Generator Set Data Sheet
1540 kW Continuous

Model:	**C1540 N5CC**
Frequency:	**50 Hz**
Fuel Type:	**Natural Gas MI 70 +**
Emissions Performance NOx:	**500 Mg/Nm^3**
LT Water Inlet Temperature:	**45 °C (113 °F)**
HT Water Outlet Temperature:	**90 °C (194 °F)**

Generator Set Outline Drawing:	A042T047

Fuel Consumption (ISO3046/1)	**See note**	**100% of rated load**	**90% of rated load**	**75% of rated load**	**50% of rated load**
Fuel consumption (LHV) ISO3046/1, kW (MMBTU/hr)	2,3,6,9	3513 (12)	3187 (10.88)	2710 (9.26)	1899 (6.49)
Mechanical efficiency ISO3046/1, percent	2,3,6	45.2%	44.8%	43.9%	41.8%
Electrical efficiency ISO3046/1, percent	2,9,11	43.8%	43.5%	42.6%	40.5%

Engine

Engine manufacturer	Cummins
Engine model	QSK60G
Configuration	V16
Displacement, L (cu.in.)	60 (3661)
Aspiration	Turbocharged (1)
Gross engine power output, kWm (hp)	1588 (2128)
BMEP, bar (psi)	21.2 (307.4)
Bore, mm (in.)	159 (6.26)
Stroke, mm (in.)	190 (7.48)
Rated speed, rpm	1500
Piston speed, m/s (ft/min)	9.5 (1870)
Compression ratio	13.7:1
Lube oil capacity, L (qt)	380 (400)
Overspeed limit, rpm	1875
Full load lubricating oil consumption, g/kWe-hr (g/hp-hr)	0.15 (0.11)

Fuel

Gas supply pressure to engine inlet, bar (psi)[6]	0.20 (2.9)
Minimum methane index	70

Starting System(s)

Electric starter voltage, volts	24
Minimum battery capacity @ 40 ℃ (104 ℉), AH	720
Air starter pressure, barg (psig)	N/A
Air starter flow Nm^3/s (scfm)	N/A

Genset Dimensions (see note 1)

Genset length, m (ft)	5.12 (16.8)
Genset width, m (ft)	2.23 (7.32)
Genset height, m (ft)	2.84 (9.32)
Genset weight (wet), kg (lbs)	16,976 (37,956)

	See note	100% of rated load	90% of rated load	75% of rated load	50% of rated load
Energy Data					
Continuous generator electrical output kWe @ 1.0 pf	2,6,11	1540	1386	1155	770
Total heat rejected in LT circuit, kW (MMBTU/h)	16	119 (0.41)	104 (0.35)	84 (0.29)	59 (0.20)
Total heat rejected in HT circuit, kW (MMBTU/h)	16	898 (3.06)	793 (2.71)	654 (2.23)	471 (1.61)
Unburnt, kW (MMBTU/h)	12	67 (0.23)	64 (0.22)	54 (0.19)	37 (0.13)
Heat radiated to ambient, kW (MMBTU/h)	16	230 (0.78)	208 (0.71)	176 (0.60)	122 (0.42)
Available exhaust heat to 105 ℃, kW (MMBTU/h)	16	721 (2.46	690 (2.35)	626 (2.14)	484 (1.65)
Intake Air Flow					
Intake air flow mass, kg/s (lb/hr)	16	2.14 (16950)	1.92 (15210)	1.60 (12670)	1.06 (8630)
Intake air flow volume, m^3/s @ 0 ℃ (scfm)	16	1.65 (3690)	1.48 (3310)	1.24 (2770)	0.84 (1880)
Max air cleaner restriction below 35 ℃, mm HG (in H_2O)		11 (5.9)	-	-	-
Max air cleaner restriction above 35 ℃, mm HG (in H_2O)		11 (5.9)	-	-	-
Exhaust Air Flow					
Exhaust gas flow mass, kg/s (lb/hr)	16	2.22 (17580)	1.99 (15760)	1.66 (13150)	1.14 (9030)
Exhaust gas flow volume, m^3/s (cfm)	16	4.06 (8600)	3.74 (7920)	3.22 (6820)	2.35 (4980)
Exhaust temp after turbine, ℃ (℉)	5	373 (20.0)	390 (734)	411 (772)	454 (848)
Max exhaust system back pressure, mm HG (in H_2O)	13	37.3 (20.0)	-	-	-
Min exhaust system back pressure, mm HG (in H_2O)	13	18.4 (10)	-	-	-
HT Cooling Circuit					
HT circuit engine coolant volume, l (gal)		181 (48)	181 (48)	181 (48)	181 (48)
HT coolant flow @ max ext restriction, m^3/h (gal/min)		70 (308)	70 (308)	70 (308)	70 (308)
Max HT engine coolant inlet temp, ℃ (℉)	7	78 (172)	79 (174)	81 (178)	83 (182)
HT coolant outlet temp, ℃ (℉)	7	90 (194)	90 (194)	90 (194)	90 (194)
Max pressure drop in external HT circuit, bar (psig)		1.0 (15)	1.0 (15)	1.0 (15)	1.0 (15)
HT circuit max pressure, bar (psig)		5.0 (73)	5.0 (73)	5.0 (73)	5.0 (73)
Min static head - pump inlet, bar (psig)		0.5 (7)	0.5 (7)	0.5 (7)	0.5 (7)
LT Cooling Circuit					
LT circuit engine coolant volume, l (gal)		34 (9)	34 (9)	34 (9)	34 (9)
LT coolant flow @ max ext restriction, m^3/h (gal/min)		23 (100)	23 (100)	23 (100)	23 (100)
Max LT engine coolant inlet temp, ℃ (℉)	8	55 (131)	55 (131)	55 (131)	55 (131)
LT coolant outlet temp, ℃ (℉) reference only	8	45 (113)	45 (113)	45 (113)	45 (113)
Max pressure drop in external LT circuit, bar (psig)		1.0 (15)	1.0 (15)	1.0 (15)	1.0 (15)
LT circuit max pressure, bar (psig)		5.0 (73)	5.0 (73)	5.0 (73)	5.0 (73)
Min static head - pump inlet, bar (psig)		0.5 (7)	0.5 (7)	0.5 (7)	0.5 (7)

