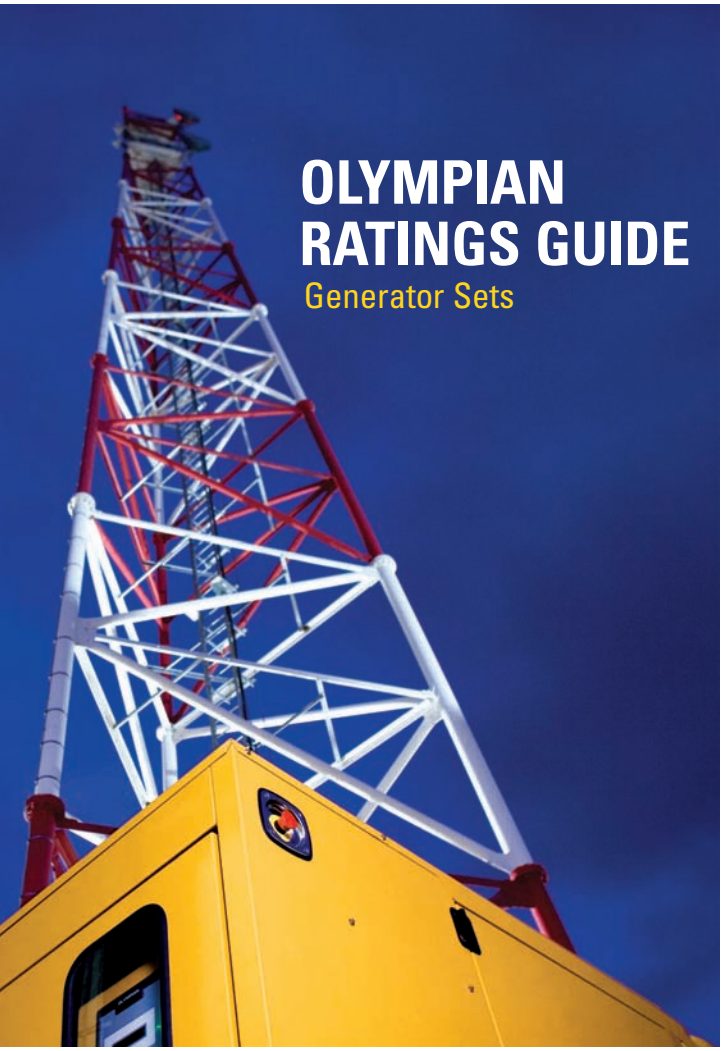


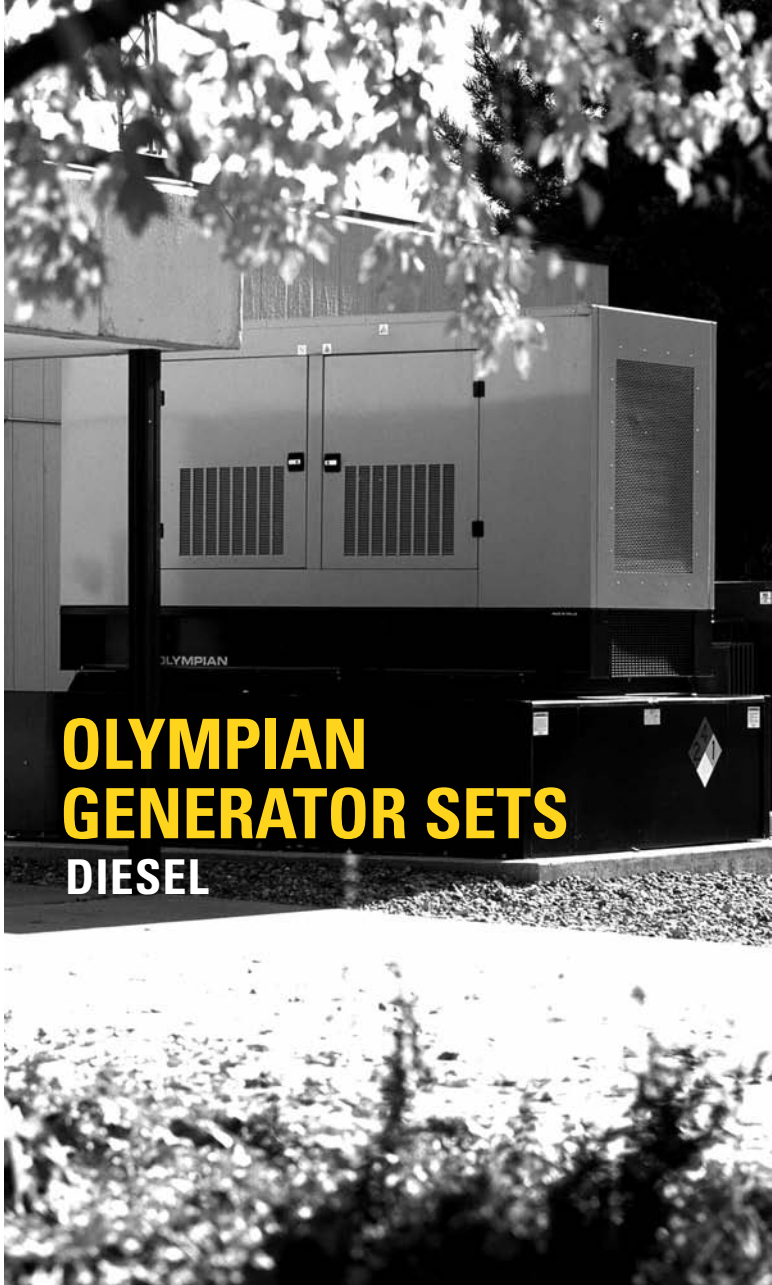
OLYMPIAN RATINGS GUIDE

Generator Sets

OLYMPIAN™
GENERATOR SETS

CONTENTS

RATINGS GUIDE



OLYMPIAN GENERATOR SETS

DIESEL

OLYMPIAN INTERNATIONAL
50Hz DIESEL RATINGS

RPM	50Hz – kVA Standby	50Hz – kVA Prime	Generator Set Model
single phase output			
1500	11	10	GEP11SP-4
1500	14	13	GEP14SP-4
1500	16.5	15	GEP16SP-4
1500	26	24	GEP26SP1
1500	26	26	GEP26SP2
1500	35	32	GEP35SP5
1500	35	32	GEP35SP2
1500	44	40	GEP44SP1
1500	44	40	GEP44SP2
1500	50	45	GEP50SP5
1500	50	45	GEP50SP2
1500	64	58	GEP64SP1
1500	64	58	GEP64SP2
1500	80	72	GEP80SP2
1500	105	96	GEP105SP1

Models ending in 2 or 4 meet EU Stage 2 Emissions
All ratings at 1.0 pf and 27° C (80.6° F)

OLYMPIAN INTERNATIONAL
50Hz DIESEL RATINGS (CONT.)

RPM	50Hz – kVA Standby	50Hz – kVA Prime	Generator Set Model
3 – phase output			
1500	13.5	12.5	GEP13.5-4
1500	18	16.5	GEP18-4
1500	22	20	GEP22-4
1500	30	27	GEP30-1
1500	30	27	GEP30-2
1500	33	30	GEP33-1
1500	33	30	GEP33-2
1500	44	40	GEP44-5
1500	44	40	GEP44-2
1500	50	45	GEP50-5
1500	50	45	GEP50-2
1500	55	50	GEP55-1
1500	55	50	GEP55-2
1500	65	60	GEP65-5
1500	65	60	GEP65-2
1500	88	80	GEP88-1
1500	88	80	GEP88-2
1500	110	100	GEP110-2

Models ending in 2 or 4 meet EU Stage 2 Emissions
All ratings at 0.8 pf and 27° C (80.6° F)

OLYMPIAN INTERNATIONAL
50Hz DIESEL RATINGS (CONT.)

