(1) Orient the headform so that its face is down, and lock it in that orientation.

(2) Place the helmet on the appropriate size full chin headform in accordance with the HPI and fasten the retention system in accordance with the manufacturer's instructions. Adjust the straps to remove any slack.

(3) Suspend the dynamic impact system from the helmet by positioning the flexible strap over the helmet along the midsagittal plane and attaching the hook over the edge of the helmet as shown in Figure 7 of this part.

(4) Raise the drop weight to a height of 0.6 m (2 ft) from the stop anvil and release it, so that it impacts the stop anvil.

(5) The test shall be repeated with the headform's face pointing upwards, so that the helmet is pulled from front to rear.

§ 1203.16 Dynamic strength of retention system test.

(a) *Test equipment.*

(1) ISO headforms without the lower chin portion shall be used.

(2) The retention system strength test equipment shall consist of a dynamic impact apparatus that allows a 4-kg (8.8-lb) drop weight to slide in a guided free fall to impact a rigid stop anvil (see Figure 8 of this part). Two cylindrical rollers that spin freely, with a diameter of 12.5±0.5 mm (0.49 in.±0.02 in.) and a center-to-center distance of 76.0±1 mm (3.0±0.04 in.), shall make up a stirrup that represents the bone structure of the lower jaw. The entire dynamic test apparatus hangs freely on the retention system. The entire mass of the support assembly, including the 4-kg (8.8-lb) drop weight, shall be 11 kg±0.5 kg (24.2 lb±1.1 lb).

(b) *Test procedure.*

(1) Place the helmet on the appropriate size headform on the test device according to the HPI. Fasten the strap of the retention system under the stirrup.

(2) Mark the pre-test position of the retention system, with the entire dynamic test apparatus hanging freely on the retention system.

(3) Raise the 4-kg (8.8-lb) drop weight to a height of 0.6 m (2 ft) from the stop anvil and release it, so that it impacts the stop anvil.

(4) Record the maximum elongation of the retention system during the impact. A marker system or a displacement transducer, as shown in Figure 8 of this part, are two methods of measuring the elongation.

§ 1203.17 Impact attenuation test.

(a) *Impact test instruments and equipment.*

(1) *Measurement of impact attenuation.* Impact attenuation is determined by measuring the acceleration of the test headform during impact. Acceleration is measured with a uniaxial accelerometer that is capable of withstanding a shock of at least 1000 g. The helmet is secured onto the headform and dropped in a guided free fall, using a monorail or guidewire test apparatus (see Figure 9 of this part), onto an anvil fixed to a rigid base. The center of the anvil shall be aligned with the center vertical axis of the accelerometer. The base shall consist of a solid mass of at least 135 kg (298 lb), the upper surface of which shall consist of a steel plate at least 12 mm (0.47 in.) thick and having a surface area of at least 0.10 m^2 (1.08 ft^2).

(2) *Accelerometer.* A uniaxial accelerometer shall be mounted at the center of gravity of the test headform, with the sensitive axis aligned within 5 degrees of vertical when the test headform is in the impact position. The acceleration data channel and filtering shall comply with SAE Recommended Practice J211 OCT88, Instrumentation for Impact Tests, Requirements for Channel Class 1000.

(3) *Headform and drop assembly—centers of gravity.* The center of gravity of the test headform shall be at the center of the mounting ball on the support assembly and within an inverted cone having its axis vertical and a 10-degree included angle with the vertex at the point of impact. The location of the center of gravity of the drop assembly (combined test headform and support assembly) must meet the specifications of Federal Motor Vehicle Safety Standard No. 218, Motorcycle Helmets, 49 CFR 571.218 (S7.1.8). The center of gravity of the drop assembly shall lie within the rectangular volume bounded by

x=−6.4 mm (−0.25 in.), x=21.6 mm (0.85 in.), y=6.4 mm (0.25 in.), and y=−6.4 mm (−0.25 in.), with the origin located at the center of gravity of the test headform. The origin of the coordinate axes is at the center of the mounting ball on the support assembly. The rectangular volume has no boundary along the z-axis. The positive z-axis is downward. The x-y-z axes are mutually perpendicular and have positive or negative designations as shown in Figure 10 of this part. Figure 10 shows an overhead view of the x-y boundary of the drop assembly center of gravity.

(4) *Drop assembly*. The combined mass of the drop assembly, which consists of instrumented test headform and support assembly (excluding the test helmet), shall be 5.0±0.1 kg (11.00±0.22 lb).

(5) *Impact anvils*. Impact tests shall be performed against the three different solid (*i.e.*, without internal cavities) steel anvils described in this paragraph (a)(5).

(i) *Flat anvil*. The flat anvil shall have a flat surface with an impact face having a minimum diameter of 125 mm (4.92 in.). It shall be at least 24 mm (0.94 in.) thick (see Figure 11 of this part).

(ii) *Hemispherical anvil*. The hemispherical anvil shall have a hemispherical impact surface with a radius of 48±1 mm (1.89±0.04 in.) (see Figure 12 of this part).

(iii) *Curbstone anvil*. The curbstone anvil shall have two flat faces making an angle of 105 degrees and meeting along a striking edge having a radius of 15 mm±0.5 mm (0.59±0.02 in.). The height of the curbstone anvil shall not be less than 50 mm (1.97 in.), and the length shall not be less than 200 mm (7.87 in.) (see Figure 13 of this part).

(b) *Test Procedure*.

