

OFFICE OF STATE AID ROAD CONSTRUCTION			S.O.P. NO. SA II-3-11
STANDARD OPERATING PROCEDURES			Page 1 of 15
Subject: S.O.P. VOLUME CORRECTION FOR BITUMINOUS MATERIALS			Distribution A, B, C, D, E
EFFECTIVE July 1, 2005	ISSUED July 1, 2005	SUPERSEDES Page 1 of 15 S.O.P. NO. SAD II-3-11 EFFECTIVE: March 1, 1981	APPROVED J. Brooks Miller, Sr. STATE AID ENGINEER

PURPOSE: To Publish Volumetric-Temperature Correction Tables For Use In Correcting Volumes Of Bituminous Liquids to 60°F.

1. GENERAL:

- 1.1. When bituminous materials are to be paid by the gallon, the pay quantity will be based on the volume of the material at 60°F.
- 1.2. At the time of use, the temperature of the material will be determined by the use of a thermometer. This will be the observed temperature.

2. USE OF TABLES:

- 2.1. From the observed temperature, the conversion factor can be chosen for emulsions, cutback asphalt, and asphalt cements.
- 2.2. The correct volume of the material can be calculated by multiplying the conversion factor times the volume of material at the observed temperature.
- 2.3. **EXAMPLE:** What is the volume of 20,000 gallons of AC-5 at 60°F with an observed temperature of 300°F?

From the table, the conversion factor at 300°C for AC is 0.9187.

$$20,000 \text{ gallons} \times 0.9187 = 18,374 \text{ gallons}$$

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Temperature - Volume Corrections for Asphalt Materials, Degrees F
SPECIFIC GRAVITY AT 60°F ABOVE 0.966
t = observed temperature in degrees Fahrenheit
M = multiplier for correcting oil volumes to the basis of 60° F

t	M	t	M	t	M	t	M
0	1.0211	19	1.0144	38	1.0077	57	1.0010
1	1.0208	20	1.0141	39	1.0074	58	1.0007
2	1.0204	21	1.0137	40	1.0070	59	1.0003
3	1.0201	22	1.0133	41	1.0067	60	1.0000
4	1.0197	23	1.0130	42	1.0063	61	0.9997
5	1.0194	24	1.0126	43	1.0060	62	0.9993
6	1.0190	25	1.0123	44	1.0056	63	0.9990
7	1.0186	26	1.0119	45	1.0053	64	0.9986
8	1.0183	27	1.0116	46	1.0049	65	0.9983
9	1.0179	28	1.0112	47	1.0046	66	0.9979
10	1.0176	29	1.0109	48	1.0042	67	0.9976
11	1.0172	30	1.0105	49	1.0038	68	0.9972
12	1.0169	31	1.0102	50	1.0035	69	0.9969
13	1.0165	32	1.0098	51	1.0031	70	0.9965
14	1.0162	33	1.0095	52	1.0028	71	0.9962
15	1.0158	34	1.0091	53	1.0024	72	0.9958
16	1.0155	35	1.0088	54	1.0021	73	0.9955
17	1.0151	36	1.0084	55	1.0017	74	0.9951
18	1.0148	37	1.0081	56	1.0014	75	0.9948

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t	M	t	M	t	M	t	M
76	0.9944	98	0.9868	120	0.9792	142	0.9716
77	0.9941	99	0.9864	121	0.9788	143	0.9713
78	0.9937	100	0.9861	122	0.9785	144	0.9710
79	0.9934	101	0.9857	123	0.9782	145	0.9706
80	0.9930	102	0.9854	124	0.9778	146	0.9703
81	0.9927	103	0.9851	125	0.9775	147	0.9699
82	0.9923	104	0.9847	126	0.9771	148	0.9696
83	0.9920	105	0.9844	127	0.9768	149	0.9693
84	0.9916	106	0.9840	128	0.9764	150	0.9689
85	0.9913	107	0.9837	129	0.9761	151	0.9686
86	0.9909	108	0.9833	130	0.9758	152	0.9682
87	0.9906	109	0.9830	131	0.9754	153	0.9679
88	0.9902	110	0.9826	132	0.9751	154	0.9675
89	0.9899	111	0.9823	133	0.9747	155	0.9672
90	0.9896	112	0.9819	134	0.9744	156	0.9669
91	0.9892	113	0.9816	135	0.9740	157	0.9665
92	0.9889	114	0.9813	136	0.9737	158	0.9662
93	0.9885	115	0.9809	137	0.9734	159	0.9658
94	0.9882	116	0.9806	138	0.9730	160	0.9655
95	0.9878	117	0.9802	139	0.9727	161	0.9652
96	0.9875	118	0.9799	140	0.9723	162	0.9648
97	0.9871	119	0.9795	141	0.9720	163	0.9645

