Engines

- Research
  - Combustion
  - Emissions
  - Heat Rejection
  - Friction
  - Analysis
- Development
  - Testing
  - Durability
  - Mapping
  - Emissions

Emissions

- Research
- Development
  - Deterioration Factors
- Certification
- Audit
- Compliance

Chemistry

- Research
- Development
- Unregulated Emissions
- GC/Mass Spec.

Services

- Support
- Consulting

July 30, 2010

Janet Buyer and Susan Bathalon
jbuyer@cpsc.gov and sbathalon@cpsc.gov
U.S. Consumer Product Safety Commission
4330 East West Hwy, Room 611
Bethesda, MD 20814

Subject: CPSC-Q-10-0069, "Test and Provide Laboratory Exhaust Emission Testing Results for a Prototype Generator Engine Designed for Low Carbon Monoxide (CO) Emission Rates and EPA Phase 2 Emission Standards for Nonroad Small Spark-Ignited (SI) Nonhandheld Engines" Report

Dear Ms. Buyer and Ms. Bathalon,

Thank you for your interest in Intertek Carnot Emission Services' (Intertek CES) engine emission testing services. This report and included test sheets detail the laboratory exhaust emission testing for a prototype generator engine designed for low carbon monoxide (CO) emission rates and EPA Phase 2 emission standards for nonroad small spark-ignition (SI) nonhandheld engines. The objective of this test program was to conduct triplicate 6 load points on the prototype engine with an aged catalyst and triplicate with a non-catalyst OEM muffler while the engine was installed in a generator using a resistive load bank. The engine was then uninstalled from the generator and tested in triplicate 6 mode emission tests on a prototype engine with an aged catalyst and in triplicate with a non-catalyst OEM muffler while installed on a AC dynamometer.

If there are any questions, I can be reached at (210) 928-2230, or via FAX at (210) 928-1233, or via email at tim.griffin@intertek.com.

Approved by:

Steven E. Griffin
General Manager
Intertek CES

Sincerely,

Timothy Griffin
Lab Operations Manager
Intertek CES

Test and Provide Laboratory Exhaust Emission Testing Results for a Prototype Generator Engine Designed for Low Carbon Monoxide (CO) Emission Rates and EPA Phase 2 Emission Standards for Nonroad Small Spark-Ignited (SI) Nonhandheld Engines

Project CPSC-Q-10-0069

CONDUCTED FOR:

U.S. Consumer Product Safety Commission
4330 East West Hwy, Room 611
Bethesda, MD 20814

SUBMITED BY:

Timothy Griffin
Lab Operations Manager
Intertek Carnot Emission Services

In my opinion, this testing was conducted in a valid manner according to the test method listed.
The results provided on this report relate only to the items tested.

Report History:

Revision A	Initial Release	July 30, 2010

INTRODUCTION

This report documents Intertek Carnot Emission Services' (Intertek CES) recent testing of Honda GX390 389cc small offroad engine (SORE) with serial number GCANK-1254782. Intertek CES conducted emission testing that meets applicable CARB regulations and test procedures conforming to the California Code of Regulations, Title 13, Sections 2400-2409, as well as the 40 CFR Part 90, 1054, and 1065 for EPA. 40 CFR Part 90 regulates SORE Class II (≥225cc) for Phase II through 2010 while 40 CFR Part 1054 covers SORE Class II for Phase III for 2011+. 40 CFR Part 1065 is EPA's overall regulation covering test procedures. CCR 2400-2409 is the California Air Resource Boards equivalent of 40 CFR Parts 90 and1054. A summary of the work for this engine test program is shown in Table 1. Tests were first conducted on a load bank with the engine installed in the generator in triplicate with the catalyst and in triplicate without the catalyst according to the load points provided by CPSC (5.5 kW, 4.7 kW, 3.2 kW, 1.5 kW, 0.6 kW, and no load). The engine was then removed from the generator and installed on a test stand to be tested on a dynamometer in triplicate with the catalyst and in triplicate without the catalyst according to an EPA B cycle as shown in Table 2.

TABLE 1. General Program Tasks

Task	Description
A	**Conduct engine emission testing using the prescribed regulations and test methods conforming to 40 CFR 90 and 1065.**
A.1	Conduct engine emission testing with aged catalyst installed at 6 resistive load points (5.5 kW, 4.7 kW, 3.2 kW, 1.5 kW, 0.6 kW, and no load) applied to the generator through its 240-volt receptacle using load bank. The applied loads will be measured, verified, and recorded using a power-meter. Process data and determine test results based on efficiency data correlation between generator and engine power supplied by CPSC. A minimum of three tests will be conducted.
A.2	Conduct engine emission testing without catalyst (OEM muffler) at 6 resistive load points (5.5 kW, 4.7 kW, 3.2 kW, 1.5 kW, 0.6 kW, and no load) applied to the generator through its 240-volt receptacle using load bank. The applied loads will be measured, verified, and recorded using a power-meter. Process data and determine test results based on efficiency data correlation between generator and engine power supplied by CPSC. A minimum of three tests will be conducted.
B	**Disassemble engine shaft from brushless alternator rotors in generator unit for dynamometer testing.**
C	**Conduct dynamometer engine emission testing using the prescribed regulations and test methods conforming to 40 CFR 90 and 1065.**
C.1	Install engine on dynamometer, verify engine performance and conduct power/torque curve.
C.2	Conduct 6 mode B cycle weighted cycle emission test on dynamometer with aged catalyst installed. Process data and determine test results. A minimum of three tests will be conducted.
C.3	Conduct 6 mode B cycle weighted cycle emission test on dynamometer without catalyst (OEM muffler). Process data and determine test results. A minimum of three tests will be conducted.
D	**Prepare and submit deliverables.**

TEST FACILITIES

Intertek is a leading provider of quality and safety solutions serving a wide range of industries around the world. From auditing and inspection, to testing, quality assurance and certification, Intertek people are dedicated to adding value to customers' products and processes, supporting their success in the global marketplace.

Our services take us into almost every field imaginable, such as textiles, toys, electronics, building, heating, pharmaceuticals, petroleum, food and cargo scanning. We operate a global network of more than 400 laboratories and offices and over 21,000 people in 110 countries around the world. Customers of Intertek include some of the world's leading brands, major global and local companies and governments.

Intertek provides laboratory testing, laboratory outsourcing, consulting, cargo inspection and certification services for clients in a wide range of industries, on a global basis. Industrial and commercial organizations choose Intertek as their preferred partner across the world for quality, professionalism, performance and solutions.

Intertek CES is a branch of Intertek and is a research and development facility specializing in the offroad engine industry. The offroad engine industry produces exhaust emissions that are regulated by the Environmental Protection Agency (EPA) and California Air Resources Board (CARB). Reductions of exhaust and evaporative emissions require extensive engine research, development, testing, durability, and certification services to meet both government and consumer needs. The offroad industry typically includes gasoline (SI), diesel (CI), liquefied-petroleum gas (LPG), or natural gas (NG) powered, two or four stroke, water or air-cooled, and vertical or horizontal shaft engines used in numerous applications ranging from small offroad engines (SORE), large spark ignited (LSI) engines, to stationary spark ignition internal combustion engines and marine engines.

Intertek CES is located at KellyUSA, in a 29,500 ft^2 facility. Ten test cells, most with multiple test stands, are used for conducting a wide range of engine tests and measurements. The test cells are equipped with AC dynamometers using in-line torque meters for the highest accuracy and motoring capabilities. Emission measurements are available using PDP CVS full flow dilute sampling, and have been used for lab-to-lab correlation with EPA and other major OEM's. Standard emission sampling includes particulate matter (PM), hydrocarbons (HC), oxides of nitrogen (NOx), carbon monoxide (CO), and carbon dioxide (CO_2). Measurements of nonmethane hydrocarbons (NMHC), volatile organic compounds (VOCs), oxygen (O_2), and intake CO_2 for determining exhaust gas recirculation (EGR) are also available.

Emission equipment used for the testing includes an Emerson Rosemount set of analyzers packaged by Richmond Instruments. The analyzers include NGA 2000 series heated flame ionization detector, wet NOx and chemiluminescense detector (CLD), and infrared (MLT) detectors for CO and CO_2. Calibrations are made with span gases that have 1% accuracy, and are traceable to a NIST standard reference material (SRM).

Data acquisition is monitored and recorded with an HP 34970A unit, and National Instruments LabVIEW software integrated with a 6031E Series card. ICES maintains and calibrates all equipment used for certification testing in compliance with the schedules and standards specified by the Code of Federal Regulations and California Code of Regulations.

The exhaust gas sampling system conforms to §86.1310, and §89.308, §90.420, and §1065. The design of the system used at Intertek CES is depicted in Figure 1.

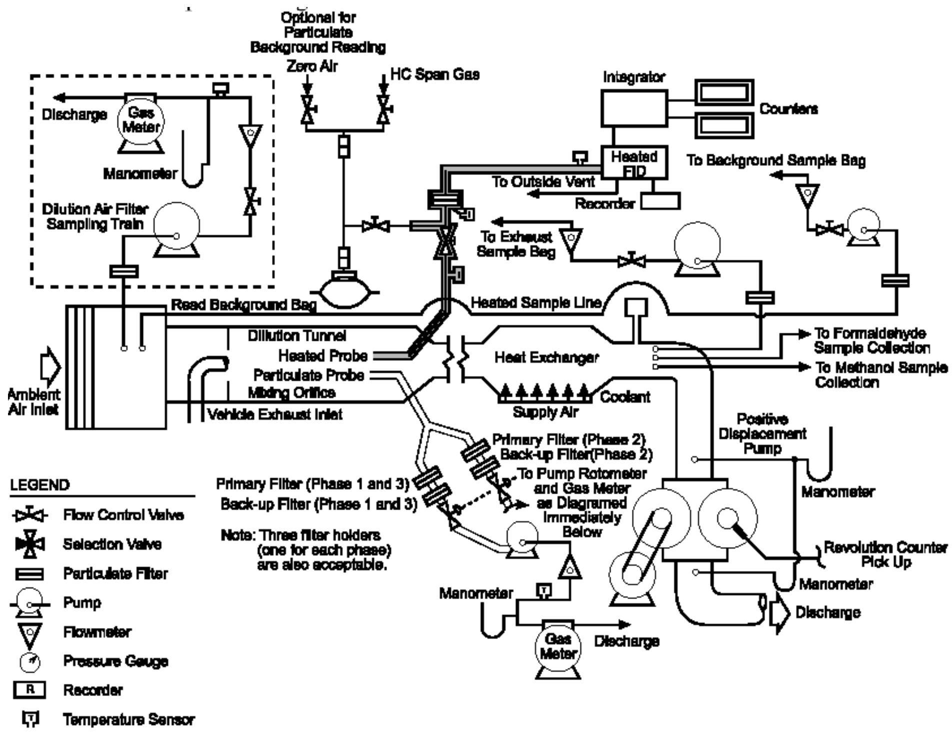


Figure 1 - Gaseous and Particulate Emissions Sampling System (PDP-CVS)

The exhaust gas measurement system conforms to §86.1310, §89.309, §89.421, and §1065. The configuration that is used at Intertek CES is represented in Figure 2.

Dilution tunnel calibrations are performed with a Meriam Instruments LFE for both the primary and secondary dilution tunnels. Monthly propane recovery checks are also performed on the dilution tunnels using a Horiba single CFO.

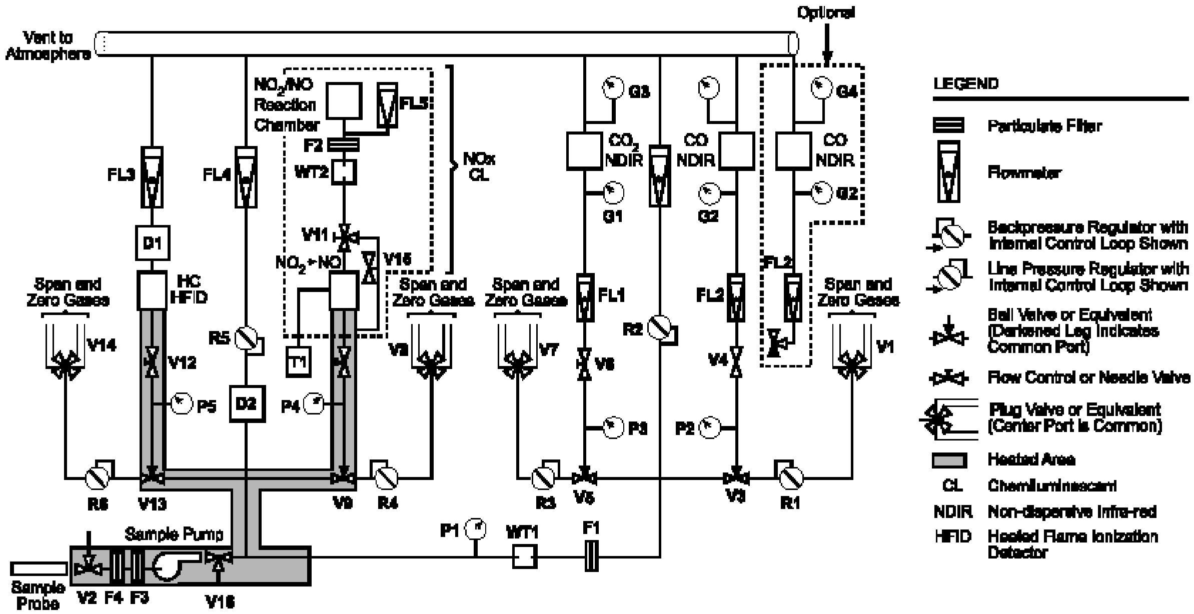
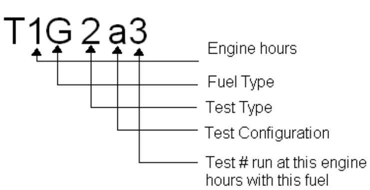


Figure 2 - Exhaust Gas Sampling and Analytical Train

INSTALLATION & PERFORMANCE VERIFICATION

The engine/generator configuration was installed in Test Cell #1 on July 19. 2010. The engine was removed from the generator and installed on the dynamometer on stand B in Test Cell #1 on July 22, 2010. After installation (Figure 3) Intertek CES conducted a power curve with the governor enabled on the engine. The power curve results can be found in Figure 4. Overall results from the power and torque curves are in the summary Table 2. Engine testing nomenclature, task, or performance identification is as follows:



Fuel Type Code:
- ***G- Gasoline***
- L- LPG
- D- Diesel
- C- Compressed Natural Gas
- E- Ethanol
- O- Other

Test Type Code:
- 1- LSI Transients
- 2- LSI C2 Constant Speed 7Mode
- 3- LSI C1 LSI Diesel 8Mode
- ***4- SORE A-Cycle 6Mode***
- ***5- SORE B-Cycle 6Mode***
- ***6- SORE C-Cycle 2Mode***
- 7- LSI D2 Constant Speed 5Mode
- 8- Marine E1 5Mode
- 9- Marine E2 4Mode
- 0- Power Curves or Other Manufacturer Tests

