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An American National Standard

Standard Test Methods for Evaluating Design and Performance Characteristics of Motorized Treadmills[1]

This standard is issued under the fixed designation F2106; 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.

INTRODUCTION

The goal of these test methods is to provide reliable and repeatable methods for the evaluation of motorized treadmills. Users of the equipment must recognize that conformance to a standard will not necessarily prevent injuries. Like other physical activities, exercise involving a treadmill involves a risk of injury, particularly if the equipment is not maintained or used properly.

The equipment user must recognize, however, that a 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 or instruction from the fitness facility, or both, 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 These test methods specify procedures and equipment used for testing and evaluating a motorized treadmill for compliance to Specification F2115. Both design and operational parameters will be evaluated. 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 F2115, Specification F2115 takes precedence.

1.2 This test method is to be used in conjunction with Specification F2276, Test Methods F2571, and Specification F2115.

1.3 This standard takes precedence over Specification F2276 and Test Methods F2571 in areas that are specific to motorized treadmills.

1.4 *Requirements*—A motorized treadmill is to be tested for all of the following parameters:
1.4.1 Stability,
1.4.2 Exterior design,
1.4.3 ~~Endurance,~~Endurance loading,
1.4.4 Static loading,
~~1.4.5 Overheating,~~
1.4.5 Adjustable incline ~~system function,~~system,
1.4.6 ~~User interface parameters,~~Controls,
1.4.7 Motorized drive ~~system operation,~~system,
1.4.8 Folding treadmills,
1.4.9 Additional universal design requirements,
1.4.10 Documentation,
1.4.11 ~~Warning label compliance,~~ Marking, and
1.4.12 ~~Documentation.~~Warnings/Warning labels.

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

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1.5 This test method[2] contains additional requirements to address the accessibility of the equipment for persons with disabilities.

1.6 The values stated in SI units are to be regarded as the standard. The values in parenthesis are for information only.

1.7 *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.*

1.8 *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]

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

F2115 Specification for Motorized Treadmills

F2276 Specification for Fitness Equipment

F2277 Test Methods for Evaluating Design and Performance Characteristics of Selectorized Strength Equipment

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

F3022 Test Method for Evaluating the Universal Design of Fitness Equipment for Inclusive Use by Persons with Functional Limitations and Impairments

2.2 *UL ~~Standards:~~Standard:*[4]

UL 1647 Motor Operated Massage and Exercise Machines

~~2.3 *European Standard:*~~[4]

~~EN 957-1 Stationary Training Equipment—Part 1: General Safety Requirements and Test Methods~~

3. Terminology

3.1 *Definitions*—For definitions applicable to this standard, see ~~Specification~~Specifications F2115 and F3021.

4. Significance and Use

4.1 The purpose of these test methods is to provide reliable and repeatable test methods for the evaluation of motorized treadmills assembled and maintained according to the manufacturer's specifications. Use of these test methods in conjunction with Specification F2115, Specification F2276, and Test Methods F2571 is intended to ~~insure~~ensure appropriate performance and reliability of a motorized treadmill and reduce the risk of serious injury from design deficiencies.

~~5. Certification~~

~~5.1 5.1 These test methods permit self-certification. It is recommended that each manufacturer employ an independent laboratory to evaluate and validate that their designs and test procedures conform and comply with these test methods and Specification F2115, Specification F2276, and Test Methods F2571.~~

~~6. Units of Measure~~

~~6.1 The values stated in SI units are to be regarded as the standard. The values in parenthesis are for information only.~~

5. Sample Preparation

5.1 Assemble and adjust the treadmill on a horizontal surface according to the manufacturer's instructions. ~~On treadmills that are~~ Once fully assembled, verify according to the manufacturer's instructions that the moving surface has been adjusted to the proper tension and alignment. Unless otherwise stated, the treadmill must pass the following tests without adjustment from this initial condition. Apply power to the treadmill and verify that the unit functions properly. If the unit is equipped with an adjustable incline system, operate it through its full range.

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

[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.

[4] Available from Underwriters Laboratories (UL), Corporate Progress, 333 Pfingsten Rd., Northbrook, IL 60062.

