

# HP 152a

## Aerosol Propellant

### Physical Properties of HP 152a and Isobutane Mixtures

## Technical Information

For the full range of HP 152a/I compositions, this bulletin presents the saturated vapor pressures and liquid densities from 70°F to 130°F (21.1°C to 54.4°C) and flammability data for the vapor mixtures in air.

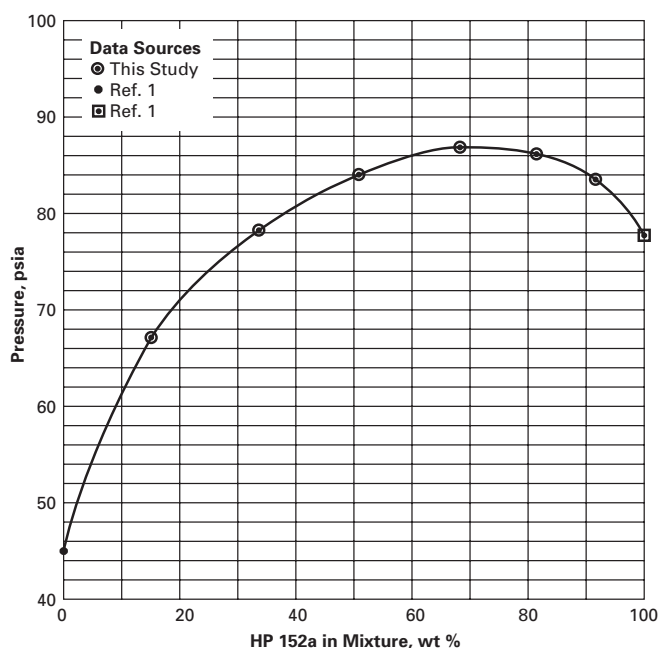
The saturated vapor pressure data for HP 152a/I are shown in Figures 1–4 and Table 1. The graphs are based on literature data for the pure components (Ref. 1) and experimental data given in Table 1. Figures 1 and 2, which show the saturated vapor pressures for the HP 152a/I blends at 70°F and 130°F, reveal that HP 152a and isobutane form an azeotropic mixture containing 70 weight percent HP 152a at 70°F and 77 weight percent HP 152a at 130°F.

Figure 5 and Table 2 show the liquid densities that were calculated from pure component data (Ref. 1). The flammability of HP 152a/I vapor mixtures in air is shown in Figure 6 and Table 3. These data are based on literature values for the pure components (Ref. 2 and 3) and experimental values for a 50/50 mole percent (53.25/46.75 wt %) HP 152a/I mixture.

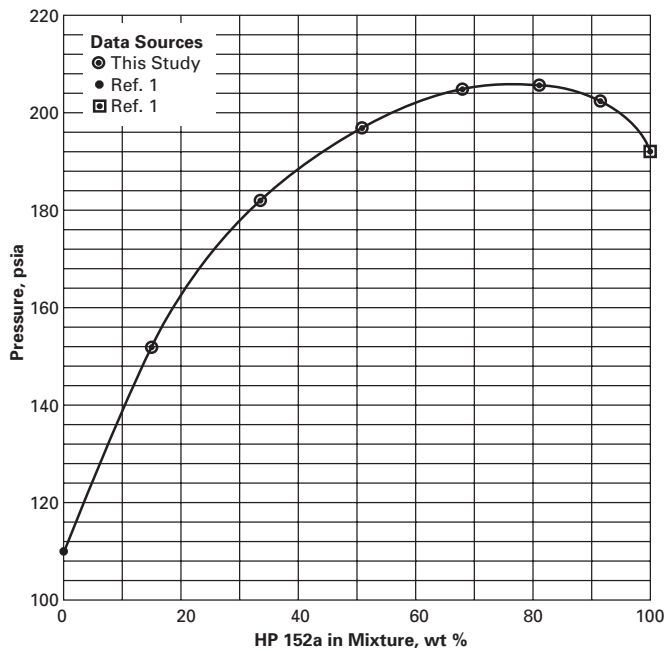
### References

1. ASHRAE, *Handbook of Fundamentals*, 1972.
2. Bulletin 503, Bureau of Mines, "Limits of Flammability of Gases and Vapors".
3. *Handbook of Aerosol Technology*, P.A. Sanders, Van Nostrand Reinhold Company, 1979.

