

**ASME NUM-1–2016**  
(Revision of ASME NUM-1–2009)

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

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**The American Society of  
Mechanical Engineers**

Two Park Avenue • New York, NY • 10016 USA

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# CONTENTS

Foreword .....		viii
Committee Roster .....		ix
Preparation of Technical Inquiries to the Committee on Cranes for Nuclear Facilities .....		x
Summary of Changes .....		xi
<b>Section NUM-G-1000</b>	<b>Introduction .....</b>	<b>1</b>
NUM-G-1100	General .....	1
NUM-G-1200	Scope .....	1
NUM-G-1300	Applications .....	1
NUM-G-1400	Responsibility .....	1
<b>Section NUM-G-2000</b>	<b>Environmental Conditions of Service .....</b>	<b>2</b>
NUM-G-2100	General .....	2
NUM-G-2200	Radiation .....	2
NUM-G-2300	Temperature .....	2
NUM-G-2400	Pressure .....	2
NUM-G-2500	Humidity .....	2
NUM-G-2600	Chemical .....	3
NUM-G-2700	Wind .....	3
NUM-G-2800	Seismic .....	3
NUM-G-2900	Drainage .....	3
<b>Section NUM-G-3000</b>	<b>Performance Requirements .....</b>	<b>4</b>
NUM-G-3100	General .....	4
NUM-G-3200	Service Class .....	4
NUM-G-3300	Capacity .....	4
NUM-G-3400	Speeds .....	4
NUM-G-3500	Other Considerations .....	4
<b>Section NUM-G-4000</b>	<b>Coatings and Finishes .....</b>	<b>8</b>
NUM-G-4100	Coating Service Levels .....	8
NUM-G-4200	Specific Requirements for Coating Service Levels .....	8
<b>Section NUM-G-5000</b>	<b>Quality Assurance .....</b>	<b>10</b>
NUM-G-5100	Requirements .....	10
NUM-G-5200	Documentation .....	10
<b>Section NUM-G-6000</b>	<b>Definitions .....</b>	<b>11</b>
NUM-G-6100	Definitions .....	11
<b>Section NUM-G-7000</b>	<b>Referenced Codes and Standards .....</b>	<b>15</b>
NUM-G-7100	General .....	15
<b>Section NUM-G-8000</b>	<b>Nomenclature .....</b>	<b>17</b>
NUM-G-8100	General .....	17
<b>Section NUM-I-1000</b>	<b>Introduction .....</b>	<b>18</b>
NUM-I-1100	General .....	18
NUM-I-1300	Applications .....	18
<b>Section NUM-I-5000</b>	<b>Jib Cranes .....</b>	<b>19</b>
NUM-I-5300	Mechanical .....	19
NUM-I-5400	Electrical .....	19

<b>Section NUM-I-6000</b>	<b>Monorail Systems</b> .....	20
NUM-I-6300	Mechanical .....	20
<b>Section NUM-I-7000</b>	<b>Overhead Hoists and Under-Running Trolleys</b> .....	21
NUM-I-7700	Under-Running Trolleys .....	21
NUM-I-7900	Hoist Common Requirements .....	21
<b>Section NUM-I-8000</b>	<b>Common Requirements and Criteria</b> .....	28
NUM-I-8200	Structural .....	28
NUM-I-8300	Mechanical .....	28
NUM-I-8400	Electrical .....	30
NUM-I-8500	Inspection and Testing .....	30
NUM-I-8600	Hoist Marking .....	37
<b>Section NUM-II-1000</b>	<b>Introduction</b> .....	38
NUM-II-1100	General .....	38
NUM-II-1300	Applications .....	38
<b>Section NUM-II-7000</b>	<b>Overhead Hoists and Under-Running Trolleys</b> .....	39
NUM-II-7100	Description .....	39
<b>Section NUM-II-8000</b>	<b>Common Requirements and Criteria</b> .....	40
NUM-II-8200	Structural .....	40
NUM-II-8300	Mechanical .....	45
NUM-II-8400	Electrical .....	45
NUM-II-8500	Inspection and Testing .....	45
<b>Section NUM-III-1000</b>	<b>Introduction</b> .....	46
NUM-III-1100	General .....	46
NUM-III-1300	Applications .....	46
<b>Section NUM-III-2000</b>	<b>Underhung Cranes</b> .....	47
NUM-III-2100	Description .....	47
NUM-III-2200	Structural .....	47
NUM-III-2300	Mechanical .....	49
NUM-III-2400	Electrical .....	50
NUM-III-2500	Inspection and Testing .....	52
<b>Section NUM-III-3000</b>	<b>Top-Running Bridge and Gantry Cranes</b> .....	53
NUM-III-3100	Description .....	53
NUM-III-3200	Structural .....	53
NUM-III-3300	Mechanical .....	55
NUM-III-3400	Electrical .....	57
NUM-III-3500	Inspection and Testing .....	57
<b>Section NUM-III-4000</b>	<b>Traveling Wall Cranes</b> .....	58
NUM-III-4100	Description .....	58
NUM-III-4200	Structural .....	58
NUM-III-4300	Mechanical .....	58
NUM-III-4400	Electrical .....	60
NUM-III-4500	Inspection and Testing .....	60
<b>Section NUM-III-5000</b>	<b>Jib Cranes</b> .....	62
NUM-III-5100	Description .....	62
NUM-III-5200	Structural .....	62
NUM-III-5300	Mechanical .....	62
NUM-III-5400	Electrical .....	63
NUM-III-5500	Inspection and Testing .....	67
<b>Section NUM-III-6000</b>	<b>Monorail Systems</b> .....	68
NUM-III-6100	Description .....	68
NUM-III-6200	Structural .....	68

