Generator Ratings Explained

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Definitions

Term	Definition
Intermittent Power	The highest output obtainable at SAE standard ambient conditions. These levels may be only maintained for operating periods of short duration
Standby Power	The electrical output of a generator set used for emergency or backup power, for use when normal powerline utilities fail. Usually runs less than 60 hours per year.
Continuous Power	The output which can be obtained at SAE standard ambient conditions, operating in a continuous duty mode. The electrical load on the generator set will usually be steady.
Prime Power	The electrical output of a generator set used as the primary source of power, often running 24 hours a day. The electrical load usually varies.
pf - Power Factor	• Three phase circuits will usually assume a "power factor" (**p.f.**) of 0.8 lagging. • The concept of power factor can get a bit confusing but basically it refers to the out-of-phase relationship between the voltage and the current in an electrical system. • If actual data are not available, a p.f. of 0.8 is assumed and the power is shown in kiloVolt/Amperes (**kVA**). • There is a direct relationship between the voltage (**V**), the current (**A**), and the power in kW or in kVA. • The assumption of a 0.8 lagging power factor for three phase circuits is not necessarily a safe assumption. This may be "typical", if typical exists, of inductive reactance loads such as motors. However, many three phase circuits now incorporate non-linear loads such as variable frequency drives that require special attention to correctly size the generator to the load characteristics. Similarly, assuming a 1.0 (unity) power factor for single phase circuits may not always be correct.
kW - kilowatts	kW, kilowatts, or sometimes kWm, kilowatts mechanical, refers to the power output from an engine driving a generator set or, in other words, the mechanical power driving the generator.

Term	Definition
	To avoid confusion, the electrical output from the generator is often referred to as kWe which is the actual generator output after efficiency losses within the generator. Electrical power is usually measured in Watts (W) or thousands of Watts (kilowatts, kWe). kWe is sometimes referred to as "real power" while kVA (kilovolt-amperes) is apparent power. For single phase circuits the relationship is: Amperes x Volts ÷ 1,000 = kW. For three phase circuits: Volts x 1.73 x Amperes ÷ 1,000 = kVA

If you know the electrical load in Amps and you know the system voltage, you can find the required kilowatts or kVA from the chart. Similarly, the system's current can easily be found if you know the kWe and voltage.

Sizing a Generator Set

Before attempting to size a generator set, gather as much detail about the actual operating conditions and loads as possible. Sometimes a custom-built generator set—sized for the specific requirements—can easily pay for its cost in fuel savings, especially where motor starting is a primary consideration.

The following charts are handy guides to find the current (amperes) or kilowatts in an electrical system.

Generator Ratings in Amperes for 3 Phase Outputs at 0.8 Power Factor

KVA	KWe	208V	220V	240V	380V	416V	440V	480V	600V
6.3	5	17.5	16.5	15.2	9.6	8.6	8.3	7.6	6.1
9.4	7.5	26.1	24.7	22.6	14.3	13	12.3	11.3	9.1
12.5	10	34.7	33	30.1	19.2	17.3	16.6	15.1	12
18.7	15	52	49.5	45	28.8	26	24.9	22.5	18

KVA	KWe	208V	220V	240V	380V	416V	440V	480V	600V
25	20	69.5	66	60.2	38.4	43.7	33.2	30.1	24.1
31.3	25	87	82.5	75.5	48	52	41.5	37.8	30.2
37.5	30	104	99	90.3	57.6	62.5	49.8	45.2	36.1
43.8	35	125	118	108	68	70	59	54	42.2
50	40	139	131	120	76	78	66	60	48
56.3	45	156	147	135	86	86	74	68	54
62.5	50	173	165	152	96	104	83	76	60
75	**60**	208	198	181	115	130	99.6	91	72
93.8	**75**	261	247	226	143	139	123	113	90
100	**80**	278	264	240	154	173	133	120	96
125	**100**	347	330	301	192	217	166	150	120
156	**125**	433	413	375	240	260	208	188	150
187	**150**	520	495	450	288	304	249	225	180
219	**175**	608	577	527	335	347	289	264	211
250	**200**	694	660	601	384	434	332	301	241
312	**250**	866	825	751	480	521	415	376	301
375	**300**	1040	990	903	576	607	498	451	361
438	**350**	1220	1155	1053	672	694	581	527	422
500	**400**	1390	1320	1203	770	868	665	602	482
625	**500**	1735	1650	1504	960	868	830	752	602

1) Formula used is A = (KVA x 1000) / (1.73 x Volts)
2) Current ratings are "linear". For example, a 750 KVa (600 kWe at 0.8 Power Factor) at 480V produces 902 amps, or double the what is shown in the table for 375 kVa

*NEMA Starting Codes for Three Phase Motors KVA / HP Required for Locked Rotor Starting

Code	Starting KVA /HP §	Typical Motor Size
A	0 - 3.15	(Special)
B	3.15 - 3.55	(Special)
C	3.55 - 4.0	(Special)
D	4.0 - 4.5	(Special)
E	4.5 - 5.0	(Special)
F	5.0 - 5.6	15 H.P. +
G	5.6 - 6.3	10 H.P.
H	6.3 - 7.1	5 & 7.5 H.P.
J	7.1 - 8.0	3 H.P.
K	8.0 - 9.0	1.5 & 2 H.P.
L	9.0 - 10.0	1 H.P.
M	10.0 - 11.2	< 1 H.P.

** Starting code letter can be found on Motor Name Plate Data. DO NOT confuse "design code" with "starting code".*
***§** For generator sizing use the higher inrush value. Consult the generator set manufacturer for voltage dip information and for generator current output capability.*