

English Conversion Factors & Data

From	To	Multiply By
Measurements		
Cubic Feet	Cubic Inches	1728.0
Cubic Inches	Cubic Feet	0.00058
Cubic Feet	Gallons	7.480
Gallons	Cubic Feet	0.1337
Cubic Inches	Gallons	0.00433
Gallons	Cubic Inches	231.0
Barrels	Gallons	42.0
Gallons	Barrels	0.0238
Imperial Gallons	US Gallons	1.2009
US Gallons	Imperial Gallons	0.8326
Feet	Inches	12.0
Inches	Feet	0.0833
Square Feet	Square Inches	144.0
Square Inches	Square Feet	0.00695
Short Tons	Pounds	2000
Liters	US Gallons	0.2642
Pressure (@ 32°F)		
Inches of Water	Pounds per Square Inch	0.03612
Pounds per Square Inch	Inches of Water	27.686
Feet of Water	Pounds per Square Inch	0.4334
Pounds per Square Inch	Feet of Water	2.307
Inches of Mercury	Pounds per Square Inch	0.4912
Pounds per Square Inch	Inches of Mercury	2.036
Atmospheres	Pounds per Square Inch	14.696
Pounds per Square Inch	Atmospheres	0.06804
Power		
Horsepower	Metric Horsepower	1.014
Horsepower	Feet/Pounds per Minute	33000.0
Horsepower	Kilowatts	0.746
Kilowatts	Horsepower	1.3404
British Thermal Units	Foot/Pounds	778.177
Foot/Pounds	British Thermal Units	0.001285
British Thermal Units	Horsepower Hours	0.0003927
Horsepower Hours	British Thermal Units	2544.1
British Thermal Units	Kilowatt Hours	0.0002928
Kilowatt Hours	British Thermal Units	3415
Watt Hours	British Thermal Units	3.415
Volume-Weight Conversions (Wt. Lbs.)		
1 Cubic Foot of Water		62.4*
1 Cubic Inch of Water		0.0361*
1 Gallon of Water		8.33*
1 Cubic Foot of Air		0.75†
1 Cubic Inch of Steel		0.284
1 Cubic Foot of Brick		112-120
1 Cubic Foot of Concrete		120-140
1 Cubic Foot of Earth		70-120

* at 32°F.
† at 70°F – 29.92" Hg

English to Metric Conversion Factors

From	To	Multiply By
Measurements		
Cubic Feet	Cubic Centimeters	28,317.0
Cubic Inches	Cubic Centimeters	16.387
Cubic Feet	Liters	28.32
Gallons	Liters	3.7854
Cubic Inches	Liters	0.0164
Gallons	Cubic Centimeters	3785.4
Barrels	Cubic Meters	1.0551
Imperial Gallons	Cubic Meters	0.0045461
US Gallons	Cubic Meters	0.0037854
Feet	Meters	0.3048
Inches	Meters	0.0254
Square Feet	Square Meters	0.0929
Square Inches	Square Centimeters	6.452
Short Ton	Cubic Meters	907.2
Liters	Cubic Meters	0.001
Pounds	Kilograms	0.45359
Pressure (@ 32°F)		
Inches of Water	Newton/Sq. Meter	249.082
Pounds per Square Inch	Newton/Sq. Meter	6894.8
Feet of Water	Newton/Sq. Meter	2988.98
Pounds per Square Inch	Kilograms/Sq. Cent.	0.07031
Inches of Mercury	Newton/Sq. Meter	3386.4
Pounds per Square Inch	Dyne/Sq. Cent.	68948.0
Atmospheres	Newton/Sq. Meter	101325.0
Pascal	Newton Sq. Meter	1.0
Power		
Horsepower	Watt	745.7
British Thermal Units	Joule	1054.35
Foot/Pounds	Joule	1.3558
British Thermal Units	Calorie	252.0
British Thermal Units	Watt-Second	1054.35
Watt-Second	Joule	1.0
Calorie	Joule	4.184
Watt Hours	Joule	3600.0
Kilocalorie/Minute	Watt	69.73
Ton (Refrigeration)	Watt	3516.8
BTU/Hour	Watt	0.29288
BTU/In./Hr. Ft. 2°F	Watt/Meter °K	0.14413
BTU/Hr. at 10°F TD	Kcal/Hr. at 6 °C TD	0252
BTU/Hr. at 15°F TD	Kcal/Hr. at 8 °C TD	0.252
Volume-Weight Conversions (Wt. Kilograms)		
1 Cubic Foot of Water		28.3*
1 Cubic Inch of Water		0.0164*
1 Gallon of Water		3.788
1 Cubic Foot of Air		0.034†
1 Cubic Inch of Steel		0.1288
1 Cubic Foot of Brick		51-54
1 Cubic Foot of Concrete		54-64
1 Cubic Foot of Earth		32-54

