



Standard Specification for Stationary Upright and Recumbent Exercise Bicycles and Upper Body Ergometers¹

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INTRODUCTION

The goal of this specification is to promote proper design and manufacturing practices for stationary upright and recumbent exercise bicycles and upper body ergometers. Through these specifications, this specification aims to assist designers and manufactures in reducing the possibility of injury when these products are used in accordance with the operational instructions.

The equipment user must recognize, however, that a standard alone will not necessarily prevent injuries. Like other physical activities, exercise involving stationary upright and recumbent exercise bicycles and upper body ergometers involves the risk of injury, particularly if the equipment is used improperly or not properly maintained. In addition, users with physical limitations should seek medical advice and instruction from the fitness facility prior to using this equipment. Certain physical conditions or limitations may preclude some persons from using this equipment properly and without increasing the risk of serious injury.

1. Scope

1.1 This standard establishes parameters for the design and manufacture of stationary exercise bicycle equipment as defined in 3.2.16.

1.2 It is the intent of this standard to specify fitness products for use only by an individual age 13 and older.

1.3 This standard is to be used in conjunction with Specification F2276 and Test Methods F3023.

1.4 This specification is intended to reduce the demonstrated hazards associated with the use of stationary exercise bicycles.

1.5 This specification is written to provide reasonable safety standards for the user of stationary exercise bicycles during storage, movement, entry, use, and exit from the product.

1.6 This standard does not apply to mechanisms that convert road bikes to indoor stationary cycles.

1.7 The values stated in SI units are to be regarded as standard. The values in parentheses are for information only.

1.8 *This standard does not purport to address all the safety concerns, if any, associated with its use. It is the responsibility*

of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 *ASTM Standards:*²

F1749 Specification for Fitness Equipment and Fitness Facility Safety Signage and Labels

F2276 Specification for Fitness Equipment

F2571 Test Methods for Evaluating Design and Performance Characteristics of Fitness Equipment

F3023 Test Methods for Evaluating Design and Performance Characteristics of Stationary Upright and Recumbent Exercise Bicycles and Upper Body Ergometers

3. Terminology

3.1 The terms listed below are unique to this specification. For terms not defined below, refer to Specification F2276.

3.2 *Definitions:*

3.2.1 *back support, n*—the part of the user support means that comes in contact with the users back during operation.

3.2.2 *consumer exercise bicycle, n*—stationary exercise bicycle intended for use by one person or family unit in a home environment.

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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.

3.2.3 *cycle, n*—movement of a point or load from a starting position and back to the same starting position. The cycle being executed through the full range of intended motion.

3.2.4 *direct drive exercise bicycle, n*—stationary exercise bicycles wherein the flywheel is directly coupled to the pedals without the use of a freewheel mechanism. These exercise bicycles are often used in a “class” or group institutional setting.

3.2.5 *ergometer, n*—(1) a stationary exercise bicycle-like device where the user is positioned in an upright seated position and engages the crank mechanism by hand, or (2) upper body cardio vascular exercise units that may or may not be equipped with an apparatus for measuring the work performed by exercising.

3.2.5.1 *Discussion*—The pedals are replaced by handles as shown in Fig. 1. The unit may have a back support, similar to a recumbent bike, that supports the user’s back.

3.2.6 *flywheel, n*—a heavy wheel for opposing and moderating, by its inertia, fluctuations of speed in the exercise bicycle on which it is mounted.

3.2.7 *freewheel, n*—a mechanism that is designed to disengage the flywheel from the pedal mechanism in one direction.

3.2.8 *handlebar, n*—the means that are provided to a user to enhance balance and stability by partially or substantially supporting the user’s weight with the user’s arms.

3.2.9 *handlebar stem, n*—connection between the handlebar and frame provided to adjust the height of the handlebar.

3.2.10 *institutional exercise bicycle, n*—stationary exercise bicycle intended for use by numerous persons in a commercial or institutional, as opposed to a consumer or residential, environment.

3.2.11 *pedal, n*—a device designed to support the foot while the user is performing the exercise as intended by the manufacturer, or while the user mounts or dismounts the equipment.

3.2.12 *recumbent exercise bicycle, n*—a stationary exercise bicycle where the user is positioned in a seated position with their back supported against a back support.

3.2.13 *seat post tube, n*—member or component used to adjust the height of the seat.

3.2.14 *seat sleeve tube, n*—the part of the frame where the seat post is inserted.

