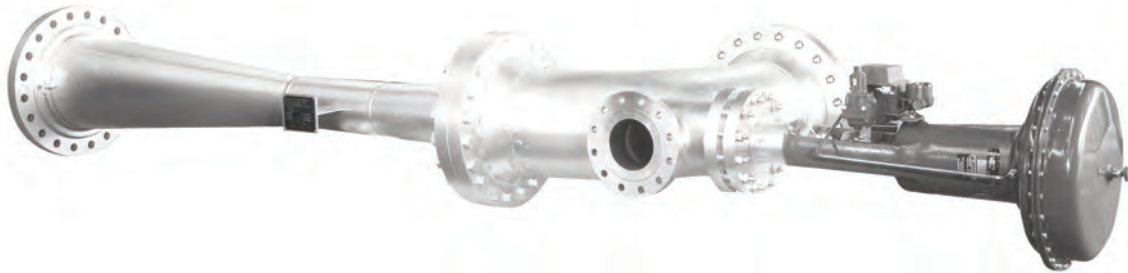


## Performance Data on Jet Compressors



Description	Page
Performance	2
Table 1 - Thermal Data for Gases	2
Symbols Used In Thermodynamic Formulas	2
Chart A - Sizing Chart for Thermocompressors (Types 420, 425, 426, 427, 439) Discharge Flow Range: $10^2$ - $10^6$	3
Chart B - Capacity Ratios of Steam Jet Thermocompressors 100 psig Operating Live Steam Discharge Pressure Range: 0 - 70 psig	3
Chart C - Capacity Ratios of Steam Jet Thermocompressors 125 psig Operating Live Steam Discharge Pressure Range: -10 - 100 psig	3
Chart D - Capacity Ratios of Steam Jet Thermocompressors 150 psig Operating Live Steam Discharge Pressure Range: -10 - 110 psig	3
Chart E - Capacity Ratios of Steam Jet Thermocompressors 200 psig Operating Live Steam Discharge Pressure Range: 60 - 150 psig	4
Chart F - Capacity Ratios of Steam Jet Thermocompressors 200 psig Operating Live Steam Discharge Pressure Range: -10 - 110 psig	4
Chart G - Capacity Ratios of Steam Jet Thermocompressors 300 psig Operating Live Steam Discharge Pressure Range: 100 - 220 psig	4
Chart H - Capacity Ratios of Steam Jet Thermocompressors 300 psig Operating Live Steam Discharge Pressure Range: -10 - 130 psig	4
Chart I - Capacity Ratios of Steam Jet Thermocompressors 400 psig Operating Live Steam Discharge Pressure Range: -10 - 130 psig	5
Chart J - Capacity Ratios of Steam Jet Thermocompressors 400 psig Operating Live Steam Discharge Pressure Range: 100 - 240 psig	5
Chart K - Capacity Ratios of Steam Jet Thermocompressors 400 psig Operating Live Steam Discharge Pressure Range: 200 - 300 psig	5

Description	Page
Chart L - Capacity Ratios of Steam Jet Thermocompressors 600 psig and 600°F Discharge Pressure Range: 0 - 120 psig	5
Chart M - Capacity Ratios of Steam Jet Compressors 600 psig and 600°F Discharge Pressure Range: 90 - 220 psig	6
Chart N - Capacity Ratios of Steam Jet Thermocompressors 600 psig and 600°F Discharge Pressure Range: 130 - 260 psig	6
Chart O - Capacity Ratios of Steam Jet Thermocompressors 600 psig and 600°F Discharge Pressure Range: 200 - 330 psig	6
Chart P - Capacity Ratios of Steam Jet Thermocompressors 600 psig and 600°F Discharge Pressure Range: 300 - 400 psig	6
Chart Q - Propane-Air Back Pressure Curves Heating Value Discharge Pressure Range: 0 - 9 psig	7
Chart R - Propane-Air Capacity Curves Heating Value For 2" Type 420 Gas Jet Compressors Discharge Capacity Range: 0 - 18 Cubic Ft. x $10^3$ Per Hour	7
Chart S - Butane-Air Back Pressure Curves Heating Value Discharge Pressure Range: 0 - 9 psig	7
Chart T - Butane-Air Capacity Curves Heating Value For 2" Type 420 Gas Jet Compressors Discharge Capacity Range: 0 - 18 Cubic Ft. x $10^3$ Per Hour	7
Chart U - Natural Gas-Air Back Pressure Curves Heating Value Discharge Pressure Range: 1 - 19 psig	8
Chart V - Natural Gas-Air Capacity Curves Heating Value For 2" Type 420 Gas Jet Compressors Discharge Capacity Range: 0 - 45 Cubic Ft. x $10^3$ Per Hour	8
Chart W - Air-Air Back Pressure Curves For Type 420 Air Jet Compressors Back Pressure Range: 0 - 40 psig	8
Chart X - Air-Air Capacity Curves For 2" Type 420 Air Jet Compressors Discharge Capacity Range: 0 - 45 Cubic Ft. x $10^3$ Per Hour	8

**PERFORMANCE**

To help you evaluate jet compressors in terms of your particular requirement the following performance criteria should be considered.

Jet compressors can be divided into two categories based upon the type of performance.

The first category is termed “noncritical” in performance. If the absolute pressure at the compressor discharge is less than 1.8 times the absolute pressure at the suction (for instance, suction pressure 15 psia - discharge pressure 27 psia), the performance is noncritical.

When performance is noncritical, a constant pressure can be maintained at the suction of a compressor, at varying capacities, by controlling motive flow.