* at 32°F
† at 70°F – 29.92" Hg

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Fax: 515-331-2236

Wichita
316-262-5231
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Decimal and Metric Equivalents

Equivalents of Common Fractions of An Inch

64THS	32NDS	16THS	8THS	DECIMAL	MM
1/64				0.01562	0.397
3/64	1/32	1/16		0.03125	0.794
				0.04688	1.191
				0.06250	1.588
5/64				0.07812	1.984
7/64	3/32		1/8	0.09375	2.381
				0.10938	2.778
				0.12500	3.175
9/64				0.14062	3.572
11/64	5/32	3/16		0.15625	3.969
				0.17188	4.366
				0.18750	4.763
13/64				0.20312	5.159
15/64	7/32		1/4	0.21875	5.556
				0.23438	5.953
				0.25000	6.350
17/64				0.26562	6.747
19/64	9/32	5/16		0.28125	7.144
				0.29688	7.541
				0.31250	7.938
21/64				0.32812	8.334
23/64	11/32		3/8	0.34375	8.731
				0.35938	9.128
				0.37500	9.525
25/64				0.39062	9.922
27/64	13/32	7/16		0.40625	10.319
				0.42188	10.716
				0.43750	11.113
29/64				0.45312	11.509
31/64	15/32		1/2	0.46875	11.906
				0.48438	12.303
				0.50000	12.700

64THS	32NDS	16THS	8THS	DECIMAL	MM
33/64				0.51562	13.097
35/64	17/32	9/16		0.53125	13.494
				0.54688	13.891
				0.56250	14.288
37/64				0.57812	14.684
39/64	19/32		5/8	0.59375	15.081
				0.60938	15.478
				0.62500	15.875
41/64				0.64062	16.272
43/64	21/32	11/16		0.65625	16.669
				0.67188	17.066
				0.68750	17.463
45/64				0.70312	17.859
47/64	23/32		3/4	0.71875	18.256
				0.73438	18.653
				0.75000	19.050
49/64				0.76562	19.447
51/64	25/32	13/16		0.78125	19.844
				0.79688	20.241
				0.81250	20.638
53/64				0.82812	21.034
55/64	27/32		7/8	0.84375	21.431
				0.85938	21.828
				0.87500	22.225
57/64				0.89062	22.622
59/64	29/32	15/16		0.90625	23.019
				0.92188	23.416
				0.93750	23.813
61/64				0.95312	24.209
63/64	31/32		1	0.96875	24.606
				0.98438	25.003
				1.00000	25.400

