

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER B-58-10

Relating to Conversion of Engines to Alternative Fuels

ROUSH INDUSTRIES INC.

Pursuant to the authority vested in the Air Resources Board by Sections 43004 and 43006 of the Health and Safety Code and Section 10753(d) of the Revenue and Taxation Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-14-012;

IT IS ORDERED AND RESOLVED: The dedicated liquefied petroleum gas (LPG) retrofit system, manufactured by Roush Industries Inc. (Roush) of 12249 Levan Road, Livonia, MI 48150, is certified as described below for the following 2015 model-year Ford Motor Company 6.8 liter heavy-duty engine.

Fuel Type: Gasoline to LPG

Engine Family: FFMXE06.8BW5 Displacement: 6.8 liter

Engine Models: F450/550 Chassis Cab, F650 Chassis Cab, Step Van, Motor Home

Major Retrofit System Components: See Attachment A

All emission control systems, excluding the gasoline fuel and evaporative emission control systems, and the engine manufacturer's tune-up label shall be retained. The engine shall be adjusted to Roush's tune-up specifications. The production retrofit system shall be in all material respect the same as that for which certification is granted.

The certification exhaust emission standards for this engine family in grams per brake horsepower-hour are:

Emission Standard	<u>NMHC</u>	<u>NOx</u>	<u>CO</u>	<u>PM</u>	<u>HCHO</u>
HDO @110,000 Miles	0.14	0.20	14.4	0.01	0.01

The certification exhaust emission values for this engine family with the dedicated LPG retrofit system in grams per brake horsepower-hour are:

Certification Levels	@110,000 Miles	<u>NMHC</u>	<u>NOx</u>	<u>CO</u>	<u>PM</u>	<u>HCHO</u>
		0.07	0.08	2.2	0.000	0.000

BE IT FURTHER RESOLVED: The retrofit system manufacturer has submitted and the Executive Officer hereby approves the materials in the application to demonstrate certification compliance with the emission standards set forth in Section 4 of the "California Certification and Installation Procedures for Alternative Fuel Retrofit Systems for 2004 and Subsequent Model Year On-Road Motor Vehicles and Engines."

BE IT FURTHER RESOLVED: The retrofit system manufacturer has stated that the retrofit system described above is identical, as defined in Title 13, California Code of Regulations, Section 2030(c), to the alternative fuel system described in the certification application of its engine family FRIIE06.8BW5 which was certified by ARB per Executive Order A-344-0052-3. At the request of the manufacturer, the retrofit system is certified under Section 2030(c) (expedited approval using carry-over / carry-across of data from new engine certification).

BE IT FURTHER RESOLVED: The retrofit system manufacturer has submitted and the Executive Officer hereby approves the materials in the application to demonstrate certification compliance with the on-board diagnostic system requirements in Section 6 of the "California Certification and Installation Procedures for Alternative Fuel Retrofit Systems for 2004 and Subsequent Model Year On-Road Motor Vehicles and Engines."

BE IT FURTHER RESOLVED: The retrofit system manufacturer shall provide a supplemental emission control information label, which shall be affixed in a permanent manner adjacent to the original Vehicle Emission Control Information label, and shall comply with the labeling requirements described in Section 3(e) of the "California Certification and Installation Procedures for Alternative Fuel Retrofit Systems for 2004 and Subsequent Model Year On-Road Motor Vehicles and Engines."

BE IT FURTHER RESOLVED: The retrofit system manufacturer has submitted and the Executive Officer hereby approves the materials required to demonstrate certification compliance with the warranty requirements, including warranty notification under Sections 3(f)(5) , 3(g), and 9 of the "California Certification and Installation Procedures for Alternative Fuel Retrofit Systems for 2004 and Subsequent Model Year On-Road Motor Vehicles and Engines."

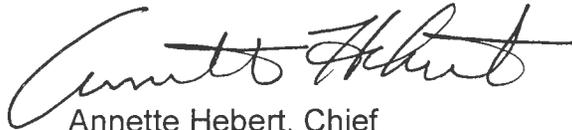
BE IT FURTHER RESOLVED: The retrofit system manufacturer may be subject to in-use enforcement emission testing as described in Section 12 of the "California Certification and Installation Procedures for Alternative Fuel Retrofit Systems for 2004 and Subsequent Model Year On-Road Motor Vehicles and Engines."

