

Fuel Comparison Chart

| | Acetylene | MAPP | MAP-Pro | Propane | Butane | Methane |
|---|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Flame Temperature¹ (In Oxygen) - °F | 5560 ² | 5390 ³ | 5360 ² | 5110 ² | 5150 ² | 5090 ² |
| Flame Temperature⁴ (In Air) - °F | 4690 ² | 3750 ⁴ | 3730 ² | 3600 ² | 3580 ² | 3550 ² |
| Flame Speed⁴ (C_v) (In Oxygen) - Ft./Sec | 24.9 ² | 15.4 ² | 12.8 ² | 10.9 ² | 10.9 ² | 12.8 ² |
| Flame Speed⁴ (C_v) (In Air) - Ft./Sec | 4.8 ² | 3.5 ² | 3.3 ^{5,2} | 1.7 ² | 1.2 ² | 1.3 ² |
| Primary Flame Heat Value⁶ (C_h) - BTU/cu.ft. | 507 ² | 571 ² | 438 ² | 255 ² | 315 ² | 11 ² |
| Secondary Flame Heat Value⁸ (C _h) - BTU/cu.ft. | 963 ² | 1889 ² | 1962 ² | 2243 ² | 3114 ² | 989 ² |
| Total Heat Value⁸ (C _h) - BTU/cu.ft. | 1470 ² | 2460 ² | 2400 ² | 2498 ² | 3374 ² | 1061 ² |
| Total Heat Value of Gas⁷ (after vaporization) (C_h) BTU/lb | 21,500 ² | 21,000 ² | 21,100 ² | 21,800 ² | 21,500 ⁸ | 23,900 ² |
| Volume to weight ratio⁹ Ft ³ /lb @60°F | 14.6 ² | 8.9 ² | 8.9 ² | 8.7 ² | 6.4 ⁸ | 23.6 ² |
| Combustion Intensity Primary flame² In Air (C _h x C _v) – Btu/ft ² sec | 2,433 ² | 1998 ² | 1445 ² | 433 ² | 378 ² | 14 ² |
| Combustion Intensity Secondary flame² In Air (C _h x C _v)– Btu/ft ² sec | 4622 ² | 6112 ² | 6494 ² | 3813 ² | 3736 ² | 1285 ² |
| Combustion Intensity In Air² (Total heat) - Btu/ft² sec | 7055 ² | 8110 ² | 7939 ² | 4246 ² | 4114 ² | 1299 ² |

Air Fuel – atmospheric air mixed with fuel in torch assembly prior to combustion

Oxy Fuel – pure oxygen supplied from cylinders mixed with fuel in the torch assembly prior to combustion

Flame Speed – velocity of fuel mixture at the reaction zone; speed is dependent upon flame temperature

Primary Flame – interior cone or shell of the combustion zone with a characteristic blue/white color

Secondary Flame – exterior cone of combustion zone where gaseous products mix with surrounding air identifiable by its darker blue color

Heat Value – hotter burning fuels generally have higher heat content (BTU's) in the primary flame

Combustion Intensity – product of the heat value x the flame speed of the gas; directly dependent on flame temperature

¹ Air Liquide – Gas Encyclopedia, Gas Data Sheets

² Worthington Cylinders – Fuel Flame Properties

³ TWI-UK- Job Knowledge for welders 49, http://www.twi.co.uk/j32k/protected/band_3/jk49.html

⁴ The Fabricator – Nov. 1999 - Selecting the best gas, Jeffrey P. Johnson

⁵ Eclipse – Combustion Engineering Guide, 1986

⁶ Bernzomatic – Product Knowledge Guide

⁷ AWS - Welding Handbook –1978, Volume Two, Table 13.1