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New Technology Research & Development Program
Grant Contract 582-5-70807-0004

Task 2 Deliverable Report

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Texas Commission on Environmental Quality.

10 December 2006

Task 2 Report:
EPA AND CARB CERTIFICATION APPLICATIONS

Prepared for:

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

NTRD Grant 582-5-70807-0004

Submitted by:

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1.0 PROJECT OBJECTIVE

The objective of this project is to develop, emissions test, and emissions certify with EPA and CARB a low NOx LPG and Low NOx CNG fueling system for GM heavy duty 8.1L and 6.0L engines. The technology is based upon Baytech's Compressed Natural Gas (CNG) sequential Multi-Port Fuel Injection (MPFI) system, which will be modified to operate on LPG. Emissions testing will be conducted on both fuels. The NOx emission goal for both engines is 0.1 g/bhp-hr.

The project consists of four tasks:

Task 1: Modify Heavy Duty Vehicles with Baytech MPFI LPG System

Task 2: EPA and CARB Certification Applications

Task 3: Perform Heavy Duty Engine Emission Testing

Task 4: Program Management and Reporting

This task report documents the work performed on Task 2 of the project.

2.0 EMISSIONS CERTIFICATION APPLICATIONS

Baytech conducted heavy duty engine dynamometer testing on the 8.1L and 6.0L propane and CNG fueled engines at Southwest Research Institute (SwRI) in San Antonio. The 8.1L engine was tested in February 2005. The 6.0L engine was tested in July 2006.

Formal HD Transient Test Procedures test protocols required by US Environmental Protection Agency (EPA) and California Air Resources Board (CARB) for heavy duty engine certification were conducted for propane and CNG fuels, and for baseline gasoline. The HD Transient tests were performed according to the Federal Register and CA Title 13 regulations, as described in the Task 3 report.

Detailed emissions test results, and emission certification levels after application of EPA-assigned end-of-life deterioration factors, were presented in the Task 3 report. In this task, Baytech prepared emissions certification applications to EPA/CARB for dedicated and bi-fuel versions of the 8.1L and 6.0L heavy duty propane and CNG fueled engines using the certification level emissions test results presented in the Task 3 report.

2.1 8.1L Heavy Duty Engine Certification Application

This section presents Baytech's certification applications for eight 8.1L heavy duty propane, CNG, and dual fuel (propane or gasoline and CNG or gasoline) engine families/test groups. (Note: Two configurations of the 8.1L engine were tested, as described in the Task 3 report.) The first page of the application is presented for each engine family, followed by the second page of the application for each engine family, etc.

Public Version

Family Info.

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C23**
Certificate #: **BYT-ONHWY-06-03**
Date Cert Issued: **5/31/2005**
Engine category: **On-highway HDGE**

*Some fields will be missing in the public version

1. Model Year: 2006
2. Carryover: No

If yes, list the previous family:

3. Process Code: New Submission

Date EPA Fee Paid: 3-22-2005

5. Mfr's Family Name:

6. Engine Cycle: Otto
7. DISPLACEMENT(S) 8.1 L
8. Engine Configuration: V-8
9. Emission Control system:
   - ☒ Catalyst
   - ☐ None
   - ☐ Engine Modification
   - ☐ Other…
   - ☒ Electronic Control
   - ☐ Smoke Puff Limiter
   - ☐ EGR
10. FUEL TYPE: Dual-fuel 1(CNG or Gasoline)
11. FUEL SYSTEM TYPE: Sequential Fuel Injection
12. METHOD OF ASPIR.: Naturally
13 USEFUL LIFE PERIOD: 8 years / 110,000 miles

14. DETERIORATION FACTOR TYPE

A. Gaseous Exh: Multiplicative

B. Smoke: NA

15. Intended Service Class

HDG 1 (<=14k lbs), HDG 2 (>14K

IF CFF, Select category

CFF/ULEV

21. Program Information:

NCPs	NA
AVE	NA
B&T	NA

22. Family Emission Limits:

PM	NA
NOx	NA
NMHC+NOx	NA
Units:	g/bHp-hr

23. Nonroad Engine Equipment Types:

- ☐ Crane
- ☐ Pump
- ☐ Other…
- ☐ Loaders
- ☐ Compressor
- ☐ Tractor
- ☐ Generator Set
- ☐ Dozer
- ☒ NA

24. Auxiliary Emission Control Devices:

AECD	Sensed	PARAMETER	Controlled	Does AECD result in reducing effectivness of emission control device(s):
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No

25. Adjustable Parameters:

Parameter	Adjustable Range (or N/a)	Tamper Resistance Method (or N/a)
NA		

Public Version

Family Info.

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P23**
Certificate #: **BYT-ONHWY-06-04**
Date Cert Issued: **6/1/2005**
Engine category: **On-highway HDGE**

*Some fields will be missing in the public version

1. Model Year: 2006
2. Carryover: No

If yes, list the previous family:

3. Process Code: New Submission

Date EPA Fee Paid: 3-22-2005

5. Mfr's Family Name:

6. Engine Cycle: Otto
7. DISPLACEMENT(S) 8.1 L
8. Engine Configuration: V-8
9. Emission Control system:
   - ☒ Catalyst
   - ☐ None
   - ☐ Engine Modification
   - ☐ Other…
   - ☒ Electronic Control
   - ☐ Smoke Puff Limiter
   - ☐ EGR
10. FUEL TYPE: Dual-fuel 3(Propane or Gasoline)
11. FUEL SYSTEM TYPE: Sequential Fuel Injection
12. METHOD OF ASPIR.: Naturally
13 USEFUL LIFE PERIOD: 8 years / 110,000 miles

14. DETERIORATION FACTOR TYPE

A. Gaseous Exh: Multiplicative

B. Smoke: NA

15. Intended Service Class

HDG 1 (<=14k lbs), HDG 2 (>14K

IF CFF, Select category

CFF/ULEV

21. Program Information:

NCPs	NA
AVE	NA
B&T	NA

22. Family Emission Limits:

PM	NA
NOx	NA
NMHC+NOx	NA
Units:	g/bHp-hr

23. Nonroad Engine Equipment Types:

- ☐ Crane
- ☐ Loaders
- ☐ Tractor
- ☐ Dozer
- ☐ Pump
- ☐ Compressor
- ☐ Generator Set
- ☒ NA
- ☐ Other…

24. Auxiliary Emission Control Devices:

AECD	Sensed	PARAMETER	Controlled	Does AECD result in reducing effectivness of emission control device(s):
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No

25. Adjustable Parameters:

Parameter	Adjustable Range (or N/a)	Tamper Resistance Method (or N/a)
NA		

Public Version

Family Info.

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C12**
Certificate #: **BYT-ONHWY-06-o5**
Date Cert Issued: **6/1/2005**
Engine category: **On-highway HDGE**

*Some fields will be missing in the public version

1. Model Year: 2006
2. Carryover: No

If yes, list the previous family:

3. Process Code: New Submission

Date EPA Fee Paid: 3-22-2005

5. Mfr's Family Name:

6. Engine Cycle: Otto
7. DISPLACEMENT(S) 8.1 L
8. Engine Configuration: V-8
9. Emission Control system:
   - ☒ Catalyst
   - ☐ None
   - ☐ Engine Modification
   - ☐ Other…
   - ☒ Electronic Control
   - ☐ Smoke Puff Limiter
   - ☐ EGR
10. FUEL TYPE: Natural Gas
11. FUEL SYSTEM TYPE: Sequential Fuel Injection
12. METHOD OF ASPIR.: Naturally
13 USEFUL LIFE PERIOD: 8 years / 110,000 miles

14. DETERIORATION FACTOR TYPE

A. Gaseous Exh: Multiplicative

B. Smoke: NA

15. Intended Service Class

HDG 2 (>14k lbs) (CFF/ILEV)

IF CFF, Select category

CFF/ILEV

21. Program Information:

NCPs	NA
AVE	NA
B&T	NA

22. Family Emission Limits:

PM	NA
NOx	NA
NMHC+NOx	NA
Units:	g/bHp-hr

23. Nonroad Engine Equipment Types:

- ☐ Crane
- ☐ Loaders
- ☐ Tractor
- ☐ Dozer
- ☐ Pump
- ☐ Compressor
- ☐ Generator Set
- ☒ NA
- ☐ Other…

24. Auxiliary Emission Control Devices:

AECD	Sensed	**PARAMETER**	Controlled	Does AECD result in reducing effectivness of emission control device(s):
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No

25. Adjustable Parameters:

Parameter	Adjustable Range (or N/a)	Tamper Resistance Method (or N/a)
NA		

Public Version

Family Info.

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C22**
Certificate #: **BYT-ONHWY-06-06**
Date Cert Issued: **6/1/2005**
Engine category: **On-highway HDGE**

*Some fields will be missing in the public version

1. Model Year: 2006
2. Carryover: No

If yes, list the previous family:

3. Process Code: New Submission

Date EPA Fee Paid: 3-22-2005

5. Mfr's Family Name:

6. Engine Cycle: Otto
7. DISPLACEMENT(S) 8.1 L
8. Engine Configuration: V-8
9. Emission Control system:
   - ☒ Catalyst
   - ☐ None
   - ☐ Engine Modification
   - ☐ Other…
   - ☒ Electronic Control
   - ☐ Smoke Puff Limiter
   - ☐ EGR
10. FUEL TYPE: Dual-fuel 1(CNG or Gasoline)
11. FUEL SYSTEM TYPE: Sequential Fuel Injection
12. METHOD OF ASPIR.: Naturally
13 USEFUL LIFE PERIOD: 8 years / 110,000 miles

14. DETERIORATION FACTOR TYPE

A. Gaseous Exh: Multiplicative

B. Smoke: NA

15. Intended Service Class

HDG 2 (>14k lbs) (CFF/ULEV)

IF CFF, Select category

CFF/ULEV

21. Program Information:

NCPs	NA
AVE	NA
B&T	NA

22. Family Emission Limits:

PM	NA
NOx	NA
NMHC+NOx	NA
Units:	g/bHp-hr

23. Nonroad Engine Equipment Types:

- ☐ Crane
- ☐ Loaders
- ☐ Tractor
- ☐ Dozer
- ☐ Pump
- ☐ Compressor
- ☐ Generator Set
- ☒ NA
- ☐ Other…

24. Auxiliary Emission Control Devices:

AECD	Sensed	PARAMETER	Controlled	Does AECD result in reducing effectivness of emission control device(s):
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No

25. Adjustable Parameters:

Parameter	Adjustable Range (or N/a)	Tamper Resistance Method (or N/a)
NA		

Public Version

Family Info.