The second category is termed “critical” in performance. If the compression ratio (ratio of absolute discharge pressure to absolute suction pressure) is over 1.8 to 1 (for instance, 20 psia is 36 psia), the performance is critical.

When performance is critical, control cannot be exerted by means of the motive fluid. In order to control the suction pressure of such a unit at varying process loads, it is necessary to maintain a constant load on the compressor by addition of a secondary suction fluid, or to vary the suction pressure at the compressor by introducing an artificial pressure drop in the suction line.

Most jet compressors are operated at low compression ratios and are noncritical in performance. Should there be any question about control or performance, please check with S&K Engineers.

**SIZING CHARTS**

To find out whether or not a jet compressor will provide desired performance and the size required to meet requirements, refer to the charts on pages 3 through 6 for thermocompressors and to the charts on pages 7 and 8 for other gases.

**TABLE 1. THERMAL DATA FOR GASES**  
(for use in ordinary calculations)

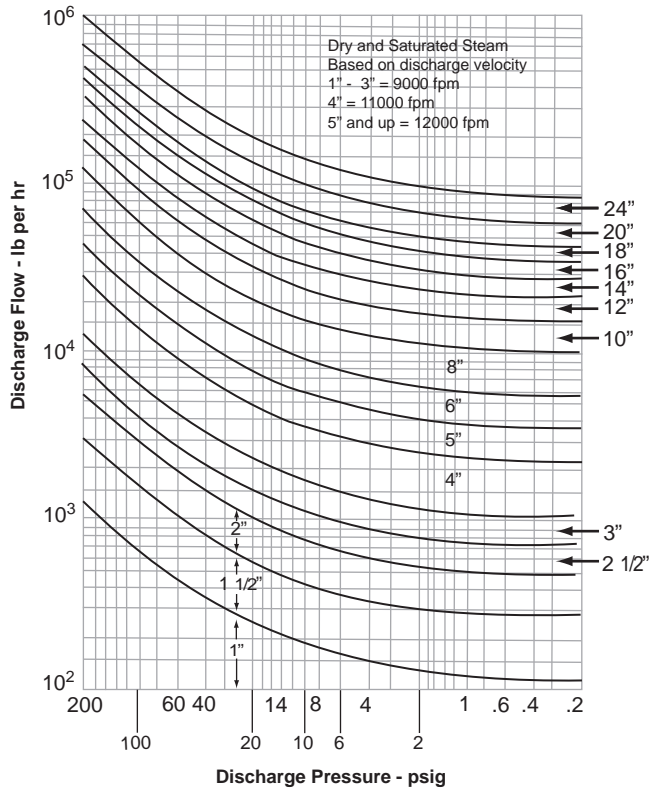
Gas	Formula	Molecular Weight (Lb/Mol.)	Specific Heat at Atmospheric Pressure & Temp. of 200°C	Ratio of Specific Heats at 0°C & Low Pressure $\gamma = \frac{C_p}{C_v}$
Helium	He	4.002	1.25	1.66
Argon	Ar	39.944	0.12	1.66
Hydrogen	H <sub>2</sub>	2.016	3.43	1.409
Nitrogen	N <sub>2</sub>	28.016	0.25	1.400
Oxygen	O <sub>2</sub>	32	0.22	1.399
Air	-	28.967	0.24	1.402
Carbon Monoxide	CO	28.00	0.25	1.400
Nitric Oxide	NO	30.008	0.20	1.385
Hydrogen Chloride	HCl	36.465	0.19	1.40
Hydrogen Sulfide	H <sub>2</sub> S	34.002	0.25	1.3
Carbon Dioxide	CO <sub>2</sub>	44.00	0.20	1.301
Nitrous Oxide	N <sub>2</sub> O	44.016	0.21	1.270
Sulfur Dioxide	SO <sub>2</sub>	64.06	0.15	1.272
Water Vapor	H <sub>2</sub> O	18.016	0.47	1.3
Ammonia	NH <sub>3</sub>	17.032	0.52	1.313
Acetylene	C <sub>2</sub> H <sub>2</sub>	26.016	0.38	1.255
Methane	CH <sub>4</sub>	16.031	0.56	1.319
Natural Gas (sp. gr. 0.62)	-	18.0	0.56	1.3
Methyl Chloride	CH <sub>3</sub> Cl	50.48	0.24	1.29
Ethylene	C <sub>2</sub> H <sub>4</sub>	28.031	0.40	1.249
Ethane	C <sub>2</sub> H <sub>6</sub>	30.047	0.39	1.20
Ethyl Chloride	C <sub>2</sub> H <sub>5</sub> Cl	64.50	0.28	1.16
Propane	C <sub>3</sub> H <sub>8</sub>	44.094	0.5	1.128
Butane-n	C <sub>4</sub> H <sub>10</sub>	58.12	0.5	1.088

**SYMBOLS USED BY S&K IN THERMODYNAMIC FORMULAS**

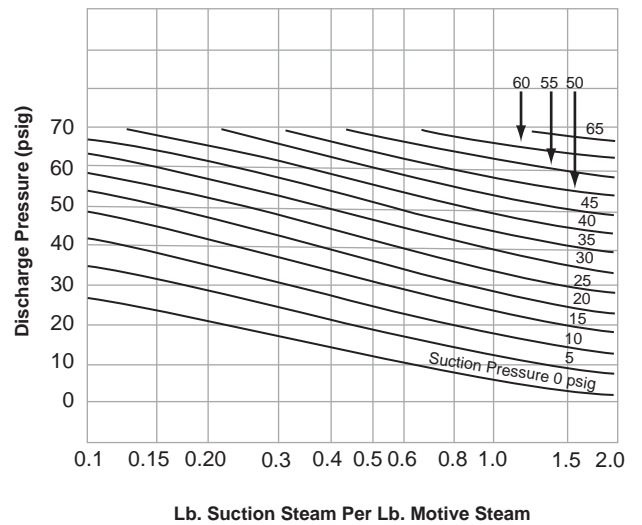
The symbols below are common to this and similar type problems. Check gas tables for thermodynamic properties.