	See note	100% of rated load	90% of rated load	75% of rated load	50% of rated load
Emissions					
NO_x emissions dry, ppm	14	168	168	176	180
NO_x emissions, mg/Nm^3 @ 5% O_2 (g/hp-h)	14	500 (1.00)	500 (1.00)	500 (1.00)	500 (1.00)
THC emissions wet, ppm	12	1213	1303	1388	1424
THC emissions, mg/Nm^3 @ 5% O_2 (g/hp-h)	12	1349 (3.00)	1465 (3.00)	1537 (3.00)	1519 (3.00)
CH_4 emissions wet, ppm	12	841	1028	1092	1117
CH_4 emission, mg/Nm3 (g/hp-h)	12	948 (2.0)	1176 (2.0)	1230 (2.0)	1213 (2.0)
NMHC emissions wet, ppm	12	372	275	296	308
NMHC exhaust emissions, mg/Nm^3 (g/hp-h)	12	420 (0.8)	311 (0.9)	330 (0.8)	329 (0.8)
VOC wet, ppm	12	229	263	282	294
VOC, mg/Nm^3 (g/hp-h)	12	256 (0.5)	298 (0.6)	314 (0.6)	315 (0.7)
Formaldehyde wet, ppm	12	81	82	82	84
Formaldehyde, mg/Nm^3 (g/hp-h)	12	169 (0.3)	175 (0.3)	174 (0.3)	171 (0.4)
CO emissions (dry), ppm	4	446	453	454	459
CO emissions, mg/Nm^3 @ 5% O_2 (g/hp-h)	4	757 (1.50)	777 (1.50)	768 (1.50)	746 (1.60)
CO_2 emissions (dry), percent	4	6.6	6.7	6.7	7.0
CO_2 emissions, mg/Nm^3 @5% O_2 (g/hp-h)	4	175549 (342)	179914 (345)	179235 (350)	178957 (377)
O_2 emissions (dry), percent	4	9.2	9.3	9.2	8.7
Particulates PM10, g/hp-h	4	< 0.04	< 0.04	< 0.04	< 0.04

Genset De-rating

Altitude and temperature derate multiplication factor

Barometer		Altitude		Table A * Derate multiplier with grid parallel operation								
In Hg	mbar	Feet	Meters									
20.7	701	9843	3000	0.74	0.75	0.73	0.69	0.64	-	-	-	-
21.4	723	9022	2750	0.77	0.77	0.75	0.71	0.67	0.62	-	-	-
22.1	747	8202	2500	0.80	0.80	0.78	0.74	0.69	0.65	-	-	-
22.8	771	7382	2250	0.83	0.83	0.80	0.76	0.71	0.67	-	-	-
23.5	795	6562	2000	0.86	0.86	0.83	0.79	0.74	0.69	-	-	-
24.3	820	5741	1750	0.89	0.89	0.86	0.81	0.76	0.72	-	-	-
25.0	846	4921	1500	0.92	0.92	0.89	0.84	0.79	0.74	-	-	-
25.8	872	4101	1250	0.95	0.95	0.92	0.87	0.82	0.77	-	-	-
26.6	899	3281	1000	0.98	0.98	0.95	0.90	0.84	0.79	0.74	-	-
27.4	926	2461	750	1.00	1.00	0.98	0.93	0.87	0.82	0.77	-	-
28.3	954	1640	500	1.00	1.00	1.00	0.96	0.90	0.84	0.79	-	-
29.1	983	820	250	1.00	1.00	1.00	0.99	0.93	0.87	0.82	-	-
29.5	995	492	150	1.00	1.00	1.00	1.00	0.94	0.88	0.83	-	-
30.0	1012	0	1.00	1.00	1.00	1.00	1.00	0.96	0.90	0.84	-	-
			℃	20	25	30	35	40	45	50	55	60
			℉	68	77	86	95	104	113	122	131	140
			Air filter inlet temperature									

* Based on SAE standard ambient pressure vs. altitude. Assumes LT return temperature is 10 ℃ 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℃ above the air filter inlet with a maximum LT temperature of 50℃.
3. If the LT temperature exceeds 50℃, consult factory for recommendations.
4. Altitude is based upon SAE standard ambient pressure vs. altitude. For low barometric conditions add 150 m (500 ft) to site altitude.

