

FORMULAS

THREE PHASES SYSTEM

$$\text{kVA} = \text{kWe} / \text{PF}$$

$$\text{kVA} = \frac{U \times I \times 1,73}{1000}$$

$$\text{kVA} = (\text{kWm} - \text{kWfan}) \times \text{EFF} / 0,8 / 1,1 = \text{PRP}$$

$$\text{kWe} = \text{kWm} \times \text{EFF}$$

$$\text{kWe} = \frac{U \times I \times 1,73 \times \text{PF}}{1000}$$

$$\text{kVAR} = \frac{U \times I \times 1,73 \times \sqrt{1 - (\text{PF})^2}}{1000}$$

$$\text{Amps} = \frac{\text{kVA} \times 1000}{U \times 1,73}$$

$$\text{Amps} = \frac{\text{kWe} \times 1000}{U \times 1,73 \times \text{PF}}$$

$$\text{Hz} = \frac{\text{rpm} \times \text{poles}}{2 \times 60}$$

$$\text{rpm} = \frac{2 \times 60 \times \text{Hz}}{\text{poles}}$$

$$\text{kVA} = \frac{U \times I}{1000}$$

Single phase system

ENGINE

$$\text{PME} = \frac{2 \times \text{kWm}}{\text{displ} \times \text{rpm}} \text{ (MPa)}$$

$$\text{kWm} = \frac{2\pi \times T \times \text{rpm}}{1000 \times 60}$$

CAPTION

Displ	Displacement
EFF	Generator efficiency
Hz	Frequency
I	Current (ampere)
kVA	Active power
kVAR	Reactive power
kWe	Active power
PF	Power factor
PME	Mean effective pressure
rpm	Revolution per minute
T	Torque
U	Voltage

STANDARDS

93 / 68 / CEE (92 / 31 / CEE ; 89 / 336 / CEE)

Approximation of the laws of the member States relating to electromagnetic compatibility

93 / 68 / CE (73 / 23 / CEE)

Approximation of the laws of the Member states relating to electrical equipment designed for use within certain voltage limits

98 / 79 / CE (98 / 37 / CE ; 89 / 392 / CE)

Machinery safety

2000 / 14 / CE

Environmental acoustic emission of machines and equipments to be used outside

2002 / 88 / CE (97 / 68 / CE ; 2004 / 26 / CE)

Approximation of the laws of the Members States relating to measures against the emissions of gaseous and particulate pollutants from internal combustion engines to be installed in non road mobile machinery.

ISO 8528

Reciprocating internal combustion engine driven alternating current generating sets

ISO 3046

Reciprocating internal combustion engines.

RATINGS DESIGNATION

Engine : Engine Power ratings are based on operation at ISO 3046 power standard.

Genset : Genset power ratings are based on ISO 8528 power standards

GENSET POWER DESIGNATION

The Prime Power :

It's the maximum power available with varying loads for an unlimited number of hours. The average power output during a 24 period of operation must not exceed 80 % of the declared prime power between the prescribed maintenance intervals and at standard environmental conditions. A 10 % overload is permissible for 1 hour every 12 hours of operation.

The Stand By Power :

It's the maximum power available for a period of 500 hours/year with a mean load factor of 90 % of the declared stand-by power. No kind of overload is permissible for this use.

The Continuous Power :

It's the power delivered continuously for an unlimited number of hours per year between the stated maintenance intervals and under stated ambient conditions.