NUM-III-6300	Mechanical .....	69
NUM-III-6400	Electrical .....	71
NUM-III-6500	Inspection and Testing .....	72
<b>Section NUM-III-7000</b>	<b>Overhead Hoists and Under-Running Trolleys</b> .....	<b>73</b>
NUM-III-7100	Description .....	73
NUM-III-7200	Electric Wire-Rope Hoists .....	73
NUM-III-7300	Hand-Chain Hoists .....	74
NUM-III-7400	Electric-Chain Hoists .....	78
NUM-III-7500	Air-Operated Wire-Rope Hoists .....	79
NUM-III-7600	Air-Operated Chain Hoists .....	79
NUM-III-7700	Under-Running Trolleys .....	79
NUM-III-7800	Inspection and Testing .....	82
NUM-III-7900	Hoist Common Requirements .....	82
<b>Section NUM-III-8000</b>	<b>Common Requirements and Criteria</b> .....	<b>90</b>
NUM-III-8100	Description .....	90
NUM-III-8200	Structural .....	90
NUM-III-8300	Mechanical .....	106
NUM-III-8400	Electrical .....	114
NUM-III-8500	Inspection and Testing .....	127
NUM-III-8600	Crane and Monorail Marking .....	130
<b>Figures</b>		
NUM-I-7931-1	Type IA Dual Hoist Drive Unit With Single Drum .....	21
NUM-I-7931-2	Type IA Single Hoist Drive Unit With Drum Brake .....	22
NUM-I-7931-3	Type IA Dual Hoist Drive Unit With Dual Drum .....	23
NUM-I-7942-1	Drum Fleet Angle .....	23
NUM-I-7942-2	Sheave Fleet Angle .....	23
NUM-I-7942.3-1	Type IA Redundant Reeving With Single Drum (With Upper Equalizer Sheaves) .....	24
NUM-I-7942.3-2	Type IA Redundant Reeving With Single Drum (With Equalizer Bar) .....	25
NUM-I-7942.3-3	Type IA Redundant Reeving With Dual Drum .....	25
NUM-II-8215.3.6-1	Boundary Conditions for Wheel-to-Rail Interface .....	42
NUM-III-2100-1	Single-Girder Underhung Crane .....	47
NUM-III-2100-2	Double-Girder Underhung Crane With Underhung Trolley .....	48
NUM-III-2100-3	Double-Girder Underhung Crane With Top-Running Trolley .....	48
NUM-III-2100-4	Single-Girder Underhung Semi-Gantry Crane .....	49
NUM-III-2321-1	Arrangement of Crane Bridge Drives (A-2 Drive) .....	50
NUM-III-2321-2	Arrangement of Crane Bridge Drives (A-4 Drive) .....	51
NUM-III-3100-1	Single-Girder Top-Running Crane .....	53
NUM-III-3100-2	Double-Girder Top-Running Crane With Underhung Trolley .....	54
NUM-III-3100-3	Single-Girder Top-Running Semi-Gantry Crane .....	54
NUM-III-3100-4	Single-Girder Top-Running Gantry Crane .....	55
NUM-III-3320-1	Arrangement of Crane Bridge Drives (A-1 Drive) .....	56
NUM-III-3320-2	Arrangement of Crane Bridge Drives (A-2 Drive) .....	56
NUM-III-3320-3	Arrangement of Crane Bridge Drives (A-4 Drive) .....	56
NUM-III-4100-1	Traveling Wall Crane .....	59
NUM-III-5100-1	Wall-Mounted Jib Cranes .....	63
NUM-III-5100-2	Freestanding Pillar Jib Cranes .....	64
NUM-III-5100-3	Mast-Type Jib Cranes .....	65
NUM-III-5422-1	Slew Drive Motor-Size Selection .....	66
NUM-III-6100-1	Monorail System .....	68
NUM-III-6100-2	Two-Way Switches .....	69
NUM-III-6100-3	Three-Way Switches .....	69
NUM-III-6100-4	Cross-Track Switches .....	69
NUM-III-6100-5	Interlocking Mechanisms .....	70