Test Configuration Code:
- ***A- Genset testing with Catalyst***
- ***B- Genset testing witout Catalyst***
- ***C - Dynamometer testing without Catalyst***
- ***D - Dynamometer testing with Catalyst***

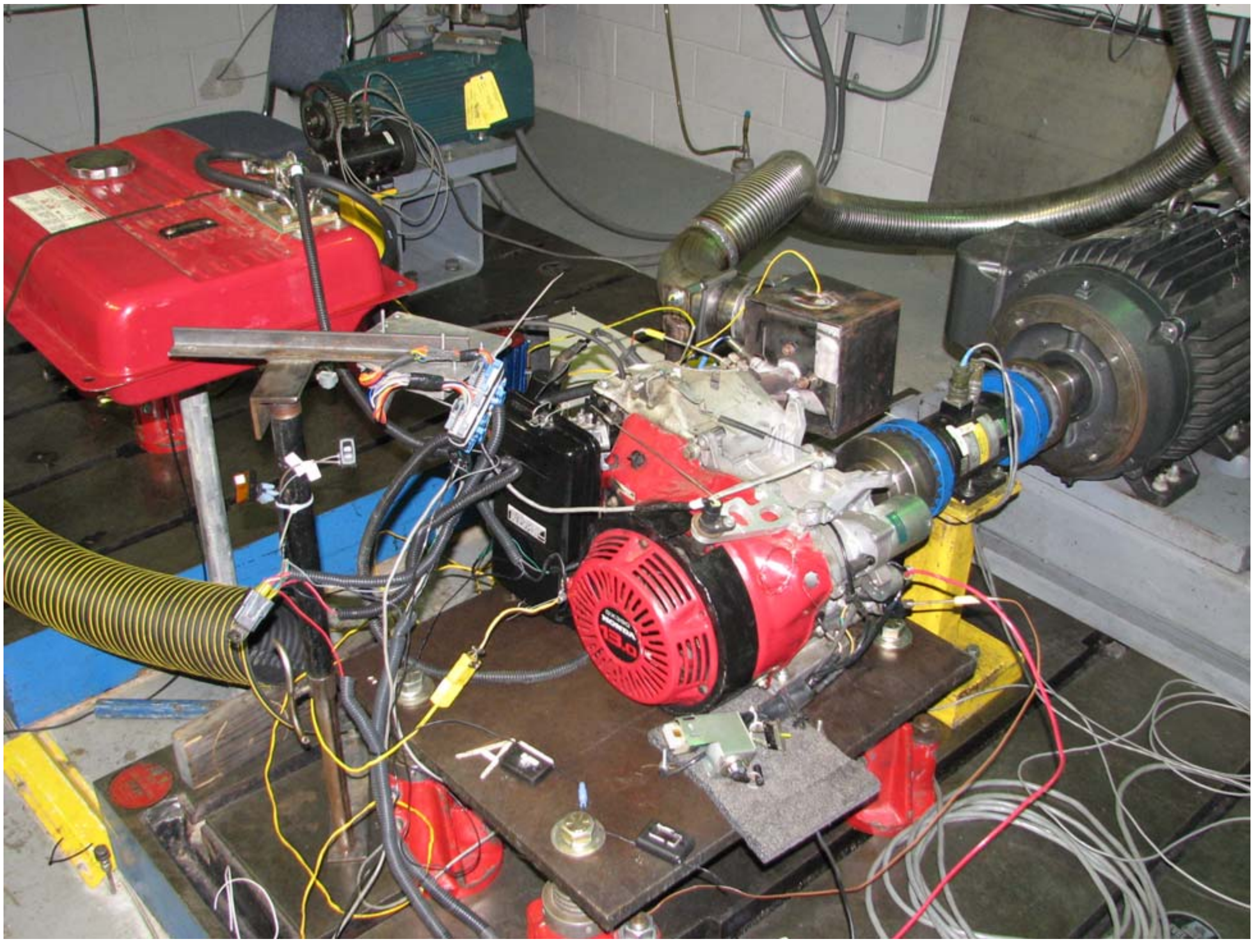


FIGURE 3. Installation Photo

TABLE 2. Governor Enabled Power Curve Results

Test	Engine	Rated T_{Test} Power	T_{Test} Torque
T1G0A1	GCANK-1254782	7.4 kW @ 3163 rpm	22.2 N-m @ 3163 rpm

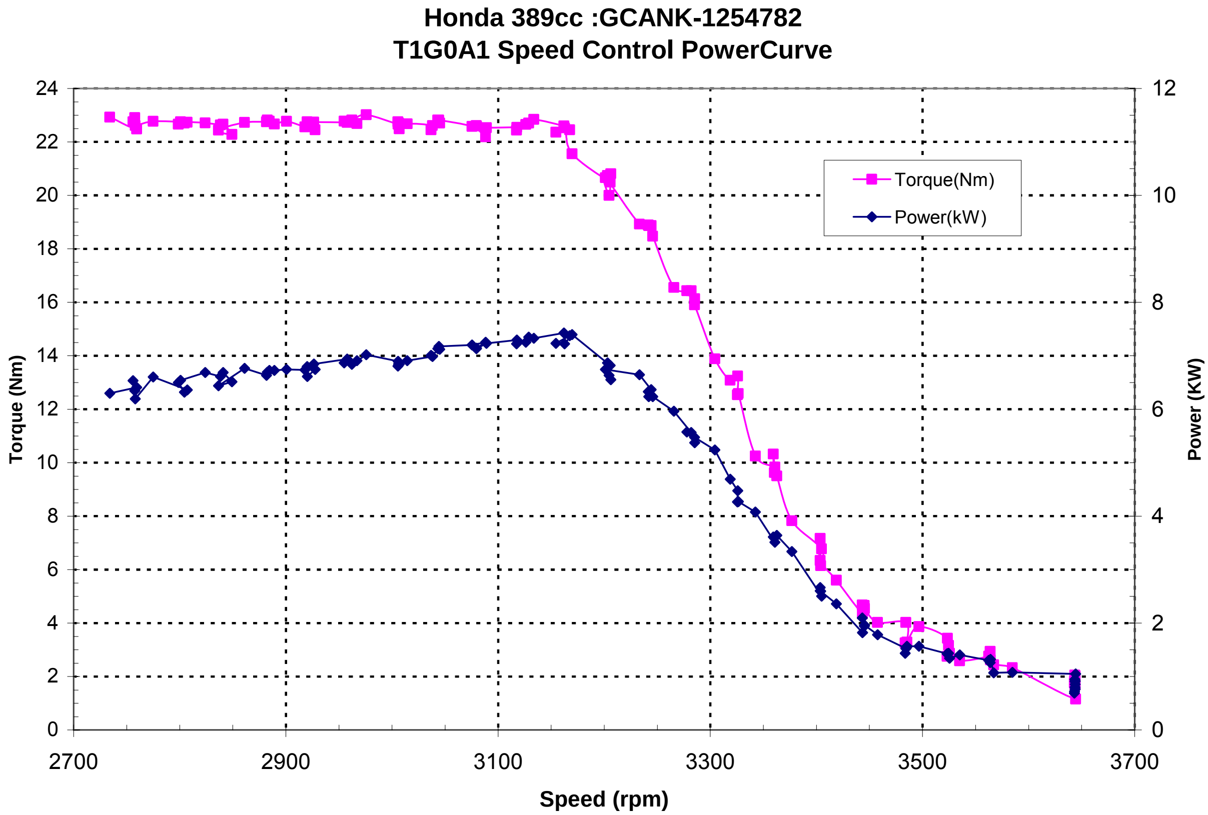


FIGURE 4. Speed Control Power Curve

TESTING

Testing was conducted on the engine while installed in the generator using a resistive load bank at 6 resistive load points applied to the generator through its 240-volt receptacle. The planned targeted load points were 5.5 kW, 4.7 kW, 3.2 kW, 1.5 kW, 0.6 kW, and no load while the actual load points were ~4.9 kW, ~4.7 kW, ~3.2 kW, ~1.5 kW, ~0.6 kW, and no load. Triplicate emission tests were conducted both with and without the catalyst installed on the engine. The mode 1 load points were reduced due to the generator circuitry that either melted wires or tripped breakers. Minor mapping was performed at Intertek Carnot prior to performing the tests.

After the generator based testing was concluded, the engine was removed from the generator and installed on a dynamometer.

Dynamometer testing included triplicate, full EPA B-Cycle steady-state emission tests on the engine both with and without the catalyst installed. The EPA approved B-cycle is a 6-mode test cycle and is shown in Table 3. Table 4 shows the current and future Class II emission standards. The test fuel used is a Chevron-Phillips Unleaded Test Gasoline (UTG) that is compliant with 40 CFR 1065.710 general testing (Table 5).

TABLE 3. ISO 8178-G2 (B) Test Cycle

Mode	1	2	3	4	5	6
Speed	Rated	Rated	Rated	Rated	Rated	Low/High Idle
Load (%)	100	75	50	25	10	N/A
Weight (%)	9	20	29	30	7	5

TABLE 4. Class II Emission Standards

CLASS II - EMISSION STANDARDS			
	EPA Ph2	EPA Ph3	CARB
g/kW-hr	2001-2010	2011+	2008 +
BSCO	610.0	610.0	549.0
BS(HC+NOx)	12.1	8.0	8.0

TABLE 5. 40 CFR 1065.710 Gasoline Test Fuel Specifications

Item	Units	General testing	Low-temperature testing	Reference procedure[1]
Distillation Range:				
Initial boiling point	°C	24–35[2]	24–36	
10% point	°C	49–57	37–48	ASTM D86–07a.
50% point	°C	93–110	82–101	
90% point	°C	149–163	158–174	
End point	°C	Maximum, 213	Maximum, 212	
Hydrocarbon composition:				
Olefins	m^3/m^3	Maximum, 0.10	Maximum, 0.175	ASTM D1319–03.
Aromatics		Maximum, 0.35	Maximum, 0.304	
Saturates		Remainder	Remainder	
Lead (organic)	g/liter	Maximum, 0.013	Maximum, 0.013	ASTM D3237–06e01.
Phosphorous	g/liter	Maximum, 0.0013	Maximum, 0.005	ASTM D3231–07.
Total sulfur	mg/kg	Maximum, 80	Maximum, 80	ASTM D2622–07.
Volatility (Reid Vapor Pressure)	kPa	60.0–63.4[2,3]	77.2–81.4	ASTM D5191–07.

RESULTS

A summary of the results from each test are shown in Table 6 along with averages, standard deviation and coefficient of variance for each triplicate set of tests. The averages, standard deviation and coefficient of variance is also shown for all the testing in the generator and all the testing on the dynamometer. Full test result sheets are available in Appendices A through D.

Genset Testing with Catalyst (g/kw-hr)

Test	CO	HC	NOx	HC + Nox
T1G0A1	6.09	0.36	6.60	6.96
T1G0A2	6.77	0.39	7.19	7.58
T1G0A3	5.06	0.38	7.40	7.78
Average	5.98	0.38	7.06	7.44
StDev	0.86	0.01	0.42	0.43
COV	**14.4%**	**3.6%**	**5.9%**	**5.7%**

Dynamometer Testing without Catalyst (B-cycle)

Test	CO	HC	NOx	HC + Nox
T1G5C1	28.12	1.38	11.63	13.01
T1G5C2	26.06	1.37	11.54	12.91
T1G5C3	26.40	1.31	11.33	12.64
Average	26.86	1.35	11.50	12.85
StDev	1.10	0.04	0.15	0.19
COV	**4.1%**	**2.9%**	**1.3%**	**1.5%**

Genset Testing without Catalyst (g/kw-hr)

Test	CO	HC	NOx	HC + Nox
T1G0B1	24.15	1.16	11.91	13.08
T1G0B2	23.88	1.17	12.16	13.33
T1G0B3	23.42	1.20	12.15	13.34
Average	23.82	1.17	12.07	13.25
StDev	0.37	0.02	0.14	0.15
COV	**1.6%**	**1.5%**	**1.2%**	**1.1%**

Dynamometer Testing with Catalyst (B-cycle)

Test	CO	HC	NOx	HC + Nox
T1G5D1	5.96	0.42	6.25	6.67
T1G5D2	5.68	0.41	6.26	6.66
T1G5D3	5.42	0.40	6.43	6.83
Average	5.68	0.41	6.31	6.72
StDev	0.27	0.01	0.10	0.09
COV	**4.8%**	**2.6%**	**1.6%**	**1.4%**

All Testing without Catalyst (g/kw-hr) / **All Testing with Catalyst**

Test	CO	HC	NOx	HC + Nox		Test	CO	HC	NOx	HC + Nox
T1G0B1	24.15	1.16	11.91	13.08		T1G0A1	6.09	0.36	6.60	6.96
T1G0B2	23.88	1.17	12.16	13.33	◄Genset Tests►	T1G0A2	6.77	0.39	7.19	7.58
T1G0B3	23.42	1.20	12.15	13.34		T1G0A3	5.06	0.38	7.40	7.78
T1G5C1	28.12	1.38	11.63	13.01		T1G5D1	5.96	0.42	6.25	6.67
T1G5C2	26.06	1.37	11.54	12.91	◄ B Cycle Tests►	T1G5D2	5.68	0.41	6.26	6.66
T1G5C3	26.40	1.31	11.33	12.64		T1G5D3	5.42	0.40	6.43	6.83
Average	25.34	1.26	11.79	13.05		Average	5.83	0.39	6.69	7.08
StDev	1.82	0.10	0.34	0.27		StDev	0.59	0.02	0.49	0.48
COV	**7.2%**	**8.0%**	**2.9%**	**2.0%**		**COV**	**10.2%**	**5.3%**	**7.4%**	**6.8%**

TABLE 6. EPA B-Cycle Steady-State and Genset Emission Results
Mode 1 of B-Cycle Tests were conducted at 3600 rpm and WOT.
Mode 1 of Genset Tests were set to highest load prior to breaker tripping.

For calculating the generator based testing composite brake emissions, the electrical motor efficiency table supplied by CPSC was originally utilized. After further review of the high calculated torques during test groups A and B, Fuel flow versus Power was plotted (Figure 5) from the T1G5C1 Dynamometer test. The high torque calculated from the generator based tests led us to believe that the electrical motor efficiencies were too low so that when plotted together, the genset fuel economy was below the dyno economy. By forcing the motor efficiencies from groups A and B to fit the T1G5C1 Fuel Flow vs. Power curve for the generator based tests we were able to determine that the efficiency of the electrical motor should be adjusted in test groups A and B from about 75% at modes 1 and 2 to 80%. Idle efficiency remained the same.

