Designation: F3022 – 16ε1

Standard Test Method for Evaluating the Universal Design of Fitness Equipment for Inclusive Use by Persons with Functional Limitations and Impairments[1]

This standard is issued under the fixed designation F3022; 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.

ε[1] NOTE—Editorially corrected the introduction and 5.1.6.8*(3)* in June 2017.

INTRODUCTION

The goal of this test method is to provide reliable and repeatable methods for the evaluation of universally designed fitness equipment.

The equipment user must recognize, however, that the standard alone will not necessarily prevent injuries. Like other physical activities, exercise involving fitness equipment 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 as intended by the manufacturer, and using this equipment may increase the risk of injury.

1. Scope

1.1 This test method[2] specifies procedures and equipment used for testing and evaluating the accessibility of fitness equipment for compliance to Specification F3021 design parameters. Where possible and applicable, accepted test methods from other recognized bodies will be used and referenced. In case of a conflict between this document and Specification F3021, Specification F3021 takes precedence.

1.2 This test method is to be used in conjunction with Specification F3021.

1.3 This standard is to be used as additional requirements to address the accessibility of the equipment for persons with disabilities.

NOTE 1—Additional test methods applicable to specific pieces of equipment, such as treadmills, bicycles, ellipticals, and strength equipment are currently under development.

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

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 and health 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:*[3]

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

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

F3021 Specification for Universal Design of Fitness Equipment for Inclusive Use by Persons with Functional Limitations and Impairments

[1] This test method is under the jurisdiction of ASTM Committee F08 on Sports Equipment, Playing Surfaces, and Facilities and is the direct responsibility of Subcommittee F08.30 on Fitness Products.

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[2] This work was funded, in part, by the Rehabilitation Engineering Research Center on RecTech through the National Institute on Disability, Independent Living, and Rehabilitation Research grant #90RE5009-01-00.

[3] 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. Terminology

3.1 *Definitions*—For definitions applicable to this standard see Specification F3021.

4. Sample Preparation

4.1 Assemble and adjust the fitness equipment apparatus on a horizontal surface according to the manufacturer's instructions. Verify that assembled units are done so according to the manufacturer's instructions. Unless otherwise stated, the fitness equipment apparatus must pass the following tests without adjustment from this initial condition.

4.2 Any equipment with a removable/movable seat shall be set up with the seat in the non-moved position.

4.3 The individual test methods will describe any variations or modifications that are required to the test sample.

5. Test Methods and Procedures

5.1 *General Requirements:*

5.1.1 *Access and Set Up:*

5.1.1.1 *Access, Egress, and Transfer*—This test is a visual inspection of the sample to ensure that all access paths to the piece of equipment, set in the start position, are not obstructed by the frame or other structural parts of the equipment.

Apparatus and Set Up—The sample shall be set up as described in Section 4.

Calibration—No calibration required. Visual inspection only.

Procedure—Inspect all access paths to verify that the path is clear of any obstruction by the frame or other structural parts.

Pass/Fail Criteria—The access path shall conform to the clear space requirements of subsection 5.1.1.1 of Specification F3021.

Precision and Bias—No information is presented about either the precision or bias of test 5.1.1.1 for evaluating access since the test result is non-quantitative.

NOTE 2—Performance tests to get on/off the equipment from the perspective of a broad range of people with disabilities, including people using wheelchairs or those who have functional limitations, sensory deficits, cognitive impairments, visual, or hearing impairments, or a combination thereof, is suggested. One possible method would be to use testers with disabilities.

5.1.1.2 *Maximum Approach Positions*—This test is a visual inspection of the sample to ensure that access paths to the piece of equipment, set in the start position, are available from as many positions as possible (that is, front, rear, left, and right).

Apparatus and Set Up—The sample shall be set up as described in Section 4.

Calibration—No calibration required. Visual inspection only.

Procedure—Inspect access paths from the front, rear, left, and right of the equipment to verify that the path is clear of any obstruction by the frame or other structural parts from as many points of access as possible.

Pass/Fail Criteria—Equipment must be accessible and shall avoid left/right bias as specified in the requirements of subsection 5.1.1.2 of Specification F3021. There is no pass/fail criteria.

