Method of Test for

MEASUREMENT OF TEXTURE DEPTH BY SAND-PATCH

LDH Designation: TR 617-74

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Scope

1. This method describes a procedure for determining the average texture depth of a selected portion of a pavement surface.

Apparatus

2. The apparatus shall consist of the following:

(a) Sand spreading tool consisting of a 2 ½ in. (63.5 mm) diameter flat wooden disc with a 1/16 in. (1.59 mm) thick hard rubber disc of the same diameter attached to one face and a short dowel serving as a handle attached to the other face.

(b) Metal cylinder with a volume of approximately 1.5 in.^{3} (24.6 cm^3).

(c) Natural silica sand from Ottawa, Illinois, graded to pass a No. 50 (.300 mm) sieve and retained on a No. 100 (.150 mm) sieve.

(d) Balance sensitive to .01 g.

(e) Ruler, 12 in. (305 mm) long, with markings in divisions of every 0.1 in. (2 mm).

(f) Wire brush and soft hand brush.

Procedure

3. (a) Normally a volume of 1.50 in.^{3} (24.6 cm^3) of sand is used in performing this test. This volume can be obtained by a cylinder 0.75 in. (19 mm) in inside diameter and 3.40 in. (86.4 mm) in height.

(b) If a volume other than 1.50 in.^{3} (24.6 cm^3) is desired, prepare a conversion table in which texture depths, T, can be determined for sand-patch diameters, D, ranging from 4 to 12 inches (100 to 306 mm) in increments of 0.1 in. (2 mm).

(1) Calculate the exact volume, V , of the metal cylinder prepared for this purpose.

(2) To prepare the conversion table, use the equation $T = \dfrac{4V}{\pi D^2}$

(c) Determine the weight of sand needed to fill the metal cylinder.

(1) Fill the cylinder to the top with dry sand and gently tap the base of the cylinder three times on a rigid surface. Add more sand to fill the cylinder again to the top and level the top with a straightedge.

(2) Determine the weight of sand in the cylinder. This weight of sand should be placed in suitable containers (35 mm film cans) and used for

every sand-patch test. (The weight has been determined to be 38.83 grams for every 1.50 in.^{3} [24.6 cm^3].) If a balance is not available, the required amount of sand can be measured for each test by filling the metal cylinder according to the method described in Section 3c (1).

(d) The pavement surface selected for test must be dry. If the pavement has not been subjected to traffic, scrub the test surface with a wire brush to remove any loosely bonded particles or curing compounds that will be worn away by a small amount of traffic. Otherwise, the pavement surface should be swept with a soft hand brush.

(e) Pour the measured sand on the test surface and spread it with the rubber disc spreading tool into a circular patch with the surface depressions filled to the level of the peaks. The sand spreading tool should be kept flat on the surface and moved in a circular motion. Avoid losing any sand, especially during windy conditions. Sand used for one test should not be reused for another test.

(f) Measure the diameter of the sand-patch at five or more equally spaced locations and record to the nearest 0.1 in. (2 mm).

(g) For very smooth pavement surfaces where patch diameters are greater than 12 in. (305 mm), the diameter shall be listed as 12 in. (305 mm) plus and texture depth less than 0.013 in. (0.33 mm).

Calculation of Texture Depth

4. Compute the average diameter of the sand-patch and determine the texture depth by using the formula $T = \dfrac{4V}{\pi D^2}$, where:

V = Volume (in.^{3} or mm^3)

D = Sand patch diameter (in. or mm)

T = Texture depth (in. or mm)

Texture depths for a volume of 1.50 in.^{3} (24.6 cm^3) and diameters ranging from 4 to 12 inches (100 to 306 mm) in increments of 0.1 in. (2 mm) are given, in inches in Table I and in millimeters in Table II.

Reference

This test method is a modification of Test Method Tex-436-A, "Measurement of Texture Depth by the Sand-Patch Method," Texas Highway Department.

TABLE I

Texture Depth, in. (1.50 in.^{3} volume)

D = Sand-patch diameter, in.
T = Texture depth, in.

D	T	D	T	D	T
4.0	0.119	6.7	0.043	9.4	0.022
4.1	0.113	6.8	0.041	9.5	0.021
4.2	0.108	6.9	0.040	9.6	0.021
4.3	0.103	7.0	0.039	9.7	0.020
4.4	0.098	7.1	0.038	9.8	0.020
4.5	0.094	7.2	0.037	9.9	0.019
4.6	0.090	7.3	0.036	10.0	0.019
4.7	0.086	7.4	0.035	10.1	0.019
4.8	0.083	7.5	0.034	10.2	0.018
4.9	0.080	7.6	0.033	10.3	0.018
5.0	0.077	7.7	0.032	10.4	0.018
5.1	0.074	7.8	0.031	10.5	0.017
5.2	0.071	7.9	0.031	10.6	0.017
5.3	0.068	8.0	0.030	10.7	0.017
5.4	0.065	8.1	0.029	10.8	0.016
5.5	0.063	8.2	0.028	10.9	0.016
5.6	0.061	8.3	0.028	11.0	0.016
5.7	0.059	8.4	0.027	11.1	0.016
5.8	0.057	8.5	0.026	11.2	0.015
5.9	0.055	8.6	0.026	11.3	0.015
6.0	0.053	8.7	0.025	11.4	0.015
6.1	0.051	8.8	0.025	11.5	0.014
6.2	0.050	8.9	0.024	11.6	0.014
6.3	0.048	9.0	0.024	11.7	0.014
6.4	0.047	9.1	0.023	11.8	0.014
6.5	0.045	9.2	0.023	11.9	0.013
6.6	0.044	9.3	0.022	12.0	0.013

TABLE II

Texture Depth, mm (24.6 cm^3 volume)

D = Sand-patch diameter, mm
T = Texture depth, mm

D	T	D	T	D	T	D	T
100	3.13	152	1.35	204	0.75	256	0.48
102	3.01	154	1.32	206	0.74	258	0.47
104	2.89	156	1.29	208	0.72	260	0.46
106	2.79	158	1.25	210	0.71	262	0.46
108	2.68	160	1.22	212	0.70	264	0.45
110	2.59	162	1.19	214	0.68	266	0.44
112	2.49	164	1.16	216	0.67	268	0.44
114	2.41	166	1.14	218	0.66	270	0.43
116	2.33	168	1.11	220	0.65	272	0.42
118	2.25	170	1.08	222	0.64	274	0.42
120	2.17	172	1.06	224	0.62	276	0.41
122	2.10	174	1.03	226	0.61	278	0.40
124	2.04	176	1.01	228	0.60	280	0.40
126	1.97	178	0.99	230	0.59	282	0.39
128	1.91	180	0.97	232	0.58	284	0.39
130	1.85	182	0.94	234	0.57	286	0.38
132	1.80	184	0.92	236	0.56	288	0.38
134	1.74	186	0.90	238	0.55	290	0.37
136	1.69	188	0.89	240	0.54	292	0.37
138	1.64	190	0.87	242	0.53	294	0.36
140	1.60	192	0.85	244	0.53	296	0.36
142	1.55	194	0.83	246	0.52	298	0.35
144	1.51	196	0.81	248	0.51	300	0.35
146	1.47	198	0.80	250	0.50	302	0.34
148	1.43	200	0.78	252	0.49	304	0.34
150	1.39	202	0.77	254	0.49	306	0.33