



Designation: **F2783–17 F2783 – 20**

Standard Practice for Design, Manufacture, Operation, Maintenance, and Inspection of Amusement Rides and Devices, in Canada¹

This standard is issued under the fixed designation F2783; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

Note—This ASTM Standard has been developed to replace CAN/CSA Z267-00 (R2011), which is being withdrawn as an active CSA Standard.

INTRODUCTION

The Canadian Standards Association (CSA) and the American Society for Testing Materials (ASTM) have paved the way for the development of new ASTM amusement device standards, introducing uniform safety criteria for both Canada and the United States of America.

Seeking to gain a level of consistency and eliminate much duplication, CSA and ASTM struck a subcommittee to develop a new ASTM F24 standard, a comprehensive, one-volume document, that provides a mechanism to:

- adapt F24 standards to Canadian needs;
- provide greater two way communication between CSA and ASTM; and
- facilitate adoption by Canadian provinces and territories.

This one-source standard replaces the current CSA Z267 Safety Code for Amusement Rides and Devices. As CSA Z267 was primarily based on the ASTM F24 Family of Standards, Practice F2783 is a realignment of those core essentials with new sections tailor-made for Canada. Categorized in four distinct sections, the standard includes:

- **Core Standards** (for example, Terminology, Design, Manufacture, Operation, Maintenance, and Inspection);
- **Supporting Standards** (for example, Measuring Ride Dynamics and Hardness of Composite Foam);
- **Specific Classification of Amusement Rides and Devices Standards** (for example, Go-Karts, Water Slides, Inflatables and Trains); and
- **Other Standards** (other standards used to support amusement device design).

This standard is structured such that Section 2.2 listings of Core Standards capture the essential and broad safety requirements for all amusement rides and devices. Section 2.3 listings of Supporting Standards are intended to complement in design of all amusement rides and devices where applicable. Section 2.4 listings of Specific Classification of Amusement rides and Devices Standards capture supplemental requirements in addition to Core Standards for anomalous amusement rides and devices. Section 2.5 listing Other Standards used to support amusement device design.

To provide greater application within Canada, Practice F2783 also incorporates specific sections that include: Standards Cross Referencing Table; Substitutions; Exceptions; and Additional Requirements.

This unique initiative would not have been possible were it not for the active collaboration of the CSA Z267 and the ASTM F24.80 Harmonization Committees, representative of a diverse stakeholder base, including delegates from government (regulators), manufacturers, engineers, park owners/operators as well as general and consumer interests.

Practice F2783 is supported by Canadian provincial and territorial regulators and amusement device stakeholders, the International Association of Amusement Parks and Attractions (IAAPA), CSA and ASTM.

This standard has been printed in Canada's two official languages.

1. Scope

1.1 This practice applies to the terminology, design, manufacture, operation, maintenance, and inspection of amusement rides and devices in Canada.

¹ This practice is under the jurisdiction of ASTM Committee F24 on Amusement Rides and Devices and is the direct responsibility of Subcommittee F24.80 on Harmonization.

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1.2 This practice adopts ASTM Committee F24 Standards listed under Sections subsections 2.2, 2.3 and 2.4. The adoption of the standards in 2.2, 2.3 and 2.4 in whole or part is at the sole discretion of the Authority Having Jurisdiction.

1.3 This practice includes an annex (mandatory), which provides additional information (for example, rationale, background, interpretations, drawings, commentary, etc.) related to the application of the criteria presented in this practice.

1.4 This practice includes an appendix (non-mandatory), which provides additional information (for example, rationale, background, interpretations, drawings, commentary, and so forth) to improve the user’s understanding and application of the criteria presented in this practice.

1.5 It is the responsibility of the users of this practice and other ASTM Standards to judge their suitability for a particular purpose.

