Designation: D 633 – 97

Standard Volume Correction Table for Road Tar[1]

This standard is issued under the fixed designation D 633; 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.

1. Scope

1.1 This table has been prepared by the National Bureau of Standards to meet a demand from the tar industry for a short and convenient table for reducing volumes of road tar to the basis of 15.6°C (60°F) when extreme accuracy is not required. The table shows the volume occupied at 15.6°C by a quantity of material occupying unit volume at the indicated temperature.

2. Referenced Documents

2.1 *ASTM Standards:*

D 490 Specification for Road Tar[2]

3. Significance and Use

3.1 Tars change in volume with changes in temperature. They are loaded or transferred at widely varying temperatures. Volume correction factors are used to adjust bulk volumes measured at those temperatures with corresponding volumes at a base temperature of either 15.6°C or 60°F for the purposes of custody transfer and accounting operations.

3.2 Correction factors as provided in this table have proven to be sufficiently accurate for the intended purposes.

3.3 The coefficient of expansion for D 490 type RT-12 at 15.6°C (60°F) per degree F is 0.00030.

[1] This standard is under the jurisdiction of ASTM Committee D-4 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.43 on Specifications and Tests for Tar and Tar Products.

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[2] *Annual Book of ASTM Standards,* Vol 04.03.

TABLE 1 Volume Correction Table for Tar

Legend: *t* = observed temperature in degrees Fahrenheit; *tc* = observed temperature in degrees centigrade; *M* = multiplier for reducing volumes to the basis of 60° Fahrenheit (15.6°C)

