
**Reciprocating internal combustion
engines — Vocabulary of components
and systems —**

**Part 11:
Fuel systems**

*Moteurs alternatifs à combustion interne — Vocabulaire des
composants et des systèmes —*

Partie 11: Systèmes de carburant



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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword — Supplementary information](#).

The committee responsible for this document is ISO/TC 70, *Internal combustion engines*.

ISO 7967 consists of the following parts, under the general title *Reciprocating internal combustion engines — Vocabulary of components and systems*:

- *Part 1: Structure and external covers*
- *Part 2: Main running gear*
- *Part 3: Valves, camshaft drives and actuating mechanisms*
- *Part 4: Pressure charging and air/exhaust gas ducting systems*
- *Part 5: Cooling systems*
- *Part 6: Lubricating systems*
- *Part 7: Governing systems*
- *Part 8: Starting systems*
- *Part 9: Control and monitoring systems*
- *Part 10: Ignition systems*
- *Part 11: Fuel systems*
- *Part 12: Exhaust emission control systems*

Reciprocating internal combustion engines — Vocabulary of components and systems —

Part 11: Fuel systems

1 Scope

This part of ISO 7967 establishes a vocabulary for fuel systems of reciprocating internal combustion engines. Also, in this part of ISO 7967, the terms and the definitions are classified as follows:

- fuel supply system (3.1);
- carburetor (3.2);
- fuel injection system (3.3).

ISO 2710-1 gives a classification of reciprocating internal combustion engines and denotes the basic terms and definitions of such engines and their characteristics.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7876-1:1990, *Fuel injection equipment — Vocabulary — Part 1: Fuel injection pumps*

ISO 7876-3:1993, *Fuel injection equipment — Vocabulary — Part 3: Unit injectors*

ISO 7876-5, *Fuel injection equipment — Vocabulary — Part 5: Common rail fuel injection system*

3 Terms and definitions

3.1 Fuel supply system

3.1.1

fuel supply system

system which consists of low pressure fuel equipment for delivering fuel from the fuel tank to the high pressure unit for fuel injection to the engine

3.1.2

fuel feed pump

low pressure pump delivering fuel from the tank through one or several filters, to the high-pressure-generating components

[SOURCE: ISO 7876-5:2004, 2.2]

3.1.3

fuel filter

filter to eliminate contamination in the fuel

3.1.4

priming pump

pump to fill the fuel pipe at starting

3.2 Carburetor

3.2.1

carburetor

device which vaporizes fuel into charge air and also controls air-fuel ratio of the mixture

3.2.2

elementary carburetor

carburetor (3.2.1) without compensation device which consists of the main system, the float unit, the *venturi* (3.2.34), and the *throttle valve* (3.2.42)

3.2.3

float carburetor

carburetor (3.2.1) in which the fuel level is maintained at the constant level by the *float* (3.2.47) and the fuel is absorbed in the air by the vacuum pressure at the *venturi* (3.2.34)

3.2.4

electronic controlled carburetor

carburetor (3.2.1) which controls air-fuel ratio by the electronic circuit

3.2.5

air-fuel ratio feedback controlled carburetor

carburetor (3.2.1) which is equipped with the device for feedback control of air-fuel ratio

3.2.6

fixed-venturi carburetor

carburetor (3.2.1) with fixed area *venturi*

3.2.7

variable venturi carburetor

carburetor (3.2.1) with variable area *venturi*

3.2.8

updraft carburetor

carburetor (3.2.1) with upward exit of air-fuel mixture

3.2.9

downdraft carburetor

carburetor (3.2.1) with downward exit of air-fuel mixture

3.2.10

horizontal carburetor

sidedraft carburetor

carburetor (3.2.1) with horizontal exit of air-fuel mixture

3.2.11

single-barrel carburetor

carburetor (3.2.1) with one set of *venturi* (3.2.34)

3.2.12

multi-barrel carburetor

carburetor (3.2.1) with more than two sets of *venturi* (3.2.34)

3.2.13

two-barrel carburetor

carburetor (3.2.1) with two sets of *venturi* (3.2.34)

3.2.14**compound carburetor**

multiple carburetor

multi-carburetor

carburetor system with more than two sets of independent *carburetors* (3.2.1) in which *throttle valves* (3.2.42) are linked so as to work simultaneously or in sequence

Note 1 to entry: The unit with two carburetors is called twin-carburetor.