NON-ROAD		EMISSION STANDARDS																UPDATE 27/10/03					
Vehicle category	Unit																	Test cycle	Directive				
Europe	130-560 kW	CO	HC		NOX	PM	CO	HC		NOX	PM	CO	Nox	HC			PM	CO	Nox	HC	PM	ISO 8178 C1	2004/26 EEC
		Stage 1					Stage 2					Stage 3					Stage 4						
		5,00	1,30		9,20	0,54	3,50	1,00		6,00	0,20	3,50	4,00			0,20	3,50	4,00	0,025				
	75-129 kW	Stage 1					Stage 2					Stage 3					Stage 4						
		5,00	1,30		9,20	0,70	5,00	1,00		6,00	0,30	5,00	4,00			0,30	5,00	4,00	0,025				
		Stage 1					Stage 2					Stage 3					Stage 4						
	37-74 kW	Stage 1					Stage 2					Stage 3					Stage 4						
		5,00	1,30		9,20	0,85	5,00	1,30		7,00	0,40	5,00	4,70			0,40	5,00	4,70	0,025				
		Stage 1					Stage 2					Stage 3					Stage 4						
USA	>560 kW	CO	HC		NOX	PM	CO		NMHC	NOX	PM	CO		NMHC	NOX	PM		Nox	HC	PM	ISO 8178 C1 + TSC	EPA/40 CFR	
		Tier 1					Tier 2					Tier 3					Tier 4						
		11,40	1,30		9,20	0,54	3,50		6,40		0,20	3,50		4,00		0,20		4,00	0,013				
	450-559 kW	Tier 1					Tier 2					Tier 3					Tier 4						
		11,40	1,30		9,20	0,54	3,50		6,40		0,20	3,50		4,00		0,20		4,00	0,013				
		Tier 1					Tier 2					Tier 3					Tier 4						
	225-449 kW	Tier 1					Tier 2					Tier 3					Tier 4						
		11,40	1,30		9,20	0,54	3,50		6,40		0,20	3,50		4,00		0,20		4,00	0,013				
		Tier 1					Tier 2					Tier 3					Tier 4						
130-224 kW	Tier 1					Tier 2					Tier 3					Tier 4							
	11,40	1,30		9,20	0,54	3,50		6,60		0,20	3,50		4,00		0,20		4,00	0,013					
	Tier 1					Tier 2					Tier 3					Tier 4							
75-129 kW	Tier 1					Tier 2					Tier 3					Tier 4							
				9,20		5,00		6,60		0,30	5,00		4,00		0,30		4,00	0,013					
	Tier 1					Tier 2					Tier 3					Tier 4							
37-74 kW	Tier 1					Tier 2					Tier 3					Tier 4							
				9,20		5,00		7,50		0,40	5,00		4,70		0,40		4,70	0,013					
	Tier 1					Tier 2					Tier 3					Tier 4							
India	Agric.Tractor	CO	HC		NOX		CO	HC		NOX	PM											ISO 8178 C1	77/537/EC
		Stage 1					Stage 2																
		14,00	3,50		18,00		11,20	2,40		14,40													

NOx Nitrous oxide are formed by a reaction between the N and O on the air at high temperatures.

HC Hydrocarbons are elements of unburned fuel which have formed as a result of low combustion temperature and/or a poor fuel/air mixture. They give diesel exhaust its characteristic smell

CO Carbon monoxide is formed at the intermediate combustion stage as a result of air deficiency, which results in incomplete oxidization from CO to CO2

PT Particulate consist of a core of carbon (< 10 µm) and comes from the fuel and the lubricating oil. This is primarily a result of poor fuel/air mixture. Poisonous hydrocarbons condense on the surface of the particles

NON-ROAD	REGISTRATION DATE									
VEHICLE CATEGORY	2002	2003	2004	2005	2006	2007	2008	2009	2010	
<i>Europe</i>										
NR costant speed 130-560 kW	Stage 2								Stage 3	
NR costant speed 75-129 kW	Stage 1		Stage 2						Stage 3	
NR costant speed 37-74 kW	Stage 1			Stage 2						
<i>USA</i>										
Non road > 560 kW	Tier 1					Tier 2				
Non road 225 - 559 kW	Tier 2					Tier 3			Tier 4	
Non road 130 - 224 kW	Tier 1	Tier 2				Tier 3			Tier 4	
Non road 75 - 129 kW	Tier 1	Tier 2				Tier 3			Tier 4	
Non road 37 - 74 kW	Tier 1			Tier 2			Tier 3		Tier 4	
<i>India</i>										
Agric.Tractor	S 1	Stage 2								