(1) *Instrument system check (precision and accuracy)*. The impact-attenuation test instrumentation shall be checked before and after each series of tests (at least at the beginning and end of each test day) by dropping a spherical impactor onto an elastomeric test medium (MEP). The spherical impactor shall be a 146 mm (5.75 in.) diameter aluminum sphere that is mounted on the ball-arm connector of the drop assembly. The total mass of the spherical-impactor drop assembly shall be 5.0±0.1 kg (11.0±0.22 lb). The MEP shall be 152 mm (6 in.) in diameter and 25 mm (1 in.) thick, and shall have a durometer of 60±2 Shore A. The MEP shall be affixed to the top surface of a flat 6.35 mm (¼ in.) thick aluminum plate. The geometric center of the MEP pad shall be aligned with the center vertical axis of the accelerometer (see paragraph (a)(2) of this section). The impactor shall be dropped onto the MEP at an impact velocity of 5.44 m/s±2%. (Typically, this requires a minimum drop height of 1.50 meters (4.9 ft) plus a height adjustment to account for friction losses.) Six impacts, at intervals of 75±15 seconds, shall be performed at the beginning and end of the test series (at a minimum at the beginning and end of each test day). The first three of six impacts shall be considered warm-up drops, and their impact values shall be discarded from the series. The second three impacts shall be recorded. All recorded impacts shall fall within the range of 380 g to 425 g. In addition, the difference between the high and low values of the three recorded impacts shall not be greater than 20 g.

(2) *Impact sites*. Each of helmets 1 through 4 (one helmet for each conditioning environment) shall impact at four different sites, with two impacts on the flat anvil and two impacts on the hemispherical anvil. The center of any impact may be anywhere on or above the test line, provided it is at least 120 mm (4.72 in), measured on the surface of the helmet, from any prior impact center. Each of helmets 5 through 8 (one helmet for each conditioning environment) shall impact at one site on the curbstone anvil. The center of the curbstone impacts may be on or anywhere above the test line. The curbstone anvil may be placed in any orientation as long as the center of the anvil is aligned with the axis of the accelerometer. As noted in §1203.12(d)(1), impact sites, the order of anvil use (flat and hemispherical), and curbstone anvil sites and orientation shall be chosen by the test personnel to provide the most severe test for the helmet. Rivets and other mechanical fasteners, vents, and any other helmet feature within the test region are valid test sites.

(3) *Impact velocity*. The helmet shall be dropped onto the flat anvil with an impact velocity of 6.2 m/s±3% (20.34 ft/s±3%). (Typically, this requires a minimum drop height of 2 meters (6.56 ft), plus a height adjustment to account for friction losses.) The helmet shall be dropped onto the hemispherical and curbstone anvils with an impact velocity of 4.8 m/s±3% (15.75 ft/s±3%). (Typically, this requires a minimum drop height of 1.2 meters (3.94 ft), plus a height adjustment to account for friction losses.) The impact velocity shall be measured during the last 40 mm (1.57 in) of free-fall for each test.

(4) *Helmet position*. Prior to each test, the helmet shall be positioned on the test headform in accordance with the HPI. The helmet shall be secured so that it does not shift position prior to impact. The helmet retention system shall be secured in a manner that does not interfere with free-fall or impact.

(5) *Data*. Record the maximum acceleration in g's during impact. See Subpart C, § 1203.41(b).

Subpart B—Certification

§ 1203.30 Purpose, basis, and scope.

(a) *Purpose*. The purpose of this subpart is to establish requirements that manufacturers and importers of bicycle helmets subject to the Safety Standard for Bicycle Helmets (subpart A of this part 1203) shall issue certificates of compliance in the form specified.

(b) *Basis*. Section 14(a)(1) of the Consumer Product Safety Act (CPSA), 15 U.S.C. 2063(a)(1), requires every manufacturer (including importers) and private labeler of a product which is subject to a consumer product safety standard to issue a certificate that the product conforms to the applicable standard. Section 14(a)(1) further requires that the certificate be based either on a test of each product or on a ''reasonable testing program.'' The Commission may, by rule, designate one or more of the manufacturers and private labelers as the persons who shall issue the required certificate. 15 U.S.C. 2063(a)(2).

(c) *Scope*. The provisions of this subpart apply to all bicycle helmets that are subject to the requirements of the Safety Standard for Bicycle Helmets, subpart A of this part 1203.

§ 1203.31 Applicability date.

All bicycle helmets manufactured on or after March 11, 1999, must meet the standard and must be certified as complying with the standard in accordance with this subpart B.

§ 1203.32 Definitions.

The following definitions shall apply to this subpart:

(a) *Foreign manufacturer* means an entity that manufactured a bicycle helmet outside the United States, as defined in 15 2052(a)(10) and (14).

(b) *Manufacturer* means the entity that either manufactured a helmet in the United States or imported a helmet manufactured outside the United States.

(c) *Private labeler* means an owner of a brand or trademark that is used on a bicycle helmet subject to the standard and that is not the brand or trademark of the manufacturer of the bicycle helmet, provided the owner of the brand or trademark caused, authorized, or approved its use.

(d) *Production lot* means a quantity of bicycle helmets from which certain bicycle helmets are selected for testing prior to certifying the lot. All bicycle helmets in a lot must be essentially identical in those design, construction, and material features that relate to the ability of a bicycle helmet to comply with the standard.

(e) *Reasonable testing program* means any tests which are identical or equivalent to, or more stringent than, the tests defined in the standard and which are performed on one or more bicycle helmets selected from the production lot to determine whether there is reasonable assurance that all of the bicycle helmets in that lot comply with the requirements of the standard.

§ 1203.33 Certification testing.

(a) *General*. Manufacturers, as defined in § 1203.32(b) to include importers, shall conduct a reasonable testing program to demonstrate that their bicycle helmets comply with the requirements of the standard.