

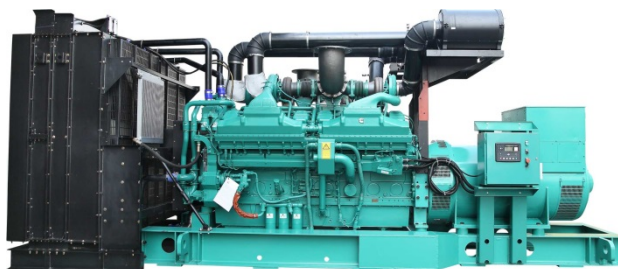
DATA SHEET

DIESEL GENERATOR 450KW

MODEL#FDK-CG450E/H1

50HZ/1500RPM

CUMMINS MODEL: KTA19-G4



General Features:

- ♦ All qualified generator sets are subjected to a comprehensive performance test which includes 50% load, 70% load, 100% load, 110% load and to check, verify that all control systems, alarm and shut-down protection.
- ♦ Equipped with battery charger and 24V high performance maintenance-free lead-acid starting batteries and connecting cables.
- ♦ Stainless galvanized zinc plates with strong corrosion-proof.
- ♦ Vibration isolators between the engine/alternator and base frame.
- ♦ Equipped with industrial silencer and flexible exhaust hose.
- ♦ Designed to comply with ISO8528/GB2820.
- ♦ Powered by Cummins engine and coupled with Stamford alternator.
- ♦ Water jacket preheater, oil heater and double air cleaner, etc. are available.

FDK Diesel Generator Set Data

Genset Model	FDK-CG450E/H1
Prime Power	400KW/500KVA
Standby Power	450KW/563KVA
Output Frequency / Rated speed	50Hz/1500rpm
Rated Voltage	230V/400V

Engine Make	Cummins Original
Engine Model	KTA19-G4
Alternator model	Stamford HCI544C
Control System	DSE7320
Phase	Three

(1) **Prime power:** The rating is available for an unlimited of annual operating hours in variable load applications, in accordance with ISO8528-1.A 10% overload is available for a period of 1 hour within 12-hour period of operation, in accordance with ISO 3046-1.

(2) **Standby power:** The rating is applicable for supplying emergency power in variable load applications for up to 200 hours per year in accordance with ISO8528-1. Overload is not allowed.

(3) **Rated voltage:** available with customer requirement.

Engine Specifications (DETAILED in APPENDIX)

Engine Model	KTA19-G4
Engine Manufacturer	Cummins (Onan USA)
Cylinder quantity	6
Cylinder Arrangement	In-line
Cycle	4

Aspiration	Turbo-charged
Bore x Stroke (mm x mm)	159x159
Displacement	18.9L
Compression Ratio	13.9:1
Prime power / Speed (KW/RPM)	448/1500
Standby power/ Speed (KW/RPM)	504/1500



ISO9001:2008

FDK reserves the right to change the specifications and designs without notice.

Type Injection System	Direct Injection Cummins PT	Fuel Consumption at 100% load (g/KWh)	197 at 1500rpm
Piston Speed	7.9m/s	Starter motor	DC24V
Friction Energy Output	45kw	Low idle	675-775rpm
Total Lubrication System Capacity (L)	50	Coolant Capacity (L)	30

Alternator Specifications

Alternator model	HCI544C	Number of phase	3
Alternator manufacturer	STAMFORD	Rated voltage	400V (Available with custom requirements)
Exciter type	Single bearing, Brushless, Self-excited	Power factor	0.8
Rated output prime power	450KVA	Voltage regulation NL-FL	≤±1%
Rated speed	1500 rpm	Insulation grade	H
Rated frequency	50Hz	Protection grade	IP23

Alternator option: Leroy Somer, MECC, Marathon, Engga, Faraday

Control System DSE7320 (DETAILED in INSTRUCTION)

DSE7320 is an advanced control module based on micro-processor, containing all necessary functions for protection of the genset and the breaker control. It can monitor the mains supply, breaker control and automatically start the engine when the mains are abnormal. Accurately measure various operational parameters and display all values and alarms information on the LCD. In addition, the control module can automatically shut down the engine and indicate the engine failure.