~~**8. Report**~~

~~8.1 *Record of Tests*—Maintain complete test records and test summary reports for all testing, whether performed by the manufacturer or an independent laboratory. The records can be stored on paper, electronically, or on photographs, or a combination thereof. A copy of the test summary must be kept by the laboratory that performed the test for a minimum of five years from the date of the test and by the manufacturer for a minimum of five years past the end of production of the model tested. The summary shall include the signature of the technician(s) performing the tests and a management representative of the laboratory performing the test. The test summary shall include the following information:~~

~~8.1.1 Manufacturer's name and location,~~

~~8.1.2 Information provided by the manufacturer to accurately identify the configuration of, and specific unit provided to, the testing agency,~~

~~8.1.3 Dates over which the tests were conducted, and~~

~~8.1.4 Name and location of the testing laboratory, if different from the manufacturer.~~

~~8.1.5 Summary and results of each test performed including method and apparatus used. This shall include what the desired requirement was and whether the test sample met that parameter or failed. If the test requires a specific number of cycles to be met, then the report must include the number of cycles actually conducted. If the treadmill fails to meet a parameter, then that failure must be noted in clear and accurate terms to enable a reader of the report to understand at a later date what transpired.~~

6. Test Methods and Procedures

6.1 *Stability*—The treadmill shall be tested by a series of load applications in the orientation that is most obviously unstable.

6.1.1 *Apparatus and Set Up*—Place treadmill on a nonskid 10° surface in the orientation that is least stable. A method of applying a steady state force equal to 1.0 × maximum user weight in the vertical direction must be provided. Possible methods of providing force include, but are not limited to, pneumatic cylinder(s) or dead weights.

6.1.2 *Calibration*—Using an angle measuring instrument accurate to within 0.1°, verify the nonskid surface is 10 ± 0.5°. Calibrate the load measurement apparatus to confirm accuracy to within ±20 N (4.5 lb) over entire user weight range.

6.1.3 *Procedure*—Test the treadmill as follows:

6.1.3.1 Using the aforementioned load apparatus, apply a vertical load equal to 1.0 × maximum specified user weight ± 5 % in a non-impact manner at the point on the foot rail which creates the most instability. Verify that the treadmill does not tip over.

6.1.3.2 Repeat ~~9.1.3.1~~6.1.3.1 with the treadmill oriented in any other directions of potential instability.

6.1.3.3 For folding treadmills, the treadmill shall, after completing ~~9.1.3.1~~6.1.3.1 and ~~9.1.3.2~~6.1.3.2, be folded to its storage position per manufacturer's instructions and placed on the 10° inclined surface in all orientations that could cause instability. No additional load is to be applied.

6.1.4 *Pass/Fail Criteria*—In none of the above test conditions shall the treadmill tip over.

6.1.5 *Precision and Bias*—No information is presented about either the precision or bias of this test ~~9.1~~for measuring stability since the test result is non-quantitative.

6.2 *Exterior Design:*

6.2.1 *Rotating Parts in the Accessible Area and Rear Roller Area*—The purpose of this test is to evaluate the risk of injury due to a moving mechanical part. Methodology entails insertion of an articulate probe that simulates an accepted case finger into all questionable areas.

6.2.1.1 *Apparatus and Set Up*—This test requires a probe as specified in ~~Fig. 2, "Test~~Test Methods F2277~~Finger," of EN 957-1.~~ , Fig. 3. Verify that all guards are properly positioned and secured and the moving surface is centered per instructions in the owner's manual. Apply power to the treadmill so that its incline can be elevated and the moving surface can be run.

6.2.1.2 *Calibration*—Verify the probe conforms to the dimensions of ~~Fig. 2, "Test~~Test Methods F2277~~Finger," of EN 957-1.~~ , Fig. 3.

6.2.1.3 *Procedure*—With no power applied, insert the probe at any pull-in nip points or areas accessible to any mechanical hazards on the treadmill. Points of insertion include, but shall not be limited to the rear roller guards, foot rail to moving surface interface, motor compartment/moving surface gap and any openings in the motor compartment or shroud. For all insertions, the probe is to be rotated and bent in all possible configurations and application force shall not exceed 4.4 N ~~(1~~(1.0 lb). Elevate the treadmill to its maximum incline position. Under the assumption there shouldn't be any hazard, run the moving surface at minimum speed and verify the finger will not get trapped anywhere. If any other incline positions reveal a potential pull-in or nip points, the test shall be repeated at that incline position.