3.2.15**two-stage carburetor**

carburetor system with two *carburetors* (3.2.1) with different characteristics in which each *throttle valve* (3.2.42) works in sequence

Note 1 to entry: The carburetor which works first is called the primary carburetor and another is called the secondary carburetor.

3.2.16**float circuit**

float system

mechanism which maintains the level of fuel in the *carburetor* (3.2.1)

3.2.17**main metering system**

main circuit

high-speed system

high-speed circuit

circuit in the *carburetor* (3.2.1) where fuel flows continuously during normal engine operation, except idling

3.2.18**slow speed system**

idle system

idle circuit

circuit in the *carburetor* (3.2.1) where fuel flows at idling

3.2.19**secondary idle system**

secondary low speed system

circuit of the secondary *carburetor* (3.2.1) where fuel flows from the main fuel circuit when the opening of the *throttle valve* (3.2.42) is small

3.2.20**power system**

full-power circuit

power enrichment system

circuit where additional fuel flows for the enrichment of air-fuel mixture at high power operation of the engine

3.2.21**starting system**

choke system

system or a series of parts in the *carburetor* (3.2.1) which restricts the air flow in the *venturi* (3.2.34) at the starting of the engine

3.2.22**accelerating system**

accelerator-pump system

circuit of additional fuel for the enrichment of air-fuel mixture at the sudden acceleration of the engine

3.2.23

compensating device

device which adjusts air-fuel ratio in accordance with the requirement from the engine using a procedure such as *air bleed* (3.2.53) method

3.2.24

bore size of throttle-body flange

throttle-diameter

diameter of the exit of the *carburetor* (3.2.1) which indicates the size of the carburetor

Note 1 to entry: When the carburetor has two or more exits, the size is usually indicated by plural diameters.

3.2.25

carburetor body

main body of carburetor

body including main parts of the *carburetor* (3.2.1) such as *venturi* (3.2.34) and *float chamber* (3.2.44)

3.2.26

air intake body

body which forms *air intake* (3.2.28) passage with the *choke valve* (3.2.31)

3.2.27

flange body

throttle body

body which forms the exit of air passage with *throttle valve* (3.2.42)

3.2.28

air horn

air intake

air intake portion of the *carburetor* (3.2.1)

3.2.30

choke

choking

means to enrich the air-fuel mixture by choking the inlet of charge air to the *carburetor* (3.2.1)

3.2.31

choke valve

strangler valve

air shutter

valve for *choking* (3.2.30) the air inlet in the *carburetor* (3.2.1)

3.2.32

choke relief valve

valve equipped in the *choke valve* (3.2.31) which relieves charge air when air-fuel ratio exceeds the limit due to excessive negative pressure at the *venturi* (3.2.34)

3.2.33

automatic choke

device which operates *choke valve* (3.2.31) automatically depending on the temperature of the engine

3.2.34

venturi

venturi tube

nozzle (3.2.64) with throat which produces low pressure of charge air for fuel injection

3.2.35

venturi diameter

diameter of throat of *venturi* (3.2.34)

3.2.36**single venturi**

venturi (3.2.34) of one part

3.2.37**double venturi**

unified *venturi* (3.2.34) from two venturis

3.2.38**triple venturi**

unified *venturi* (3.2.34) from three venturis

3.2.39**primary venturi**

smallest *venturi* (3.2.34) of *double venturi* (3.2.37) or *triple venturi* (3.2.38)