FEATURES

- ♦ Microprocessor control, with high stability and credibility.
- ♦ Monitoring and measuring operational parameters of the mains supply and genset.
- ♦ Indicating operation status, fault conditions, all parameters and alarms.
- ♦ Multiple protections; multiple parameters display, like pressure, temp. etc.
- ♦ Manual, automatic and remote work mode selectable.
- ♦ Real time clock for time and date display, overall runtime display, 250 log entries.
- ♦ Overall power output display.
- ♦ Integral speed/frequency detecting, telling status of start, rated operation, overspeed etc.
- ♦ Communication with PC via RS485 OR RS232 interface, using MODBUS protocol.

Soundproof Enclosure Specification

FDK silent generator is designed by professional acoustic engineers based on years of experience. Now we can make the noise of the generator less than 80-85dB(A) at 1m, or 70-75dB(A) at 7m, 60-65dB(A) at 15m.

FEATURES

- ♦ Multi-way air intake and exhaust guarantee the power performance of the generator.
- ♦ Large-scale impedance combined type silencer effectively reduce noise of the generator.
- ♦ Internal high performance rubber damper and flexible materials reduce vibration.
- ♦ Base mounted fuel tank supports the generator running for 8 hours.



ISO9001:2008

FDK reserves the right to change the specifications and designs without notice.

Optional

Generator set	Alternator	Low environment Temp	ATS
<input type="checkbox"/> Open generator set <input type="checkbox"/> Silent generator set <input type="checkbox"/> Trailer generator set <input type="checkbox"/> ABB MCCB circuit breaker	<input type="checkbox"/> Stamford <input type="checkbox"/> Marathon <input type="checkbox"/> Mecc Alte <input type="checkbox"/> Leroy Somer <input type="checkbox"/> Farady <input type="checkbox"/> Engga	<input type="checkbox"/> Water heater <input type="checkbox"/> Oil heater <input type="checkbox"/> Battery heater	<input type="checkbox"/> CHINT <input type="checkbox"/> SCHNEIDER <input type="checkbox"/> ABB
Fuel system	Control system	Voltage	Synchronized system
<input type="checkbox"/> 12hrs base tank <input type="checkbox"/> 24hrs base tank <input type="checkbox"/> Dual wall base fuel tank <input type="checkbox"/> Outside fuel tank	<input type="checkbox"/> AMF function <input type="checkbox"/> ATS control cabinet <input type="checkbox"/> DSE7320 <input type="checkbox"/> DSE7510 <input type="checkbox"/> GU620A	<input type="checkbox"/> 415/240V <input type="checkbox"/> 400/230V <input type="checkbox"/> 380/220V <input type="checkbox"/> 220/127V <input type="checkbox"/> 200/115V	<input type="checkbox"/> CHINT Cabinet <input type="checkbox"/> SCHNEIDER Cabinet <input type="checkbox"/> DSE8610 Module <input type="checkbox"/> COMAQ Module <input type="checkbox"/> DEIF Module

Dimension & Weight

Open

Overall Size: LxWxH (mm)	3300x1620x1950
Weight (kg)	4900

Soundproof Version

Overall Size: LxWxH (mm)	4600x1630x2515
Weight (kg)	5340

Sales Promises

- ◆ FDK provides a full line of brand new and high quality products. Each and every unit is strictly factory tested before shipment.
- ◆ Quality warranty is according to our standard conditions: 12 months from BL date or 1000 running hours, whichever comes first.
- ◆ Service and parts are available from FDK or distributors in your location.
- ◆ FDK guarantee use **BRAND NEW & GENUINE MACHINE.**





CUMMINS ENGINE COMPANY, INC

Columbus, Indiana 47201

ENGINE PERFORMANCE CURVE

Basic Engine Model:
KTA19-G4

Curve Number:
FR-4212

Page No.

