ASME NUM-1–2023

(Revision of ASME NUM-1–2016)

Rules for Construction of Cranes, Monorails, and Hoists (With Bridge or Trolley or Hoist of the Underhung Type)

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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The American Society of Mechanical Engineers
Two Park Avenue • New York, NY • 10016 USA

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FOREWORD

The Committee on Cranes for Nuclear Power Plants was first established in 1976. In 1980, the scope of the committee was revised, and its name was changed to the Committee on Cranes for Nuclear Facilities. In 1983, the Nuclear Underhung and Monorail (NUM) Subcommittee was established to develop a standard to cover the design, fabrication, installation, and testing of underhung and monorail equipment used in nuclear facilities. ASME NUM-1 is the result of the subcommittee's work.

The first edition of ASME NUM-1 was approved by the American National Standards Institute (ANSI) on October 28, 1996. The second edition of ASME NUM-1 was approved by ANSI on May 3, 2000. The third edition of ASME NUM-1 was approved by ANSI on August 17, 2004. The fourth edition of ASME NUM-1 was approved by ANSI on December 22, 2009. The fifth edition of ASME NUM-1 was approved by ANSI on June 16, 2016.

This Standard, or portions thereof, can be applied to cranes, monorails, and hoists at facilities other than nuclear where enhanced equipment safety may be required and can be provided by means of single failure-proof features, additional safety features, increased design factors, or a seismic design.

ASME NUM-1–2023 has been reformatted and updated. The Standard comprises the following three Parts, which cover the topics and equipment listed below:

Part GR, General Requirements (applicable to all equipment)
- Environmental Conditions of Service
- Performance Requirements
- Coatings and Finishes
- Quality Assurance
- Definitions
- Referenced Codes and Standards

Part CM, Cranes and Monorails
- Structural Requirements, Cranes and Monorails (Types I and II)
- Mechanical Requirements, Cranes and Monorails (Type I)
- Electrical Requirements, Cranes and Monorails (Type I)
- Pneumatic Requirements, Cranes and Monorails (Type I)
- Marking, Cranes and Monorails (Types I and II)
- Inspection and Tests, Cranes and Monorails (Types I and II)

Part HT, Hoists and Trolleys
- Powered Wire Rope Hoists (Type IA)
- Powered Wire Rope Hoists (Type IB)
- Powered Chain Hoists (Type IB)
- Hand-Chain Hoists (Type IB)
- Under-Running Trolleys (Type IB)
- Common NDE Criteria for Hoists and Trolleys

The Standard now applies only to the enhanced safety and seismic Type I cranes and monorails, seismic Type II cranes and monorails, and enhanced safety Type I hoist and trolley units. Hoists having single failure-proof features are identified as Type IA, with those having additional safety features and increased design factors identified as Type IB. This Standard now separately and more clearly addresses the criteria for powered wire rope hoists (Type IA), powered wire rope hoists (Type IB), powered chain hoists (Type IB), manual chain hoists (Type IB), and under-running trolleys (Type IB). Type III standard equipment, which is not used for handling critical loads and is not required to withstand a seismic event, is no longer addressed in this Standard since such equipment is covered by other industry standards.

The 2023 edition of ASME NUM-1 was approved by ANSI on December 4, 2023.

ASME CNF COMMITTEE
Cranes for Nuclear Facilities

(The following is the roster of the committee at the time of approval of this Standard.)

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Revisions and Errata. The committee processes revisions to this Standard on a continuous basis to incorporate changes that appear necessary or desirable as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published in the next edition of the Standard.

In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive e-mail notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph number, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases

(a) The most common applications for cases are

(1) to permit early implementation of a revision based on an urgent need

(2) to provide alternative requirements

(3) to allow users to gain experience with alternative or potential additional requirements prior to incorporation directly into the Standard

(4) to permit the use of a new material or process

(b) Users are cautioned that not all jurisdictions or owners automatically accept cases. Cases are not to be considered as approving, recommending, certifying, or endorsing any proprietary or specific design, or as limiting in any way the freedom of manufacturers, constructors, or owners to choose any method of design or any form of construction that conforms to the Standard.