3.2.40**secondary venturi**

venturi (3.2.34) larger than *primary venturi* (3.2.39) in *double venturi* (3.2.37) or *triple venturi* (3.2.38)

3.2.41**third venturi**

largest *venturi* (3.2.34) of *triple venturi* (3.2.38)

3.2.42**throttle valve**

throttle butterfly

part included in the *carburetor* (3.2.1) which controls the flow rate of air-fuel mixture into the engine

3.2.43**air valve**

air damper

damper which is equipped in the second stage of *two-barrel carburetor* (3.2.13) for the control of air-fuel mixture

3.2.44**float chamber**

float bowl

chamber containing fuel with the *float* (3.2.47) which maintains the fuel level

3.2.45**float chamber vent**

pipe or *hole* (3.2.67) to introduce air pressure into the upper space of the *float chamber* (3.2.44)

3.2.46**outer vent**

float chamber vent (3.2.45) connected to the atmosphere

3.2.47**float**

pontoon

part to maintain the level of fuel in the *float chamber* (3.2.44)

3.2.48**float valve**

float needle valve

valve which detects the movement of the *float* (3.2.47) and controls the level of fuel in the *float chamber* (3.2.44)

3.2.49

float-level height

distance of upper or lower surface of the *float* (3.2.47) from a certain reference surface of the *float chamber* (3.2.44)

3.2.50

fuel-level height

level of fuel measured from a certain reference surface of the *float chamber* (3.2.44)

3.2.51

jet

metering jet

metering orifice

<general term> orifice used in the *carburetor* (3.2.1) which controls fuel flow or air flow

3.2.52

fuel jet

petrol jet

fuel metering jet

jet (3.2.51) which controls the fuel flow

3.2.53

air jet

air bleed

well vent jet

jet (3.2.51) which controls bleed air flow

3.2.54

needle jet

jet (3.2.51) with *jet needle* (3.2.55)

3.2.55

jet needle

fine bar installed in the *hole* (3.2.67) of a *jet* (3.2.51) to control the passage area of the fluid

3.2.56

main jet

main-metering jet

jet (3.2.51) for the *main metering system* (3.2.17)

3.2.57

slow running jet

slow speed jet

idling jet

jet (3.2.51) for *slow speed system* (3.2.18)

3.2.58

secondary slow jet

jet (3.2.51) for *secondary idle system* (3.2.19)

3.2.59

power by-pass jet

power jet

jet (3.2.51) for *power system* (3.2.20)

3.2.60

power valve

power jet valve

valve to control the fuel flow of the *power system* (3.2.20)

3.2.61**pump jet**

accelerating pump jet

jet (3.2.51) in the *accelerating system* (3.2.22)

3.2.62**starting petrol jet**

jet (3.2.51) for *starting system* (3.2.21)

3.2.63**main air bleed**

main air jet

jet (3.2.51) which bleeds air from the *main metering system* (3.2.17)

3.2.64**nozzle**

discharge jet

discharge tube

nozzle to discharge fuel into charge air flow

3.2.65**main nozzle**

main discharge nozzle

nozzle (3.2.64) in the main metering system

3.2.66**pump discharge nozzle**

nozzle (3.2.64) in the *accelerating system* (3.2.22)

3.2.67**port**

hole

hole (3.2.67) for injecting fuel on the air passage of *carburetor* (3.2.1)

3.2.68**idle port**

idle discharge hole

port (3.2.67) for *slow speed system* (3.2.18)

3.2.69**progression hole**

secondary idle orifice

two-hole type *idle port* (3.2.68) located on the upper side of the air passage

3.2.70**primary idle orifice**

idle discharge hole

two-hole type *idle port* (3.2.68) located on the lower side of the air passage

3.2.71**secondary throttle barrel by-pass hole**

port (3.2.67) for *secondary idle system* (3.2.19)

3.2.72**starting mixture supply port**

outlet for starting mixture

port (3.2.67) for *starting system* (3.2.21)