6.2.1.4 *Pass/Fail Criteria*—The probe shall not become entrapped in any mechanical hazard. Entrapment is defined to have occurred if the force to pull out the probe is greater than 4.4 N ~~(1~~(1.0 lb).

6.2.1.5 *Precision and Bias*—No information is presented about either the precision or bias of this test ~~9.2.1~~for evaluating hazards of rotating parts since the test result is non-quantitative.

6.2.2 *Guarding from Electrical Hazards*—The purpose of this test is to verify that all electrical elements are adequately guarded to prevent electric shock from un-insulated live parts and film-coated wire. Methodology entails insertion of an articulate probe that simulates a worst case finger into all questionable areas.

6.2.2.1 *Apparatus and Set Up*—This test requires an articulating probe as specified in UL 1647. Verify that all guards are properly positioned and secured and the moving surface is centered per instructions in the owner's manual. Treadmill to be tested in all incline positions and all normal usage positions that may present a hazard.

6.2.2.2 *Calibration*—Verify articulate probes conform to the dimensions of UL 1647.

6.2.2.3 *Procedure*—With no power applied, insert probe at any points where contact with electrical elements is possible. Points of insertion include, but shall not be limited to, the motor compartment/moving surface gap and any openings in the motor compartment or shroud. For all insertions, the probe is to be rotated and bent in all possible configurations and application force shall not exceed 4.4 N ~~(1~~(1.0 lb). Elevate the treadmill to all other incline positions that may present a hazard and repeat the insertion test. The components not involved in the insertion area may now be removed to clearly see whether the probe can contact any electrical hazard.

6.2.2.4 *Pass/Fail Criteria*—The probe shall not contact any electrical hazard.

6.2.2.5 *Precision and Bias*—No information is presented about either the precision or bias of this test ~~9.2.2~~for evaluating accessibility of electrical components since the test result is non-quantitative.

6.2.3 *Foot Rails*—The purpose of this test is to verify the dimensional compliance of the foot rails.

6.2.3.1 *Apparatus and Set Up*—No set up required, dimensional inspection only.

6.2.3.2 *Calibration*—Verify that the distance measuring equipment is calibrated and accurate to within ±1 mm ~~(0.040~~(0.04 in.).

6.2.3.3 *Procedure*—~~Measure the length of the foot rails. Measure the distance from the forward edge usable moving surface to the beginning of the foot rail. Locate the center of the usable moving surface. Measure the distance from this point to the end of the foot rail.~~ Verify that the foot rails extend from either the base of the masts or treadmill uprights or the end of the motor cover to the rear end caps of the treadmill. Measure the width of the moving surface. Measure the width of the foot rail surface.

6.2.3.4 *Pass/Fail Criteria*—The dimensions of the foot rails shall conform to dimensional requirements of ~~subsection 4.3.3 of~~ Specification F2115.

6.2.3.5 *Precision and Bias*—No information is presented about either the precision or bias of this test ~~9.2.3 for measuring foot rail dimensions~~ since the test result is non-quantitative.

(1) Precision—The precision of this test method has not been determined.

(2) Bias—The bias of this test method includes quantitative estimates of the uncertainties of the measuring devices, the calibrations of testing equipment, and the skill of the operators. At this time, the statements on bias should be limited to documented performance of particular laboratories.

6.2.4 *Moving Surface*—The purpose of this test is to verify the dimensional and marking compliance of the moving surface.

6.2.4.1 *Apparatus and Set Up*—No set up required, dimensional inspection only.

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

6.2.4.3 *Procedure*—Consult the moving surface table Specification F2115. Refer to Fig. 3 in Specification F2115 and measure the length and width of the moving surface. Verify the presence of movement indicators on the moving surface. Verify that they meet the minimum dimensions specified in Specification F2115. Operate the treadmill and verify that a portion of the movement indicator is visible at all times as the moving surface rotates.