NUM-III-6100-6	Lift/Drop Sections .....	70
NUM-III-7100-1	Electric Wire-Rope Hoist .....	73
NUM-III-7100-2	Hand-Chain Hoist .....	74
NUM-III-7100-3	Electric-Chain Hoist .....	74
NUM-III-7100-4	Air-Operated Wire-Rope Hoist .....	75
NUM-III-7100-5	Air-Operated Chain Hoist .....	75
NUM-III-7100-6	Under-Running Trolley .....	75
NUM-III-7210-1	Electric Wire-Rope Hoist, Suspension Types .....	76
NUM-III-7310-1	Hand-Chain Hoist, Suspension Types .....	77
NUM-III-7410-1	Electric-Chain Hoist, Suspension Types .....	78
NUM-III-7510-1	Air-Operated Wire-Rope Hoist, Suspension Types .....	80
NUM-III-7610-1	Air-Operated Chain Hoist, Suspension Types .....	81
NUM-III-7942.3-1	Single and Double Reeving .....	84
NUM-III-8212.2-1	Wheel-Skewing Forces (From CMAA 74) .....	91
NUM-III-8214-1	Building Runway Alignment Tolerance for Patent Track .....	93
NUM-III-8214-2	Building Runway Alignment Tolerance (From CMAA 74) .....	94
NUM-III-8232.3-1	Local Bending of Flanges due to Wheel Loads (From CMAA 74) .....	97
NUM-III-8234.1-1	Joint Configuration (From CMAA 74) .....	105
NUM-III-8344.1-1	Bridge Span (From CMAA 74) .....	112
NUM-III-8425.1-1	Arrangement of Pendant Push-Button Controllers .....	122
NUM-III-8425.2-1	Arrangement of Cab Master-Switch Controllers .....	123
NUM-III-8425.3-1	Arrangement of Radio-Transmitter Lever-Switch Controllers .....	124
NUM-III-8427.2-1	Various Styles of Conductor System Types .....	125
<b>Tables</b>		
NUM-G-3210-1	Service Classes for Cranes and Monorails .....	5
NUM-G-3220-1	Service Classes for Electrically Operated Hoists .....	6
NUM-G-3230-1	Service Classes for Air Wire-Rope and Air Chain Hoists .....	7
NUM-I-1100-1	Major Design Differences Between Types IA and IB .....	18
NUM-I-8210-1	Acceptable Materials and Reference Properties for Structural Components .....	29
NUM-I-8210-2	Required Inspections or Tests (Type IA) .....	31
NUM-I-8210-3	Required Inspections or Tests (Type IB) .....	33
NUM-II-8215.3.6-1	Boundary Conditions for Wheel-to-Rail Interface .....	43
NUM-III-7942.1-1	Minimum Pitch Diameter of Running Sheaves .....	84
NUM-III-7942.2-1	Minimum Pitch Diameter of Drums .....	84
NUM-III-7944.1-1	Bearing Life Expectancy .....	85
NUM-III-7945-1	Hoist Service Factor, $C_d$ .....	85
NUM-III-7945-2	Hoist Service Factor, $S_f$ .....	86
NUM-III-7952-1	Standard Rated Motor Voltages .....	88
NUM-III-8213-1	Load Designations .....	92
NUM-III-8231.1-1	Allowable Stresses (Members Not Controlled by Buckling) .....	95
NUM-III-8231.2-1	Modifying Coefficient, $N$ .....	95
NUM-III-8231.5-1	Bolt Allowable Stresses .....	95
NUM-III-8232.4-1	Bolt Shear and Tension Factor, $R$ .....	99
NUM-III-8234.1-1	Allowable Stress Ranges .....	100
NUM-III-8234.1-2	Fatigue Stress Provisions — Tension (T) or Reversal (Rev) Stresses .....	101
NUM-III-8341.2-1	Crane Service Factor, $S_f$ .....	107
NUM-III-8341.2-2	Machinery Service Factor, $C_d$ .....	108
NUM-III-8342-1	AFBMA L10 Bearing Life .....	108
NUM-III-8343.5-1	Crane Class Factor, $K_c$ .....	110
NUM-III-8343.5-2	Surface Condition Factor, $K_{sc}$ .....	110
NUM-III-8344.1-1	Bridge Wheel Loadings, $lb; P; KDW$ .....	111
NUM-III-8344.1-2	Bridge Load Factor, $K_{bw}$ .....	112
NUM-III-8344.1-3	Speed Factor, $C_s$ .....	113

