

Method of Test for
COMPRESSIVE STRENGTH OF EPOXY-URETHANE FOR OVERLAY SYSTEMS
DOTD Designation: TR 710-13

I. Scope

A. This method of test is intended to determine the compressive strength of cured epoxy-urethane overlay systems.

B. Reference Document

1. AASHTO T 106 -

Compressive Strength of Hydraulic Mortar.

2. AASHTO M 231- Balances

Used in the Testing of Materials.

3. ASTM C305 - Standard

Practice for Mechanical Mixing of Hydraulic Cement Pastes and Mortars of Plastic Consistency

4. ASTM C778 - Standard
Specification for Standard Sand

II. Apparatus

A. Balance - A type I or II, Class D balance conforming to AASHTO M 231.

B. Beaker - A 800 mL (minimum) graduated disposable plastic beaker.

C. Mixing Tools - Stainless steel spatulas, ½ in. variable speed drill and a 2 ½ in. paint stirring spindle.

D. Thermometer - A thermometer conforming generally to the requirements for ASTM 1C or 1F thermometers.

E. Molds - Three molds for 2 in. cubes conforming to AASHTO T 106.

F. Tamper - A tamper conforming to AASHTO T 106.

G. Mechanical Mixer, paddle and mixing bowl meet ASTM C 305.

H. Testing Machine - A

compression testing machine conforming to the requirements of AASHTO T 106.

I. Timer - A clock or stop watch capable of measuring minutes and seconds.

J. Wax - Paraffin wax.

K. Hot Plate.

L. Paint Brush - 1 in.

M. Aggregate - Graded standard Ottawa sand conforming to AASHTO T 106.

N. Straightedge- A 12 in metal straightedge.

O. Personal Protective Equipment (apron, safety glasses, rubber gloves, ...)

P. Hood Vent.

Q. Worksheet

III. Sample

A minimum of 1 Gallon of each component of epoxy. Deliver in sealed 1 gallon friction top metal can.

IV Health Precautions

The following precautions should be observed when handling epoxy components and cleaning fluids:

A. Use appropriate protective clothing, including rubber or plastic gloves, and appropriate eye protection such as safety glasses.

B. If any epoxy or cleaning material should contact the skin, the material should be removed immediately with a dry cloth or paper towel, and the affected area should be washed thoroughly with soap and

water.

C. If any material should come in contact with the eyes, flush immediately with water and contact a physician.

D. Use hood vent. Perform testing in a well ventilated area.

E. Observe all precautions as specified by the manufacturer before handling each material.

V. Sample Preparation

Note: Laboratory Temperature during sample preparation shall be 77 ± 2 °F.

A. Brush a light coat of melted wax on the inner and outer surfaces of the mold, paying special attention to seam areas.

B. Using the manufacturer's recommended sample conditioning, thoroughly stir the individual epoxy components for at least one minute immediately before testing.

C. Combine and mix sufficient quantities of components A and B in the 800 mL beaker in accordance with the manufacturer's recommended mixing ratio. Use a minimum sample quantity of 600 mL of mixed epoxy. Unless the manufacturer recommends a mixing time, mix the sample for at least 3 minutes. Use separate tools when obtaining and mixing the desired quantities of each component to avoid contamination.

D. Place the graded sand into the mixing bowl. Use 2.75 parts by mass of ASTM C 778 standard sand (graded) per 1 part of mixed epoxy.

E. Combine the premixed adhesive with the graded sand in the mixing bowl and mix, using the mechanical mixer at

the manufacturer's recommended mixing speed and mixing time.

F. Place a layer of the epoxy mortar about one half the depth of the mold in all of the cube compartments. Tamp the mortar in each of the cube compartments 32 times in about 10 seconds in 4 rounds of eight strokes, distributed uniformly over the surface area. The tamping pressure shall be sufficient to ensure uniform filling of the molds. After tamping the first layer in all of the cube compartments, fill the compartments with the second layer of mortar and tamp as specified for the first layer. Strike off the excess mortar with the straightedge by using a sawing motion over the top of the mold.

G. Cure the specimens in air at 77 ± 2 °F for a minimum period of 24 hours or other designated period.

H. Remove the specimens from the mold.

VI. Procedure

A. Center the cube specimens on the lower testing head of the compression testing machine.

B. Apply the load rate within the range of 200 to 400 lbs/s.

C. Record the maximum load indicated by the testing machine as (L) to the nearest pound(lb).

D. Repeat steps A through C for the remaining two specimens.

VII. Calculations

A. Calculate the compressive strength of each specimen to the nearest 10 psi using the following formula:

$$C = \frac{L}{A}$$

where:

C = Compressive strength, psi
L = max. load, lbf
A = Area of 2" cube, in²

Note: If the cross-section area of the specimen varies more than 1.5 percent from the nominal, use the actual area for the calculation of the compressive strength.

SHOW AN EXAMPLE CALCULATION

$$C = \frac{24653}{4} = 6160$$

VIII. Report

Record the individual age, maximum load, and compressive strength of specimens.

Report the average compressive strength (C) of the specimens to the nearest 10 psi.