3.2.15 *seat support, n*—the part of the seat post where the seat pad is secured or mounted.

3.2.16 *stationary exercise bicycle, n*—stationary training equipment that positions a user’s upper or lower body in an upright or recumbent position to turn a directly coupled or connected flywheel or freewheel crank mechanism with the user’s feet.

4. Equipment Types

4.1 This specification covers the design and manufacture of stationary exercise bicycles as defined in 3.2.16 and illustrated in Figs. 2-4, as well as the design and manufacture of upper body ergometers as defined by 3.2.5 and illustrated in Fig. 1.

5. Design and Construction Requirements

5.1 *Seat and Seat Post:*

5.1.1 *Insertion Depth*—The seat post tube shall have a permanent line indicating the minimum insertion depth of at least 1.5 times the largest cross section dimension (for example, diameter or longest dimension of the inserted seat tube) into the seat sleeve tube. A mark is not required if the minimum insertion depth is provided by the design.



FIG. 1 Upper Body Ergometer



FIG. 2 Recumbent Bike



FIG. 3 Upright Bike



FIG. 4 Direct Drive Exercise Bicycle

5.1.2 The seat shall be adjustable as prescribed by the manufacturer's specifications. The seat post tube shall be retained by a clamp, pin, or similar means.

5.1.3 The seat shall be mounted onto the seat post tube with a seat support. A seat support structure shall be provided that protects the user from impalement in case of failure of the seat or seat post.

5.1.4 When properly adjusted for use according to the manufacturer's specifications, and tested in accordance with the test method, the seat shall not pivot in an upward, downward or side to side direction on its seat post tube

connection means through an angle greater than 2θ when a load of $680\text{ N} \pm 2\%$ ($152\text{ lb} \pm 2\%$) is applied.

5.1.5 The seat and seat post shall meet the loading requirements of Specification F2276.

5.2 *Seat Back Support*—The seat back support shall withstand a load applied to it in accordance with the test method and as defined below, without breakage. For consumer exercise bicycles this load shall be 1.0 times the maximum user weight (as defined by the manufacturer) or 136 kg (300 lb) whichever is greater. For institutional exercise bicycles, a load of 1.5 times the maximum user weight (as defined by the manufacturer) or 150 kg (330 lb) whichever is greater.

5.3 *Handlebars:*

5.3.1 *Insertion Depth*—If a vertical shaft adjustment is used, the adjustment tube shall have a permanent line indicating the minimum insertion depth of at least 63.5 mm (2.50 in.). A mark is not required if the minimum insertion depth is provided by the design.

5.3.2 The handlebars shall not rotate around its horizontal axis when a moment of 61.00 N-m (45 ft-lb) is applied.

5.3.3 The handlebar stem shall not rotate around its vertical axis when a moment of 47.00 N-m (35 ft-lb) is applied.

5.3.4 Handlebars shall meet the loading requirements of Specification F2276.

5.3.5 *Recumbent Seat Support Handlebars*—Consumer recumbent exercise bicycles handlebars shall endure a vertical load of 2.5 times the maximum user weight specified by the manufacturer or 250 kg (114 lb) (whichever is greater without breakage). For institutional recumbent exercise bicycles the loading shall be 400 kg (182 lb) or 4 times the maximum user weight (whichever is greater) without breakage. This load shall be applied to both handlebars or one half of the stated load shall be applied to one handlebar.

5.4 *Pedals:*

5.4.1 Pedals shall have right hand/left hand symmetry.

5.4.2 A slip-resistant surface shall be present on the surface presented to the rider's foot.

5.4.3 A minimum clearance of 60 mm (2.4 in.) shall be provided below the pedals when they are in a horizontal position at the lowest level.

5.4.4 Pedals shall meet the loading requirements of F2276. The load shall be applied vertically at the midpoint of the pedal.

5.4.5 Pedals used on direct drive exercise bicycles shall pass an endurance load test of 900 N (202 lb) applied cyclically to a fixed pedal for 1 000 000 cycles. The load shall be applied to the pedal vertically at the midpoint of the pedal following the guidelines of Test Methods F2571.

5.5 *Drive Train*—Drive train elements shall be guarded in accordance with in Specification F2276.

6. Documentation

6.1 Documentation provided with stationary exercise bicycles shall meet the guidelines established in Specification F2276 and shall also include the following:

6.1.1 *Owner's/User's Manual*—An owner's/user's manual shall be provided with the exercise bicycle.