NUM-III-8344.1-4	Wheel Service Factor, $S_m$ , and Minimum Load Service Factor, $K_{wl}$ .....	113
NUM-III-8344.2-1	Maximum Wheel Loads/I Beams and Wide Flange Beams .....	114
NUM-III-8421.4-1	AC Contactor Ratings for AC Wound Rotor Motors .....	116
NUM-III-8421.4-2	AC Contactor Ratings for AC Squirrel-Cage Motors (Maximum Intermittent Horsepower Rating) .....	116
NUM-III-8421.4-3	DC Contactor Ratings for DC Motors (230 V to 250 V DC) .....	116
NUM-III-8421.4-4	AC Contactor Ratings for Mainline Service .....	117
NUM-III-8421.4-5	DC Contactor Ratings for Mainline Service (230 V to 250 V DC) .....	117
NUM-III-8421.5-1	NEMA Resistor Classification .....	117
NUM-III-8422.2-1	Standard Rated Motor Voltages .....	118
NUM-III-8422.4-1	Standard Maximum Acceleration Rate to Prevent Wheel Skidding .....	120
NUM-III-8422.4-2	Standard Bridge Motion Acceleration Rates .....	120
NUM-III-8422.4-3	Mechanical Efficiency, $E$ , of Drive Machinery .....	120
NUM-III-8422.4-4	Standard Values for Friction Factor, $f$ (for Bridges With Metallic Wheels and Antifriction Bearings) .....	120
NUM-III-8422.4-5	Standard Values of Accelerating Torque Factor, $K_t$ .....	121
<b>Mandatory Appendix</b>		
IV	SI Conversion Factors .....	131
<b>Nonmandatory Appendices</b>		
A	Service Guidance .....	133
B	Examples .....	141

# 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. The NUM-1 Standard 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.

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, enhanced safety features, or a seismic design.

This Standard is split into four major sections: NUM-G, General Specifications (applicable to all equipment); NUM-I, Type I equipment (i.e., equipment that is used to handle critical loads and is required to withstand a seismic event); NUM-II, Type II equipment (i.e., equipment that is not used to handle critical loads and is required to withstand a seismic event); and NUM-III, Type III equipment (i.e., equipment that is not used to handle critical loads and is not required to withstand a seismic event).

Suggestions for the improvement of this Standard are welcome. They should be addressed to the Secretary, ASME Committee on Cranes for Nuclear Facilities, The American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990.

The 2016 edition of ASME NUM-1 was approved by ANSI on June 16, 2016.