BE IT FURTHER RESOLVED: The retrofit system manufacturer shall maintain a record of each engine on which the retrofit system is installed as required in Section 3(h) of the "California Certification and Installation Procedures for Alternative Fuel Retrofit Systems for 2004 and Subsequent Model Year On-Road Motor Vehicles and Engines." The manufacturer shall supply a copy of installation information upon request and annually report the annual sales by March 1 of the following calendar year.

The retrofit system certified under this Executive Order must conform to all applicable California emission regulations. Certification of the retrofit system shall not be construed as a certification to sell, offer for sale, or advertise any component of the retrofit system as an individually certified part.

The Bureau of Automotive Repair will be notified by copy of this Executive Order.

Executed at El Monte, California on this 13 day of October 2014.



Annette Hebert, Chief

Emissions Compliance, Automotive Regulations and Science Division

SECTION 6 – EXHAUST EMISSIONS PARTS LIST

- Test Group: FRIIE06.8BW5
- Evaporative Families: FRIIF0265LPG, FRIIF0415LPG & GRIIF0265LPG⁶

4-6-2016

2015 Model Year Vehicles

<u>Part Name</u>	<u>Vehicle</u>	<u>LPG Tank Size</u>	<u>OEM Part Number (12A650)</u>	<u>Roush Calibration Number (03P150) ♦</u>	<u>Speed Limit</u>
PCM Assembly					
FFF418YR505	F-450/F-550 Chassis Cab	aft-axle	FC3A-AKA*	PDEB-AC	85 or 75
FFF418NR505	F-450/F-550 Chassis Cab	aft-cab	FC3A-AKB*	PDEB-AC	85 or 75
FFF418PR505	F-450/F-550 Chassis Cab	1 long tank	FC3A-AJC*	PDEB-AC	85 or 75
FFF41LYR505	F-450/F-550 Chassis Cab	aft-axle	FC3A-AJA*	PDEB-BA	60
FFF41LNR505	F-450/F-550 Chassis Cab	aft-cab	FC3A-AJB*	PDEB-BA	60
FFF41LPR505	F-450/F-550 Chassis Cab	1 long tank	FC3A-AJC*	PDEB-BA	60
FFF418RR505	Step-Van	aft-axle	DU9A-BE*	PDEB-SC	85 or 75
FFF418QR505	Motor Home	aft-axle	DU9A-AE*	PDEB-MB	85 or 75
FFF618AR505	F-650 Chassis Cab	2 long tanks	DC4A-AH*	PDFB-AB	85 or 75
FFF61HAR505	F-650 Chassis Cab	2 short tanks	DC4A-AH*	PDFB-AB	85 or 75
FFF61UAR505	F-650 Chassis Cab	1 long tank	DC4A-AH*	PDFB-BA	85 or 75
FFF418YR510 ³	F-450/F-550 Chassis Cab	aft-axle	FC3A-AKA*	PDEB-AD	85 or 75
FFF418NR510 ³	F-450/F-550 Chassis Cab	aft-cab	FC3A-AKB*	PDEB-AD	85 or 75
FFF418PR510 ³	F-450/F-550 Chassis Cab	1 long tank	FC3A-AKC*	PDEB-AD	85 or 75
FFF41LYR510 ³	F-450/F-550 Chassis Cab	aft-axle	FC3A-AJA*	PDEB-BB	60
FFF41LNR510 ³	F-450/F-550 Chassis Cab	aft-cab	FC3A-AJB*	PDEB-BB	60
FFF41LPR510 ³	F-450/F-550 Chassis Cab	1 long tank	FC3A-AJC*	PDEB-BB	60
FFF618PR505 ⁴	F-650 Chassis Cab	1 long tank	DC4A-AH*	PDFB-BA	85 or 75
FFF418TR505 ⁷	Step-Van	1 side tank	DU9A-BE*	PDEB-SC	85 or 75
FFF618AR530 ⁹	F-650 Chassis Cab	2 long tanks	DC4A-AH*	PDFB-CA	85 or 75
FFF61HAR530 ⁹	F-650 Chassis Cab	2 short tanks	DC4A-AH*	PDFB-CA	85 or 75
2016 Model Year Vehicles⁶					
FFF418YR510 ³	F-450/F-550 Chassis Cab	aft-axle	FC3A-AKA*	PDEB-AD	85 or 75
FFF418NR510 ³	F-450/F-550 Chassis Cab	aft-cab	FC3A-AKB*	PDEB-AD	85 or 75
FFF418PR510 ³	F-450/F-550 Chassis Cab	1 long tank	FC3A-AKC*	PDEB-AD	85 or 75
FFF41LYR510 ³	F-450/F-550 Chassis Cab	aft-axle	FC3A-AJA*	PDEB-BB	60
FFF41LNR510 ³	F-450/F-550 Chassis Cab	aft-cab	FC3A-AJB*	PDEB-BB	60
FFF41LPR510 ³	F-450/F-550 Chassis Cab	1 long tank	FC3A-AJC*	PDEB-BB	60