Precision and Bias—Equipment must be accessible and shall avoid left/right bias as specified in the requirements of subsection 5.1.1.2 of Specification F3021. There is no pass/fail criteria.

5.1.1.3 *Step-On Height*—This test is a dimensional inspection of the sample to ensure the dimensional compliance of the step-on height.

Apparatus and Set Up—The sample shall be set up as described in Section 4 in the neutral position with 0 % grade/zero incline.

Calibration—Verify that the distance measuring equipment is calibrated and accurate to within 1 mm (0.040 in.).

Procedure—Measure the height from the floor to the top of the highest portion of the step-on surface/frame or top of the transfer surface (see Fig. 1).

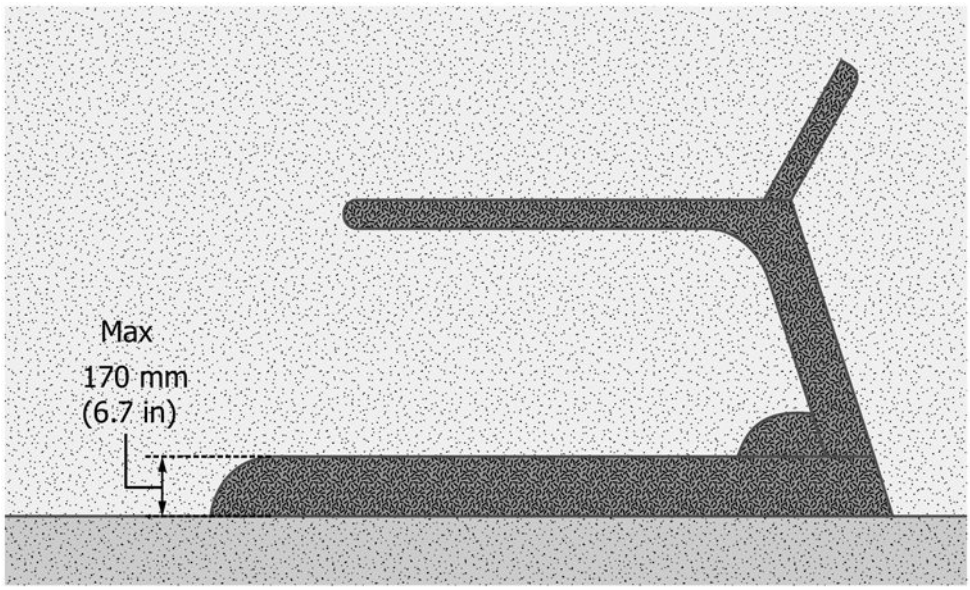

FIG. 1 Maximum Step-on Height Example

Pass/Fail Criteria—The dimensions of the step-on height shall conform to dimensional requirements of subsection 5.1.1.3 of Specification F3021.

Precision and Bias—No information is presented about either the precision or bias of test 5.1.1.3 for measuring step-on height dimensions since the test result is non-quantitative.

5.1.1.4 *Step-Over Height*—This test is a dimensional inspection of the sample to ensure the dimensional compliance of the step-over height.

Apparatus and Set Up—The sample shall be set up as described in Section 4.

Calibration—Verify that the distance measuring equipment is calibrated and accurate to within 1 mm (0.040 in.).

Procedure—Locate the part of the structure that must be stepped over in order to use the equipment. Measure the distance from the floor to the top of the highest step-over point of the frame (see Fig. 2).

Pass/Fail Criteria—The dimensions of the step-over height shall conform to dimensional requirements of subsection 5.1.1.4 of Specification F3021.

Precision and Bias—No information is presented about either the precision or bias of test 5.1.1.4 for measuring step-over height dimensions since the test result is non-quantitative.

5.1.1.5 *Integral Surface/Separate Step Height*—This test is a dimensional inspection of the sample to ensure the dimensional compliance of the step-on/step-over height, with the addition of an integral surface or separate step.

Apparatus and Set Up—The sample shall be set up as described in Section 4 with an integral surface or separate step intact.

Calibration—Verify that the distance measuring equipment is calibrated and accurate to within 1 mm (0.040 in.).

