

Fuel Consumption (ISO3046/1)	100% of Rated Load	90% of Rated Load	75% of Rated Load	50% of Rated Load
Fuel Consumption (LHV) ISO3046/1, kW (MMBTU/hr)	4530 (15.47)	4106 (14.02)	3492 (11.93)	2458(8.39)
Electrical Efficiency ISO3046/1, percent	44.2%	43.8%	43.0%	40.7%
Thermal Efficiency ISO3046/1, percent	45.9%	46.0%	46.7%	48.5%

ENGINE

Engine Manufacturer	Cummins
Engine Model	HSK78
Configuration	V12
Displacement, L (cu.in)	78 (4778)
Aspiration	Turbocharged and Charge Air Aftercooled
BMEP, bar (psi)	22 (319)
Bore, mm (in)	190 (7.48)
Stroke, mm (in)	230 (9.06)
Rated Speed, rpm	1500
Piston Speed, m/s (ft/min)	11.5 (2264)
Compression Ratio	13.0:1
Lube Oil Capacity, L (qt)	583 (616)
Overspeed Limit, rpm	TBD
Full Load Lubricating oil consumption, g/kWe-hr (g/hp-hr)	0.2 (0.15)

FUEL SYSTEM

Gas supply pressure to FSOV inlet, bar (psi) ⁶	0.15 - 0.45 (2.2 - 6.5)
Minimum Methane Index	70

STARTING SYSTEM(S)

Electric starter voltage, volts	24
Minimum battery capacity @ 40°C (104°F), AH	179
Air Starter Pressure, barg (psig)	#N/A
Air Starter Flow Nm ³ /s (scfm)	#N/A

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GENSET DIMENSIONS

Genset Length, m (ft)	6.9 (22)
Genset Width, m (ft)	2.2 (7)
Genset Height, m (ft)	2.8 (9)
Genset Weight (wet), kg (lbs)	23100 (51000)

ENERGY DATA

	100% of Rated Load	90% of Rated Load	75% of Rated Load	50% of Rated Load
Continuous Generator Electrical Output kWe @ 1.0 pf	2000	1800	1500	1000
Total Heat Rejected in LT Circuit, kW (MMBTU/h)	127 (0.43)	119 (0.40)	111 (0.38)	94 (0.32)
Total Heat Rejected in HT Circuit, kW (MMBTU/h)	1180 (4.03)	1035 (3.53)	868 (2.96)	593 (2.02)
Lube Oil Cooler Heat Rejection, kW (MMBTU/h)	302 (1.03)	291 (0.99)	271 (0.93)	222 (0.76)
HT Charge Air Cooler Heat Rejection, kW (MMBTU/h)	480 (1.64)	380 (1.30)	259 (0.88)	96 (0.33)
Heat Dissipated in Block, kW (MMBTU/h)	398 (1.36)	364 (1.24)	338 (1.15)	274 (0.94)
Unburnt, kW (MMBTU/h)	105 (0.36)	102 (0.35)	91 (0.31)	68 (0.23)
Heat Radiated to Ambient, kW (MMBTU/h)	214 (0.73)	193 (0.66)	163 (0.56)	113 (0.39)
Available Exhaust heat to 105°C, kW (MMBTU/h)	947 (3.23)	898 (3.07)	800 (2.73)	624 (2.13)

INTAKE AIR FLOW

	100% of Rated Load	90% of Rated Load	75% of Rated Load	50% of Rated Load
Intake Air Flow Mass, kg/s (lb/hr)	3.12 (24762)	2.80 (22210)	2.35 (18654)	1.60 (12713)
Intake Air Flow Volume, m ³ /s @ 0°C (scfm)	2.41 (5380)	2.16 (4820)	1.82 (4070)	1.24 (2770)
Maximum Air Cleaner Restriction, mmHG (in H ₂ O)	18.7 (10.0)	18.7 (10.0)	18.7 (10.0)	18.7 (10.0)

