

**Factors For Determining MMBtu and MCF Shrinkage From Liquids Volumes (Gallons)
Using GPA Standard 2145-09 (2009)**

**Factor to Convert Gallons of Liquid to MMBtu Shrinkage Resulting From Extraction of Liquids
(Multiply Gallons of Each Liquid by Appropriate Factor to Calculate MMBtu Shrinkage Volume)**

Product		MMBtu/Gal (A)	Factor
Carbon Dioxide	CO2	0	
Nitrogen	N2	0	
Methane	C1	59,729	0.059729
Ethane	C2	66,340	0.066340
Propane	C3	91,563	0.091563
I-Butane	IC4	99,630	0.099630
N-Butane	NC4	103,740	0.103740
Iso-Pentane	IC5	109,680	0.109680
Norm. Pentane	NC5	110,870	0.110870
Hexanes Plus (*)	C6+	115,950	0.115950

(A) Gross Heating Value - Btu/Gal, fuel as ideal gas (GPA 2145-03)

Note: MMBtu factor is same regardless of pressure base.

Shrinkage Factors to Determine MCF Shrinkage Due to Removal of Liquids

Product		CF / GAL @ 14.696 (B)	CF / GAL @ 14.65	CF / GAL @ 14.73	CF / GAL @ 15.025
Carbon Dioxide	CO2	58.746	58.930	58.610	57.460
Nitrogen	N2	91.128	91.414	90.918	89.133
Methane	C1	59.138	59.324	59.001	57.843
Ethane	C2	37.488	37.606	37.401	36.667
Propane	C3	36.391	36.505	36.307	35.594
I-Butane	IC4	30.637	30.733	30.566	29.966
N-Butane	NC4	31.801	31.901	31.728	31.105
Iso-Pentane	IC5	27.414	27.500	27.351	26.814
Norm. Pentane	NC5	27.658	27.745	27.594	27.052
Hexanes Plus (*)	C6+	24.380	24.457	24.324	23.846

(B) - Volume - cu. ft. ideal gas / gal liquid (GPA 2145-03 @ 14.696)

Multiply gallons of liquid product by factor below to determine MCF shrinkage:

Product		MCF @ 14.696	MCF @ 14.65	MCF @ 14.73	MCF @ 15.025
Carbon Dioxide	CO2	0.058746	0.058930	0.058610	0.057460
Nitrogen	N2	0.091128	0.091414	0.090918	0.089133
Methane	C1	0.059138	0.059324	0.059001	0.057843
Ethane	C2	0.037488	0.037606	0.037401	0.036667
Propane	C3	0.036391	0.036505	0.036307	0.035594
I-Butane	IC4	0.030637	0.030733	0.030566	0.029966
N-Butane	NC4	0.031801	0.031901	0.031728	0.031105
Iso-Pentane	IC5	0.027414	0.027500	0.027351	0.026814
Norm. Pentane	NC5	0.027658	0.027745	0.027594	0.027052
Hexanes Plus (*)	C6+	0.024380	0.024457	0.024324	0.023846

(*) Should be determined by chromatograph analysis.

Example of calculations: MCF calculated at 14.73 psia

Product		Gallons	MCF Factor	MCF Shrink	MMBTU Factor	MMBTU Shrink
Ethane	C2	3,082,682	0.037401	115,295	.066340	204,505
Propane	C3	4,662,471	0.036307	169,280	.091563	426,910
I-Butane	IC4	1,596,868	0.030566	48,810	.099630	159,096
N-Butane	NC4	1,750,713	0.031728	55,547	.103740	181,619
Iso-Pentane	IC5	810,327	0.027351	22,163	.109680	88,877
Norm. Pentane	NC5	602,408	0.027594	16,623	.110870	66,789