RPM	50Hz – kVA Standby	Prime	Generator Set Model
3 – phase output			
1500	150	135	GEP150
1500	150	135	GEP150-2
1500	165	150	GEP165
1500	165	150	GEP165-2
1500	200	180	GEP200-2
1500	220	200	GEH220-2
1500	250	230	GEH250-2
1500	275	250	GEH275-2
1500	400	350	GEP400-1
1500	400	350	GEP400-2
1500	450	400	GEP450-1
1500	450	400	GEP450-2
1500	500	450	GEP500-1
1500	500	450	GEP500-2
1500	550	500	GEP550-1
1500	550	500	GEP550-2
1500	605	550	GEP605-1
1500	660	600	GEP660-1
1500	700	635	GEP700-1

Models ending in 2 or 4 meet EU Stage 2 Emissions
All ratings at 0.8 pf and 27° C (80.6° F)

OLYMPIAN INTERNATIONAL
60Hz DIESEL RATINGS

RPM	60Hz – kVA (eKW) Standby	Prime	Generator Set Model
single phase output			
1800	13 (13)	12 (12)	GEP11SP-4
1800	17 (17)	15.5 (15.5)	GEP14SP-4
1800	20 (20)	18 (18)	GEP16SP-4
1800	30 (30)	27 (27)	GEP26SP1
1800	40 (40)	36 (36)	GEP35SP5
1800	44 (44)	40 (40)	GEP44SP1
1800	55 (55)	50 (50)	GEP50SP5
1800	72 (72)	65 (65)	GEP64SP1
1800	113 (113)	100 (100)	GEP105SP1

Models ending in 2 or 4 meet EU Stage 2 Emissions
All ratings at 1.0 pf and 27° C (80.6° F)

OLYMPIAN INTERNATIONAL
60Hz DIESEL RATINGS

RPM	60Hz – kVA (eKW) Standby	Prime	Generator Set Model
3 – phase output			
1800	16.2 (13)	15 (12)	GEP13.5-4
1800	21.3 (17)	21.3 (17)	GEP18-4
1800	25 (20)	25 (20)	GEP22-4
1800	34 (27.2)	30 (24)	GEP30-1
1800	37.5 (30)	33.8 (27)	GEP33-1
1800	50 (40)	45 (36)	GEP44-5
1800	56.3 (45)	50 (40)	GEP50-5

Models ending in 2 or 4 meet EU Stage 2 Emissions
All ratings at 0.8 pf and 27° C (80.6° F)

OLYMPIAN INTERNATIONAL
60Hz DIESEL RATINGS (CONT.)

60Hz – kVA (eKW)			Generator
RPM	Standby	Prime	Set Model
3 – phase output			
1800	62.5 (50)	56.3 (45)	GEP55-1
1800	75 (60)	68.8 (55)	GEP65-5
1800	100 (80)	90 (72)	GEP88-1
1800	125 (100)	113 (90.4)	GEP110-2
1800	165 (132)	150 (120)	GEP150
1800	250 (200)	225 (180)	GEH220-2
1800	563 (450)	513 (410)	GEP563-1
1800	625 (500)	563 (450)	GEP625-1
1800	688 (550)	–	GEP688-1
1800	750 (600)	675 (540)	GEP750-1

Models ending in 2 or 4 meet EU Stage 2 Emissions
All ratings at 0.8 pf and 27° C (80.6° F)

OLYMPIAN RENTAL
50Hz DIESEL RATINGS

kVA			Generator
RPM	Standby	Prime	Set Model
3 – phase output			
1500	–	20	XQE20-4
1500	–	30	XQE30-2
1500	–	60	XQE60-2
1500	–	80	XQE80-2
1500	–	100	XQE100-2
1500	–	150	XQE150-2
1500	–	200	XQE200-2
1500	–	250	XQE250-2

Models ending in 2 or 4 meet EU Stage 2 Emissions
All ratings at 0.8 pf and 27° C (80.6° F)

OLYMPIAN
DIESEL RATINGS DEFINITIONS

Prime Rating (ORoW)
These ratings are applicable for supplying continuous electrical power (at variable load) in lieu of commercially purchased power. There is no limitation to the annual hours of operation and this model can supply 10% overload power for 1 hour in 12 hours.