EXHAUST AIR FLOW

	100% of Rated Load	90% of Rated Load	75% of Rated Load	50% of Rated Load
Exhaust Gas Flow Mass, kg/s (lb/hr)	3.22 (25563)	2.89 (22936)	2.43 (19272)	1.66 (13148)
Exhaust Gas Flow Volume, m ³ /s (cfm)	6.05 (12810)	5.55 (11750)	4.81 (10180)	3.51 (7430)
Exhaust Temperature After Turbine, °C (°F)	390 (734)	405 (760)	426 (800)	474 (886)
Max Exhaust System Back Pressure, mmHG (in H ₂ O)	36.8 (19.7)	36.8 (19.7)	36.8 (19.7)	36.8 (19.7)
Min Exhaust System Back Pressure, mmHG (in H ₂ O)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)

EMISSIONS

	100% of Rated Load	90% of Rated Load	75% of Rated Load	50% of Rated Load
NOx Emissions dry, ppm	163	163	166	169
NOx Emissions, mg/Nm ³ @5% O ₂ (g/hp-h)	493 (0.94)	489 (0.94)	494 (0.97)	490 (1.01)
THC Emissions wet, ppm	1261	1313	1408	1587
THC Emissions, mg/Nm ³ @5% O ₂ (g/hp-h)	1500 (2.87)	1549 (2.98)	1646 (3.22)	1817 (3.76)
CH ₄ Emissions wet, ppm	1002	1044	1114	1251
CH ₄ Emission, mg/Nm ³ @5% O ₂ (g/hp-h)	1203 (2.30)	1243 (2.39)	1314 (2.57)	1447 (2.99)
NMHC Emissions wet, ppm	259	269	294	336
NMHC Exhaust Emissions, mg/Nm ³ @5% O ₂ (g/hp-h)	207 (0.57)	214 (0.59)	235 (0.65)	267 (0.77)
Formaldehyde wet, ppm	42	43	45	49



EMISSIONS

	100% of Rated Load	90% of Rated Load	75% of Rated Load	50% of Rated Load
Formaldehyde, mg/Nm ³ @5% O ₂ (g/hp-h)	95 (0.18)	97 (0.35)	100 (0.39)	107 (0.46)
CO Emissions dry, ppm	467	477	489	502
CO Emissions, mg/Nm ³ @5% O ₂ (g/hp-h)	980 (1.65)	992 (1.68)	1008 (1.73)	1014 (1.83)
CO ₂ Emissions dry, percent	6.0	6.0	6.1	6.2
CO ₂ Emissions, mg/Nm ³ @5% O ₂ (g/hp-h)	197 (330)	197 (332)	197 (338)	198 (357)
O ₂ Emissions dry, percent	10.1	10.0	9.9	9.7
Particulates PM10, g/hp-h	-	-	-	-