3.2.73**starting valve**

valve which opens and closes the by-pass line to supply fuel rich mixture during starting of the engine

3.2.74

idle adjustment system

idling speed adjustment system

system for adjustment of carburetor and/or *fuel injection system* ([3.3.1](#)) for smooth idling operation

3.2.75

idle needle valve

idle adjustment screw

screw for adjustment of air-fuel ratio of air-fuel mixture

3.2.76

idle limiter

idle stopper

device which limits the movement of the *idle needle valve* ([3.2.75](#)) to avoid a too rich air-fuel ratio

3.2.77

throttle-stop screw

idle-adjustment screw

screw which adjusts the opening of the *throttle valve* ([3.2.42](#)) at idling operation

3.2.78

fast idle system

device to keep opening of the *throttle valve* ([3.2.42](#)) above certain limit to continue smooth idling operation without stopping at warming-up of the engine

3.2.79

hot idle compensator

compensation device to avoid too rich air-fuel ratio caused by inlet air temperature rise during idling

3.2.80

choke valve opener

device which forcibly opens the *choke valve* ([3.2.31](#)) during full throttle operation

3.2.81

air bleed system

system which injects small amount of air into fuel line to compensate air-fuel ratio and to aid in the atomization of the fuel

3.2.82

bleed hole in needle jet

hole ([3.2.67](#)) to bleed air in the *main metering system* ([3.2.17](#))

3.2.83

idle air bleed

idle air bleeder

pilot air bleed

hole ([3.2.67](#)) to bleed air in the *slow speed system* ([3.2.18](#))

3.2.84

step air bleed

secondary air bleed

hole ([3.2.67](#)) to bleed air in the *secondary idle system* ([3.2.19](#))

3.2.85

starting air jet

hole ([3.2.67](#)) to bleed air in the *starting system* ([3.2.21](#))

3.2.86

acceleration pump

pump which supplies additional fuel at the time of rapid acceleration of the engine

3.2.87**main well**

reserve well

fuel pool downstream of *main jet* (3.2.56)

3.2.88**anti-percolator**

device to avoid percolation in the fuel system

Note 1 to entry: During operation of spark ignition engines, if the fuel is vaporised excessively between the fuel tank and the carburetor, the pressure in the fuel line increases and brings about excessive fuel supply to the engine. Such a phenomenon is called percolation.

3.2.89**altitude mixture control valve**

high altitude compensator

valve which prevents excessive rich air-fuel mixture at high altitude

3.2.90**vaporizer**

converter

unit which vaporizes liquefied gas fuel used for gas fuelled engines

3.2.91**gas mixer**

unit which mixes gas fuel and inlet air and also controls air-fuel ratio

3.3 Fuel injection system**3.3.1****fuel injection system**

system for injecting fuel into an engine

3.3.2**electronic control fuel injection system**

fuel injection system (3.3.1) in which parameters, such as fuel flow and injection timing, are controlled with electronic circuits

3.3.3**individual (fuel) injection system**

unit pump fuel injection system

fuel injection system (3.3.1) in which each cylinder is equipped with a dedicated fuel injection pump

3.3.4**common rail (fuel) injection system**

fuel injection system (3.3.1) in which fuel is distributed and injected to each cylinder from a common high pressure manifold installed after the *fuel injection pump* (3.3.7)

Note 1 to entry: For details, refer to ISO 7876-5.