Procedure—Locate the part of the structure that must be stepped on/over in order to use the equipment. Measure the distance from the surface of the integral surface or separate step to the top of the highest step-over point of the frame (see 5.1.1.4).

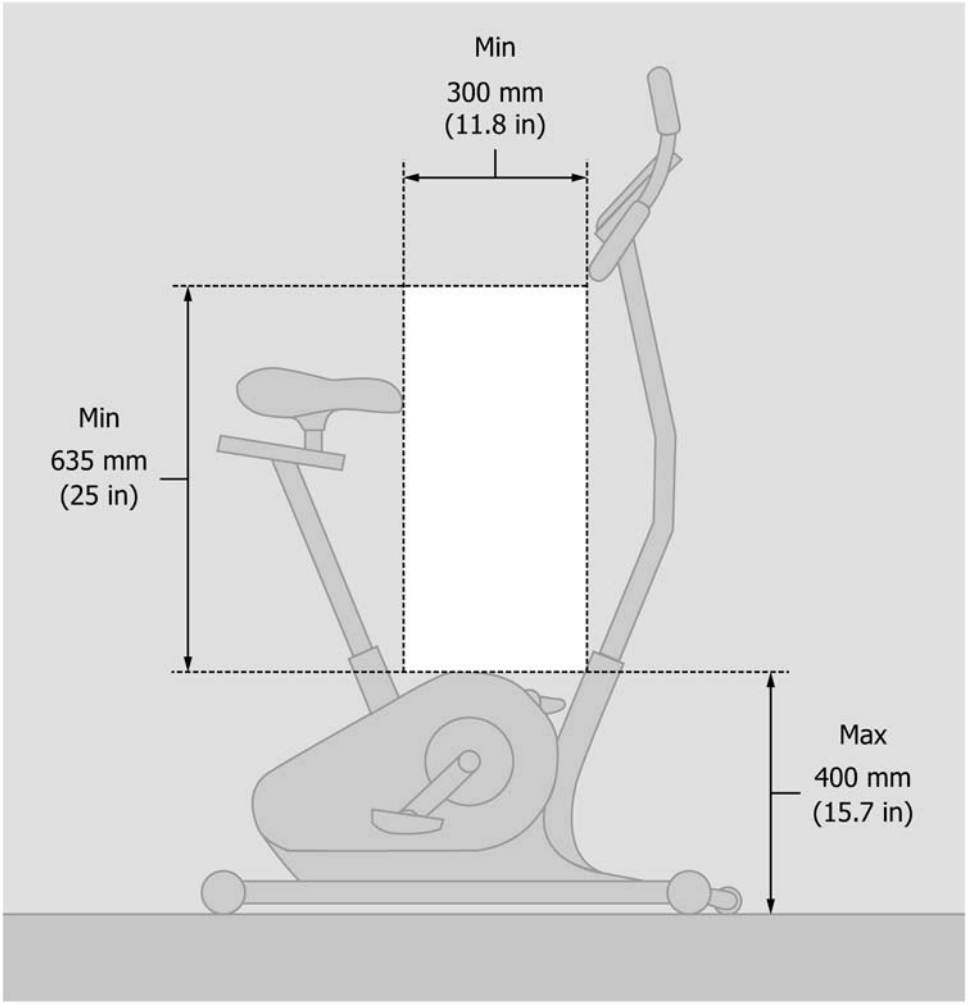

FIG. 2 Maximum Step-over Height Example

Pass/Fail Criteria—The dimensions of the integral surface or separate step height shall conform to dimensional requirements of subsection 5.1.1.5 of Specification F3021.

Precision and Bias—No information is presented about either the precision or bias of test 5.1.1.5 for measuring integral surface or separate step height dimensions since the test result is non-quantitative.

5.1.1.6 *Integral Surface/Separate Step Length/Width/Height*—This test is a dimensional inspection of the sample to ensure the dimensional compliance of the integral surface and separate step length, width, and height.

Apparatus and Set Up—The sample shall be set up as described in Section 4 with an integral surface or separate step intact.

Calibration—Verify that the distance measuring equipment is calibrated and accurate to within 1 mm (0.040 in.).