- |                 |   |                                    |   |
|-----------------|---|------------------------------------|---|
| M <sub>1</sub>  | = Molecular weight of primary gas                     | C <sub>ps</sub>                    | = Specific heat of secondary gas at a constant pressure                                 |
| M <sub>s</sub>  | = Molecular weight of secondary gas                   | C <sub>p2</sub>                    | = Specific heat of mixed gas at a constant pressure                                     |
| M <sub>2</sub>  | = Molecular weight of discharged gas                  | $\gamma_1 = \frac{C_{p1}}{C_{v1}}$ | = Specific heat ratio of primary gas  |
| t <sub>1</sub>  | = Temperature of primary gas in degrees F             | $\gamma_2 = \frac{C_{p2}}{C_{v2}}$ | = Specific heat ratio of mixed gas  |
| t <sub>s</sub>  | = Temperature of secondary gas in degrees F           | Pr <sub>1</sub>                    | = Pressure ratio of secondary to primary gas pressure, P <sub>s</sub> /P <sub>1</sub>   |
| t <sub>2</sub>  | = Temperature of discharge gas in degrees F           | Pr <sub>2</sub>                    | = Pressure ratio of secondary to discharge gas pressure, P <sub>s</sub> /P <sub>2</sub> |
| P <sub>1</sub>  | = Pressure of primary gas in psia                     | R <sub>w</sub>                     | = Weight ratio of secondary gas to primary gas  |
| P <sub>s</sub>  | = Pressure of secondary gas in psia                   |                                    |   |
| P <sub>2</sub>  | = Pressure of discharge gas in psia                   |                                    |   |
| C <sub>p1</sub> | = Specific heat of primary gas at a constant pressure |                                    |   |

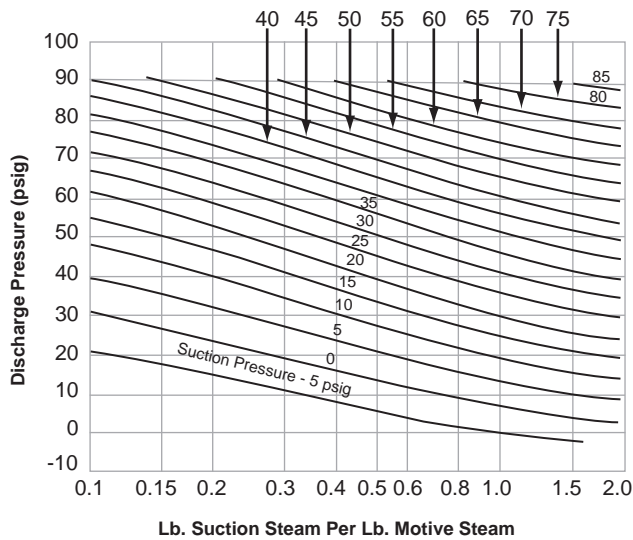
**Chart A - Sizing Chart  
for Thermocompressors  
(Types 420, 425, 426, 427, 439)**



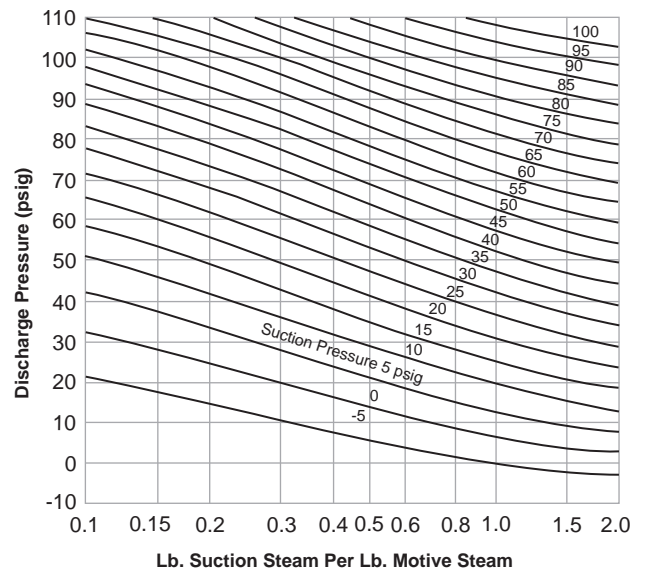
**Chart B - Capacity Ratios of  
Steam Jet Thermocompressors  
100 psig Operating Live Steam**



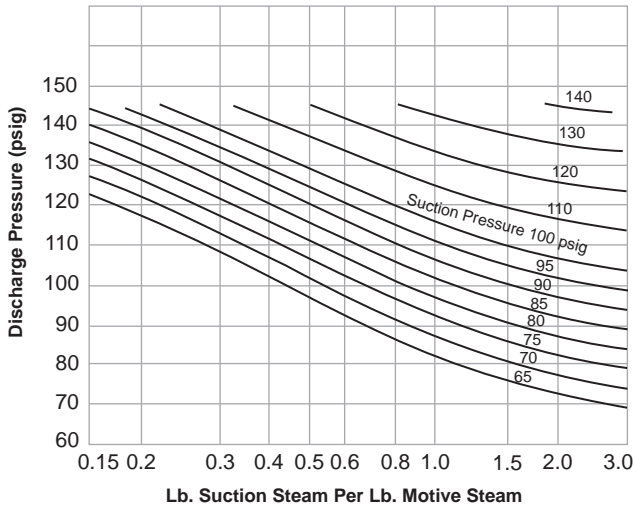
**Chart C - Capacity Ratios of  
Steam Jet Thermocompressors  
125 psig Operating Live Steam**



