

ژنراتور : Stamford

موتور دیزل : Cummins


Standby		Prime		دیزل ژنراتور
KVA	KW	KVA	KW	
44	35	40	32	



موتور دیزل		
Manufacturer	Cummins	تولید کننده
Type	4BT3.9G2	تیپ
Number of cylinders	4	تعداد سیلندر ها
Cylinder arrangement	In-Line	آرایش سیلندر ها
Displacement , Liters	3.9	جا به جایی
Bore × Stroke , mm	102X120	قطر سیلندر × کورس پیستون
Compression Ratio	16.5:1	نسبت تراکم
Aspiration	Turbocharged	سیستم تنفس
Gross engine power, kWb	36	قدرت نافالص موتور
Combustion air flow, m <sup>3</sup> /min	3.5796	جریان هوای احتراق
Exhaust gas temp.(after turbo) , °C	487	دمای گاز خروجی از اگزوز
Exhaust gas flow (after turbo) , litre/s	108	جریان هوای خروجی از اگزوز
Mean Piston Speed , m/s	6	میانگین سرعت پیستون

### ژنراتور

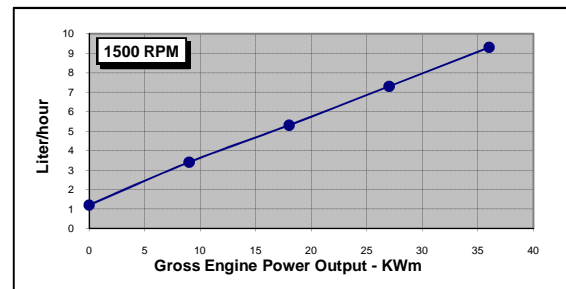
Manufacturer	Stamford	تولید کننده
Type	PI144J	تیپ
Standby power at rated voltage ,KVA	40	توان standby در ولتاژ نامی
Efficiency, %	87.9	راندمان
Power factor	0.8	ضریب قدرت
Phase	3	فاز
Frequency, Hz	50	فرکانس
Speed, Rpm	1500	سرعت
Voltage, V	380	ولتاژ
Stator windings	Double layer concentric	سیم پیچ استاتور
Voltage Regulation, %	± 1.0 %	تنظیم ولتاژ
Rotor	with damping cage	روتور
Over speed, Rpm	2250	مداکثر سرعت مجاز
Insulation class	H	کلاس عایق
Connection	Curve current value X 2	اتصال
Protection class	IP 23	کلاس حفاظتی
Cooling air volume,m <sup>3</sup> / sec	0.135 m <sup>3</sup> /sec	دبی هوای فنک کننده

	<b>Cummins Inc.</b> Engine Data sheet	Basic Engine Model: 4BT3.9-G2	Date: November 2008	Page No. 1
		Displacement: 3,9liter      Bore: 102mm      Stroke: 120mm		No. of Cylinders: 4      Aspiration: Turbocharged
Emissions: EURO II & III				

Engine Speed RPM	Standby Power Rating		Prime Power Rating		Continuous Power Rating	
	kWm	BHP	kWm	BHP	kWm	BHP
1500	40	54	36	48	*	*
1800	45	60	40	54	*	*

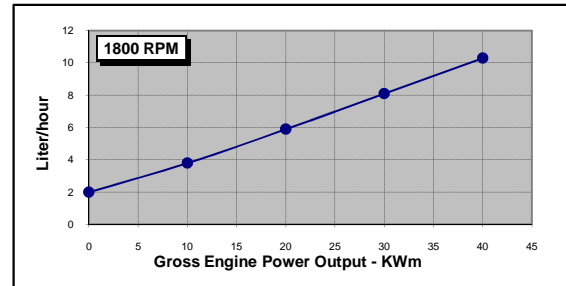
### Engine Performance Data @ 1500 RPM

Output Power			Fuel Consumption	
%	kWm	BHP	kg/ kWm-h	litre/ hour
<b>Standby Power</b>				
100	40	54	0,212	10,3
<b>Prime Power</b>				
100	36	48	0,214	9,3
75	27	26	0,223	7,3
50	18	24	0,244	5,3
25	9	12	0,312	3,4
<b>Continuous Power</b>				
100	*	*	*	*