# ASME COMMITTEE ON CRANES FOR NUCLEAR FACILITIES

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

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# PREPARATION OF TECHNICAL INQUIRIES TO THE COMMITTEE ON CRANES FOR NUCLEAR FACILITIES

## INTRODUCTION

The ASME Committee on Cranes for Nuclear Facilities (CNF) will consider written requests for interpretations and revisions to CNF standards and develop new requirements if dictated by technological development. The Committee's activities in this regard are limited strictly to interpretations of the requirements or to consideration of revisions to the present Standard on the basis of new data or technology. As a matter of published policy, ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity and, accordingly, inquiries requiring such consideration will be returned. Moreover, ASME does not act as a consultant on specific engineering problems or on the general application or understanding of the

Standard requirements. If, based on the inquiry information submitted, it is the opinion of the Committee that the inquirer should seek assistance, the inquiry will be returned with the recommendation that such assistance be obtained.

All inquiries that do not provide the information needed for the Committee's full understanding will be returned.

## INQUIRY FORMAT

Inquiries shall be limited strictly to interpretations of the requirements or to the consideration of revisions to the present Standard on the basis of new data or technology.

Requests for interpretation shall be submitted through the Interpretation Submittal Form found at <http://go.asme.org/InterpretationRequest>.

# ASME NUM-1–2016

## SUMMARY OF CHANGES

Following approval by the ASME Committee on Cranes for Nuclear Facilities and ASME, and after public review, ASME NUM-1–2016 was approved by the American National Standards Institute on June 16, 2016.

The 2016 Edition of ASME NUM-1 includes revisions, additions, deletions, corrections, and editorial changes introduced in ASME NUM-1–2009, as well as the following changes identified by a margin note, **(16)**, placed next to the affected area.

<i>Page</i>	<i>Location</i>	<i>Change</i>
4	NUM-G-3200	Reference to Nonmandatory Appendix A corrected
	NUM-G-3400	Paragraph (b) reference to Nonmandatory Appendix A corrected
8	NUM-G-4230	First paragraph reference to Nonmandatory Appendix A corrected
10	NUM-G-5200	First paragraph reference to Nonmandatory Appendix A corrected
11, 13	NUM-G-6100	Definitions of <i>braking torque</i> , <i>momentary peak load</i> added; definition of <i>reeving</i> updated; alphabetical order of some definitions updated
15	NUM-G-7100	References updated to latest editions; ANSI/AGMA 9002-B04, ANSI/AGMA 9003-B08, ANSI/AGMA 9103-B08, ANSI/AGMA 9112-A04 added
19	NUM-I-5400, NUM-I-5420	Added for proper nesting
21	NUM-I-7730, NUM-I-7740	Added for proper nesting
	NUM-I-7749	Added
	NUM-I-7931	Paragraph (c) references to figures updated
	Figure NUM-I-7931-1	Figure number updated
22	NUM-I-7942.1	Added for proper nesting
	Figure NUM-I-7931-2	Figure number updated
23	Figure NUM-I-7931-3	Figure number updated
24	NUM-I-7945	Paragraph (a) revised to add “keys”
26	NUM-I-7947	NUM-I-7947.1, NUM-I-7947.2, NUM-I-7947.6 added; NUM-I-7947.4 deleted; others redesignated
27	NUM-I-7950, NUM-I-7952	Added for proper nesting
	NUM-I-7970	Redesignated, reference to NUM-III-7970(a) updated
28	NUM-I-8212, NUM-I-8320, NUM-I-8332	Added for proper nesting
	NUM-I-8340, NUM-I-8345	Added

<i>Page</i>	<i>Location</i>	<i>Change</i>
29–30	Table NUM-I-8210-1	Note (3) reference to tables corrected
	NUM-I-8420	Added for proper nesting
36	NUM-I-8532	Added for proper nesting
40	NUM-II-8210	Added for proper nesting
	NUM-II-8213	Editorially revised
41	NUM-II-8215.3.5	Paragraph (c) equations renumbered
43, 44	Table NUM-II-8215.3.6-1	General Note added
	NUM-II-8215.3.10	Equations renumbered
45	NUM-II-8320, NUM-II-8410, NUM-II-8520, NUM-II- 8521.2	Added for proper nesting
55	NUM-III-3222	Revised
60	NUM-III-4422	Motor sizing cross-reference corrected
63, 65	NUM-III-5422	Paragraph (b) editorially revised
72	NUM-III-6510	Paragraph (e) cross-reference corrected
76	Figure NUM-III-7210-1	Illustration (d) corrected
77, 78	NUM-III-7341	Paragraph (d) reference to table corrected
	Figure NUM-III-7410-1	Callouts added
80	Figure NUM-III-7510-1	Illustration (d) corrected
81	Figure NUM-III-7610-1	Callouts added
	NUM-III-7720	Reference to Nonmandatory Appendix A corrected
85	NUM-III-7945	Subparagraph (b)(2) revised, including equations
88	NUM-III-7953.2	Added new para. (b), others redesignated
91	NUM-III-8212.3	Paragraph (a) reference updated
	NUM-III-8213	Editorially revised
93	Figure NUM-III-8214-1	Caption updated
94	NUM-III-8231.2	Equations (9), (10) editorially revised; eq (11) corrected; equation numbers updated
	Figure NUM-III-8214-2	Caption updated
95	NUM-III-8231.4	Reference updated
	NUM-III-8232.1	Description of $\sigma_b$ updated
96, 98	NUM-III-8232.3	(1) Subparagraph (a) nomenclature updated (2) Subparagraph (b) $\sigma t$ corrected in third paragraph (3) Subparagraph (f) description of $\tau$ corrected