6.2.4.4 *Pass/Fail Criteria*—The dimensions of the moving surface shall conform to dimensional requirements of ~~subsection 4.3.4.3~~Table 1 of Specification F2115.

6.2.4.5 *Precision and Bias*—No information is presented about either the precision or bias of this test ~~9.2.4 for measuring moving surface dimensions~~ since the test result is non-quantitative.

(1) Precision—The precision of this test method has not been determined.

(2) Bias—The bias of this test method includes quantitative estimates of the uncertainties of the measuring devices, the calibrations of testing equipment, and the skill of the operators. At this time, the statements on bias should be limited to documented performance of particular laboratories.

6.2.5 *Moving Surface Slip Resistance*—The purpose of this test is to evaluate the slip resistance of the moving surface of the treadmill.

6.2.5.1 *Apparatus and Set Up*—The treadmill shall be set up in accordance with Test Methods F2571. The moving surface shall be restrained from moving.

6.2.5.2 *Calibration*—Per Test Methods F2571, no calibration is required.

6.2.5.3 *Procedure*—Secure the moving surface so that it cannot move. Conduct the test in accordance with Test Methods F2571.

6.2.5.4 *Pass/Fail Criteria*—Moving surfaces that do not resist foot slippage shall fail the test.

6.2.5.5 *Precision and Bias*—No information is presented about either the precision or bias of this test ~~9.2.5~~for evaluating moving surface slip resistance since the test result is ~~nonquantitative.~~non-quantitative.

6.2.6 ~~*Handrails*—~~*Hand Grips and Grippable Surfaces*—The purpose of this test is to verify the presence and dimensional compliance of the handrails.

6.2.6.1 *Apparatus and Set Up*—No set up required, dimensional inspection only.

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

6.2.6.3 *Procedure*—Verify how many front/side handrails are present. Measure the length of all segments of the handrail. Measure the distance from Line A on the moving surface to the top of the grip surface. Evaluate through the full range of inclination. If so equipped, measure the horizontal distance between the side handrails.

6.2.6.4 *Pass/Fail Criteria*—The dimensions of the handrails shall conform to dimensional requirements of ~~subsection 4.3.5 of~~ Specification F2115.

6.2.6.5 *Precision and Bias*—No information is presented about either the precision or bias of this test ~~9.2.6 for measuring handrail dimensions~~ since the test result is non-quantitative.

(1) Precision—The precision of this test method has not been determined.

(2) Bias—The bias of this test method includes quantitative estimates of the uncertainties of the measuring devices, the calibrations of testing equipment, and the skill of the operators. At this time, the statements on bias should be limited to documented performance of particular laboratories.

6.3 ~~*Endurance*—~~*Endurance Loading*—These tests are intended to confirm the endurance of the main components of the treadmill.

6.3.1 *Mechanical Frame Endurance*—The stationary moving surface, frame, and structural components of the treadmill are subjected to a repeated load equal to 1.5 times the maximum user weight as specified by the manufacturer.

6.3.1.1 *Apparatus and Set Up*—A pneumatic cylinder or other appropriate load application device shall be fixtured to apply load to the moving surface at the centerline of the treadmill 33 % of the length of the usable moving surface rearward from the front of the usable moving surface. A 30 by 30 cm (~~12~~11.8 by ~~12~~11.8 in.) load application area shall be used for the test. Timing controls must be supplied to regulate the load application frequency. Provide appropriate instrumentation to assure that the load is consistent throughout the test duration.

6.3.1.2 *Calibration*—Verify that the load and frequency measuring equipment is properly calibrated and that the load accuracy is within ±5 % of the applied load and that the frequency measurement is accurate to within ±0.2 Hz.

6.3.1.3 *Procedure*—Elevate the treadmill to the incline that will provide the most stress to the frame and incline system components and position the treadmill under the load application device. No power shall be connected to the treadmill. Block the treadmill into position so that the vibrations created by the test do not cause it to move on the floor. Apply power to the load application system. Adjust the applied load to 1.5 times maximum user weight ±5 % at a frequency of 0.5 to 2 Hz. Assure that the moving surface rebounds completely prior to the next cycle. Verify that the counter is recording the number of cycles. Inspect the treadmill and test apparatus approximately every 250 000 cycles or as needed to ~~insure~~ensure that the test is functioning properly. If the design of the treadmill is such that keeping the moving surface stationary for the duration of the test would abnormally stress the moving surface (that is, a treadmill that employs moving slats rather than a conventional belt and deck), the moving surface may be repositioned periodically during the test.

