



**INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS AND TESTS**

**VERIFYING SOIL TEST MOLDS
ITM No. 914-21**

1.0 SCOPE.

- 1.1 This test method covers the procedures for verifying the critical dimensions, including mold volume, of 4 in. molds used in ITM 512 and 6 in. molds used in AASHTO T 99 and AASHTO T 180.
- 1.2 This ITM may involve hazardous materials, operations, and equipment and may not address all of the safety problems associated with the use of the test method. The user of the ITM is responsible for establishing appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.

2.0 REFERENCES.

2.1 AASHTO Standards.

T 19 Standard Method of Test for Bulk Density (Unit Weight) and Voids in Aggregate

T 99 Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop

T 134 Moisture-Density Relations of Soil-Cement Mixtures

T 180 Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

2.2 ITM Standards.

ITM 512 Field Determination of Maximum Dry Density and Optimum Moisture Content of Soil

3.0 APPARATUS.

- 3.1 Calipers, readable to 0.001 in.
- 3.2 Feeler gauge, 0.005 in.
- 3.3 Straight edge, 4 in. long
- 3.4 Proctor mold, 4 in. and 6 in.

- 3.5** **Thermometer**
- 3.6** Molds having a volume of $0.0333 \pm 0.0005 \text{ ft}^3$ ($0.000943 \pm 0.000014 \text{ m}^3$) shall have an inside diameter of $4.000 \pm 0.016 \text{ in.}$ ($101.60 \pm 0.40 \text{ mm}$) and a height of $4.584 \pm 0.018 \text{ in.}$ ($116.40 \pm 0.50 \text{ mm}$).
- 3.7** Molds having a volume of $0.07500 \pm 0.0009 \text{ ft}^3$ ($0.002124 \pm 0.000025 \text{ m}^3$) shall have an inside diameter of $6.000 \pm 0.026 \text{ in.}$ ($152.40 \pm 0.70 \text{ mm}$) and a height of $4.584 \pm 0.018 \text{ in.}$ ($116.40 \pm 0.50 \text{ mm}$).
- 4.0** **TERMINOLOGY.** Definitions for terms and abbreviations shall be in accordance with the Department's Standard Specifications, Section 101.
- 5.0** **SIGNIFICANCE AND USE.** This ITM is used to verify the critical dimensions and volumes of 4 in. and 6 in. soil test molds.
- 6.0** **PROCEDURE.**
- 6.1** **Dimension Verification of the Mold**
- 6.1.1** Measure the inside diameter of the mold with the calipers to the nearest 0.001 in. Rotate the mold 90° and measure the inside diameter again. Record the average.
- 6.1.2** Measure the height of the mold with the calipers to the nearest 0.001 in. Rotate the mold 180° and measure the height again. Record the average.
- 6.1.3** Place the straightedge firmly on the base plate of the mold. Attempt to pass the feeler gauge between the base and the straightedge. The base plate is considered plane if the gauge does not pass under the straight edge.
- 6.2** **Volume Verification of the Plate Glass and Mold**
- 6.2.1** Apply a thin layer of grease on the rim to prevent leakage of water from the mold.
- 6.2.2** Determine the mass of the plate and mold to the nearest 0.1 lb (0.05 kg).
- 6.2.3** Fill the mold with water to eliminate the bubble and overflow and cover with the glass plate.
- 6.2.4** Determine the mass of the water, mold, and glass plate to nearest 0.1lb (0.05 kg).

6.2.5 Water shall be at 20°C. If not, density shall be adjusted.

7.0 TOLERANCES.

Mold	Internal Diameter	Internal Height	Volume
4 in.	4.000 ± 0.016 in.	4.584 ± 0.005 in.	0.0333 ± 0.0005 ft ³
	(101.60 ± 0.41 mm)	(116.43 ± 0.13 mm)	(0.000943 ± 0.000014 m ³)
6 in.	6.000 ± 0.026 in.	4.584 ± 0.005 in.	0.07500 ± 0.0009 ft ³
	(152.40 ± 0.66 mm)	(116.43 ± 0.13 mm)	(0.002124 ± 0.000025 m ³)

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SOIL TEST MOLDS VERIFICATION

Equipment:

Calipers: _____

Feeler Gauge: _____

4 in. Molds			
Mold No.	Is Base Plane? (Y/N)	Internal Height	Internal Diameter

6 in. Molds			
Mold No.	Is Base Plane? (Y/N)	Internal Height	Internal Diameter

Do measurements comply with requirements of AASHTO T 99, T 180, or **ITM 512**? (Y/N)

Remarks: _____

Verified by: _____

Date: _____

Next Due Date: _____

A fillable version of this form is available on the Department's Geotechnical Engineering website: <https://www.in.gov/indot/2804.htm>

VOLUME DETERMINATION OF COMPACTION MOLDS

AASHTO T 99, T180, & ITM 512

Procedure used: AASHTO T19, section 8

Date:

Verification Frequency: 12 months

Equipment used: Thermometer: Balance: Proctor Mold (4 in.)
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Calibrated by:

Mold ID:

Remarks:

Tare Wt. of MOLD & GLASS PLATE:	<input type="text"/>	gms
Total Wt. of WATER, MOLD, & GLASS PLATE:	<input type="text"/>	gms
Weight of water:	<input type="text"/>	gms
Temperature of water:	<input type="text"/>	°C
Density of Water:	<input type="text"/>	kg/m ³ x 1000 = <input type="text"/> g/m ³
Mold Volume: =	<input type="text"/>	m ³ x 35.315 ft ³ /m ³ = <input type="text"/> ft ³

Volume Range: 0.0328 to 0.0338 ft³

Procedure used: AASHTO T19, section 8

Date:

Verification Frequency: 12 months

Equipment used: Thermometer: Balance: Proctor Mold (6 in.)
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Calibrated by:

Mold ID:

Remarks:

Tare Wt. of MOLD & GLASS PLATE:	<input type="text"/>	gms
Total Wt. of WATER, MOLD, & GLASS PLATE:	<input type="text"/>	gms
Weight of water:	<input type="text"/>	gms
Temperature of water:	<input type="text"/>	°C
Density of Water:	<input type="text"/>	kg/m ³ x 1000 = <input type="text"/> g/m ³
Mold Volume: =	<input type="text"/>	m ³ x 35.315 ft ³ /m ³ = <input type="text"/> ft ³

Volume Range: 0.0741 to 0.0759 ft³