



Designation: F3559 – 24

Standard Guide for ASTM F24 Standards Governing Lifecycle Management of Amusement Rides and Devices¹

This standard is issued under the fixed designation F3559; 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.

1. Scope

1.1 This guide provides an overview of the appropriate F24 standard(s) to be applied during development and operation and use phases of an amusement ride or device.

1.2 This guide sets forth procedures for owners, operators, designers, engineers, manufacturers, vendors, and suppliers to apply throughout the lifecycle of an amusement ride or device.

1.3 This guide sets forth procedures for assessing and managing the end of operational life for an amusement ride or device, sub-system or component.

1.4 This guide includes an appendix, which provides additional information to improve the understanding and application of the criteria presented in this standard guide.

1.5 *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.*

1.6 *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 *ASTM Standards:*²

F747 Terminology Relating to Amusement Rides and Devices

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

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

F1148 Consumer Safety Performance Specification for Home Playground Equipment

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

F1487 Consumer Safety Performance Specification for Playground Equipment for Public Use

F1918 Safety Performance Specification for Soft Contained Play Equipment

F1957 Test Method for Composite Foam Hardness-Durometer Hardness

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

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

F2291 Practice for Design of Amusement Rides and Devices

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

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

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

F2729 Consumer Safety Specification for Constant Air Inflatable Play Devices for Home Use

F2783 Practice for Design, Manufacture, Operation, Maintenance, and Inspection of Amusement Rides and Devices, in Canada

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

F2974 Practice for Auditing Amusement Rides and Devices

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

¹ This guide is under the jurisdiction of ASTM Committee F24 on Amusement Rides and Devices and is the direct responsibility of Subcommittee F24.20 on Specifications and Terminology.

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

[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](#)

[F3168 Practice for Hayride Attractions](#)

[F3214 Practice for Characterization of Fire Properties of Seating, Upholstery, and Padding Materials for Vehicles Associated with Amusement Rides and Devices](#)

[F3493 Practice for Measuring Dynamic Characteristics of Water Slide Systems Using Instrumented Humans](#)

3. Terminology

3.1 Definitions:

3.1.1 *core standard, n*—an F24 standard that contains fundamental requirements and recommendations which, in whole or in part, are applied to all types of amusement rides and devices.

3.1.1.1 *Discussion*—It is permissible that specific standards only reference the applicable requirements within each of the core standards. For those amusement rides or devices with a specific standard, the design criteria in the specific standard will govern while referencing to applicable sections within the Core Standards.

3.1.2 *operation and use phase, n*—the Lifecycle phase that begins after the amusement ride or device has been commissioned and is first placed into service and ends once it is permanently taken out of service.

3.1.2.1 *Discussion*—This phase includes all uses of the amusement ride or device, such as operation, maintenance, inspection, and evacuation. This phase also includes routine setup (assembly), tear down (disassembly), transportation and storage of portable amusement rides and devices.

3.1.3 *qualified alternate supplier, n*—a company or individual who is knowledgeable in the design/engineering of amusement rides or devices including understanding of ASTM F24 and other relevant codes, but who was not an original designer/engineer or manufacturer at the time the amusement ride or device began Operation and Use.

4. Significance and Use

4.1 The scope of the Committee F24 is the development of standard methods of testing, performance specifications, definitions, standard methods of maintenance and operations, and best practices for amusement rides and devices. The work of this Committee F24 will be coordinated with other ASTM Committees and other societies and organizations having mutual interest.

4.2 The intent of this standard guide is to serve as an overview for F24 standards and to outline processes and procedures to manage the lifecycle of an amusement ride or device. Persons looking for more details on an individual type of amusement ride or device should reference the specific standards available. See [Appendix X1](#).

5. Summary of Guide

5.1 This standard guide defines seven primary phases of the lifecycle of an amusement ride or device. See [X2.1](#) for additional information. Refer to [Fig. 1](#). The phases include:

- 5.1.1 Requirements Definition,
- 5.1.2 Design and Engineering,
- 5.1.3 Manufacturing,
- 5.1.4 Installing,
- 5.1.5 Commissioning,
- 5.1.6 Operation and Use, and
- 5.1.7 End of Life.

5.2 Alternate representation of the lifecycle phases, other than shown in [Fig. 1](#), may be followed.

6. Requirements Definition Phase

6.1 Requirements, key concepts and operational parameters to be applied during the development of the amusement ride or device, should be defined during the Requirements Definitions Phase.