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t	M	t	M	t	M	t	M
164	0.9641	186	0.9567	208	0.9493	230	0.9419
165	0.9638	187	0.9563	209	0.9489	231	0.9416
166	0.9635	188	0.9560	210	0.9483	232	0.9412
167	0.9631	189	0.9557	211	0.9486	233	0.9409
168	0.9628	190	0.9553	212	0.9479	234	0.9405
169	0.9624	191	0.9550	213	0.9476	235	0.9402
170	0.9621	192	0.9547	214	0.9472	236	0.9399
171	0.9618	193	0.9543	215	0.9469	237	0.9395
172	0.9614	194	0.9540	216	0.9466	238	0.9392
173	0.9611	195	0.9536	217	0.9462	239	0.9389
174	0.9607	196	0.9533	218	0.9459	240	0.9385
175	0.9604	197	0.9530	219	0.9456	241	0.9382
176	0.9601	198	0.9526	220	0.9452	242	0.9379
177	0.9597	199	0.9523	221	0.9449	243	0.9375
178	0.9594	200	0.9520	222	0.9446	244	0.9372
179	0.9590	201	0.9516	223	0.9442	245	0.9369
180	0.9587	202	0.9513	224	0.9439	246	0.9365
181	0.9584	203	0.9509	225	0.9436	247	0.9362
182	0.9580	204	0.9506	226	0.9432	248	0.9359
183	0.9577	205	0.9503	227	0.9429	249	0.9356
184	0.9574	206	0.9499	228	0.9426	250	0.9352
185	0.9570	207	0.9496	229	0.9422	251	0.9349

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t	M	t	M	t	M	t	M
252	0.9346	274	0.9273	296	0.9200	318	0.9128
253	0.9342	275	0.9269	297	0.9197	319	0.9125
254	0.9339	276	0.9266	298	0.9194	320	0.9122
255	0.9336	277	0.9263	299	0.9190	321	0.9118
256	0.9332	278	0.9259	300	0.9187	322	0.9115
257	0.9329	279	0.9256	301	0.9184	323	0.9112
258	0.9326	280	0.9253	302	0.9181	324	0.9109
259	0.9322	281	0.9250	303	0.9177	325	0.9105
260	0.9319	282	0.9246	304	0.9174	326	0.9102
261	0.9316	283	0.9243	305	0.9171	327	0.9099
262	0.9312	284	0.9240	306	0.9167	328	0.9096
263	0.9309	285	0.9236	307	0.9164	329	0.9092
264	0.9306	286	0.9233	308	0.9161	330	0.9089
265	0.9302	287	0.9230	309	0.9158	331	0.9086
266	0.9299	288	0.9227	310	0.9154	332	0.9083
267	0.9296	289	0.9223	311	0.9151	333	0.9079
268	0.9293	290	0.9220	312	0.9148	334	0.9076
269	0.9289	291	0.9217	313	0.9145	335	0.9073
270	0.9286	292	0.9213	314	0.9141	336	0.9070
271	0.9283	293	0.9210	315	0.9138	337	0.9066
272	0.9279	294	0.9207	316	0.9135	338	0.9063
273	0.9276	295	0.9204	317	0.9132	339	0.9060

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t	M	t	M	t	M	t	M
340	0.9057	362	0.8986	384	0.8915	406	0.8845
341	0.9053	363	0.8982	385	0.8912	407	0.8841
342	0.9050	364	0.8979	386	0.8908	408	0.8838
343	0.9047	365	0.8976	387	0.8905	409	0.8835
344	0.9044	366	0.8973	388	0.8902	410	0.8832
345	0.9040	367	0.8969	389	0.8899	411	0.8829
346	0.9037	368	0.8966	390	0.8896	412	0.8826
347	0.9034	369	0.8963	391	0.8892	413	0.8822
348	0.9031	370	0.8960	392	0.8889	414	0.8819
349	0.9028	371	0.8957	393	0.8886	415	0.8816
350	0.9024	372	0.8953	394	0.8883	416	0.8813
351	0.9021	373	0.8950	395	0.8880	417	0.8810
352	0.9018	374	0.8947	396	0.8876	418	0.8806
353	0.9015	375	0.8944	397	0.8873	419	0.8803
354	0.9011	376	0.8941	398	0.8870	420	0.8800
355	0.9008	377	0.8937	399	0.8867	421	0.8797
356	0.9005	378	0.8934	400	0.8864	422	0.8794
357	0.9002	379	0.8931	401	0.8861	423	0.8791
358	0.8998	380	0.8928	402	0.8857	424	0.8787
359	0.8995	381	0.8924	403	0.8854	425	0.8784
360	0.8992	382	0.8921	404	0.8851	426	0.8781
361	0.8989	383	0.8918	405	0.8848	427	0.8778

