American National Standard

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Published by

Rack Manufacturers Institute –
Storage Rack Decking Group
An Industry Group of MHI
8720 Red Oak Blvd., Suite 201, Charlotte, NC, 28217-3992
Telephone: (704) 676-1190 Fax: (704) 676-1199
www.mhi.org/mdi
standards@mhi.org

© 2017 by MHI
All rights reserved.

No part of this publication may be reproduced in any form,
in an electronic retrieval system or otherwise, without
prior written permission of the publisher.
American National Standard

Design, Fabrication, Testing and Utilization of Welded-Wire Rack Decking

Rack Manufacturers Institute – Storage Rack Decking Group
An Industry Group of MHI

Approved February 17, 2017
American National Standards Institute, Inc.
FOREWORD. This standard, which was developed under the American National Standards Institute (ANSI) Canvass method and approved by ANSI on February 17, 2017, represents suggested design practices and operational requirements for dock leveling devices. It was developed by MHI, along with the Rack Manufacturers Institute (“RMI”), one of its Industry Groups, and is intended to provide useful information and guidance for owners, users, designers, purchasers or specifiers of material handling equipment or engaged in the manufacture, marketing, purchase, or use of welded-wire rack decking. It is advisory only and should only be regarded as a simple tool that its intended audience may or may not choose to follow, adopt, modify, or reject. A standard may be part of, but does not constitute a comprehensive safety program that cannot guard against pitfalls in operating, selecting and purchasing such a system, and should not be relied upon as such. Such a program should be developed by a qualified professional.

VOLUNTARY. The use of this document is completely voluntary. Its existence does not in any respect preclude anyone, whether it has approved this standard or not, from following procedures and assuming responsibilities not conforming to this standard.

DISCLAIMER OF LIABILITY. MHI, RMI and their members assume no responsibility and disclaim all liability of any kind, however arising, as a result of acceptance or use or alleged use of this standard. Anyone using this standard specifically understands and agrees that MHI, RMI, their members, officers, agents, and employees shall not be liable under any legal theory of any kind for any action or failure to act with respect to the design, erection, installation, manufacture, and preparation for sale, sale, characteristics, features, or delivery of anything covered by this standard or any other activity covered by this standard. Any use of this information must be determined by the user to be in accordance with applicable federal, state, and local laws and regulations.

DISCLAIMER OF WARRANTY. MHI, RMI and their members make NO WARRANTIES of any kind, express or implied, in connection with the information in this brochure and SPECIFICALLY DISCLAIM ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR PARTICULAR PURPOSE.

INDEMNIFICATION. By referring to or otherwise employing this standard, its user agrees to defend, protect, indemnify, and hold MHI, RMI, their members, officers, agents, and employees harmless from and against all claims, losses, expenses, damages, and liabilities, direct, incidental, or consequential, arising from acceptance or use or alleged use of this standard, including loss of profits and reasonable attorneys' fees which may arise out of the acceptance or use or alleged use of this document. The intent of this provision is to absolve and protect MHI, RMI, their members, officers, agents, and employees from any and all loss relating in any way to this document, including those resulting from the user’s own negligence.
The Storage Rack Decking Group is a subset of the **Rack Manufacturers Institute** (RMI), an MHI Industry Group. The Storage Rack Decking Group is comprised of a substantial portion of the major companies that design and manufacture welded-wire rack decking in the United States. This standard is the result of the group’s recognition of the need to develop a comprehensive safety standard and establish minimum design and performance criteria to ensure the safe application and utilization of welded-wire rack decking, and was formulated under American National Standards Institute (ANSI) procedures.

This standard, which was originally approved by ANSI on November 15, 2007, represents design, operating and testing practices and performance criteria that may be used in determining product utilization.