6.3.1.4 *Pass/Fail Criteria*—Upon completion of the test, remove the test unit from the fixture and confirm normal operation of all functions. The treadmill must meet life requirements per classification of use per subsection ~~4.4~~4.3 of Specification F2115. The unit must not show structural cracks or other indications of impending failure.

6.3.1.5 *Precision and Bias*—No information is presented about either the precision or bias of this test ~~9.3.1~~for evaluating frame endurance since the test result is non-quantitative.

6.3.2 *Treadmill Switch and Switch Actuation Mechanism Endurance*—Stop, Pause or End functions (see Note 1).

NOTE 1—If several means of stopping exist—for example, Stop switch and Pause switch—each means must be separately tested only if the actuator types are different.

6.3.2.1 *Apparatus and Set Up*—Provide a mechanism to repeatedly activate the switch of interest at a rate not to exceed 2 Hz. and to accumulate a count of actuations. Activation force for testing shall be ~~1.5 times~~ 1.5× ± 10 % the minimum actuating force for the particular switch. For push switches, the activating mechanism can be a simulated finger mounted to an appropriate pneumatic cylinder operating parallel to the line of action of the switch, a test system designed specifically for switch testing (having an air cylinder plunger with a rounded simulated finger 0.675 diameter, 45 durometer rubber, SF-45), or other appropriate actuating means. For non-returning switches, a mechanism must be provided to pull out the switch between actuations, with a force equal to ~~1.5 times~~ 1.5× ± 10 % the minimum activating force. For lanyard-type, pull-off mechanisms, the switch can be tested as outlined above without the lanyard attached. If this method is employed, a separate lanyard strength test must be conducted by applying a load equal to 5 times the maximum activation force of the switch on the lanyard. A means of automatically sensing activation (for example, sensing a "beep" from the control panel internal electronics) will allow monitoring each activation response.

6.3.2.2 *Calibration*—Verify that the load application system applies 1.5 times ± 10 % of the minimum activation force for the switch to be tested. Using appropriate instrumentation, set the timing of the activator to 0.1 to 0.2 s "on" time and the repeat rate as desired but not over 2 Hz. Verify activation counter operation for at least 100 cycles. If a lanyard pull is required, the pull force must guarantee activation.

6.3.2.3 *Procedure*—Actuate the switch being tested with the load application system and confirm that the force applied causes the switch to function. The function of the switch shall be confirmed on every actuation of the switch via a circuit that actuates a counter. A manual check must be made of switch function before and after the full test sequence, and during the automated

sequence, some activation-confirming feedback must be observable for each activation. As an alternate to this procedure, if the switch is installed according to the switch manufacturer's recommendations, the switch manufacturer's testing may be used.

6.3.2.4 *Pass/Fail Criteria*—The switch(s) tested must be functional as described in procedure at the end of the life test requirements for the classification for use as follows: Consumer Treadmills—1560 actuations without damage or non-functionality. Institutional Treadmills—46 800 actuations without damage or non-functionality.

6.3.2.5 *Precision and Bias*—No information is presented about either the precision or bias of this test ~~9.3.2~~for evaluating actuator endurance since the test result is non-quantitative.

6.4 *Static Loading of Structures*—The purpose of this test is to evaluate the static structural integrity of the deck, foot rails, any frame structure and user supports (that is, handlebars and side handrails) as applicable to user safety.

6.4.1 *Moving Surface and Foot Rails:*

6.4.1.1 *Apparatus and Set Up*—Supply a means of providing a steady state load (pneumatic cylinder, weights, etc.) on the deck and foot rails, capable of adjustment to apply vertical load to the test member at minimum, mid-range and maximum incline for the moving surface. Load is to be applied on a 300 by 300 mm (~~12~~11.8 by ~~12~~11.8 in.) square area located on the centerline of the moving surface 33 % of the usable surface length back from the front of the usable moving surface. For the foot rails, the vertical load is to be applied at the longitudinal centerline of the foot rail.