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t	M	t	M	t	M	t	M
428	0.8775	446	0.8718	464	0.8661	482	0.8605
429	0.8772	447	0.8715	465	0.8658	483	0.8602
430	0.8768	448	0.8712	466	0.8655	484	0.8599
431	0.8765	449	0.8709	467	0.8652	485	0.8596
432	0.8762	450	0.8705	468	0.8649	486	0.8593
433	0.8759	451	0.8702	469	0.8646	487	0.8590
434	0.8756	452	0.8699	470	0.8643	488	0.8587
435	0.8753	453	0.8696	471	0.8640	489	0.8583
436	0.8749	454	0.8693	472	0.8636	490	0.8580
437	0.8746	455	0.8690	473	0.8633	491	0.8577
438	0.8743	456	0.8687	474	0.8630	492	0.8574
439	0.8740	457	0.8683	475	0.8627	493	0.8571
440	0.8737	458	0.8680	476	0.8624	494	0.8568
441	0.8734	459	0.8677	477	0.8621	495	0.8565
442	0.9731	460	0.8674	478	0.8618	496	0.8562
443	0.8727	461	0.8671	479	0.8615	497	0.8559
444	0.8724	462	0.8668	480	0.8611	498	0.8556
445	0.8721	463	0.8665	481	0.8608	499	0.8552

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Temperature - Volume Corrections for Asphalt Materials, Degrees F
SPECIFIC GRAVITY AT 60°F OF 0.850 TO 0.966
t = observed temperature in degrees Fahrenheit
M = multiplier for correcting oil volumes to the basis of 60° F

t	M	t	M	t	M	t	M
0	1.0241	19	1.0164	38	1.0088	57	1.0012
1	1.0237	20	1.0160	39	1.0084	58	1.0008
2	1.0233	21	1.0156	40	1.0080	59	1.0004
3	1.0229	22	1.0152	41	1.0076	60	1.0000
4	1.0225	23	1.0148	42	1.0072	61	0.9996
5	1.0221	24	1.0144	43	1.0068	62	0.9992
6	1.0217	25	1.0140	44	1.0064	63	0.9988
7	1.0213	26	1.0136	45	1.0060	64	0.9984
8	1.0209	27	1.0132	46	1.0056	65	0.9980
9	1.0205	28	1.0128	47	1.0052	66	0.9976
10	1.0201	29	1.0124	48	1.0048	67	0.9972
11	1.0197	30	1.0120	49	1.0044	68	0.9968
12	1.0193	31	1.0116	50	1.0040	69	0.9964
13	1.0189	32	1.0112	51	1.0036	70	0.9960
14	1.0185	33	1.0108	52	1.0032	71	0.9956
15	1.0181	34	1.0104	53	1.0028	72	0.9952
16	1.0177	35	1.0100	54	1.0024	73	0.9948
17	1.0173	36	1.0096	55	1.0020	74	0.9944
18	1.0168	37	1.0092	56	1.0016	75	0.9940

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t	M	t	M	t	M	t	M
76	0.9936	98	0.9850	120	0.9763	142	0.9678
77	0.9932	99	0.9846	121	0.9760	143	0.9674
78	0.9929	100	0.9842	122	0.9756	144	0.9670
79	0.9925	101	0.9838	123	0.9752	145	0.9666
80	0.9921	102	0.9834	124	0.9748	146	0.9662
81	0.9917	103	0.9830	125	0.9744	147	0.9659
82	0.9913	104	0.9826	126	0.9740	148	0.9655
83	0.9909	105	0.9822	127	0.9736	149	0.9651
84	0.9905	106	0.9818	128	0.9732	150	0.9647
85	0.9901	107	0.9814	129	0.9728	151	0.9643
86	0.9897	108	0.9810	130	0.9725	152	0.9639
87	0.9893	109	0.9806	131	0.9721	153	0.9635
88	0.9889	110	0.9803	132	0.9717	154	0.9632
89	0.9885	111	0.9799	133	0.9713	155	0.9628
90	0.9881	112	0.9795	134	0.9709	156	0.9624
91	0.9877	113	0.9791	135	0.9705	157	0.9620
92	0.9873	114	0.9787	136	0.9701	158	0.9616
93	0.9869	115	0.9783	137	0.9697	159	0.9612
94	0.9865	116	0.9779	138	0.9693	160	0.9609
95	0.9861	117	0.9775	139	0.9690	161	0.9605
96	0.9857	118	0.9774	140	0.9686	162	0.9601
97	0.9854	119	0.9767	141	0.9682	163	0.9597