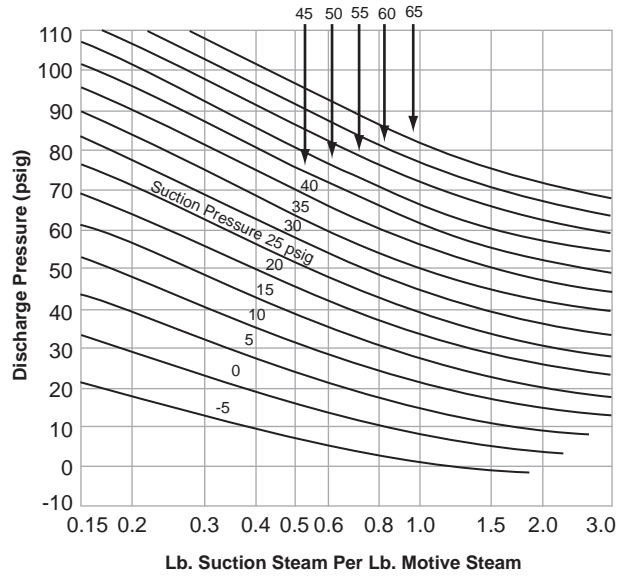
**Chart D - Capacity Ratios of  
Steam Jet Thermocompressors  
150 psig Operating Live Steam**



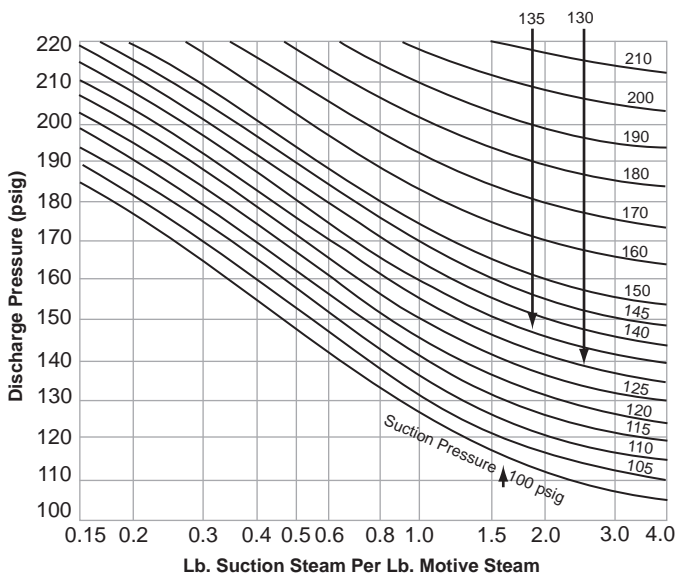
**Chart E - Capacity Ratios of Steam Jet Thermocompressors  
200 psig Operating Live Steam**



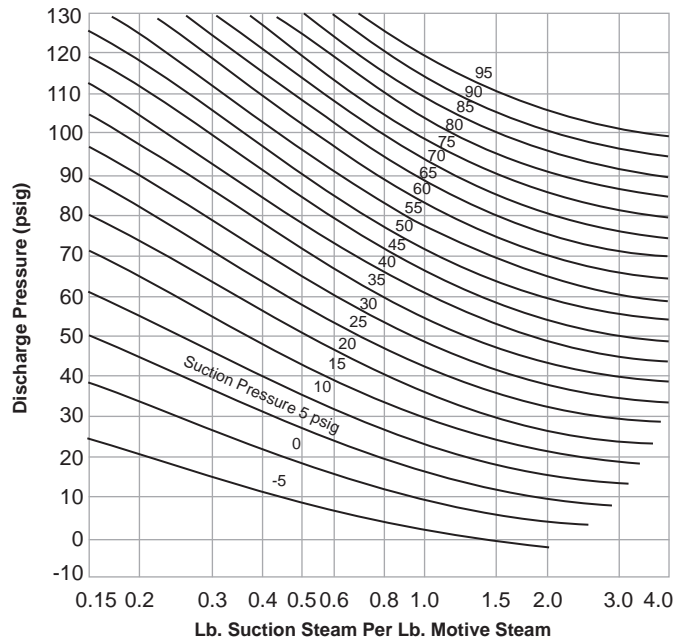
**Chart F - Capacity Ratios of Steam Jet Thermocompressors  
200 psig Operating Live Steam**



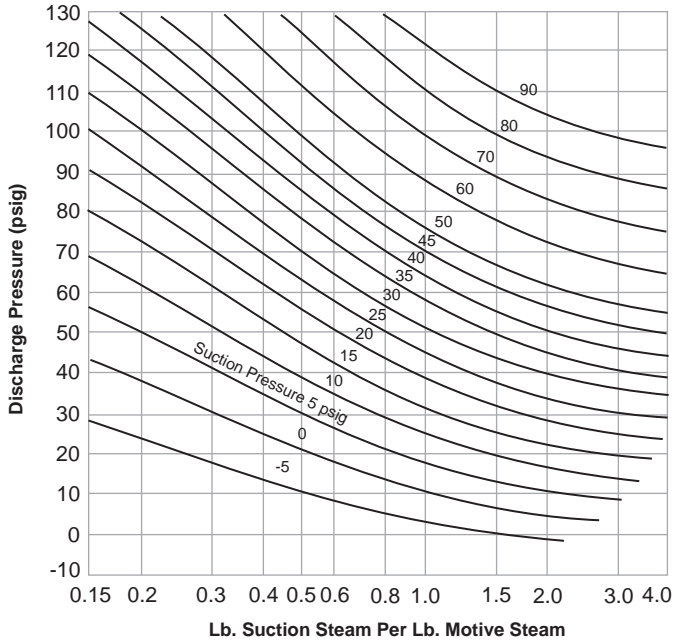
**Chart G - Capacity Ratios of Steam Jet Thermocompressors  
300 psig Operating Live Steam**