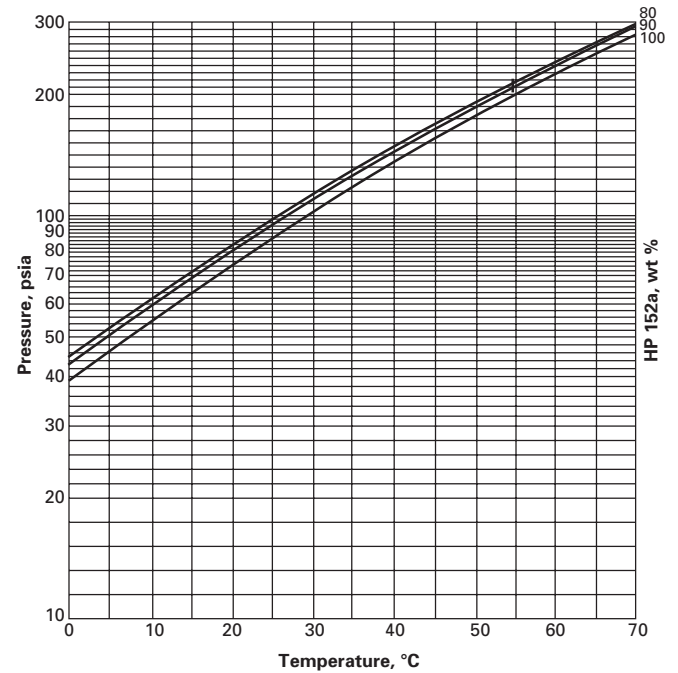
**Figure 1.** Saturated Vapor Pressure of HP 152a/I at 70°F—Experimental Data



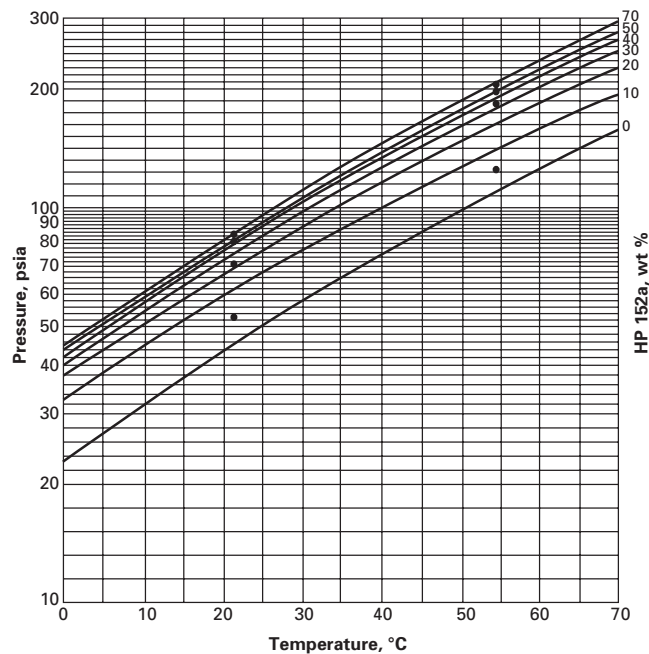
**Figure 2.** Saturated Vapor Pressure of HP 152/I at 130°F—Experimental Data