Standby Rating (ORoW)
These ratings are applicable for supplying continuous electrical power (at variable load) in the event of a utility power failure. No overload is permitted on these ratings. The alternator on this model is peak continuous rated (as defined in ISO 8528-3).

Standby Rating (ONA)
These ratings are applicable for supplying continuous electrical power (at variable load) in the event of a utility power failure. No overload is permitted on these ratings. The generator is peak rated (as defined in ISO 8528-3).

Prime Rating (ONA)
These ratings are applicable for supplying continuous electrical power (at variable load) in lieu of commercially purchased power. There is no limitation to the annual hours of operation and this model can supply 10% overload power for 1 hour in 12 hours.

OLYMPIAN GENERATOR SETS
GAS

OLYMPIAN INTERNATIONAL 50Hz GAS RATINGS

RPM	Standby kVA LP	Standby kVA Natural	Prime kVA LP	Prime kVA Natural	Generator Set Model
Single Phase Output					
1500	13	11.8	11	10	**GEUG13S1
3000	24	24	–	–	**GEUHG24S1
3 – Phase Output					
1500	16.5	15	14	12.5	*GEUG16-1
3000	30	30	–	–	*GEUHG30-1

*Ratings at 0.8 pf and 25° C (77° F)

**Ratings at 1.0 pf and 25° C (77° F)

OLYMPIAN INTERNATIONAL
60Hz GAS RATINGS

RPM	Standby kVA LP	Standby kVA Natural	Prime kVA LP	Prime kVA Natural	Generator Set Model
Single Phase Output					
1800	16	15	13.5	13	**GEUG13S1
3600	25	25	–	–	**GEUHG24S1
3 – Phase Output					
1800	20	18.3	16.9	16.9	*GEUG16-1
3600	31.3	31.3	–	–	*GEUHG30-1

*Ratings at 0.8 pf and 25° C (77° F)

**Ratings at 1.0 pf and 25° C (77° F)

OLYMPIAN NORTH AMERICA
GAS RATINGS

RPM	Standby LP	Standby Natural	Prime LP	Prime Natural	Generator Set Model
Single Phase Output					
1800	10	10	–	–	G10U3S
1800	15	15	–	–	G15U3S
3600	17.5	17.5	–	–	G17.5UH3S
1800	–	20	–	–	G20G1S
3600	25	25	–	–	G25UH3S
1800	–	25	–	–	G25G1S
1800	30	30	–	–	G30F3S
1800	35	35	–	–	G35F3S
1800	45	42.5	–	–	G45F3S
1800	55	55	–	–	G55F3S
1800	75	70	–	–	G75F3S
1800	–	100	–	–	G100F3S

All ratings at 1.0 pf and 25° C (77° F)

OLYMPIAN NORTH AMERICA GAS RATINGS

	Standby		Prime		Generator
RPM	LP	Natural	LP	Natural	Set Model
3 – Phase Output					
1800	12	12	–	–	G12U3
1800	15	15	–	–	G15U3
1800	–	20	–	–	G20G1
3600	20	20	–	–	G20UH3
1800	–	25	–	–	G25G1
1800	25	25	–	–	G25UH3
1800	30	30	–	–	G30F3
1800	40	40	–	–	G40F3
1800	50	45	–	–	G50F3
1800	60	60	–	–	G60F3
1800	80	75	–	–	G80F3
1800	–	100	–	–	G100F3
1800	–	125	–	–	G125G1
1800	–	150	–	–	G150G1

All ratings at 0.8 pf and 25° C (77° F)

OLYMPIAN GAS RATINGS DEFINITIONS

Standby
These ratings are applicable for supplying continuous electrical power (at variable load) in the event of a utility power failure. No overload is permitted on these ratings. The generator is peak rated (as defined in ISO8528-3).

Prime
These ratings are applicable for supplying continuous electrical power (at variable load) in lieu of commercially purchased power. There is no limitation to the annual hours of operation and this model can supply 10% overload power for 1 hour in 12 hours.