Procedure—Measure the height from the floor to the top of the stepping surface of the integral surface or separate step. Measure the length and width from the outer edge of the stepping surface lengthwise and the outer edge of the stepping surface widthwise on the integral surface or separate step.

Pass/Fail Criteria—The dimensions of the integral surface or separate step length/width/height shall conform to dimensional requirements of subsection 5.1.1.6 of Specification F3021.

Precision and Bias—No information is presented about either the precision or bias of test 5.1.1.6 for measuring integral surface and separate step length, width, and height dimensions since the test result is non-quantitative.

5.1.1.7 *Integral Surfaces/Separate Steps—Significant Color Value Contrast*—Perform the color value measurement test in 5.3.

5.1.1.8 *Intentional/Unintentional Movement*—This test is a performance and dimensional inspection of the sample to ensure that separate steps do not unintentionally move during use and that they have appropriate mechanisms to facilitate intentional movement.

Apparatus and Set Up—The sample shall be set up as described in Section 4 on carpet for testing the ease of moving the step and on tile or similar flooring for testing for unintentional movement during use.

Calibration—Verify that the force measuring equipment is calibrated and accurate to within 0.5 N (0.1 lbf) over its entire range.

Procedure—Check for skids or wheel lock mechanism. Step on/off the step on tile or similar flooring and visually inspect for unintentional movement during use. Pull the step over carpet flooring and measure the pull force.

Pass/Fail Criteria—The step unintentional/intentional movement shall conform to performance requirements of subsection 5.1.1.8 of Specification F3021.

Precision and Bias—No information is presented about either the precision or bias of test 5.1.1.8 for evaluating and measuring step unintentional/intentional movement since the test result is non-quantitative.

5.1.1.9 *Seated Cardio Back Support*—This test is a visual inspection of the sample to ensure that any seated cardio equipment has an integral back support.

Apparatus and Set Up—The sample shall be set up as described in Section 4.

Calibration—No calibration required. Visual inspection only.

Procedure—Verify that the seated cardio equipment has a back support intact.

Pass/Fail Criteria—The presence of the seated cardio back support shall conform to the requirements of subsection 5.1.1.9 of Specification F3021.

Precision and Bias—No information is presented about either the precision or bias of test 5.1.1.9 for seated cardio back support since the test result is non-quantitative.

5.1.1.10 *Walk Through Structure Clear Area*—This test is a performance inspection of the sample to ensure the dimensional compliance of walk through structure height.

Apparatus and Set Up—The sample shall be set up as described in Section 4.

Calibration—Verify that the distance measuring equipment is calibrated and accurate to within 1 mm (0.040 in.).

Procedure—Step through the walk through area of the equipment. Make sure that there is adequate low structure height to step through without impediment or obstruction. Measure the height from the floor to the highest part of the walk through structure.

Pass/Fail Criteria—The dimensions of the walk through structure area shall conform to dimensional requirements of subsection 5.1.1.10 of Specification F3021.

Precision and Bias—No information is presented about either the precision or bias of test 5.1.1.10 for measuring walk through structure area dimensions since the test result is non-quantitative.

5.1.1.11 *Walk Through Transition Area Box*—This test is a dimensional inspection of the sample to ensure the dimensional compliance of walk through structure area.

Apparatus and Set Up—The sample shall be set up as described in Section 4.

Calibration—Verify that the distance measuring equipment is calibrated and accurate to within 1 mm (0.040 in.).

Procedure—Measure the height and width of the transition area (see Fig. 3).

Pass/Fail Criteria—The dimensions of the transition area box shall conform to dimensional requirements of subsection 5.1.1.11 of Specification F3021.

Precision and Bias—No information is presented about either the precision or bias of test 5.1.1.11 for measuring the transition area box dimension since the test result is non-quantitative.

5.1.1.12 *Recumbent Cardio Seat Forwards/Backwards Range*—This test is a performance and dimensional inspection of the sample to ensure the dimensional compliance of the seat forwards/backwards range.

Apparatus and Set Up—The sample shall be set up as described in Section 4.

