

# TECHNICAL REFERENCES

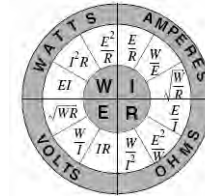
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MULTIPLY	BY	TO OBTAIN
<b>Atmospheres (Std.)</b>		
760 MM of Mercury at 32°F.....	14.696.....	Lbs./sq.inch.....
<b>Atmospheres</b> .....	76.0.....	Cms. of mercury.....
Atmospheres.....	29.92.....	In. of mercury.....
Atmospheres.....	33.90.....	Feet of water.....
Atmospheres.....	1.0333.....	Kgs./sq. cm.....
Atmospheres.....	14.70.....	Lbs./sq. inch.....
Atmospheres.....	1.058.....	Tons/sq. ft.....
<b>Brit. Therm. Units</b> .....	0.2520.....	Kilogram-calories.....
Brit. Therm. Units.....	777.5.....	Foot-lbs.....
Brit. Therm. Units.....	0.000393.....	Horse-power-hrs.....
Brit. Therm. Units.....	0.293.....	Watt-hrs.....
<b>BTU/min</b> .....	12.96.....	Foot-lbs./sec.....
BTU/min.....	0.02356.....	Horse-power.....
BTU/min.....	0.01757.....	Kilowatts.....
BTU/min.....	17.57.....	Watts.....
<b>Calorie</b> .....	0.003968.....	BTU.....
<b>Centimeters</b> .....	0.3937.....	Inches.....
Centimeters.....	0.03280.....	Feet.....
Centimeters.....	0.01.....	Meters.....
Centimeters.....	10.....	Millimeters.....
<b>Centmtrs. of Merc.</b> .....	0.01316.....	Atmospheres.....
Centmtrs. of Merc.....	0.4461.....	Feet of Water.....
Centmtrs. of Merc.....	136.0.....	Kgs./sq. meter.....
Centmtrs. of Merc.....	27.85.....	Lbs./sq.ft.....
Centmtrs. of Merc.....	0.1934.....	Lbs./sq. inch.....
<b>Cubic Feet</b> .....	2.832x10 <sup>4</sup> .....	Cubic cms.....
Cubic Feet.....	1728.....	Cubic inches.....
Cubic Feet.....	0.02832.....	Cubic meters.....
Cubic Feet.....	0.03704.....	Cubic yards.....
Cubic Feet.....	7.48052.....	Gallons U.S.....
<b>Cubic Feet/minute</b> .....	472.0.....	Cubic cms./sec.....
Cubic Feet/minute.....	0.1247.....	Gallons/sec.....
<b>Cubic foot water</b> .....	62.4.....	Pounds @ 60° F.....
<b>Feet</b> .....	30.48.....	Centimeters.....
Feet.....	12.....	Inches.....
Feet.....	0.3048.....	Meters.....
Feet.....	1/3.....	Yards.....
<b>Feet of water</b> .....	0.02950.....	Atmospheres.....
Feet of water.....	0.8826.....	Inches of mercury.....
Feet of water.....	0.03048.....	Kgs./sq. cm.....
Feet of water.....	62.43.....	Lbs./sq.ft.....
Feet of water.....	0.4335.....	Lbs./sq. inch.....
<b>Feet/min</b> .....	0.5080.....	Centimeters/sec.....
Feet/min.....	0.01667.....	Feet/sec.....
Feet/min.....	0.01829.....	Kilometers/hr.....
Feet/min.....	0.3048.....	Meters/min.....
Feet/min.....	0.01136.....	Miles/hr.....