t	*tc*	*M*	t	*tc*	*M*	*t*	*tc*	*M*	*t*	*tc*	*M*	*t*	*tc*	*M*	*t*	*tc*	*M*	*t*	*tc*	*M*	*t*	*tc*	*M*
0	−17.78	1.0183	35	1.67	1.0076	70	21.11	0.9970	105	40.56	0.9867	140	60.00	0.9766	175	79.44	0.9657	210	98.89	09589	245	118.33	0.9474
1	−17.22	1.0180	36	2.22	1.0073	71	21.67	0.9967	106	41.11	0.9864	141	60.56	0.9763	176	80.00	0.9664	211	99.44	0.9567	246	118.89	0.9471
2	−16.67	1.0177	37	2.78	1.0070	72	22.22	0.9964	107	41.67	0.9861	142	61.11	0.9760	177	80.56	0.9661	212	100.00	0.9564	247	119.44	0.9469
3	−16.11	1.0174	38	3.33	1.0067	73	22.78	0.9961	108	42.22	0.9858	143	61.67	0.9757	178	81.11	0.9658	213	100.56	0.9561	248	120.00	0.9466
4	−15.56	1.0171	39	3.89	1.0064	74	23.33	0.9958	109	42.78	0.9855	144	62.22	0.9754	179	81.67	0.9655	214	101.11	0.9558	249	120.56	0.9463
5	−15.00	1.0168	40	4.44	1.0060	75	23.89	0.9955	110	43.33	0.9852	145	62.78	0.9751	180	82.22	0.9553	215	101.67	0.9556			
6	−14.44	1.0165	41	5.00	1.0057	76	24.44	0.9952	111	43.89	0.9849	146	63.33	0.9748	181	82.78	0.9650	216	102.22	0.9553			
7	−13.89	1.0162	42	5.56	1.0054	77	25.00	0.9949	112	44.44	0.9846	147	63.89	0.9746	182	83.33	0.9647	217	102.78	0.9550			
8	−13.33	1.0158	43	6.11	1.0051	78	25.56	0.9946	113	45.00	0.9843	148	64.44	0.9743	183	83.89	0.9644	218	103.33	0.9547			
9	−12.78	1.0155	44	6.67	1.0048	79	26.11	0.9943	114	45.56	0.9841	149	65.00	0.9740	184	84.44	0.9641	219	103.89	0.9545			
10	−12.22	1.0152	45	7.22	1.0045	80	26.67	0.9940	115	46.11	0.9838	150	65.56	0.9737	185	85.00	0.9639	220	104.44	0.9542			
11	−11.67	1.0149	46	7.78	1.0042	81	27.22	0.9937	116	46.67	0.9835	151	66.11	0.9734	186	85.56	0.9636	221	105.00	0.9539			
12	−11.11	1.0146	47	8.33	1.0039	82	27.78	0.9934	117	47.22	0.9832	152	66.87	0.9731	187	86.11	0.9633	222	105.56	0.9537			
13	−10.56	1.0143	48	8.89	1.0036	83	28.33	0.9931	118	47.78	0.9829	153	67.22	0.9729	188	86.67	0.9630	223	106.11	0.9534			
14	−10.00	1.0140	49	9.44	1.0033	84	28.89	0.9929	119	48.33	0.9826	154	67.78	0.9726	189	87.22	0.9627	224	106.67	0.9531			
15	−9.44	1.0137	50	10.00	1.0030	85	29.44	0.9926	120	48.89	0.9823	155	68.33	0.9723	190	87.78	0.9625	225	107.22	0.9528			
16	−8.89	1.0134	51	10.58	1.0027	86	30.00	0.9923	121	49.44	0.9820	156	68.89	0.9720	191	88.33	0.9622	226	107.78	0.9526			
17	−8.33	1.0131	52	11.11	1.0024	87	30.56	0.9920	122	50.00	0.9817	157	69.44	0.9717	192	88.89	0.9619	227	108.33	0.9523			
18	−7.78	1.0128	53	11.67	1.0021	88	31.11	0.9917	123	50.58	0.9815	158	70.00	0.9714	193	89.44	0.9616	228	108.89	0.9520			
19	−7.22	1.0125	54	12.22	1.0018	89	31.67	0.9914	124	51.11	0.9812	159	70.56	0.9712	194	90.00	0.9614	229	109.44	0.9517			
20	−6.67	1.0121	55	12.78	1.0015	90	32.22	0.9911	125	51.67	0.9809	160	71.11	0.9709	195	90.56	0.9611	230	110.00	0.9515			
21	−6.11	1.0118	56	13.33	1.0012	91	32.78	0.9908	126	52.22	0.9806	161	71.67	0.9706	196	91.11	0.9608	231	110.56	0.9512			
22	−5.56	1.0115	57	13.89	1.0009	92	33.33	0.9905	127	52.78	0.9803	162	72.22	0.9703	197	91.67	0.9605	232	111.11	0.9509			
23	−5.00	1.0112	58	14.44	1.0006	93	33.89	0.9902	128	53.33	0.9800	163	72.78	0.9700	198	92.22	0.9602	233	111.67	0.9507			
24	−4.44	1.0109	59	15.00	1.0003	94	34.44	0.9899	129	53.89	0.9797	164	73.33	0.9697	199	92.76	0.9600	234	112.22	0.9504			
25	−3.89	1.0106	60	15.56	1.0000	95	35.00	0.9896	130	54.44	0.9794	165	73.89	0.9695	200	93.33	0.9597	235	112.78	0.9501			
26	−3.33	1.0103	61	16.11	0.9997	96	35.56	0.9893	131	55.00	0.9791	166	74.44	0.9692	201	93.89	0.9594	236	113.33	0.9498			
27	−2.78	1.0100	62	16.67	0.9994	97	36.11	0.9890	132	55.56	0.9789	167	75.00	0.9689	202	94.44	0.9591	237	113.89	0.9496			
28	−2.22	1.0097	63	17.22	0.9991	98	36.67	0.9887	133	56.11	0.9786	168	75.56	0.9686	203	95.00	0.9589	238	114.44	0.9493			
29	−1.67	1.0094	64	17.78	0.9988	99	37.22	0.9884	134	56.67	0.9783	169	76.11	0.9683	204	95.56	0.9586	239	115.00	0.9490			
30	−1.11	1.0091	65	18.33	0.9985	100	37.78	0.9881	135	57.22	0.9780	170	76.67	0.9681	205	96.11	0.9583	240	115.56	0.9488			
31	−0.56	1.0088	66	18.89	0.9982	101	38.33	0.9878	136	57.78	0.9777	171	77.22	0.9678	206	96.67	0.9580	241	116.11	0.9485			
32	0	1.0085	67	19.44	0.9979	102	38.89	0.9876	137	58.33	0.9774	172	77.78	0.9675	207	97.22	0.9578	242	116.67	0.9482			
33	0.56	1.0082	68	20.00	0.9976	103	39.44	0.9873	138	58.89	0.9771	173	78.33	0.9672	208	97.78	0.9575	243	117.22	0.9480			
34	1.11	1.0079	69	20.56	0.9973	104	40.00	0.9870	139	59.44	0.9768	174	78.89	0.9669	209	98.33	0.9572	244	117.78	0.9477			