Typical Motor Ampere Values*

NOMINAL HORSE-POWER	SINGLE PHASE				THREE PHASE					
	115V		230V		230		V460V		575V	
	FLA	LRA	FLA	LRA	FLA	LRA	FLA	LRA	FLA	LRA
1/6	4.4		2.2		-	-	-	-	-	-
1/4	5.8		2.9		-	-	-	-	-	-
1/3	7.2		3.6		-	-	-	-	-	-
1/2	9.8	58.8	4.9	29.4	2	12	1	6	0.8	4.8
3/4	13.8	82.8	6.9	41.4	2.8	16.8	1.4	8.4	1.1	6.6
1	16	96	8	48	3.6	21	1.8	10.8	1.4	8.4
1-1/2	20	120	10	60	5.2	30	2.6	15	2.1	12
2	24	144	12	72	6.8	39	3.4	19.8	2.7	15.6
3	34	204	17	102	9.6	54	4.8	27	3.9	24
5	56	336	28	168	15.2	90	7.6	45	6.1	36
7-1/2	80	480	40	240	22	132	11	66	9	54
10	100	600	50	300	28	162	14	84	11	66
15	-	-	-	-	42	240	21	120	17	96
20	-	-	-	-	54	312	27	156	22	126
25	-	-	-	-	68	384	34	192	27	156
30	-	-	-	-	80	468	40	234	32	186
40	-	-	-	-	104	624	52	312	41	246
50	-	-	-	-	130	750	65	378	52	300
60	-	-	-	-	154	900	77	450	62	360
75	-	-	-	-	192	1110	96	558	77	444
100	-	-	-	-	248	1476	124	738	99	588
125	-	-	-	-	312	1860	156	930	125	744
150	-	-	-	-	360	2160	180	1080	144	864
200	-	-	-	-	480	2880	240	1440	192	1152

* Source: 1975 National Electrical Code. Tables 430-148, -150, -151. See applicable notes regarding 200V & 208V. Data presented as a guide only.

Centrifugal Blower & Pump Laws

Capacity varies directly as speed
 Pressure varies directly as (speed)²
 Power varies directly as (speed)³

$$\text{New RPM} = \text{Present RPM} \times \left(\frac{\text{New CFM}}{\text{Present CFM}} \right)$$

$$\text{New CFM} = \frac{\text{Old CFM} \times \text{New RPM}}{\text{Old RPM}}$$

$$\text{New SP} = \text{Present SP} \times \left(\frac{\text{New CFM}}{\text{Present CFM}} \right)^2$$

$$\text{New Static Pressure} = \text{Old Static Pressure} \times \left(\frac{\text{New RPM}}{\text{Old RPM}} \right)^2$$

$$\text{New HP} = \text{Present HP} \times \left(\frac{\text{New CFM}}{\text{Present CFM}} \right)^3$$

$$\text{New HP} = \text{Old HP} \times \left(\frac{\text{New RPM}}{\text{Old RPM}} \right)^3$$

Class 1 blower not to exceed 3300 FPM tip speed

$$\text{Shaft HP} = \frac{\text{Ft-lbs. Torque} \times \text{RPM}}{5250}$$

$$\text{Pump HP} = \frac{\text{GPM} \times \text{Total Head}}{3960 \times \text{Pump Efficiency}}$$

Drill Sizes

Drill number or Letter*	Decimal Equiv.
80	0.0135
79	0.0415
1/64	0.0156
78	0.016
77	0.018
76	0.020
75	0.021
74	0.0225
73	0.024
72	0.025
71	0.026
70	0.028
69	0.0292
68	0.031
1/32	0.0312
67	0.032
66	0.033
65	0.035
64	0.036
63	0.037
62	0.038
61	0.039
60	0.040
59	0.041
58	0.042
57	0.043
56	0.0465
3/64	0.0468
55	0.052
54	0.055
53	0.0595
1/16	0.0625
52	0.0635
51	0.067
50	0.070
49	0.073
48	0.076
5/64	0.0781
47	0.0785
46	0.081
45	0.082
44	0.086
43	0.089
42	0.0935
3/32	0.0937
41	0.096

