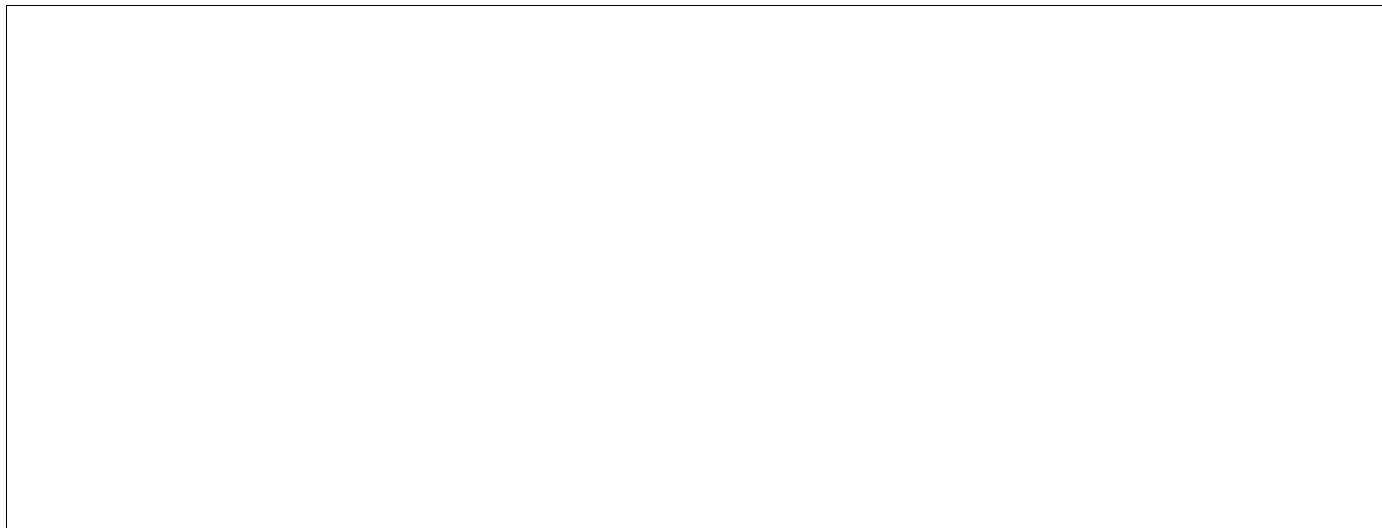
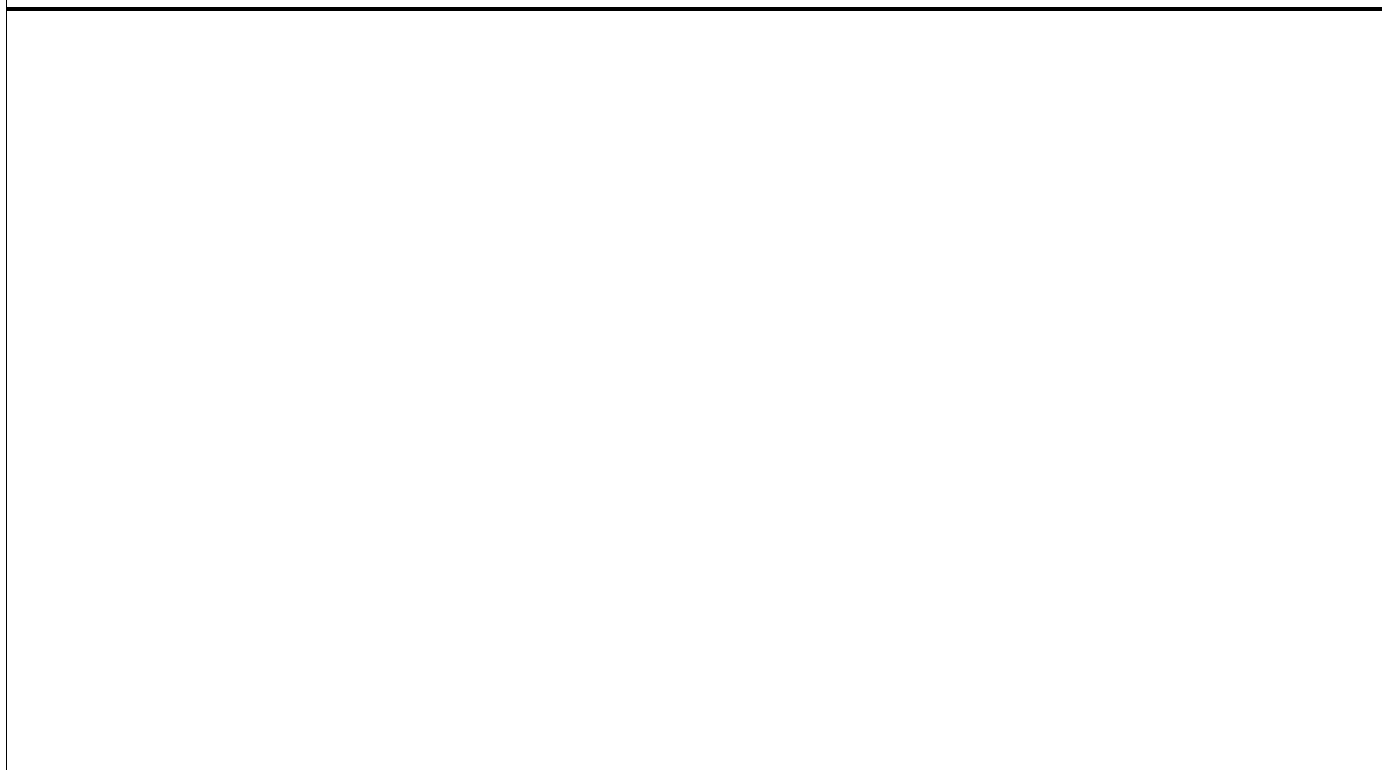
	Doc ID	: PTOTOT240507	
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## DATOS TÉCNICOS GRUPOS GENERARES



