



Standard Specification for Condition 3 Bicycle Forks¹

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1. Scope

1.1 This standard establishes testing requirements for qualifying designs using production forks intended for use in Condition 3 per Classification F2043.

1.2 This standard is applicable to suspension and non-suspension bicycle forks for use of a bicycle on rough trails, rough unpaved roads, and rough technical areas and unimproved trails. Contact with irregular terrain and momentary loss of tire contact with the ground may occur during usage. This usage is referred to as Condition 3 per Classification F2043. Other types of bicycle uses exist and other specification standards will apply for uses other than Condition 3.

2. Referenced Documents

2.1 *ASTM Standards*:²

- F739 Practice for Statistical Analysis of Linear or Linearized Stress-Life ($S-N$) and Strain-Life ($\epsilon-N$) Fatigue Data
- F2043 Classification for Bicycle Usage
- F2273 Test Methods for Bicycle Forks

3. Terminology

3.1 *Definitions of Terms Specific to This Standard*:

3.1.1 *confidence*—as used in this standard, is defined as a probability that the population value for either the mean or standard deviation lies within a particular interval determined based on the desired probability and the sample size.

4. Classification

4.1 Condition 3 per Classification F2043.

5. Sampling and Test Specimens

5.1 *Selection and Preparation of Specimens*:

5.1.1 Five forks shall be randomly selected from the first production lot for the fatigue test per this test method.

5.1.2 Three forks shall be randomly selected from the first production lot for the impact test per this test method.

5.1.3 One fork shall be randomly selected from the first production lot for both the compression and bending tests per this test method.

6. Performance Requirements

6.1 Bicycle forks intended by the manufacturer to be used according to Condition 3 shall be tested per Test Methods F2273.

6.1.1 *Compression Load Test*:

6.1.1.1 The fork shall withstand a compression load of 2800 N without any component failure, fracture or permanent deformation.

6.1.1.2 Under the application of the compression load of 2800 N, the minimum clearance from the maximum tire profile intended for use by the manufacturer to the nearest surface of the crown shall be at least 3 mm.

6.1.2 *Bending Load Test*:

6.1.2.1 The fork shall withstand a maximum bending load of 1500 N (100 N initial load plus an additional 1400 N).

6.1.2.2 The permanent deflection of a rigid fork shall not exceed 5 mm and the permanent deflection of a suspension fork shall not exceed 10 mm.

6.1.3 *Impact Resistance Test*:

6.1.3.1 For each fork, permanent deflection shall be less than 45 mm following impact of a 22.5 kg mass dropped from height number 1 such that the velocity at impact shall be at least 2.66 m/s. Note that in a frictionless system, this velocity would be achieved for height number 1 of 360 mm.

6.1.3.2 For each fork, following impact of a 22.5 kg mass dropped from height number 2 such that the velocity at impact shall be at least 3.43 m/s, the connection between the steerer tube and crown must withstand at least 108.5 Nm of torque without rotation. Note that in a frictionless system, this velocity would be achieved for height number 2 of 600 mm.

6.1.4 *Fatigue Test*:

6.1.4.1 Each fork shall withstand a fully reversed sinusoidal load of 750 N for at least 50 000 cycles without failure.

6.1.4.2 Using the lower 90 percent confidence limit on the mean and the upper 90 percent confidence limit on the standard deviation, the computed number of cycles that includes 90 percent of the area under the fatigue life distribution determined using these confidence limits must exceed 20 000. In computing the number of cycles that includes 90 percent of the area under the fatigue life distribution, the measured number of

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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.