1.6 This practice includes the following sections:

Title	Section
Scope	1
Referenced Documents	2
ASTM Committee F24 Core Standards for Amusement Rides and Devices	2.2
ASTM Committee F24 Supporting Standards for Amusement Rides and Devices	2.3
ASTM Committee F24 Standards for Specific Classification of Amusement Rides and Devices	2.4
Other Standards	2.5
Reference Codes, Standards, Specifications, and Handbooks	2.6
Terminology	3
Significance and Use	4
Design	5
General	5.1
Substitution of Referenced Documents in Practice F2291 with Alternate Documents	5.2
General	5.2.1
Canadian Standards	5.2.2
Exceptions from Practice F2291	5.3
Additional Requirements	5.4
Manufacture	6
Ownership, Operation, Maintenance, and Inspection	7
Exceptions from Practice F770	7.3
Additional Requirements	7.4
Auditing of Amusement Rides and Devices	8
Recognized Certification Marks	Annex A1
Significance and Use	Appendix X1
Hardness Measurement of Patron Seat and Restraint Padding	Appendix X2
Applicable Code(s) used for Amusement Ride or Device Evaluation at Time of Request for Approval within a Jurisdiction	Appendix X3

1.7 For a glossary of terms that includes the meaning and intent of words such as shall, should, may, will, standard, practice, guide, classification, specification, etc. used in ASTM standards, please refer to “Form and Style for ASTM Standards,” which is available at www.astm.org.

1.8 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.9 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 The documents listed in 2.2, 2.3 and 2.4 contain provisions, which through reference in this standard, constitute provisions of this practice.

NOTE 1—For undated references, the latest edition of the referenced document applies. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. Where a Ride Specific standard points to an earlier edition of a published Core standard, the requirements of the Ride Specific standard shall apply (unless specific direction has otherwise been provided by the authority having jurisdiction). However, users of this practice are encouraged to investigate the possibility of applying the most recent editions of documents referenced below.

2.2 Core Standards for Amusement Rides and Devices:²

F747 Terminology Relating to Amusement Rides and Devices

F770 Practice for Ownership, Operation, Maintenance, and Inspection of Amusement Rides and Devices

F1193 Practice for Quality, Manufacture, and Construction of Amusement Rides and Devices

F2291 Practice for Design of Amusement Rides and Devices

F2974 Practice for Auditing Amusement Rides and Devices

2.3 Supporting Standards for Amusement Rides and Devices:²

F1957 Test Method for Composite Foam Hardness-Durometer Hardness

F2137 Practice for Measuring the Dynamic Characteristics of Amusement Rides and Devices

F2375 Practice for Design, Manufacture, Installation and Testing of Climbing Nets and Netting/Mesh used in Amusement Rides, Devices, Play Areas and Attractions

F3214 Practice for Characterization of Fire Properties of Materials Specified for Vehicles Associated with Amusement Rides and Devices

2.4 Standards for Specific Classification of Amusement Rides and Devices:²

F2007 Practice for Design, Manufacture, and Operation of Concession Go-Karts and Facilities

F2374 Practice for Design, Manufacture, Operation, and Maintenance of Inflatable Amusement Devices

F2376 Practice for Classification, Design, Manufacture, Construction, and Operation of Water Slide Systems

F2460 Practice for Special Requirements for Bumper Boats

F2461 Practice for Manufacture, Construction, Operation, and Maintenance of Aquatic Play Equipment

F2959 Practice for Aerial Adventure Courses

F2960 Practice for Permanent Amusement Railway Ride Tracks and Related Devices

F2970 Practice for Design, Manufacture, Installation, Operation, Maintenance, Inspection and Major Modification of Trampoline Courts

F3054 Practice for Operations of Amusement Railway Rides, Devices, and Facilities

F3099 Practices for Parasailing

F3133 Practice for Classification, Design, Manufacture, Construction, Maintenance, and Operation of Stationary Wave Systems

F3158 Practice for Patron Transportation Conveyors Used with a Water Related Amusement Ride or Device

2.5 Other Standards:

D785 Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials

D2240 Test Method for Rubber Property—Durometer Hardness

F1159 Practice for Design of Amusement Rides and Devices that are Outside the Purview of Other F24 Design Standards

2.6 Reference Codes, Standards, Specifications, and Handbooks:

NOTE 2—Table 1 provides cross-references of document(s) acceptable in lieu of specific editions of codes, standards, specifications, and handbooks referenced in standards from ASTM Committee F24 on Amusement Rides and Devices. Only that portion of the codes, standards, specifications and handbooks as specified by the requirements of this standard is applicable.

3. Terminology

3.1 Terms that are meant to have common meaning among the ASTM Committee F24 standards referenced in Section 2 are defined in Terminology F747.

3.2 Terms that are meant to have specific meaning within the ASTM Committee F24 standards are defined in those standards referenced in Section 2.

3.3 *engineer, n*—an engineer as defined by and licensed in accordance with the applicable provincial or territorial statute.