6.2 Requirements should be developed and compliant with appropriate ASTM F24 standards and requirements of applicable authorities having jurisdiction. See [X2.2](#).

6.3 Operational parameters should be sufficiently developed to guide the Requirements Definition Phase. Operational parameters include operations, maintenance, training, and inspection requirements.

6.4 See [X2.3](#) for potential deliverables for the Requirements Definition Phase.

7. Design and Engineering Phase

7.1 During the Design and Engineering Phase, the party or parties responsible for the design will assess and demonstrate compliance with design requirements, applicable codes, and standards as defined during the Requirements Definitions Phase. See [X2.4](#), [X2.5](#) and [X2.6](#) for additional information.

7.2 Design and engineering requirements are described in Practice [F2291](#) or other applicable ASTM F24 Specific standards, see [Appendix X1](#).

7.3 The documentation produced by the party or parties responsible for the design is to be in compliance with the requirements of Practice [F2291](#) or other applicable ASTM F24 Specific standards, see [Appendix X1](#). See [X2.7](#) for additional information.

7.4 When an audit is required, Practice [F2974](#) provides requirements on conducting an audit.

8. Manufacturing Phase

8.1 The party or parties responsible for manufacturing will develop procedures and fabricate the amusement ride or device in compliance with the requirements specified in the Design and Engineering Phase. See [X2.8](#) for additional information.

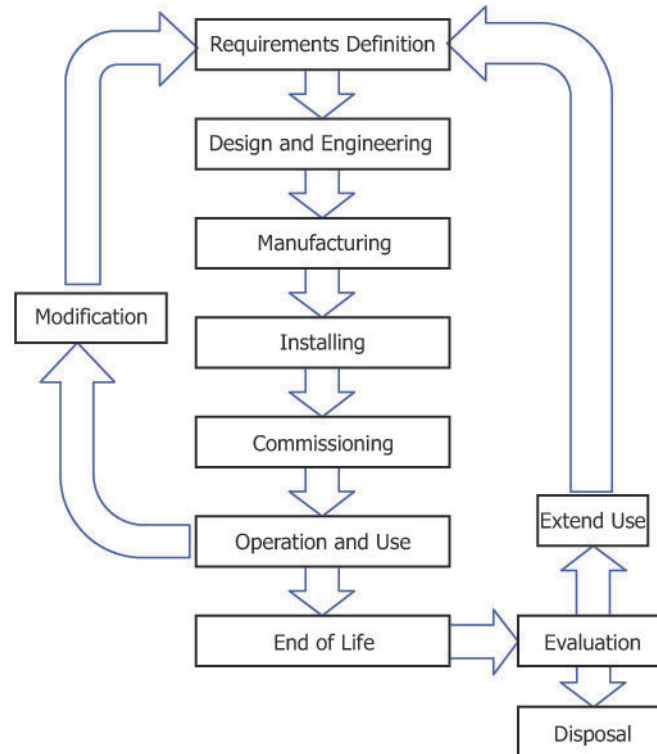


FIG. 1 Lifecycle Chart

8.2 The applicable manufacturing and quality assurance requirements are described in Practice F1193, or other applicable ASTM F24 Specific standards, see Appendix X1.

8.3 The party or parties responsible for manufacturing are to produce the required documentation to comply with manufacturing requirements, support verification, and to demonstrate compliance with applicable codes and standards. The required documentation is to be in compliance with the requirements of Practice F1193. See X2.9 for additional information.

8.4 When an audit is required, Practice F2974 provides requirements on conducting an audit.

9. Installing Phase

9.1 The party or parties responsible for installation will develop procedures and install the amusement ride or device in compliance with specified requirements. The installation procedures are described in Practice F1193, Practice F2291, or other applicable ASTM F24 Specific standards, see Appendix X1.

9.2 The party or parties responsible for the installation are to use a quality assurance program that is in compliance with Practice F1193 or other applicable ASTM F24 Specific standards, see Appendix X1. See X2.10 and X2.11 for additional information.

9.3 The party or parties responsible for the installation are to develop the required documentation in compliance with installation requirements and to demonstrate compliance with applicable codes and standards. The documentation produced is to be in compliance with Practice F1193, Practice F2291, or other

applicable ASTM F24 Specific standards, see Appendix X1. See X2.12 for additional information.