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t	M	t	M	t	M	t	M
164	0.9593	186	0.9509	208	0.9425	230	0.9343
165	0.9589	187	0.9505	209	0.9422	231	0.9339
166	0.9585	188	0.9501	210	0.9418	232	0.9335
167	0.9582	189	0.9498	211	0.9414	233	0.9331
168	0.9578	190	0.9494	212	0.9410	234	0.9328
169	0.9574	191	0.9490	213	0.9407	235	0.9324
170	0.9570	192	0.9486	214	0.9403	236	0.9320
171	0.9566	193	0.9482	215	0.9399	237	0.9316
172	0.9562	194	0.9478	216	0.9395	238	0.9313
173	0.9559	195	0.9475	217	0.9391	239	0.9309
174	0.9555	196	0.9471	218	0.9388	240	0.9305
175	0.9551	197	0.9467	219	0.9384	241	0.9301
176	0.9547	198	0.9463	220	0.9380	242	0.9298
177	0.9543	199	0.9460	221	0.9376	243	0.9294
178	0.9539	200	0.9456	222	0.9373	244	0.9290
179	0.9536	201	0.9452	223	0.9369	245	0.9286
180	0.9532	202	0.9448	224	0.8365	246	0.9283
181	0.9528	203	0.9444	225	0.9361	247	0.9279
182	0.9524	204	0.9447	226	0.9358	248	0.9575
183	0.9520	205	0.9437	227	0.9354	249	0.9272
184	0.9547	206	0.9433	228	0.8350	250	0.9268
185	0.9513	207	0.9429	229	0.9346	251	0.9264

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t	M	t	M	t	M	t	M
252	0.9260	274	0.9179	296	0.9098	318	0.9018
253	0.9257	275	0.9175	297	0.9094	319	0.9014
254	0.9253	276	0.9171	298	0.9091	320	0.9010
255	0.9249	277	0.9168	299	0.9087	321	0.9007
256	0.9245	278	0.9164	300	0.9083	322	0.9003
257	0.9242	279	0.9160	301	0.9080	323	0.9000
258	0.9238	280	0.9157	302	0.9076	324	0.8996
259	0.9234	281	0.9153	303	0.9072	325	0.8992
260	0.9231	282	0.9149	304	0.9069	326	0.8989
261	0.9227	283	0.9146	305	0.9065	327	0.8985
262	0.9223	284	0.9142	306	0.9061	328	0.8981
263	0.9219	285	0.9138	307	0.9058	329	0.8978
264	0.9216	286	0.9135	308	0.9054	330	0.8974
265	0.9212	287	0.9131	309	0.9050	331	0.8971
266	0.9208	288	0.9127	310	0.9047	332	0.8967
267	0.9205	289	0.9124	311	0.9043	333	0.8963
268	0.9201	290	0.9120	312	0.9039	334	0.8960
269	0.9197	291	0.9116	313	0.9036	335	0.8956
270	0.9194	292	0.9113	314	0.9032	336	0.8952
271	0.9190	293	0.9109	315	0.9029	337	0.8949
272	0.9186	294	0.9105	316	0.9025	338	0.8945
273	0.9182	295	0.9102	317	0.9021	339	0.8942