Emisión	Generado por	Revisado por	Proyecto
MAYO 2007	Nombre : Vicente Rosello	Nombre : Alexi Larrain	333 - TOTORALILLO
	Cargo : Project Engineer	Cargo : Ingeniero Soporte Operaciones	
	Empresa : Finning Chile S.A.	Empresa : Finning Chile S.A.	

## PROYECTO PUERTO TOTORALILLO Power plant capacity calculation

**Duty cycle**  
**Recommended maximum load factor**

<b>PRIME</b>	<b>CONTINUOUS</b>
<b>70%</b>	<b>100%</b>

**AMBIENT**

deg.C

20	20
----	----

**GENSET DETAILS**

Engine type:

Performance Number

Fuel type

Speed

Site output (engine)

Alternator efficiency

Gross site output (genset)

Module auxiliaries

Net site output per unit

rpm

bkW

ekW

ekW

ekW

Caterpillar	Caterpillar
3512BDITA	3512BDITA
DM6664	DM8042
Diesel N°2	Diesel N°2
1500	1500
1.454	1.151
94%	94%
1.360	1.056
1	1
1.359	1.055

**POWER PLANT DETAILS**

Number of units installed

Station auxiliary power (estimate)

Net capacity to export

n

kW

n ekW

n - 1 ekW

n - 2 ekW

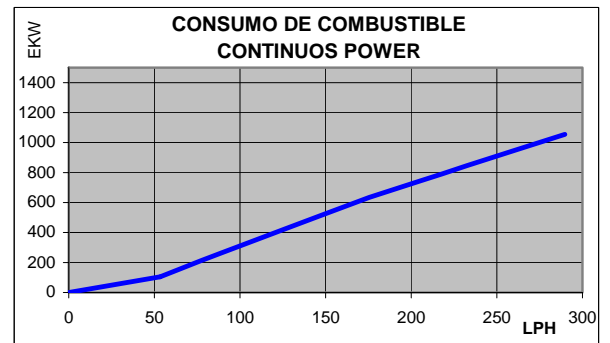
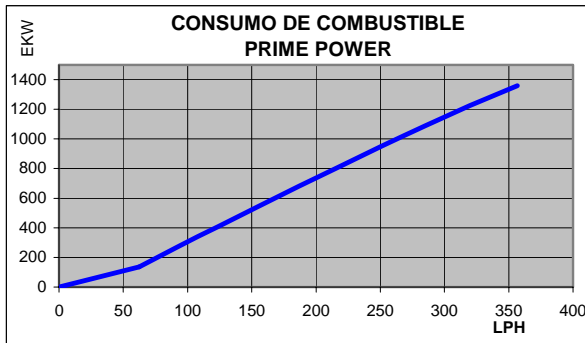
Annual energy production

n - 2 eGWh

3	3
9	9
4.069	3.157
2.710	2.102
1.350	1.046
8,28	9,17

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## FUEL CONSUMPTION



**PRIME POWER**

EKW	LOAD	LPH	G/BKW-HR	M <sup>3</sup> /MWH
1360	100%	356,7	205,8	0,262
1224	90%	319,5	204,3	0,261
1088	80%	284,8	203,9	0,262
1020	75%	267,8	203,9	0,263
952	70%	251,2	204,2	0,264
816	60%	218,6	205,4	0,268
680	50%	186,6	207,7	0,274
544	40%	155,1	211,5	0,285
408	30%	123,6	218,1	0,303
340	25%	107,9	223,7	0,317
272	20%	92,3	232,0	0,339
136	10%	62,3	273,9	0,458

