

Delphi Multec[®] Gasoline Direct Injection Fuel Rail Assemblies

Delphi Multec[®] Gasoline Direct Injection Fuel Rail Assemblies are integrated, pre-assembled conduits that transfer fuel from a vehicle's high pressure fuel pump and distribute it to each fuel injector location on the engine.

Constructed of stainless steel for superior durability and corrosion protection, Delphi Multec GDi Fuel Rails offer a number of design advantages. Delphi offers configuration alternatives to enable efficient packaging and optimal program integration for the manufacturer. Delphi's damping technology and orifice designs reduce port-to-port fueling variation and noise. Delphi Multec GDi Fuel Rails deliver superior performance simultaneously with low cost.

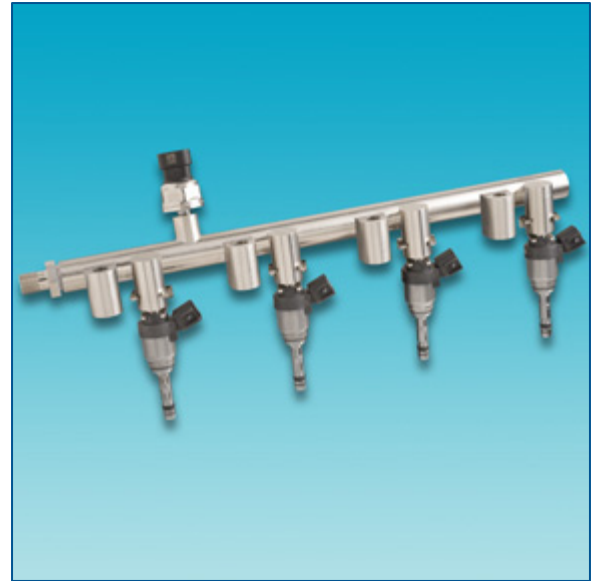
Delphi Multec GDi Fuel Rails are supplied preassembled with Delphi Multec[®] Fuel Injectors and a high pressure sensor. They are leak tested prior to delivery to reduce the need for engine-level leak testing by the manufacturer.

► Benefits

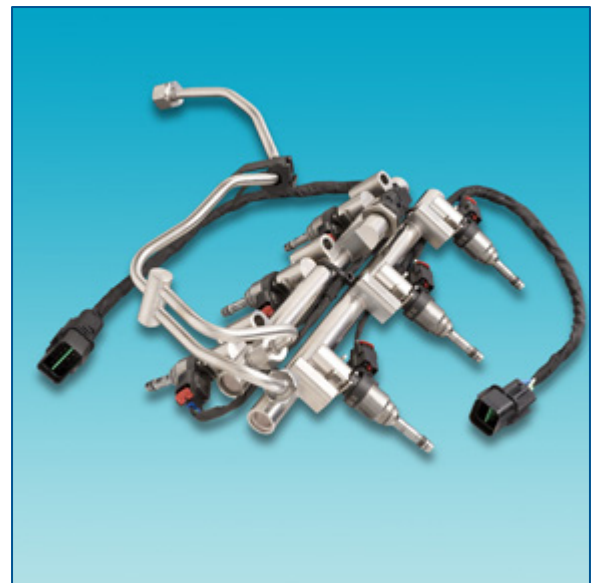
- Stainless steel construction provides superior durability and prevents corrosion with all approved market fuels.
- Stainless steel construction and the use of an O-ring only at the injector interface contribute to reduced evaporative emissions.
- Available with either an overhead conduit or an offset conduit for flexible program integration.
 - In the overhead conduit design, the main conduit is positioned directly above the injector sockets.
 - In the offset conduit design, the injector sockets are positioned to the side of the main conduit.
- Robust to ethanol fuel blends (0 to E100) and methanol fuel blends (including M15) for 15 years/150,000 miles based on severe temperature and vibration test schedules.
- Each rail design is unique and optimized to meet the customer's specific application requirements.

► Typical Applications

Delphi Gasoline Direct Injection Fuel Rail Assemblies are suitable for use with homogeneous mode and spray guided gasoline direct injection and flexible fuel engines, ranging from one- to 12-cylinders. Delphi GDi Fuel Rails are sold in conjunction with Delphi GDi Fuel Injectors.