MULTIPLY	BY	TO OBTAIN
<b>Foot-pounds</b> .....	0.001286.....	BTU.....
<b>Gallons</b> .....	3785.....	Cu. centimeters.....
Gallons.....	0.1337.....	Cubic Feet.....
Gallons.....	231.....	Cubic inches.....
Gallons.....	128.....	Fluid ounces.....
Gallons.....	3.785.....	Liters.....
<b>Gallons-water</b> .....	8.35.....	Lbs. water/60°F.....
<b>Horse-power</b> .....	42.44.....	BTU/min.....
Horse-power.....	33,000.....	Foot-lbs/min.....
Horse-power.....	550.....	Foot-lbs/sec.....
Horse-power.....	0.7457.....	Kilowatts.....
Horse-power.....	745.7.....	Watts.....
<b>Horse-power(boiler)</b> .....	33,479.....	BTU/hr.....
Horse-power (boiler).....	9.803.....	Kilowatts.....
<b>Horse-power-hours</b> .....	2547.....	BTU.....
Horse-power-hours.....	0.7457.....	Kilowatt-hours.....
<b>Inches</b> .....	2,540.....	Centimeters.....
Inches.....	25.4.....	Millimeters.....
Inches.....	0.0254.....	Meters.....
Inches.....	0.0833.....	Foot.....
<b>Inches of mercury</b> .....	0.03342.....	Atmospheres.....
Inches of mercury.....	1.133.....	Feet of Water.....
Inches of mercury.....	13.57.....	Inches of water.....
Inches of mercury.....	70.73.....	Lbs./sq. ft.....
Inches of mercury.....	0.4912.....	Lbs./sq. inch.....
<b>Inches of water</b> .....	0.002458.....	Atmospheres.....
Inches of water.....	0.07355.....	In. of mercury.....
Inches of water.....	0.5781.....	Ounces/sq. inch.....
Inches of water.....	5.202.....	Lbs./sq. foot.....
Inches of water.....	0.03613.....	Lbs./sq. inch.....
<b>Kilowatts</b> .....	56.92.....	BTU/min.....
Kilowatts.....	1.341.....	Horse-power.....
Kilowatts.....	1000.....	Watts.....
<b>Kilowatt-hours</b> .....	3415.....	BTU.....
Liters.....	0.2642.....	Gallons.....
Liters.....	2.113.....	Pints (liq.).....
Liters.....	1.057.....	Quarts (liq.).....
<b>Meters</b> .....	100.....	Centimeters.....
Meters.....	3.281.....	Feet.....
Meters.....	39.37.....	Inches.....
Meters.....	1000.....	Millimeters.....
Meters.....	1.094.....	Yards.....
<b>Ounces (fluid)</b> .....	1.805.....	Cubic Inches.....
Ounces (fluid).....	0.02957.....	Liters.....
<b>Ounces/sq. Inch</b> .....	0.0625.....	Lbs./sq. inch.....
Ounces/sq.inch.....	1.73.....	Inches of water.....
<b>Pints</b> .....	0.4732.....	Liter.....
<b>Pounds (avoir.)</b> .....	16.....	Ounces.....

MULTIPLY	BY	TO OBTAIN
<b>Pounds of water</b> .....	0.01602.....	Cubic Feet.....
Pounds of water.....	27.68.....	Cubic Inches.....
Pounds of water.....	0.1198.....	Gallons.....
<b>Pounds/sq. foot</b> .....	0.01602.....	Feet of water.....
Pounds/sq. foot.....	0.006945.....	Pounds/sq. inch.....
<b>Pounds/sq. inch</b> .....	0.06804.....	Atmospheres.....
Pounds/sq. inch.....	2.307.....	Feet of water.....
Pounds/sq. inch.....	2.036.....	In. of mercury.....
Pounds/sq. inch.....	27.68.....	Inches of water.....
<b>Temp. (°C) +273</b> .....	1.....	Abs. temp (°C).....
Temp. (°C) +17.78.....	1.8.....	Temp (° F).....
Temp. (°F) +460.....	1.....	Abs. temp (° F).....
Temp. (°F) -32.....	5/9.....	Temp (° C).....
<b>Therm</b> .....	100,000.....	BTU.....
<b>Tons(long)</b> .....	2240.....	Pounds.....
<b>Ton, Refrigeration</b> .....	12,000.....	BTU/hr.....
<b>Tons (short)</b> .....	2000.....	Pounds.....
<b>Watts</b> .....	3.415.....	BTU.....
Watts.....	0.05692.....	BTU/min.....
Watts.....	44.26.....	Foot-pounds/min.....
Watts.....	0.7376.....	Foot-pounds/sec.....
Watts.....	0.001341.....	Horse-power.....
Watts.....	0.001.....	Kilowatts.....
<b>Watt-hours</b> .....	3,415.....	BTU/hr.....
Watt-hours.....	2,655.....	Foot-pounds.....
Watt-hours.....	0.001341.....	Horse-power hrs.....
Watt-hours.....	0.001.....	Kilowatt-hours.....