GENSET DE-RATING

Altitude and Temperature Derate Multiplication Factor

Barometer		Altitude		Table A											
InHg	mbar	Feet	Meters	Derate Multiplier											
18.2	616	13123	4000	0.72	0.71	0.71	0.71	0.71	0.71	0.67	0.62	0.57	0.21	0.17	0.15
18.8	636	12303	3750	0.74	0.74	0.74	0.74	0.74	0.74	0.70	0.65	0.60	0.39	0.19	0.16
19.5	657	11483	3500	0.77	0.77	0.77	0.77	0.77	0.77	0.73	0.68	0.63	0.43	0.20	0.17
20.1	678	10663	3250	0.80	0.79	0.79	0.79	0.79	0.79	0.76	0.71	0.66	0.45	0.21	0.18
20.7	701	9843	3000	0.83	0.82	0.82	0.82	0.82	0.82	0.79	0.74	0.69	0.48	0.22	0.19
21.4	723	9022	2750	0.85	0.85	0.85	0.85	0.85	0.85	0.82	0.77	0.72	0.52	0.23	0.20
22.1	747	8202	2500	0.88	0.88	0.88	0.88	0.88	0.88	0.85	0.80	0.75	0.57	0.24	0.21
22.8	771	7382	2250	0.91	0.91	0.91	0.91	0.91	0.91	0.89	0.83	0.78	0.65	0.26	0.22
23.5	795	6562	2000	0.94	0.94	0.94	0.94	0.94	0.94	0.92	0.87	0.81	0.69	0.27	0.24
24.3	820	5741	1750	0.98	0.97	0.97	0.97	0.97	0.97	0.95	0.90	0.84	0.72	0.29	0.25
25.0	846	4921	1500	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.93	0.88	0.76	0.30	0.26
25.8	872	4101	1250	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.91	0.80	0.32	0.27
26.6	899	3281	1000	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.83	0.34	0.29
27.4	926	2461	750	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.87	0.36	0.30
28.3	954	1640	500	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.38	0.32
29.1	983	820	250	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.40	0.33
29.5	995	492	150	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.41	0.34
30.0	1012	0	0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.43	0.34
			°C	0	5	10	15	20	25	30	35	40	45	50	55
			°F	32	41	50	59	68	77	86	95	104	113	122	131
				Air Filter Inlet Temperature											

* Based on SEA standard ambient pressure vs. altitude. Assumes LT return temperature is 10 °C above air filter inlet.

Temperature & Altitude Derate

1. Determine derate multiplier vs. temperature and altitude in Table A depending upon your operating condition.
2. Assumes the LT return temperature is 10°C above the air filter inlet with a maximum LT temperature of 50°C.
3. If the LT temperature exceeds 50°C, consult factory for recommendations.
4. Altitude is based upon SAE standard ambient pressure vs. altitude. For low barometric conditions add 150m (500 ft) to site altitude.

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ALTERNATOR DATA

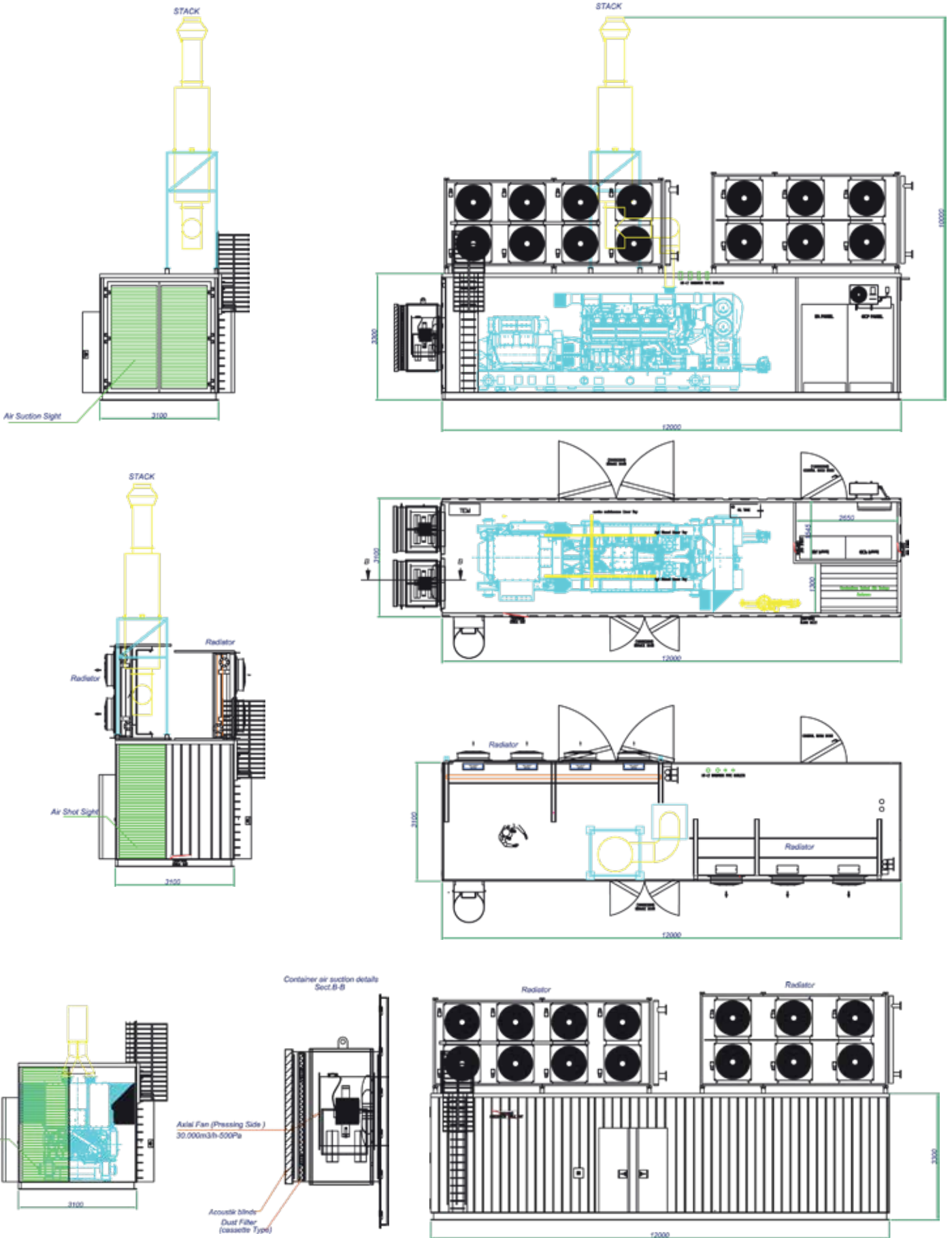
Manufacturer	Mecc Alte
Alternator Made and Model	ECO 46-2L/4 A
Frequency (Hz)	50
Power (kVA)	2500
VOLTAGE (V)	400
Phase 3	3
A.V.R.	DER1
Voltage Regulation	(+/-)0.5%
Insulation System	H
Protection	IP23
Rated Power Factor	0.8
WEIGHT COMP. GENERATOR (Kg)	4380
COOLING AIR (m ³ /min)	135