Heat Rejection Factor (altitude and ambient) for HT and LT Circuits

Barometer		Altitude		Table B Multiplier for HT & LT heat rejection vs alt & temp.								
In Hg	mbar	Feet	Meters									
20.7	701	9843	3000	1.14	1.16	1.18	1.20	1.22	1.25	1.27	1.29	-
21.4	723	9022	2750	1.12	1.14	1.17	1.19	1.21	1.23	1.25	1.27	-
22.1	747	8202	2500	1.11	1.13	1.15	1.17	1.20	1.22	1.24	1.26	-
22.8	771	7382	2250	1.10	1.12	1.14	1.16	1.18	1.20	1.23	1.25	-
23.5	795	6562	2000	1.08	1.10	1.12	1.15	1.17	1.1	1.21	1.23	-
24.3	820	5741	1750	1.07	1.09	1.11	1.13	1.15	1.18	1.20	1.22	-
25.0	846	4921	1500	1.05	1.08	1.10	1.12	1.14	1.16	1.18	1.21	-
25.8	872	4101	1250	1.04	1.06	1.08	1.10	1.13	1.15	1.17	1.19	-
26.6	899	3281	1000	1.03	1.05	1.07	1.09	1.11	1.13	1.16	1.18	-
27.4	926	2461	750	1.01	1.03	1.06	1.08	1.10	1.12	1.14	1.16	-
28.3	954	1640	500	1.00	1.02	1.04	1.06	1.08	1.11	1.13	1.15	-
29.1	983	820	250	0.98	1.01	1.03	1.05	1.07	1.09	1.11	1.14	-
29.5	995	492	150	0.98	1.00	1.02	1.04	1.06	1.09	1.11	1.13	-
30.0	1012	0	0	0.97	0.99	1.01	1.03	1.06	1.08	1.10	1.12	-
			℃	20	25	30	35	40	45	50	55	60
			℉	68	77	86	95	104	113	122	131	140
			Air filter inlet temperature									

LT & HT Circuit Heat Rejection Calculation

1. Determine derate multiplier vs. temperature derate per Table A.
2. Using the multiplier from #1 in Table A as the percent load factor determine the heat rejection from the previous page.
3. From Table B find the HT and LT circuit multiplier.
4. Multiply the result of step 2 by the result of step 3 to obtain the heat rejection at your altitude and temperature.

Methane Number Capability

Load (percent of rated)			
100%	90%	75%	50%
70	70	70	70

Alternator Data

Voltage range	Connection configuration	Temp rise degrees C	Duty[10] cycle	Single phase factor	Alternator data sheet
380-440	Wye, 3 Phase	80/105	C	N/A	Note 17
400-415	Wye, 3 Phase	80/105	C	N/A	Note 17
3300	Wye, 3 Phase	80/105	C	N/A	Note 17
6600	Wye, 3 Phase	80/105	C	N/A	Note 17
10000	Wye, 3 Phase	80/105	C	N/A	Note 17
11000	Wye, 3 Phase	80/105	C	N/A	Note 17
13200	Wye, 3 Phase	80/105	C	N/A	Note 17

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).

Notes

1) Weights and set dimensions represent a generator set with its standard features only. See outline drawing for other configurations.
2) At ISO3046 reference conditions, altitude 1013 mbar (30 in. Hg), air inlet temperature 25 °C (77 °F).
3) According to ISO3046/I with fuel consumption tolerance of +5% -0%.
4) Production variation/tolerance ±10%.
5) With air intake at 25 °C (77 °F). Tolerance ± 10 °F.
6) Tested using pipeline natural gas with LHV of 33.44 mJ/Nm^3 (905 BTU/ft^3).
7) Outlet temperature controlled by thermostat. Inlet temperature for reference only.
8) Inlet temperature controlled by thermostat. Outlet temperature for reference only.
9) With off engine coolant pumps.
10) Standby (S), Prime (P), Continuous (C).
11) At electrical output of 1.0 power factor.
12) Tolerance +/- 15%.
13) Exhaust system back pressure is at rated load and will decrease at lower loads.
14) Tolerance ±10% for 500 mg, ±14% for 350 mg & ±20% for 250 mg.
15) N/A = Not Applicable
16) Tolerance +/- 5%
17) Alternator model and data sheet information available on www.powersuite.cummins.com

For more information contact your local Cummins distributor or visit power.cummins.com

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