### OHMS LAW EQUATION WHEEL



This "wheel" shows the equation for calculating any one of the basic factors of electricity – Watts (W), Amperes (I), Volts (E) or Ohms (R) – when any two of these factors are known. The elements to be calculated are shown on the rim of the wheel. Each quadrant shows three equations for solving the unknown; select the

$$\frac{W}{E} = I \text{ - or: } 2400W / 240V = 10 \text{ Amps}$$

equation appropriate for the known values.  
**Example:** A 2400 Watt heater is connected to a 240 Volt circuit. How many Amps does it draw?  
**Solution:** Since we are finding amps, the formula will be found in the I (Amperes) section of the wheel. What is the Resistance?

$$\frac{E^2}{W} = R \text{ - or: } 240V \times 240V / 2400W = 24 \text{ Ohms}$$

### CONVERSION TABLE FOR WATTS - AMPERES - VOLTS

WATTS	VOLTAGE (AC -Single Phase)			
	120	208	240	277
	AMPERES			
500	4.2	2.4	2.1	1.8
1000	8.3	4.8	4.2	3.6
1500	12.5	7.2	6.3	5.4
2000	16.7	9.6	8.3	7.2
2500	20.9	12.0	10.4	9.0
3000	25.0	14.4	12.5	10.8
3500	29.2	16.8	14.6	12.6

### HOW TO DETERMINE SIZE AND SPEED OF PULLEYS OR GEARS

**The Driving Pulley is called the Driver and the Driven Pulley the Driven**

To determine the diameter of Driver, the diameter of the Driven and its revolutions, and also revolutions of the Driver being given:

$$\frac{\text{Diam. of Driven} \times \text{revolutions of Driven}}{\text{Revolutions of Driver}} = \text{Diam. of Driver}$$

To determine the diameter of Driven, the Revolutions of the Driven and diameter, and revolutions of the driver being given:

$$\frac{\text{Diam. of Driver} \times \text{revolutions of Driver}}{\text{Revolutions of Driven}} = \text{Diam. of Driven}$$

To determine the revolutions of Driver, the diameter and revolutions of the Driven, and diameter of the Driver being given

$$\frac{\text{Diam of Driven} \times \text{revolutions of Driven}}{\text{Diameter of Driver}} = \text{Rev. of Driver}$$

To determine the revolutions of Driven, the diameter and revolutions of the Driver, and diameter of the Driven being given:

$$\frac{\text{Diam of Driver} \times \text{revolutions of Driver}}{\text{Diameter of Driven}} = \text{Rev. of Driven}$$