Natural Gas
Natural gas ratings have been established on natural gas with net calorific value of approximately 36.8 MJ/m^3 (988 Btu / ft^3).

FUEL SYSTEM - DIESEL

Day Tank Sizing

Tank Size (gal) = $\frac{\text{Rated BSFC (lb/hp•hr)}}{\text{7.076 (lb/gal)}}$ x Rated HP x Load Factor

x Hours Between Refilling
+ Reserve Requirement

OR

Rule of Thumb for tank size with 25% reserve

0.056 x Ave. BHP demand x Hours between refills x 1.25 = _____gal.
0.27 x Ave. BKW demand x Hours between refills x 1.25 = _____liters.

Note: Additional tank capacity required for cooling of recirculated fuel in unit-injected engines. Tank should be located below level of injectors or nozzles.

On-Site Power Requirements

Based on 100,000 sq ft. of office bldg., etc and 40°N. Latitudes

- Electric Requirements
  600 kW continuous load
  (Air conditioning is absorption)
  Use three - 300kW units
  (2 prime and 1 standby)
- Air Conditioning and Compressor
  400 tons prime load
  Use two - 200 hp engines
  (No Standby)

Refrigeration

- One ton refrigeration = 200 Btu/min = 12,000 Btu/h
- One Boiler hp = 33,475 Btu/h
- One ton compressor rating = One engine hp
- Auxiliary air conditioning equipment requires 1/4 hp/ton of compressor rating

Ice Plant

- Complete power requires 4-5 hp per daily ton capacity

Air Compressor

- hp = 1/4 x cu ft m/min at 100 psi
  Increase bhp 10% for 125 psi
  Decrease bhp 10% for 80 psi

CONVERSIONS
CONTINUED

ELECTRICAL TABLES

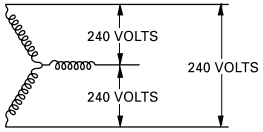
To Obtain	Alternating Current: Single Phase	Alternating Current: Three-Phase	Direct Current
Kilowatts	$\frac{V \times I \times P.F.}{1000}$	$\frac{1.732 \times V \times I \times P.F.}{1000}$	$\frac{V \times I}{1000}$
kVA	$\frac{V \times I}{1000}$	$\frac{1.732 \times V \times I}{1000}$	
Horsepower required when kW known (Generator)	$\frac{kW}{.746 \times EFF. (Gen)}$	$\frac{kW}{.746 \times EFF. (Gen)}$	$\frac{kW}{.746 \times EFF. (Gen)}$
kW input when HP known (Motor)	$\frac{HP \times .746}{EFF. (Motor)}$	$\frac{HP \times .74}{EFF. (Motor)}$	$\frac{HP \times .74}{EFF. (Motor)}$
Ampheres when HP known	$\frac{HP \times .746}{V \times P.F. \times EFF.}$	$\frac{HP \times .746}{1.732 \times V \times EFF \times P.F.}$	$\frac{HP \times .746}{V \times EFF.}$
Ampheres when kW known	$\frac{kW \times 100}{V \times P.F.}$	$\frac{kW \times 100}{1.732 \times V \times P.F.}$	$\frac{kW \times 100}{V}$
Ampheres when kVA known	$\frac{kVA \times 1000}{V}$	$\frac{kVA \times 1000}{1.732 \times V}$	
Frequency (c.p.s)	$\frac{Poles \times RPM}{120}$	$\frac{Poles \times RPM}{120}$	
Reactive kVA (kVAR)	$\frac{V \times I \times \sqrt{1-(P.F.)^2}}{1000}$	$\frac{1.732 \times V \times I \times \sqrt{1-(P.F.)^2}}{1000}$	
% Voltage Regulation	$\frac{100\ (V_{NL}-V_{FL})}{V_{FL}}$	$\frac{100\ (V_{NL}-V_{FL})}{V_{FL}}$	$\frac{100\ (V_{NL}-V_{FL})}{V_{FL}}$