**Figure 4.** Saturated Vapor Pressures of HP 152/I Mixtures



**Figure 3.** Saturated Vapor Pressures of HP 152/I Mixtures



**Note:** Data based on pure component data plus shown experimental points (—)

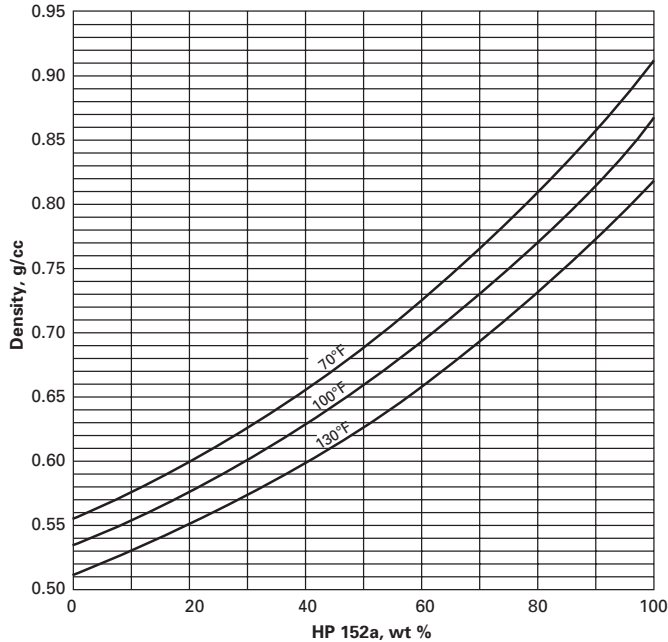
**Note:** A 70 wt % HP 152 line falls at or just below the 80 wt % line. A 70 wt % HP 152 mixture has a pressure of 44.6 psia at 0°C and 288.7 psia at 70°C. The azeotropic mixture contains 70 wt % HP 152 at 70°F and 77 wt % HP 152 at 130°F.

**Table 1.** Saturated Vapor Pressures of HP 152/I Mixtures—Experimental Data

HP 152 in Propellant Mixture, wt %	Pressure, psia	
	77°F (25°C)	130°F (54.4°C)
0*	45.1	109.7
15.0	66.7	152.2
33.0	77.7	181.4
50.0	83.1	195.1
67.0	85.9	203.7
80.0	85.1	204.5
90.0	83.0	201.3
100.0*	77.2	191.5

\*Ref. 1

**Figure 5.** Liquid Densities of HP 152/I Mixtures



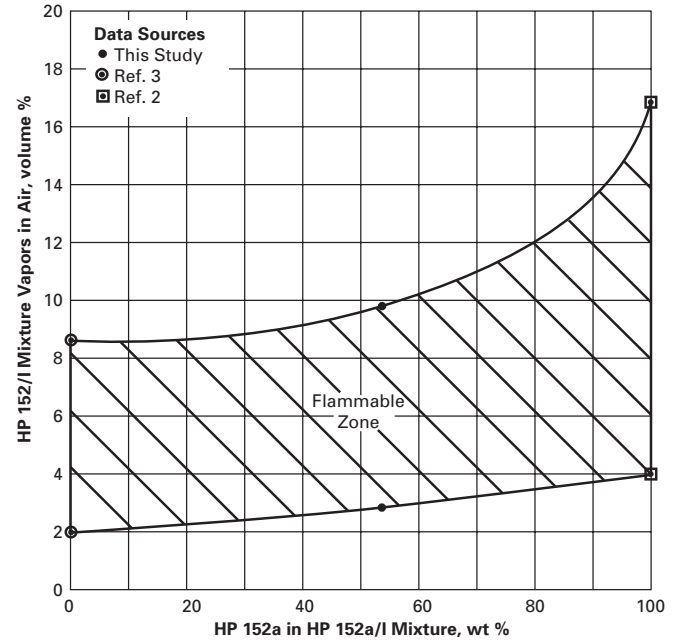
Note: Data calculated from pure component densities.

**Table 2.** Calculated Liquid Densities of HP152/I Mixtures

HP 152 in Mixture, wt %	Densities, g/cc at		
	70°F	100°F	130°F
0*	0.5559	0.5347	0.5117
20	0.6027	0.5790	0.5529
40	0.6582	0.6312	0.6014
60	0.7248	0.6938	0.6592
80	0.8065	0.7702	0.7293
100*	0.9090	0.8655	0.8161

\*Ref. 1

**Figure 6.** Flammability Limits of HP 152/I Mixtures



**Table 3.** Flammability Limits of HP 152/I Vapor Mixtures in Air

Concentration of HP 152 in HP 152/I Mixture		Flammability Limits in Air, vol %	
Weight, %	Mole, %	Lower	Upper
0.0 <sup>a</sup>	0.0	1.8	8.4
53.25	50.0	2.7 ± 0.1	11.5 ± 0.1
100.0 <sup>b</sup>	100.0	3.9	16.9

<sup>a</sup>Ref. 2

<sup>b</sup>Ref. 3

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