



Bulletin

Category: VOLUMETRIC	Bulletin: V-18-E (rev. 3)	Date: 1999-09-19	Page 1 of 9
Document(s): W&M Regs, section 270		Supersedes: V-18 (rev. 2)	

Subject: **Selection of Volume Correction Factor Tables and Mean Density Values for Some Common Products**

1. The purpose of this bulletin is to provide an index of the volume correction factor (VCF) tables presently provided in other Measurement Canada bulletins and to list the corresponding table to be referenced for some other products.
2. Where, for the purposes of approval and/or inspection, a manufacturer of a temperature compensator/converter wishes to use predetermined and non-resettable value(s) for the base density of a particular liquid, the mean density values in Table 1 for that product shall be used.
3. Subject to subsection 270(1)(a)(i) of the *Weights and Measures Regulations* this bulletin also provides extrapolated volume correction factors for use during the temperature compensation of gasoline and diesel fuels with densities of 730 kg/m³ (Table 2) and 840 kg/m³ (Table 3).
4. Revisions

The purpose of revision 1 was to include the volume correction tables for gasoline and diesel oil.

The purpose of revision 2 was to change the values of the mean density and density range for some of the products and to reference new bulletin numbers.

The purpose of revision 3 is to correct some mistakes in the tables.

5. For additional information regarding this bulletin, please contact the undersigned. Further information regarding Measurement Canada and its programs can be found on the Measurement Canada web site located at <http://mc.ic.gc.ca>

Ted Kingsbury
Senior Program Officer
Volumetric Measurement

TABLE 1: Selection of volume correction factor table for some common products

Product Name	Mean Density (kg/m ³) @ 15°C	Density Range (kg/m ³) @ 15°C	Volume Reduction Factor Reference Table:
Note: This list is not exhaustive.			
LPGs Propane Butane	510 580	495-520 564-585	ASTM-IP, Table 54
Gasoline Premium Gasoline Clear Gasoline Unleaded Gasoline Low Lead Gas	730	640-780	API Chapter 11.1, Table 54B
Gasoline: Alcohol Blends (15% alcohol max)	730	653-780	
Diesel Fuels Fuel Oils Stove Oils	840	780-1074 830- 900	
Aviation Gasoline	710	654-727	
Aviation Fuels - (Kerosine based) Jet A, A1, Jet Kerosine Turbine Fuel	800	780-840	
Jet B (Naphtha based)	760	750-770	API Chapter 11.1, Table 54A
Stoddard Solvent	790	780-800	API Chapter 11.1, Table 54B
Lubricating Oils (SAE Grades)	880	850-905	API Chapter 11.1, Table 54D

TABLE 1: Selection of volume correction factor table for some common products

Product Name	Mean Density (kg/m ³) @ 15°C	Density Range (kg/m ³) @ 15°C	Volume Reduction Factor Reference Table:
Note: This list is not exhaustive.			
Alcohols Methanol Ethanol Isopropyl Alcohol Hexylene Glycol	Refer to bulletin V10 for coefficients of expansion and specific tables. (Note: Isopropyl Alcohol is bulletin V13)		API Chapter 11.1, Table 54C
Acetone Methyl Ethyl Ketone Methyl Isobutyl Carbinol	Refer to bulletin V10 for coefficients of expansion and specific tables.		
Anhydrous Ammonia	617.7	-	Refer to bulletin V10 for specific tables.
Toluene Xylene	870 870	869-873 865-875	Refer to bulletin V12 for specific tables.
Isopropyl Alcohol and Water Mix (IPA-CMB) (88% and 12% mix only)	820.3	-	Refer to bulletin V13 for specific tables.