*Same suffix as OEM, unique Roush LPG calibration

♦ Part differs from OEM

¹Added per C01; ³Added per C03; ⁴Added per C04; ⁶Added per C06; ⁷Added per C07; ⁹Added per C09

SECTION 6 – EXHAUST EMISSIONS PARTS LIST

- **Test Group: FRIIE06.8BW5**
- **Evaporative Families: FRIIF0265LPG, FRIIF0415LPG & GRIIF0265LPG⁶**

<u>Part Name</u>	<u>Part Number</u>	
Catalyst	F-450/F-550 Motor Home, Step Van F-650	BC34 – 5E212 – AC 9U94 – 5E212 – AC CC40 – 5E212 – AC
Fuel Pump (2) ♦		P11BB – 10A020 – AB P11BB – 10A020 – AA (alt)
Cylinder Head Temperature Sensor		9L8A – 6G004 – CC 9L8A – 6G004 – CB (alt) 9L8A – 6G004 – CA (alt)
Camshaft Position Sensor		1W7E – 6B288 – AB
Crankshaft Position Sensor		1W7E – 6C315 – AA
PCV Valve		9L1E – 6A666 – BA
Univ. Heated Oxygen Sensor – Upstream (2)		8F9A – 9Y460 – GA 8L9A – 9Y460 – GA (alt) 8L9A – 9Y460 – HA (alt)
Heated Oxygen Sensor – Downstream		BL3A – 9G444 – DA F85F – 9Y460 – DA (alt) F85F – 9G444 – BB (alt)
Injectors ♦		P11BB – 03D021 – AA (10)
Fuel Rail Pressure Control Module ♦		P13EB – 10E200 – AB P13EB – 10E200 – AA (alt)
Mass Airflow/Intake Air Temperature Sensor		BR31 – 12B579 – AA
Knock Sensor (2) (deactivated)		AL3A – 12A699 – BA
Electric Throttle Body		9C3E – 9F991 – CB 9C3E – 9F991 – CA (alt)
Throttle Body Position Sensor		AG1E – 9E928 – BA AG1E – 9E928 – AA (alt)
Integrated Fuel Pressure Temperature Sensor (IPTS) ♦		P10C3 – 9G756 – AA
SRM (Smart Relay Module) ♦ (Interfaces IPTS sensor to PCM via CAN)		<u>F450-550/Motor-Home/Step-Van</u> P12EB – 03P205 – FB [▲] P12EB – 03P205 – FC (alt) ³ P12EB – 03P205 – GA P12EB – 03P205 – GB (alt) ³ P12EB – 03P205 – HA P12EB – 03P205 – HB (alt) ³
		<u>LPG Tank</u> aft-axle aft-cab 1 long tank 1 side tank ⁷ 1 long tank
		<u>F-650</u> P13FB – 03P205 – BA P13FB – 03P205 – AA P12EB – 03P205 – FB [▲] P12EB – 03P205 – HA ⁴
		2 short tanks 2 long tanks underbody 1 long tank

♦ Part differs from OEM; ▲ Part number prefix corrected

¹Added per C01; ³Added per C03; ⁴Added per C04; ⁶Added per C06; ⁷Added per C07

TEST GROUP: FRIIE06.8BW5

ISSUED: March 3, 2014

REVISED: April 28, 2014; September 19, 2014; January 6, 2015; May 29, 2015; June 29, 2015