3.3.5**continuous-flow (fuel) injection system**

fuel injection system (3.3.1) in which fuel flows continuously

3.3.6**timed (fuel) injection system**

fuel injection system (3.3.1) which supplies fuel to the engine intermittently

3.3.7**fuel injection pump**

pump for injecting fuel into the cylinder through *fuel injection valve* (3.3.82) (commonly called injector)

3.3.8

constant-stroke fuel injection pump

fuel injection pump (3.3.7) with a constant stroke plunger

3.3.9

variable-stroke fuel injection pump

fuel injection pump (3.3.7) with a variable stroke plunger

3.3.10

jerk fuel injection pump

plunger type fuel injection pump

3.3.11

distributor type fuel injection pump

fuel injection pump (3.3.7) with one pressurizing unit and distributes fuel to more than one cylinder through a distributing device

3.3.12

unit injector

assembly which combines the features of a single-cylinder pump and an injector in one unit through which a metered volume of fuel under high pressure is injected into the combustion chamber

[SOURCE: ISO 7876-3:1993, 3.1]

Note 1 to entry: For details, refer to ISO 7876-3:1993.

3.3.13

accumulator fuel injection pump

fuel injection pump (3.3.7) in which the force required to move the *plunger* (3.3.30) is received directly from an energy accumulator

[SOURCE: ISO 7876-1:1990, 4.2]

3.3.14

single-cylinder fuel injection pump

fuel injection pump (3.3.7) with only one *pumping element* (3.3.29) and one outlet

[SOURCE: ISO 7876-1:1990, 7.1]

3.3.15

multi-cylinder fuel injection pump

integrated fuel injection pump with more than one *pumping elements* (3.3.29) and fuel outlets corresponding to the number of engine cylinder

3.3.16

in-line fuel injection pump

fuel injection pump assembly having the axes of its *pumping elements* (3.3.29) arranged parallel to each other and in one plane

[SOURCE: ISO 7876-1:1990, 7.2]

3.3.17

driveshaft fuel injection pump

mechanical injection pump with an integral shaft or camshaft for actuating the *plunger(s)* (3.3.30) of the *pumping element(s)* (3.3.29)

[SOURCE: ISO 7876-1:1990, 6.3]

3.3.18**vee fuel injection pump**

driveshaft fuel injection pump (3.3.16) with two pumping element banks inclined at an angle to each other (with a single camshaft)

[SOURCE: ISO 7876-1:1990, 7.4]

3.3.19**camshaft pump**

self-contained drive pump

fuel injection pump (3.3.7) with a camshaft which drives the *plunger* (3.3.30)

3.3.20**camless pump**

fuel injection pump (3.3.7) without camshaft which drives the *plunger* (3.3.30)

3.3.21**metering**

process of establishing any required fuel delivery within the operating range of the *fuel injection system* (3.3.1) using various means of control

[SOURCE: ISO 7876-1:1990, 10.1]

3.3.22**port and helix metering**

metering (3.3.21) by means of one or more oblique grooves in the *plunger* (3.3.30) and one or more *ports* (3.2.67) in the barrel or inversely

[SOURCE: ISO 7876-1:1990, 10.2]

3.3.23**sleeve metering**

metering (3.3.21) incorporating a movable sleeve by which the port opening and/or closing is controlled

[SOURCE: ISO 7876-1:1990, 10.3]

3.3.24**inlet metering**

metering method by controlling the amount of fuel entering the pumping chamber during the filling or charging of the pump cycle

Note 1 to entry: Refer to ISO 7876-1:1990, 10.4.

3.3.25**over-flow type metering**

metering (3.3.21) by by-passing the excess fuel from the *spill valve* (3.3.40) or the *spill port* (3.3.41)

3.3.26**spill valve metering**

metering (3.3.21) by changing the operation timing of the *spill valve* (3.3.40) or the inlet valve

3.3.27**ported metering**

metering (3.3.21) by changing the opening of the spill hole

3.3.28**throttle valve metering**

metering (3.3.21) by changing the opening of the *spill valve* (3.3.40) or the inlet valve

3.3.29

pumping element

combination of a pumping plunger and its barrel in a *fuel injection pump* ([3.3.7](#))

[SOURCE: ISO 7876-1:1990, 11.2]

3.3.30

plunger

piston which moves in a barrel and pressurizes the fuel in a *pumping element* ([3.3.29](#))

3.3.31

plunger barrel

cylinder in which the *plunger* ([3.3.30](#)) moves up and down and pressurizes the fuel

