

# Delphi Multec<sup>®</sup> Gasoline Multi-Port Fuel Injectors

Delphi Multec<sup>®</sup> Gasoline Multi-Port Fuel Injectors provide manufacturers with industry-leading fuel injection performance at competitive cost. This family of injectors for multi-port fuel injection (MPFI) satisfies a wide range of customer requirements for spray pattern, linear range, working flow range and operating voltage. The injectors can meet a variety of packaging requirements and they are suitable for automotive original equipment, aftermarket and performance engines. Delphi also offers MPFI injectors for non-automotive small gasoline engine products.

### ► Benefits

- Superior low pulse width fuel control, which enables excellent fuel control for low friction engines and increased evaporative emissions canister purge opportunity
- Spray can be skewed to circumvent packaging limitations
- Reduced spray variation and improved targeting for better cold start and transient emissions
- Increased spray velocity and smaller spray particle size, which also helps improve cold starts and helps reduce transient emissions
- Multi-fuel capability enables worldwide applications
- Choice of lengths to provide packaging flexibility, improved impact protection and lower engine profiles
- Electrical connection options add to packaging flexibility
- Cold sealing to -40°C helps cold weather operation
- USCA OBDII electrical connector is a submersion-proof sealed design and includes a connector position assurance feature for proper mating connection
- Plugging resistant designs contribute to improved field durability and performance

### ► Typical Applications

Delphi's Multec Gasoline Multi-Port Fuel Injectors are suitable for all passenger vehicle applications, from 4-cylinder and 4-cylinder boosted engines to V-8 and 12-cylinder engines. The injectors can operate on any gasoline-alcohol fuel mixture (0 to E100).

Delphi also offers MPFI injectors for non-automotive applications including:

- Motorcycles
- Motor scooters
- Marine engines
- Personal watercraft and all-terrain vehicles
- Lawn equipment
- Gasoline power generators

They can be used for single- or multi-intake valve spark ignition systems.



**Delphi Multec<sup>®</sup> Multi-Port Fuel Injectors are available in various design configurations to meet a wide range of customer requirements.**

▶ **Delphi Multec® 3.5 Fuel Injector Family**

The Delphi Multec Fuel Injector family includes a simplified injector design that helps provide benchmark quality and offers excellent durability, linear range, and improved robustness to plugging.

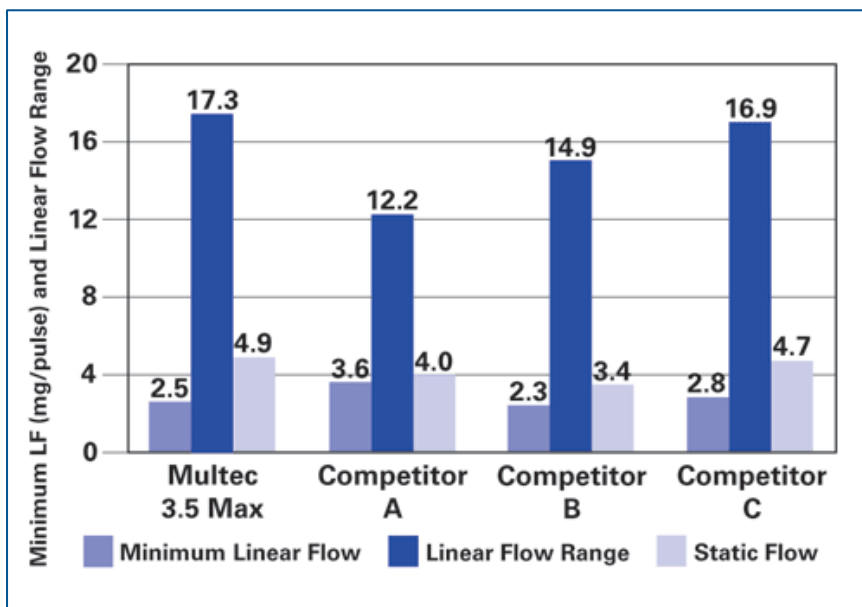
The Delphi Multec MPFI family includes the Delphi Multec® 3.5 Max Fuel Injector, which can help manufacturers meet California Air Resources Board (CARB) Partial Zero Emission Vehicle (PZEV) Emissions Standards. It features superior flow capacity for ethanol fuel blends (0 to 100), without sacrificing low fuel performance. It also offers:

- PZEV-capable spray and tip leakage
- Extended tip to enable flexibility in packaging and to deliver the fuel spray close to the intake valves
- Customer-driven flexibility for options
- Flexible spray geometry includes single- and dual-spray, variable cone and separation
- Availability of premium features, such as:
  - PZEV spray
  - Targeting
  - Low tip leak
- Multiple options for electrical connectors
- Various packaging lengths—including a new micro-length package—and two types of mounting configurations available (conventional clip and cushion steel)

▶ **Delphi Multec® 3.5 Max Fuel Injector Performance Specifications**

Injector quality performance	<1 PPM
IPTV at 12 months (4-cylinder applications)	<0.7
Plugging test cycles with <5% flow shift	>300 (Delphi test cycles)
Dynamic durability, % at billion (1,000 million) cycles	+/-3%
Tip leakage (mean cc/min) air at 420 kPa	<0.02 cc/min
Spray SMD, µm at 400 kPa, 3.0 g/s	<55 µm
Linear range with 5 V minimum operating voltage, 300 kPa	>16
Working flow range (+/-5%)	>12
Minimum operating voltage at 400 kPa	<5.0 V

▶ **Multec® 3.5 Max Injector Minimum Linear Flow Comparison**



This comparison of minimum linear fuel delivery demonstrates the superiority of the Delphi Multec® 3.5 Max Fuel Injector design versus three competitive products.

(Note: Measurements at 380 kPa pressure.)

▶ **Performance Advantages**

Delphi Multec Gasoline Multi-Port Fuel Injectors provide excellent flexibility in design features and options, allowing vehicle manufacturers around the world to incorporate them into a wide range of engine management systems. Delphi continues to improve and simplify the design of its MPFI fuel injectors to meet customer benchmarks for quality and low cost.

▶ **The Delphi Advantage**

Delphi has produced hundreds of millions of gasoline fuel injectors over the years for customers around the world. That vast experience has led to product and manufacturing process improvements which have helped eliminate contamination-related failures and provided other quality and cost advantages. Delphi's in-depth knowledge of systems and the combustion process help optimize injector performance.

As a global leader in engine management systems technology, Delphi can help manufacturers meet emissions requirements, improve fuel economy and enhance performance. Delphi is a source for high value solutions and our systems approach encourages collaboration. And, Delphi has a thorough understanding of automotive markets around the world and a global network of resources.



**The tip of Delphi Multec® 3.5 Fuel Injectors features a multi-hole director plate that provides fine atomization.**



**The Delphi Multec® 3.5 Max Fuel Injector offers high flow capacity for E85 fuel compatibility.**