Engine Critical Parts List:
CPL: 4153

Date:
09Dec98

Displacement : **18.9 litre (1150 in³)**

Bore : **159 mm (6.25 in.)** Stroke : **159 mm (6.25 in.)**

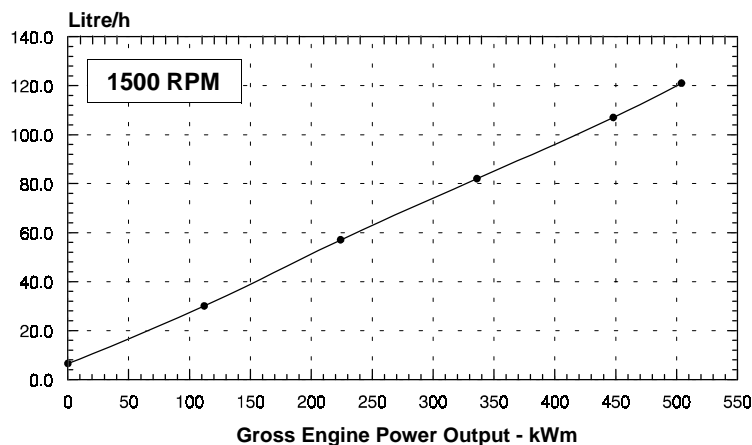
No. of Cylinders : **6**

Aspiration : **Turbocharged and Aftercooled**

Engine Speed RPM	Standby Power		Prime Power		Continuous Power	
	kWm	BHP	kWm	BHP	kWm	BHP
1500	504	675	448	600	355	475
1800	563	755	507	680	429	575

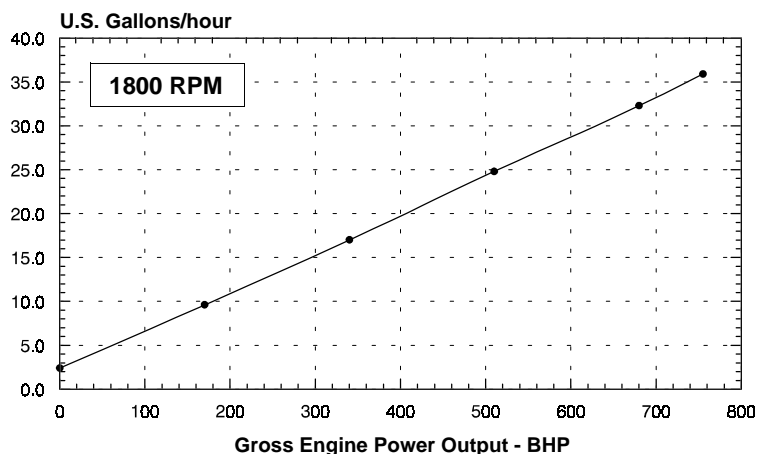
Engine Performance Data @ 1500 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm·h	lb/ BHP·h	litre/ hour	U.S. Gal/ hour
STANDBY POWER						
100	504	675	0.204	0.336	121	31.9
PRIME POWER						
100	448	600	0.203	0.336	107	28.4
75	336	450	0.207	0.341	82	21.6
50	224	300	0.216	0.353	57	14.9
25	112	150	0.228	0.383	30	8.1
CONTINUOUS POWER						
100	355	475	0.207	0.340	86	22.8



Engine Performance Data @ 1800 RPM

OUTPUT POWER			FUEL CONSUMPTION			
%	kWm	BHP	kg/ kWm·h	lb/ BHP·h	litre/ hour	U.S. Gal/ hour
STANDBY POWER						
100	563	755	0.206	0.338	136	35.9
PRIME POWER						
100	507	680	0.205	0.337	122	32.3
75	380	510	0.210	0.346	94	24.8
50	254	340	0.218	0.355	65	17.0
25	127	170	0.241	0.401	36	9.6
CONTINUOUS POWER						
100	429	575	0.207	0.340	104	27.5



CONVERSIONS: (Litres = U.S. Gal x 3.785) (Engine kWm = BHP x 0.746) (U.S. Gal = Litres x 0.2642) (Engine BHP = Engine kWm x 1.34)

Data shown above represent gross engine performance capabilities obtained and corrected in accordance with ISO-3046 conditions of 100 kPa (29.53 in Hg) barometric pressure [110 m (361 ft) altitude], 25 °C (77 °F) air inlet temperature, and relative humidity of 30% with No. 2 diesel or a fuel corresponding to ASTM D2. See reverse side for application rating guidelines.