Drill number or Letter*	Decimal Equiv.
40	0.098
39	0.0995
38	0.1015
37	0.104
36	0.1065
7/64	0.1094
35	0.110
34	0.111
33	0.113
32	0.116
31	0.120
1/8	0.1250
30	0.1285
29	0.136
28	0.1405
9/64	0.1406
27	0.144
26	0.147
25	0.1495
24	0.152
23	0.154
5/32	0.1562
22	0.157
21	0.159
20	0.161
19	0.166
18	0.1695
11/64	0.1719
17	0.173
16	0.177
15	0.180
14	0.182
13	0.185
3/16	0.1875
12	0.189
11	0.191
9	0.196
8	0.199
7	0.201
13/64	0.2031
6	0.204
5	0.2055
4	0.209
3	0.213
7/32	0.2187
2	0.221

Drill number or Letter*	Decimal Equiv.
1	0.228
A	0.234
15/64	0.2344
B	0.238
C	0.242
C	0.242
D	0.246
E & 1/4	0.250
F	0.257
G	0.261
17/64	0.2656
H	0.266
I	0.272
J	0.277
K	0.281
9/32	0.2812
L	0.290
M	0.295
19/64	0.2969
N	0.302
5/16	0.3125
O	0.316
P	0.323
21/64	0.3281
Q	0.332
R	0.339
11/32	0.3437
S	0.348
T	0.358
23/64	0.3594
U	0.368
3/8	0.375
V	0.377
W	0.386
25/64	0.3906
X	0.397
Y	0.404
13/32	0.4062
Z	0.413
27/64	0.4219
7/16	0.4375
29/64	0.4531
15/32	0.4687
31/64	0.4844
1/2	0.5000

NOTE: The shank of a numbered drill makes a good gauge to determine the inside diameter of capillary tubing or to measure gas burner orifices.

CAPACITORS

All PSC motors are designed to be used with an external capacitor. This capacitor operates in the circuit continuously. It is commonly referred to as a run capacitor. The most common capacitor for fan/blower motors is 5 MFD, 370V. However, other ratings will also be used, depending on the model.

FACT: A capacitor is a device capable of storing and releasing an electric charge.

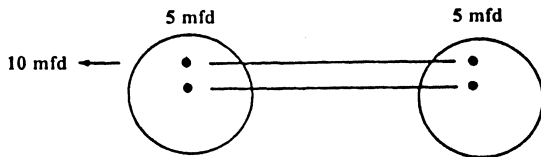
FACT: Always discharge a capacitor before removing it from an installation.

FACT: The capacitor used with a capacitor start motor is called a start capacitor because it is only used while the motor is starting.

FACT: The capacitor rating is printed on the capacitor itself, the motor nameplate, or the system wiring diagram. You must know this rating to properly choose the replacement capacitor.

FACT: Capacitors are rated by both capacity (2 MFD, 5 MFD, etc.) and voltage (370V, 440V, etc). The rated capacitor size should not be changed, since the motor operates at maximum efficiency when using the specified capacitor size. If necessary, the replacement capacitor voltage rating can be higher than specified, but not lower without impairing capacitor life.

FACT: Capacitors can be hooked up in parallel to increase capacity. For example, two 5 MFD, 370V capacitors connected in parallel are the equivalent of a 10 MFD, 370V capacitor. See illustration below.



FACT: If the ground lead is present, it will be green or green with a yellow tracer. The wiring diagram for all Fasco motors is shown on the motor nameplate.

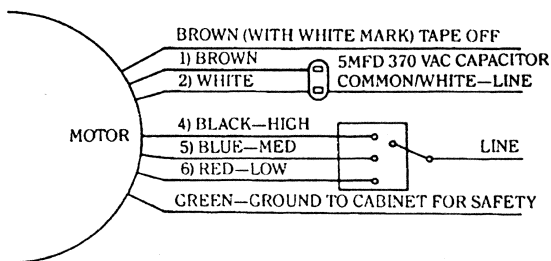
FACT: To reverse rotation of Fasco electrically reversible models, switch the four external connectors (two female receptors and two male plugs). It's impossible to plug the male plugs together, and it's impossible to plug the female receptors into each other. One plug goes into each receptor, and if rotation is wrong, simply reverse the plugs.