3.4 *Clarification of Terminology in ASTM Committee F24 Standards:*

3.4.1 The term “attractions” used in the ASTM F24 Committee Standards for Amusement Rides and Devices hold the same meaning as “amusement devicesrides or rides”devices” defined in Terminology F747.

3.4.2 The term “English” used in the ASTM F24 Committee Standards for Amusement Rides and Devices means “English and French” for the purpose of this Standard.

4. Significance and Use

4.1 The purpose of this practice is to adopt the ASTM F24 Committee Standards for Amusement Rides and Devices for use in Canada.

4.2 This practice provides guidance for use of additional codes and standards in Canada.

4.3 In cases where conflicts exist between this practice and local codes, local codes would prevail.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.

TABLE 1 Cross-References of Documents

Reference Documents in ASTM F24 Committee Standards			Alternate Acceptable Documents in Canada		Comments
Designation (Listed by Authoring Organization)	ASTM Standards Reference Source	Title	Designation (Publisher)	Title	
ACI Standards:					
ACI 301	F2291	Specifications for Structural Concrete	NBCC (NRCC)	National Building Code of Canada	See also 5.2.2.6.
ACI 318	F2291	Building Code Requirements for Structural Concrete (318) and Commentary (318R)	NBCC (NRCC)	National Building Code of Canada	See also 5.2.2.6.
AF&PA American Wood Council Standards:					
NDS 2005	F2291	National Design Specification for Wood Construction	O86 (CSA)	Consolidation – Engineering design in wood	
AISC Manuals:					
AISC 316	F2291 F2970	Manual of Steel Construction, Allowable Stress Design (ASD)	(CISC) & S16 (CSA)	Handbook of Steel Construction – Ninth Edition; and Design of Steel Structures	AISC 316, the CISC Handbook, and CSA S16 are to be used in conjunction with the section on loads and strengths in Practice F2291.
AISC 360-05	F2291	Specifications for Structural Steel Buildings	(CISC) & S16 (CSA)	Limit States Design in Structural Steel Eighth Edition, and Design of steel structures	AISC 360, the CISC LSD publication, and CSA S16 are to be used in conjunction with the section on loads and strengths in Practice F2291.
AISC M015	F2291 F2970	Manual on Steel Construction, Load & Resistance Factor Design (LRFD)	(CISC) & S16 (CSA)	Limit States Design in Structural Steel Ninth Edition, and Design of steel structures	AISC M015, the CISC LSD publication, and CSA S16 are to be used in conjunction with the section on loads and strengths in Practice F2291.
ANSI Standards:					
ANSI B11.TR3	F2291	Risk Assessment and Risk Reduction—A Guide to Estimate, Evaluate, and Reduce Risks Associated with Machine Tools	None	None	This technical report is intended to complement the topic about Ride Analysis covered in Practice F2291.
ANSI B77.1	F2291 F2959 F3158	Passenger Ropeways—Aerial Tramways, Aerial Lifts, Surface Lifts, Tows and Conveyors—Safety Requirements	Z98 (CSA)	Passenger ropeways and passenger conveyors	See also 5.3.3.
ANSI B77.2	F3054	Funiculars - Safety Requirements	Z98 (CSA)	Passenger ropeways and passenger conveyors	None
ANSI Y32.10	F2291	Graphic Symbols for Fluid Power Diagrams	None	None	None
ANSI Z359	F2959	Fall Protection Code	None	None	See also provincial Occupational Health and Safety requirements related to Fall Protection
ANSI A10.11	F2461	Personal and Debris Nets	None	None	None
ANSI/IAF-9	F2461	American National Standard for Aquatic Recreation Facilities	None	None	Refer to Provincial pool safety standards as required. Also known as APSP-9.
APSP (Association of Pool & Spa Professionals) Document:					
ANSI/APSP-16	F3133	Suction Fittings for Use in Swimming Pools, Wading Pools, Spas and Hot Tubs	None	None	Refer to Provincial pool safety standards as required
AREMA (American Railway Engineering and Maintenance-of-Way Association):					
Manual for Railway Engineering (AREMA)	F2960	Manual for Railway Engineering	None	None	None