### Engine Performance Data @ 1800 RPM

Output Power			Fuel Consumption	
%	kWm	BHP	kg/ kWm-h	litre/ hour
<b>Standby Power</b>				
100	45	60	0,219	11,6
<b>Prime Power</b>				
100	40	54	0,219	10,3
75	30,0	40	0,229	8,1
50	20	27	0,251	5,9
25	10	13	0,323	3,8
<b>Continuous Power</b>				
100	*	*	*	*



CONVERSIONS:      (kWm = BHP x 0.746)      (BHP = Engine kWm x 1.34)

Data shown above represent gross engine performance capabilities obtained and concerned in accordance with ISO-3046 conditions of 100 Kpa baromatic pressure [110m altitude], 25C air temperature, and relative humidity of 30% with no.2 diesel or a fuel corresponding to ASTM D2. The fuel consumption data is based on No.2 diesel fuel weight at 0.85kg/litre. Power output curves are based on the engine operating with fuel system ,water pump and lubricating oil pump; not include are charging alternator, fan, optional equipment and driven components.

TECHNICAL DATA DEPT.

CERTIFIED WITHIN 5%

CHIEF ENGINEER



# Cummins Inc.

## Engine Data Sheet

ENGINE MODEL: 4BT3.9-G2

DATA SHEET : DS-4BT3

DATE : November 2008

- Fan to Flywheel

### GENERAL ENGINE DATA

Type .....	(Cycles #, Disposition, Cylinders)	In-Line 4 Cycle, Water Cooled
Aspiration.....		Turbocharged
Bore x Stroke.....	(mm x mm)	102x120
Displacement.....	(liter)	3,9
Compression Ratio.....		16,5:1
Dry Weight		
Fan to Flywheel Engine.....	(Kg)	320
Wet Weight		
Fan to Flywheel Engine.....	(Kg)	336
Moment of Inertia of Rotating Components.....(kg.m <sup>2</sup> )		
Center of Gravity from Front Face of Block.....	(mm)	373
Center of Gravity above Crankshaft Centerline.....	(mm)	163

### ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block .....	(N.m)	1356
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### EXHAUST SYSTEM

Maximum Back Pressure.....	(mm Hg)	76
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### AIR INDUCTION SYSTEM

Maximum Intake Air Restriction		
• With Dirty Filter Element.....	(mmH <sub>2</sub> O)	635
• With Normal Duty Air Cleaner and Clean Filter Element .....	(mmH <sub>2</sub> O)	254
• With Heavy Duty air Cleaner and Clean Filter Element.....	(mmH <sub>2</sub> O)	381

### LUBRICATION SYSTEM

Oil Pressure @ Idle Speed .....	(kPa)	207
@ Governed Speed .....	(kPa)	345
Maximum Oil Temperature.....	(°C)	121
Oil Capacity With Oil Pan : High-Low.....	(Litre)	9,5-8,5
Total System Capacity (Including Filters).....	(Litre)	11
Angularity of Oil Pan		
• Front Down.....		40°
• Front Up .....		40°
• Side to Side.....		40°

### FUEL SYSTEM

Type Injection System .....		BYC A Stanadyne
Maximum Inlet Restriction at Injection Pump.....	(mmHg)	102
Maximum Allowable Head on Injector Return Line .....	(mmHg)	254
Fuel Flow to Lift Pump @ 43psi (3kg/cm <sup>2</sup> ).....	(Litre/hr)	30

### COOLING SYSTEM

Coolant Capacity – Engine Only .....	(Litre)	7,2
Maximum coolant Friction Head External to Engine – 1500 rpm.....	(kPa)	28
Maximum coolant Friction Head External to Engine – 1800 rpm.....	(kPa)	35
Maximum Static Head of Coolant Above Engine Crank Centerline .....	(m)	14
Standard Thermostat ( Modulating) Range.....	(°C)	82-95
Minimum Pressure Cap.....	(kPa)	69
Maximum Top Tank Temperature for Standby / prime Power .....	(°C)	104/100