FACT: The current Fasco reversing lead system consists of two yellow and two purple leads.

FACT: On multi-speed motors, always connect the common (white) lead to the power first.

FACT: Connecting like-color leads (yellow to yellow, purple to purple) will give clockwise rotation (shaft end). Connecting unlike-color leads will give counterclockwise rotation (shaft end).

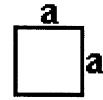
FACT: When the original motor does not have two separate capacitor leads and the original wiring pattern is desired, the following diagram can be used for most Fasco motors:



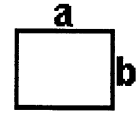
Areas, Volumes & Service Areas

Areas

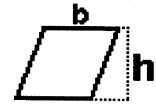
Square = aa



Rectangle = ab



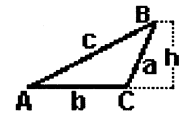
Parallelogram = bh



Circle = πr^2

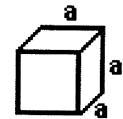


Triangle = $(1/2) bh$

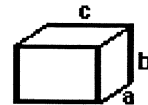


Volumes

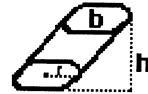
Cube = a^3



Rectangular Prism = abc



Cylinder = $bh = \pi r^2 h$



Pyramid = $(1/3) bh$



Cone = $(1/3) bh$
= $1/3 \pi r^2 h$

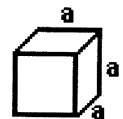


Sphere = $(4/3) \pi r^3$



Surface Areas

Cube = $6a^2$



Sphere = $4 \pi r^2$



Formulas - Electrical

$$\text{VOLTS} = \frac{\text{Watts}}{\text{Amps}} = \sqrt{\text{Watts} \times \text{Ohms}}$$

$$\text{AMPS} = \frac{\text{Volts}}{\text{Ohms}} = \frac{\text{Watts}}{\text{Volts}} = \frac{\sqrt{\text{Watts}}}{\sqrt{\text{Ohms}}}$$

$$\text{WATTS} = \text{Volts} \times \text{Amps} = \text{Amps}^2 \times \text{Ohms} = \frac{\text{Volts}^2}{\text{Ohms}}$$

$$\text{OHMS} = \frac{\text{Volts}}{\text{Amps}} = \frac{\text{Volts}^2}{\text{Watts}} = \frac{\text{Watts}}{\text{Amps}^2}$$

$$\text{Power Factor} = \frac{\text{KW}}{\text{KVA}} = \cos \theta$$

Single Phase	Three Phase
$\text{KW} = \frac{\sqrt{x} \times A \times \text{PF}}{1000}$	$\frac{\sqrt{3} \times V \times A \times \text{PF}}{1000}$

$\text{KVA} = \frac{V \times A}{1000}$	$\frac{\sqrt{3} \times V \times A}{1000}$
--	---

$\text{AMPS} = \frac{\text{KVA} \times 1000}{V}$	$\frac{\text{KVA} \times 1000}{\sqrt{3} \times V}$
--	--

$$\sqrt{3} = 1.73$$

Approx. Motor KVA = Motor Horsepower (At Full Load)

Capacitors Connected In Parallel: C₁ + C₂ + C₃ = C Total

Capacitors Connected In Series:

For Two	More Than Two
$\frac{C_1 \times C_2}{C_1 + C_2} = C \text{ Total}$	$\frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}} = C \text{ Total}$

VOLTAGE UNBALANCE

$$\% \text{ Voltage Unbalance} = \frac{100 \times \text{Max. Voltage Deviation From Average Voltage}}{\text{Average Voltage}}$$

BOOST TRANS.:

$$\text{Rating Plate F.L.A.} \times \text{Rating Plate VOLTS} = \text{KVA}$$

$$\frac{\text{Rating Plate VOLTS}}{\text{Rating Plate VOLTS} - \text{Norm. Line VOLTS}} = \text{FACTOR}$$

$$\frac{\text{KVA}}{\text{FACTOR}} = \text{Trans. KVA Rating}$$

$$\left(\frac{V_2}{V_1}\right)^2 \times \text{Heater Rating} = \text{Rating @ New Voltage}$$

V₁ Rated Volts V₂ = Measured Volts

Formulas – Belt Drives

Driven Pulley Diameter
(Motor Pulley Dia. x RPM) ÷ Driven Pulley RPM

Driven Pulley RPM
(Motor RPM x Motor Pulley Dia.) ÷ Driven Pulley Dia.