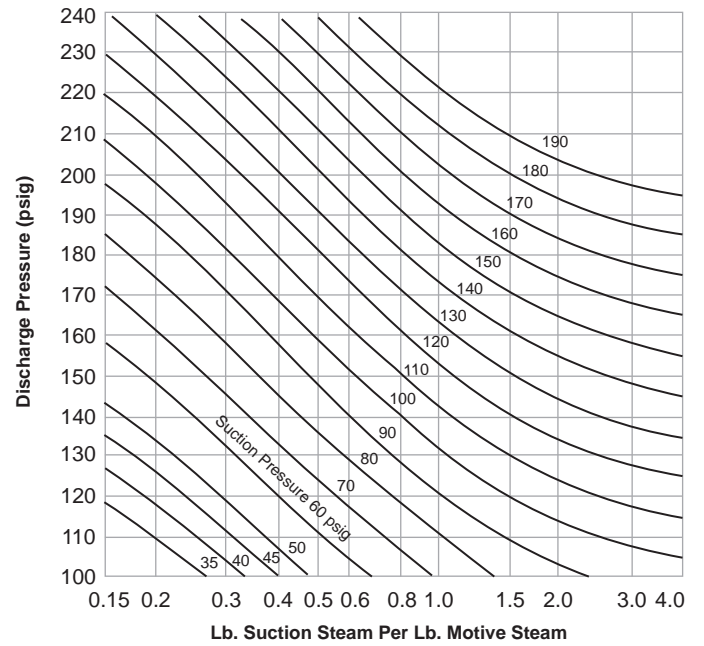
**Chart H - Capacity Ratios of Steam Jet Thermocompressors  
300 psig Operating Live Steam**



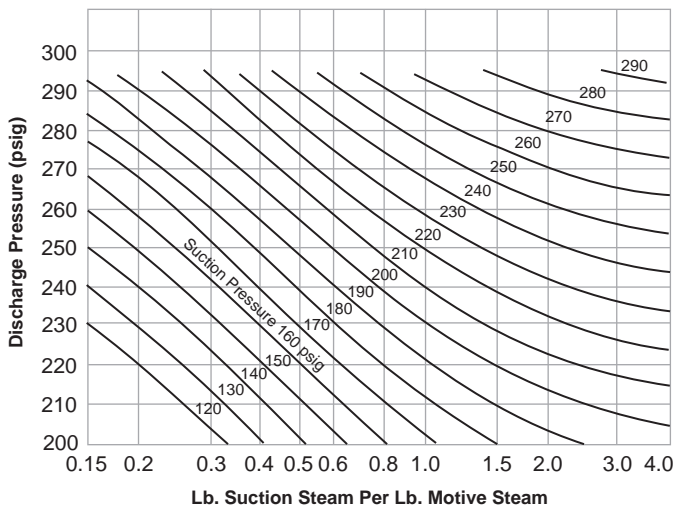
**Chart I - Capacity Ratios of Steam Jet Thermocompressors 400 psig Operating Live Steam**



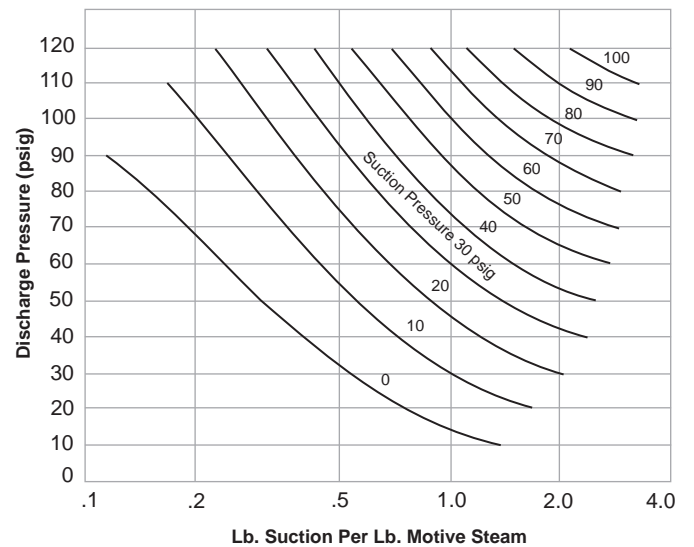
**Chart J - Capacity Ratios of Steam Jet Thermocompressors 400 psig Operating Live Steam**