9.4 When an audit is required, Practice F2974 provides requirements on conducting an audit.

10. Commissioning Phase

10.1 The party or parties responsible for commissioning will develop procedures and commission the amusement ride or device in compliance with the specified requirements. Commissioning procedures are described in Practice F1193, Practice F2291, or other applicable ASTM F24 Specific standards, see Appendix X1.

10.2 The party or parties responsible for the commissioning are to use a quality assurance program that is in compliance with Practice F1193, or other applicable ASTM F24 Specific standards see Appendix X1. See X2.13 and X2.14 for additional information.

10.3 The party or parties responsible for the commissioning are to develop the required documentation in compliance with commissioning requirements, support verification and to demonstrate compliance with applicable codes and standards. The documentation produced is to be in compliance with Practice F1193, Practice F2291, or other applicable ASTM F24 Specific standards, see Appendix X1. See X2.15 for additional information.

10.4 When an audit is required, Practice F2974 provides requirements on conducting an audit.

11. Operation and Use Phase

11.1 The owner/operator will follow procedures and documentation for operation and use of the amusement ride or device as described in Practice [F770](#), or other applicable ASTM F24 Specific standards, see [Appendix X1](#).

11.2 The owner/operator will use the documentation provided by the design/engineer and manufacturer in accordance with Practice [F2291](#) and Practice [F1193](#), as well as supplemental notification bulletins in accordance with Practice [F1193](#), to establish a program for maintenance, testing, inspection and training for the amusement ride or device. See [X2.16](#) for additional information.

11.3 All modifications completed during the Operation and Use phase should follow the lifecycle workflow, as referenced in [Fig. 1](#), starting with the Requirement Definition Phase. The duration in each phase will vary based on scope of work. See [X2.17](#) for additional information.

11.4 During seasonal or planned maintenance, the owner/operator should secure the amusement ride or device from operation by unauthorized persons. When returning the amusement ride or device to service the owner/operator should complete the manufacturer's required operational inspections and tests, as well as any actions required by supplemental notification bulletins as specified in Practice [F1193](#). See [X2.18](#) and [X2.19](#) for additional information.

11.5 Renewed components or assemblies are to comply with the applicable ASTM standards for the amusement ride or device in which they are installed. See [X2.20](#).

11.6 The owner/operator should produce and maintain the required documentation for operation and use to be in compliance with Practice [F770](#), or other applicable ASTM F24 Specific standards. See [Appendix X1](#).

11.7 When an audit is required, Practice [F2974](#) provides requirements on conducting an audit.

12. End of Life Phase

12.1 An amusement ride or device has reached the end of operational life when the ride or device can no longer be operated in compliance with the manufacturer's requirements, applicable ASTM standards, or local regulations and codes. If an amusement ride or device has reached the end of operational life, the owner/operator should complete an evaluation and may elect to (1) dispose of the amusement ride or device in its entirety or (2) attempt to extend the use of the amusement ride, device, sub-system or component. With either option, the amusement ride, device, sub-system or component should be removed from service and secured from operation until the evaluation is completed.

12.2 If the owner/operator elects to dispose of an amusement ride or device, the owner/operator should oversee the disposal process and confirm that any related documentation produced is in compliance with applicable codes and standards.

12.3 If the owner/operator elects to extend the use of the amusement ride or device, or extend the use of sub-system(s) or component(s), a process should be developed to assess the current condition and determine the process required to return the amusement ride or device, sub-system(s), or component(s) to operation. This evaluation may be performed either before or after the end of the operational life of the amusement ride or device. See [X2.21](#) for additional information.

12.4 The owner/operator should collaborate with the manufacturer or a qualified alternate supplier to evaluate the amusement ride or device, sub-system or component with respect to the operational life, if any, and the methods by which its use may be extended.

APPENDIXES

(Nonmandatory Information)

X1. F24 COMMITTEE STANDARDS AND REFERENCES

X1.1 F24 Committee Standard Tree

X1.1.1 The chart in [Fig. X1.1](#) shows the suite of F24 standards and associated sub-committees.

X1.1.2 F24 has leadership including Chair, Vice-Chair, Secretary and Membership Secretary. Each sub-committee has a Sub-committee Chair, Vice-Chair and Secretary. The sub-committee is responsible to oversee any change, edit and new content into each of the standards under their oversight.