The fuel consumption data is based on No. 2 diesel fuel weight at 0.85 kg/litre (7.1 lbs/U.S. gal).

Power output curves are based on the engine operating with fuel system, water pump and lubricating oil pump; not included are battery charging alternator, fan, optional equipment and driven components.

D.K. Trueblood

CHIEF ENGINEER

www.fdkenergy.com

POWER RATING APPLICATION GUIDELINES FOR GENERATOR DRIVE ENGINES

These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations. Generator drive engines are not designed for and shall not be used in variable speed D.C. generator set applications.

STANDBY POWER RATING is applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. Under no condition is an engine allowed to operate in parallel with the public utility at the Standby Power rating.

This rating should be applied where reliable utility power is available. A standby rated engine should be sized for a maximum of an 80% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Standby Power rating. Standby ratings should never be applied except in true emergency power outages. Negotiated power outages contracted with a utility company are not considered an emergency.

CONTINUOUS POWER RATING is applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.

PRIME POWER RATING is applicable for supplying electric power in lieu of commercially purchased power. Prime Power applications must be in the form of one of the following two categories:

UNLIMITED TIME RUNNING PRIME POWER

Prime Power is available for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours.

The total operating time at 100% Prime Power shall not exceed 500 hours per year.

A 10% overload capability is available for a period of 1 hour within a 12 hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours per year.

LIMITED TIME RUNNING PRIME POWER

Prime Power is available for a limited number of hours in a non-variable load application. It is intended for use in situations where power outages are contracted, such as in utility power curtailment. Engines may be operated in parallel to the public utility up to 750 hours per year at power levels never to exceed the Prime Power rating. The customer should be aware, however, that the life of any engine will be reduced by this constant high load operation. Any operation exceeding 750 hours per year at the Prime Power rating should use the Continuous Power rating.

Reference Standards:

BS-5514 and DIN-6271 standards are based on ISO-3046.

Operation At Elevated Temperature And Altitude:

The engine may be operated at:

1800 RPM up to 5,000 ft (1500 m) and 104° F (40° C) without power deration.

1500 RPM up to 3,300 ft (1000 m) and 104° F (40° C) without power deration.

For sustained operation above these conditions, derate by 4% per 1,000 ft (300 m), and 1% per 10° F (2% per 11° C).

Cummins Engine Company, Inc.

Engine Data Sheet

ENGINE MODEL : **KTA19-G4**

CONFIGURATION NUMBER : D193091DX02

DATA SHEET : DS-4212-A

DATE : 09Dec98

PERFORMANCE CURVE : FR-4212

INSTALLATION DIAGRAM

- Fan to Flywheel : 3003983
- Heat Exchanger Cooled :

CPL NUMBER

- Engine Critical Parts List : 4153

GENERAL ENGINE DATA

Type	4 Cycle; In-line; 6 Cylinder Diesel
Aspiration	Turbocharged and Aftercooled
Bore x Stroke	6.25 x 6.25 (159 x 159)
Displacement	1150 (18.9)
Compression Ratio	13.9 : 1

Dry Weight

Fan to Flywheel Engine.....	— lb (kg)	4085	(1855)
Heat Exchanger Cooled Engine.....	— lb (kg)	4572	(2076)

Wet Weight

Fan to Flywheel Engine.....	— lb (kg)	4245	(1927)
Heat Exchanger Cooled Engine.....	— lb (kg)	4808	(2183)