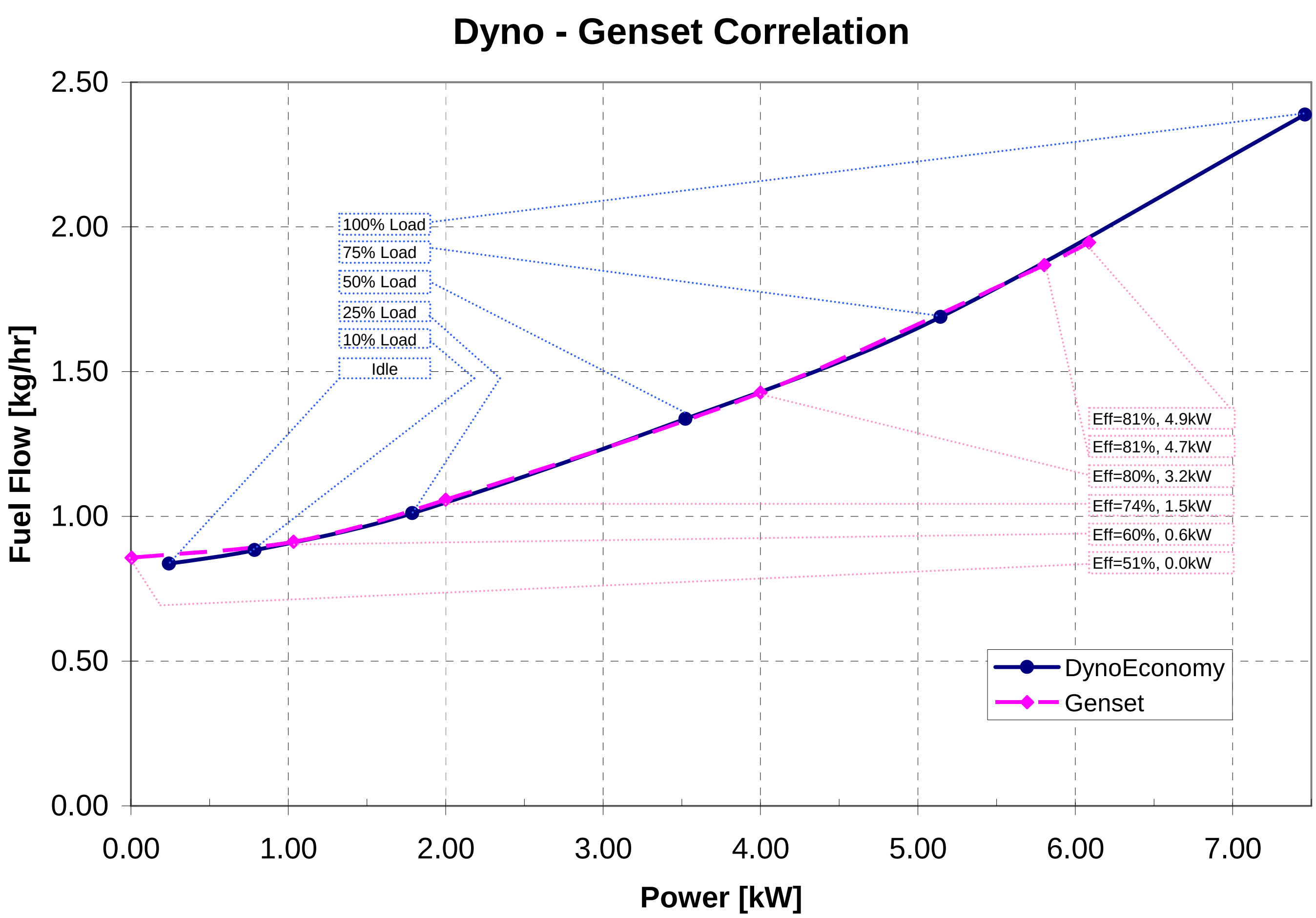


FIGURE 5. Fuel Flow vs. Power

CLOSURE

Intertek Carnot Emission Services continuously works toward improvements that benefit our quality and performance. Our sincere hope is that our engineering services benefit your test programs and core business. If you have any questions, comments, or feedback regarding the testing and/or reporting on this program, we would be happy to discuss those items at any time. We can be reached at (210) 928-1724, or via FAX at (210) 928-1233 if you have any questions.

Approved by:

Steven E. Griffin
General Manager
Intertek CES

Sincerely,

Timothy Griffin
Lab Operations Manager
Intertek CES

APPENDIX A

Honda GX390
sn GCANK-1254872

Summary Test Result Sheets
Generator Testing with Resistive Load Bank
Catalyst Installed

Intertek

INTERTEK CARNOT EMISSION SERVICES

EPA/CARB B-Cycle (ISO 8178 G2) EMISSION TEST RESULTS
INTERTEK CES PROJECT: CPSC-10-01

616 Perrin
San Antonio, TX 78226
tel: 210-928-2230
fax: 210-928-1233

U.S. Consumer Product Safety Commision
CPSC-Q-10-0069

ENGINE IDENTIFICATION			FUEL/OIL INFORMATION		TEST CELL INFORMATION		
Engine Manufacturer:	Honda		Fuel ID:	UTG	Test Cell/Stand:	1B	
Engine Model Number:	GX390		H/C Ratio:	1.84	Test Operator:	TG	0
Engine Serial Number:	GCANK1254782		Engine Cycle:	Otto - 4-stroke	Test Date:	07/21/10	
Engine Displacement [cc/in^3]:	389	23.7	Oil Type:	client provided	Start Test:	8:15:00	
Emission Ctrl System:	0		Engine Mfr Date:		Test No:	T1G0A1	
Rated/Idle Speed:	3600	3600	Engine Family:	0	Engine Start Hr./Duration:	0.00	

Notes: Genset tested using loadbank with Catalyst installed.

	TARGET			MEASURED			Assumed	CALCULATED	INLET AIR CONDITIONS			TEST FACTORS			
	Speed	Load	Gen Pwr	Time	Speed	Torque	Efficiency	FUEL FLOW	Temp	Dew Point	Baro	Dry-Wet	NOx Hum.	HumRatio	F Factor
MODE	[rpm]	[%]	[kW]	[sec]	[rpm]	[N-m]	[%]	[kg/hr]	[deg C]	[deg C]	[kPa]	Correction	Correction	grH2O/lbAir	N/A
1	3600	100	5.0	120.0	3340	17.76	0.81	2.05	23.1	21.6	99.083	0.993	1.090	113.54	1.021
2	3600	75	4.7	120.0	3340	16.59	0.81	1.94	23.7	21.0	99.081	0.994	1.081	109.42	1.021
3	3600	50	3.2	120.0	3395	11.25	0.80	1.48	23.0	18.5	99.084	0.996	1.046	94.08	1.016
4	3600	25	1.5	120.0	3475	5.57	0.74	1.09	22.9	17.5	99.082	0.998	1.033	88.35	1.015
5	3600	10	0.6	120.0	3550	2.78	0.60	0.94	22.6	16.9	99.088	0.998	1.024	84.54	1.013
6	3600	0	0.0	120.0	3660	0.01	0.51	0.88	22.2	16.2	99.091	0.999	1.017	81.12	1.011

	BHP	DILUTE SAMPLE EMISSIONS						DILUTION	DILUTE SAMPLE MASS FLOW						
	from Work	CO	CO2	THC	NOx	CH4	PM	RATIO	PDP Flow	CO	CO2	THC	NOx	CH4	PM
MODE	[kW]	[ppm]	[%]	[ppmC1]	[ppm]	[ppmC1]	[mg]		[scfm]	[g/hr]	[g/hr]	[g/hr C1]	[g/hr]	[g/hr C1]	[g/hr]
1	6.21	135.76	1.07	13.41	88.11			11.98	225.0	51.82	6398.3	2.53	60.21		
2	5.80	92.55	1.02	13.95	84.17			12.54	225.3	35.18	6093.5	2.62	56.78		
3	4.00	65.71	0.78	8.11	35.27			16.26	225.2	25.03	4647.6	1.53	23.07		
4	2.03	32.77	0.57	3.03	8.21			21.77	225.4	12.56	3432.3	0.58	5.34		
5	1.03	17.33	0.49	1.52	5.14			25.03	225.4	6.68	2976.3	0.29	3.33		
6	0.00	14.47	0.46	0.91	3.55			26.77	225.4	5.60	2774.0	0.17	2.29		

	WEIGHT	WEIGHTED SAMPLE MASS FLOW						WEIGHTED
	FACTOR	CO	CO2	THC	NOx	CH4	PM	POWER
MODE		[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[kW]
1	0.09	4.66	575.8	0.23	5.42			0.56
2	0.20	7.04	1218.7	0.52	11.36			1.16
3	0.29	7.26	1347.8	0.44	6.69			1.16
4	0.30	3.77	1029.7	0.17	1.60			0.61
5	0.07	0.47	208.3	0.02	0.23			0.07
6	0.05	0.28	138.7	0.01	0.11			0.00
SUM	1.00	23.47	4519.1	1.40	25.42			3.56

COMPOSITE BRAKE EMISSIONS

BSCO	=	4.92	g/hp-hr	=	6.59	g/kW-hr
BSCO2	=	946.61	g/hp-hr	=	1269.4	g/kW-hr
BSTHC	=	0.29	g/hp-hr	=	0.39	g/kW-hr
BSNOx	=	5.32	g/hp-hr	=	7.14	g/kW-hr
BS(THC+NOx)	=	5.62	g/hp-hr	=	7.53	g/kW-hr
BSCH4	=		g/hp-hr	=		g/kW-hr
BSNMHC	=		g/hp-hr	=		g/kW-hr
BSPM	=		g/hp-hr	=		g/kW-hr
BSFC	=	0.664	lb/hp-hr	=	0.404	kg/kW-hr

	PERCENT CONTRIBUTION							LAMBDA	RELATIVE	TEMPERATURES					
	CO	CO2	HC	NOx	HC+NOx	CH4	PM	AIR/FUEL	HUMIDITY	HEAD	MF SURF	EXH PRE	EXH POST	CELL	OIL
MODE	%	%	%	%	%	%	%		[%]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]
1	19.9%	12.7%	16.3%	21.3%	21.1%			14.420	43.48	210.29	217.05	648.7	357.4	35.9	124.4
2	30.0%	27.0%	37.5%	44.7%	44.3%			14.421	40.96	210.38	209.18	642.5	345.3	36.3	131.5
3	30.9%	29.8%	31.7%	26.3%	26.6%			14.437	39.51	191.39	174.44	608.2	287.0	34.3	120.8
4	16.1%	22.8%	12.4%	6.3%	6.6%			14.381	39.72	172.61	145.80	586.0	239.6	33.1	109.0
5	2.0%	4.6%	1.5%	0.9%	0.9%			14.394	40.75	162.99	131.55	585.6	218.3	31.8	100.3
6	1.2%	3.1%	0.6%	0.5%	0.5%			14.405	40.64	156.96	126.76	594.1	211.2	31.2	95.0

MANUFACTURER DECLARATIONS				
RATED POWER	8.2	kW @	3600	rpm
PEAK TORQUE	25.1	N-m @	2500	rpm
DECLARED IDLE	N/A	@	N/A	rpm

	CORR.	CORR
	FACTOR	POWER
MODE		[kW]
1	1.0253	6.40

CLASS II - EMISSION STANDARDS			
	EPA Ph2	EPA Ph3	CARB
g/kW-hr	2001-2010	2011+	2008 +
BSCO	610.0	610.0	549.0
BS(HC+NOx)	12.1	8.0	8.0

* Wintertime engines only have to meet CO standard

Intertek

INTERTEK CARNOT EMISSION SERVICES

EPA/CARB B-Cycle (ISO 8178 G2) EMISSION TEST RESULTS
INTERTEK CES PROJECT: CPSC-10-01

U.S. Consumer Product Safety Commision
CPSC-Q-10-0069

616 Perrin
San Antonio, TX 78226
tel: 210-928-2230
fax: 210-928-1233

ENGINE IDENTIFICATION			FUEL/OIL INFORMATION		TEST CELL INFORMATION		
Engine Manufacturer:	Honda		Fuel ID:	UTG	Test Cell/Stand:	1B	
Engine Model Number:	GX390		H/C Ratio:	1.84	Test Operator:	TG	0
Engine Serial Number:	GCANK1254782		Engine Cycle:	Otto - 4-stroke	Test Date:	07/21/10	
Engine Displacement [cc/in^3]:	389	23.7	Oil Type:	client provided	Start Test:	9:40:00	
Emission Ctrl System:	0		Engine Mfr Date:		Test No:	T1G0A2	
Rated/Idle Speed:	3600	3600	Engine Family:	0	Engine Start Hr./Duration:	0.00	

Notes: Genset tested using loadbank with Catalyst installed.