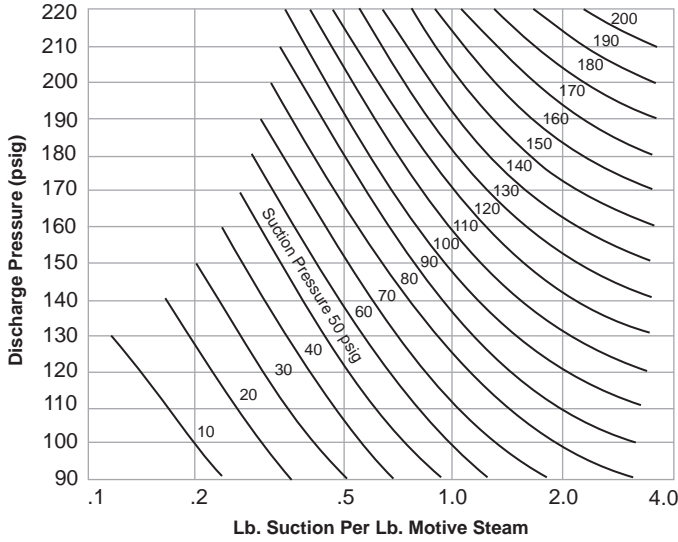
**Chart K - Capacity Ratios of Steam Jet Thermocompressors 400 psig Operating Live Steam**



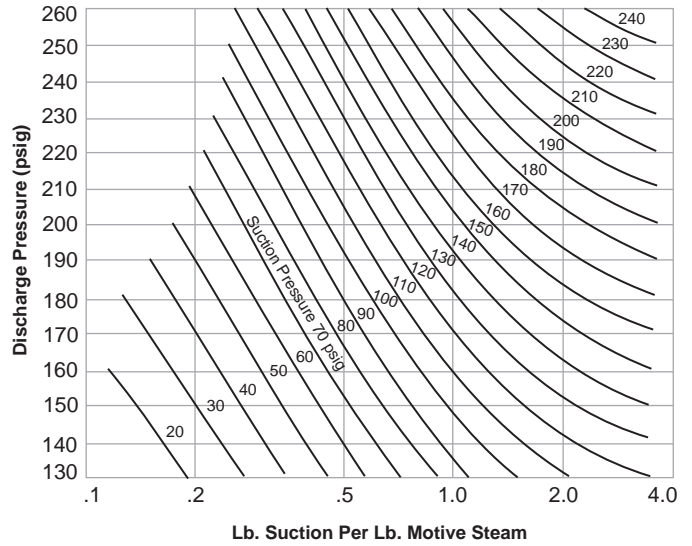
**Chart L - Capacity Ratios of Steam Jet Thermocompressors 600 psig and 600°F.**



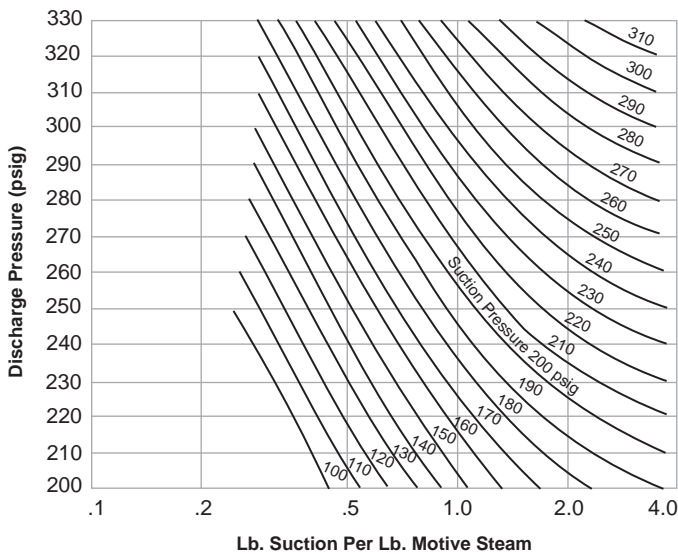
**Chart M - Capacity Ratios of Steam Jet Compressors  
600 psig and 600°F.**



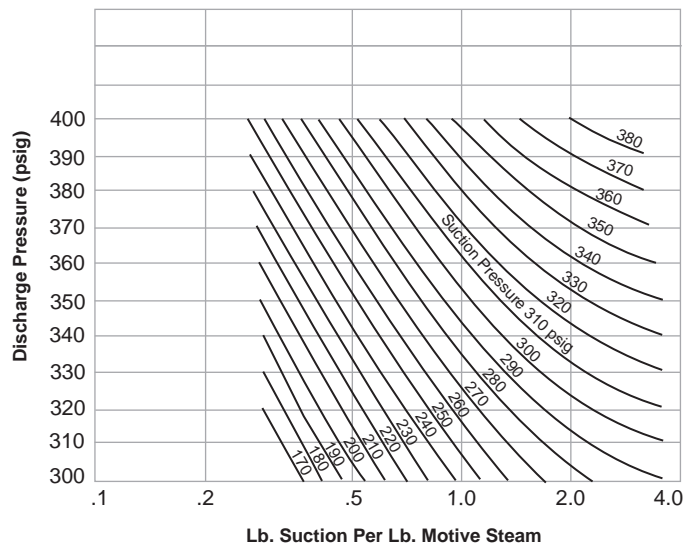
**Chart N - Capacity Ratios of Steam Jet Thermocompressors  
600 psig and 600°F.**



