 2.1\(D\)](#).

1.3.21**shall**

indicates a statement is mandatory

1.3.22**should**

indicates a recommendation

1.3.23**spine bracing****back bracing****vertical bracing**

bracing system providing *down-aisle* ([1.3.10](#)) stability for racking

Note 1 to entry: Spine bracing is normally provided in the vertical plane at the rear of the racking, see [Figure 2.1\(B\)](#).

1.3.24**tolerance**

permissible positive or negative variation from dimension or position resulting from either manufacture or erection or both

1.3.25**unit load**

individual item that is placed or retrieved in one operation

1.3.26**unit load depth**

measurement of the *unit load* ([1.3.25](#)) in the *cross-aisle* ([1.3.9](#)) direction

1.3.27**unit load depth clearance**

distance between adjacent *unit loads* ([1.3.25](#)) in the *cross-aisle* ([1.3.9](#)) direction

Note 1 to entry: See [Figure 2.1\(D\)](#).

Note 2 to entry: This is also known as flue space.

1.3.28**unit load height**

distance from the underside of the pallet to the highest point of the *unit load* ([1.3.25](#))

Note 1 to entry: See [Figure 2.1\(D\)](#).

1.3.29**unit load height clearance**

distance between the highest point of the *unit load* ([1.3.25](#)) and the underside of the *pallet beam* ([1.3.16](#)) located immediately above

Note 1 to entry: See [Figure 2.1\(E\)](#).

1.3.30**unit load width**

distance from one edge of the *unit load* ([1.3.25](#)) to the other edge, measured parallel to the operating aisle

Note 1 to entry: See [Figure 2.1\(E\)](#).

1.3.31**upright**

vertical member in an *upright frame* ([1.3.32](#)) that is used to support pallet beams

Note 1 to entry: See [Figure 2.1\(A\)](#).

1.3.32**upright frame**

frame assembly comprised of *uprights* ([1.3.31](#)), bracings and baseplates

Note 1 to entry: The upright frame supports loads that are typically transmitted through *pallet beams* ([1.3.16](#)) and operating equipment.

Note 2 to entry: See [Figure 2.1\(A\)](#).

1.3.33**upright frame height**

height of an *upright frame* ([1.3.32](#)) measured from the underside of the baseplate to the uppermost part of the *upright* ([1.3.31](#))

Note 1 to entry: See [Figure 2.1\(D\)](#).

1.3.34**upright protector**

component in front of an *upright frame* ([1.3.32](#)) that is secured either to the floor or an *upright* ([1.3.31](#)) or both and used to resist minor impact loads

Section 2 Tolerances and clearances

2.1 General

A range of loads, dimensions, clearances, and tolerances that are relevant for a racking system are illustrated in [Figures 2.1\(A\) to 2.1\(E\)](#).

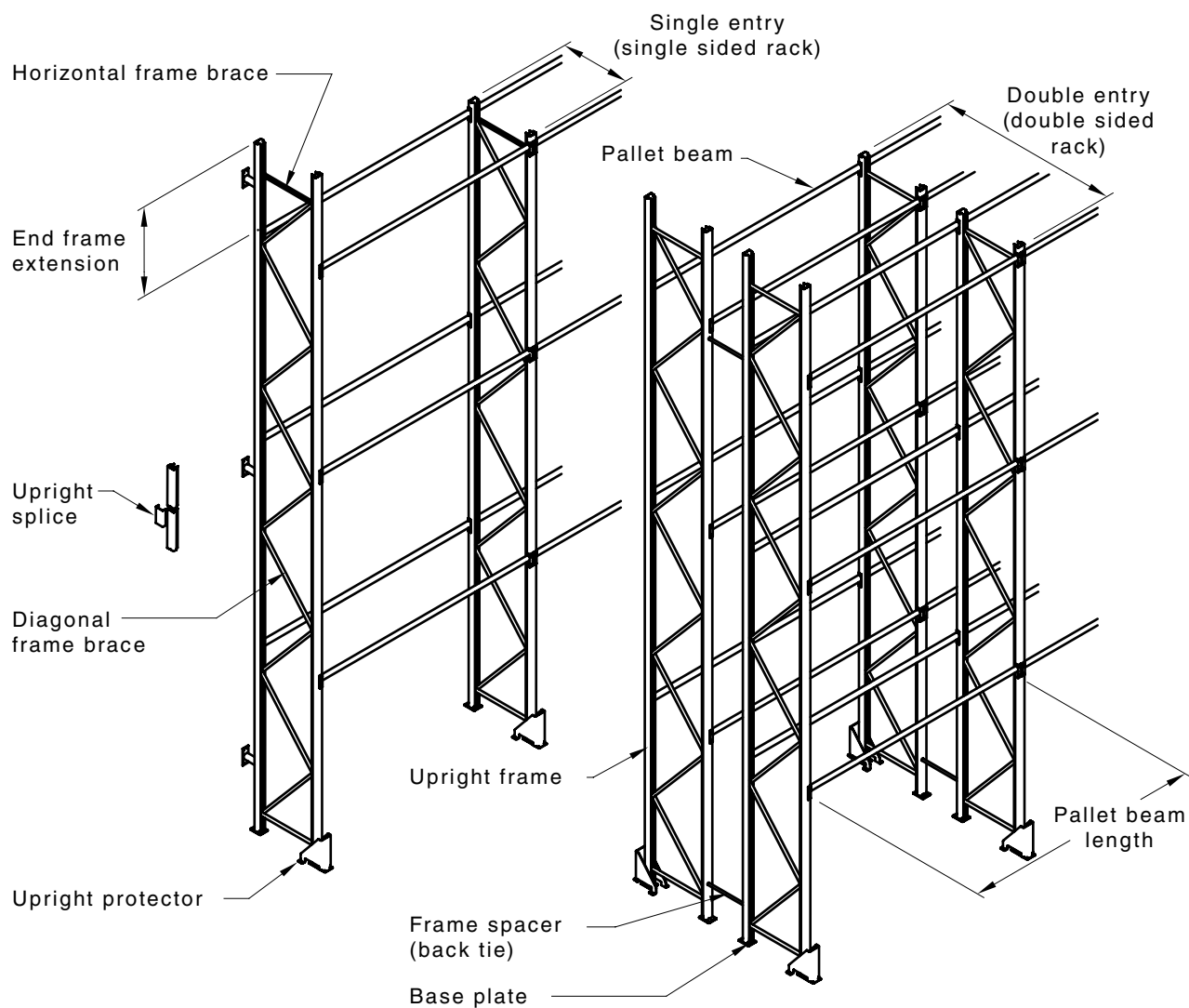


Figure 2.1(A) — Unbraced racking