	TARGET			MEASURED			Assumed	CALCULATED	INLET AIR CONDITIONS			TEST FACTORS			
	Speed	Load	Gen Pwr	Time	Speed	Torque	Efficiency	FUEL FLOW	Temp	Dew Point	Baro	Dry-Wet	NOx Hum.	HumRatio	F Factor
MODE	[rpm]	[%]	[kW]	[sec]	[rpm]	[N-m]	[%]	[kg/hr]	[deg C]	[deg C]	[kPa]	Correction	Correction	grH2O/lbAir	N/A
1	3600	100	5.0	120.0	3310	17.92	0.81	2.04	29.2	19.6	99.087	0.993	1.061	100.60	1.032
2	3600	75	4.7	120.0	3340	16.59	0.81	1.93	29.5	20.9	99.084	0.994	1.080	109.03	1.035
3	3600	50	3.2	120.0	3400	11.24	0.80	1.47	29.0	19.7	99.079	0.996	1.062	101.20	1.032
4	3600	25	1.5	120.0	3460	5.60	0.74	1.07	28.4	18.7	99.073	0.998	1.048	95.22	1.029
5	3600	10	0.6	120.0	3530	2.80	0.60	0.93	27.9	17.9	99.081	0.998	1.038	90.64	1.027
6	3600	0	0.0	120.0	3660	0.01	0.51	0.87	27.5	17.7	99.083	0.999	1.036	89.50	1.026

	BHP	DILUTE SAMPLE EMISSIONS						DILUTION	DILUTE SAMPLE MASS FLOW						
	from Work	CO	CO2	THC	NOx	CH4	PM	RATIO	PDP Flow	CO	CO2	THC	NOx	CH4	PM
MODE	[kW]	[ppm]	[%]	[ppmC1]	[ppm]	[ppmC1]	[mg]		[scfm]	[g/hr]	[g/hr]	[g/hr C1]	[g/hr]	[g/hr C1]	[g/hr]
1	6.21	282.71	1.05	21.00	83.01			12.03	224.9	107.91	6279.5	3.97	55.20		
2	5.80	82.20	1.02	12.80	96.99			12.62	225.3	31.27	6068.4	2.41	65.44		
3	4.00	53.30	0.77	7.98	39.92			16.40	225.3	20.31	4619.0	1.51	26.54		
4	2.03	30.70	0.56	3.40	8.18			22.13	225.4	11.77	3377.1	0.65	5.40		
5	1.03	16.41	0.49	1.82	4.95			25.36	225.4	6.33	2943.7	0.35	3.26		
6	0.00	13.86	0.45	1.03	3.42			27.05	225.4	5.36	2747.7	0.20	2.25		

	WEIGHT	WEIGHTED SAMPLE MASS FLOW						WEIGHTED
	FACTOR	CO	CO2	THC	NOx	CH4	PM	POWER
MODE		[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[kW]
1	0.09	9.71	565.2	0.36	4.97			0.56
2	0.20	6.25	1213.7	0.48	13.09			1.16
3	0.29	5.89	1339.5	0.44	7.70			1.16
4	0.30	3.53	1013.1	0.19	1.62			0.61
5	0.07	0.44	206.1	0.02	0.23			0.07
6	0.05	0.27	137.4	0.01	0.11			0.00
SUM	1.00	26.10	4474.9	1.50	27.71			3.56

COMPOSITE BRAKE EMISSIONS						
BSCO	=	5.47	g/hp-hr	=	7.33	g/kW-hr
BSCO2	=	937.36	g/hp-hr	=	1257.0	g/kW-hr
BSTHC	=	0.32	g/hp-hr	=	0.42	g/kW-hr
BSNOx	=	5.80	g/hp-hr	=	7.78	g/kW-hr
BS(THC+NOx)	=	6.12	g/hp-hr	=	8.21	g/kW-hr
BSCH4	=		g/hp-hr	=		g/kW-hr
BSNMHC	=		g/hp-hr	=		g/kW-hr
BSPM	=		g/hp-hr	=		g/kW-hr
BSFC	=	0.658	lb/hp-hr	=	0.400	kg/kW-hr

	PERCENT CONTRIBUTION							LAMBDA	RELATIVE	TEMPERATURES					
	CO	CO2	HC	NOx	HC+NOx	CH4	PM	AIR/FUEL	HUMIDITY	HEAD	MF SURF	EXH PRE	EXH POST	CELL	OIL
MODE	%	%	%	%	%	%	%		[%]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]
1	37.2%	12.6%	23.7%	17.9%	18.2%			14.363	37.60	213.88	216.31	645.1	355.7	36.4	127.4
2	24.0%	27.1%	32.1%	47.2%	46.4%			14.455	37.57	215.14	210.53	642.7	345.1	37.9	135.0
3	22.6%	29.9%	29.0%	27.8%	27.8%			14.435	38.82	195.41	174.95	607.8	285.5	35.9	125.2
4	13.5%	22.6%	12.9%	5.8%	6.2%			14.378	40.53	174.75	144.91	583.5	236.9	34.0	111.5
5	1.7%	4.6%	1.6%	0.8%	0.9%			14.345	41.43	164.70	132.19	583.5	217.6	32.8	101.8
6	1.0%	3.1%	0.7%	0.4%	0.4%			14.383	41.73	159.63	127.77	594.0	211.6	32.4	97.2

MANUFACTURER DECLARATIONS				
RATED POWER	8.2	kW @	3600	rpm
PEAK TORQUE	25.1	N-m @	2500	rpm
DECLARED IDLE	N/A	@	N/A	rpm

	CORR.	CORR
	FACTOR	POWER
MODE		[kW]
1	1.0493	6.57

CLASS II - EMISSION STANDARDS			
	EPA Ph2	EPA Ph3	CARB
g/kW-hr	2001-2010	2011+	2008 +
BSCO	610.0	610.0	549.0
BS(HC+NOx)	12.1	8.0	8.0

* Wintertime engines only have to meet CO standard

Intertek

616 Perrin
San Antonio, TX 78226
tel: 210-928-2230
fax: 210-928-1233

INTERTEK CARNOT EMISSION SERVICES

EPA/CARB B-Cycle (ISO 8178 G2) EMISSION TEST RESULTS
INTERTEK CES PROJECT: CPSC-10-01

U.S. Consumer Product Safety Commision
CPSC-Q-10-0069

ENGINE IDENTIFICATION			FUEL/OIL INFORMATION		TEST CELL INFORMATION		
Engine Manufacturer:	Honda		Fuel ID:	UTG	Test Cell/Stand:	1B	
Engine Model Number:	GX390		H/C Ratio:	1.84	Test Operator:	TG	0
Engine Serial Number:	GCANK1254782		Engine Cycle:	Otto - 4-stroke	Test Date:	07/21/10	
Engine Displacement [cc/in^3]:	389	23.7	Oil Type:	client provided	Start Test:	10:56:00	
Emission Ctrl System:	0		Engine Mfr Date:		Test No:	T1G0A3	
Rated/Idle Speed:	3600	3600	Engine Family:	0	Engine Start Hr./Duration:	0.00	

Notes: Genset tested using loadbank with Catalyst installed.

	TARGET			MEASURED			Assumed	CALCULATED	INLET AIR CONDITIONS			TEST FACTORS			
	Speed	Load	Gen Pwr	Time	Speed	Torque	Efficiency	FUEL FLOW	Temp	Dew Point	Baro	Dry-Wet	NOx Hum.	HumRatio	F Factor
MODE	[rpm]	[%]	[kW]	[sec]	[rpm]	[N-m]	[%]	[kg/hr]	[deg C]	[deg C]	[kPa]	Correction	Correction	grH2O/lbAir	N/A
1	3600	100	4.9	120.0	3320	17.51	0.81	2.01	26.5	19.8	99.075	0.993	1.063	101.70	1.026
2	3600	75	4.7	120.0	3340	16.42	0.81	1.90	26.7	19.2	99.074	0.994	1.055	98.05	1.026
3	3600	50	3.2	120.0	3400	11.24	0.80	1.46	26.3	18.9	99.060	0.996	1.051	96.23	1.025
4	3600	25	1.5	120.0	3460	5.60	0.74	1.08	25.6	17.5	99.049	0.998	1.033	88.16	1.021
5	3600	10	0.6	120.0	3550	2.78	0.60	0.94	25.2	17.2	99.044	0.998	1.029	86.46	1.020
6	3600	0	0.0	120.0	3660	0.01	0.51	0.88	24.9	17.1	99.035	0.999	1.028	86.15	1.019

	BHP	DILUTE SAMPLE EMISSIONS						DILUTION	DILUTE SAMPLE MASS FLOW						
	from Work	CO	CO2	THC	NOx	CH4	PM	RATIO	PDP Flow	CO	CO2	THC	NOx	CH4	PM
MODE	[kW]	[ppm]	[%]	[ppmC1]	[ppm]	[ppmC1]	[mg]		[scfm]	[g/hr]	[g/hr]	[g/hr C1]	[g/hr]	[g/hr C1]	[g/hr]
1	6.09	107.57	1.05	13.80	100.08			12.18	224.9	40.99	6302.9	2.60	66.59		
2	5.74	76.91	1.00	13.48	94.29			12.85	225.4	29.29	5975.9	2.54	62.21		
3	4.00	50.86	0.77	8.63	41.14			16.53	225.4	19.42	4601.3	1.63	27.12		
4	2.03	29.83	0.56	3.40	8.60			22.09	225.5	11.46	3403.9	0.65	5.60		
5	1.03	18.41	0.49	1.76	5.04			25.28	225.5	7.11	2956.2	0.34	3.29		
6	0.00	13.60	0.46	1.08	3.56			26.99	225.5	5.27	2769.5	0.21	2.33		

	WEIGHT	WEIGHTED SAMPLE MASS FLOW						WEIGHTED
	FACTOR	CO	CO2	THC	NOx	CH4	PM	POWER
MODE		[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[kW]
1	0.09	3.69	567.3	0.23	5.99			0.55
2	0.20	5.86	1195.2	0.51	12.44			1.15
3	0.29	5.63	1334.4	0.47	7.86			1.16
4	0.30	3.44	1021.2	0.19	1.68			0.61
5	0.07	0.50	206.9	0.02	0.23			0.07
6	0.05	0.26	138.5	0.01	0.12			0.00
SUM	1.00	19.38	4463.4	1.44	28.33			3.54

COMPOSITE BRAKE EMISSIONS						
BSCO	=	4.09	g/hp-hr	=	5.48	g/kW-hr
BSCO2	=	941.17	g/hp-hr	=	1262.1	g/kW-hr
BSTHC	=	0.30	g/hp-hr	=	0.41	g/kW-hr
BSNOx	=	5.97	g/hp-hr	=	8.01	g/kW-hr
BS(THC+NOx)	=	6.28	g/hp-hr	=	8.42	g/kW-hr
BSCH4	=		g/hp-hr	=		g/kW-hr
BSNMHC	=		g/hp-hr	=		g/kW-hr
BSPM	=		g/hp-hr	=		g/kW-hr
BSFC	=	0.659	lb/hp-hr	=	0.401	kg/kW-hr

	PERCENT CONTRIBUTION							LAMBDA	RELATIVE	TEMPERATURES					
	CO	CO2	HC	NOx	HC+NOx	CH4	PM	AIR/FUEL	HUMIDITY	HEAD	MF SURF	EXH PRE	EXH POST	CELL	OIL
MODE	%	%	%	%	%	%	%		[%]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]
1	19.0%	12.7%	16.2%	21.2%	20.9%			14.401	37.00	214.89	214.58	645.5	353.3	36.9	132.3
2	30.2%	26.8%	35.2%	43.9%	43.5%			14.444	35.78	211.56	206.68	637.6	340.3	36.8	131.8
3	29.1%	29.9%	32.8%	27.8%	28.0%			14.473	37.12	191.83	172.21	605.8	283.3	35.8	119.7
4	17.7%	22.9%	13.4%	5.9%	6.3%			14.402	38.48	171.77	144.08	585.2	236.8	33.6	106.6
5	2.6%	4.6%	1.6%	0.8%	0.9%			14.402	39.05	163.01	132.36	585.6	218.5	33.0	99.5
6	1.4%	3.1%	0.7%	0.4%	0.4%			14.405	40.12	157.68	127.25	593.9	212.1	32.4	94.7

MANUFACTURER DECLARATIONS				
RATED POWER	8.2	kW @	3600	rpm
PEAK TORQUE	25.1	N-m @	2500	rpm
DECLARED IDLE	N/A	@	N/A	rpm

	CORR. FACTOR	CORR POWER
MODE		[kW]
1	1.0381	6.36

CLASS II - EMISSION STANDARDS			
	EPA Ph2	EPA Ph3	CARB
g/kW-hr	2001-2010	2011+	2008 +
BSCO	610.0	610.0	549.0
BS(HC+NOx)	12.1	8.0	8.0

* Wintertime engines only have to meet CO standard

APPENDIX B

Honda GX390
sn GCANK-1254872

Summary Test Result Sheets
Generator Testing with Resistive Load Bank
Without Catalyst Installed

INTERTEK CARNOT EMISSION SERVICES

EPA/CARB B-Cycle (ISO 8178 G2) EMISSION TEST RESULTS
INTERTEK CES PROJECT: CPSC-10-01

616 Perrin
San Antonio, TX 78226
tel: 210-928-2230
fax: 210-928-1233

U.S. Consumer Product Safety Commision
CPSC-Q-10-0069

ENGINE IDENTIFICATION			FUEL/OIL INFORMATION		TEST CELL INFORMATION		
Engine Manufacturer:	Honda		Fuel ID:	UTG	Test Cell/Stand:	1B	
Engine Model Number:	GX390		H/C Ratio:	1.84	Test Operator:	TG	0
Engine Serial Number:	GCANK1254782		Engine Cycle:	Otto - 4-stroke	Test Date:	07/21/10	
Engine Displacement [cc/in^3]:	389	23.7	Oil Type:	client provided	Start Test:	14:12:00	
Emission Ctrl System:	0		Engine Mfr Date:		Test No:	T1G0B1	
Rated/Idle Speed:	3600	3600	Engine Family:	0	Engine Start Hr./Duration:	0.00	

Notes: Genset tested using loadbank without Catalyst installed.

	TARGET			MEASURED			Assumed	CALCULATED	INLET AIR CONDITIONS			TEST FACTORS			
	Speed	Load	Gen Pwr	Time	Speed	Torque	Efficiency	FUEL FLOW	Temp	Dew Point	Baro	Dry-Wet	NOx Hum.	HumRatio	F Factor
MODE	[rpm]	[%]	[kW]	[sec]	[rpm]	[N-m]	[%]	[kg/hr]	[deg C]	[deg C]	[kPa]	Correction	Correction	grH2O/lbAir	N/A
1	3600	100	4.9	120.0	3340	17.40	0.81	1.95	25.9	20.4	98.931	0.994	1.073	105.96	1.027
2	3600	75	4.7	120.0	3340	16.59	0.81	1.87	26.2	19.6	98.921	0.995	1.061	100.73	1.027
3	3600	50	3.2	120.0	3390	11.27	0.80	1.43	25.3	18.5	98.895	0.997	1.046	94.08	1.024
4	3600	25	1.5	120.0	3450	5.54	0.74	1.06	24.8	17.4	98.891	0.998	1.031	87.42	1.021
5	3600	10	0.6	120.0	3500	2.82	0.60	0.91	24.9	17.7	98.876	0.999	1.035	89.17	1.022
6	3600	0	0.0	120.0	3640	0.01	0.51	0.86	24.5	17.4	98.872	0.999	1.031	87.36	1.020

	BHP	DILUTE SAMPLE EMISSIONS						DILUTION	DILUTE SAMPLE MASS FLOW						
	from Work	CO	CO2	THC	NOx	CH4	PM	RATIO	PDP Flow	CO	CO2	THC	NOx	CH4	PM
MODE	[kW]	[ppm]	[%]	[ppmC1]	[ppm]	[ppmC1]	[mg]		[scfm]	[g/hr]	[g/hr]	[g/hr C1]	[g/hr]	[g/hr C1]	[g/hr]
1	6.09	369.61	0.90	39.65	141.22			13.63	247.8	153.74	5905.7	8.17	103.54		
2	5.80	303.95	0.88	38.21	137.88			14.13	248.2	126.01	5702.9	7.84	99.65		
3	4.00	222.86	0.67	23.99	61.96			18.30	248.4	92.86	4366.5	4.95	44.37		
4	2.00	167.80	0.49	10.26	14.35			24.24	248.5	70.26	3239.1	2.13	10.18		
5	1.03	115.85	0.43	4.03	6.55			27.90	248.6	48.75	2815.8	0.84	4.69		
6	0.00	98.07	0.40	1.76	4.19			29.67	248.7	41.35	2653.4	0.37	2.99		