Electrical Table Abbreviations

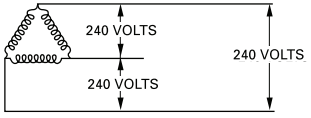
V - voltage in volts
I - current in ampheres
kW - power in kilowatts (actual power)
kVA - kilovolt ampheres (apparent power)
HP - horsepower
RPM - revolutions per minute
kVAR - reactive kilovolt ampheres
EFF. - efficiency as a decimal factor
NL - no load
FL - full load
P.F. - power factor

Note: DC kW = DC kVA

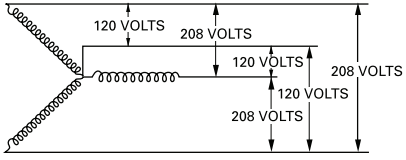
THREE PHASE CONNECTION SYSTEMS



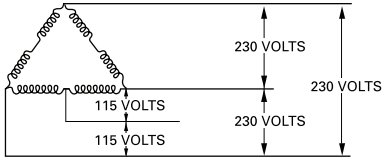
THREE-PHASE, THREE-WIRE (WYE)
A



THREE-PHASE, THREE-WIRE (DELTA)
B



THREE-PHASE, FOUR-WIRE (WYE)
C



THREE-PHASE, FOUR-WIRE (DELTA)
D

REDUCED VOLTAGE STARTERS

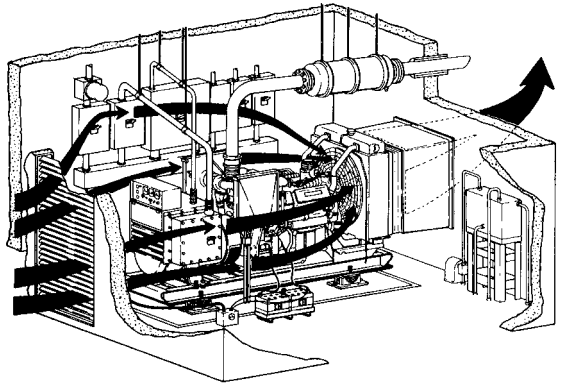
Type of Starter	Motor Voltage (% Line Voltage)	Line Current (% Full Voltage) Starting Current	Starting Torque (% of Full Voltage) Starting Torque
Full Voltage Starter	100	100	100
Auto Transformer • 80% Tap • 65% Tap • 50% Tap	 80 65 50	 68 46 30	 64 42 25
Resistor Starter Single Step (adjusted for motor voltage to be 80% of line voltage)	80	80	64
Reactor • 50% Tap • 45% Tap • 37.5% Tap	 50 45 37.5	 50 45 37.5	 25 20 14
Part Winding (low speed motors only) • 75% Winding • 80% Winding	 100 100	 75 50	 75 50

COMPARISON OF REDUCED VOLTAGE STARTING METHODS

Characteristics	Autotransformer	Primary Resistor	Reactor	Two-Step
Starting Line Current at Same Motor Terminal Voltage	Least	More than autotransformer type		
Starting Power Factor	Low	*High	Low	Low
Power Draw from Line During Starting	Low	More than autotransformer type		
Torque	Increases slightly with speed	Increases rapidly with speed		Increases slightly with speed
Smoothness of Acceleration	Motor momentarily disconnected from line from start to run	Smooth. Transfer made with little change in motor terminal voltage		Smooth
Relative Cost	Average	Lower in small size- otherwise equal	Average	Less than others
Ease of Control	Same	Same	Same	No provision for adjustment of starting current
Maintenance	Same	Same	Same	Less than others
Line Disturbance	Varies with conditions and type of load			More than others

* Resistor starting adds considerable kW load to generator set. Total power required includes the motor kW and the kW which is lost as heat in the resistor. The series resistors account for a higher than normal starting power factor.