<i>Page</i>	<i>Location</i>	<i>Change</i>
99	NUM-III-8233.2	Equation editorially revised
	NUM-III-8233.3	(1) Equation (43) corrected (2) Second column head of text table updated
	NUM-III-8233.4	Reference updated
100	Table NUM-III-8234.1-1	Revised
101–104	Table NUM-III-8234.1-2	Note (1) added
105	Figure NUM-III-8234.1-1	Parts 7, 13, and 31 corrected
107	NUM-III-8341.2	Revised, including equations
108	NUM-III-8343.5	Revised
114	Table NUM-III-8344.2-1	In Contour Tread straddle head, units corrected
118–119	NUM-III-8422.4	(1) Subparagraph (a)(1) definition of $K_s$ updated (2) Subparagraph (b)(3) revised
120	Table NUM-III-8422.4-1	Units updated
135	NUM-A-1320	Table number corrected
144, 146	NUM-B-4100	(1) Subparagraph (a) last equation in section corrected (2) Subparagraph (b) penultimate equation in section corrected (3) Subparagraph (d) units for penultimate equation in section corrected
	NUM-B-4200	Deleted

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# **RULES FOR CONSTRUCTION OF CRANES, MONORAILS, AND HOISTS (WITH BRIDGE OR TROLLEY OR HOIST OF THE UNDERHUNG TYPE)**

## **Section NUM-G-1000 Introduction**

### **NUM-G-1100 GENERAL**

(a) This Standard is split into the following four major sections:

(1) NUM-G: General Specifications, applicable to all equipment

(2) NUM-I: Type I equipment, i.e., equipment that is used to handle critical loads and is required to withstand a seismic event (see Section NUM-G-6000)

(3) NUM-II: Type II equipment, i.e., equipment that is not used to handle critical loads and is required to withstand a seismic event (see Section NUM-G-6000)

(4) NUM-III: Type III equipment, i.e., equipment that is not used to handle critical loads and is not required to withstand a seismic event (see Section NUM-G-6000)

(b) Equipment covered under this Standard shall be designed 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.

### **NUM-G-1200 SCOPE**

This Standard covers underhung cranes, top-running bridge and gantry cranes with underhung trolleys, traveling wall cranes, jib cranes, monorail systems, overhead

hoists, and hoists with integral trolleys used in nuclear facilities. All of the above cranes, whether single or multiple girder, are covered by this Standard with the exception of multiple-girder cranes with both top-running bridge and trolley, which are covered by ASME NOG-1.

### **NUM-G-1300 APPLICATIONS**

This Section of the Standard applies to the design, manufacture, testing, inspection, shipment, storage, and erection of the cranes, hoists, and monorails covered by this Standard.

### **NUM-G-1400 RESPONSIBILITY**

The equipment covered by this Standard is classified into three types (see Section NUM-G-6000, equipment Types I, II, and III) depending on the equipment location and usage of the equipment at a nuclear facility.

The owner shall be responsible for determining and specifying the equipment type. The owner shall also be responsible for determining and specifying the environmental conditions of service, performance requirements, type and category of coatings and finishes, and degree of quality assurance.

Determining the extent to which this Standard can be used either in part or in its entirety at other than nuclear facilities shall be the responsibility of those referencing the use of the Standard.