Moment of Inertia of Rotating Components

• with FW 4001 Flywheel	— lb _m • ft ² (kg • m ²)	170	(7.2)
• with FW 4006 Flywheel	— lb _m • ft ² (kg • m ²)	199	(8.4)
Center of Gravity from Rear Face of Flywheel Housing (FH 4018)	— in (mm)	28.4	(721)
Center of Gravity above Crankshaft Centerline.....	— in (mm)	9.0	(229)
Maximum Static Loading at Rear Main Bearing.....	— lb (kg)	2000	(908)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block	— lb • ft (N • m)	1000	(1356)
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EXHAUST SYSTEM

Maximum Back Pressure at Standby Power Rating	— in Hg (mm Hg)	3	(76)
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AIR INDUCTION SYSTEM

Maximum Intake Air Restriction

• with Dirty Filter Element.....	— in H ₂ O (mm H ₂ O)	25	(635)
• with Normal Duty Air Cleaner and Clean Filter Element.....	— in H ₂ O (mm H ₂ O)	10	(254)
• with Heavy Duty Air Cleaner and Clean Filter Element.....	— in H ₂ O (mm H ₂ O)	15	(381)

COOLING SYSTEM

Coolant Capacity — Engine Only	— US gal (liter)	8.0	(30)
— with HX 4073 Heat Exchanger.....	— US gal (liter)	17.5	(66)

Maximum Coolant Friction Head External to Engine — 1800 rpm.....	— psi (kPa)	10	(69)
— 1500 rpm.....	— psi (kPa)	8	(55)

Maximum Static Head of Coolant Above Engine Crank Centerline.....	— ft (m)	60	(18.3)
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Standard Thermostat (Modulating) Range	— °F (°C)	180 - 200	(82 - 93)
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Minimum Pressure Cap	— psi (kPa)	10	(69)
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Maximum Top Tank Temperature for Standby / Prime Power	— °F (°C)	220 / 212	(104 / 100)
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Minimum Raw Water Flow @ 90°F to HX 4073 Heat Exchanger	— US gpm (liter / min)	54	(204)
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Maximum Raw Water Inlet Pressure at HX 4073 Heat Exchanger	— psi (kPa)	50	(345)
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LUBRICATION SYSTEM

Oil Pressure @ Idle Speed.....	— psi (kPa)	20	(138)
@ Governed Speed	— psi (kPa)	50 - 70	(345 - 483)

Maximum Oil Temperature	— °F (°C)	250	(121)
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Oil Capacity with OP 4019 Oil Pan : High - Low	— US gal (liter)	10 - 8.5	(38 - 32)
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Total System Capacity (Including Bypass Filter).....	— US gal (liter)	13.2	(50)
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Angularity of OP 4019 Oil Pan — Front Down	30°
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— Front Up	30°
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— Side to Side.....	30°
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FUEL SYSTEM

Type Injection System.....	Direct Injection Cummins PT
Maximum Restriction at PT Fuel Injection Pump — with Clean Fuel Filter..... — in Hg (mm Hg)	4.0 (102)
— with Dirty Fuel Filter..... — in Hg (mm Hg)	8.0 (203)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head)..... — in Hg (mm Hg)	6.5 (165)
Maximum Fuel Flow to Injection Pump..... — US gph (liter / hr)	58 (220)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement)..... — volt	24
Battery Charging System, Negative Ground..... — ampere	35
Maximum Allowable Resistance of Cranking Circuit..... — ohm	0.002
Minimum Recommended Battery Capacity	
• Cold Soak @ 50 °F (10 °C) and Above..... — 0°F CCA	600
• Cold Soak @ 32 °F to 50 °F (0 °C to 10 °C)..... — 0°F CCA	640
• Cold Soak @ 0 °F to 32 °F (-18 °C to 0 °C)..... — 0°F CCA	900

COLD START CAPABILITY

Minimum Ambient Temperature for Aided (with Coolant Heater) Cold Start within 10 seconds..... — °F (°C)	50 (10)
Minimum Ambient Temperature for Unaided Cold Start..... — °F (°C)	32 (0)

PERFORMANCE DATA

- All data is based on:
- Engine operating with fuel system, water pump, lubricating oil pump, air cleaner and exhaust silencer; not included are battery charging alternator, fan, and optional driven components.
 - Engine operating with fuel corresponding to grade No. 2-D per ASTM D975.
 - ISO 3046, Part 1, Standard Reference Conditions of:

