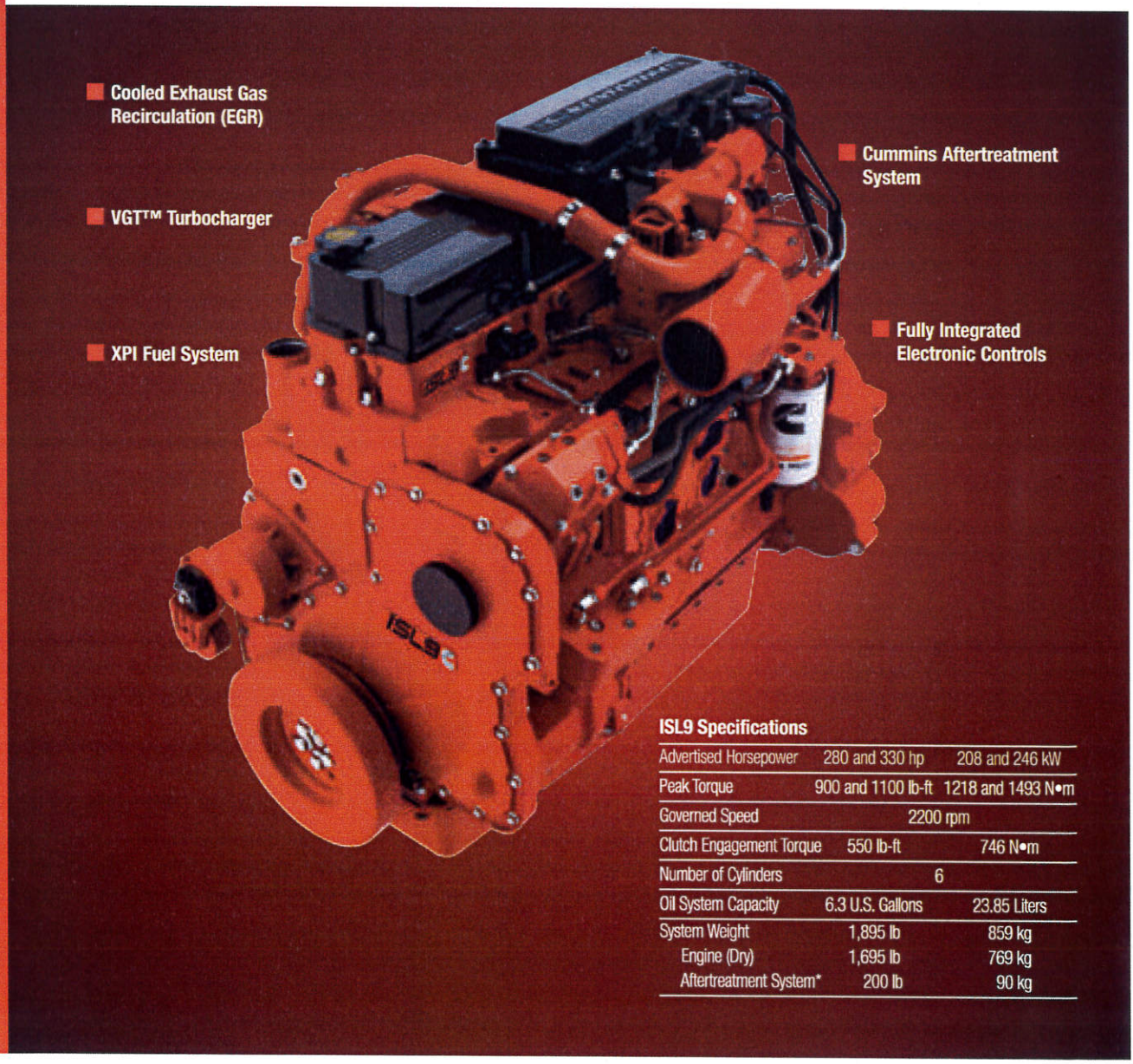
CITY AND COUNTY OF SAN FRANCISCO
San Francisco Municipal Transportation Agency
Request for Proposals
THE PROCUREMENT OF
30-Foot, 40-FOOT AND 60-FOOT LOW FLOOR
DIESEL HYBRID COACHES

Proposal Section	Title	Bid Submission Requirements
3-K	K. Engine	1) Provide a description of the engine offered in your proposal. 2) Provide technical data and other supporting documentation for engine performance with emphasis on hybrid system integration. 3) Provide technical data and other supporting documentation to demonstrate the performance of the engine in the following areas: emissions (CARB certification), audible noise, vibration, and reliability. 4) Explain any engine recalls or re-design performed by the engine manufacturer within the last five years. 5) Provide a summary of current or planned transit applications for the engine. If current transit use is limited, provide a summary of current usage outside the transit industry. 6) Describe any problems the engine has experienced and how they were handled. 7) Describe how the engine system will comply with anticipated laws regulating the amount of time an engine idles.

New Flyer is proposing the Cummins ISL applicable for Hybrid operation. Attached is information regarding the proposed engine and the CARB status can be found in section 4-A.

A Step Ahead. Every™ Route.

ISL9 For EPA 2013
For Urban Transit Bus Applications.