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TABLE 1 Continued

Reference Documents in ASTM F24 Committee Standards			Alternate Acceptable Documents in Canada		
Designation (Listed by Authoring Organization)	ASTM Standards Reference Source	Title	Designation (Publisher)	Title	Comments
ASCE Standards:					
ASCE 7	F2291	Minimum Design Loads for Buildings and Other Structures	NBCC (NRCC)	National Building Code of Canada	ASCE 7 and the NBCC are to be used in conjunction with the section on loads and strengths in Practice F2291.
ASCE 16	F2291	Standard for Load and Resistance Factor Design (LRFD) for Engineered Wood Construction	O86 (CSA)	Consolidation – Engineering design in wood	
ASM Documents:					
Atlas of Fatigue Curves	F2291	ASM Atlas of Fatigue Curves	None	None	The ASM Atlas and the ASM Handbook are intended to complement the topic about fatigue strength of mechanical and structural components.
ASM Handbook Volume 19: Fatigue and Fracture	F2291	ASM Handbook Volume 19: Fatigue and Fracture	None	None	The ASM Atlas and the ASM Handbook are intended to complement the topic about fatigue strength of mechanical and structural components.
ASME Standards:					
ASME A17.1/CSA B44	F2291 F3158	Safety Code for Elevators and Escalators	ASME A17.1/CSA B44 (ASME/CSA)	Safety code for elevators and escalators	This standard may be applicable where elevator and escalator technology is used in the design of amusement rides or devices.
ASME B15.1	F2291	Safety Standards for Mechanical Power Transmission Apparatus	None	None	None
ASME B20.1	F3158	Safety Standard for Conveyors and Related Equipment	A17.1/B44 (ASME)	Safety code for Elevators and Escalators	Requirements of B20.1 may be subject to Provincial adoption
ASME BPVC	F2291	ASME Boiler and Pressure Vessel Code	B51 (CSA)	Boiler, pressure vessel, and pressure piping code.	Accumulators shall be constructed in accordance with Section 8, Division 1 of the ASME Boiler and Pressure Vessel Code for unfired pressure vessels, or equivalent.
ASNT Document:					
ASNT SNT-TC-1A	F1193	Topical Outlines for Qualification of Nondestructive Testing Personnel	48.9712 / ISO 9712 (CGSB)	Nondestructive Testing; Qualification and Certification of Personnel	For all NDT Personnel: Natural Resources Canada (NRCan), through the CANMET Materials Technology Laboratory (MTL), is the Certifying Agency for the Canadian Non-Destructive Testing (NDT) Personnel Certification Program. NRCan certifies individuals according to the Canadian General Standards Board Standard CAN/CGSB-48.9712 (Qualification and Certification of Non-Destructive Testing Personnel). For NDT of Welding to CSA W47.1: In Canada, the CWB (Canadian Welding Bureau) is the Certification Body for the administration of CSA Standard W178: 1) NDT shall be conducted by organization certified to W178.1-08 – Certification of Welding Inspection Organizations. 2) NDT shall be conducted by individual certified to W178.2-08 – Certification of Welding Inspectors.

TABLE 1 Continued

Reference Documents in ASTM F24 Committee Standards			Alternate Acceptable Documents in Canada		
Designation (Listed by Authoring Organization)	ASTM Standards Reference Source	Title	Designation (Publisher)	Title	Comments
ASTM Standards:					
ASTM D737	F2970	Test Method for Air Permeability of Textile Fabrics	None	None	None
ASTM D3574	F2970	Test Methods for Flexible Cellular Materials—Slab, Bonded, and Molded Urethane Foams	None	None	None
ASTM D3786	F2970	Test Method for Bursting Strength of Textile Fabrics— Diaphragm Bursting Strength Tester Method	None	None	None
ASTM D3787	F2970	Test Method for Bursting Strength of Textiles— Constant-Rate-of-Traverse (CRT) Ball Burst Test	None	None	None
ASTM D4533	F2970	Test Method for Trapezoid Tearing Strength of Geotextiles	None	None	None
ASTM D4632	F2970	Test Method for Grab Breaking Load and Elongation of Geotextiles	None	None	None
ASTM D4833	F2970	Test Method for Index Puncture Resistance of Geomembranes and Related Products	None	None	None
ASTM D5034	F2970	Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)	None	None	None
ASTM D5672	F2970	Test Method for Testing Flexible Cellular Materials Measurement of Indentation Force Deflection Using a 25 mm [1 in.] Deflection Technique	None	None	None
ASTM D6413	F2970	Test Method for Flame Resistance of Textiles (Vertical Test)	None	None	None
ASTM E84	F2970 F3214	Test Method for Surface Burning Characteristics of Building Materials	None	None	None
ASTM E136	F3214	Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C	None	None	None
ASTM E162	F3214	Test Method for Surface flammability of Materials Using Radiant Heat Energy Source	None	None	None
ASTM E543	F1193	Standard Specification for Agencies Performing Nondestructive Testing	48.9712 / ISO 9712 (CGSB)	Nondestructive Testing; Qualification and Certification of Personnel	For all NDT Personnel: Natural Resources Canada (NRCan), through the CANMET Materials Technology Laboratory (MTL), is the Certifying Agency for the Canadian Non-Destructive Testing (NDT) Personnel Certification Program. NRCan certifies individuals according to the Canadian General Standards Board Standard CAN/CGSB-48.9712 (Qualification and Certification of Non-Destructive Testing Personnel). For NDT of Welding to CSA W47.1: In Canada, the CWB (Canadian Welding Bureau) is the Certification Body for the administration of CSA Standard W178: 1) NDT shall be conducted by organization