(c) A proposed case shall be written as a question and reply in the same format as existing cases. The proposal shall also include the following information:

(1) a statement of need and background information

(2) the urgency of the case (e.g., the case concerns a project that is underway or imminent)

(3) the Standard and the paragraph, figure, or table number

(4) the editions of the Standard to which the proposed case applies

(d) A case is effective for use when the public review process has been completed and it is approved by the cognizant supervisory board. Approved cases are posted on the committee web page.

Interpretations. Upon request, the committee will issue an interpretation of any requirement of this Standard. An interpretation can be issued only in response to a request submitted through the online Inquiry Submittal Form at https://go.asme.org/InterpretationRequest. Upon submitting the form, the inquirer will receive an automatic e-mail confirming receipt.

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ASME NUM-1–2023
SUMMARY OF CHANGES

Following approval by the ASME CNF Standards Committee and ASME, and after public review, ASME NUM-1–2023 was approved by the American National Standards Institute on December 4, 2023.

ASME NUM-1–2023 has been revised in its entirety.

PART GR
GENERAL REQUIREMENTS

Section GR-1
Introduction

GR-1.1 GENERAL

Design of equipment covered by this Standard shall be in accordance with the Standard's requirements but not necessarily with its recommendations. The word *shall* is used to denote a requirement; the word *should* is used to denote a recommendation; and the word *may* is used to denote permission, which is neither a requirement nor a recommendation.

This Standard is comprised of three major parts:

(a) Part GR: general requirements applicable to all equipment

(b) Part CM: requirements applicable to cranes and monorails

(c) Part HT: requirements applicable to hoists and trolleys

Part CM provides criteria for the crane and monorail structures and is used in conjunction with Part HT, which provides criteria for the hoist and trolley units. Both parts require inclusion of the general criteria of Part GR for the specified crane, monorail, hoist, and trolley configurations.

GR-1.2 SCOPE

This Standard covers the following lifting and handling equipment configurations used in nuclear facilities that require enhanced safety features or seismic design features, or both:

(a) underhung cranes

(b) top-running bridge and gantry cranes with underhung trolleys

(c) traveling wall cranes

(d) jib cranes

(e) monorail systems

(f) overhead hoists

(g) hoists with integral trolleys

(h) separate underhung trolleys

Subsection GR-6.2 provides graphical depictions of the various crane, monorail, hoist, and trolley configurations addressed in this Standard.

The above cranes, whether single or multiple girder, are covered by this Standard. For multiple-girder cranes with both top-running bridge and top-running trolley, see ASME NOG-1.

GR-1.2.1 Equipment Types Covered

The handling equipment used in a nuclear facility is categorized as Type I, Type II, or Type III. This Standard addresses Type I and Type II cranes and monorails and Type I hoists and trolleys. Type II hoists and trolleys shall meet the requirements of general industry standards and the additional requirements noted in para. GR-1.2.1.2. Type III cranes, hoists, monorails, and trolleys shall meet the requirements of general industry standards. Paragraphs GR-1.2.1.1 through GR-1.2.1.3 define the three categories of equipment.

GR-1.2.1.1 Type I Equipment. Type I equipment is a crane, monorail, hoist, or trolley with enhanced safety designs and features for handling a critical load. Design and construction of Type I equipment shall be such that it will remain in place and support the critical load during and after a safe shutdown earthquake (SSE) event; however, Type I equipment does not have to be operational after this event.

There are two subtypes of Type I equipment.

(a) Type IA equipment shall incorporate single-failure-proof designs and features. The design shall be such that any credible failure of a single component will not result in the loss of capability to stop and hold a critical load.

(b) Type 1B equipment shall incorporate enhanced safety designs and features. This includes increased design factors and redundant components that minimize the potential for failure that would result in the loss of capability to stop and hold a critical load.