Motor Pulley Diameter
(Driven Pulley Dia. x RPM) ÷ Motor RPM

Motor RPM
(Driven Pulley Dia. x RPM) ÷ Motor Pulley Dia.

Determining Belt Length

$$L = \frac{D + d}{2} \times \text{Pi} + 2x$$

Where:
L = length of belt
D = diameter of large pulley
d = diameter of small pulley
x = center to center distance
Pi = 3.1416

Useful Data

Nominal Air Flow (Normal Return Air):
Cooling – 400 CFM per ton
Heating – 12 CFM per 1000 BTU input

Approx. Heat Values (BTUs)

Fuel Oil, Gal.			Gas, Cu. Ft.		Gas, Gal.	
#1	#2	#3	Natural	Propane	Propane	Butane
135,800	139,400	141,800	1150/950	2550	91,500	102,600

Gas Pressure Conversions

In. W.C.	=	Oz.
1	=	.58
1.73	=	1
3.5	=	2
10.5	=	6.1
27.71	=	16

Watts of Heat

1 Watt = 3.413 BTUs
BTUs = Watts x 3.143

& Troubleshooting

Conversion Factors (Constants)

Water

500 = 8.33 lbs./gal. x 60 min.
(Converts GPM to lbs./hr.)

Air

4.5 = $\frac{60 \text{ min.}}{13.35 \text{ cu. ft./lb.}}$
(Converts CFM to lbs./hr.)

1.08 = 4.5 x 0.241 BTU/lb.°F
(Lbs./hr. x sp. ht. of air)

0.68 = $\frac{4.5 \times 1054.3 \text{ BTU/lb.}}{7000 \text{ gr./lb.}}$
(Combined with heat of vaporization of water at 70°F and grains per pound of water)

Water Heating, Cooling & Heat Reclaim Coils, Water Chillers, Condensers, Etc.

Q = 500 x GPM x Δ T = BTU/H

$$\Delta T = \frac{Q}{500 \times \text{GPM}}$$

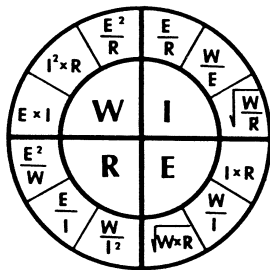
For brines, Q = 500 x GPM x Δ T x (Sp. ht. x sp. gr. of brine) = BTU/hr.

Properties of Water at 39.2°F

- Density of water = 62.4 lbs./cu. ft.
- Specific heat of water = 1 BTU/lb.°F
- Latent heat of vaporization = 970 BTU/lb. at 212°F & 1 atmosphere
= 1054.3 BTU/lb. at 70°F
- Specific heat of ice = 0.5 BTU/lb.°F
- Latent heat of fusion = 144 BTU/lb.
- 1 Gallon of water = 8.33 lbs.
- 1 Pound of water = 7000 grains.

Single Phase Loads

Ohm's Law for direct current



- W = Watts
- I = Current (Amperes)
- E = Electromotive Force (Volts)
- R = Resistance (Ohms)

To obtain any value in the center circle, for direct or alternating current, perform the operation indicated in one segment of the adjacent outer circle.