### ELECTRICAL SYSTEM

Cranking Motor Voltage (Positive Engagement).....	(Volt)	24
Battery Charging System, Negative Ground .....	(Amp)	40
Maximum Allowable Resistance of Cranking Circuit .....	(Ohm)	0,002
Minimum Recommended Battery Capacity		
• Cold Soak @ -12°C.....	(°F CCA)	400

**PERFORMANCE DATA**

Governed Engine Speed .....(RPM)  
 Engine Idle Speed .....(RPM)  
 Gross Engine power output .....(kWm)  
 Brake Mean Effective Pressure .....(kPa)  
 Piston Speed .....(m/s)  
 Friction Horsepower..... (kWm)

**Engine water Flow at Stated Friction Head**

**External to Engine:**

- 1 psi Friction Head .....(litre/s)
- Maximum Friction Head .....(litre/s)

**Engine Data With Type Exhaust Manifold:**

Intake Air Flow..... (litre/s)  
 Exhaust Gas Temperature .....(°C)  
 Exhaust Gas Flow..... (litre/s)  
 Heat Rejection to Coolant .....(kWm)

STANDBY POWER		PRIME POWER	
60Hz	50Hz	60Hz	50Hz
1800	1500	1800	1500
950-1150	950-1150	950-1150	950-1150
45	40	40	36
823	820	741	738
7,2	6	7,2	6
11,9	8,2	11,9	8,2
2,8	2,2	2,8	2,2
2,2	1,6	2,2	1,6
48,9	44,9	46,6	43,6
490	487	466	463
111	108	104	101
33	29	28,9	25,9