6.1.2 *Assembly Instructions*—If the stationary exercise bicycle requires assembly, a manual shall be supplied detailing the assembly procedure for the bicycle.

6.1.2.1 Information relating to the proper adjustment of the seat and handlebars including their minimum insertion depth of the adjustment posts shall be provided.

6.1.2.2 Information relating to the procedure for leveling the stationary exercise bicycle shall be provided.

6.1.3 *Operational Instructions*—In addition to the requirements of Specification **F2276**, the following topics shall be included.

6.1.3.1 The function of any immobilization methods.

6.1.3.2 Function of any emergency stop methods.

6.1.3.3 Operation of all controls on the control panel.

6.1.3.4 Instructions for safe mounting and dismounting of the equipment.

6.1.4 *Maintenance Instructions*—Care and necessary maintenance advice shall be provided. This shall include a review of all applicable warning notices and how replacement warning labels can be obtained. Special attention shall be drawn to components most susceptible to wear.

6.1.4.1 Only manufacturer-supplied components shall be used to maintain/repair the equipment.

6.1.5 *Installation Instructions*—Installation instructions for stationary exercise bicycles shall be provided and shall include as a minimum the following:

6.1.5.1 The requirement that a complete visual inspection, and test of the features and functions of the assembled exercise bicycle be made prior to use.

6.1.5.2 Installation of power supply (if applicable) shall comply with local building codes.

6.1.5.3 Procedures for proper storage, movement, and placement of the exercise bicycle.

6.1.5.4 The exercise bicycle shall be set up and operated on a solid level surface.

6.1.5.5 The recommended minimum clearance required around each exercise bicycle for access to, passage around, and emergency dismount. The minimum dimensions are: 0.5 m (19.7 in.) on at least one side, and 0.5 m (19.7 in.) either behind or in front of the exercise bicycle.

(1) The dimensions stated in the installation instructions are the recommended minimum dimensions as set forth by the manufacturer. The actual area for access and passage shall be the responsibility of the facility and should take into account this training envelope, Americans with Disabilities Act Accessibility Guidelines (ADAAG) requirements and any required local codes or regulations (www.access-board.gov/ada).

7. Marking

7.1 Stationary exercise bicycles shall have manufacturer identification affixed to the product in accordance with Specification **F2276**.

8. Warnings

8.1 Stationary exercise bicycles shall be accompanied by appropriate warnings as set forth in Specifications **F2276** and **F1749**. The warnings shall also include:

8.1.1 *General Warning Label*—

8.1.1.1 Set up and operate the stationary exercise bicycle on a solid level surface.

8.1.1.2 Care should be taken in mounting and dismounting the stationary exercise bicycle. Before mounting or dismounting move the pedal on the mounting or dismounting side to its lowest position and bring the machine to a complete stop.

8.1.1.3 Recommendations to keep the top surface of the pedal clean and dry.

8.1.1.4 Consumer exercise bicycles shall contain notification that the stationary exercise bicycle is for consumer use only.

8.1.1.5 Direct drive exercise bicycles shall be affixed with an additional label in a prominent location addressing the following:

(1) Spinning pedals can cause injury.

(2) This exercise bicycle does not have a freewheel and pedal speed must be reduced in a controlled manner.

(3) The stationary exercise bicycle should only be used after a thorough review of the operation manual (consumer stationary exercise bicycles) or under the direct supervision of a trained instructor (institutional stationary exercise bicycles).

8.1.2 *Site Specific Labels*—Site specific labels alerting users, third parties, and service personnel to the hazards specified in Specifications **F1749** and **F2276** and those that are unique to stationary exercise bicycles shall be provided.

8.1.2.1 Disconnect all power before servicing the equipment (if applicable).

8.1.3 *Owner's Manual Warnings*—As specified in Specification **F2276** additional warnings shall be provided in the owner's manual and shall include the following:

8.1.3.1 Do not operate electrically powered equipment in damp or wet locations (if applicable).

9. Keywords

9.1 exercise bicycle; flywheel; freewheel; recumbent; spinning

RELATED MATERIAL

EN 957-1 Stationary training equipment – Part 1: General safety requirements and test methods

EN 957-5 Stationary training equipment – Part 5: Crank driven exercise equipment, additional specific safety requirements and test methods

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