TABLE 2: API TABLE 54B, VOLUME CORRECTION TO 15°C										DENSITY AT 15°C = 730 kg/m ³
Temp.	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
-40.00	1.0671	1.0672	1.0673	1.0675	1.0676	1.0677	1.0678	1.0680	1.0681	1.0682
-39.00	1.0659	1.0660	1.0661	1.0663	1.0664	1.0665	1.0666	1.0668	1.0669	1.0670
-38.00	1.0647	1.0648	1.0649	1.0651	1.0652	1.0653	1.0654	1.0656	1.0657	1.0658
-37.00	1.0635	1.0636	1.0637	1.0639	1.0640	1.0641	1.0642	1.0644	1.0645	1.0646
-36.00	1.0623	1.0624	1.0625	1.0627	1.0628	1.0629	1.0630	1.0632	1.0633	1.0634
-35.00	1.0611	1.0612	1.0613	1.0615	1.0616	1.0617	1.0618	1.0620	1.0621	1.0622
-34.00	1.0599	1.0600	1.0601	1.0603	1.0604	1.0605	1.0606	1.0608	1.0609	1.0610
-33.00	1.0587	1.0588	1.0589	1.0591	1.0592	1.0593	1.0594	1.0596	1.0597	1.0598
-32.00	1.0575	1.0576	1.0577	1.0579	1.0580	1.0581	1.0582	1.0584	1.0585	1.0586
-31.00	1.0563	1.0564	1.0565	1.0567	1.0568	1.0569	1.0570	1.0572	1.0573	1.0574
-30.00	1.0551	1.0552	1.0553	1.0555	1.0556	1.0557	1.0558	1.0560	1.0561	1.0562
-29.00	1.0539	1.0540	1.0541	1.0543	1.0544	1.0545	1.0546	1.0548	1.0549	1.0550
-28.00	1.0527	1.0528	1.0529	1.0531	1.0532	1.0533	1.0534	1.0536	1.0537	1.0538
-27.00	1.0515	1.0516	1.0517	1.0519	1.0520	1.0521	1.0522	1.0524	1.0525	1.0526
-26.00	1.0503	1.0504	1.0505	1.0507	1.0508	1.0509	1.0510	1.0512	1.0513	1.0514
-25.00	1.0491	1.0492	1.0493	1.0495	1.0496	1.0497	1.0498	1.0500	1.0501	1.0502
-24.00	1.0479	1.0480	1.0481	1.0483	1.0484	1.0485	1.0486	1.0488	1.0489	1.0490
-23.00	1.0467	1.0468	1.0469	1.0471	1.0472	1.0473	1.0474	1.0476	1.0477	1.0478
-22.00	1.0455	1.0456	1.0457	1.0459	1.0460	1.0461	1.0462	1.0464	1.0465	1.0466
-21.00	1.0443	1.0444	1.0445	1.0447	1.0448	1.0449	1.0450	1.0452	1.0453	1.0454
-20.00	1.0431	1.0432	1.0433	1.0435	1.0436	1.0437	1.0438	1.0440	1.0441	1.0442
-19.00	1.0419	1.0420	1.0421	1.0423	1.0424	1.0425	1.0426	1.0428	1.0429	1.0430
-18.00	1.0407	1.0408	1.0409	1.0411	1.0412	1.0413	1.0414	1.0416	1.0417	1.0418
-17.00	1.0395	1.0396	1.0397	1.0399	1.0400	1.0401	1.0402	1.0403	1.0405	1.0406
-16.00	1.0383	1.0384	1.0385	1.0387	1.0388	1.0389	1.0390	1.0391	1.0393	1.0394
-15.00	1.0371	1.0372	1.0373	1.0375	1.0376	1.0377	1.0378	1.0379	1.0381	1.0382
-14.00	1.0359	1.0360	1.0361	1.0393	1.0364	1.0365	1.0366	1.0367	1.0369	1.0370
-13.00	1.0346	1.0347	1.0348	1.0350	1.0351	1.0352	1.0353	1.0355	1.0356	1.0358
-12.00	1.0334	1.0335	1.0336	1.0338	1.0339	1.0340	1.0341	1.0342	1.0344	1.0345
-11.00	1.0322	1.0323	1.0324	1.0326	1.0326	1.0328	1.0329	1.0330	1.0332	1.0333