	WEIGHT	WEIGHTED SAMPLE MASS FLOW						WEIGHTED
	FACTOR	CO	CO2	THC	NOx	CH4	PM	POWER
MODE		[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[kW]
1	0.09	13.84	531.5	0.73	9.32			0.55
2	0.20	25.20	1140.6	1.57	19.93			1.16
3	0.29	26.93	1266.3	1.44	12.87			1.16
4	0.30	21.08	971.7	0.64	3.05			0.60
5	0.07	3.41	197.1	0.06	0.33			0.07
6	0.05	2.07	132.7	0.02	0.15			0.00
SUM	1.00	92.53	4239.9	4.45	45.65			3.54

COMPOSITE BRAKE EMISSIONS						
BSCO	=	19.49	g/hp-hr	=	26.13	g/kW-hr
BSCO2	=	892.96	g/hp-hr	=	1197.5	g/kW-hr
BSTHC	=	0.94	g/hp-hr	=	1.26	g/kW-hr
BSNOx	=	9.61	g/hp-hr	=	12.89	g/kW-hr
BS(THC+NOx)	=	10.55	g/hp-hr	=	14.15	g/kW-hr
BSCH4	=		g/hp-hr	=		g/kW-hr
BSNMHC	=		g/hp-hr	=		g/kW-hr
BSPM	=		g/hp-hr	=		g/kW-hr
BSFC	=	0.644	lb/hp-hr	=	0.392	kg/kW-hr

	PERCENT CONTRIBUTION							LAMBDA	RELATIVE	TEMPERATURES					
	CO	CO2	HC	NOx	HC+NOx	CH4	PM	AIR/FUEL	HUMIDITY	HEAD	MF SURF	EXH PRE	EXH POST	CELL	OIL
MODE	%	%	%	%	%	%	%		[%]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]
1	15.0%	12.5%	16.5%	20.4%	20.1%			14.434	39.74	212.11	405.66	646.8	235.5	36.3	123.4
2	27.2%	26.9%	35.2%	43.7%	42.9%			14.479	37.83	212.66	398.80	643.0	229.9	36.3	128.6
3	29.1%	29.9%	32.2%	28.2%	28.5%			14.484	37.89	191.43	344.49	607.7	187.3	35.0	116.7
4	22.8%	22.9%	14.3%	6.7%	7.4%			14.412	38.89	172.58	296.18	587.2	152.9	33.3	106.2
5	3.7%	4.6%	1.3%	0.7%	0.8%			14.400	40.53	164.56	277.73	586.0	139.1	32.9	100.0
6	2.2%	3.1%	0.4%	0.3%	0.3%			14.385	41.38	159.81	273.13	595.2	135.6	32.1	95.7

MANUFACTURER DECLARATIONS				
RATED POWER	8.2	kW @	3600	rpm
PEAK TORQUE	25.1	N-m @	2500	rpm
DECLARED IDLE	N/A	@	N/A	rpm

	CORR.	CORR
	FACTOR	POWER
MODE		[kW]
1	1.0375	6.36

CLASS II - EMISSION STANDARDS			
	EPA Ph2	EPA Ph3	CARB
g/kW-hr	2001-2010	2011+	2008 +
BSCO	610.0	610.0	549.0
BS(HC+NOx)	12.1	8.0	8.0

* Wintertime engines only have to meet CO standard

Intertek

616 Perrin
San Antonio, TX 78226
tel: 210-928-2230
fax: 210-928-1233

INTERTEK CARNOT EMISSION SERVICES

EPA/CARB B-Cycle (ISO 8178 G2) EMISSION TEST RESULTS
INTERTEK CES PROJECT: CPSC-10-01

U.S. Consumer Product Safety Commision
CPSC-Q-10-0069

ENGINE IDENTIFICATION			FUEL/OIL INFORMATION		TEST CELL INFORMATION		
Engine Manufacturer:	Honda		Fuel ID:	UTG	Test Cell/Stand:	1B	
Engine Model Number:	GX390		H/C Ratio:	1.84	Test Operator:	TG	0
Engine Serial Number:	GCANK1254782		Engine Cycle:	Otto - 4-stroke	Test Date:	07/21/10	
Engine Displacement [cc/in^3]:	389	23.7	Oil Type:	client provided	Start Test:	15:10:00	
Emission Ctrl System:	0		Engine Mfr Date:		Test No:	T1G0B2	
Rated/Idle Speed:	3600	3600	Engine Family:	0	Engine Start Hr./Duration:	0.00	

Notes: Genset tested using loadbank without Catalyst installed.

	TARGET			MEASURED			Assumed	CALCULATED	INLET AIR CONDITIONS			TEST FACTORS			
	Speed	Load	Gen Pwr	Time	Speed	Torque	Efficiency	FUEL FLOW	Temp	Dew Point	Baro	Dry-Wet	NOx Hum.	HumRatio	F Factor
MODE	[rpm]	[%]	[kW]	[sec]	[rpm]	[N-m]	[%]	[kg/hr]	[deg C]	[deg C]	[kPa]	Correction	Correction	grH2O/lbAir	N/A
1	3600	100	4.9	120.0	3320	17.51	0.81	1.93	26.1	21.9	98.841	0.995	1.097	116.21	1.031
2	3600	75	4.7	120.0	3340	16.42	0.81	1.85	26.1	20.9	98.829	0.995	1.080	108.96	1.030
3	3600	50	3.2	120.0	3400	11.24	0.80	1.42	25.1	18.9	98.815	0.997	1.052	96.54	1.024
4	3600	25	1.5	120.0	3450	5.50	0.74	1.05	24.1	17.5	98.827	0.998	1.033	88.31	1.020
5	3600	10	0.6	120.0	3520	2.80	0.60	0.92	24.1	17.0	98.815	0.999	1.027	85.42	1.019
6	3600	0	0.0	120.0	3640	0.01	0.51	0.85	23.8	16.8	98.807	0.999	1.024	84.09	1.019

	BHP	DILUTE SAMPLE EMISSIONS						DILUTION	DILUTE SAMPLE MASS FLOW						
	from Work	CO	CO2	THC	NOx	CH4	PM	RATIO	PDP Flow	CO	CO2	THC	NOx	CH4	PM
MODE	[kW]	[ppm]	[%]	[ppmC1]	[ppm]	[ppmC1]	[mg]		[scfm]	[g/hr]	[g/hr]	[g/hr C1]	[g/hr]	[g/hr C1]	[g/hr]
1	6.09	337.82	0.90	39.75	144.19			13.73	248.1	140.29	5869.4	8.17	107.87		
2	5.74	293.66	0.87	35.89	137.91			14.23	248.5	121.82	5668.5	7.37	101.51		
3	4.00	214.50	0.66	23.83	61.63			18.42	248.6	89.41	4345.0	4.92	44.40		
4	1.99	180.88	0.49	11.89	14.15			24.38	248.7	75.80	3218.2	2.47	10.07		
5	1.03	111.32	0.43	3.67	6.55			27.87	248.8	46.93	2830.2	0.77	4.65		
6	0.00	100.50	0.40	1.85	4.15			29.73	248.9	42.44	2644.2	0.39	2.95		

	WEIGHT	WEIGHTED SAMPLE MASS FLOW						WEIGHTED
	FACTOR	CO	CO2	THC	NOx	CH4	PM	POWER
MODE		[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[kW]
1	0.09	12.63	528.2	0.74	9.71			0.55
2	0.20	24.36	1133.7	1.47	20.30			1.15
3	0.29	25.93	1260.0	1.43	12.88			1.16
4	0.30	22.74	965.5	0.74	3.02			0.60
5	0.07	3.28	198.1	0.05	0.33			0.07
6	0.05	2.12	132.2	0.02	0.15			0.00
SUM	1.00	91.07	4217.8	4.45	46.38			3.52

COMPOSITE BRAKE EMISSIONS						
BSCO	=	19.27	g/hp-hr	=	25.84	g/kW-hr
BSCO2	=	892.44	g/hp-hr	=	1196.8	g/kW-hr
BSTHC	=	0.94	g/hp-hr	=	1.26	g/kW-hr
BSNOx	=	9.81	g/hp-hr	=	13.16	g/kW-hr
BS(THC+NOx)	=	10.75	g/hp-hr	=	14.42	g/kW-hr
BSCH4	=		g/hp-hr	=		g/kW-hr
BSNMHC	=		g/hp-hr	=		g/kW-hr
BSPM	=		g/hp-hr	=		g/kW-hr
BSFC	=	0.643	lb/hp-hr	=	0.391	kg/kW-hr

	PERCENT CONTRIBUTION							LAMBDA	RELATIVE	TEMPERATURES					
	CO	CO2	HC	NOx	HC+NOx	CH4	PM	AIR/FUEL	HUMIDITY	HEAD	MF SURF	EXH PRE	EXH POST	CELL	OIL
MODE	%	%	%	%	%	%	%		[%]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]
1	13.9%	12.5%	16.5%	20.9%	20.5%			14.503	40.01	214.39	407.54	645.5	235.9	37.9	127.2
2	26.8%	26.9%	33.1%	43.8%	42.8%			14.411	38.47	212.94	399.43	639.9	228.4	37.4	129.5
3	28.5%	29.9%	32.1%	27.8%	28.1%			14.462	37.54	192.98	345.35	606.5	186.7	35.7	120.3
4	25.0%	22.9%	16.6%	6.5%	7.4%			14.387	38.68	172.03	295.14	584.8	151.9	33.5	106.3
5	3.6%	4.7%	1.2%	0.7%	0.7%			14.392	39.82	163.83	278.25	585.7	139.0	32.4	97.5
6	2.3%	3.1%	0.4%	0.3%	0.3%			14.406	39.81	159.33	272.64	594.1	135.0	32.2	95.0

MANUFACTURER DECLARATIONS				
RATED POWER	8.2	kW @	3600	rpm
PEAK TORQUE	25.1	N-m @	2500	rpm
DECLARED IDLE	N/A	@	N/A	rpm

	CORR.	CORR
	FACTOR	POWER
MODE		[kW]
1	1.0393	6.37

CLASS II - EMISSION STANDARDS			
	EPA Ph2	EPA Ph3	CARB
g/kW-hr	2001-2010	2011+	2008 +
BSCO	610.0	610.0	549.0
BS(HC+NOx)	12.1	8.0	8.0

* Wintertime engines only have to meet CO standard

Intertek

INTERTEK CARNOT EMISSION SERVICES

EPA/CARB B-Cycle (ISO 8178 G2) EMISSION TEST RESULTS
INTERTEK CES PROJECT: CPSC-10-01

616 Perrin
San Antonio, TX 78226
tel: 210-928-2230
fax: 210-928-1233

U.S. Consumer Product Safety Commision
CPSC-Q-10-0069

ENGINE IDENTIFICATION			FUEL/OIL INFORMATION		TEST CELL INFORMATION		
Engine Manufacturer:	Honda		Fuel ID:	UTG	Test Cell/Stand:	1B	
Engine Model Number:	GX390		H/C Ratio:	1.84	Test Operator:	TG	0
Engine Serial Number:	GCANK1254782		Engine Cycle:	Otto - 4-stroke	Test Date:	07/21/10	
Engine Displacement [cc/in^3]:	389	23.7	Oil Type:	client provided	Start Test:	16:32:00	
Emission Ctrl System:	0		Engine Mfr Date:		Test No:	T1G0B3	
Rated/Idle Speed:	3600	3600	Engine Family:	0	Engine Start Hr./Duration:	0.00	

Notes: Genset tested using loadbank without Catalyst installed.

	TARGET			MEASURED			Assumed	CALCULATED	INLET AIR CONDITIONS			TEST FACTORS			
	Speed	Load	Gen Pwr	Time	Speed	Torque	Efficiency	FUEL FLOW	Temp	Dew Point	Baro	Dry-Wet	NOx Hum.	HumRatio	F Factor
MODE	[rpm]	[%]	[kW]	[sec]	[rpm]	[N-m]	[%]	[kg/hr]	[deg C]	[deg C]	[kPa]	Correction	Correction	grH2O/lbAir	N/A
1	3600	100	4.9	120.0	3310	17.56	0.81	1.91	26.2	19.9	98.774	0.995	1.066	102.83	1.029
2	3600	75	4.7	120.0	3330	16.46	0.81	1.84	26.0	19.3	98.773	0.995	1.057	98.83	1.028
3	3600	50	3.2	120.0	3400	11.24	0.80	1.42	25.2	18.9	98.788	0.997	1.051	96.21	1.025
4	3600	25	1.5	120.0	3450	5.54	0.74	1.05	24.8	18.9	98.829	0.998	1.051	96.00	1.024
5	3600	10	0.6	120.0	3510	2.81	0.60	0.89	24.7	17.6	98.812	0.999	1.035	88.91	1.022
6	3600	0	0.0	120.0	3640	0.01	0.51	0.85	24.1	17.5	98.817	0.999	1.033	88.18	1.020

	BHP	DILUTE SAMPLE EMISSIONS						DILUTION	DILUTE SAMPLE MASS FLOW						
	from Work	CO	CO2	THC	NOx	CH4	PM	RATIO	PDP Flow	CO	CO2	THC	NOx	CH4	PM
MODE	[kW]	[ppm]	[%]	[ppmC1]	[ppm]	[ppmC1]	[mg]		[scfm]	[g/hr]	[g/hr]	[g/hr C1]	[g/hr]	[g/hr C1]	[g/hr]
1	6.09	318.65	0.89	36.55	148.21			13.87	248.2	132.40	5823.9	7.52	107.87		
2	5.74	295.33	0.86	40.25	140.12			14.36	248.6	122.59	5613.7	8.27	101.02		
3	4.00	220.97	0.66	26.71	62.14			18.47	248.7	92.24	4330.8	5.52	44.80		
4	2.00	165.73	0.49	9.02	13.82			24.46	248.8	69.62	3227.9	1.88	10.02		
5	1.03	110.04	0.41	3.47	6.47			28.75	248.8	46.39	2742.2	0.72	4.63		
6	0.00	99.39	0.40	1.77	4.09			29.81	248.9	41.96	2642.8	0.37	2.93		

	WEIGHT	WEIGHTED SAMPLE MASS FLOW						WEIGHTED
	FACTOR	CO	CO2	THC	NOx	CH4	PM	POWER
MODE		[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[kW]
1	0.09	11.92	524.2	0.68	9.71			0.55
2	0.20	24.52	1122.7	1.65	20.20			1.15
3	0.29	26.75	1255.9	1.60	12.99			1.16
4	0.30	20.89	968.4	0.56	3.01			0.60
5	0.07	3.25	192.0	0.05	0.32			0.07
6	0.05	2.10	132.1	0.02	0.15			0.00
SUM	1.00	89.42	4195.3	4.56	46.38			3.53