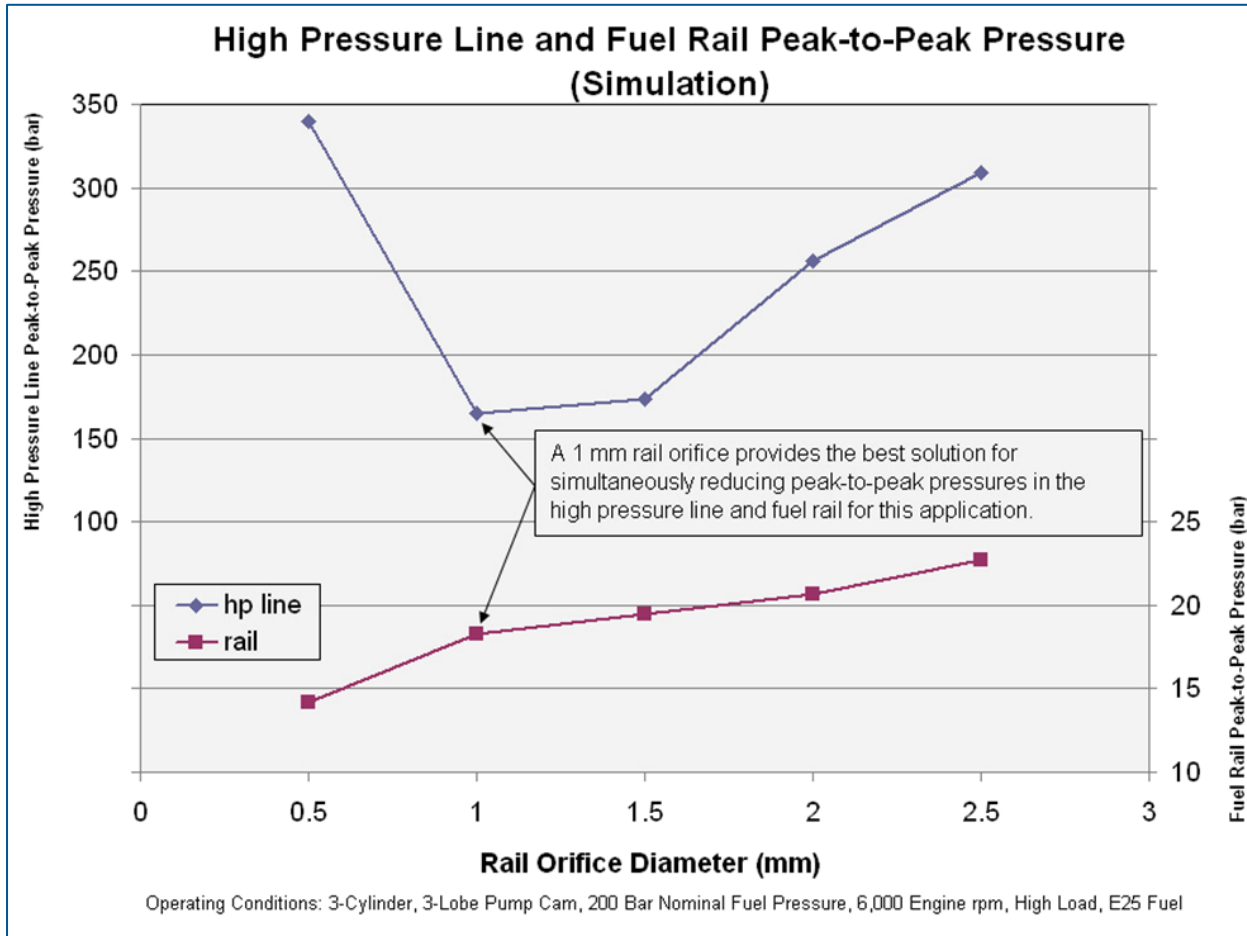


Delphi Multec[®] 4-Cylinder Gasoline Direct Injection Fuel Rail Assembly



Delphi Multec[®] 6-Cylinder Gasoline Direct Injection Fuel Rail Assembly

► **High Pressure Line and Fuel Rail Peak-to-Peak Pressure Simulation**



Delphi Gasoline Direct Injection Fuel Rails are designed to reduce fuel system-generated noise. For example, the rails can be isolated from the head. This reduces energy transfer from the rail to the head through the connection point.

Delphi engineers use math modeling to determine the proper size of the orifice for each application. Inputs include the fuel rail, high pressure pump, spill valve, system control and fuel lines. Delphi's engineering process is capable of predicting fuel pressure and flow rate at any point in the system and response time of the valves.

Delphi's high volume business and global presence provides manufacturers with the benefits of a varied customer base and diverse operating environments. With its extensive experience in fuel rail design and manufacturing, Delphi understands the fuel rail environment and validation requirements. Delphi conducts all testing in-house using its own laboratories and state-of-the-art tools for fuel rail design, testing and validation. Delphi investigates fuels worldwide and has developed aggressive formulations for ethanol and methanol blends and worst-case scenarios as required for validation testing.

▶ **The Delphi Advantage**

Delphi offers the benefits of more than 25 years manufacturing stainless steel gasoline fuel rails and more than 20 years manufacturing composite gasoline fuel rails. Delphi Multi-Port Fuel Injection Fuel Rails have provided customers with excellent first-time quality and excellent warranty performance. Delphi engineers also focus on the development of new cost competitive technologies and efficient manufacturing processes to provide manufacturers with gasoline fuel rails that deliver good value.

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 expertise is built into every product. Delphi's flexible engineering approach encourages collaboration. And, Delphi has a thorough understanding of automotive markets around the world and a global network of resources.