**CONTINUOS POWER**

EKW	LOAD	LPH	G/BKW-HR	M <sup>3</sup> /MWH
1056	100%	289,7	211,2	0,274
950,4	90%	261,0	211,0	0,275
844,8	80%	232,3	210,3	0,275
792	75%	218,0	210,0	0,275
739,2	70%	203,7	209,5	0,276
633,6	60%	175,4	208,5	0,277
528	50%	150,3	211,5	0,285
422,4	40%	125,9	216,3	0,298
316,8	30%	101,3	224,1	0,320
264	25%	89,1	230,3	0,338
211,2	20%	77,0	239,9	0,365
105,6	10%	53,3	282,4	0,505

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## EMISSIONS DATA

### PRIME POWER:

#### RATED SPEED "Nominal Data"

GEN PWR EKW	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) mg/norm cu M @ %5 O2	TOTAL CO mg/norm cu M @ %5 O2	TOTAL HC mg/norm cu M @ %5 O2	PART MATTER mg/norm cu M @ %5 O2	OXYGEN IN EXHAUST PERCENT	DRY SMOKE OPACITY PERCENT	BOSCH SMOKE NUMBER
1,360.0	100	1,453.9	2,626.6	332.9	65.7	14.9	10.2000	1.0000	1.2800
1,020.0	75	1,101.9	2,772.4	443.0	63.6	21.8	10.7000	1.9000	1.2800
680.0	50	753.6	2,884.6	346.9	79.0	32.4	11.2000	2.6000	1.2800

$$SO_2 = 206 \text{ mg/bkW-h}$$

### CONTINUOUS POWER:


#### RATED SPEED "Nominal Data"

GEN PWR EKW	PERCENT LOAD	ENGINE POWER BKW	TOTAL NOX (AS NO2) mg/norm cu M @ %5 O2	TOTAL CO mg/norm cu M @ %5 O2	TOTAL HC mg/norm cu M @ %5 O2	PART MATTER mg/norm cu M @ %5 O2	OXYGEN IN EXHAUST PERCENT	DRY SMOKE OPACITY PERCENT	BOSCH SMOKE NUMBER
1,056.0	100	1,150.6	1,798.7	147.4	94.6	38.3	11.4000	1.3000	1.2800
792.0	75	871.0	2,079.8	270.5	106.4	46.5	11.7000	1.8000	1.2800
528.0	50	596.0	2,772.1	422.5	115.5	53.4	12.1000	2.1000	1.2800

$$SO_2 = 211 \text{ mg/bkW-h}$$

EMISSIONS DATA MEASUREMENT IS CONSISTENT WITH THOSE DESCRIBED IN EPA CFR 40 PART 86 SUBPART D AND ISO 8178-1 FOR MEASURING HC, CO, CO2 AND NOX. THESE PROCEDURES ARE VERY SIMILAR TO THE METHODS DESCRIBED IN EPA CFR 40 PART 60 APPENDIX A METHOD 25A FOR HYDROCARBONS, METHOD 10 FOR CO, METHOD 7E FOR NOX. DATA SHOWN IS BASED ON STEADY STATE ENGINE OPERATING CONDITIONS OF 25 DEG C, 96 KPA AND NUMBER 2 DIESEL FUEL WITH 35 DEG API AND LHV OF 42,780 KJ/KG.

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GEN SET - PACKAGED - DIESEL TOLERANCES:  
 AMBIENT AIR CONDITIONS AND FUEL USED WILL AFFECT THESE VALUES. EACH OF THE VALUES MAY VARY IN ACCORDANCE WITH THE FOLLOWING TOLERANCES.

ENGINE POWER	+/- 3%
EXHAUST STACK TEMPERATURE	+/- 8%
GENERATOR POWER	+/- 5%
INLET AIR FLOW	+/- 5%
INTAKE MANIFOLD PRESSURE - GAGE	+/- 10%
EXHAUST FLOW	+/- 6%
SPECIFIC FUEL CONSUMPTION	+/- 3%
FUEL RATE	+/- 5%
HEAT REJECTION	+/- 5%
HEAT REJECTION EXHAUST ONLY	+/- 10%

CONDITIONS:

ENGINE PERFORMANCE IS CORRECTED TO INLET AIR STANDARD CONDITIONS OF 99 KPA (29.31 IN HG) AND 25 DEG C (77 DEG F).