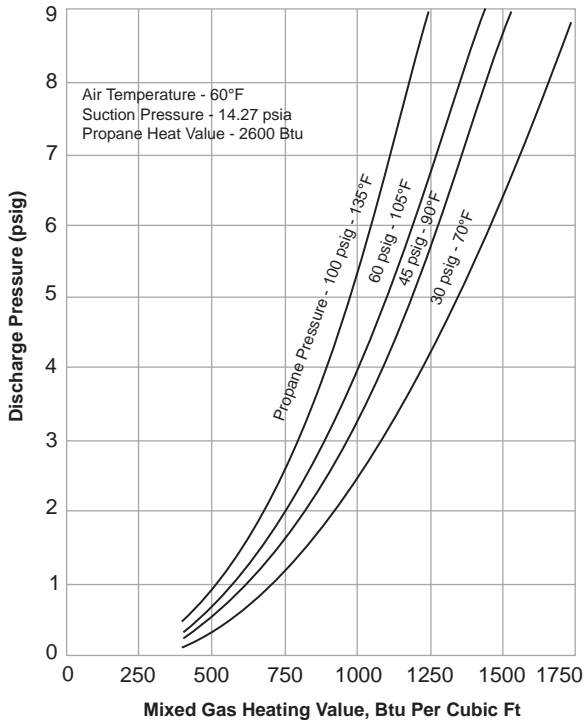
**Chart O - Capacity Ratios of Steam Jet Thermocompressors  
600 psig and 600°F.**



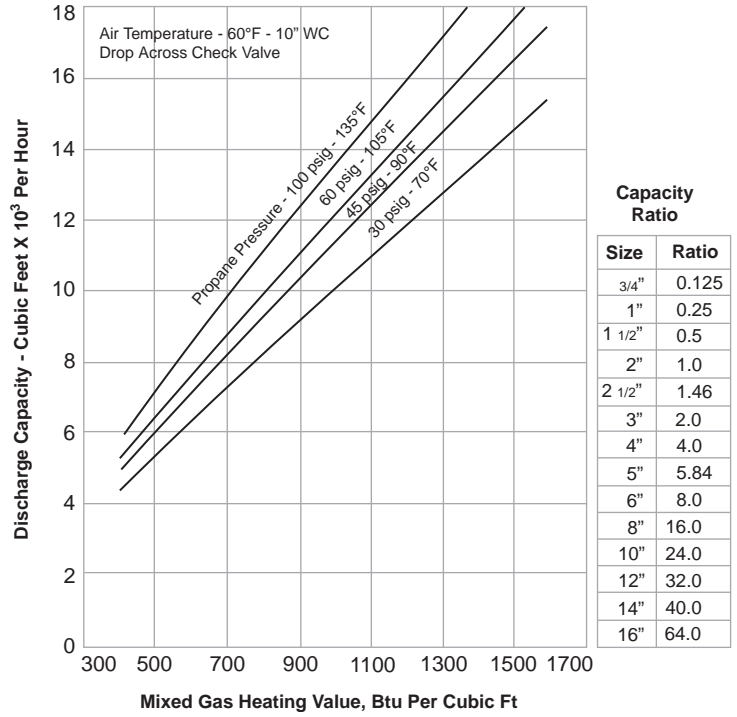
**Chart P - Capacity Ratios of Steam Jet Thermocompressors  
600 psig and 600°F.**



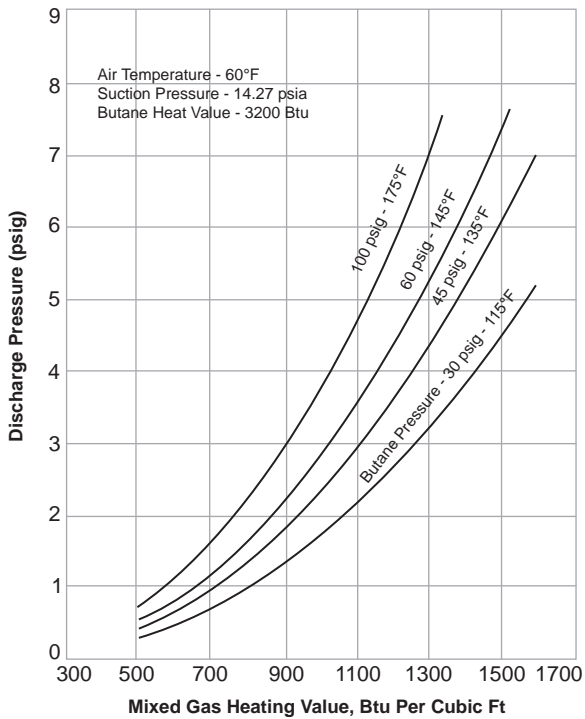
**Chart Q - Propane-Air Back Pressure Curves**



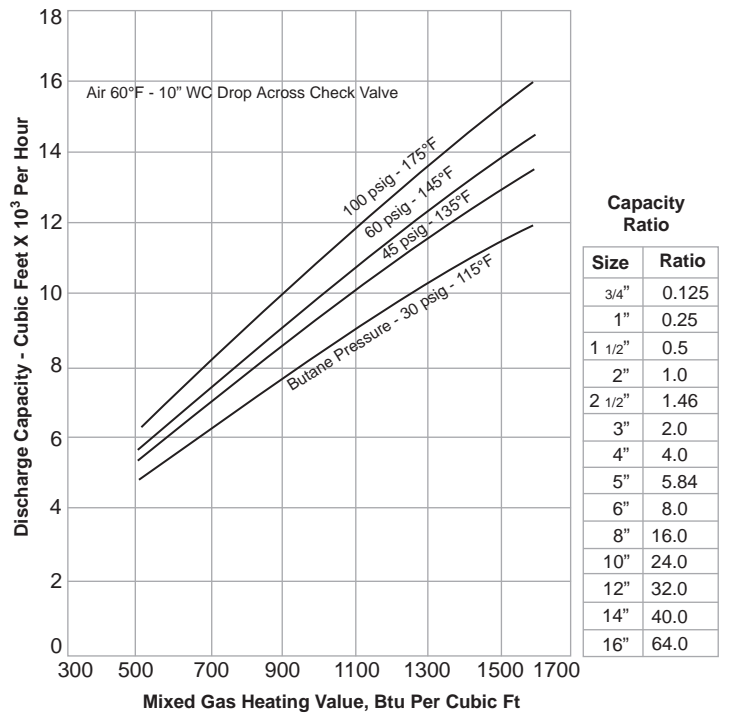
**Chart R - Propane-Air Capacity Curves For 2" Type 420 Gas Jet Compressors**



