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Fuel injection equipment — Vocabulary —

Part 5: Common rail fuel injection system

Équipement d'injection de combustible — Vocabulaire —

Partie 5: Système d'injection de combustible à rampe commune

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Contents

Page

Foreword

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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*.

This second edition cancels and replaces the first edition (ISO 7876-5:2004), which has been technically revised.

The main changes compared to the previous edition are as follows:

— additional terms, already in use worldwide, have been added to Clause 3.

A list of all parts in the ISO 7876 series can be found on the ISO website.

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

Since this document was published in 2004, the common rail fuel injection system has updated its functions or component performances to improve diesel engine performance and exhaust after treatment with respect to driveability, engine power, emission, fuel consumption, noise, vibration and so on. New terms are defined to describe this updated functionality.

Fuel injection equipment — Vocabulary —

Part 5:
Common rail fuel injection system

1 Scope

This document establishes a vocabulary for common rail (CR) fuel injection systems for diesel (compression-ignition) engines and their components. The terms defined in this document are unique to common rail fuel injection systems, terms and definitions relating to other fuel injection systems are found in the other parts of the ISO 7876 series.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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 https://www.electropedia.org/

3.1
common rail fuel injection system
common rail injection system
CR fuel injection system
common rail system
CRS
high-pressure fuel injection system, comprised of the *high pressure supply pump* (3.3), the *rail* (3.9) or the d*istribution block* (3.10), and the *CR injectors* (3.5).

Note 1 to entry: It is also characterized by the following features:

— the fuel pressure of a *rail* (3.9) or a *distribution block* (3.10) may be varied independently from engine speed and load and is electronically controlled;

— the start and the end of the injections are controlled by an electrical valve at the *CR injector* (3.5);

— the energy for the injections is supplied to the *CR injectors* (3.5) from a *rail* (3.9) or a *distribution block* (3.10) with highly pressurized fuel;

— The injected fuel is supplied from a *rail* (3.9) or a *distribution block* (3.10).

3.2
fuel feed pump
low-pressure pump delivering fuel from the tank via one or several filters to the high-pressure-generating components

3.3
high-pressure supply pump
mechanically driven pump of any configuration (gear pump, piston pump, etc.) which is able to deliver the necessary amount of fuel at the highest required pressure

Note 1 to entry: This pump may include a device or devices for regulating the delivered quantity of fuel to the *rail* (3.9) or the *distribution block* (3.10).

Note 2 to entry: For the definition of conventional injection pump, see ISO 7876-1.

Note 3 to entry: The word "high-pressure" can be omitted providing there can be no misunderstanding.

3.4
internal transfer pump
pre-supply pump (e.g. vane type pump, gear pump) integrated in the housing of the *high-pressure supply pump* (3.3) and driven by the same shaft

3.5
CR injector
CR fuel injector
fuel injector that includes some features of a conventional fuel injector and, additionally, a device for controlling the start and end of the injection, e.g. by means of a valve driven by solenoid or piezo actuator

Note 1 to entry: The *CR injector* (3.5) may or may not contain a pressure amplifier for the injection pressure; the amplifier is actuated by highly pressurized fuel.

Note 2 to entry: For the definition of conventional fuel injector, see ISO 7876-2.

3.6
pressure control valve
electrically actuated spill valve in the high-pressure system designed to control and vary the pressure in the *rail* (3.9) or the *distribution block* (3.10) to the required values depending on speed and load of the engine

3.7
inlet control valve
inlet throttling device
inlet flow control valve
inlet metering valve
inlet flow metering unit
suction control valve
device designed to throttle the fuel flow at the inlet of the *high-pressure supply pump* (3.3) in order to control the quantity of the highly pressurized fuel delivered to the *rail* (3.9) or the *distribution block* (3.10)

3.8
outlet control valve
outlet flow control valve
outlet metering valve
electrical suction valve
device designed to control the amount of fuel spilled back into the inlet during a pumping event of the *high-pressure supply pump* (3.3) in order to control the quantity of the highly pressurized fuel delivered to the *rail* (3.9) or the *distribution block* (3.10)

3.9
rail
high-pressure storage chamber with a tube-type long shape that supplies the *CR injector* (3.5) with fuel

Note 1 to entry: It may be manufactured as a separate part (e.g. a tubular device) attached to the engine or may be a channel integrated within the cylinder head.

3.10
distribution block
high-pressure storage chamber with the function of supplying the *CR injector* (3.5) with fuel, and it doesn't have a long shape

3.11
flow limiter
device located between the *rail* (3.9) or the *distribution block* (3.10), and each *CR injector* (3.5) designed to shut off the fuel flow in the pipe if the maximum permitted flow is exceeded

3.12
flow damper
device located between the *rail* (3.9) or the *distribution block* (3.10), and each *CR injector* (3.5) designed to moderate the fuel pressure pulsation in the pipe caused by each injection

Note 1 to entry: This damper may also act as a *flow limiter* (3.11).

3.13
CR pressure sensor
sensor designed to measure the pressure within the *rail* (3.9) or the *distribution block* (3.10), providing an electrical signal to the *electronic control unit* (3.15)

Note 1 to entry: The word "CR" can be omitted providing there can be no misunderstanding.

3.14
pressure limiter
pressure limiting valve
safety valve designed to limit the operating pressure to the maximum permitted pressure

3.15
electronic control unit
device that controls the *high-pressure supply pump* (3.3), the *CR injectors* (3.5) and other valves, e.g. the *pressure control valve* (3.6), depending on the speed and load of the engine and on other operating conditions (air temperature, coolant temperature, boost pressure, etc.)

3.16
multiple injection
fuel injection performed multiple times during a single engine combustion cycle in a controlled state

3.17
main injection
parts of the *multiple injection* (3.16) that contribute most to the combustion generating a force to depress the piston

3.18
pre injection
pilot injection
small amount of fuel injection that takes place in a controlled manner before the *main injection* (3.17), with a clear non-injection period between the pre-injection and the main injection

3.19
post injection
after injection
fuel injection that takes place in a controlled manner again after the *main injection* (3.17), with a clear non-injection period between the main injection and the post injection