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P12**
Certificate #: **BYT-ONHWY-06-07**
Date Cert Issued: **6/2/2005**
Engine category: **On-highway HDGE**

*Some fields will be missing in the public version

1. Model Year: 2006
2. Carryover: No

If yes, list the previous family:

3. Process Code: New Submission

Date EPA Fee Paid: 3-22-2005

5. Mfr's Family Name:

6. Engine Cycle: Otto
7. DISPLACEMENT(S) 8.1 L
8. Engine Configuration: V-8
9. Emission Control system:
   - ☒ Catalyst
   - ☐ None
   - ☐ Engine Modification
   - ☐ Other…
   - ☒ Electronic Control
   - ☐ Smoke Puff Limiter
   - ☐ EGR
10. FUEL TYPE: Propane
11. FUEL SYSTEM TYPE: Sequential Fuel Injection
12. METHOD OF ASPIR.: Naturally
13 USEFUL LIFE PERIOD: 8 years / 110,000 miles

14. DETERIORATION FACTOR TYPE

A. Gaseous Exh: Multiplicative

B. Smoke: NA

15. Intended Service Class

HDG 2 (>14k lbs) (CFF/ILEV)

IF CFF, Select category

CFF/ILEV

21. Program Information:

NCPs	NA
AVE	NA
B&T	NA

22. Family Emission Limits:

PM	NA
NOx	NA
NMHC+NOx	NA
Units:	g/bHp-hr

23. Nonroad Engine Equipment Types:

- ☐ Crane
- ☐ Loaders
- ☐ Tractor
- ☐ Dozer
- ☐ Pump
- ☐ Compressor
- ☐ Generator Set
- ☒ NA
- ☐ Other…

24. Auxiliary Emission Control Devices:

AECD	Sensed	**PARAMETER**	Controlled	Does AECD result in reducing effectivness of emission control device(s):
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No

25. Adjustable Parameters:

Parameter	Adjustable Range (or N/a)	Tamper Resistance Method (or N/a)
NA		

Public Version

Family Info.

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P22**
Certificate #: **BYT-ONHWY-06-08**
Date Cert Issued: **6/2/2005**
Engine category: **On-highway HDGE**

*Some fields will be missing in the public version

1. Model Year: 2006
2. Carryover: No

If yes, list the previous family:

3. Process Code: New Submission

Date EPA Fee Paid: 3-22-2005

5. Mfr's Family Name:

6. Engine Cycle: Otto
7. DISPLACEMENT(S) 8.1 L
8. Engine Configuration: V-8
9. Emission Control system:
   - ☒ Catalyst
   - ☐ None
   - ☐ Engine Modification
   - ☐ Other…
   - ☒ Electronic Control
   - ☐ Smoke Puff Limiter
   - ☐ EGR
10. FUEL TYPE: Dual-fuel 3(Propane or Gasoline)
11. FUEL SYSTEM TYPE: Sequential Fuel Injection
12. METHOD OF ASPIR.: Naturally
13 USEFUL LIFE PERIOD: 8 years / 110,000 miles

14. DETERIORATION FACTOR TYPE

A. Gaseous Exh: Multiplicative
B. Smoke: NA

15. Intended Service Class

HDG 2 (>14k lbs) (CFF/ULEV)

IF CFF, Select category

CFF/ULEV

21. Program Information:

NCPs	NA
AVE	NA
B&T	NA

22. Family Emission Limits:

PM	NA
NOx	NA
NMHC+NOx	NA
Units:	g/bHp-hr

23. Nonroad Engine Equipment Types:

- ☐ Crane
- ☐ Loaders
- ☐ Tractor
- ☐ Dozer
- ☐ Pump
- ☐ Compressor
- ☐ Generator Set
- ☒ NA
- ☐ Other…

24. Auxiliary Emission Control Devices:

AECD	Sensed	PARAMETER	Controlled	Does AECD result in reducing effectivness of emission control device(s):
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No

25. Adjustable Parameters:

Parameter	Adjustable Range (or N/a)	Tamper Resistance Method (or N/a)
NA		

Public Version

Family Info.

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C13**
Certificate #: **BYT-ONHWY-06-01.1**
Date Cert Issued: **6/2/2005**
Engine category: **On-highway HDGE**

*Some fields will be missing in the public version

1. Model Year: 2006
2. Carryover: No

If yes, list the previous family:

3. Process Code: New Submission

Date EPA Fee Paid: 3-22-2005

5. Mfr's Family Name:

6. Engine Cycle: Otto
7. DISPLACEMENT(S) 8.1 L
8. Engine Configuration: V-8
9. Emission Control system:
   - ☒ Catalyst
   - ☐ None
   - ☐ Engine Modification
   - ☐ Other…
   - ☒ Electronic Control
   - ☐ Smoke Puff Limiter
   - ☐ EGR
10. FUEL TYPE: Natural Gas
11. FUEL SYSTEM TYPE: Sequential Fuel Injection
12. METHOD OF ASPIR.: Naturally
13 USEFUL LIFE PERIOD: 8 years / 110,000 miles

14. DETERIORATION FACTOR TYPE

A. Gaseous Exh: Multiplicative

B. Smoke: NA

15. Intended Service Class

HDG 1 (<=14k lbs), HDG 2 (>14k

IF CFF, Select category

CFF/ILEV

21. Program Information:

NCPs	NA
AVE	NA
B&T	NA

22. Family Emission Limits:

PM	NA
NOx	NA
NMHC+NOx	NA
Units:	g/bHp-hr

23. Nonroad Engine Equipment Types:

- ☐ Crane
- ☐ Loaders
- ☐ Tractor
- ☐ Dozer
- ☐ Pump
- ☐ Compressor
- ☐ Generator Set
- ☒ NA
- ☐ Other…

24. Auxiliary Emission Control Devices:

AECD	Sensed	PARAMETER	Controlled	Does AECD result in reducing effectivness of emission control device(s):
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No

25. Adjustable Parameters:

Parameter	Adjustable Range (or N/a)	Tamper Resistance Method (or N/a)
NA		

Public Version

Family Info.

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P13**
Certificate #: **BYT-ONHWY-06-02.1**
Date Cert Issued: **6/2/2005**
Engine category: **On-highway HDGE**

*Some fields will be missing in the public version

1. Model Year: 2006
2. Carryover: No

If yes, list the previous family:

3. Process Code: New Submission

Date EPA Fee Paid: 3-22-2005

5. Mfr's Family Name:

6. Engine Cycle: Otto
7. DISPLACEMENT(S) 8.1 L
8. Engine Configuration: V-8
9. Emission Control system:
   - ☒ Catalyst
   - ☐ None
   - ☐ Engine Modification
   - ☐ Other…
   - ☒ Electronic Control
   - ☐ Smoke Puff Limiter
   - ☐ EGR
10. FUEL TYPE: Propane
11. FUEL SYSTEM TYPE: Sequential Fuel Injection
12. METHOD OF ASPIR.: Naturally
13 USEFUL LIFE PERIOD: 8 years / 110,000 miles

14. DETERIORATION FACTOR TYPE

A. Gaseous Exh: Multiplicative

B. Smoke: NA

15. Intended Service Class

HDG 1 (<=14k lbs), HDG 2 (>14K

IF CFF, Select category

CFF/ILEV

21. Program Information:

NCPs	NA
AVE	NA
B&T	NA

22. Family Emission Limits:

PM	NA
NOx	NA
NMHC+NOx	NA
Units:	g/bHp-hr

23. Nonroad Engine Equipment Types:

- ☐ Crane
- ☐ Loaders
- ☐ Tractor
- ☐ Dozer
- ☐ Pump
- ☐ Compressor
- ☐ Generator Set
- ☒ NA
- ☐ Other…

24. Auxiliary Emission Control Devices:

AECD	Sensed	**PARAMETER**	Controlled	Does AECD result in reducing effectivness of emission control device(s):
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No

25. Adjustable Parameters:

Parameter	Adjustable Range (or N/a)	Tamper Resistance Method (or N/a)
NA		

Public Version

Test Info.

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C23**
Certificate #: **BYT-ONHWY-06-03**

4. Engine Code: **20**
5. Engine Model: **L18**
6. Displacement(s) (cid Or Liters): **8.1L**
7. Engine I.d. Number: **12558110**
8. Rated Hp @ Rated Rpm: **283, (317)** @ **4089, (4008)**
9. Torque (ft-lb) @ Engine Rpm: **379, (449)** @ **3279, (3228)**

10. WAIVERs:

Co	Pm	Smoke	Idle Co
NA	NA	NA	NA

11. COLD START: **NA**
12. Certification Fuel: **Dual-fuel 1(CNG or Gasoline)**
13. Special Test Device ☒ Yes ☐ No
14 Test Procedure: **On-Hwy Otto**

15. OFFICAL TEST RESULTS

	Test 1	Test 2	Test 3
Date:	2/16/2005	2/10/2005	
HC/OMHCE	0.21	0.10	
NMHC/OMNMHCE	0.00	0.06	
HC + NOx			
CARBON MONOXIDE	1.34	1.70	
OXIDE OF NITROGEN	0.23	0.12	
PARTICULATE			
FORMALDEHYDE	0.0006	0.0007	
ACCEL SMOKE %			
LUGGING SMOKE %			
PEAK SMOKE %opacity			
IDLE CO%	0.001	0.005	
CO2	522	644	

16. DETERIORATION FACTORS

DF Type: X

2.200
1.600
1.300
2.200
2

17. CERTIFICATION LEVELS
(Rounded Data)

Units-- g/bHp-hr --Units

Data In Desired Units
○ g/KW-hr ◉ g/BHP-hr

	Test 1	Test 2	Test 3	Avg	STDs g/bHp-hr	STDs g/kW-hr	Test 1	Test 2	Test 3
HC/OMHCE	0.5	0.2		0.3	<Table	<Table	0.5	0.2	
NMHC/OMNMHCE	0.0	0.1		.065	<Table	<Table	0.0	0.1	
HC + NOx	0.3	0.3		.3	<Table	<Table	0.3	0.3	
CARBON MONOXIDE	2.1	2.7		2.4	<Table	<Table	2.1	2.7	
OXIDE OF NITROGEN	0.3	0.2		0.2	<Table	<Table	0.3	0.2	
PARTICULATE					<Table	<Table			
FORMALDEHYDE	0.00	0.00		.0015	<Table	<Table	0.00	0.00	
ACCEL SMOKE %					<Table Missing>				
LUGGING SMOKE %					<Table Missing>				
PEAK SMOKE %opacity					<Table Missing>				
IDLE CO%	0.00	0.01			<Table Missing>				

Public Version

Test Info.