Air Coils

- Q Sensible = 1.08 x CFM Δ T = BTU/hr.
- Q Latent = 0.68 x CFM x Δ SH = BTU/hr.
- Q Total = 4.5 x CFM x Δ H = BTU/hr.

$$\text{Lb./hr. condensate} = \frac{4.5 \times \text{CFM} \times \Delta \text{SH grains}}{7000 \text{ grains/lb.}}$$

$$\text{SHR (Sensible heat ratio)} = \frac{\text{Q Sensible}}{\text{Q Total}}$$

Heat Transmission

Q Total = U x A Surface Δ T = BTU/hr.

Product

- Sensible heat in BTU/hr. = Lbs./hr. x Sp. ht. x Δ T
- Latent heat in BTU/hr. = Lbs./hr. x Lt. ht. in BTU/lb.
- Heat of resp. in BTU/hr. = Lbs. x Heat of respiration in BTU/lb./hr.

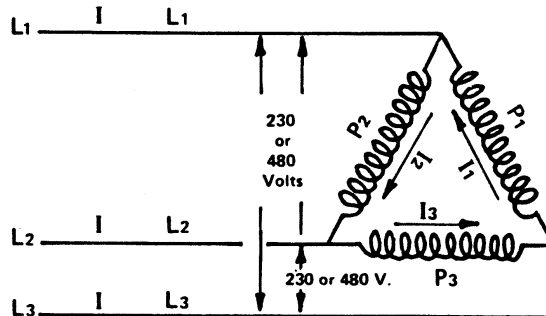
All conversion factors used in standard calculations must be corrected for other than standard properties.

Nomenclature

- Q = Heat flow in BTU/hr.
- T = Temperature in °F (Δ T = Temp. diff.)
- A = Area in sq. ft.
- U = Coef. of heat transfer in BTU/hr./sq.ft./°F
- H = Total heat of air at wet bulb temp. BTU/lb.
- Δ H = Enthalpy difference between entering & leaving air
- SH = Specific humidity in grains of moisture/lb. of dry air (Δ SH = specific humidity difference for entering & leaving air).
- CFM = Cu. ft./min.
- GPM = Gal./min.

3 Phase Delta Loads

3 0 Balanced loads = P₁ + P₂ + P₃
Total line current = Total power (balanced load)



If the phases are unbalanced, each of the phases will differ from the others:

Formulae:

$$\begin{aligned} I_{L1} &= \sqrt{I_2^2 + I_1^2 + (I_1 \times I_2)} \\ I_{L2} &= \sqrt{I_2^2 + I_3^2 + (I_2 \times I_3)} \\ I_{L3} &= \sqrt{I_3^2 + I_1^2 + (I_1 \times I_3)} \end{aligned}$$

IMPORTANT NOTICE:

This information is for reference only. Read and follow all manufacturer's installation instructions. All installations shall be in accordance with all applicable codes, standards, rules and requirements. This information for use only by licensed, qualified technicians and HVAC/R professionals.

**Checking Gas Input
(Natural Gas)**

Note: Front door of burner box must be secured when checking gas input.

- 1) Turn off all other gas appliances connected to gas meter.
- 2) With furnace turned on, measure time needed for one revolution of the hand on smallest dial on meter. A typical domestic gas meter usually has a 1/2 or 1 cubic foot test dial.
- 3) Using the number of seconds for each revolution and the size of the test dial increment, find the cubic feet of gas consumed per hour (see table to right).

To find **BTUH input**, use the following formula:

$$\text{Cu. Ft. gas} \times \text{meter correction factor} \times \text{gas BTU content} = \text{BTUH Input}$$

The gas meter is affected by both temperature and barometric pressure. The meter should be correct at 60°F and 30.0" barometric pressure. At all other conditions, it will be inaccurate, though the correction factor is easily calculated.

Temperatures over 60°F will speed up the meter and make it read high. Temperatures under 60°F will slow the meter and make it read low. Barometric pressure below 30.0" will slow the meter, and above 30.0" will speed up the meter. At some conditions, the meter may be off significantly; an error of ±5% is not uncommon.