TABLE 2: API TABLE 54B, VOLUME CORRECTION TO 15°C										DENSITY AT 15°C = 730 kg/m ³
Temp.	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
-10.00	1.0310	1.0311	1.0312	1.0314	1.0315	1.0316	1.0317	1.0318	1.0320	1.0321
-9.00	1.0297	1.0298	1.0300	1.0301	1.0302	1.0303	1.0304	1.0305	1.0306	1.0309
-8.00	1.0285	1.0286	1.0287	1.0289	1.0290	1.0291	1.0292	1.0293	1.0295	1.0296
-7.00	1.0273	1.0274	1.0275	1.0277	1.0278	1.0279	1.0280	1.0281	1.0283	1.0284
-6.00	1.0261	1.0262	1.0263	1.0265	1.0266	1.0267	1.0268	1.0269	1.0271	1.0272
-5.00	1.0248	1.0249	1.0250	1.0252	1.0253	1.0254	1.0255	1.0257	1.0258	1.0260
-4.00	1.0236	1.0237	1.0238	1.0240	1.0241	1.0242	1.0243	1.0244	1.0246	1.0247
-3.00	1.0224	1.0225	1.0226	1.0228	1.0229	1.0230	1.0231	1.0232	1.0234	1.0235
-2.00	1.0211	1.0212	1.0213	1.0215	1.0216	1.0217	1.0218	1.0220	1.0221	1.0223
-1.00	1.0199	1.0200	1.0201	1.0203	1.0204	1.0205	1.0206	1.0207	1.0209	1.0210
-0.00	1.0187	1.0188	1.0189	1.0191	1.0192	1.0193	1.0194	1.0195	1.0197	1.0198
+0.00	1.0187	1.0186	1.0184	1.0183	1.0181	1.0180	1.0179	1.0178	1.0176	1.0175
1.00	1.0174	1.0173	1.0172	1.0170	1.0169	1.0168	1.0167	1.0166	1.0164	1.0163
2.00	1.0162	1.0161	1.0160	1.0158	1.0157	1.0156	1.0155	1.0153	1.0152	1.0150
3.00	1.0149	1.0148	1.0147	1.0145	1.0144	1.0143	1.0142	1.0141	1.0139	1.0138
4.00	1.0137	1.0136	1.0135	1.0133	1.0132	1.0131	1.0130	1.0129	1.0127	1.0126
5.00	1.0125	1.0124	1.0122	1.0121	1.0119	1.0118	1.0117	1.0116	1.0114	1.0113
6.00	1.0112	1.0111	1.0110	1.0108	1.0107	1.0106	1.0105	1.0104	1.0102	1.0101
7.00	1.0100	1.0099	1.0098	1.0096	1.0095	1.0094	1.0093	1.0091	1.0090	1.0088
8.00	1.0087	1.0086	1.0085	1.0083	1.0082	1.0081	1.0080	1.0079	1.0077	1.0076
9.00	1.0075	1.0074	1.0073	1.0071	1.0070	1.0069	1.0069	1.0066	1.0065	1.0063
10.00	1.0062	1.0061	1.0060	1.0058	1.0057	1.0056	1.0055	1.0054	1.0052	1.0051
11.00	1.0050	1.0049	1.0048	1.0046	1.0045	1.0044	1.0043	1.0041	1.0040	1.0038
12.00	1.0037	1.0036	1.0035	1.0033	1.0032	1.0031	1.0030	1.0029	1.0027	1.0026
13.00	1.0025	1.0024	1.0023	1.0021	1.0020	1.0019	1.0018	1.0017	1.0015	1.0014
14.00	1.0013	1.0012	1.0010	1.0009	1.0007	1.0006	1.0005	1.0004	1.0002	1.0001
15.00	1.0000	0.9999	0.9998	0.9996	0.9995	0.9994	0.9993	0.9991	0.9990	0.9988
16.00	0.9987	0.9986	0.9985	0.9983	0.9982	0.9981	0.9980	0.9979	0.9977	0.9976
17.00	0.9975	0.9974	0.9973	0.9971	0.9970	0.9969	0.9968	0.9966	0.9965	0.9963
18.00	0.9962	0.9961	0.9960	0.9958	0.9957	0.9956	0.9955	0.9954	0.9952	0.9951

