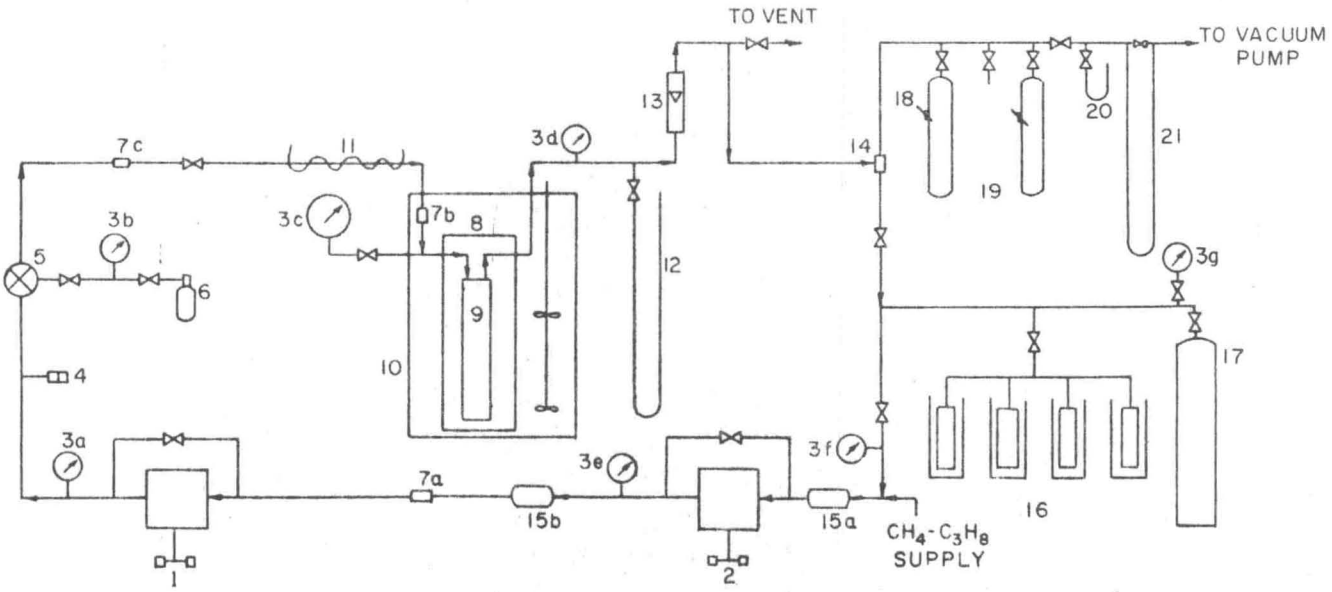

1 - AMINCO AIR-DRIVEN DIAPHRAGM GAS COMPRESSOR
2 - ELECTRICALLY-DRIVEN DIAPHRAGM GAS COMPRESSOR
3 - PRESSURE GAUGE
4 - RUPTURE DISK
5 - MITY-MITE PRESSURE REGULATOR
6 - NITROGEN SUPPLY CYLINDER
7 - MICRON FILTER
8 - STAGNANT AIR BATH
9 - CALORIMETER
10 - CONSTANT TEMPERATURE GLYCOL BATH
11 - PREHEATER
12 - MANOMETER
13 - ROTAMETER
14 - THREE-WAY SOLENOID VALVE
15 - SURGE TANK
16 - COLLECTION BOMBS IMMERSED IN LIQUID NITROGEN
17 - 12-GALLON STORAGE CYLINDER
18 - THERMOMETER
19 - GLASS COLLECTION BOMBS
20 - McLEOD GAUGE
21 - ABSOLUTE MANOMETER

Fig. 1. Schematic flow diagram of isothermal throttling calorimeter.

The time required to perform a single run was on the order of 8 to 12 hr. This length of time was required to reach steady state operation. The high total heat capacity of the calorimeter relative to that of the fluid led to a sluggish response of changes in power input.

EXPERIMENTAL RESULTS

Compositions of the two mixtures studied are given in Table 1. Experimental results are given in Table 2 for methane and the two mixtures. The uncorrected Δh values are the raw data, that is, the enthalpy differences between the outlet and inlet conditions of the calorimeter. These Δh values were corrected from the calorimeter outlet pressure (15 to 50 lb./sq. in. abs.) to zero outlet pressure and for small differences between the inlet and outlet temperatures of the calorimeter (~0.2°F.). The pressure corrections were made using a truncated virial equation of state and experimental second virial coefficients for the gases (*5, 8*). Ideal gas state heat capacities (*1*) and a generalized correlation for the effect of pressure on heat capacity (*9*) were used in making temperature correc-

TABLE 1. COMPOSITIONS OF METHANE-PROPANE MIXTURES

Component	Mole Percent Compositions 94%CH_4	86%CH_4
methane	93.90	86.23*
ethane	0.27	0.28
propane	5.09	12.57*
carbon dioxide	0.20	0.41
oxygen	0.01	0.01
nitrogen	0.53	0.49
isobutane	Trace	Trace
	100.00	100.00

* Adjusted from original values of 86.47 ± 0.5 and 12.61 ± 0.4 to give a total of 100.00.

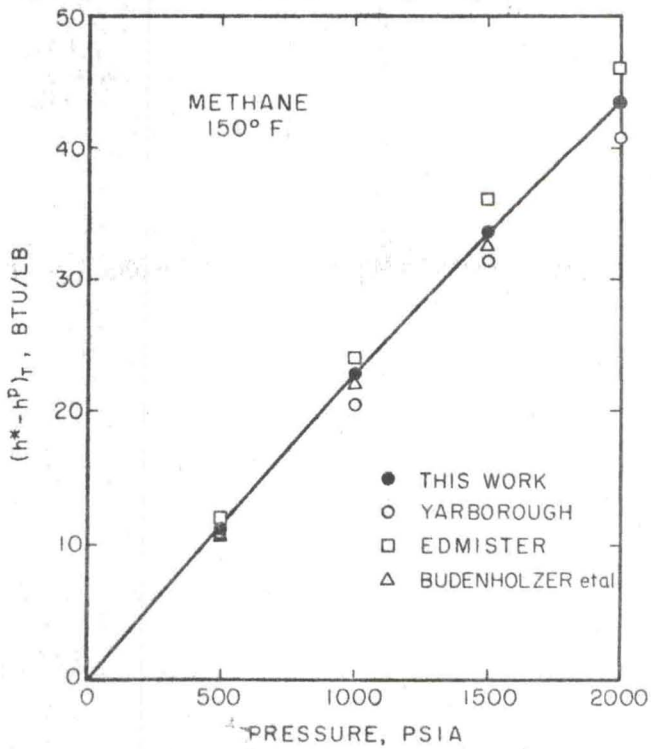

Fig. 2. Enthalpy of methane at 150°F.