ENGINE ROOM VENTILATION



Engine room ventilation can be estimated by the following formulas, assuming 100°F (38°C) ambient air temperature:

$$V\ (cfm) = \frac{H}{0.070 \times 0.24 \times \Delta T} + \text{Engine Combustion Air}$$

$$V\ (m^3/min) = \frac{H}{1.099 \times 0.017 \times \Delta T} + \text{Engine Combustion Air}$$

V = Ventilation air (cfm) (m^3/min).
H = Heat radiation (Btu/min) (kW).
Δ**T** = Permissible temperature rise in engine room (°F) (°C).
Density of air at 100°F = 0.070 lb/cu ft (1.099 kg/m^3).
Specific heat of air = 0.24 Btu/°F (0.017 kW/°C).

CONVERSIONS
CONTINUED

CONVERSION FACTORS

LENGTH

Unit	mm	in	ft	yd	m	km	mi
mm	1	.03937	.003281	.001094	.001	.0000 01	–
in	25.4	1	0.083 33	.027 78	0.0254	0.000 03	–
ft	304.8	12	1	0.333 33	0.3048	0.000 30	–
yd	914.4	36	3	1	0.9144	0.000 91	–
m	1000	39.3701	3208.84	1.093 61	1	0.001	0.000 62
km	100 0000	39 370.1	3208.84	1093.61	1000	1	0.621 37
mi	160 9340	63 360	5280	1760	1609.34	1.609 34	1

AREA

Unit	mm^2	in^2	m^2	ft^2
mm^2	1	0.00155	–	–
in^2	645.16	1	0.000 645 16	0.006 944
m^2	10 00000	1550	1	10.764
ft^2	92903	144	0.0929	1

1 sq mile = 640 acres
1 cir mil = $5.067 \times 10^{-6} cm^2$
1 cir mil = .7854 x $mils^2$
1 cir mil = $7.854 \times 10^{-7} in^2$
1 acre = 4840 yd^2

WEIGHT

Unit	Kilograms	Ounces Avoirdupois	Pounds Avoirdupois	Short Tons	Long Tons	Metric Tons
1 Kilogram	1	35.27	2.205	–	–	–
1 Ounce	0.02835	1	0.0625	–	–	–
1 Pound	0.4536	16	1	–	–	–
1 Short Ton	907.2	32,000	2,000	1	0.8929	0.9072
1 Long Ton	1,016	35,840	2,240	1.12	1	1.016
1 Metric Ton	1,000	35,300	2,205	1.102	0.9842	1

1 grain = 0.064799 gram

CONVERSION FACTORS

FLOW

Unit	U.S. gal/min	million U.S. gal/day	ft^3/s	m^3/h	L/s
U.S. gal/min	1	0.001 440	0.002 23	0.2270	0.0631
1 million gal/day	694.5	1	1.547	157.73	43.8
ft3/s	448.8	0.0646	1	101.9	28.32
m3/h	4.403	0.006 34	0.009 81	1	0.2778
L/s	15.85	0.0228	0.0353	3.60	1

MCFD = 1000 ft^3/day
MMCFD = 1,000,000 ft^3/day
lb/bhp-hr x 607.73 = g/kW-hr

ENERGY

Unit	Btu	Cal	ft-lb	J	Kcal	Therm
Btu	1	252	778	1055.056	0.252	0.00001
Calorie	0.00397	1	3.08866	4.187	0.001	–
Foot-Pound	0.001285	0.323765	1	1.356	0.003089	–
Joule	0.000948	0.23895	0.73745	1	–	–
Kilocalorie	3.96825	1000	3089	4185	1	2.519
Therm	100,000	396.8254	128.5347	94.78169	0.39682	1

1 Therm = 1,000,000 Btu
Btu/ft^3 = 8.899 kg-cal/m^3
Btu/ft^2/min = 0.1220 Watts/in^2
Btu/lb = .5556 kg-cal/kg

CONVERSIONS
CONTINUED

CONVERSION FACTORS

TEMPERATURE CONVERSION

°F = (1.8 x °C) + 32
°C = 0.5555 (°F - 32)

ANGLE

1 quadrant = 90 degrees
1 quadrant = 1.57 radians
1 radian = 57.3
1 degree = 60 minutes
1 minute = 2.9 x 10 radians