TABLE 1 Continued

Reference Documents in ASTM F24 Committee Standards			Alternate Acceptable Documents in Canada		
Designation (Listed by Authoring Organization)	ASTM Standards Reference Source	Title	Designation (Publisher)	Title	Comments
ASTM E648	F2970	Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source	None	None	certified to W178.1-08 – Certification of Welding Inspection Organizations. 2) NDT shall be conducted by individual certified to W178.2-08 – Certification of Welding Inspectors. None
ASTM E662	F3214	Test Method for Specific Optical Density of Smoke Generated by Solid Materials	None	None	None
ASTM E1354	F3214	Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using Oxygen Consumption Calorimeter	None	None	None
ASTM F355	F2970	Test Method for Impact Attenuation of Playing Surface Systems and Materials	None	None	None
ASTM F1148	F2461	Consumer Safety Performance Specification for Home Playground Equipment	None	None	None
ASTM F1292	F2461	Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment	None	None	None
ASTM F1487	F2959 F2461	Consumer Safety Performance Specification for Playground Equipment for Public Use	CAN/CSA-Z614	Children's playspaces and equipment	None
ASTM F1772	F2959	Specification for Harnesses for Rescue, Safety, and Sport Activities	CAN/CSAZ259.10	Full body harness	See ASTM requirements where not addressed by the CSA Standard
ASTM F1918	F2461	Safety Performance Specification for Soft Contained Play Equipment	None	None	None
ASTM F2650	F2970	Terminology Relating to Impact Testing of Sports Surfaces and Equipment	None	None	None
ASTM Technical Publication:					
ASTM STP-1330	F2291	Composite Materials: Fatigue and Fracture, 7th Volume	None	None	Publication STP-1330 contains papers presented at the Seventh Symposium on Composite Materials, and Fatigue and Fracture.
AWPA (American Wood Preserver's Association) Standard:					
AWPA U1	F2960	Use Category System	None	None	None
AWS Standards:					
AWS D1.1/D1.1M	F1193 F2291 F2970	Structural Welding Code - Steel	W47.1 W59	Certification of Companies for Fusion Welding of Steel Welded Steel Construction (Metal Arc Welding)	Refer to 5.3.4 for additional information. CSA W47.1 and CSA W59 together are acceptable to ANSI D1.1
AWS D1.1/D1.1M	F2291 F2970	Structural Welding Code – Steel	W178.1 (CSA) W178.2 (CSA)	Certification of welding inspection organizations Certification of welding inspectors	See also 5.3.4.

