Designation: D 368 – 89 (Reapproved 1995)ε1

American Association State
Highway Transportation Officials Standard
AASHTO No. T 86

Standard Test Method for Specific Gravity of Creosote and Oil-Type Preservatives[1]

This standard is issued under the fixed designation D 368; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

ε[1] NOTE—Section 9 was added editorially in July 1995.

1. Scope

1.1 This test method covers the determination of the specific gravity of oil-type preservatives by means of the hydrometer. Test Methods D 38 covers the sampling of wood preservatives prior to testing. To determine the specific gravity of distillation fractions of such preservatives use Test Method D 369.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 38 Test Methods for Sampling Wood Preservatives Prior to Testing[2]

D 347 Test Method for Volume and Specific Gravity Correction Tables for Creosote and Coal Tar[2]

D 369 Test Method for Specific Gravity of Creosote Fractions and Residue[2]

D 390 Specification for Coal-Tar Creosote for the Preservative Treatment of Piles, Poles, and Timbers for Marine, Land, and Fresh Water Use[2]

D 391 Specification for Creosote-Coal Tar Solution[2]

E 1 Specification for ASTM Thermometers[3]

E 100 Specification for ASTM Hydrometers[3]

3. Summary of Test Method

3.1 A hydrometer is floated in a totally liquid sample of the preservative solution. The specific gravity is read at the meniscus of the stem and corrected to the desired temperature.

4. Significance and Use

4.1 This is a test method to determine the specific gravity of creosote and creosote-coal tar solutions for conformance to Specifications D 390 and D 391. It may also be used with other oil-type preservatives.

5. Apparatus

5.1 *Hydrometers*—A set of three hydrometers covering the range 1.000 to 1.150 and conforming to the requirements for hydrometers 125H (range 1.000 to 1.050), 126H (range 1.050 to 1.100), and 127H (range 1.100 to 1.150) is prescribed in Specification E 100. If not available, hydrometers (60/60°F) in the range 1.000 to 1.150 of similar accuracy and having a scale length not less than 9.5 mm/0.010 units of specific gravity, may be used.

5.2 *Hydrometer Cylinder*—A glass cylinder having the following approximate dimensions:

Length	approximately 300 mm
Diameter	not less than 32 mm

5.3 *Thermometer*—An ASTM Low Softening Point Thermometer having a range from −2 to 80°C (30 to 180°F), conforming to the requirements for Thermometer 15C (15F) as described in Specification E 1, or other thermometer of suitable range and precision.

6. Procedure

6.1 Place the oil in the cylinder to a depth sufficient to float the hydrometer, and with thorough stirring to ensure uniformity, adjust the temperature to 38°C (100°F), or if not entirely liquid at that temperature, to the lowest temperature at which the oil is completely liquid (Note 1). Insert the hydrometer and allow the instrument to settle until it is in floating equilibrium. Then read the height of the meniscus on the stem of the hydrometer and the temperature to the nearest 0.1°C (0.2°F). Add to the hydrometer reading an increment of specific gravity equivalent to 1 mm on the scale. Then correct this observed specific gravity at the observed temperature to the specific gravity at 38/15.5°C using Table 2 of Test Method D 347.

NOTE 1—It is advantageous to have the cylinder immersed in a bath maintained at the temperature of test.

NOTE 2—See Table 1.

---

[1] This test method is under the jurisdiction of ASTM Committee D-7 on Wood and is the direct responsibility of Subcommittee D07.06 on Treatments for Wood Products.

Current edition approved Oct. 29, 1989. Published December 1989. Originally published as D 368 – 33 T. Last previous edition D 368 – 84.

This test method is identical in substance with the Standard Method for the Determination of the Specific Gravity of Oil-Type Preservatives which is part of the American Wood-Preservers' Association Standard Methods for Analysis of Creosote and Oil-Type Preservatives (A1 – 62). Acknowledgment is made to the American Wood-Preservers' Association for its development of the subject matter covered in this test method.

[2] *Annual Book of ASTM Standards,* Vol 04.10.

[3] *Annual Book of ASTM Standards,* Vol 14.03.

TABLE 1 Factors to Be Used for Determining the Specific Gravity at 60°F When Determined at Temperatures Ranging From 50 to 150°F[A]