At the date of approval of this amended standard, the Storage Rack Decking Group of RMI consisted of the following member companies:

- DACS, Inc.
- Husky Rack & Wire
- ITC
- J&L Wire Products
- Nashville Wire Products
- Prodeck 50 Inc.
- Worldwide Material Handling Products, LLC

Questions or suggestions for improvement regarding this standard are welcome. They should be sent to: MH26.2 Committee (RMI), MHI, 8720 Red Oak Blvd., Suite 201, Charlotte, NC, 28217; standards@mhi.org.
Design, Fabrication, Testing and Utilization of Welded-Wire Rack Decking

Contents

1 Purpose and scope ................................................................................................................................ 1
  1.1 Purpose ......................................................................................................................................... 1
  1.2 Limitations ..................................................................................................................................... 1
2 Normative references............................................................................................................................. 1
3 Definitions .............................................................................................................................................. 2
  3.1 General.......................................................................................................................................... 2
4 Materials ................................................................................................................................................ 6
5 Dimensional and descriptive characteristics .......................................................................................... 6
  5.1 Nominal dimensions and descriptive characteristics .................................................................... 6
  5.2 Actual dimensions ......................................................................................................................... 7
  5.3 Manufacturing tolerances .............................................................................................................. 7
6 Design and fabrication procedures ........................................................................................................ 7
  6.1 Design procedures ........................................................................................................................ 7
  6.2 Fabrication procedures ................................................................................................................. 7
    6.2.1 Welding ..................................................................................................................................... 7
    6.2.2 Wires ..................................................................................................................................... 7
    6.2.3 Reinforcement members ....................................................................................................... 8
7 Two-line load test procedures ................................................................................................................ 8
  7.1 General.......................................................................................................................................... 8
  7.2 Safety factors ................................................................................................................................ 8
    7.2.1 Deflection limit ....................................................................................................................... 8
    7.2.2 Stress safety factor................................................................................................................ 8
  7.3 Equipment required........................................................................................................................ 8
  7.4 Procedure ...................................................................................................................................... 9
  7.5 Allowable work load capacity ratings .......................................................................................... 10

List of Figures

Figure 1. Section through a typical bay in a storage rack system .......................................................... 2
Figure 2. Deck section .......................................................................................................................... 3
Figure 3. Deck section with reinforcement ......................................................................................... 3
Figure 4. Box beam ............................................................................................................................ 4
Figure 5. Step beam ........................................................................................................................... 5
Figure 6. Two line-load testing diagram for 42 in. deep decking assembly ........................................... 9
Design, Fabrication, Testing and Utilization of Welded-Wire Rack Decking

1 Purpose and scope

1.1 Purpose

This standard is established to provide a guideline for design, testing, fabrication and utilization of welded-wire mesh rack decking utilized as an accessory for industrial steel storage racks.

This standard applies to uniformly loaded rack decking fabricated from welded-wire mesh with permanently attached reinforcements for use in storage racks. The purpose for such rack decking is to provide storage capability by creating a surface, in conjunction with a rack upon which to place materials that may be on pallets, in containers, or in some other form.

1.2 Limitations

This standard does not apply to:

- rack decking manufactured prior to date of adoption of this standard;
- rack decking that has been improperly installed, altered, damaged, or used in any manner other than that for which it was originally intended, designed, purchased, sold, or a combination thereof;
- decking or shelf surface materials other than welded-wire rack decking; or
- decking or surfaces intended to carry anything other than static loads (e.g. impact or moving loads due to walking or stepping).

2 Normative references

The following standards contain provisions, which through reference in this text, constitute provisions of this American National Standard. At the time of publication of this document, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.


AWS C1.1M/C1.1:2012, Recommended Practices for Resistance Welding

AISC, Steel Construction Manual, 14th Edition

AISI Publication SG 671, 1991 (1986 edition with 1989 Addendum), Specification for The Design of Cold-Formed Steel Structural Member, Allowable Stress Design

AISI Publication SG 672, Test Procedures for Use with August 19, 1986 Edition of the Cold-Formed Specification

ASTM A510/A510M-13, Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel

ASTM A1064/A1064M-16b, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete


ASTM A1008/A1008M-03, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable