



**MAKING, PROTECTING & CURING
CONCRETE FLEXURAL STRENGTH FIELD SPECIMENS**

SCOPE

This method covers procedures for making, protecting and curing flexural strength field specimens sampled from concrete being used in construction.

PROCEDURE

A. Apparatus

1. 6 in. x 6 in. x 20 in. (152 mm x 152 mm x 508 mm) beam mold. The molds provided will comply with the requirements of AASHTO T-23 for dimensions, construction, materials, smoothness and straightness.
2. Shovel (square point).
3. Rubber hammer or equivalent
4. Wood float or equivalent.

B. Test Procedure

Specimens molded for determination of compliance with strength specifications shall be cast and cured according to AASHTO T-23.

1. Secure the concrete sample in accordance with [IM 327](#), Method of Sampling Concrete for Slump, Air Content and Strength Testing. Specimens shall be molded on a level, rigid, horizontal surface as near as practicable to the place where they will be stored during the first 20 ± 4 hours. All jarring, striking, tilting or scarring (however, preliminary markings with a nail or other sharp object within 4 in. (100 mm) of the beam end will be permitted) of the specimen surface shall be avoided if moving immediately after striking off is necessary. Place the concrete in the mold in two equal layers and thoroughly spade each layer with the shovel. Use special care consolidating the sides and after spading each layer strike the sides of the form with a rubber hammer or equivalent until the spading marks are closed. Strike off the excess concrete and smooth the surface with as little manipulation of the concrete as possible. Excessive spading and smoothing must be avoided.

When consolidating by vibration, fill concrete in one layer. Insert the vibrator at intervals not exceeding 6 in. (150 mm) along the centerline of the long dimension of the specimen, avoiding the exact center of the beam. Sufficient vibration is achieved as soon as the surface has become relatively smooth. Avoid overvibration which may cause segregation. After vibrating, strike the sides of the form with a rubber hammer 10 to 15 times to release any air bubbles that may have been trapped.

When consolidating by rodding, specimens shall receive the proper number of roddings evenly distributed per layer as indicated in the table. The bottom layer shall be rodded throughout its depth. For the upper layer, the rod shall penetrate 1 in. (25 mm) into the underlying layer. After rodding each layer, strike the sides of the form with a rubber hammer 10 to 15 times to release any air bubbles that may have been trapped.

Rod Size	No. of Layers	No. of Roddings per Layer
5/8 in. (16 mm)	2	60

2. Immediately after smoothing protect the freshly made beam against moisture loss by evaporation, against rapid temperature increase caused by the combined effects of hot weather, bright sun, and the chemical hydration process and against freezing or near freezing temperature. It is generally practical to apply the same protection to the test specimen that is applied to the represented pavement or structure. This is not absolutely necessary, however, so long as the three conditions outlined above are satisfied.
3. On the day after the specimens are made and when they have reached an age of 16 to 24 hours, move the specimens while still in the molds to the location of final storage and curing, generally the concrete plant inspector's laboratory. The beams, even with the molds in place, must be handled carefully to avoid injury. A slight jar or bump may cause cracking which may be invisible at the time but which may become apparent with later handling or as premature failure during testing.
4. Remove the specimens from the molds (generally at the plant), clean, oil, reassemble and return the molds to the sampling location (generally at the direction of the paving or grade inspector).
5. Assign a chronological number, which corresponds with the day the beam was made to each beam. Begin with number 1. When more than one beam is made on a given day use capital letters A, B, C, etc., following the number which identifies the day to identify the daily making sequence. When two or more mixers are operated on separate sections of a project use a separate letter identification preceding the number assigned to the beams made from each respective mixer. Clean the beam and mark the numbers on the smooth bottom of the beam as cast. The numbers should be neatly made, and should be 4 to 8 inches (100 to 200 mm) from the end of the beam. When freshly marked specimens are being placed in storage, cover the marked section with a small board to keep the sand out of the marking.
6. Store the specimens in a wetted sand filled pit of adequate size to accommodate all specimens made on the project or in lime saturated water. A pit 4' x 6' x 18" (1.2 m x 1.8 m x 0.5 m) is normally adequate. Place the specimens on a reasonable smooth bed of sand and cover them completely with additional sand. If the temperature in the sand-filled pit drops below 40°F (4°C) remove the specimens and place them under wetted burlap in a heated enclosure or in lime saturated water. Maintain the specimens in a continually wet condition, and above 40°F (4°C) until they are tested. **NOTE:** Lime-saturated water is prepared by mixing 1 ounce (28 gm) of hydrated lime with 1 gallon (3.8 liters) of water. Hydrated lime should be a minimum of 90 percent calcium hydroxide (CaOH).



Concrete Beam Mold