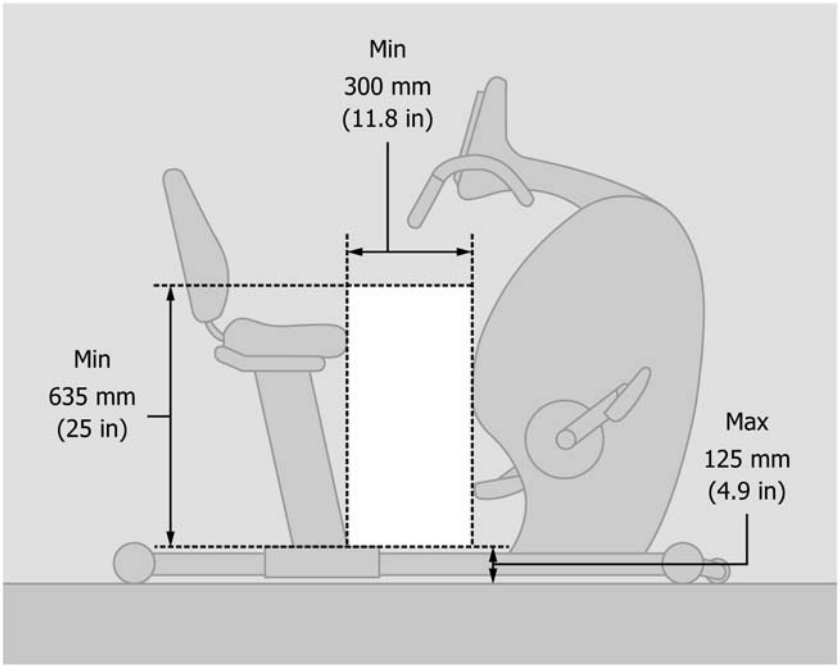

FIG. 3 Minimum Dimensions for Transition Area Box

Calibration—Verify that the distance measuring equipment is calibrated and accurate to within 1 mm (0.040 in.).

Procedure—Adjust the seat from lowest (forward) to highest (back) position. Set the seat to its lowest position. Measure the horizontal distance of the seat range from a specific point on the seat frame between the lowest (forward) to highest (back) positions (see Fig. 4).

Pass/Fail Criteria—The recumbent bicycle seat forwards/backwards range shall conform to dimensional requirements of subsection 5.1.1.12 of Specification F3021.

Precision and Bias—No information is presented about either the precision or bias of test 5.1.1.12 for measuring recumbent bicycle seat forwards/backwards range since the test result is non-quantitative.

5.1.1.13 *Recumbent Cardio Swivel Seat*—This test is a performance inspection of the sample to ensure the compliance of a swivel seat for cardio equipment which enables both upper limb function/movement.

Apparatus and Set Up—The sample shall be set up as described in Section 4.

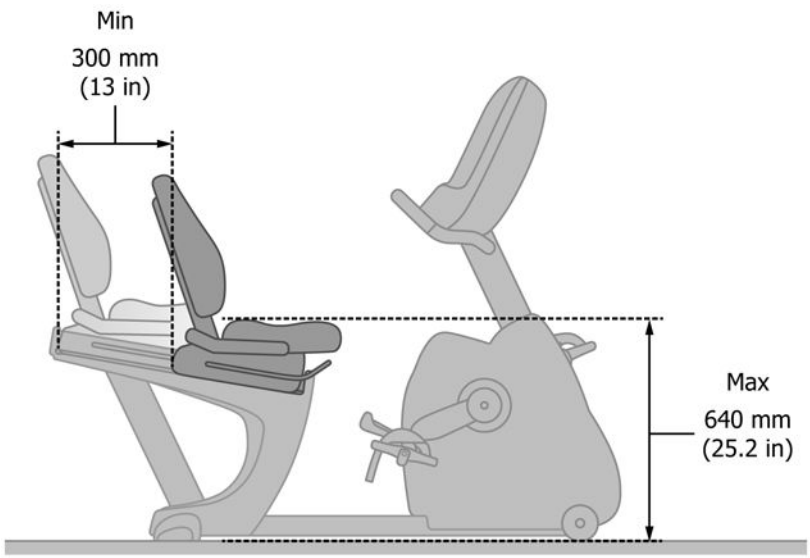

FIG. 4 Recumbent Bicycle Seat Dimensions