Observed Temperature, °F	Factors			Observed Temperature, °F	Factors			Observed Temperature, °F	Factors			Observed Temperature, °F	Factors		
	Group 0	Group 1	Group 2		Group 0	Group 1	Group 2		Group 0	Group 1	Group 2		Group 0	Group 1	Group 2
50	0.9965	0.9960	0.9951	76	1.0056	1.0064	1.0080	102	1.0148	1.0170	1.0212	128	1.0240	1.0276	1.0350
51	0.9968	0.9964	0.9956	77	1.0059	1.0068	1.0085	103	1.0152	1.0173	1.0219	129	1.0244	1.0280	1.0355
52	0.9972	0.9968	0.9961	78	1.0063	1.0072	1.0090	104	1.0155	1.0177	1.0224	130	1.0248	1.0284	1.0360
53	0.9975	0.9972	0.9965	79	1.0066	1.0076	1.0095	105	1.0159	1.0182	1.0229	131	1.0251	1.0288	1.0366
54	0.9979	0.9976	0.9970	80	1.0069	1.0080	1.0100	106	1.0162	1.0186	1.0234	132	1.0255	1.0292	1.0371
55	0.9982	0.9980	0.9975	81	1.0073	1.0084	1.0105	107	1.0166	1.0190	1.0240	133	1.0258	1.0296	1.0377
56	0.9986	0.9984	0.9980	82	1.0077	1.0088	1.0110	108	1.0169	1.0193	1.0244	134	1.0262	1.0300	1.0382
57	0.9990	0.9988	0.9985	83	1.0081	1.0092	1.0115	109	1.0173	1.0197	1.0249	135	1.0266	1.0304	1.0387
58	0.9994	0.9992	0.9990	84	1.0084	1.0096	1.0120	110	1.0176	1.0201	1.0254	136	1.0269	1.0309	1.0392
59	0.9997	0.9996	0.9995	85	1.0087	1.0100	1.0125	111	1.0180	1.0206	1.0259	137	1.0272	1.0313	1.0398
60	1.0000	1.0000	1.0000	86	1.0091	1.0104	1.0130	112	1.0183	1.0210	1.0265	138	1.0276	1.0316	1.0402
61	1.0003	1.0004	1.0005	87	1.0094	1.0108	1.0135	113	1.0187	1.0214	1.0270	139	1.0280	1.0320	1.0408
62	1.0007	1.0008	1.0010	88	1.0098	1.0112	1.0140	114	1.0191	1.0218	1.0275	140	1.0284	1.0325	1.0413
63	1.0010	1.0012	1.0015	89	1.0101	1.0117	1.0146	115	1.0195	1.0222	1.0280	141	1.0288	1.0329	1.0418
64	1.0014	1.0016	1.0020	90	1.0105	1.0121	1.0151	116	1.0198	1.0226	1.0286	142	1.0291	1.0333	1.0424
65	1.0018	1.0020	1.0025	91	1.0108	1.0125	1.0156	117	1.0202	1.0231	1.0291	143	1.0294	1.0336	1.0430
66	1.0021	1.0024	1.0030	92	1.0112	1.0129	1.0161	118	1.0205	1.0235	1.0296	144	1.0298	1.0341	1.0435
67	1.0024	1.0028	1.0035	93	1.0115	1.0133	1.0167	119	1.0209	1.0239	1.0300	145	1.0302	1.0345	1.0440
68	1.0028	1.0032	1.0039	94	1.0119	1.0137	1.0171	120	1.0212	1.0243	1.0307	146	1.0305	1.0349	1.0446
69	1.0031	1.0036	1.0044	95	1.0122	1.0141	1.0178	121	1.0216	1.0247	1.0312	147	1.0308	1.0353	1.0451
70	1.0035	1.0040	1.0049	96	1.0126	1.0145	1.0182	122	1.0220	1.0252	1.0318	148	1.0312	1.0358	1.0457
71	1.0038	1.0044	1.0054	97	1.0130	1.0150	1.0187	123	1.0223	1.0255	1.0323	149	1.0316	1.0362	1.0462
72	1.0042	1.0048	1.0059	98	1.0133	1.0154	1.0192	124	1.0227	1.0259	1.0328	150	1.0319	1.0366	1.0469
73	1.0045	1.0052	1.0065	99	1.0137	1.0158	1.0197	125	1.0230	1.0263	1.0334	...	...	...	...
74	1.0048	1.0056	1.0070	100	1.0140	1.0162	1.0202	126	1.0233	1.0267	1.0339	...	...	...	...
75	1.0052	1.0060	1.0075	101	1.0144	1.0166	1.0207	127	1.0237	1.0272	1.0344	...	...	...	...

[A] For petroleum oils and pentachlorophenol solutions to correct the specific gravity at the observed temperature to the basis of 60°F, multiply it by the factor in Table 1 at the corresponding temperature.

Group	Degrees	Specific Gravity at 60/60°F
0	0 to 14.9	1.0760 to 0.9665
1	15 to 34.9	0.9659 to 0.8504
2	35 to 50.9	0.8498 to 0.7758

7. Report

7.1 Report the specific gravity at 38/15.5°C to the nearest one thousandth unit of specific gravity.

8. Precision and Bias

8.1 The following criteria should be used for judging the acceptability of results at the 95 % probability level:

8.1.1 *Repeatability*—Duplicate determinations by the same operator should not be considered suspect unless the reported results differ by more than 0.005.

8.1.2 *Reproducibility*—The results submitted by two different laboratories should not be considered suspect unless the reported results differ by more than 0.010.

9. Keywords

9.1 creosote; oil; preservative; specific gravity; wood