TABLE 1 Continued

Reference Documents in ASTM F24 Committee Standards			Alternate Acceptable Documents in Canada		
Designation (Listed by Authoring Organization)	ASTM Standards Reference Source	Title	Designation (Publisher)	Title	Comments
AWS D14.4	F2291 F2970	Specification for Welded Joints in Machinery and Equipment	W59 (CSA)	Welded steel construction (metal arc welding)	See also 5.3.4 .
BSI Standards:					
BS EN 1907	F2960 F3054	Safety Requirements for Cableway Installations Designed to Carry Persons—Terminology	None	None	None
BS 5400-10	F2291	Steel, Concrete and Composite Bridges—Code of Practice for Fatigue	None	None	BS 5400 is intended to complement the topic about fatigue strength of mechanical and structural components.
BS 7608	F2291	Code of Practice for Fatigue Design and Assessment of Steel Structures	None	None	BS 7608 is intended to complement the topic about fatigue strength of mechanical and structural components.
BS EN 12277	F2959	Mountaineering equipment – Harnesses – Safety requirements and test methods	None	None	None
California Technical Bulletin:					
California Technical Bulletin 117	F2970	Requirements, Test Procedure and Apparatus for Testing the Flame Retardance of Resilient Filling Materials	None	None	None
CDC (Center of Disease Control):					
Growth Charts	F2291	Basic Body Measurements	None	None	
CFR (Code of Federal Regulations):					
OSHA 29 CFR	F1159	Fall Protection Systems Criteria and Practices	None	None	Refer to provincial Occupational Health and Safety requirements related to Fall Protection
46 CFR Part 16	F3099	46 CFR Part 16 Chemical Testing	None	None	Relates to chemical and drug testing of individuals. Refer to Provincial or Federal regulations as appropriate for waterways
DIN Standards:					
DIN 1055	F2291	Actions on structures, Parts 1–7	NBCC (NRCC)	National Building Code of Canada	DIN 1055 and DIN 1055-100 are to be used in conjunction with the section on loads and strengths in Practice F2291 .
DIN 1055-100	F2291	Load combinations	NBCC (NRCC)	National Building Code of Canada	DIN 1055 and DIN 1055-100 are to be used in conjunction with the section on loads and strengths in Practice F2291 .
DIN 4102	F3214	Fire Behavior of building materials and building components	None	None	None
DIN 15018-1	F2291	Cranes; Steel Structures; Verification and Analyses Data	None	None	DIN 15018-1 is not specifically referenced in Practice F2291 . It is up to designer/engineer to determine its relevance in Practice F2291 .
EN Standards:					
EN 280	F2291	Mobile Elevating Work Platforms—Design Calculations, Stability Criteria, Construction, Safety, Examinations, and Tests	B29.100 (ANSI/ASME)	Precision Power Transmission, Double-Pitch Power Transmission, and Double-Pitch Conveyor Roller Chains, Attachments and Sprockets	None
EN 954-1	F2291	Safety of Machinery—Safety Related Parts of Control Systems—General Principles for Design	ISO 13849-1 (ISO)	Safety of machinery—Safety-related parts of control systems—Part 1: General principles for	ISO 13849 is intended to complement the topic of electrical, electronic, and programmable electronic systems covered in Practice

TABLE 1 Continued

Reference Documents in ASTM F24 Committee Standards			Alternate Acceptable Documents in Canada		
Designation (Listed by Authoring Organization)	ASTM Standards Reference Source	Title	Designation (Publisher)	Title	Comments
EN 1021-1	F3214	Assessment of Ignitability of Upholstered Furniture	None	design None	F2291. None
EN 1050	F2291	Safety of Machinery—Principles for Risk Assessment	12100 (ISO)	Safety of machinery – General principles for design – Risk assessment and risk reduction National Building Code of Canada	EN 1050 and ISO 12100 are intended to complement the topic of ride analysis covered in Practice F2291.
EN 1991 EN 1992 EN 1993 EN 1994 EN 1995	F2291	Eurocode 1: Actions on structures Eurocode 2: Design of concrete Eurocode 3: Design of steel structures Eurocode 4: Design of composite steel and concrete structures Eurocode 5: Design of timber structures	NBCC (NRCC) National Building Code of Canada		The Eurocodes 1 to 5 and the NBCC are to be used in conjunction with the section on loads and strengths in Practice F2291.
EN 60947-1	F2291	Low-Voltage Switchgear and Control gear	60947-1 (IEC)	Low-voltage switchgear and control gear—Part 1: General rules	None
F: Fatigue Strength of Welded Structures (Abington Publishing, Cambridge, England)	F2291	Fatigue Strength of Welded Structures, Maddox, S.J., 1993	None	None	<i>Fatigue Strength of Welded Structures</i> is intended to complement the topic on fatigue of welded structures as referenced in Practice F2291.
Factory Mutual Standard: FM 6930	F2291	Flammability Classification of Industrial Fluids	None	None	None
H: Handbook of Mechanical Engineering (Springer Verlag, Berlin, Germany)	F2291	Handbook of Mechanical Engineering, Beitz, W., Heinrich, D., and Kuttner, K.H., 1994	None	None	The <i>Handbook of Mechanical Engineering</i> is intended to complement the topic on fatigue behavior due to surface finish and other material conditions as referenced in Practice F2291.
Human Scale 4/5/6 (The MIT Press, Cambridge, MA, USA) Human Scale 7/8/9 (The MIT Press, Cambridge, MA, USA)	F2291	Human Scale 4/5/6, Bardagjy, J., Diffrient, N., and Tilley, A., 1981 Human Scale 7/8/9, Bardagjy, J., Diffrient, N., and Tilley, A., 1982	None	None	Human Scale 4/5/6 and 7/8/9 books are no longer published.
ICC (International Code Council): ICC A117.1	F2461	Accessible and Usable Buildings and Facilities	None	None	Refer to Provincial accessibility standards as required
International Building Code	F2291	International Building Code Chapter 16, “Structural Design”	NBCC (NRCC)	National Building Code of Canada	The International Building Code and the NBCC are to be used in conjunction with the section on loads and strengths in Practice F2291.
IEC Documents: IEC 60204-1	F2291	Safety of Machinery—Electrical Equipment of Machines—Part 1: General Requirements	None	None	NFPA 79 is also used for these devices.
IEC 61496-1	F2291	Safety of Machinery—Electrosensitive Protective Equipment—General Requirements and Tests	E61496-1 (CSA)	Safety of machinery - electro-sensitive protective equipment – Part 1: General requirements and	CAN/CSA-E61496-1 adopted IEC-61496-1 with Canadian deviations.