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P23**
Certificate #: **BYT-ONHWY-06-04**

4. Engine Code: **20**
5. Engine Model: **L18**
6. Displacement(s) (cid Or Liters): **8.1L**
7. Engine I.d. Number: **12558110**
8. Rated Hp @ Rated Rpm: **332, (317)** @ **4202. (4008)**
9. Torque (ft-lb) @ Engine Rpm: **439, (449)** @ **3350, (3228)**

10. WAIVERs:

Co	Pm	Smoke	Idle Co
NA	NA	NA	NA

11. COLD START: **NA**
12. Certification Fuel: **Dual-fuel 3(Propane or Gasoline)**
13. Special Test Device ☒ Yes ☐ No
14 Test Procedure: **On-Hwy Otto**

15. OFFICAL TEST RESULTS

	Test 1	Test 2	Test 3
Date:	2/11/2005	2/10/2005	
HC/OMHCE	0.10	0.10	
NMHC/OMNMHCE	0.06	0.06	
HC + NOx			
CARBON MONOXIDE	2.56	1.70	
OXIDE OF NITROGEN	0.21	0.12	
PARTICULATE			
FORMALDEHYDE	0.0006	0.0007	
ACCEL SMOKE %			
LUGGING SMOKE %			
PEAK SMOKE %opacity			
IDLE CO%	0.003	0.005	
CO2	596	644	

16. DETERIORATION FACTORS

DF Type: X

2.200
1.600
1.300
2.200
2

17. CERTIFICATION LEVELS
(Rounded Data)

Units-- g/bHp-hr --Units

Data In Desired Units
○ g/KW-hr ◉ g/BHP-hr

	Test 1	Test 2	Test 3	Avg	STDs g/bHp-hr	STDs g/kW-hr	Test 1	Test 2	Test 3
HC/OMHCE	0.2	0.2		0.2	<Table	<Table	0.2	0.2	
NMHC/OMNMHCE	0.1	0.1		.13	<Table	<Table	0.1	0.1	
HC + NOx	0.4	0.3		.35	<Table	<Table	0.4	0.3	
CARBON MONOXIDE	4.1	2.7		3.4	<Table	<Table	4.1	2.7	
OXIDE OF NITROGEN	0.3	0.2		0.2	<Table	<Table	0.3	0.2	
PARTICULATE					<Table	<Table			
FORMALDEHYDE	0.00	0.00		.0015	<Table	<Table	0.00	0.00	
ACCEL SMOKE %					<Table Missing>				
LUGGING SMOKE %					<Table Missing>				
PEAK SMOKE %opacity					<Table Missing>				
IDLE CO%	0.01	0.01			<Table Missing>				

Public Version

Test Info.

Manufacturer: Baytech Corporation
Engine Family: 6BYTH08.1C12
Certificate #: BYT-ONHWY-06-o5

4. Engine Code: 20
5. Engine Model: L18
6. Displacement(s) (cid Or Liters): 8.1L
7. Engine I.d. Number: 12558110
8. Rated Hp @ Rated Rpm: 256 @ 3565
9. Torque (ft-lb) @ Engine Rpm: 381 @ 2555

10. WAIVERs:

Co	Pm	Smoke	Idle Co
NA	NA	NA	NA

11. COLD START: NA
12. Certification Fuel: Natural Gas (Part 86.1313-94(e)(1))
13. Special Test Device ☒ Yes ☐ No
14 Test Procedure: On-Hwy Otto

15. OFFICAL TEST RESULTS

	Test 1	Test 2	Test 3
Date:	2/21/2005		
HC/OMHCE	0.56		
NMHC/OMNMHCE	0.09		
HC + NOx			
CARBON MONOXIDE	3.40		
OXIDE OF NITROGEN	0.21		
PARTICULATE			
FORMALDEHYDE	0.0010		
ACCEL SMOKE %			
LUGGING SMOKE %			
PEAK SMOKE %opacity			
IDLE CO%	0.001		
CO2	535		

16. DETERIORATION FACTORS

DF Type: X

2.200
1.600
1.300
2.200
2

17. CERTIFICATION LEVELS
(Rounded Data)

Units-- g/bHp-hr --Units

Data In Desired Units
○ g/KW-hr ◉ g/BHP-hr

	Test 1	Test 2	Test 3	Avg	STDs g/bHp-hr	STDs g/kW-hr	Test 1	Test 2	Test 3
HC/OMHCE	1.2			1.2	<Table	<Table	1.2		
NMHC/OMNMHCE	0.2			.2	<Table	<Table	0.2		
HC + NOx	0.5			.5	<Table	<Table	0.5		
CARBON MONOXIDE	5.4			5.4	<Table	<Table	5.4		
OXIDE OF NITROGEN	0.3			0.3	<Table	<Table	0.3		
PARTICULATE					<Table	<Table			
FORMALDEHYDE	0.00			.002	<Table	<Table	0.00		
ACCEL SMOKE %					<Table Missing>				
LUGGING SMOKE %					<Table Missing>				
PEAK SMOKE %opacity					<Table Missing>				
IDLE CO%	0.00				<Table Missing>				

Public Version

Test Info.

Manufacturer: Baytech Corporation
Engine Family: 6BYTH08.1C22
Certificate #: BYT-ONHWY-06-06

4. Engine Code: 20
5. Engine Model: L18
6. Displacement(s) (cid Or Liters): 8.1L
7. Engine I.d. Number: 12558110
8. Rated Hp @ Rated Rpm: 256, (296) @ 3565, (3732)
9. Torque (ft-lb) @ Engine Rpm: 381, (433) @ 2555, (2830)

10. WAIVERs:

Co	Pm	Smoke	Idle Co
NA	NA	NA	NA

11. COLD START: NA
12. Certification Fuel: Dual-fuel 1(CNG or Gasoline)
13. Special Test Device ☒ Yes ☐ No
14 Test Procedure: On-Hwy Otto

15. OFFICAL TEST RESULTS

	Test 1	Test 2	Test 3
Date:	2/21/2005	2/22/2005	
HC/OMHCE	0.56	0.17	
NMHC/OMNMHCE	0.09	0.11	
HC + NOx			
CARBON MONOXIDE	3.40	3.80	
OXIDE OF NITROGEN	0.21	0.21	
PARTICULATE			
FORMALDEHYDE	0.0010	0.0010	
ACCEL SMOKE %			
LUGGING SMOKE %			
PEAK SMOKE %opacity			
IDLE CO%	0.001	0.001	
CO2	535	676	

16. DETERIORATION FACTORS

DF Type: X

2.200
1.600
1.300
2.200
2

17. CERTIFICATION LEVELS
(Rounded Data)

Units-- g/bHp-hr --Units

Data In Desired Units
○ g/KW-hr ◉ g/BHP-hr

	Test 1	Test 2	Test 3	Avg	STDs g/bHp-hr	STDs g/kW-hr	Test 1	Test 2	Test 3
HC/OMHCE	1.2	0.4		0.8	<Table	<Table	1.2	0.4	
NMHC/OMNMHCE	0.2	0.2		.22	<Table	<Table	0.2	0.2	
HC + NOx	0.5	0.5		.5	<Table	<Table	0.5	0.5	
CARBON MONOXIDE	5.4	6.1		5.8	<Table	<Table	5.4	6.1	
OXIDE OF NITROGEN	0.3	0.3		0.3	<Table	<Table	0.3	0.3	
PARTICULATE					<Table	<Table			
FORMALDEHYDE	0.00	0.00		.002	<Table	<Table	0.00	0.00	
ACCEL SMOKE %					<Table Missing>				
LUGGING SMOKE %					<Table Missing>				
PEAK SMOKE %opacity					<Table Missing>				
IDLE CO%	0.00	0.00			<Table Missing>				

Public Version

Test Info.

Manufacturer: Baytech Corporation
Engine Family: 6BYTH08.1P12
Certificate #: BYT-ONHWY-06-07

4. Engine Code: 20
5. Engine Model: L18
6. Displacement(s) (cid Or Liters): 8.1L
7. Engine I.d. Number: 12558110
8. Rated Hp @ 279 @ Rated Rpm: 3660
9. Torque (ft-lb) @ 406 @ Engine Rpm: 2920

10. WAIVERs:

Co	Pm	Smoke	Idle Co
NA	NA	NA	NA

11. COLD START: NA
12. Certification Fuel: Propane
13. Special Test Device ☒ Yes ☐ No
14 Test Procedure: On-Hwy Otto

15. OFFICAL TEST RESULTS

Date: 2/18/2005

	Test 1	Test 2	Test 3
HC/OMHCE	0.34		
NMHC/OMNMHCE	0.26		
HC + NOx			
CARBON MONOXIDE	5.45		
OXIDE OF NITROGEN	0.25		
PARTICULATE			
FORMALDEHYDE	0.0010		
ACCEL SMOKE %			
LUGGING SMOKE %			
PEAK SMOKE %opacity			
IDLE CO%	0.001		
CO2			

16. DETERIORATION FACTORS

DF Type: X

2.200
1.600
1.300
2.200
2

17. CERTIFICATION LEVELS

(Rounded Data)

Units-- g/bHp-hr --Units

Data In Desired Units

○ g/KW-hr ◉ g/BHP-hr

	Test 1	Test 2	Test 3	Avg	STDs g/bHp-hr	STDs g/kW-hr	Test 1	Test 2	Test 3
HC/OMHCE	0.8			0.8	<Table	<Table	0.8		
NMHC/OMNMHCE	0.6			.57	<Table	<Table	0.6		
HC + NOx	0.9			.9	<Table	<Table	0.9		
CARBON MONOXIDE	8.7			8.7	<Table	<Table	8.7		
OXIDE OF NITROGEN	0.3			0.3	<Table	<Table	0.3		
PARTICULATE					<Table	<Table			
FORMALDEHYDE	0.00			.002	<Table	<Table	0.00		
ACCEL SMOKE %					<Table Missing>				
LUGGING SMOKE %					<Table Missing>				
PEAK SMOKE %opacity					<Table Missing>				
IDLE CO%	0.00				<Table Missing>				

Public Version

Test Info.

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P22**
Certificate #: **BYT-ONHWY-06-08**

4. Engine Code: **20**
5. Engine Model: **L18**
6. Displacement(s) (cid Or Liters): **8.1L**
7. Engine I.d. Number: **12558110**
8. Rated Hp @ Rated Rpm: **279, (296)** @ **3660, (3732)**
9. Torque (ft-lb) @ Engine Rpm: **406, (433)** @ **2920, (2830)**

10. WAIVERs:

Co	Pm	Smoke	Idle Co
NA	NA	NA	NA

11. COLD START: **NA**
12. Certification Fuel: **Dual-fuel 3(Propane or Gasoline)**
13. Special Test Device ☒ Yes ☐ No
14 Test Procedure: **On-Hwy Otto**

15. OFFICAL TEST RESULTS

	Test 1	Test 2	Test 3
Date:	2/18/2005	2/22/2005	
HC/OMHCE	0.34	0.17	
NMHC/OMNMHCE	0.26	0.11	
HC + NOx			
CARBON MONOXIDE	5.45	3.80	
OXIDE OF NITROGEN	0.25	0.21	
PARTICULATE			
FORMALDEHYDE	0.0010	0.0010	
ACCEL SMOKE %			
LUGGING SMOKE %			
PEAK SMOKE %opacity			
IDLE CO%	0.001	0.001	
CO2		676	

16. DETERIORATION FACTORS

DF Type: X

2.200
1.600
1.300
2.200
2

17. CERTIFICATION LEVELS
(Rounded Data)

Units-- g/bHp-hr --Units

Data In Desired Units
○ g/KW-hr ◉ g/BHP-hr

	Test 1	Test 2	Test 3	Avg	STDs g/bHp-hr	STDs g/kW-hr	Test 1	Test 2	Test 3
HC/OMHCE	0.8	0.4		0.6	<Table	<Table	0.8	0.4	
NMHC/OMNMHCE	0.6	0.2		.405	<Table	<Table	0.6	0.2	
HC + NOx	0.9	0.5		.7	<Table	<Table	0.9	0.5	
CARBON MONOXIDE	8.7	6.1		7.4	<Table	<Table	8.7	6.1	
OXIDE OF NITROGEN	0.3	0.3		0.3	<Table	<Table	0.3	0.3	
PARTICULATE					<Table	<Table			
FORMALDEHYDE	0.00	0.00		.002	<Table	<Table	0.00	0.00	
ACCEL SMOKE %					<Table Missing>				
LUGGING SMOKE %					<Table Missing>				
PEAK SMOKE %opacity					<Table Missing>				
IDLE CO%	0.00	0.00			<Table Missing>				

Public Version

Test Info.

Manufacturer: Baytech Corporation
Engine Family: 6BYTH08.1C13
Certificate #: BYT-ONHWY-06-01.1

4. Engine Code: 20
5. Engine Model: L18
6. Displacement(s) (cid Or Liters): 8.1L
7. Engine I.d. Number: 12558110
8. Rated Hp @ Rated Rpm: 283 @ 4089
9. Torque (ft-lb) @ Engine Rpm: 379 @ 3279

10. WAIVERs:

Co	Pm	Smoke	Idle Co
NA	NA	NA	NA

11. COLD START: NA
12. Certification Fuel: Natural Gas (Part 86.1313-94(e)(1))
13. Special Test Device ☒ Yes ☐ No
14 Test Procedure: On-Hwy Otto

15. OFFICAL TEST RESULTS

Date: 2/16/2005

	Test 1	Test 2	Test 3
HC/OMHCE	0.21		
NMHC/OMNMHCE	0.00		
HC + NOx			
CARBON MONOXIDE	1.34		
OXIDE OF NITROGEN	0.23		
PARTICULATE			
FORMALDEHYDE	0.0006		
ACCEL SMOKE %			
LUGGING SMOKE %			
PEAK SMOKE %opacity			
IDLE CO%	0.001		
CO2	522		

16. DETERIORATION FACTORS

DF Type: X

2.200
1.600
1.300
2.200
2

17. CERTIFICATION LEVELS

(Rounded Data)

Units-- g/bHp-hr --Units

Data In Desired Units

○ g/KW-hr ◉ g/BHP-hr

	Test 1	Test 2	Test 3	Avg	STDs g/bHp-hr	STDs g/kW-hr	Test 1	Test 2	Test 3
HC/OMHCE	0.5			0.5	<Table	<Table	0.5		
NMHC/OMNMHCE	0.0			0	<Table	<Table	0.0		
HC + NOx	0.3			.3	<Table	<Table	0.3		
CARBON MONOXIDE	2.1			2.1	<Table	<Table	2.1		
OXIDE OF NITROGEN	0.3			0.3	<Table	<Table	0.3		
PARTICULATE					<Table	<Table			
FORMALDEHYDE	0.00			.001	<Table	<Table	0.00		
ACCEL SMOKE %					<Table Missing>				
LUGGING SMOKE %					<Table Missing>				
PEAK SMOKE %opacity					<Table Missing>				
IDLE CO%	0.00				<Table Missing>				

Public Version

Test Info.

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P13**
Certificate #: **BYT-ONHWY-06-02.1**

4. Engine Code: **20**
5. Engine Model: **L18**
6. Displacement(s) (cid Or Liters): **8.1L**
7. Engine I.d. Number: **12558110**
8. Rated Hp @ Rated Rpm: **332** @ **4202**
9. Torque (ft-lb) @ Engine Rpm: **439** @ **3350**

10. WAIVERs:

Co	Pm	Smoke	Idle Co
NA	NA	NA	NA

11. COLD START: **NA**
12. Certification Fuel: **Propane**
13. Special Test Device ☒ Yes ☐ No
14 Test Procedure: **On-Hwy Otto**

15. OFFICAL TEST RESULTS

Date: 2/11/2005

	Test 1	Test 2	Test 3
HC/OMHCE	0.10		
NMHC/OMNMHCE	0.06		
HC + NOx			
CARBON MONOXIDE	2.56		
OXIDE OF NITROGEN	0.21		
PARTICULATE			
FORMALDEHYDE	0.0006		
ACCEL SMOKE %			
LUGGING SMOKE %			
PEAK SMOKE %opacity			
IDLE CO%	0.003		
CO2	596		

16. DETERIORATION FACTORS

DF Type: X

2.200
1.600
1.300
2.200
2

17. CERTIFICATION LEVELS
(Rounded Data)

Units-- g/bHp-hr --Units

Data In Desired Units
○ g/KW-hr ◉ g/BHP-hr

	Test 1	Test 2	Test 3	Avg	STDs g/bHp-hr	STDs g/kW-hr	Test 1	Test 2	Test 3
HC/OMHCE	0.2			0.2	<Table	<Table	0.2		
NMHC/OMNMHCE	0.1			.13	<Table	<Table	0.1		
HC + NOx	0.4			.4	<Table	<Table	0.4		
CARBON MONOXIDE	4.1			4.1	<Table	<Table	4.1		
OXIDE OF NITROGEN	0.3			0.3	<Table	<Table	0.3		
PARTICULATE					<Table	<Table			
FORMALDEHYDE	0.00			.001	<Table	<Table	0.00		
ACCEL SMOKE %					<Table Missing>				
LUGGING SMOKE %					<Table Missing>				
PEAK SMOKE %opacity					<Table Missing>				
IDLE CO%	0.01				<Table Missing>				

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C23**
Certificate #: **BYT-ONHWY-06-03**

Public Version

Models Info.

1.Engine Code	2.Engine Model	3. Rated BHP@RPM (SAE Gross)	4. Fuel Rate: mm/stroke @ peak HP (for diesel only)	5. Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6. Torque @ RPM (SEA Gross)	7. Fuel Rate: mm/stroke@peak torque	8. Fuel Rate: (lbs/hr)@peak torque	9. Emission Control Device Per SAE J1930
50 State								
10	L18	195@3680	NA	NA	295@2460	NA	NA	2TWC, SFI
		(219@3607)			(349@2421)			2HO2S
20	L18	283@4089	NA	NA	379@3279	NA	NA	2TWC, SFI
		(317@3607)			(449@3226)			2HO2S
30	L18	283@4089	NA	NA	379@3279	NA	NA	2TWC, SFI
		(317@3607)			(449@3226)			2HO2S

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P23**
Certificate #: **BYT-ONHWY-06-04**

Public Version

Models Info.

1.Engine Code	2.Engine Model	3. Rated BHP@RPM (SAE Gross)	4. Fuel Rate: mm/stroke @ peak HP (for diesel only)	5. Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6. Torque @ RPM (SEA Gross)	7. Fuel Rate: mm/stroke@peak torque	8. Fuel Rate: (lbs/hr)@peak torque	9. Emission Control Device Per SAE J1930
50 State								
10	L18	225@3782	NA	NA	341@2512	NA	NA	2TWC, SFI
		(219@3607)			(349@2420)			2HO2S
20	L18	332@4002	NA	NA	439@3350	NA	NA	2TWC, SFI
		(317@4008)			(449@3226)			2HO2S
30	L18	332@4002	NA	NA	439@3350	NA	NA	2TWC, SFI
		(317@4008)			(449@3226)			2HO2S

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C12**
Certificate #: **BYT-ONHWY-06-o5**

Public Version

Models Info.

1.Engine Code	2.Engine Model	3. Rated BHP@RPM (SAE Gross)	4. Fuel Rate: mm/stroke @ peak HP (for diesel only)	5. Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6. Torque @ RPM (SEA Gross)	7. Fuel Rate: mm/stroke@peak torque	8. Fuel Rate: (lbs/hr)@peak torque	9. Emission Control Device Per SAE J1930
50 State								
10	L18	195@3680		295@2460				2TWC, SFI
								2HO2S
20	L18	256@3565		381@2555				2TWC, SFI
								2HO2S

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C22**
Certificate #: **BYT-ONHWY-06-06**

Public Version

Models Info.

1.Engine Code	2.Engine Model	3. Rated BHP@RPM (SAE Gross)	4. Fuel Rate: mm/stroke @ peak HP (for diesel only)	5. Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6. Torque @ RPM (SEA Gross)	7. Fuel Rate: mm/stroke@peak torque	8. Fuel Rate: (lbs/hr)@peak torque	9. Emission Control Device Per SAE J1930
50 State								
10	L18	195@3680		295@2460				2TWC, SFI
		(219@3607)		(349@2421)				2HO2S
20	L18	256@3565		381@2555				2TWC, SFI
		(296@3732)		(433@2830)				2HO2S

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P12**
Certificate #: **BYT-ONHWY-06-07**

Public Version

Models Info.

1.Engine Code	2.Engine Model	3. Rated BHP@RPM (SAE Gross)	4. Fuel Rate: mm/stroke @ peak HP (for diesel only)	5. Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6. Torque @ RPM (SEA Gross)	7. Fuel Rate: mm/stroke@peak torque	8. Fuel Rate: (lbs/hr)@peak torque	9. Emission Control Device Per SAE J1930
50 State								
10	L18	225@3782		341@2512				2TWC, SFI
								2HO2S
20	L18	279@3660		406@2920				2TWC, SFI
								2HO2S

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P22**
Certificate #: **BYT-ONHWY-06-08**

Public Version

Models Info.

1.Engine Code	2.Engine Model	3. Rated BHP@RPM (SAE Gross)	4. Fuel Rate: mm/stroke @ peak HP (for diesel only)	5. Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6. Torque @ RPM (SEA Gross)	7. Fuel Rate: mm/stroke@peak torque	8. Fuel Rate: (lbs/hr)@peak torque	9. Emission Control Device Per SAE J1930
50 State								
10	L18	225@3600		350@2400				2TWC, SFI
		(219@3607)		(349@2421)				2HO2S
20	L18	325@4000		450@3200				2TWC, SFI
		(296@3732)		(433@2830)				2HO2S

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C13**
Certificate #: **BYT-ONHWY-06-01.1**

Public Version

Models Info.

1.Engine Code	2.Engine Model	3. Rated BHP@RPM (SAE Gross)	4. Fuel Rate: mm/stroke @ peak HP (for diesel only)	5. Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6. Torque @ RPM (SEA Gross)	7. Fuel Rate: mm/stroke@peak torque	8. Fuel Rate: (lbs/hr)@peak torque	9. Emission Control Device Per SAE J1930
50 State								
10	L18	195@3680	NA	NA	295@2460	NA	NA	2TWC, SFI
								2HO2S
20	L18	283@4089	NA	NA	379@3279	NA	NA	2TWC, SFI
								2HO2S
30	L18	283@4089	NA	NA	379@3279	NA	NA	2TWC, SFI
								2HO2S

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P13**
Certificate #: **BYT-ONHWY-06-02.1**

Public Version

Models Info.

1.Engine Code	2.Engine Model	3. Rated BHP@RPM (SAE Gross)	4. Fuel Rate: mm/stroke @ peak HP (for diesel only)	5. Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6. Torque @ RPM (SEA Gross)	7. Fuel Rate: mm/stroke@peak torque	8. Fuel Rate: (lbs/hr)@peak torque	9. Emission Control Device Per SAE J1930
50 State								
10	L18	225@3782	NA	NA	341@2512	NA	NA	2TWC, SFI
								2HO2S
20	L18	332@4002	NA	NA	439@3350	NA	NA	2TWC, SFI
								2HO2S
30	L18	332@4202	NA	NA	439@3350	NA	NA	2TWC, SFI
								2HO2S

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C23**
Certificate #: **BYT-ONHWY-06-03**

Public Version

Parts Info.

Engine Code	Engine Model	Injection Pump	Injector	Turbo Charge	Electronic Control Module	After Treatment Device (Specify)	Smoke Puff Limiter	Sensor Assemblies	
								Description	Part Number
					Service No.				
10, 20	L18	NA	CNG Fuel Rail	NA	12589462	Catalyst	NA	HO2S	12572705
			MPFI-8			12573730			12572707
						12589606			
						two used			
30	L18	NA	CNG Fuel Rail	NA	12589462	Catalyst	NA	HO2S	12572706
			MPFI-8			12573730			
						12589606			
						two used			

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P23**
Certificate #: **BYT-ONHWY-06-04**

Public Version

Parts Info.

Engine Code	Engine Model	Injection Pump	Injector	Turbo Charge	Electronic Control Module	After Treatment Device (Specify)	Smoke Puff Limiter	Sensor Assemblies	
								Description	Part Number
					Service No.				
10, 20	L18	NA	Propane Fuel Rail	NA	12589462	Catalyst	NA	HO2S	12572705
			MPFI-8P			12573730			12572707
						12589606			
30						two used			
	L18	NA	Propane Fuel Rail	NA	12589462	Catalyst	NA	HO2S	12572706
			MPFI-8P			12573730			
						12589606			
						two used			

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C12**
Certificate #: **BYT-ONHWY-06-o5**

Public Version

Parts Info.

Engine Code	Engine Model	Injection Pump	Injector	Turbo Charge	Electronic Control Module	After Treatment Device (Specify)	Smoke Puff Limiter	Sensor Assemblies	
								Description	Part Number
					Service No.				
10, 20	L18	NA	CNG Fuel Rail	NA	12589462	Catalyst	NA	HO2S	12572705
			MPFI-8			12573730			12572707
						12589606			
						two used			

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C22**
Certificate #: **BYT-ONHWY-06-06**

Public Version

Parts Info.

Engine Code	Engine Model	Injection Pump	Injector	Turbo Charge	Electronic Control Module	After Treatment Device (Specify)	Smoke Puff Limiter	Sensor Assemblies	
								Description	Part Number
					Service No.				
10, 20	L18	NA	CNG Fuel Rail	NA	12589462	Catalyst	NA	HO2S	12572705
			MPFI-8			12573730			12572707
			GASO Fuel Rail			12589606			
			12574882			two used			

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P12**
Certificate #: **BYT-ONHWY-06-07**

Public Version

Parts Info.

Engine Code	Engine Model	Injection Pump	Injector	Turbo Charge	Electronic Control Module	After Treatment Device (Specify)	Smoke Puff Limiter	Sensor Assemblies	
								Description	Part Number
					Service No.				
10, 20	L18	NA	Propane Fuel Rail	NA	12589462	Catalyst	NA	HO2S	12572705
			MPFI-8P			12573730			12572707
						12589606			
						two used			

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P22**
Certificate #: **BYT-ONHWY-06-08**

Public Version

Parts Info.

Engine Code	Engine Model	Injection Pump	Injector	Turbo Charge	Electronic Control Module	After Treatment Device (Specify)	Smoke Puff Limiter	Sensor Assemblies	
								Description	Part Number
					Service No.				
10, 20	L18	NA	Propame Fuel Rail	NA	12589462	Catalyst	NA	HO2S	12572705
			MPFI-8P			12573730			12572707
			GASO Fuel Rail			12589606			
			12574882			two used			

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C13**
Certificate #: **BYT-ONHWY-06-01.1**

Public Version

Parts Info.

Engine Code	Engine Model	Injection Pump	Injector	Turbo Charge	Electronic Control Module	After Treatment Device (Specify)	Smoke Puff Limiter	Sensor Assemblies	
								Description	Part Number
					Service No.				
10, 20	L18	NA	CNG Fuel Rail	NA	12589462	Catalyst	NA	HO2S	12572705
			MPFI-8			12573730			12572707
						12589606			
						two used			
30	L18	NA	CNG Fuel Rail	NA	12589462	Catalyst	NA	HO2S	12572706
			MPFI-8			12573730			
						12589606			
						two used			

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P13**
Certificate #: **BYT-ONHWY-06-02.1**

Public Version

Parts Info.

Engine Code	Engine Model	Injection Pump	Injector	Turbo Charge	Electronic Control Module	After Treatment Device (Specify)	Smoke Puff Limiter	Sensor Assemblies	
								Description	Part Number
					Service No.				
10, 20	L18	NA	PropaneFuel Rail	NA	12589462	Catalyst	NA	HO2S	12572705
			MPFI-8P			12573730			12572707
						12589606			
						two used			
30	L18	NA	PropaneFuel Rail	NA	12589462	Catalyst	NA	HO2S	12572706
			MPFI-8P			12573730			
						12589606			
						two used			

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C23**
Certificate #: **BYT-ONHWY-06-03**

Public Version

Parts Info.

Engine Code	Engine Model	PCV	EGR Valve	Regulator
10, 20	L18	part of intake	NA	NGV150
		12574558		
		12574559		
30	L18	part of intake	NA	NGV150
		12574558		
		12574559		

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P23**
Certificate #: **BYT-ONHWY-06-04**

Public Version

Parts Info.

Engine Code	Engine Model	PCV	EGR Valve	Regulator
10, 20	L18	part of intake	NA	VAP25
		12574558		
		12574559		
30				
	L18	part of intake	NA	VAP25
		12574558		
		12574559		

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C12**
Certificate #: **BYT-ONHWY-06-o5**

Public Version

Parts Info.

Engine Code	Engine Model	PCV	EGR Valve	Regulator
10, 20	L18	part of intake	NA	NGV150
		12574558		
		12574559		

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C22**
Certificate #: **BYT-ONHWY-06-06**

Public Version

Parts Info.

Engine Code	Engine Model	PCV	EGR Valve	Regulator
10, 20	L18	part of intake	NA	NGV150
		12574558		
		12574559		

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P12**
Certificate #: **BYT-ONHWY-06-07**

Public Version

Parts Info.

Engine Code	Engine Model	PCV	EGR Valve	Regulator
10, 20	L18	part of intake	NA	VAP25
		12574558		
		12574559		

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P22**
Certificate #: **BYT-ONHWY-06-08**

Public Version

Parts Info.

Engine Code	Engine Model	PCV	EGR Valve	Regulator
10, 20	L18	part of intake	NA	VAP25
		12574558		
		12574559		

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1C13**
Certificate #: **BYT-ONHWY-06-01.1**

Public Version

Parts Info.

Engine Code	Engine Model	PCV	EGR Valve	Regulator
10, 20	L18	part of intake	NA	NGV150
		12574558		
		12574559		
30	L18	part of intake	NA	NGV150
		12574558		
		12574559		

Manufacturer: **Baytech Corporation**
Engine Family: **6BYTH08.1P13**
Certificate #: **BYT-ONHWY-06-02.1**

Public Version

Parts Info.

Engine Code	Engine Model	PCV	EGR Valve	Regulator
10, 20	L18	part of intake	NA	VAP25
		12574558		
		12574559		
30	L18	part of intake	NA	VAP25
		12574558		
		12574559		

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Table of Families

Manufacturer	Engine Family	NOx	HC	CO	PM	Accel	Lug	Peak	Nox FEL	PM FEL	Sales Area	Cert Date	Cert #
	6BYTH08.1C23	.30	.46	2.1					NA	NA		5/31/200	BYT-ONHWY-06-03
		.16	.22	2.7									
Baytech Corporation													
	Average:	.23	.34	2.4					g/bHp-hr				
	6BYTH08.1P23	.27	.22	4.1					NA	NA		6/1/2005	BYT-ONHWY-06-04
		.16	.22	2.7									
Baytech Corporation													
	Average:	.215	.22	3.4					g/bHp-hr				
	6BYTH08.1C12	.27	1.23	5.4					NA	NA		6/1/2005	BYT-ONHWY-06-o5
Baytech Corporation													
	Average:	.27	1.23	5.4					g/bHp-hr				
	6BYTH08.1C22	.27	1.23	5.4					NA	NA		6/1/2005	BYT-ONHWY-06-06
		.27	.37	6.1									
Baytech Corporation													
	Average:	.27	.8	5.75					g/bHp-hr				
	6BYTH08.1P12	.33	.75	8.7					NA	NA		6/2/2005	BYT-ONHWY-06-07
Baytech Corporation													
	Average:	.33	.75	8.7					g/bHp-hr				
	6BYTH08.1P22	.33	.75	8.7					NA	NA		6/2/2005	BYT-ONHWY-06-08
		.27	.37	6.1									
Baytech Corporation													
	Average:	.3	.56	7.4					g/bHp-hr				
	6BYTH08.1C13	.30	.46	2.1					NA	NA		6/2/2005	BYT-ONHWY-06-01.1
Baytech Corporation													
	Average:	.3	.46	2.1					g/bHp-hr				
	6BYTH08.1P13	.27	.22	4.1					NA	NA		6/2/2005	BYT-ONHWY-06-02.1
Baytech Corporation													
	Average:	.27	.22	4.1					g/bHp-hr				

2.2 6.0L Heavy Duty Engine Certification Applications

This section presents Baytech's certification applications for four 6.0L heavy duty propane, CNG, and dual fuel (propane or gasoline and CNG or gasoline) engine families/test groups. The first page of the application is presented for each engine family, followed by the second page of the application for each engine family, etc.

Public Version

Family Info.

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0613**
Certificate #: **BYT-ONHWY-07-01**
Date Cert Issued: **9/27/2006**
Engine category: **On-highway HDGE**

*Some fields will be missing in the public version

1. Model Year: 2007
2. Carryover: No
If yes, list the previous family:
3. Process Code: New Submission
Date EPA Fee Paid: 7-31-2006
5. Mfr's Family Name:
6. Engine Cycle: Otto
7. DISPLACEMENT(S) 6.0 L
8. Engine Configuration: V-8
9. Emission Control system:
☒ Catalyst ☐ None
☐ Engine Modification ☐ Other…
☒ Electronic Control
☐ Smoke Puff Limiter
☐ EGR
10. FUEL TYPE: Natural Gas
11. FUEL SYSTEM TYPE: Sequential Fuel Injection
12. METHOD OF ASPIR.: Naturally
13 USEFUL LIFE PERIOD: 8 years / 110,000 miles

14. DETERIORATION FACTOR TYPE
A. Gaseous Exh: Multiplicative
B. Smoke: NA
15. Intended Service Class
HDG 1 (<=14k lbs), HDG 2 (>14k

IF CFF, Select category

21. Program Information:

NCPs	
AVE	NA
B&T	NA
	yes

22. Family Emission Limits:

PM	NA
NOx	NA
NMHC+NOx	0.25
Units:	g/bHp-hr

23. Nonroad Engine Equipment Types:
☐ Crane ☐ Pump ☐ Other…
☐ Loaders ☐ Compressor
☐ Tractor ☐ Generator Set
☐ Dozer ☒ NA

24. Auxiliary Emission Control Devices:

AECD	Sensed	PARAMETER	Controlled	Does AECD result in reducing effectivness of emission control device(s):
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No

25. Adjustable Parameters:

Parameter	Adjustable Range (or N/a)	Tamper Resistance Method (or N/a)
NA		

Public Version

Family Info.

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0643**
Certificate #: **BYT-ONHWY-07-04**
Date Cert Issued: **9/27/2006**
Engine category: **On-highway HDGE**

*Some fields will be missing in the public version

1. Model Year: 2007
2. Carryover: No

If yes, list the previous family:

3. Process Code: New Submission

Date EPA Fee Paid: 7-31-2006

5. Mfr's Family Name:

6. Engine Cycle: Otto
7. DISPLACEMENT(S) 6.0 L
8. Engine Configuration: V-8
9. Emission Control system:
   - ☒ Catalyst
   - ☐ None
   - ☐ Engine Modification
   - ☐ Other…
   - ☒ Electronic Control
   - ☐ Smoke Puff Limiter
   - ☐ EGR
10. FUEL TYPE: Dual-fuel 3(Propane or Gasoline)
11. FUEL SYSTEM TYPE: Sequential Fuel Injection
12. METHOD OF ASPIR.: Naturally
13 USEFUL LIFE PERIOD: 8 years / 110,000 miles

14. DETERIORATION FACTOR TYPE

A. Gaseous Exh: Multiplicative

B. Smoke: NA

15. Intended Service Class

HDG 1 (<=14k lbs), HDG 2 (>14k

IF CFF, Select category

21. Program Information:

NCPs	
AVE	NA
B&T	NA
	Yes

22. Family Emission Limits:

PM	NA
NOx	NA
NMHC+NOx	.5
Units:	g/bHp-hr

23. Nonroad Engine Equipment Types:

- ☐ Crane
- ☐ Pump
- ☐ Other…
- ☐ Loaders
- ☐ Compressor
- ☐ Tractor
- ☐ Generator Set
- ☐ Dozer
- ☒ NA

24. Auxiliary Emission Control Devices:

AECD	Sensed	PARAMETER	Controlled	Does AECD result in reducing effectivness of emission control device(s):
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No

25. Adjustable Parameters:

Parameter	Adjustable Range (or N/a)	Tamper Resistance Method (or N/a)
NA		

Public Version

Family Info.

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0623**
Certificate #: **BYT-ONHWY-07-02**
Date Cert Issued: **9/27/2006**
Engine category: **On-highway HDGE**

*Some fields will be missing in the public version

1. Model Year: 2007
2. Carryover: No

If yes, list the previous family:

3. Process Code: New Submission

Date EPA Fee Paid: 7-31-2006

5. Mfr's Family Name:

6. Engine Cycle: Otto
7. DISPLACEMENT(S) 6.0 L
8. Engine Configuration: V-8
9. Emission Control system:
   - ☒ Catalyst
   - ☐ None
   - ☐ Engine Modification
   - ☐ Other…
   - ☒ Electronic Control
   - ☐ Smoke Puff Limiter
   - ☐ EGR
10. FUEL TYPE: Dual-fuel 1(CNG or Gasoline)
11. FUEL SYSTEM TYPE: Sequential Fuel Injection
12. METHOD OF ASPIR.: Naturally
13 USEFUL LIFE PERIOD: 8 years / 110,000 miles

14. DETERIORATION FACTOR TYPE

A. Gaseous Exh: Multiplicative

B. Smoke: NA

15. Intended Service Class

HDG 1 (<=14k lbs), HDG 2 (>14k

IF CFF, Select category

21. Program Information:

NCPs	
AVE	NA
B&T	NA
	Yes

22. Family Emission Limits:

PM	NA
NOx	NA
NMHC+NOx	.5
Units:	g/bHp-hr

23. Nonroad Engine Equipment Types:

☐ Crane	☐ Pump	☐ Other…
☐ Loaders	☐ Compressor	
☐ Tractor	☐ Generator Set	
☐ Dozer	☒ NA	

24. Auxiliary Emission Control Devices:

AECD	Sensed	PARAMETER	Controlled	Does AECD result in reducing effectivness of emission control device(s):
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No

25. Adjustable Parameters:

Parameter	Adjustable Range (or N/a)	Tamper Resistance Method (or N/a)
NA		

Public Version

Family Info.

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0633**
Certificate #: **BYT-ONHWY-07-03**
Date Cert Issued: **7/31/2006**
Engine category: **On-highway HDGE**

*Some fields will be missing in the public version

1. Model Year: 2007
2. Carryover: No

If yes, list the previous family:

3. Process Code: New Submission

Date EPA Fee Paid: 7-31-2006

5. Mfr's Family Name:

6. Engine Cycle: Otto
7. DISPLACEMENT(S) 6.0 L
8. Engine Configuration: V-8
9. Emission Control system:
   - ☒ Catalyst
   - ☐ None
   - ☐ Engine Modification
   - ☐ Other…
   - ☒ Electronic Control
   - ☐ Smoke Puff Limiter
   - ☐ EGR
10. FUEL TYPE: Propane
11. FUEL SYSTEM TYPE: Sequential Fuel Injection
12. METHOD OF ASPIR.: Naturally
13 USEFUL LIFE PERIOD: 8 years / 110,000 miles

14. DETERIORATION FACTOR TYPE

A. Gaseous Exh: Multiplicative

B. Smoke: NA

15. Intended Service Class

HDG 1 (<=14k lbs), HDG 2 (>14k

IF CFF, Select category

21. Program Information:

NCPs	
AVE	NA
B&T	NA
	Yes

22. Family Emission Limits:

PM	NA
NOx	NA
NMHC+NOx	.25
Units:	g/bHp-hr

23. Nonroad Engine Equipment Types:

- ☐ Crane
- ☐ Pump
- ☐ Other…
- ☐ Loaders
- ☐ Compressor
- ☐ Tractor
- ☐ Generator Set
- ☐ Dozer
- ☒ NA

24. Auxiliary Emission Control Devices:

AECD	Sensed	PARAMETER	Controlled	Does AECD result in reducing effectivness of emission control device(s):
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No
				☐ Yes ☐ No

25. Adjustable Parameters:

Parameter	Adjustable Range (or N/a)	Tamper Resistance Method (or N/a)
NA		

Public Version

Test Info.

Manufacturer: Baytech Corporation
Engine Family: 7BYTH06.0613
Certificate #: BYT-ONHWY-07-01

4. Engine Code: 30
5. Engine Model: LQ4
6. Displacement(s) (cid Or Liters): 6.0L
7. Engine I.d. Number: 10YKCW052371247
8. Rated Hp @ Rated Rpm: 266 @ 4444
9. Torque (ft-lb) @ Engine Rpm: 319 @ 3970

10. WAIVERs:

Co	Pm	Smoke	Idle Co
NA	NA	NA	NA

11. COLD START: NA
12. Certification Fuel: Natural Gas (Part 86.1313-94(e)(1))
13. Special Test Device ☒ Yes ☐ No
14 Test Procedure: On-Hwy Otto

15. OFFICAL TEST RESULTS

Date: 7/21/2006

	Test 1	Test 2	Test 3
HC/OMHCE	0.24		
NMHC/OMNMHCE	0.02		
HC + NOx			
CARBON MONOXIDE	1.83		
OXIDE OF NITROGEN	0.12		
PARTICULATE			
FORMALDEHYDE	0.0006		
ACCEL SMOKE %			
LUGGING SMOKE %			
PEAK SMOKE %opacity			
IDLE CO%	0.001		
CO2			

16. DETERIORATION FACTORS

DF Type: X

2.200
1.600
1.300
2.200
2

17. CERTIFICATION LEVELS

(Rounded Data)

Units-- g/bHp-hr --Units

Data In Desired Units

○ g/KW-hr ◉ g/BHP-hr

	Test 1	Test 2	Test 3	Avg	STDs g/bHp-hr	STDs g/kW-hr	Test 1	Test 2	Test 3
HC/OMHCE					<Table	<Table			
NMHC/OMNMHCE	0.0			0	<Table	<Table	0.0		
HC + NOx	0.2			.2	<Table	<Table	0.2		
CARBON MONOXIDE	2.9			2.9	<Table	<Table	2.9		
OXIDE OF NITROGEN	0.2			0.2	<Table	<Table	0.2		
PARTICULATE					<Table	<Table			
FORMALDEHYDE	0.00			.001	<Table	<Table	0.00		
ACCEL SMOKE %					<Table Missing>				
LUGGING SMOKE %					<Table Missing>				
PEAK SMOKE %opacity					<Table Missing>				
IDLE CO%	0.00				<Table Missing>				

Public Version

Test Info.

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0643**
Certificate #: **BYT-ONHWY-07-04**

4. Engine Code: **30**
5. Engine Model: **LQ4**
6. Displacement(s) (cid Or Liters): **6.0L**
7. Engine I.d. Number: **10YKCW052371247**
8. Rated Hp @ Rated Rpm: **290, (287)** @ **4461. (4428)**
9. Torque (ft-lb) @ Engine Rpm: **350, (348)** @ **3907, (4119)**

10. WAIVERs:

Co	Pm	Smoke	Idle Co
NA	NA	NA	NA

11. COLD START: **NA**
12. Certification Fuel: **Dual-fuel 3(Propane or Gasoline)**
13. Special Test Device ☒ Yes ☐ No
14 Test Procedure: **On-Hwy Otto**

15. OFFICAL TEST RESULTS

	Test 1	Test 2	Test 3
Date:	7/21/2006	7/19/2006	
HC/OMHCE	0.05	0.05	
NMHC/OMNMHCE	0.03	0.04	
HC + NOx			
CARBON MONOXIDE	4.09	1.28	
OXIDE OF NITROGEN	0.11	0.21	
PARTICULATE			
FORMALDEHYDE	0.0006	0.0007	
ACCEL SMOKE %			
LUGGING SMOKE %			
PEAK SMOKE %opacity			
IDLE CO%	0.001	0.009	
CO2			

16. DETERIORATION FACTORS

DF Type: X

2.200
1.600
1.300
2.200
2

17. CERTIFICATION LEVELS
(Rounded Data)

Units-- g/bHp-hr --Units

Data In Desired Units
○ g/KW-hr ◉ g/BHP-hr

	Test 1	Test 2	Test 3	Avg	STDs g/bHp-hr	STDs g/kW-hr	Test 1	Test 2	Test 3
HC/OMHCE					<Table	<Table			
NMHC/OMNMHCE	0.1	0.1		.115	<Table	<Table	0.1	0.1	
HC + NOx	0.2	0.4		.3	<Table	<Table	0.2	0.4	
CARBON MONOXIDE	6.5	2.0		4.3	<Table	<Table	6.5	2.0	
OXIDE OF NITROGEN	0.1	0.3		0.2	<Table	<Table	0.1	0.3	
PARTICULATE					<Table	<Table			
FORMALDEHYDE	0.00	0.00		.0015	<Table	<Table	0.00	0.00	
ACCEL SMOKE %					<Table Missing>				
LUGGING SMOKE %					<Table Missing>				
PEAK SMOKE %opacity					<Table Missing>				
IDLE CO%	0.00	0.01			<Table Missing>				

Public Version

Test Info.

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0623**
Certificate #: **BYT-ONHWY-07-02**

4. Engine Code: **30**
5. Engine Model: **LQ4**
6. Displacement(s) (cid Or Liters): **6.0L**
7. Engine I.d. Number: **10YKCW052371247**
8. Rated Hp @ Rated Rpm: **266, (287)** @ **4444, (4428)**
9. Torque (ft-lb) @ Engine Rpm: **319, (348)** @ **3970, (4119)**

10. WAIVERs:

Co	Pm	Smoke	Idle Co
NA	NA	NA	NA

11. COLD START: **NA**
12. Certification Fuel: **Dual-fuel 1(CNG or Gasoline)**
13. Special Test Device ☒ Yes ☐ No
14 Test Procedure: **On-Hwy Otto**

15. OFFICAL TEST RESULTS

	Test 1	Test 2	Test 3
Date:	7/21/2006	7/19/2006	
HC/OMHCE	0.24	0.05	
NMHC/OMNMHCE	0.02	0.04	
HC + NOx			
CARBON MONOXIDE	1.83	1.28	
OXIDE OF NITROGEN	0.12	0.21	
PARTICULATE			
FORMALDEHYDE	0.0006	0.0007	
ACCEL SMOKE %			
LUGGING SMOKE %			
PEAK SMOKE %opacity			
IDLE CO%	0.001	0.009	
CO2			

16. DETERIORATION FACTORS

DF Type: X

2.200
1.600
1.300
2.200
2

17. CERTIFICATION LEVELS
(Rounded Data)

Units-- g/bHp-hr --Units

Data In Desired Units
○ g/KW-hr ◉ g/BHP-hr

	Test 1	Test 2	Test 3	Avg	STDs g/bHp-hr	STDs g/kW-hr	Test 1	Test 2	Test 3
HC/OMHCE					<Table	<Table			
NMHC/OMNMHCE	0.0	0.1		.05	<Table	<Table	0.0	0.1	
HC + NOx	0.2	0.4		.3	<Table	<Table	0.2	0.4	
CARBON MONOXIDE	2.9	2.0		2.5	<Table	<Table	2.9	2.0	
OXIDE OF NITROGEN	0.2	0.3		0.2	<Table	<Table	0.2	0.3	
PARTICULATE					<Table	<Table			
FORMALDEHYDE	0.00	0.00		.0015	<Table	<Table	0.00	0.00	
ACCEL SMOKE %					<Table Missing>				
LUGGING SMOKE %					<Table Missing>				
PEAK SMOKE %opacity					<Table Missing>				
IDLE CO%	0.00	0.00			<Table Missing>				

Public Version

Test Info.

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0633**
Certificate #: **BYT-ONHWY-07-03**

4. Engine Code: **30**
5. Engine Model: **LQ4**
6. Displacement(s) (cid Or Liters): **6.0L**
7. Engine I.d. Number: **10YKCW052371247**
8. Rated Hp @ Rated Rpm: **290** @ **4461**
9. Torque (ft-lb) @ Engine Rpm: **350** @ **3907**

10. WAIVERs:

Co	Pm	Smoke	Idle Co
NA	NA	NA	NA

11. COLD START: **NA**
12. Certification Fuel: **Propane**
13. Special Test Device ☒ Yes ☐ No
14 Test Procedure: **On-Hwy Otto**

15. OFFICAL TEST RESULTS

Date: 7/21/2006

	Test 1	Test 2	Test 3
HC/OMHCE	0.05		
NMHC/OMNMHCE	0.03		
HC + NOx			
CARBON MONOXIDE	4.09		
OXIDE OF NITROGEN	0.11		
PARTICULATE			
FORMALDEHYDE	0.0006		
ACCEL SMOKE %			
LUGGING SMOKE %			
PEAK SMOKE %opacity			
IDLE CO%	0.001		
CO2			

16. DETERIORATION FACTORS

DF Type: X

2.200
1.600
1.300
2.200
2

17. CERTIFICATION LEVELS
(Rounded Data)

Units-- g/bHp-hr --Units

Data In Desired Units
○ g/KW-hr ◉ g/BHP-hr

	Test 1	Test 2	Test 3	Avg	STDs g/bHp-hr	STDs g/kW-hr	Test 1	Test 2	Test 3
HC/OMHCE					<Table	<Table			
NMHC/OMNMHCE	0.1			.13	<Table	<Table	0.1		
HC + NOx	0.2			.2	<Table	<Table	0.2		
CARBON MONOXIDE	6.5			6.5	<Table	<Table	6.5		
OXIDE OF NITROGEN	0.1			0.1	<Table	<Table	0.1		
PARTICULATE					<Table	<Table			
FORMALDEHYDE	0.00			.001	<Table	<Table	0.00		
ACCEL SMOKE %					<Table Missing>				
LUGGING SMOKE %					<Table Missing>				
PEAK SMOKE %opacity					<Table Missing>				
IDLE CO%	0.00				<Table Missing>				

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0613**
Certificate #: **BYT-ONHWY-07-01**

Public Version

Models Info.

1.Engine Code	2.Engine Model	3. Rated BHP@RPM (SAE Gross)	4. Fuel Rate: mm/stroke @ peak HP (for diesel only)	5. Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6. Torque @ RPM (SEA Gross)	7. Fuel Rate: mm/stroke@peak torque	8. Fuel Rate: (lbs/hr)@peak torque	9. Emission Control Device Per SAE J1930
50 State								
30	LQ4	266@4444	NA	NA	319@3970	NA	NA	2TWC, SFI
								2HO2S(2)
40	LQ4	266@4444	NA	NA	319@3970	NA	NA	2TWC, SFI
								2HO2S(2)
50	LQ4	266@4444	NA	NA	319@3970	NA	NA	2TWC, SFI
								2HO2S(2)
Federal								
10	LQ4	266@4444	NA	NA	319@3970	NA	NA	2TWC, SFI
								2HO2S(2)
20	LQ4	266@4444	NA	NA	319@3970	NA	NA	2TWC, SFI
								2HO2S(2)

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0643**
Certificate #: **BYT-ONHWY-07-04**

Public Version

Models Info.

1.Engine Code	2.Engine Model	3. Rated BHP@RPM (SAE Gross)	4. Fuel Rate: mm/stroke @ peak HP (for diesel only)	5. Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6. Torque @ RPM (SEA Gross)	7. Fuel Rate: mm/stroke@peak torque	8. Fuel Rate: (lbs/hr)@peak torque	9. Emission Control Device Per SAE J1930
50 State								
10	LQ4	290@4461	NA	NA	350@3907	NA	NA	2TWC, SFI
		(287@4428)			(348@4119)			2HO2S(2)
20	LQ4	290@4461	NA	NA	350@3907	NA	NA	2TWC, SFI
		(287@4428)			(348@4119)			2HO2S(2)
30	LQ4	290@4461	NA	NA	350@3907	NA	NA	2TWC, SFI
		(287@4428)			(348@4119)			2HO2S(2)
Federal								
10	LQ4	290@4461	NA	NA	350@3907	NA	NA	2TWC, SFI
		(287@4428)			(348@4119)			2HO2S(2)
20	LQ4	290@4461	NA	NA	350@3907	NA	NA	2TWC, SFI
		(287@4428)			(348@4119)			2HO2S(2)

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0623**
Certificate #: **BYT-ONHWY-07-02**

Public Version

Models Info.

1.Engine Code	2.Engine Model	3. Rated BHP@RPM (SAE Gross)	4. Fuel Rate: mm/stroke @ peak HP (for diesel only)	5. Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6. Torque @ RPM (SEA Gross)	7. Fuel Rate: mm/stroke@peak torque	8. Fuel Rate: (lbs/hr)@peak torque	9. Emission Control Device Per SAE J1930
50 State								
30	LQ4	266@4444	NA	NA	319@3970	NA	NA	2TWC, SFI
		(287@4428)			(348@4119)			2HO2S(2)
40	LQ4	266@4444	NA	NA	319@3970	NA	NA	2TWC, SFI
		(287@4428)			(348@4119)			2HO2S(2)
50	LQ4	266@4444	NA	NA	319@3970	NA	NA	2TWC, SFI
		(287@4428)			(348@4119)			2HO2S(2)
Federal								
10	LQ4	266@4444	NA	NA	319@3970	NA	NA	2TWC, SFI
		(287@4428)			(348@4119)			2HO2S(2)
20	LQ4	266@4444	NA	NA	319@3970	NA	NA	2TWC, SFI
		(287@4428)			(348@4119)			2HO2S(2)

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0633**
Certificate #: **BYT-ONHWY-07-03**

Public Version

Models Info.

1.Engine Code	2.Engine Model	3. Rated BHP@RPM (SAE Gross)	4. Fuel Rate: mm/stroke @ peak HP (for diesel only)	5. Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6. Torque @ RPM (SEA Gross)	7. Fuel Rate: mm/stroke@peak torque	8. Fuel Rate: (lbs/hr)@peak torque	9. Emission Control Device Per SAE J1930
50 State								
10	LQ4	290@4461	NA	NA	350@3907	NA	NA	2TWC, SFI
								2HO2S(2)
20	LQ4	290@4461	NA	NA	350@3907	NA	NA	2TWC, SFI
								2HO2S(2)
30	LQ4	290@4461	NA	NA	350@3907	NA	NA	2TWC, SFI
								2HO2S(2)
Federal								
10	LQ4	290@4461	NA	NA	350@3907	NA	NA	2TWC, SFI
								2HO2S(2)
20	LQ4	290@4461	NA	NA	350@3907	NA	NA	2TWC, SFI
								2HO2S(2)

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0613**
Certificate #: **BYT-ONHWY-07-01**

Public Version

Parts Info.

Engine Code	Engine Model	Injection Pump	Injector	Turbo Charge	Electronic Control Module	After Treatment Device (Specify)	Smoke Puff Limiter	Sensor Assemblies	
								Description	Part Number
					Service No.				
10	LQ4	NA	CNG Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8			12573730			25333812
						12589606			25333817
						two used			
20	LQ4	NA	CNG Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8			12573730			25333812
						12589606			25333817
						two used			
30	LQ4	NA	CNG Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8			12573730			12581346
						12589606			25333812
						two used			25333817
40	LQ4	NA	CNG Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8			12573730			25333812
						12589606			25333817
						two used			
50	LQ4	NA	CNG Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12581346
			MPFI-8			12573730			25333812
						12589606			
						two used			

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0643**
Certificate #: **BYT-ONHWY-07-04**

Public Version

Parts Info.