COMPOSITE BRAKE EMISSIONS

BSCO	=	18.90	g/hp-hr	=	25.34	g/kW-hr
BSCO2	=	886.67	g/hp-hr	=	1189.0	g/kW-hr
BSTHC	=	0.96	g/hp-hr	=	1.29	g/kW-hr
BSNOx	=	9.80	g/hp-hr	=	13.15	g/kW-hr
BS(THC+NOx)	=	10.77	g/hp-hr	=	14.44	g/kW-hr
BSCH4	=		g/hp-hr	=		g/kW-hr
BSNMHC	=		g/hp-hr	=		g/kW-hr
BSPM	=		g/hp-hr	=		g/kW-hr
BSFC	=	0.639	lb/hp-hr	=	0.389	kg/kW-hr

	PERCENT CONTRIBUTION							LAMBDA	RELATIVE	TEMPERATURES					
	CO	CO2	HC	NOx	HC+NOx	CH4	PM	AIR/FUEL	HUMIDITY	HEAD	MF SURF	EXH PRE	EXH POST	CELL	OIL
MODE	%	%	%	%	%	%	%		[%]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]
1	13.3%	12.5%	14.8%	20.9%	20.4%			14.414	36.01	214.12	405.35	642.7	232.5	37.6	126.4
2	27.4%	26.8%	36.2%	43.6%	42.9%			14.441	35.40	212.56	396.91	636.7	225.8	37.2	128.1
3	29.9%	29.9%	35.1%	28.0%	28.6%			14.431	37.08	192.68	344.92	605.4	186.5	35.8	118.5
4	23.4%	23.1%	12.3%	6.5%	7.0%			14.502	39.84	172.62	295.96	584.8	152.4	34.5	105.5
5	3.6%	4.6%	1.1%	0.7%	0.7%			14.397	40.27	163.58	276.26	588.5	138.0	32.9	98.9
6	2.3%	3.1%	0.4%	0.3%	0.3%			14.407	40.83	160.24	272.41	593.8	135.5	32.5	95.2

MANUFACTURER DECLARATIONS				
RATED POWER	8.2	kW @	3600	rpm
PEAK TORQUE	25.1	N-m @	2500	rpm
DECLARED IDLE	N/A	@	N/A	rpm

	CORR.	CORR
	FACTOR	POWER
MODE		[kW]
1	1.0406	6.38

CLASS II - EMISSION STANDARDS			
	EPA Ph2	EPA Ph3	CARB
g/kW-hr	2001-2010	2011+	2008 +
BSCO	610.0	610.0	549.0
BS(HC+NOx)	12.1	8.0	8.0

* Wintertime engines only have to meet CO standard

APPENDIX C

Honda GX390
sn GCANK-1254872

Summary Test Result Sheets
Dynamometer Testing
Without Catalyst Installed

INTERTEK CARNOT EMISSION SERVICES

EPA/CARB B-Cycle (ISO 8178 G2) EMISSION TEST RESULTS
INTERTEK CES PROJECT: CPSC-10-01

616 Perrin
San Antonio, TX 78226
tel: 210-928-2230
fax: 210-928-1233

U.S. Consumer Product Safety Commision
CPSC-Q-10-0069

ENGINE IDENTIFICATION			FUEL/OIL INFORMATION		TEST CELL INFORMATION		
Engine Manufacturer:	Honda		Fuel ID:	UTG	Test Cell/Stand:	1B	
Engine Model Number:	GX390		H/C Ratio:	1.84	Test Operator:	TG	0
Engine Serial Number:	GCANK1254782		Engine Cycle:	Otto - 4-stroke	Test Date:	07/22/10	
Engine Displacement [cc/in^3]:	389	23.7	Oil Type:	client provided	Start Test:	14:18:38	
Emission Ctrl System:	0		Engine Mfr Date:		Test No:	T1G5C1	
Rated/Idle Speed:	3600	3600	Engine Family:	0	Engine Start Hr./Duration:	0.00	

Notes: Dynamometer tested without Catalyst installed.

	TARGET			MEASURED				CALCULATED	INLET AIR CONDITIONS			TEST FACTORS			
	Speed	Load	Torque	Time	Speed	Torque	Torque	FUEL FLOW	Temp	Dew Point	Baro	Dry-Wet	NOx Hum.	HumRatio	F Factor
MODE	[rpm]	[%]	[N-m]	[sec]	[rpm]	[N-m]	[% Target]	[kg/hr]	[deg C]	[deg C]	[kPa]	Correction	Correction	grH2O/lbAir	N/A
1	3600	100	19.7	120.0	3610	19.74	0.00	2.39	27.1	12.8	98.838	0.992	0.981	64.87	1.022
2	3600	75	14.8	120.0	3338	14.72	-0.58	1.69	27.5	12.6	98.826	0.996	0.978	63.72	1.022
3	3600	50	9.9	120.0	3387	9.93	0.66	1.34	26.6	13.0	98.857	0.997	0.983	65.71	1.021
4	3600	25	4.9	120.0	3444	4.96	0.49	1.01	26.3	13.3	98.841	0.999	0.985	66.71	1.020
5	3600	10	2.0	120.0	3592	2.09	5.88	0.88	25.7	13.3	98.802	0.999	0.986	66.98	1.019
6	3600	0	0.0	120.0	3711	0.62	n/a	0.84	25.5	13.4	98.804	0.999	0.986	67.28	1.019

	BHP	DILUTE SAMPLE EMISSIONS						DILUTION	DILUTE SAMPLE MASS FLOW						
	from Work	CO	CO2	THC	NOx	CH4	PM	RATIO	PDP Flow	CO	CO2	THC	NOx	CH4	PM
MODE	[kW]	[ppm]	[%]	[ppmC1]	[ppm]	[ppmC1]	[mg]		[scfm]	[g/hr]	[g/hr]	[g/hr C1]	[g/hr]	[g/hr C1]	[g/hr]
1	7.46	418.61	1.13	43.57	191.09			11.07	247.7	171.82	7274.9	8.85	126.38		
2	5.14	267.54	0.79	39.72	113.41			15.63	248.5	111.51	5155.5	8.20	75.96		
3	3.52	238.88	0.62	24.62	46.00			19.60	248.6	100.21	4067.7	5.11	31.15		
4	1.79	160.95	0.47	9.04	12.44			25.48	248.7	67.77	3095.3	1.88	8.48		
5	0.79	125.66	0.41	3.82	5.33			28.85	248.8	53.06	2717.3	0.80	3.64		
6	0.24	108.26	0.39	2.20	3.65			30.28	248.8	45.75	2582.0	0.46	2.50		

	WEIGHT	WEIGHTED SAMPLE MASS FLOW						WEIGHTED
	FACTOR	CO	CO2	THC	NOx	CH4	PM	POWER
MODE		[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[kW]
1	0.09	15.46	654.7	0.80	11.37			0.67
2	0.20	22.30	1031.1	1.64	15.19			1.03
3	0.29	29.06	1179.6	1.48	9.03			1.02
4	0.30	20.33	928.6	0.57	2.54			0.54
5	0.07	3.71	190.2	0.06	0.26			0.06
6	0.05	2.29	129.1	0.02	0.12			0.00
SUM	1.00	93.16	4113.4	4.56	38.53			3.31

COMPOSITE BRAKE EMISSIONS						
BSCO	=	20.97	g/hp-hr	=	28.12	g/kW-hr
BSCO2	=	925.79	g/hp-hr	=	1241.5	g/kW-hr
BSTHC	=	1.03	g/hp-hr	=	1.38	g/kW-hr
BSNOx	=	8.67	g/hp-hr	=	11.63	g/kW-hr
BS(THC+NOx)	=	9.70	g/hp-hr	=	13.01	g/kW-hr
BSCH4	=		g/hp-hr	=		g/kW-hr
BSNMHC	=		g/hp-hr	=		g/kW-hr
BSPM	=		g/hp-hr	=		g/kW-hr
BSFC	=	0.666	lb/hp-hr	=	0.405	kg/kW-hr

	PERCENT CONTRIBUTION							LAMBDA	RELATIVE	TEMPERATURES					
	CO	CO2	HC	NOx	HC+NOx	CH4	PM	AIR/FUEL	HUMIDITY	HEAD	MF SURF	EXH PRE	EXH POST	CELL	OIL
MODE	%	%	%	%	%	%	%		[%]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]
1	16.6%	15.9%	17.5%	29.5%	28.2%			14.386	41.15	237.04	462.30	689.3	300.2	27.2	139.7
2	23.9%	25.1%	35.9%	39.4%	39.1%			14.431	40.32	215.34	396.90	631.3	242.1	27.2	130.7
3	31.2%	28.7%	32.5%	23.5%	24.4%			14.421	41.67	195.91	351.32	602.7	203.7	27.2	117.5
4	21.8%	22.6%	12.4%	6.6%	7.2%			14.410	42.55	178.18	306.23	585.6	168.6	27.1	108.1
5	4.0%	4.6%	1.2%	0.7%	0.7%			14.428	42.87	168.04	292.00	590.6	157.5	27.0	99.8
6	2.5%	3.1%	0.5%	0.3%	0.3%			14.410	42.89	164.48	289.78	601.6	155.0	27.1	98.1

MANUFACTURER DECLARATIONS				
RATED POWER	8.2	kW @	3600	rpm
PEAK TORQUE	25.1	N-m @	2500	rpm
DECLARED IDLE	N/A	@	N/A	rpm

	CORR.	CORR
	FACTOR	POWER
MODE		[kW]
1	1.0433	7.84

CLASS II - EMISSION STANDARDS			
	EPA Ph2	EPA Ph3	CARB
g/kW-hr	2001-2010	2011+	2008 +
BSCO	610.0	610.0	549.0
BS(HC+NOx)	12.1	8.0	8.0

* Wintertime engines only have to meet CO standard

Intertek

INTERTEK CARNOT EMISSION SERVICES

EPA/CARB B-Cycle (ISO 8178 G2) EMISSION TEST RESULTS
INTERTEK CES PROJECT: CPSC-10-01

616 Perrin
San Antonio, TX 78226
tel: 210-928-2230
fax: 210-928-1233

U.S. Consumer Product Safety Commision
CPSC-Q-10-0069

ENGINE IDENTIFICATION			FUEL/OIL INFORMATION		TEST CELL INFORMATION		
Engine Manufacturer:	Honda		Fuel ID:	UTG	Test Cell/Stand:	1B	
Engine Model Number:	GX390		H/C Ratio:	1.84	Test Operator:	TG	0
Engine Serial Number:	GCANK1254782		Engine Cycle:	Otto - 4-stroke	Test Date:	07/22/10	
Engine Displacement [cc/in^3]:	389	23.7	Oil Type:	client provided	Start Test:	15:33:31	
Emission Ctrl System:	0		Engine Mfr Date:		Test No:	T1G5C2	
Rated/Idle Speed:	3600	3600	Engine Family:	0	Engine Start Hr./Duration:	0.00	

Notes: Dynamometer tested without Catalyst installed.

	TARGET			MEASURED				CALCULATED	INLET AIR CONDITIONS			TEST FACTORS			
	Speed	Load	Torque	Time	Speed	Torque	Torque	FUEL FLOW	Temp	Dew Point	Baro	Dry-Wet	NOx Hum.	HumRatio	F Factor
MODE	[rpm]	[%]	[N-m]	[sec]	[rpm]	[N-m]	[% Target]	[kg/hr]	[deg C]	[deg C]	[kPa]	Correction	Correction	grH2O/lbAir	N/A
1	3600	100	19.7	120.0	3609	19.72	0.00	2.35	28.6	12.1	98.801	0.992	0.974	61.92	1.025
2	3600	75	14.8	120.0	3312	14.86	0.50	1.67	28.0	11.8	98.795	0.996	0.971	60.49	1.023
3	3600	50	9.9	120.0	3361	9.89	0.36	1.31	27.3	12.0	98.781	0.997	0.973	61.27	1.022
4	3600	25	4.9	120.0	3441	4.87	-1.12	1.00	26.8	12.1	98.772	0.999	0.974	61.81	1.021
5	3600	10	2.0	120.0	3598	2.00	1.67	0.87	25.8	12.1	98.758	0.999	0.974	61.89	1.019
6	3600	0	0.0	120.0	3707	0.67	n/a	0.83	25.7	12.5	98.757	0.999	0.977	63.23	1.019

	BHP	DILUTE SAMPLE EMISSIONS						DILUTION	DILUTE SAMPLE MASS FLOW						
	from Work	CO	CO2	THC	NOx	CH4	PM	RATIO	PDP Flow	CO	CO2	THC	NOx	CH4	PM
MODE	[kW]	[ppm]	[%]	[ppmC1]	[ppm]	[ppmC1]	[mg]		[scfm]	[g/hr]	[g/hr]	[g/hr C1]	[g/hr]	[g/hr C1]	[g/hr]
1	7.45	407.26	1.12	49.60	190.60			11.16	247.7	166.21	7164.7	10.02	124.51		
2	5.15	243.44	0.78	38.02	112.03			15.78	248.6	101.27	5099.6	7.83	74.34		
3	3.48	208.21	0.61	23.57	46.93			19.87	248.7	87.13	4006.3	4.88	31.39		
4	1.76	150.83	0.46	8.80	12.07			25.68	248.9	63.48	3064.4	1.83	8.13		
5	0.76	130.33	0.40	3.79	5.15			29.17	248.9	54.97	2673.9	0.79	3.48		
6	0.26	113.48	0.38	2.46	3.50			30.54	249.0	47.95	2554.3	0.51	2.37		

	WEIGHT	WEIGHTED SAMPLE MASS FLOW						WEIGHTED
	FACTOR	CO	CO2	THC	NOx	CH4	PM	POWER
MODE		[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[kW]
1	0.09	14.96	644.8	0.90	11.21			0.67
2	0.20	20.25	1019.9	1.57	14.87			1.03
3	0.29	25.27	1161.8	1.42	9.10			1.01
4	0.30	19.04	919.3	0.55	2.44			0.53
5	0.07	3.85	187.2	0.06	0.24			0.05
6	0.05	2.40	127.7	0.03	0.12			0.00
SUM	1.00	85.77	4060.8	4.52	37.98			3.29

COMPOSITE BRAKE EMISSIONS						
BSCO	=	19.43	g/hp-hr	=	26.06	g/kW-hr
BSCO2	=	920.12	g/hp-hr	=	1233.9	g/kW-hr
BSTHC	=	1.02	g/hp-hr	=	1.37	g/kW-hr
BSNOx	=	8.61	g/hp-hr	=	11.54	g/kW-hr
BS(THC+NOx)	=	9.63	g/hp-hr	=	12.91	g/kW-hr
BSCH4	=		g/hp-hr	=		g/kW-hr
BSNMHC	=		g/hp-hr	=		g/kW-hr
BSPM	=		g/hp-hr	=		g/kW-hr
BSFC	=	0.660	lb/hp-hr	=	0.402	kg/kW-hr