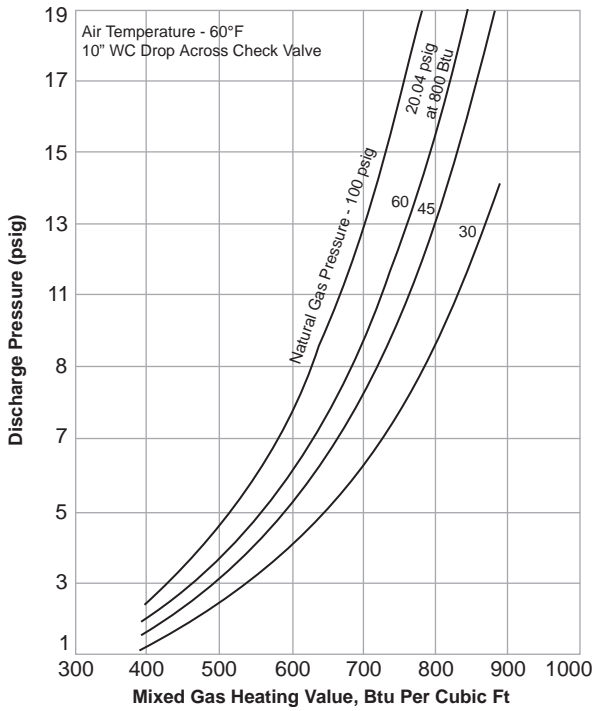
**Chart S - Butane-Air Back Pressure Curves**



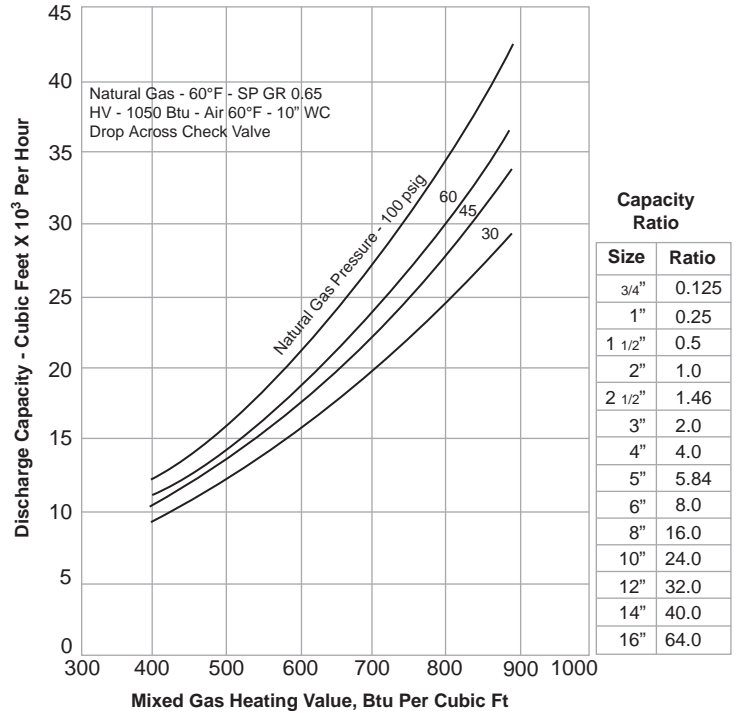
**Chart T - Butane-Air Capacity Curves For 2" Type 420 Gas Jet Compressors**



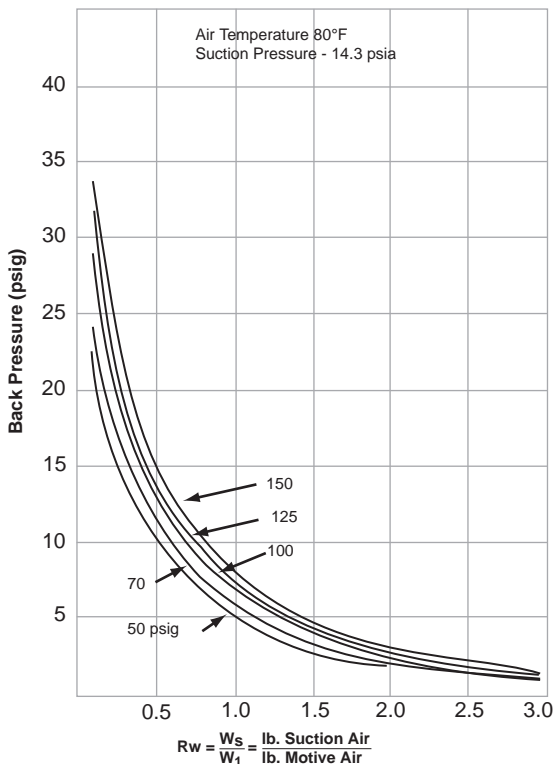
**Chart U - Natural Gas-Air Back Pressure Curves**



**Chart V - Natural Gas-Air Capacity Curves For 2" Type 420 Gas Jet Compressors**



**Chart W - Air-Air Back Pressure Curves For Type 420 Air Jet Compressors**



**Chart X - Air-Air Capacity Curves For 2" Type 420 Air Jet Compressors**