X1.2 F24 Committee Standards

X1.2.1 A review of all standards under the jurisdiction of the ASTM Committee F24 addressing amusement rides and

devices should be performed to determine if one of the Specific standards listed in [Table X1.1](#) is appropriate and more applicable to the Amusement Ride or Device in question.

X1.3 F24 Core, Supporting and Specific Standards

X1.3.1 See [Fig. X1.2](#).

X1.4 Typical Lifecycle for Development and Operation and Use

X1.4.1 See [Fig. X1.3](#).

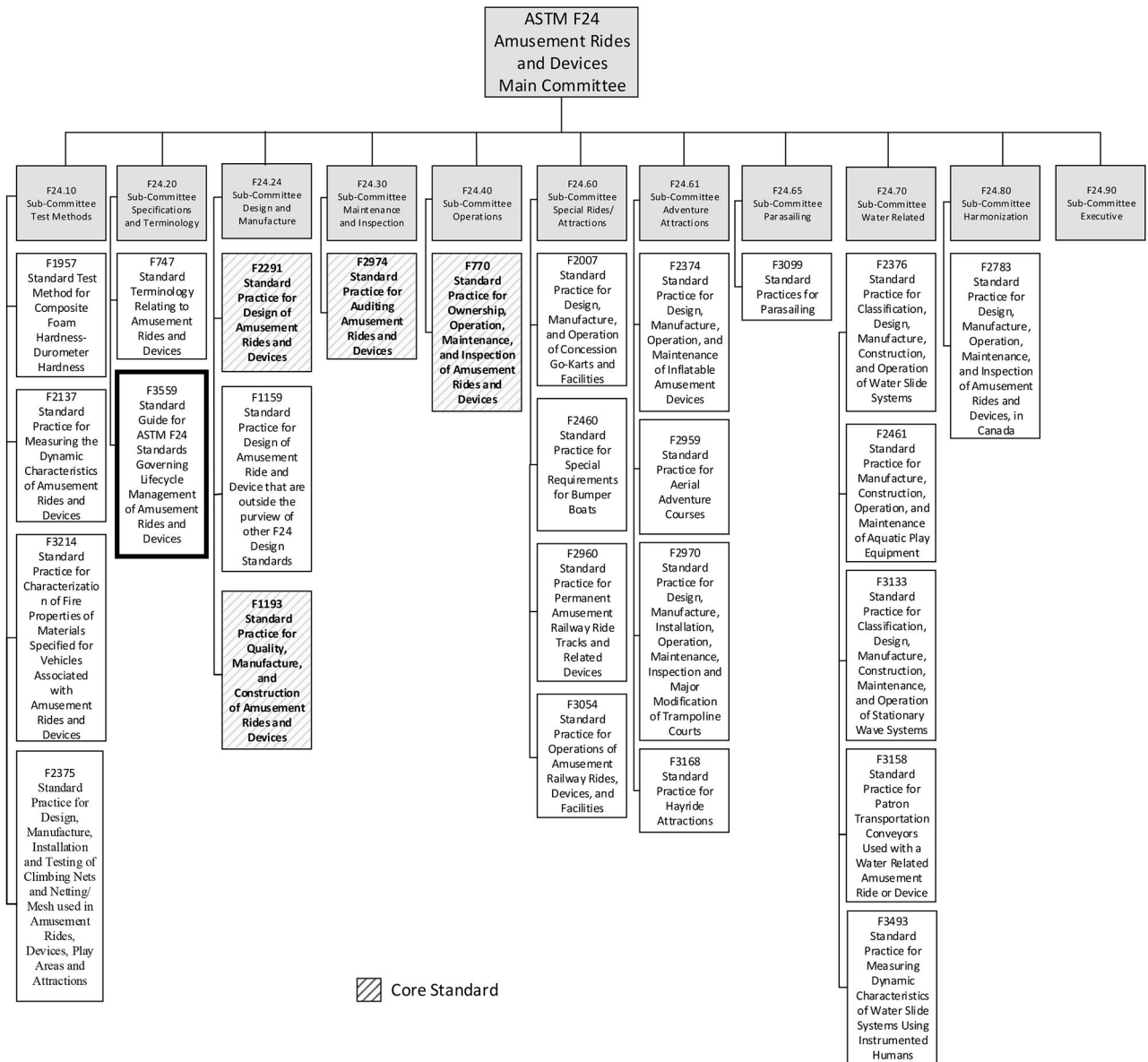


FIG. X1.1 F24 Committee Standards Tree