
**Gasoline engines with direct fuel
injection (GDI engines) — Installation
of the injectors to the engine**

*Moteurs à essence à injection directe de carburant (moteurs à
injection directe d'essence) — Installation des injecteurs sur le moteur*



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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 34, *Propulsion, powertrain and powertrain fluids*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The motor vehicle industry is increasingly being pressured by the world's regulators to improve fuel consumption thus reducing exhaust CO₂ emissions. The challenge for automotive engineers is to balance the trade-offs between the technology to improve fuel consumption and to reduce any other regulated emissions (such as NO_x, HC and particulates).

The most promising new engine technology of late is the direct injection spark ignition engine [also known as the gasoline direct injection (GDI) engine]. Listed amongst the advantages of GDI are a significantly improved fuel economy and corresponding lower CO₂ emissions than on contemporary gasoline engines.

With this technology comes new fuel system components and updates to their interfaces with the engine. One component of the GDI fuel system is the injectors, which inject the fuel directly into the combustion chambers using fuel which is supplied at high pressure from the fuel rail.

This document provides design engineers with standard dimensions for the mounting of the GDI injectors in the cylinder head and for their connection to the fuel rail.

NOTE Gasoline direct injection systems typically operate at a pressure range of up to about 35 MPa. For gasoline systems this is considered as high pressure, thus the pump is called high pressure pump. If this pressure range is regarded in the view of all injection systems, diesel and gasoline, it is considered as medium pressure, as diesel injection operates at much higher pressures. So, even if the terms differ (high pressure connector in this document, medium pressure liquid fuel supply connections in ISO 18418-1 and ISO 18418-2), they mean the same pressure range and are designed for the same purpose.

Gasoline engines with direct fuel injection (GDI engines) — Installation of the injectors to the engine

1 Scope

This document specifies the dimensions required for the installation and integration of the fuel injectors in gasoline (GDI) engines. It also describes the interface of the fuel injector cup within the fuel rail to the individual injector.

NOTE When the word “fuel” is used in the terms listed, it can be omitted, provided there is no misunderstanding.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2974, *Diesel engines — 60° female cones for high-pressure fuel injection components*

ISO 18418-1, *Gasoline engines — Medium pressure liquid fuel supply connections — Part 1: 60° female cone connectors*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

fuel injector

device energized by an electrical signal that opens an internal valve via a solenoid or a piezo-electric actuator and injects fuel directly into the combustion chamber

3.2

fuel rail

pipe that serves as a reservoir for the pressurized fuel and as an adapter to provide the fuel to the inlets of the injectors

Note 1 to entry: The rail also serves to apply the necessary force to the injectors in order to position them in their locations in the cylinder head such that they can withstand the combustion pressure.

3.3

fuel injector cup

location in the *fuel rail* (3.2), which is placed over the inlet feed of the injector and transfers the fuel into the injector and applies a hydraulic force on the injector