3.3.32

helical groove

plunger helix

metering helix

helical groove carved on the *plunger* ([3.3.30](#)) to control *metering* ([3.3.21](#)) of fuel

3.3.33

helix lead

helical lead of *plunger helix* ([3.3.32](#))

3.3.34

lower helix lead

helix lead ([3.3.33](#)) provided at the lower edge to adjust *fuel injection end* ([3.3.60](#))

3.3.35

upper helix lead

helix lead ([3.3.33](#)) provided at the upper edge to adjust *fuel injection beginning* ([3.3.59](#))

3.3.36

upper and lower helix lead

helix lead ([3.3.33](#)) provided at both upper and lower edges to adjust *fuel injection beginning* ([3.3.59](#)) and *fuel injection end* ([3.3.60](#))

3.3.37

plunger spring

spring which makes the *plunger* ([3.3.30](#)) return to the bottom and keeps the tappet roller touch with the cam

3.3.38

delivery valve

check valve provided at the exit of the fuel injection pump

3.3.39

retraction valve

unloading delivery valve

valve for retracting the fuel, usually included in the *delivery valve* ([3.3.38](#))

3.3.40

spill valve

by-pass valve

valve which controls the end of fuel delivery in *over-flow type metering* ([3.3.25](#)) or *spill valve metering* ([3.3.26](#))

3.3.41

spill port

cut-off port

by-pass port

port ([3.2.67](#)) which controls the beginning or the end of fuel delivery in *over-flow type metering* ([3.3.25](#)) or *spill valve metering* ([3.3.26](#))

3.3.42**two-way delivery valve**

constant pressure delivery valve

delivery valve (3.3.38) with the additional check valve which works to control the fuel pressure in the *delivery pipe* (3.3.49) constant

3.3.43**accumulator**

container of the high pressure fuel which maintains constant fuel pressure in the system

3.3.44**control rod**

control rack

rod to adjust the amount of injected fuel

3.3.45**control rod stopper**

stopper to restrict the movement of *control rod* (3.3.44) to avoid excess fuel injection to the engine

3.3.46**injection pump cam**

cam which drives the *plunger* (3.3.30) of *fuel injection pump* (3.3.7)

3.3.47**fuel cam**

cam which drives fuel supply pump, *fuel injection pump* (3.3.7), or *fuel injection valve* (3.3.82)

3.3.48**injection pump tappet**

part which transmits the movement of cam to the *plunger* (3.3.30)

3.3.49**injection pipe**

delivery pipe

fuel injection tubing

pipe which connects *fuel injection pump* (3.3.7) and *fuel injection valve* (3.3.82) (injector)

3.3.50**leak-off pipe**

fuel return pipe

pipe which returns by-pass fuel or leaked fuel from the injection equipment to the fuel supply line

3.3.51**injection timing device**

device which adjusts the fuel injection timing during engine operation

3.3.52**plunger stroke**

total displacement of the *plunger* (3.3.30) determined by cam lift

3.3.53**effective stroke**

displacement of the *plunger* (3.3.30) between the *beginning of fuel delivery* (3.3.54) and the *end of fuel delivery* (3.3.55)

3.3.54**beginning of delivery**

instant when the *plunger* (3.3.30) closes fuel inlet port

3.3.55

end of delivery

instant when the *plunger* (3.3.30) opens fuel exit port

3.3.56

duration of delivery

period between the *beginning of delivery* (3.3.54) and the *end of delivery* (3.3.55)

3.3.57

static injection timing

<generic term> geometrically determined *beginning of delivery* (3.3.54) and *end of delivery* (3.3.55) which depends on the structure of the *fuel injection pump* (3.3.7)

3.3.58

dynamic injection timing

<generic term> actual *beginning of delivery* (3.3.54) and *end of delivery* (3.3.55) observed during engine operation