	PERCENT CONTRIBUTION							LAMBDA	RELATIVE	TEMPERATURES					
	CO	CO2	HC	NOx	HC+NOx	CH4	PM	AIR/FUEL	HUMIDITY	HEAD	MF SURF	EXH PRE	EXH POST	CELL	OIL
MODE	%	%	%	%	%	%	%		[%]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]
1	17.4%	15.9%	20.0%	29.5%	28.5%			14.380	37.66	239.76	459.88	687.7	296.9	27.9	142.5
2	23.6%	25.1%	34.7%	39.1%	38.7%			14.445	37.38	217.13	396.44	630.2	229.7	27.6	131.0
3	29.5%	28.6%	31.4%	24.0%	24.8%			14.478	38.11	198.98	350.02	602.0	193.3	27.5	120.7
4	22.2%	22.6%	12.2%	6.4%	7.0%			14.394	38.99	179.92	306.02	587.2	163.3	27.3	109.7
5	4.5%	4.6%	1.2%	0.6%	0.7%			14.435	39.38	169.00	291.02	589.8	156.8	27.1	102.5
6	2.8%	3.1%	0.6%	0.3%	0.3%			14.407	40.23	165.07	286.47	600.4	148.9	27.1	98.0

MANUFACTURER DECLARATIONS				
RATED POWER	8.2	kW @	3600	rpm
PEAK TORQUE	25.1	N-m @	2500	rpm
DECLARED IDLE	N/A	@	N/A	rpm

	CORR. FACTOR	CORR POWER
MODE		[kW]
1	1.0497	7.89

CLASS II - EMISSION STANDARDS			
	EPA Ph2	EPA Ph3	CARB
g/kW-hr	2001-2010	2011+	2008 +
BSCO	610.0	610.0	549.0
BS(HC+NOx)	12.1	8.0	8.0

* Wintertime engines only have to meet CO standard

INTERTEK CARNOT EMISSION SERVICES

EPA/CARB B-Cycle (ISO 8178 G2) EMISSION TEST RESULTS
INTERTEK CES PROJECT: CPSC-10-01

616 Perrin
San Antonio, TX 78226
tel: 210-928-2230
fax: 210-928-1233

U.S. Consumer Product Safety Commision
CPSC-Q-10-0069

ENGINE IDENTIFICATION			FUEL/OIL INFORMATION		TEST CELL INFORMATION		
Engine Manufacturer:	Honda		Fuel ID:	UTG	Test Cell/Stand:	1B	
Engine Model Number:	GX390		H/C Ratio:	1.84	Test Operator:	TG	0
Engine Serial Number:	GCANK1254782		Engine Cycle:	Otto - 4-stroke	Test Date:	07/22/10	
Engine Displacement [cc/in^3]:	389	23.7	Oil Type:	client provided	Start Test:	16:49:32	
Emission Ctrl System:	0		Engine Mfr Date:		Test No:	T1G5C3	
Rated/Idle Speed:	3600	3600	Engine Family:	0	Engine Start Hr./Duration:	0.00	

Notes: Dynamometer tested without Catalyst installed.

	TARGET			MEASURED				CALCULATED	INLET AIR CONDITIONS			TEST FACTORS			
	Speed	Load	Torque	Time	Speed	Torque	Torque	FUEL FLOW	Temp	Dew Point	Baro	Dry-Wet	NOx Hum.	HumRatio	F Factor
MODE	[rpm]	[%]	[N-m]	[sec]	[rpm]	[N-m]	[% Target]	[kg/hr]	[deg C]	[deg C]	[kPa]	Correction	Correction	grH2O/lbAir	N/A
1	3600	100	20.3	120.0	3608	20.30	0.00	2.36	28.4	12.7	98.670	0.992	0.979	64.10	1.026
2	3600	75	15.2	120.0	3286	15.23	0.06	1.68	28.0	12.5	98.672	0.996	0.978	63.43	1.025
3	3600	50	10.1	120.0	3341	10.07	-0.83	1.32	27.3	12.6	98.687	0.997	0.979	64.02	1.023
4	3600	25	5.1	120.0	3428	5.12	0.83	1.01	26.5	12.9	98.664	0.999	0.982	65.20	1.022
5	3600	10	2.0	120.0	3575	2.02	-0.64	0.87	26.2	13.0	98.678	0.999	0.982	65.40	1.021
6	3600	0	0.0	120.0	3689	0.66	n/a	0.83	25.8	13.3	98.672	0.999	0.986	67.13	1.021

	BHP	DILUTE SAMPLE EMISSIONS						DILUTION	DILUTE SAMPLE MASS FLOW						
	from Work	CO	CO2	THC	NOx	CH4	PM	RATIO	PDP Flow	CO	CO2	THC	NOx	CH4	PM
MODE	[kW]	[ppm]	[%]	[ppmC1]	[ppm]	[ppmC1]	[mg]		[scfm]	[g/hr]	[g/hr]	[g/hr C1]	[g/hr]	[g/hr C1]	[g/hr]
1	7.67	395.82	1.12	44.65	188.79			11.13	248.1	161.76	7210.3	9.03	124.13		
2	5.24	254.86	0.78	39.85	113.45			15.70	248.9	105.95	5123.6	8.20	75.77		
3	3.52	224.22	0.61	21.16	45.58			19.77	249.0	93.76	4027.1	4.38	30.66		
4	1.84	156.92	0.47	9.49	12.52			25.39	249.1	65.95	3096.7	1.97	8.49		
5	0.75	121.15	0.40	3.52	4.96			29.31	249.1	51.05	2665.6	0.73	3.38		
6	0.25	118.39	0.38	2.38	3.41			30.64	249.2	49.95	2540.2	0.50	2.33		

	WEIGHT	WEIGHTED SAMPLE MASS FLOW						WEIGHTED
	FACTOR	CO	CO2	THC	NOx	CH4	PM	POWER
MODE		[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[kW]
1	0.09	14.56	648.9	0.81	11.17			0.69
2	0.20	21.19	1024.7	1.64	15.15			1.05
3	0.29	27.19	1167.9	1.27	8.89			1.02
4	0.30	19.78	929.0	0.59	2.55			0.55
5	0.07	3.57	186.6	0.05	0.24			0.05
6	0.05	2.50	127.0	0.02	0.12			0.00
SUM	1.00	88.79	4084.1	4.39	38.11			3.36

COMPOSITE BRAKE EMISSIONS

BSCO	=	19.69	g/hp-hr	=	26.40	g/kW-hr
BSCO2	=	905.50	g/hp-hr	=	1214.3	g/kW-hr
BSTHC	=	0.97	g/hp-hr	=	1.31	g/kW-hr
BSNOx	=	8.45	g/hp-hr	=	11.33	g/kW-hr
BS(THC+NOx)	=	9.42	g/hp-hr	=	12.64	g/kW-hr
BSCH4	=		g/hp-hr	=		g/kW-hr
BSNMHC	=		g/hp-hr	=		g/kW-hr
BSPM	=		g/hp-hr	=		g/kW-hr
BSFC	=	0.651	lb/hp-hr	=	0.396	kg/kW-hr

	PERCENT CONTRIBUTION							LAMBDA	RELATIVE	TEMPERATURES					
	CO	CO2	HC	NOx	HC+NOx	CH4	PM	AIR/FUEL	HUMIDITY	HEAD	MF SURF	EXH PRE	EXH POST	CELL	OIL
MODE	%	%	%	%	%	%	%		[%]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]
1	16.4%	15.9%	18.5%	29.3%	28.2%			14.413	38.80	237.87	460.14	686.7	294.9	28.0	134.5
2	23.9%	25.1%	37.3%	39.8%	39.5%			14.432	38.60	216.18	397.43	627.7	238.1	27.9	126.5
3	30.6%	28.6%	28.9%	23.3%	23.9%			14.505	39.13	198.87	351.19	600.3	202.1	27.8	119.5
4	22.3%	22.7%	13.5%	6.7%	7.4%			14.389	40.34	180.28	307.92	584.8	164.7	27.6	109.0
5	4.0%	4.6%	1.2%	0.6%	0.7%			14.420	40.68	169.62	289.24	588.2	152.9	27.5	102.4
6	2.8%	3.1%	0.6%	0.3%	0.3%			14.423	41.63	165.37	285.07	597.9	153.8	27.5	98.6

MANUFACTURER DECLARATIONS				
RATED POWER	8.2	kW @	3600	rpm
PEAK TORQUE	25.1	N-m @	2500	rpm
DECLARED IDLE	N/A	@	N/A	rpm

	CORR.	CORR
	FACTOR	POWER
MODE		[kW]
1	1.0504	8.12

CLASS II - EMISSION STANDARDS

	EPA Ph2	EPA Ph3	CARB
g/kW-hr	2001-2010	2011+	2008 +
BSCO	610.0	610.0	549.0
BS(HC+NOx)	12.1	8.0	8.0

* Wintertime engines only have to meet CO standard

[redacted]

APPENDIX D

Honda GX390
sn GCANK-1254872

Summary Test Result Sheets
Dynamometer Testing
With Catalyst Installed

INTERTEK CARNOT EMISSION SERVICES

EPA/CARB B-Cycle (ISO 8178 G2) EMISSION TEST RESULTS
INTERTEK CES PROJECT: CPSC-10-01

616 Perrin
San Antonio, TX 78226
tel: 210-928-2230
fax: 210-928-1233

U.S. Consumer Product Safety Commision
CPSC-Q-10-0069

ENGINE IDENTIFICATION			FUEL/OIL INFORMATION		TEST CELL INFORMATION		
Engine Manufacturer:	Honda		Fuel ID:	UTG	Test Cell/Stand:	1B	
Engine Model Number:	GX390		H/C Ratio:	1.84	Test Operator:	TG	0
Engine Serial Number:	GCANK1254782		Engine Cycle:	Otto - 4-stroke	Test Date:	07/23/10	
Engine Displacement [cc/in^3]:	389	23.7	Oil Type:	client provided	Start Test:	8:10:18	
Emission Ctrl System:	0		Engine Mfr Date:		Test No:	T1G5D1	
Rated/Idle Speed:	3600	3600	Engine Family:	0	Engine Start Hr./Duration:	0.00	

Notes: Dynamometer tested with Catalyst installed.

	TARGET			MEASURED				CALCULATED	INLET AIR CONDITIONS			TEST FACTORS			
	Speed	Load	Torque	Time	Speed	Torque	Torque	FUEL FLOW	Temp	Dew Point	Baro	Dry-Wet	NOx Hum.	HumRatio	F Factor
MODE	[rpm]	[%]	[N-m]	[sec]	[rpm]	[N-m]	[% Target]	[kg/hr]	[deg C]	[deg C]	[kPa]	Correction	Correction	grH2O/lbAir	N/A
1	3600	100	21.0	120.0	3606	21.01	0.00	2.49	26.7	17.0	98.874	0.992	1.027	85.39	1.025
2	3600	75	15.8	120.0	3285	15.72	-0.27	1.76	27.1	16.3	98.891	0.995	1.018	81.34	1.025
3	3600	50	10.5	120.0	3346	10.45	-0.50	1.39	26.4	16.4	98.901	0.997	1.019	82.09	1.023
4	3600	25	5.3	120.0	3436	5.32	1.26	1.07	26.0	16.4	98.927	0.998	1.020	82.20	1.022
5	3600	10	2.1	120.0	3577	2.05	-2.24	0.90	25.5	16.8	98.935	0.999	1.024	84.30	1.021
6	3600	0	0.0	120.0	3700	0.63	n/a	0.86	25.4	16.8	98.927	0.999	1.025	84.45	1.021

	BHP	DILUTE SAMPLE EMISSIONS						DILUTION	DILUTE SAMPLE MASS FLOW						
	from Work	CO	CO2	THC	NOx	CH4	PM	RATIO	PDP Flow	CO	CO2	THC	NOx	CH4	PM
MODE	[kW]	[ppm]	[%]	[ppmC1]	[ppm]	[ppmC1]	[mg]		[scfm]	[g/hr]	[g/hr]	[g/hr C1]	[g/hr]	[g/hr C1]	[g/hr]
1	7.93	184.37	1.22	16.21	76.13			10.54	247.3	74.87	7772.2	3.26	52.14		
2	5.41	56.83	0.85	11.94	67.43			14.97	248.1	23.50	5532.2	2.45	46.62		
3	3.66	36.05	0.67	7.21	31.26			18.80	248.2	15.02	4381.1	1.49	21.80		
4	1.91	32.88	0.51	3.57	5.68			24.13	248.3	13.77	3361.5	0.74	3.98		
5	0.77	15.39	0.43	1.41	3.37			28.23	248.3	6.47	2855.3	0.29	2.38		
6	0.24	18.60	0.41	1.06	2.13			29.55	248.4	7.84	2712.7	0.22	1.51		

	WEIGHT	WEIGHTED SAMPLE MASS FLOW						WEIGHTED
	FACTOR	CO	CO2	THC	NOx	CH4	PM	POWER
MODE		[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[kW]
1	0.09	6.74	699.5	0.29	4.69			0.71
2	0.20	4.70	1106.4	0.49	9.32			1.08
3	0.29	4.35	1270.5	0.43	6.32			1.06
4	0.30	4.13	1008.5	0.22	1.19			0.57
5	0.07	0.45	199.9	0.02	0.17			0.05
6	0.05	0.39	135.6	0.01	0.08			0.00
SUM	1.00	20.77	4420.4	1.47	21.77			3.49

COMPOSITE BRAKE EMISSIONS						
BSCO	=	4.44	g/hp-hr	=	5.96	g/kW-hr
BSCO2	=	945.76	g/hp-hr	=	1268.3	g/kW-hr
BSTHC	=	0.31	g/hp-hr	=	0.42	g/kW-hr
BSNOx	=	4.66	g/hp-hr	=	6.25	g/kW-hr
BS(THC+NOx)	=	4.97	g/hp-hr	=	6.67	g/kW-hr
BSCH4	=		g/hp-hr	=		g/kW-hr
BSNMHC	=		g/hp-hr	=		g/kW-hr
BSPM	=		g/hp-hr	=		g/kW-hr
BSFC	=	0.661	lb/hp-hr	=	0.402	kg/kW-hr

	PERCENT CONTRIBUTION							LAMBDA	RELATIVE	TEMPERATURES					
	CO	CO2	HC	NOx	HC+NOx	CH4	PM	AIR/FUEL	HUMIDITY	HEAD	MF SURF	EXH PRE	EXH POST	CELL	OIL
MODE	%	%	%	%	%	%	%		[%]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]
1	32.4%	15.8%	20.0%	21.6%	21.5%			14.389	53.89	233.44	426.71	684.7	379.3	27.2	130.1
2	22.6%	25.0%	33.3%	42.8%	42.2%			14.431	51.20	214.09	342.11	628.5	318.4	27.2	124.5
3	21.0%	28.7%	29.4%	29.0%	29.1%			14.425	51.50	196.61	299.63	604.6	286.4	27.3	116.1
4	19.9%	22.8%	15.1%	5.5%	6.1%			14.384	52.07	177.77	256.51	586.5	253.9	27.1	106.2
5	2.2%	4.5%	1.4%	0.8%	0.8%			14.422	53.36	167.34	236.20	592.8	237.9	27.1	98.8
6	1.9%	3.1%	0.8%	0.3%	0.4%			14.392	53.54	163.27	235.12	602.1	240.3	27.1	96.1

MANUFACTURER DECLARATIONS				
RATED POWER	8.2	kW @	3600	rpm
PEAK TORQUE	25.1	N-m @	2500	rpm
DECLARED IDLE	N/A	@	N/A	rpm

	CORR.	CORR
	FACTOR	POWER
MODE		[kW]
1	1.0413	8.32

CLASS II - EMISSION STANDARDS			
	EPA Ph2	EPA Ph3	CARB
g/kW-hr	2001-2010	2011+	2008 +
BSCO	610.0	610.0	549.0
BS(HC+NOx)	12.1	8.0	8.0

* Wintertime engines only have to meet CO standard

INTERTEK CARNOT EMISSION SERVICES

EPA/CARB B-Cycle (ISO 8178 G2) EMISSION TEST RESULTS

INTERTEK CES PROJECT: CPSC-10-01

616 Perrin
San Antonio, TX 78226
tel: 210-928-2230
fax: 210-928-1233

U.S. Consumer Product Safety Commision
CPSC-Q-10-0069

ENGINE IDENTIFICATION				FUEL/OIL INFORMATION		TEST CELL INFORMATION		
Engine Manufacturer:	Honda			Fuel ID:	UTG	Test Cell/Stand:	1B	
Engine Model Number:	GX390			H/C Ratio:	1.84	Test Operator:	TG	0
Engine Serial Number:	GCANK1254782			Engine Cycle:	Otto - 4-stroke	Test Date:	07/23/10	
Engine Displacement [cc/in^3]:	389	23.7		Oil Type:	client provided	Start Test:	9:17:41	
Emission Ctrl System:	0			Engine Mfr Date:		Test No:	T1G5D2	
Rated/Idle Speed:	3600	3600		Engine Family:	0	Engine Start Hr./Duration:	0.00	

Notes: Dynamometer tested with Catalyst installed.

