

AASHTO T89-02
DETERMINING THE LIQUID LIMIT OF SOILS

APPARATUS		
	Test 1	Test 2
1. Grooving Tools (a) Gage end (square) 9.8 mm – 10.20 mm? (b) Cutting edge width 1.9 – 2.1 mm? (c) Curved end thickness 9.9 – 10.1 mm? (d) Radius of curve 22.2 mm (7/8 in.)? (e) Curve length approximately 90°?		
2. Liquid Limit Device (a) Maker? (b) Hand Operated? (c) Electric 1.9-2.1 drops/second? (d) Base of hard rubber? (e) Base diameter mm AASTHO 125 ± 5 x 150 ± 5 x 50 ± 5? (f) Base has four feet made of resilient material? (g) Brass cup thickness 1.9 – 2.1 mm? (h) Cup depth 26-28 mm (i) Little or no groove in cup? (j) Rim not worn to less than ½ original thickness? (k) Cam and followers not worn excessively? AASHTO: Point of contact on cup or base less than 13 mm diameter?		
3. Porcelain Dish or similar mixing dish, about 115 mm in diameter?		
4. Spatula or pill knife about 75 to 100 mm long and 20 mm wide?		
5. Water Content Containers (a) Resistant to corrosion, disintegration, and weight change? (b) Close-fitting lids?		
6. Balance Class G1 [readable to 0.01 g]? VTM – 7 a balance sensitive to 0.1 gram may be used.		
7. Oven maintains 110±5°C (230±9°F)?		

**AASHTO T89-02
DETERMINING THE LIQUID LIMIT OF SOILS**

PROCEDURE Method B		
Sample Preparation - AASHTO only:	Test 1	Test 2
1. Sample obtained by T87 or T146?		
2. Sample was dried at 60°C (140°F)?		
3. Sample consists of about 50 g of soil passing 425- μ m (No. 40) sieve?		
4. Soil mixed with 8 to 10 mL of distilled or demineralized water in mixing dish (other than brass cup)? Note: Tap water may be used for routine testing if comparative tests indicate no differences in results using tap and distilled water.		
5. Mixing done by stirring, kneading and chopping with spatula?		
6. Additional increments of water added (1 to 3 mL) until mass is uniform and has stiff consistency?		
7. No additional dry soil added to wet sample once testing has begun?		
8. If too wet, sample either discarded or mixed to evaporate water?		
9. AASHTO T89 Method A is used for Referee Testing.		
PROCEDURE Method B		
	Test 1	Test 2
1. Liquid limit device previously inspected for wear and height of cup drop checked?		
2. Part of mixture put in cup and spread with spatula until 10 mm deep at maximum thickness?		
3. As few strokes of spatula as possible used?		
4. Care taken to avoid entrapment of air bubbles?		
5. Excess soil returned to mixing dish?		
6. Unused wet soil in storage dish covered during test?		

**AASHTO T89-02
DETERMINING THE LIQUID LIMIT OF SOILS**

PROCEDURE		
Method B (continued)		
	Test 1	Test 2
7. (Using curved grooving tool): Soil in dish divided through centerline of follower with no more than six strokes of curved tool and only last stroke of grooving tool scrapes bottom of cup? <i>or</i> (Using flat grooving tool): Groove formed in soil by drawing tool, beveled edge forward, through soil on a line joining highest point through lowest point on the rim of the cup? Note: Several strokes may be used, or precut groove with spatula and use tool to bring cut to final dimension.		
8. Soil in dish divided through centerline of follower with no more than six strokes of curved tool?		
9. Only last stroke of grooving tool scrapes bottom of cup?		
10. Tearing along groove and slippage of cake avoided?		
11. Cup lifted and dropped twice per second until bottom of groove closes about 13 mm (0.5 in.) in 22 to 28 blows? Note: Closures between 15 and 40 blows acceptable if variations of $\pm 5\%$ of the true liquid limit are tolerable to the lab. Note if lab accepts anything other than 22 to 28 blows.		
12. Base of device not held with hand while turning crank?		
13. Soil in cup immediately returned to mixing dish, and no additional water added?		
14. Steps 2 through 10 repeated?		
15. Closure in 22 to 28 blows?		
16. Number of blows recorded for second closure?		
17. Moisture specimen is taken after second groove closure (if closure is in acceptable range and within ± 2 blows of the first closure)?		
18. Slice of soil, width of spatula, extending across cake at right angles to groove and including portion that flowed together removed from dish and placed in container?		

**AASHTO T89-02
DETERMINING THE LIQUID LIMIT OF SOILS**

PROCEDURE Method B (continued)		
	Test 1	Test 2
19. Container and soil weighed to 0.01 g? VTM -7 – a balance sensitive to 0.1 gram may be used.		
20. Water content determined according to T265?		
21. Water content calculated to nearest whole percent by: $\% \text{ moisture} = \frac{\text{mass of water}}{\text{mass of oven dry soil}} \times 100?$		
22. Liquid limit calculated by one of the methods in Section 14 (nomograph, multicurve, slide rule, etc.)?		
Comments:		

Date Tested: _____ **Person Assessed:** _____ **Assessor:** _____

Retest Date: _____ **Assessor:** _____