TABLE 1 Continued

Reference Documents in ASTM F24 Committee Standards			Alternate Acceptable Documents in Canada		
Designation (Listed by Authoring Organization)	ASTM Standards Reference Source	Title	Designation (Publisher)	Title	Comments
IEC 61508-1	F2291	Functional Safety of Electrical/ Electronic/Programmable Elec- tronic Safety-Related Systems –General Requirements	None	tests None	IEC 61508-1 is Part 1 of a series of stan- dards on safety related control systems. It is used commonly for testing and certification of electrical, electronic, and programmable elec- tronic systems.
IEC 61511	F2291	Functional Safety: Safety Instru- mented Systems for the Process Industry Sector	None	None	IEC 61511 relates primarily to instrumentation used in the process industry sector.
IEC 62061	F2291	Safety of Machinery-Functional Safety–Electrical, Electronic, and Programmable Electronic Control Systems	None	None	IEC 62061 plays an increasing role in the achievement of overall machine safety as a result of automation, demand for increased production and reduced operator physical ef- fort.
ISO Standards:					
ISO 4113	F2291	Road Vehicles – Calibration Fluid for Diesel Injection Equipment	None	None	See 8.2.2.7 of ISO 4113.
ISO 4413	F2291	Hydraulic fluid power – General rules relating to systems	None	None	See 8.2.2.7 of ISO 4113.
ISO 4414	F2291	Pneumatic Fluid Power General Rules Relating to Systems	None	None	None
ISO 4406	F2291	Particle Count Chart	None	None	None
ISO 5660-1	F3214	Fire tests – Reaction to fire – Part 1: Rate of heat release from build- ing products – (Cone calorimeter method)	None	None	None
ISO 5660-2	F3214	Reaction-to-fire tests – Heat release, smoke production and mass loss rate, Part 2: Smoke production rate (dynamic mea- surement)	None	None	None
ISO 6149-1	F2291	Connections for hydraulic fluid power and general use – Ports and stud ends with ISO 261 met- ric threads and O-ring sealing – Part 1: Ports with truncated hous- ing for O-ring seal	None	None	None
M:					
Mechanical Engineering Design (McGraw-Hill, New York, NY)	F2291	Mechanical Engineering Design, Budynas, R., Mischke, C., and Shigley, J., 1988	None	None	<i>Mechanical Engineering Design</i> is intended to complement the topic on fatigue behavior due to surface finish and other material conditions as referenced in Practice F2291.
MUTCD	F2960	Manual on Uniform Traffic Control Devices for Streets and Highways	MUTCDC (Transportation Association of Canada)	Manual on Uniform Traffic Control Devices for Canada	None
MIL Standards:					
MIL 17	F2291	The Composite Materials Hand- book	None	None	None
MIL 882C	F2291	System Safety Program Require- ments	None	None	MIL 882C is intended to complement the topic of ride analysis covered in Practice F2291.
NEMA Standards:					

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