TABLE 3: API TABLE 54B, VOLUME CORRECTION TO 15°C		DENSITY AT 15°C = 840 kg/m ³								
Temp.	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
-40.00	1.0458									
-39.00	1.0450	1.0451	1.0452	1.0452	1.0453	1.0454	1.0455	1.0456	1.0456	1.0457
-38.00	1.0441	1.0442	1.0443	1.0444	1.0445	1.0446	1.0446	1.0447	1.0448	1.0449
-37.00	1.0433	1.0434	1.0435	1.0435	1.0436	1.0437	1.0438	1.0439	1.0439	1.0440
-36.00	1.0425	1.0426	1.0427	1.0427	1.0428	1.0429	1.0430	1.0431	1.0431	1.0432
-35.00	1.0417	1.0418	1.0419	1.0419	1.0420	1.0421	1.0422	1.0423	1.0423	1.0424
-34.00	1.0408	1.0409	1.0410	1.0411	1.0412	1.0413	1.0413	1.0414	1.0415	1.0416
-33.00	1.0400	1.0401	1.0402	1.0402	1.0403	1.0404	1.0405	1.0406	1.0406	1.0407
-32.00	1.0392	1.0393	1.0394	1.0394	1.0395	1.0396	1.0397	1.0398	1.0398	1.0399
-31.00	1.0384	1.0385	1.0386	1.0386	1.0387	1.0388	1.0389	1.0390	1.0390	1.0391
-30.00	1.0375	1.0376	1.0377	1.0378	1.0379	1.0380	1.0380	1.0381	1.0382	1.0383
-29.00	1.0367	1.0368	1.0369	1.0369	1.0370	1.0371	1.0372	1.0373	1.0373	1.0374
-28.00	1.0359	1.0360	1.0361	1.0361	1.0362	1.0363	1.0364	1.0365	1.0365	1.0366
-27.00	1.0351	1.0352	1.0353	1.0353	1.0354	1.0355	1.0356	1.0357	1.0357	1.0358
-26.00	1.0342	1.0343	1.0344	1.0345	1.0346	1.0347	1.0347	1.0348	1.0349	1.0350
-25.00	1.0334	1.0335	1.0336	1.0336	1.0337	1.0338	1.0339	1.0340	1.0340	1.0341
-24.00	1.0326	1.0327	1.0328	1.0328	1.0329	1.0330	1.0331	1.0332	1.0332	1.0333
-23.00	1.0317	1.0318	1.0319	1.0320	1.0321	1.0322	1.0322	1.0323	1.0324	1.0325
-22.00	1.0309	1.0310	1.0311	1.0311	1.0312	1.0313	1.0314	1.0315	1.0315	1.0316
-21.00	1.0301	1.0302	1.0303	1.0303	1.0304	1.0305	1.0306	1.0307	1.0307	1.0308
-20.00	1.0293	1.0294	1.0295	1.0295	1.0296	1.0297	1.0298	1.0299	1.0299	1.0300
-19.00	1.0284	1.0285	1.0286	1.0287	1.0288	1.0289	1.0289	1.0290	1.0291	1.0292
-18.00	1.0276	1.0277	1.0278	1.0278	1.0279	1.0280	1.0281	1.0282	1.0282	1.0283
-17.00	1.0268	1.0269	1.0270	1.0270	1.0271	1.0272	1.0273	1.0274	1.0274	1.0275
-16.00	1.0259	1.0260	1.0261	1.0262	1.0263	1.0264	1.0265	1.0266	1.0266	1.0267
-15.00	1.0251	1.0252	1.0253	1.0253	1.0254	1.0255	1.0256	1.0257	1.0257	1.0258
-14.00	1.0243	1.0244	1.0245	1.0245	1.0246	1.0247	1.0248	1.0249	1.0249	1.0250
-13.00	1.0235	1.0236	1.0237	1.0237	1.0238	1.0239	1.0240	1.0241	1.0241	1.0242
-12.00	1.0226	1.0227	1.0228	1.0228	1.0229	1.0230	1.0231	1.0232	1.0233	1.0234
-11.00	1.0218	1.0219	1.0220	1.0220	1.0221	1.0222	1.0223	1.0224	1.0224	1.0225