CONTINUOUS RATING DEFINITION

Applicable for supplying power continuously to a constant load up to the full output rating for unlimited hours. No sustained overload capability is available for this rating. Consult authorized distributor for rating. (Equivalent to Continuous Power in accordance with ISO8528, ISO3046, AS2789, DIN6271, and BS5514).

Temperature & Altitude Derate

- 1) Weights and set dimensions represent a generator set with its standard features and LV P80T alternator. See outline drawing for other configurations.
- 2) At ISO3046 reference conditions, altitude 1013 mbar (30in Hg), air inlet temperature 25°C (77°F)
- 3) According to ISO 3046/I with fuel consumption tolerance of +5%, -0%
- 4) With air intake at 25°C (77°F). Tolerance $\pm 10^{\circ}\text{C}$.
- 5) Tested using pipeline natural gas with LHV of 33.44MJ/Nm³ (905BTU/scf) @ 14.696 psia & 60 °F.
- 6) Outlet temperature controlled by thermostat. Inlet temperature for reference only. Data taken with 50% Glycol and with outlet temperature at max allowance.
- 7) Inlet temperature controlled by thermostat, outlet temperature for reference only. Data taken with 50% Glycol.
- 8) Without engine driven coolant pumps
- 9) Standby (S), Prime (P), Continuous (C)
- 10) At electrical output of 1.0 Power Factor, 97% Alternator Efficiency
- 11) Tolerance $\pm 15\%$. Values shown are measured using fuel with less than 1% NMHC by volume. Values can vary significantly depending on NMHC found in the fuel.
- 12) Exhaust system back pressure is at rated load and will decrease at lower loads. Minimum restriction/back pressure is 0 mm H 20.
- 13) Maximum flow including off engine thermostats.
- 14) Tolerance +/-10%
- 15) Pressure drop external to genset.
- 16) Exhaust gas cooled to 120 °C.



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