THESE VALUES CORRESPOND TO THE STANDARD ATMOSPHERIC PRESSURE AND TEMPERATURE IN ACCORDANCE WITH SAE J1995. ALSO INCLUDED IS A CORRECTION TO STANDARD FUEL GRAVITY OF 35 DEGREES API HAVING A LOWER HEATING VALUE OF 42,780 KJ/KG (18,390 BTU/LB) WHEN USED AT 29 DEG C (84.2 DEG F) WHERE THE DENSITY IS 838.9 G/L (7.002LB/GAL). THE CORRECTED PERFORMANCE VALUES SHOWN FOR CATERPILLAR ENGINES WILL APPROXIMATE THE VALUES OBTAINED WHEN THE OBSERVED PERFORMANCE DATA IS CORRECTED TO SAE J1995, ISO 3046-2 & 8665 & 2288 & 9249 & 1585, EEC 80/1269 AND DIN70020 STANDARD REFERENCE CONDITIONS.

ENGINES ARE EQUIPPED WITH STANDARD ACCESSORIES; LUBE OIL, FUEL PUMP AND JACKET WATER PUMP. THE POWER REQUIRED TO DRIVE AUXILIARIES MUST BE DEDUCTED FROM THE GROSS OUTPUT TO ARRIVE AT THE NET POWER AVAILABLE FOR THE EXTERNAL (FLYWHEEL) LOAD. TYPICAL AUXILIARIES INCLUDE COOLING FANS, AIR COMPRESSORS, AND CHARGING ALTERNATORS.

RATINGS MUST BE REDUCED TO COMPENSATE FOR ALTITUDE AND/OR AMBIENT TEMPERATURE CONDITIONS ACCORDING TO THE APPLICABLE DATA SHOWN ON THE PERFORMANCE DATA SET.

GEN SET - PACKAGED - DIESEL

ALTITUDE:

ALTITUDE CAPABILITY - THE RECOMMENDED REDUCED POWER VALUES FOR SUSTAINED ENGINE OPERATION AT SPECIFIC ALTITUDE LEVELS AND AMBIENT TEMPERATURES.

COLUMN "N" DATA - THE FLYWHEEL POWER OUTPUT AT NORMAL AMBIENT TEMPERATURE.

AMBIENT TEMPERATURE - TO BE MEASURED AT THE AIR CLEANER AIR INLET DURING NORMAL ENGINE OPERATION.

NORMAL TEMPERATURE - THE NORMAL TEMPERATURE AT VARIOUS SPECIFIC ALTITUDE LEVELS IS FOUND ON TM2001.

THE GENERATOR POWER CURVE TABULAR DATA REPRESENTS THE NET ELECTRICAL POWER OUTPUT OF THE GENERATOR.


GENERATOR SET RATINGS  
 EMERGENCY STANDBY POWER (ESP)

OUTPUT AVAILABLE WITH VARYING LOAD FOR THE DURATION OF AN EMERGENCY OUTAGE. AVERAGE POWER OUTPUT IS 70% OF THE ESP RATING. TYPICAL OPERATION IS 50 HOURS PER YEAR, WITH MAXIMUM EXPECTED USAGE OF 200 HOURS PER YEAR.

STANDBY POWER RATING

OUTPUT AVAILABLE WITH VARYING LOAD FOR THE DURATION OF AN EMERGENCY OUTAGE. AVERAGE POWER OUTPUT IS 70% OF THE STANDBY POWER RATING. TYPICAL OPERATION IS 200 HOURS PER YEAR, WITH MAXIMUM EXPECTED USAGE OF 500 HOURS PER YEAR.

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PRIME POWER RATING

OUTPUT AVAILABLE WITH VARYING LOAD FOR AN UNLIMITED TIME. AVERAGE POWER OUTPUT IS 70% OF THE PRIME POWER RATING. TYPICAL PEAK DEMAND IS 100% OF PRIME RATED EKW WITH 10% OVERLOAD CAPABILITY FOR EMERGENCY USE FOR A MAXIMUM OF 1 HOUR IN 12. OVERLOAD OPERATION CANNOT EXCEED 25 HOURS PER YEAR.

CONTINUOUS POWER RATING

OUTPUT AVAILABLE WITH NON-VARYING LOAD FOR AN UNLIMITED TIME. AVERAGE POWER OUTPUT IS 70-100% OF THE CONTINUOUS POWER RATING. TYPICAL PEAK DEMAND IS 100% OF CONTINUOUS RATED EKW FOR 100% OF OPERATING HOURS.

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