IDENTIFYING CODE LETTERS ON AC MOTORS

NEMA Code Letter	Starting skVA/hp
A	0.00 - 3.14
B	3.15 - 3.54
C	3.55 - 3.99
D	4.00 - 4.49
E	4.50 - 4.99
F	5.00 - 5.59
G	5.60 - 6.29
H	6.30 - 7.09
J	7.10 - 7.99
K	8.00 - 8.99
L	9.00 - 9.99
M	10.00 - 11.19
N	11.20 - 12.49
P	12.50 - 13.99
R	14.00 - 15.99
S	16.00 - 17.99
T	18.00 - 19.99
U	20.00 - 22.39
V	22.40

Note: Code letters apply to motors up to 200 HP.

CONVERSION FACTORS

CONVERSION FACTORS

VOLUME AND CAPACITY

Unit	in^3	ft^3	yd^3	mm^3	m^3	U.S. gal	Imp gal	liter
in^3	1	0.000 58	0.000 02	16387.1	0.000 02	0.004 32	0.003 61	0.01639
ft^3	1728	1	0.037 04	28 320 000	0.028 32	7.480 52	5.228 83	28.3169
yd^3	46656	27	1	764 554 858	0.76455	201.974	168.178	764.555
mm^3	6.1×10^{-5}	4.0×10^{-8}	–	1	–	2.6×10^{-7}	2.2×10^{-7}	1.0×10^{-6}
m^3	61 023.7	35.3147	1.307 95	1,000,000,000	1	264.192	219.969	1000
U.S. gal	231	0.133 68	0.004 95	3785420	0.003 78	1	–	3.785 41
Imp gal	277.419	0.160 54	0.005 95	4540090	0.004 55	1.200 95	1	4.546 09
liter	61.023 7	0.035 31	0.001 31	1000 000	0.001	0.264 17	0.219 97	1
acre-ft	–	43 560	1613.33	–	1233.48	325 851	271 335	–

1 board-foot = 144 in^3 1 bushel = 1.244 ft^3 1 bushel = 4 pecks

POWER

Unit	Btu/min	ft-lb/min	hp	J/min	Metric hp	kW	W
Btu/min	1	778.2	0.02358	1055.000	0.02391	0.0175843	17.5843
ft-lb/min	0.00128	1	0.00003	1.3504	0.00003	0.0000226	0.0226
Horsepower	42.456	33000	1	44791	1.014	0.74570	745.7
Joules/min	0.00095	0.7405	0.0000223	1	0.0000226	0.0000166	0.016668
Metric hp	41.827	32550	0.98632	44127	1	0.73549	735.498
Kilowatt	59	44250	1.34102	59997	1.35962	1	1000
Watt	0.05687	44.25	0.00134	59.9968	0.00136	0.001	1

PRESSURE AND HEAD

Unit	mm/Hg (0°C)	in./Hg (0°C)	in. H_20 (60°F)	ft. H_20 (60°F)	lb/in^2	kg/cm^2	bar	Atmospheres 101.4Pa (14.7 psi)	kPa
mm/Hg	1	0.039 37	0.5357	0.04464	0.019 34	0.001 36	0.001 33	0.001 315	–
in./Hg	25.4	1	13.61	1.134	0.491 15	0.034 53	0.033 86	0.033 42	–
in. H_20	1.868 27	0.07 355	1	0.083 33	0.036 13	0.002 54	0.002 49	0.002 46	0.249
ft. H_20	22.4192	0.882 65	12	1	0.433 52	0.030 479	0.029 89	0.029 50	2.989
lb/in^2	51.7149	2.036 02	27.70	2.309	1	0.070 31	0.068 95	0.068 05	6.895
kg/cm^2	735.559	28.959	395	32.84	14.2257	1	0.980 67	0.967 84	98.067
bar	750.062	29.530	401.8	33.49	14.504	1.019 72	1	0.98692	101.325
kPa	7.500 62	0.295 30	4.01835	0.33486	0.145 038	0.010 1972	0.010 000	0.009 869 20	1

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