Engine Code	Engine Model	Injection Pump	Injector	Turbo Charge	Electronic Control Module	After Treatment Device (Specify)	Smoke Puff Limiter	Sensor Assemblies	
								Description	Part Number
					Service No.				
10	LQ4	NA	Propane Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8P			12573730			25333812
			Gasoline			12589606			25333817
			12570701			two used			
20	LQ4	NA	Propane Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8P			12573730			25333812
			Gasoline			12589606			25333817
			12570701			two used			
30	LQ4	NA	Propane Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8P			12573730			12581346
			Gasoline			12589606			25333812
			12570701			two used			25333817
40	LQ4	NA	Propane Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8P			12573730			25333812
			Gasoline			12589606			25333817
			12570701			two used			
50	LQ4	NA	Propane Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12581346
			MPFI-8P			12573730			25333812
			Gasoline			12589606			
			12570701			two used			

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0623**
Certificate #: **BYT-ONHWY-07-02**

Public Version

Parts Info.

Engine Code	Engine Model	Injection Pump	Injector	Turbo Charge	Electronic Control Module	After Treatment Device (Specify)	Smoke Puff Limiter	Sensor Assemblies	
								Description	Part Number
					Service No.				
10	LQ4	NA	CNG Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8			12573730			25333812
			Gasoline			12589606			25333817
			12570701			two used			
20	LQ4	NA	CNG Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8			12573730			25333812
			Gasoline			12589606			25333817
			12570701			two used			
30	LQ4	NA	CNG Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8			12573730			12581346
			Gasoline			12589606			25333812
			12570701			two used			25333817
40	LQ4	NA	CNG Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8			12573730			25333812
			Gasoline			12589606			25333817
			12570701			two used			
50	LQ4	NA	CNG Fuel Rail	NA	12589463	Catalyst	NA	HO2S	12581346
			MPFI-8			12573730			25333812
			Gasoline			12589606			
			12570701			two used			

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0633**
Certificate #: **BYT-ONHWY-07-03**

Public Version

Parts Info.

Engine Code	Engine Model	Injection Pump	Injector	Turbo Charge	Electronic Control Module	After Treatment Device (Specify)	Smoke Puff Limiter	Sensor Assemblies	
								Description	Part Number
					Service No.				
10	LQ4	NA	PropaneFuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8P			12573730			25333812
						12589606			25333817
						two used			
20	LQ4	NA	PropaneFuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8P			12573730			25333812
						12589606			25333817
						two used			
30	LQ4	NA	PropaneFuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8P			12573730			12581346
						12589606			25333812
						two used			25333817
40	LQ4	NA	PropaneFuel Rail	NA	12589463	Catalyst	NA	HO2S	12572705
			MPFI-8P			12573730			25333812
						12589606			25333817
						two used			
50	LQ4	NA	PropaneFuel Rail	NA	12589463	Catalyst	NA	HO2S	12581346
			MPFI-8P			12573730			25333812
						12589606			
						two used			

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0613**
Certificate #: **BYT-ONHWY-07-01**

Public Version

Parts Info.

Engine Code	Engine Model	C/Case Vent	Rocker Cover	Regulator	EGR Valve
10	LQ4	part of rocker cover	12570427	NGV150	NA
20	LQ4	part of rocker cover	12570427	NGV150	NA
30	LQ4	part of rocker cover	12570427	NGV150	NA
40	LQ4	part of rocker cover	12570427	NGV150	NA
50	LQ4	part of rocker cover	12570427	NGV150	NA

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0643**
Certificate #: **BYT-ONHWY-07-04**

Public Version

Parts Info.

Engine Code	Engine Model	C/Case Vent	Rocker cover	Regulator	EGR Valve
10	LQ4	part of rocker cover	12570427	VAP25	NA
20	LQ4	part of rocker cover	12570427	VAP25	NA
30	LQ4	part of rocker cover	12570427	VAP25	NA
40	LQ4	part of rocker cover	12570427	VAP25	NA
50	LQ4	part of rocker cover	12570427	VAP25	NA

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0623**
Certificate #: **BYT-ONHWY-07-02**

Public Version

Parts Info.

Engine Code	Engine Model	C/Case Vent	Rocker Cover	Regulator	EGR Valve
10	LQ4	part of rocker cover	12570427	NGV150	NA
20	LQ4	part of rocker cover	12570427	NGV150	NA
30	LQ4	part of rocker cover	12570427	NGV150	NA
40	LQ4	part of rocker cover	12570427	NGV150	NA
50	LQ4	part of rocker cover	12570427	NGV150	NA

Manufacturer: **Baytech Corporation**
Engine Family: **7BYTH06.0633**
Certificate #: **BYT-ONHWY-07-03**

Public Version

Parts Info.

Engine Code	Engine Model	C/Case Vent	Rocker Cover	Regulator	EGR Valve
10	LQ4	part of rocker cover	12570427	VAP25	NA
20	LQ4	part of rocker cover	12570427	VAP25	NA
30	LQ4	part of rocker cover	12570427	VAP25	NA
40	LQ4	part of rocker cover	12570427	VAP25	NA
50	LQ4	part of rocker cover	12570427	VAP25	NA

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Table of Families

Manufacturer	Engine Family	NOx	HC	CO	PM	Accel	Lug	Peak	Nox FEL	PM FEL	Sales Area	Cert Date	Cert #
	7BYTH06.0613	.20		2.9					NA	NA		9/27/200	BYT-ONHWY-07-01
Baytech Corporation													
	Average:	.2		2.9					g/bHp-hr				
	7BYTH06.0643	.1		6.5					NA	NA		9/27/200	BYT-ONHWY-07-04
		.3		2.0									
Baytech Corporation													
	Average:	.2		4.25					g/bHp-hr				
	7BYTH06.0623	.2		2.9					NA	NA		9/27/200	BYT-ONHWY-07-02
		.27		2.0									
Baytech Corporation													
	Average:	.235		2.45					g/bHp-hr				
	7BYTH06.0633	.1		6.5					NA	NA		7/31/200	BYT-ONHWY-07-03
Baytech Corporation													
	Average:	.1		6.5					g/bHp-hr				

3.0 EPA AND CARB CERTIFICATIONS

3.1 8.1L Heavy Duty Engine EPA Certificates of Conformity

Baytech received U.S. Environmental Protection Agency Certificates of Conformity for Baytech's 8.1L propane, CNG and dual fuel (propane or gasoline and CNG or gasoline) engines for 2006 Model Years. The following table summarizes the certificates:

EPA Certificates of Conformity – 8.1L Heavy Duty Engine

Baytech Engine Family	Fuel	EPA Certification No.	Service class
6BYTH08.1C13	CNG	BYT-ONHWY-06-01.1	HDG1, HDG2
6BYTH08.1P13	Propane	BYT-ONHWY-06-02.1	HDG1, HDG2
6BYTH08.1C23	CNG or gasoline	BYT-ONHWY-06-03	HDG1, HDG2
6BYTH08.1P23	Propane or gasoline	BYT-ONHWY-06-04	HDG1, HDG2
6BYT08.1C12	CNG	BYT-ONHWY-06-05	HDG2
6BYT08.1C22	CNG or gasoline	BYT-ONHWY-06-06	HDG2
6BYTH08.1P12	Propane	BYT-ONHWY-06-07	HDG2
6BYT08.1P22	Propane or gasoline	BYT-ONHWY-06-08	HDG2

3.2 8.1L Heavy Duty Engine CARB Executive Orders

Baytech received CARB Executive Orders for Baytech's 8.1L propane, CNG and dual fuel (propane or gasoline and CNG or gasoline) engines for 2006 Model Years. The following table summarizes the Executive Orders:

CARB Executive Orders – 8.1L Heavy Duty Engine

Baytech Engine Family	Fuel	Executive Order No.	Service class
6BYTH08.1C13	CNG	A-330-0126	HDO[1]
6BYTH08.1P13	Propane	A-330-0129	HDO[1]
6BYTH08.1C23	CNG or gasoline	A-330-0133	HDO[1]
6BYTH08.1P23	Propane or gasoline	A-330-0137	HDO[1]
6BYT08.1C12	CNG	A-330-0139	HDO[1]
6BYT08.1C22	CNG or gasoline	A-330-0142	HDO[1]
6BYTH08.1P12	Propane	A-330-0140	HDO[1]
6BYT08.1P22	Propane or gasoline	A-330-0145	HDO[1]
6BYTH08.1P13	Propane	A-330-0130	HDO[2]
6BYTH08.1C23	CNG or gasoline	A-330-0134	HDO[2]
6BYTH08.1P23	Propane or gasoline	A-330-0138	HDO[2]
6BYTH08.1P12	Propane	A-330-0141	HDO[2]
6BYT08.1C22	CNG or gasoline	A-330-0143	HDO[2]
6BYT08.1P22	Propane or gasoline	A-330-0146	HDO[2]

Notes:

1 On-Road Heavy Duty Engines

2 On-Road Heavy Duty Vehicles

3.3 6.0L Heavy Duty Engine EPA Certificates of Conformity

Baytech received U.S. Environmental Protection Agency Certificates of Conformity for Baytech's 6.0L propane, CNG and dual fuel (propane or gasoline and CNG or gasoline) engines for 2007 Model Years. The following table summarizes the certificates:

EPA Certificates of Conformity –6.0L Heavy Duty Engine

Baytech Engine Family	Fuel	Certificate No.	Service class
7BYTH06.0613 ()	CNG	BYT-ONHWY-07-01	HDG1
7BYTH06.0623	CNG or gasoline	BYT-ONHWY-07-02	HDG1
7BYTH06.0633	Propane	BYT-ONHWY-07-03	HDG1
7BYTH06.0643	Propane or gasoline	BYT-ONHWY-07-04	HDG1

3.4 6.0L Heavy Duty Engine CARB Executive Orders

Baytech received CARB Executive Orders for Baytech's 6.0L propane, CNG and dual fuel (propane or gasoline and CNG or gasoline) engines for 2007 Model Years. The following table summarizes the Executive Orders:

CARB Executive Orders –6.0L Heavy Duty Engine

Baytech Engine Family	Fuel	Executive Order No.	Service class
7BYTH06.0613	CNG	A-330-0160	CA medium duty[1]
7BYTH06.0613	CNG	A-330-0161	CA medium duty[2]
7BYTH06.0613	CNG	A-330-0162	HDO[3]
7BYTH06.0633	Propane	A-330-0163	HDO[3]
7BYTH06.0633	Propane	A-330-0164	HDO[4]
7BYTH06.0623	CNG or gasoline	A-330-0165	HDO[3]
7BYTH060623	CNG or gasoline	A-330-0166	HDO[4]
7BYTH06.0643	Propane or gasoline	A-330-0167	HDO[3]
7BYTH06.0643	Propane or gasoline	A-330-0168	HDO[4]
7BYTH06.0653	CNG	A-330-0170	HDO[4]

Notes:

1 New engines for Incomplete medium duty vehicles

2 Incomplete medium duty vehicles using certified engines

3 On-Road Heavy Duty Engines

4 On-Road Heavy Duty Vehicles