Barometric Pressure	: 100 kPa (29.53 in Hg)	Air Temperature	: 25 °C (77 °F)
Altitude	: 110 m (361 ft)	Relative Humidity	: 30%

Steady State Stability Band at any Constant Load..... — %	+/- 0.25
Estimated Free Field Sound Pressure Level of a Typical Generator Set;	
Excludes Exhaust Noise; at Rated Load and 7.5 m (25 ft); 1800 rpm / 1500 rpm..... — dBA	91 / 89
Exhaust Noise at 1 m Horizontally from Centerline of Exhaust Pipe Outlet Upwards at 45°; 1800 rpm / 1500 rpm..... — dBA	119 / 118.5

Governed Engine Speed..... — rpm	
Engine Idle Speed..... — rpm	
Gross Engine Power Output..... — BHP (kW _m)	
Brake Mean Effective Pressure..... — psi (kPa)	
Piston Speed..... — ft / min (m / s)	
Friction Horsepower..... — HP (kW _m)	
Engine Water Flow at Stated Friction Head External to Engine:	
• 3 psi Friction Head..... — US gpm (liter / s)	
• Maximum Friction Head..... — US gpm (liter / s)	

	STANDBY		PRIME POWER	
	60 hz	50 hz	60 hz	50 hz
	1800	1500	1800	1500
	675 - 775	675 - 775	675 - 775	675 - 775
Gross Engine Power Output..... — BHP (kW _m)	755 (563)	675 (504)	680 (507)	600 (448)
Brake Mean Effective Pressure..... — psi (kPa)	287 (1979)	310 (2137)	260 (1793)	275 (1896)
Piston Speed..... — ft / min (m / s)	1875 (9.5)	1562 (7.9)	1875 (9.5)	1562 (7.9)
Friction Horsepower..... — HP (kW _m)	85 (63)	60 (45)	85 (63)	60 (45)
Engine Water Flow at Stated Friction Head External to Engine:				
• 3 psi Friction Head..... — US gpm (liter / s)	196 (12.4)	162 (10.2)	196 (12.4)	162 (10.2)
• Maximum Friction Head..... — US gpm (liter / s)	175 (11.0)	145 (9.1)	175 (11.0)	145 (9.1)
Intake Air Flow..... — cfm (liter / s)	1517 (716)	1226 (579)	1455 (687)	1126 (532)
Exhaust Gas Temperature..... — °F (°C)	939 (504)	1034 (557)	898 (481)	1000 (538)
Exhaust Gas Flow..... — cfm (liter / s)	3945 (1862)	3400 (1604)	3673 (1734)	3100 (1463)
Air to Fuel Ratio..... — air : fuel	25.5:1	22.5:1	27.2:1	23.2:1
Radiated Heat to Ambient..... — BTU / min (kW _m)	4700 (83)	4100 (72)	4200 (74)	3645 (64)
Heat Rejection to Coolant..... — BTU / min (kW _m)	16350 (287)	15340 (270)	14350 (252)	13660 (240)
Heat Rejection to Exhaust..... — BTU / min (kW _m)	24000 (423)	20530 (361)	21500 (378)	18125 (319)

Engine Data with Dry Type Exhaust Manifold

Intake Air Flow..... — cfm (liter / s)	1517 (716)	1226 (579)	1455 (687)	1126 (532)
Exhaust Gas Temperature..... — °F (°C)	939 (504)	1034 (557)	898 (481)	1000 (538)
Exhaust Gas Flow..... — cfm (liter / s)	3945 (1862)	3400 (1604)	3673 (1734)	3100 (1463)
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Heat Rejection to Exhaust..... — BTU / min (kW _m)	24000 (423)	20530 (361)	21500 (378)	18125 (319)

N.A. - Data is Not Available
 N/A - Not Applicable to this Engine
 TBD - To Be Determined

ENGINE MODEL : **KTA19-G4**
 DATA SHEET : DS-4212-A
 DATE : 09Dec98
 CURVE NO. : FR-4212