6.4.1.2 *Calibration*—Verify load application system is calibrated and is accurate to within ±5 % of the applied load.

6.4.1.3 *Procedure*—With the treadmill fixed to prevent movement and moving surface held stationary, apply a force of ~~three (3) times~~ 3× the maximum user weight for consumer treadmills or ~~four (4) times~~ 4× maximum user weight for commercial treadmills to the moving surface as described in ~~9.3.1.1~~6.3.1.1. The treadmill is to be supported only at points specifically intended for support during use. Apply the load for 5 to 15 s. Remove the load. Then apply vertical force of ~~2 times~~ 2× the maximum user weight for consumer treadmills or ~~3 times~~ 3× maximum user weight for commercial treadmills to the longitudinal center of one of the foot rails over an area of 180 mm (~~12~~7.1 in.) in length by 180 mm (~~12~~7.1 in.) in width, or the width of the foot rails, whichever is less. Maintain load for 5 to 15 s, then remove load.

6.4.1.4 *Pass/Fail Criteria*—Examine all frame members, welds, joints and the deck for cracks, separations or failure. No visible evidence of cracks, separations, or other structural damage is allowable. Cosmetic damage is not considered a failure.

6.4.1.5 *Precision and Bias*—No information is presented about either the precision or bias of this test ~~9.4.1 for evaluating structural integrity of moving surface and foot rails since the test result is nonquantitative.~~non-quantitative.

(1) Precision—The precision of this test method has not been determined.

(2) Bias—The bias of this test method includes quantitative estimates of the uncertainties of the measuring devices, the calibrations of testing equipment, and the skill of the operators. At this time, the statements on bias should be limited to documented performance of particular laboratories.

~~9.4.2 *Folding Treadmills*—The purpose of this test is to confirm that folding treadmills are sufficiently stable such that the handrail/console does not fold down unexpectedly during use. Further, this test is to visually confirm the presence and function of the locking mechanism(s) to secure the deck and moving surface in the folded-up storage position for treadmills where it is folded up for storage or to secure the handrails in the use position.~~

~~9.4.2.1 *Apparatus and Set Up*—Supply a means of providing a steady state horizontal load equal to 180 N (40 lb). Possible methods of providing this force include, but are not limited to, pneumatic cylinder(s) or weights with a pulley system.~~

~~9.4.2.2 *Calibration*—Verify and or calibrate the load application apparatus to confirm accuracy to within ±5 % of the applied load.~~

~~9.4.2.3 *Procedure*—Apply a load of 668 N (150 lb) on a 300 by 300-mm area ⅔ of the length of the usable surface forward of the rear roller. Apply the 180 N (40 lb) load horizontally to the topmost handrail in the direction that could cause folding. Verify that the handlebars do not fold down when this load is applied. For treadmills where the deck and moving surface fold up for storage verify that the deck and moving surface do not reach the balance point before the latching mechanism engages. Visually verify that a locking mechanism is present to secure the deck and moving surface in the storage position. For treadmills where the handrails and upright fold up for use verify that the handrails and uprights do not reach their balance point before the locking mechanism engages. Visually verify the presence of a locking mechanism to secure the handrails and uprights in the use position.~~

~~9.4.2.4 *Pass/Fail Criteria*—For the first test, the treadmill shall not fold under the applied load. In the second test, the balance point must not be achieved until the locking mechanism is activated.~~

~~9.4.2.5 *Precision and Bias*—No information is presented about either the precision or bias of test 9.4.2 for evaluating the resistance to unintentional folding of folding treadmills since the test result is non-quantitative.~~

~~9.5 *Overheating*—For an empirically determined worst case thermal combination of moving surface speed and incline setting, exterior surface temperatures shall be checked.~~

~~9.5.1 *Apparatus and Set Up*—Use a load application device that will provide a load to the motor and drive system equivalent to a maximum weight user operating at maximum speed. Use appropriate temperature measuring instruments, such as thermocouples or other equivalent devices, to measure the temperature of the surfaces and components of the treadmill. The test should be conducted at an ambient temperature of 25 ± 5°C (77 ± 9°F).~~