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t	M	t	M	t	M	t	M
340	0.8938	362	0.8859	384	0.8781	406	0.8703
341	0.8934	363	0.8856	385	0.8777	407	0.8700
342	0.8931	364	0.8852	386	0.8774	408	0.8696
343	0.8927	365	0.8848	387	0.8770	409	0.8693
344	0.8924	366	0.8845	388	0.8767	410	0.8689
345	0.8920	367	0.8841	389	0.8763	411	0.8686
346	0.8916	368	0.8838	390	0.8760	412	0.8682
347	0.8913	369	0.8834	391	0.8756	413	0.8679
348	0.8909	370	0.8831	392	0.8753	414	0.8675
349	0.8906	371	0.8827	393	0.8749	415	0.8672
350	0.8902	372	0.8823	394	0.8746	416	0.8668
351	0.8899	373	0.8820	395	0.8742	417	0.8665
352	0.8895	374	0.8816	396	0.8738	418	0.8661
353	0.8891	375	0.8813	397	0.8735	419	0.8658
354	0.8888	376	0.8809	398	0.8731	420	0.8654
355	0.8884	377	0.8806	399	0.8728	421	0.8651
356	0.8881	378	0.8802	400	0.8724	422	0.8647
357	0.8877	379	0.8799	401	0.8721	423	0.8644
358	0.8873	380	0.8795	402	0.8717	424	0.8640
359	0.8870	381	0.8792	403	0.8714	425	0.8637
360	0.8866	382	0.8788	404	0.8710	426	0.8633
361	0.8863	383	0.8784	405	0.8707	427	0.8630

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t	M	t	M	t	M	t	M
428	0.8626	446	0.8564	464	0.8502	482	0.8440
429	0.8623	447	0.8560	465	0.8498	483	0.8437
430	0.8619	448	0.8557	466	0.8495	484	0.8433
431	0.8616	449	0.8554	467	0.8492	485	0.8430
432	0.8612	450	0.8550	468	0.8488	486	0.8427
433	0.8609	451	0.8547	469	0.8485	487	0.8423
434	0.8605	452	0.8543	470	0.8481	488	0.8420
435	0.8602	453	0.8540	471	0.8478	489	0.8416
436	0.8599	454	0.8536	472	0.8474	490	0.8413
437	0.8595	455	0.8533	473	0.8471	491	0.8410
438	0.8592	456	0.8529	474	0.8468	492	0.8406
439	0.8588	457	0.8526	475	0.8464	493	0.8403
440	0.8585	458	0.8522	476	0.8461	494	0.8399
441	0.8581	459	0.8519	477	0.8457	495	0.8396
442	0.8578	460	0.8516	478	0.8454	496	0.8393
443	0.8574	461	0.8512	479	0.8451	497	0.8389
444	0.8571	462	0.8509	480	0.8447	498	0.8386
445	0.8567	463	0.8505	481	0.8444	499	0.8383

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Temperature - Volume Corrections for Emulsified Asphalt
t = observed temperature in degrees Fahrenheit
M = multiplier for correcting oil volumes to the basis of 60° F

t	M	t	M	t	M	t	M
50	1.00250	69	.99775	88	.99300	107	.98825
51	1.00225	70	.99750	89	.99275	108	.98800
52	1.00200	71	.99725	90	.99250	109	.98775
53	1.00175	72	.99700	91	.99225	110	.98750
54	1.00150	73	.99675	92	.99200	111	.98725
55	1.00125	74	.99650	93	.99175	112	.98700
56	1.00100	75	.99625	94	.99150	113	.98675
57	1.00075	76	.99600	95	.99125	114	.98650
58	1.00050	77	.99575	96	.99100	115	.98625
59	1.00025	78	.99550	97	.99075	116	.98600
60	1.00000	79	.99525	98	.99050	117	.98575
61	.99975	80	.99500	99	.99025	118	.98550
62	.99950	81	.99475	100	.99000	119	.98525
63	.99925	82	.99450	101	.98975	120	.98500
64	.99900	83	.99425	102	.98950	121	.98475
65	.99875	84	.99400	103	.98925	122	.98450
66	.99850	85	.99375	104	.98900	123	.98425
67	.99825	86	.99350	105	.98875	124	.98400
68	.99800	87	.99325	106	.98850	125	.98375

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t	M	t	M	t	M	t	M
126	.98350	139	.98025	152	.97700	165	.97375
127	.98325	140	.98000	153	.97675	166	.97350
128	.98300	141	.97975	154	.97650	167	.97325
129	.98275	142	.97950	155	.97625	168	.97300
130	.98250	143	.97925	156	.97600	169	.97275
131	.98225	144	.97900	157	.97575	170	.97250
132	.98200	145	.97875	158	.97550	171	.97225
133	.98175	146	.97850	159	.97525	172	.97200
134	.98150	147	.97825	160	.97500	173	.97175
135	.98125	148	.97800	161	.97475	174	.97150
136	.98100	149	.97775	162	.97450	175	.97125
137	.98075	150	.97750	163	.97425		
138	.98050	151	.97725	164	.97400		