ENGINE MODEL: 4BT3.9-G2  
 DATA SHEET: DS-4BT3  
 Date: November 2008

# PI144J

**STAMFORD**

## WINDING 311

CONTROL SYSTEM	STANDARD AS480 AVR (SELF EXCITED)							
VOLTAGE REGULATION	± 1.0 %							
SUSTAINED SHORT CIRCUIT	SELF EXCITED MACHINES DO NOT SUSTAIN A SHORT CIRCUIT CURRENT							
CONTROL SYSTEM	AS480 AVR WITH OPTIONAL EXCITATION BOOST SYSTEM (EBS)							
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVE (page 8)							
STATOR WINDING	DOUBLE LAYER CONCENTRIC							
WINDING PITCH	TWO THIRDS							
WINDING LEADS	12							
STATOR WDG. RESISTANCE	0.154 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED							
ROTOR WDG. RESISTANCE	0.99 Ohms at 22°C							
EXCITER STATOR RESISTANCE	22.9 Ohms at 22°C							
EXCITER ROTOR RESISTANCE	0.21 Ohms PER PHASE AT 22°C							
EBS STATOR RESISTANCE	12.9 Ohms at 22°C							
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4, VDE 0875G, VDE 0875N. refer to factory for others							
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%							
MAXIMUM OVERSPEED	2250 Rev/Min							
BEARING DRIVE END	BALL. 6310 - 2RS. (ISO)							
BEARING NON-DRIVE END	BALL. 6306 - 2RS. (ISO)							
	1 BEARING				2 BEARING			
	WITH EBS		WITHOUT EBS		WITH EBS		WITHOUT EBS	
WEIGHT COMP. GENERATOR	184 kg		182.3 kg		187 kg		185.3 kg	
WEIGHT WOUND STATOR	84 kg		84 kg		84 kg		84 kg	
WEIGHT WOUND ROTOR	70.97 kg		69.27 kg		72.68 kg		70.98 kg	
WR <sup>2</sup> INERTIA	0.2758 kgm <sup>2</sup>		0.2741 kgm <sup>2</sup>		0.2763 kgm <sup>2</sup>		0.2746 kgm <sup>2</sup>	
SHIPPING WEIGHTS in a crate	202 kg		200.3 kg		211 kg		209.3 kg	
PACKING CRATE SIZE	85 x 51 x 67 (cm)				85 x 51 x 67 (cm)			
	50 Hz				60 Hz			
TELEPHONE INTERFERENCE	THF<2%				TIF<50			
COOLING AIR	0.135 m <sup>3</sup> /sec 286cfm				0.165 m <sup>3</sup> /sec 340 cfm			
VOLTAGE SERIES STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
VOLTAGE PARALLEL STAR	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
VOLTAGE SERIES DELTA	220/110	230/115	240/120	254/127	240/120	254/127	266/133	277/138
kVA BASE RATING FOR REACTANCE VALUES	40	40	40	38	44	47	48.5	50
X <sub>d</sub> DIR. AXIS SYNCHRONOUS	1.92	1.73	1.61	1.36	2.27	2.17	2.05	1.94
X' <sub>d</sub> DIR. AXIS TRANSIENT	0.18	0.16	0.15	0.13	0.21	0.20	0.19	0.18
X'' <sub>d</sub> DIR. AXIS SUBTRANSIENT	0.13	0.12	0.11	0.09	0.15	0.14	0.14	0.13
X <sub>q</sub> QUAD. AXIS REACTANCE	0.92	0.83	0.77	0.65	1.09	1.04	0.98	0.93
X'' <sub>q</sub> QUAD. AXIS SUBTRANSIENT	0.20	0.18	0.17	0.14	0.24	0.23	0.22	0.20
X <sub>L</sub> LEAKAGE REACTANCE	0.08	0.07	0.07	0.05	0.09	0.09	0.08	0.08
X <sub>2</sub> NEGATIVE SEQUENCE	0.17	0.15	0.14	0.12	0.20	0.19	0.18	0.17
X <sub>0</sub> ZERO SEQUENCE	0.08	0.07	0.07	0.05	0.09	0.09	0.08	0.08
REACTANCES ARE SATURATED VALUES ARE PER UNIT AT RATING AND VOLTAGE INDICATED								
T' <sub>d</sub> TRANSIENT TIME CONST.	0.029 s							
T'' <sub>d</sub> SUB-TRANSTIME CONST.	0.007 s							
T' <sub>do</sub> O.C. FIELD TIME CONST.	0.66 s							
T <sub>a</sub> ARMATURE TIME CONST.	0.007 s							
SHORT CIRCUIT RATIO	1/X <sub>d</sub>							

**PI144J**

**Winding 311 / 0.8 Power Factor**

**RATINGS**

Class - Temp Rise		Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C			
<b>50 Hz</b>	Series Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Parallel Star (V)	190	200	208	220	190	200	208	220	190	200	208	220	190	200	208	220
	Series Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	36.5	36.5	36.5	34.7	40.0	40.0	40.0	38.0	44.0	44.0	44.0	41.8	45.0	45.0	45.0	42.8
	kW	29.2	29.2	29.2	27.8	32.0	32.0	32.0	30.4	35.2	35.2	35.2	33.4	36.0	36.0	36.0	34.2
	Efficiency (%)	87.9	88.1	88.2	88.5	87.3	87.6	87.8	88.2	86.5	86.9	87.1	87.7	86.3	86.7	87.0	87.6
	kW Input	33.2	33.1	33.1	31.4	36.7	36.5	36.4	34.5	40.7	40.5	40.4	38.1	41.7	41.5	41.4	39.0
<b>60 Hz</b>	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	Parallel Star (V)	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
	Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	40.2	42.9	44.3	45.6	44.0	47.0	48.5	50.0	48.4	51.7	53.4	55.0	49.5	52.9	54.6	56.3
	kW	32.2	34.3	35.4	36.5	35.2	37.6	38.8	40.0	38.7	41.4	42.7	44.0	39.6	42.3	43.7	45.0
	Efficiency (%)	88.2	88.2	88.3	88.4	87.7	87.7	87.8	87.9	87.1	87.1	87.2	87.3	86.9	86.9	87.0	87.1
	kW Input	36.5	38.9	40.1	41.3	40.1	42.9	44.2	45.5	44.4	47.5	49.0	50.4	45.6	48.7	50.2	51.7

**DIMENSIONS**