TABLE 3: API TABLE 54B, VOLUME CORRECTION TO 15°C		DENSITY AT 15°C = 840 kg/m ³								
Temp.	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90
-10.00	1.0210	1.0211	1.0212	1.0212	1.0213	1.0214	1.0215	1.0216	1.0216	1.0217
-9.00	1.0201	1.0202	1.0203	1.0203	1.0204	1.0205	1.0206	1.0207	1.0208	1.0209
-8.00	1.0193	1.0194	1.0195	1.0195	1.0196	1.0197	1.0198	1.0199	1.0199	1.0200
-7.00	1.0185	1.0186	1.0187	1.0187	1.0188	1.0189	1.0190	1.0191	1.0191	1.0192
-6.00	1.0176	1.0177	1.0178	1.0178	1.0179	1.0180	1.0181	1.0182	1.0183	1.0184
-5.00	1.0168	1.0169	1.0170	1.0170	1.0171	1.0172	1.0173	1.0174	1.0174	1.0175
-4.00	1.0160	1.0161	1.0162	1.0162	1.0163	1.0164	1.0165	1.0166	1.0166	1.0167
-3.00	1.0151	1.0152	1.0153	1.0153	1.0154	1.0155	1.0156	1.0157	1.0158	1.0159
-2.00	1.0143	1.0144	1.0145	1.0145	1.0146	1.0147	1.0148	1.0149	1.0149	1.0150
-1.00	1.0134	1.0135	1.0136	1.0137	1.0138	1.0139	1.0140	1.0141	1.0141	1.0142
-0.00	1.0126	1.0127	1.0128	1.0128	1.0129	1.0130	1.0131	1.0132	1.0132	1.0133
+0.00	1.0126	1.0125	1.0124	1.0124	1.0123	1.0122	1.0121	1.0120	1.0120	1.0119
1.00	1.0118	1.0117	1.0116	1.0116	1.0115	1.0114	1.0113	1.0112	1.0111	1.0110
2.00	1.0109	1.0108	1.0107	1.0107	1.0106	1.0105	1.0104	1.0103	1.0103	1.0102
3.00	1.0101	1.0100	1.0099	1.0099	1.0098	1.0097	1.0096	1.0095	1.0095	1.0094
4.00	1.0093	1.0092	1.0091	1.0090	1.0089	1.0088	1.0087	1.0086	1.0086	1.0085
5.00	1.0084	1.0083	1.0082	1.0082	1.0081	1.0080	1.0079	1.0078	1.0078	1.0077
6.00	1.0076	1.0075	1.0074	1.0074	1.0073	1.0072	1.0071	1.0070	1.0069	1.0068
7.00	1.0067	1.0066	1.0065	1.0065	1.0064	1.0063	1.0062	1.0061	1.0061	1.0060
8.00	1.0059	1.0058	1.0057	1.0057	1.0056	1.0055	1.0054	1.0053	1.0053	1.0052
9.00	1.0051	1.0050	1.0049	1.0048	1.0047	1.0046	1.0045	1.0044	1.0044	1.0043
10.00	1.0042	1.0041	1.0040	1.0040	1.0039	1.0038	1.0037	1.0036	1.0036	1.0035
11.00	1.0034	1.0033	1.0032	1.0032	1.0031	1.0030	1.0029	1.0028	1.0027	1.0026
12.00	1.0025	1.0024	1.0023	1.0023	1.0022	1.0021	1.0020	1.0019	1.0019	1.0018
13.00	1.0017	1.0016	1.0015	1.0015	1.0014	1.0013	1.0012	1.0011	1.0010	1.0009
14.00	1.0008	1.0007	1.0006	1.0006	1.0005	1.0004	1.0003	1.0002	1.0002	1.0001
15.00	1.0000	0.9999	0.9998	0.9998	0.9997	0.9996	0.9995	0.9994	0.9994	0.9993
16.00	0.9992	0.9991	0.9990	0.9989	0.9988	0.9987	0.9986	0.9985	0.9985	0.9984
17.00	0.9983	0.9982	0.9981	0.9981	0.9980	0.9979	0.9978	0.9977	0.9977	0.9976
18.00	0.9975	0.9974	0.9973	0.9972	0.9971	0.9970	0.9969	0.9968	0.9968	0.9967
19.00	0.9966	0.9965	0.9964	0.9964	0.9963	0.9962	0.9961	0.9960	0.9960	0.9959