ISL9 Specifications

Advertised Horsepower	280 and 330 hp	208 and 246 kW
Peak Torque	900 and 1100 lb-ft	1218 and 1493 N•m
Governed Speed	2200 rpm	
Clutch Engagement Torque	550 lb-ft	746 N•m
Number of Cylinders	6	
Oil System Capacity	6.3 U.S. Gallons	23.85 Liters
System Weight	1,895 lb	859 kg
Engine (Dry)	1,695 lb	769 kg
Aftertreatment System*	200 lb	90 kg

Ahead Of Schedule. Every™ Bus. ISL9 For EPA 2013.

Reliability in everyday use and service support whenever and wherever you need it are two key reasons that the Cummins ISL9 is a leading source of power in the urban transit market. Rugged features including replaceable wet liners, roller followers, by-pass oil filtration and targeted piston cooling enable the ISL9 to deliver long service in the toughest work environments.

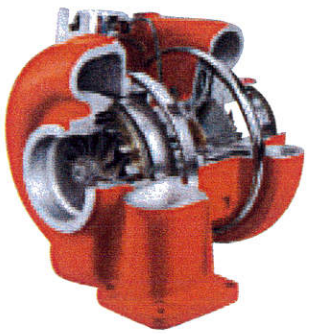
The U.S. Environmental Protection Agency (EPA) 2013 regulations call for the addition of On-Board Diagnostics (OBD) for on-highway diesel engines. The OBD system continuously monitors the engine and aftertreatment system, recognizing the potential for an out-of-range event and thus providing a real-time alert of the entire emissions control system.

In addition, new regulations have been enacted by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Transportation (DOT), setting greenhouse gas (GHG) and fuel-efficiency standards. Because lowering fuel use results in less carbon dioxide (CO2) emissions, the main GHG regulated, the standards are equivalent. These regulations are scheduled to take effect in 2014 and 2017.

The good news is that Cummins EPA 2013 ISL9 is fully capable of meeting all of these regulations by utilizing existing technology.

XPI Fuel System — The proven technology of the XPI common-rail fuel system delivers a precise quantity of fuel at ultra-high pressures. This, together with more robust electronic engine controls, enables multiple injection events per cycle. Flexibility in injection timing maximizes fuel economy and performance while decreasing exhaust emissions.

VGT™ Turbocharger — The Cummins VGT Turbocharger is both simple and precise. Electric actuation allows infinite adjustment, providing the exact amount of boost necessary for superior response, independent of engine speed. The proven sliding-nozzle design has best-in-class reliability and durability.



Cooled EGR — The cooled EGR system lowers combustion temperatures for reduced emissions and optimized fuel economy.

Fully Integrated Electronic Controls — A single, higher-capacity Electronic Control Module (ECM) controls everything from air intake to exhaust aftertreatment for peak performance and near-zero emissions.

Cummins Aftertreatment System — A totally integrated design for higher efficiency, this system works together with Cummins engines to meet emissions standards for 2013.

Malfunction Indicator Lamp (MIL) — A Malfunction Indicator Lamp (MIL) is on the vehicle's instrument panel and will illuminate if the OBD system detects a malfunction related to the emissions control system, alerting the operator. Cummins has a proven On-Board Diagnostic system that has been used on thousands of Cummins-powered on-road vehicles since 2007.

ISL9 Maintenance Intervals

Maintenance Item	Hours	Months
Oil and Filter*	500	6
Primary Fuel Filter**	500	6
Secondary Fuel Filter	500	12
Coolant Filter***	None	None
Overhead Adjustment	5,000	48
Standard Coolant Change****	2,000	24
Coalescing Filter	2,000	
DEF Filter	6,500	
Particulate Filter Cleaning	6,500	

*Assuming normal duty cycle.

**OEM-supplied; intervals may vary.

***If engine is equipped with optional coolant filter; it will need to be replaced on the same intervals as the oil filter. Regardless of whether the engine is or is not equipped with a coolant filter, SA/DCA additive levels must be checked according to the interval listed in the Owners Manual.

****Extended coolant drain/flush/fill intervals may be followed when certain requirements are met. For more information on these requirements, refer to the Cummins Coolant Requirements and Maintenance Service, Bulletin 3666132.

See Owners Manual for complete details.

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2. ENGINE & ACCESSORIES

2.1. Cummins ISL 9.0L (EPA 2013) Engine

2.1.1. Description

The Cummins ISL9 engine is an 8.9 liter, four-stroke, inline, six cylinder, diesel engine. See "Fig. 4-1: Engine Views" on page 3.

The major components and accessories of the engine are:

- ❒ Fuel System (Refer to Section 7 of this manual).
- ❒ Engine Protection System
- ❒ Air Intake System
- ❒ Exhaust System
- ❒ Engine Switch Box
- ❒ Electronic Control Module (ECM)

2.1.2. Engine Specifications

Rated Power ..... 330 HP @ 2000 RPM

Peak Torque ..... 1100 ft-lb. @ 1300 RPM

Displacement..... 8.9 liters (540 cu. in.)

Firing Order 1-5-3-6-2-4

Aspiration ..... Turbo Charge

Engine Weight (dry) ..... 1678 lb. (761 kg)

Oil Capacity (including filter) ..... 28 U.S. qt. (26.5 liters)

Coolant Capacity (engine only) ..... 13.1 U.S. qt. (12.4 liters)

Refer to the Cummins Operation & Maintenance Manual for further information on the engine.