**TO FIND OD BELT LENGTH:** OD OF SMALL PULLEY + OD OF LARGE PULLEY x 1.57 + TWICE SHAFT CENTERS = OD BELT LENGTH

# TECHNICAL REFERENCES

## REFRIGERANT PRESSURE TEMPERATURE

PSIG	TEMPERATURE, °F													
	REFRIGERANT													
	12	22	134a	MP39 401A	HP80 402A	HP62 404A	KLEA60 407A	9000 KLEA66 407C	FX-10 408A	FX-56 409A	502	507	410A	
5*	-38	-56	-31	-32	-67	-65	-52	-48	-62	-30	-65	-66	-	
4*	-34	-53	-27	-28	-64	-62	-49	-45	-58	-27	-61	-63	-	
3*	-31	-50	-24	-25	-61	-59	-46	-42	-55	-23	-58	-60	-	
2*	-28	-47	-21	-22	-58	-56	-43	-39	-52	-20	-55	-57	-	
1*	-24	-44	-18	-19	-55	-53	-41	-36	-49	-17	-52	-55	-	
0	-22	-41	-15	-16	-53	-51	-38	-34	-47	-15	-50	-52	-	
1	-19	-39	-12	-13	-50	-48	-36	-31	-44	-12	-47	-50	-60	
2	-16	-36	-10	-11	-48	-46	-33	-29	-42	-9	-45	-47	-55	
3	-14	-34	-8	-9	-45	-43	-31	-27	-39	-7	-42	-45	-53	
4	-11	-32	-5	-6	-43	-41	-29	-24	-37	-5	-40	-43	-50	
5	-9	-30	-3	-4	-41	-39	-27	-22	-35	-2	-38	-41	-50	
6	-7	-28	-1	-2	-39	-37	-25	-20	-33	0	-36	-39	-48	
7	-4	-26	1	0	-37	-35	-23	-18	-31	2	-34	-37	-45	
8	-2	-24	3	2	-36	-34	-21	-17	-29	4	-32	-35	-44	
9	0	-22	5	4	-34	-32	-20	-15	-27	6	-30	-34	-42	
10	2	-20	7	6	-32	-30	-18	-13	-26	8	-29	-32	-40	
11	4	-19	8	8	-30	-28	-16	-12	-24	9	-27	-30	-40	
12	5	-17	10	9	-29	-27	-15	-10	-22	11	-25	-29	-38	
13	7	-15	12	11	-27	-25	-13	-8	-21	13	-24	-27	-36	
14	9	-14	13	13	-26	-23	-12	-7	-19	14	-22	-25	-35	
15	11	-12	15	14	-24	-22	-10	-5	-18	16	-20	-24	-34	
16	12	-11	16	16	-23	-20	-9	-4	-16	18	-19	-23	-32	
17	14	-9	18	17	-21	-19	-8	-3	-15	19	-18	-21	-30	
18	16	-8	19	19	-20	-18	-6	-1	-13	21	-16	-20	-30	
19	17	-7	21	20	-19	-16	-5	0	-12	22	-15	-18	-28	
20	19	-5	22	21	-17	-15	-4	1	-11	23	-13	-17	-27	
21	20	-4	24	23	-16	-14	-2	3	-9	25	-12	-16	-25	
22	21	-3	25	24	-15	-12	-1	4	-8	26	-11	-15	-24	
23	23	-1	26	25	-14	-11	0	5	-7	27	-9	-13	-23	
24	24	0	27	27	-12	-10	1	6	-5	29	-8	-12	-22	
25	26	1	29	28	-11	-9	2	8	-4	30	-7	-11	-21	
26	27	2	30	29	-10	-8	4	9	-3	31	-6	-10	-20	
27	28	4	31	30	-9	-6	5	10	-2	32	-5	-9	-19	
28	30	5	32	32	-8	-5	6	11	-1	34	-3	-8	-18	
29	31	6	33	33	-7	-4	7	12	0	35	-2	-6	-17	
30	32	7	35	34	-6	-3	8	13	1	36	-1	-5	-16	
31	33	8	36	35	-5	-2	9	14	3	37	0	-4	-15	
32	34	9	37	36	-4	-1	10	15	4	38	1	-3	-14	
33	36	10	38	37	-2	0	11	16	5	39	2	-2	-13	
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36	39	13	41	40	0	3	14	19	8	42	5	1	-10	
37	40	14	42	41	1	4	15	20	9	44	6	2	-9	
38	41	15	43	43	2	5	16	21	10	45	7	3	-8	
39	42	16	44	44	3	6	17	22	11	46	8	4	-8	
40	43	17	45	44	4	8	18	23	12	47	9	5	-7	
42	45	19	47	46	6	10	19	25	13	48	11	6	-5	
44	47	21	49	48	8	11	21	26	15	50	13	8	-3	
46	49	23	51	50	10	13	23	28	17	50	15	10	-2	
48	51	24	52	42	11	14	24	30	19	39	16	12	0	
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54	57	29	57	47	16	19	29	34	24	45	21	16	4	
56	59	31	59	49	18	20	31	36	25	46	23	18	6	
58	60	32	60	50	19	22	32	37	27	48	24	19	7	
60	62	34	62	52	20	23	33	39	28	50	26	21	9	
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76	74	45	73	64	31	34	44	49	38	61	37	32	19	
78	76	46	75	65	32	35	45	51	39	63	38	33	20	

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80	77	47	76	66	34	31	37	36	46	36	41	42	41	64	40	34	21
85	81	51	79	69	37	34	40	39	49	39	44	45	44	67	43	37	23
90	84	53	82	73	40	37	42	42	52	42	46	48	47	70	46	40	26
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105	93	62	90	81	48	55	51	50	50	50	54	55	55	79	54	48	34
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115	99	67	96	87	50	50	55	55	55	55	59	60	60	84	59	53	39
120	102	69	98	89	53	53	57	57	57	57	62	62	62	87	62	56	41
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130	107	74	103	94	57	57	62	62	62	62	66	67	67	92	67	60	45
135	109	76	105	96	60	60	64	64	64	64	69	69	69	94	69	62	47
140	112	78	107	99	62	62	66	66	66	66	71	71	71	96	71	64	49
145	114	81	109	101	64	64	68	68	68	68	73	73	73	99	73	67	51
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