	TARGET			MEASURED				CALCULATED	INLET AIR CONDITIONS			TEST FACTORS			
	Speed	Load	Torque	Time	Speed	Torque	Torque	FUEL FLOW	Temp	Dew Point	Baro	Dry-Wet	NOx Hum.	HumRatio	F Factor
MODE	[rpm]	[%]	[N-m]	[sec]	[rpm]	[N-m]	[% Target]	[kg/hr]	[deg C]	[deg C]	[kPa]	Correction	Correction	grH2O/lbAir	N/A
1	3600	100	20.8	120.0	3609	20.83	0.00	2.48	27.1	15.5	98.963	0.992	1.009	77.41	1.023
2	3600	75	15.6	120.0	3283	15.56	-0.41	1.74	27.1	14.2	98.959	0.995	0.995	71.30	1.022
3	3600	50	10.4	120.0	3355	10.58	1.59	1.39	26.8	14.8	98.948	0.997	1.001	73.75	1.022
4	3600	25	5.2	120.0	3436	5.22	0.27	1.05	25.8	14.7	98.948	0.998	0.999	73.24	1.019
5	3600	10	2.1	120.0	3565	2.25	7.98	0.90	25.1	14.8	98.946	0.999	1.001	73.83	1.018
6	3600	0	0.0	120.0	3711	0.63	n/a	0.86	25.1	15.7	98.936	0.999	1.011	78.33	1.019

	BHP	DILUTE SAMPLE EMISSIONS						DILUTION	DILUTE SAMPLE MASS FLOW						
	from Work	CO	CO2	THC	NOx	CH4	PM	RATIO	PDP Flow	CO	CO2	THC	NOx	CH4	PM
MODE	[kW]	[ppm]	[%]	[ppmC1]	[ppm]	[ppmC1]	[mg]		[scfm]	[g/hr]	[g/hr]	[g/hr C1]	[g/hr]	[g/hr C1]	[g/hr]
1	7.87	178.70	1.21	15.77	76.71			10.58	247.1	72.53	7734.8	3.17	51.59		
2	5.35	55.24	0.84	11.24	68.13			15.11	247.9	22.83	5475.0	2.30	46.03		
3	3.72	37.02	0.67	7.55	32.00			18.75	248.1	15.40	4386.6	1.56	21.88		
4	1.88	27.12	0.50	3.04	6.42			24.54	248.2	11.34	3299.8	0.63	4.41		
5	0.84	14.75	0.43	1.25	3.51			28.20	248.3	6.20	2854.8	0.26	2.42		
6	0.25	16.34	0.41	0.98	2.14			29.63	248.4	6.88	2704.4	0.20	1.50		

	WEIGHT	WEIGHTED SAMPLE MASS FLOW						WEIGHTED
	FACTOR	CO	CO2	THC	NOx	CH4	PM	POWER
MODE		[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[kW]
1	0.09	6.53	696.1	0.29	4.64			0.71
2	0.20	4.57	1095.0	0.46	9.21			1.07
3	0.29	4.47	1272.1	0.45	6.35			1.08
4	0.30	3.40	989.9	0.19	1.32			0.56
5	0.07	0.43	199.8	0.02	0.17			0.06
6	0.05	0.34	135.2	0.01	0.07			0.00
SUM	1.00	19.74	4388.2	1.41	21.76			3.48

COMPOSITE BRAKE EMISSIONS						
BSCO	=	4.23	g/hp-hr	=	5.68	g/kW-hr
BSCO2	=	940.71	g/hp-hr	=	1261.5	g/kW-hr
BSTHC	=	0.30	g/hp-hr	=	0.41	g/kW-hr
BSNOx	=	4.67	g/hp-hr	=	6.26	g/kW-hr
BS(THC+NOx)	=	4.97	g/hp-hr	=	6.66	g/kW-hr
BSCH4	=		g/hp-hr	=		g/kW-hr
BSNMHC	=		g/hp-hr	=		g/kW-hr
BSPM	=		g/hp-hr	=		g/kW-hr
BSFC	=	0.657	lb/hp-hr	=	0.399	kg/kW-hr

	PERCENT CONTRIBUTION							LAMBDA	RELATIVE	TEMPERATURES					
	CO	CO2	HC	NOx	HC+NOx	CH4	PM	AIR/FUEL	HUMIDITY	HEAD	MF SURF	EXH PRE	EXH POST	CELL	OIL
MODE	%	%	%	%	%	%	%		[%]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]
1	33.1%	15.9%	20.2%	21.3%	21.3%			14.401	46.99	235.88	428.41	683.8	392.9	27.8	134.7
2	23.1%	25.0%	32.5%	42.3%	41.7%			14.431	44.80	214.30	341.89	627.2	329.6	27.3	123.3
3	22.6%	29.0%	31.9%	29.2%	29.3%			14.471	46.16	197.35	302.21	604.1	299.7	27.3	115.6
4	17.2%	22.6%	13.3%	6.1%	6.5%			14.407	46.56	177.75	254.58	585.4	258.7	27.1	106.5
5	2.2%	4.6%	1.3%	0.8%	0.8%			14.392	47.31	168.26	237.57	591.9	243.7	26.9	99.7
6	1.7%	3.1%	0.7%	0.3%	0.4%			14.419	49.72	163.28	236.31	601.8	246.9	27.1	96.3

MANUFACTURER DECLARATIONS				
RATED POWER	8.2	kW @	3600	rpm
PEAK TORQUE	25.1	N-m @	2500	rpm
DECLARED IDLE	N/A	@	N/A	rpm

	CORR.	CORR
	FACTOR	POWER
MODE		[kW]
1	1.0417	8.26

CLASS II - EMISSION STANDARDS			
	EPA Ph2	EPA Ph3	CARB
g/kW-hr	2001-2010	2011+	2008 +
BSCO	610.0	610.0	549.0
BS(HC+NOx)	12.1	8.0	8.0

* Wintertime engines only have to meet CO standard

INTERTEK CARNOT EMISSION SERVICES

EPA/CARB B-Cycle (ISO 8178 G2) EMISSION TEST RESULTS
INTERTEK CES PROJECT: CPSC-10-01

616 Perrin
San Antonio, TX 78226
tel: 210-928-2230
fax: 210-928-1233

U.S. Consumer Product Safety Commision
CPSC-Q-10-0069

ENGINE IDENTIFICATION		FUEL/OIL INFORMATION		TEST CELL INFORMATION	
Engine Manufacturer:	Honda	Fuel ID:	UTG	Test Cell/Stand:	1B
Engine Model Number:	GX390	H/C Ratio:	1.84	Test Operator:	TG 0
Engine Serial Number:	GCANK1254782	Engine Cycle:	Otto - 4-stroke	Test Date:	07/23/10
Engine Displacement [cc/in^3]:	389 23.7	Oil Type:	client provided	Start Test:	10:20:52
Emission Ctrl System:	0	Engine Mfr Date:		Test No:	T1G5D3
Rated/Idle Speed:	3600 3600	Engine Family:	0	Engine Start Hr./Duration:	0.00

Notes: Dynamometer tested with Catalyst installed.

	TARGET			MEASURED				CALCULATED	INLET AIR CONDITIONS			TEST FACTORS			
	Speed	Load	Torque	Time	Speed	Torque	Torque	FUEL FLOW	Temp	Dew Point	Baro	Dry-Wet	NOx Hum.	HumRatio	F Factor
MODE	[rpm]	[%]	[N-m]	[sec]	[rpm]	[N-m]	[% Target]	[kg/hr]	[deg C]	[deg C]	[kPa]	Correction	Correction	grH2O/lbAir	N/A
1	3600	100	20.8	120.0	3605	20.83	0.00	2.47	26.8	13.9	98.936	0.992	0.992	69.85	1.021
2	3600	75	15.6	120.0	3293	15.62	-0.04	1.74	27.3	14.8	98.939	0.995	1.001	74.06	1.023
3	3600	50	10.4	120.0	3356	10.50	0.85	1.38	26.5	14.1	98.944	0.997	0.993	70.50	1.020
4	3600	25	5.2	120.0	3433	5.23	0.46	1.05	26.1	14.9	98.961	0.998	1.002	74.43	1.020
5	3600	10	2.1	120.0	3593	2.13	2.16	0.90	25.4	14.4	98.956	0.999	0.996	71.79	1.018
6	3600	0	0.0	120.0	3727	0.67	n/a	0.86	25.0	14.7	98.964	0.999	1.000	73.50	1.017

	BHP	DILUTE SAMPLE EMISSIONS						DILUTION	DILUTE SAMPLE MASS FLOW						
	from Work	CO	CO2	THC	NOx	CH4	PM	RATIO	PDP Flow	CO	CO2	THC	NOx	CH4	PM
MODE	[kW]	[ppm]	[%]	[ppmC1]	[ppm]	[ppmC1]	[mg]		[scfm]	[g/hr]	[g/hr]	[g/hr C1]	[g/hr]	[g/hr C1]	[g/hr]
1	7.86	168.47	1.21	15.26	77.22			10.59	247.0	68.12	7707.3	3.05	50.87		
2	5.38	54.31	0.85	11.44	72.50			14.94	247.7	22.19	5477.5	2.31	48.72		
3	3.69	36.78	0.67	7.33	32.30			18.91	248.1	15.27	4341.1	1.51	21.88		
4	1.88	23.70	0.50	2.98	6.97			24.51	248.2	9.91	3308.1	0.62	4.79		
5	0.80	16.55	0.43	1.36	3.28			28.32	248.3	6.94	2838.5	0.28	2.25		
6	0.26	17.43	0.41	1.14	2.18			29.56	248.3	7.33	2708.3	0.24	1.50		

	WEIGHT	WEIGHTED SAMPLE MASS FLOW						WEIGHTED
	FACTOR	CO	CO2	THC	NOx	CH4	PM	POWER
MODE		[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[g/hr]	[kW]
1	0.09	6.13	693.7	0.27	4.58			0.71
2	0.20	4.44	1095.5	0.46	9.74			1.08
3	0.29	4.43	1258.9	0.44	6.34			1.07
4	0.30	2.97	992.4	0.18	1.44			0.56
5	0.07	0.49	198.7	0.02	0.16			0.06
6	0.05	0.37	135.4	0.01	0.08			0.00
SUM	1.00	18.82	4374.6	1.39	22.34			3.47

COMPOSITE BRAKE EMISSIONS						
BSCO	=	4.04	g/hp-hr	=	5.42	g/kW-hr
BSCO2	=	938.79	g/hp-hr	=	1258.9	g/kW-hr
BSTHC	=	0.30	g/hp-hr	=	0.40	g/kW-hr
BSNOx	=	4.79	g/hp-hr	=	6.43	g/kW-hr
BS(THC+NOx)	=	5.09	g/hp-hr	=	6.83	g/kW-hr
BSCH4	=		g/hp-hr	=		g/kW-hr
BSNMHC	=		g/hp-hr	=		g/kW-hr
BSPM	=		g/hp-hr	=		g/kW-hr
BSFC	=	0.655	lb/hp-hr	=	0.398	kg/kW-hr

	PERCENT CONTRIBUTION							LAMBDA	RELATIVE	TEMPERATURES					
	CO	CO2	HC	NOx	HC+NOx	CH4	PM	AIR/FUEL	HUMIDITY	HEAD	MF SURF	EXH PRE	EXH POST	CELL	OIL
MODE	%	%	%	%	%	%	%		[%]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]	[deg C]
1	32.6%	15.9%	19.8%	20.5%	20.5%			14.396	42.79	236.47	429.23	683.5	400.2	27.7	134.9
2	23.6%	25.0%	33.3%	43.6%	43.0%			14.454	45.25	215.60	344.85	627.8	335.2	27.8	125.5
3	23.5%	28.8%	31.4%	28.4%	28.6%			14.433	43.85	196.90	299.52	602.5	298.6	27.5	114.6
4	15.8%	22.7%	13.3%	6.4%	6.8%			14.401	46.68	178.14	253.67	587.2	260.2	27.3	104.7
5	2.6%	4.5%	1.4%	0.7%	0.7%			14.384	45.67	167.34	235.63	590.3	243.0	27.1	97.9
6	1.9%	3.1%	0.9%	0.3%	0.4%			14.343	46.72	163.16	236.36	601.2	247.6	27.1	95.6

MANUFACTURER DECLARATIONS				
RATED POWER	8.2	kW @	3600	rpm
PEAK TORQUE	25.1	N-m @	2500	rpm
DECLARED IDLE	N/A	@	N/A	rpm

	CORR. FACTOR	CORR POWER
MODE		[kW]
1	1.0409	8.24

CLASS II - EMISSION STANDARDS			
	EPA Ph2	**EPA Ph3**	**CARB**
g/kW-hr	2001-2010	2011+	2008 +
BSCO	610.0	610.0	549.0
BS(HC+NOx)	12.1	8.0	8.0

* Wintertime engines only have to meet CO standard