The gas meter correction factor is calculated as follows:

$$\frac{(\text{Barometric Pressure}) \times 520}{(\text{Temperature } ^\circ\text{F} + 460) \times 30} = \text{Meter Correction Factor}$$

Example: 28.9" Barometric Pressure, 80°F

$$\frac{(28.9) \times 520 = 15,028}{(80 + 460) \times 30 = 16,200} = \text{Correction Factor } .928$$

Contact your gas supplier for actual BTU content of gas.

Example: Checking Gas Input

It is found by measurement that it takes 26 seconds for the hand on the 1 cubic foot dial to make a revolution, with only a 120,000 BTUH furnace running. Using this information, locate 26 seconds on the first column of the table to the right, then read across to the column headed "1 cubic foot", where you will see that 138 cubic feet of gas per hour are consumed by the furnace at that rate.

With the barometer at 28.9" and a 70°F temperature, the correction factor will be .945. If the local gas heating value is 935 BTU per cubic foot, the calculations will be as follows:

$$138 \text{ cu. ft. per hr.} \times .945 \text{ correction factor} \times 935 \text{ BTU per cu. ft.} = 121,933 \text{ BTUH.}$$

The calculated firing rate of 121,933 BTUH is within the ±2% tolerance of our nominal 120,000 BTUH furnace. If the actual input is not within ±2% of the furnace rating, with allowance made for the permissible range of the regulator setting (0.3" W.C.), replace the orifice spuds with spuds of the proper size.

Caution: Be sure to relight any gas appliances that were turned off at the start of this input check.

GAS RATE (CUBIC FEET PER HOUR)

Seconds for One Revolution	Size of Test Dial	
	1/2 Cu. Ft.	1 Cu. Ft.
10	180	360
12	150	300
14	129	257
16	113	225
18	100	200
20	90	180
22	82	164
24	75	150
26	69	138
28	64	129
30	60	120
32	56	113
34	53	106
36	50	100
38	47	95
40	45	90
42	43	86
44	41	82
46	39	78
48	37	75
50	36	72
52	35	69
54	34	67
56	32	64
58	31	62
60	30	60

Formulas – Cooling Capacity *

$$\text{Total BTUH} = \text{CFM} \times (\text{THC}_1 - \text{TCH}_2) \times 4.5$$

THC = Total Heat Content Or Enthalpy (BTU per lb. of air)

$$\text{Sensible BTUH} = \text{CFM} \times (T_1 - T_2) \times 1.08$$

T = Dry Bulb Temp (Degrees Fahrenheit)

$$\text{Latent BTUH} = \text{CFM} \times (W_1 - W_2) \times 683$$

W = Specific Humidity (Grains H₂O per lb. of air)
(See Psychrometric Chart)

* Based on standard air at 13.3 cubic feet per lb.

Formulas - Heating Capacity*

$$\text{BTUH} = \text{CFM} \times 1.08 \times \text{Rise}$$

$$\text{Cfm} = \frac{\text{BTUH Output}}{1.08 \times \text{Rise}}$$

$$\text{Rise} = \frac{\text{BTUH Output}}{1.08 \times \text{Cfm}}$$

$$\text{CFM} = \frac{\text{BTU/Hr. Input}}{1.35 \times \Delta T} \quad \text{Indoor Furnace 80\%}$$

$$\text{CFM} = \frac{\text{BTU/Hr. Input}}{1.44 \times \Delta T} \quad \text{Outdoor Furnace 75\%}$$

$$\text{CFM} = \frac{\text{KW} \times 3415}{1.08 \times \Delta T} \quad \text{Electric Heat 92\%}$$

* Based on standard air at 13.3 cubic feet per lb.

Formulas - General Subjects

$$\text{Area of Circle} = 0.7854 \times (\text{Dia.})^2$$

$$\text{Circumference of Circle} = 3.14 \times \text{Dia}$$

$$\text{Area of Sphere} = 3.14 \times (\text{Dia.})^2$$

$$\text{Volume of Sphere} = 0.524 \times (\text{Dia.})^3$$