3.3.59

fuel injection beginning

instant of actual beginning of fuel injection into the engine cylinder, usually expressed by crankshaft angle from the top dead centre

3.3.60

fuel injection end

instant of actual end of fuel injection into the engine cylinder, usually expressed by crankshaft angle from the top dead centre

3.3.61

fuel injection period

fuel injection duration

actual period (duration) of fuel injection into the cylinder expressed by the crankshaft angle

3.3.62

injection time lag

injection time delay

difference of time between the *beginning of delivery* (3.3.54) and *fuel injection beginning* (3.3.59), usually expressed by crankshaft angle

3.3.63

injection quantity

quantity of the fuel injected into the cylinder from the injection nozzle (injector)

3.3.64

minimum injection limit

minimum regular delivery

minimum discharge injection

limit of minimum fuel flow which can be controlled by the *fuel injection system* (3.3.1)

3.3.65

main injection

injection of major amount of fuel to the engine

3.3.66

pilot injection

injection of small amount of fuel prior to *main injection* (3.3.65)

3.3.67

post injection

intentional injection of small amount of fuel after *main injection* (3.3.65), usually for the reduction of exhaust emissions

3.3.68**secondary injection**

abnormal fuel injection which occurs after the *main injection* (3.3.65)

3.3.69**irregular injection**

cyclic irregularity of injection

abnormal cyclic change of injection fuel flow during constant fuel operation

3.3.70**intermittent injection**

irregular injection (3.3.69) with stoppage of fuel injection

3.3.71**cut-off of injection**

condition concerning cut-off of fuel at the time of shut down of the engine

3.3.72**dribbling**

after-dripping

subsequent dripping

small leakage of fuel just after the end of injection

3.3.73**retraction**

line-pressure relief unloading

sudden decrease of fuel pressure in the *injection pipe* (3.3.49) just after the *cut-off of injection* (3.3.71), in order to avoid *dribbling* (3.3.72)

3.3.74**retraction volume**

increased volume inside the *injection pipe* (3.3.49) by the movement of the *retraction valve* (3.3.39)

3.3.75**maximum fuel stop**

full-load stopper

device for limiting the maximum fuel flow at the full load of the engine

3.3.76**unequality rate of fuel injection (from cylinder to cylinder)**

δ_q

value which indicates unequality of fuel injection between cylinders for distributor type or multi-cylinder fuel injection system

Note 1 to entry: $\delta_q = (Q_{\max} - Q_m) / Q_m \times 100 (>0)$ or $\delta_q = (Q_{\min} - Q_m) / Q_m \times 100 (<0)$

where

δ_q unequality rate of fuel injection (from cylinder to cylinder), expressed in %;

Q_m average fuel injection flow rate for all cylinders;

Q_{\max} maximum fuel injection flow rate in all cylinders;

Q_{\min} minimum fuel injection flow rate in all cylinders.

3.3.77

deviation rate of fuel injection

δ_e
value which indicates rate of deviation of the measured fuel injection from the scheduled fuel injection for a single cylinder fuel injection system

Note 1 to entry: $\delta_e = (Q_a - Q_s) / Q_s \times 100(\%)$

where

δ_e deviation rate of fuel injection;

Q_a measured fuel injection;

Q_s scheduled fuel injection.

3.3.78

rate of injection

rate of discharge
injection rate
instantaneous injection fuel flow rate during *fuel injection period* ([3.3.61](#))

Note 1 to entry: Rate of injection can be expressed as injection fuel quantity per rotation angle of camshaft or crankshaft.

3.3.79

injection interval

fuel injection interval during operation of the multi-cylinder engine, usually expressed with rotation angle of the crankshaft

3.3.80

injection order

order of fuel injection of the pump elements for the multi-cylinder injection pump

Note 1 to entry: The order is counted from the driving side.

3.3.81

excess fuel device

excess fuel starting device
device which enables the fuel system to inject more fuel than that of full load at starting of the engine

3.3.82

fuel injection valve

fuel injector
device for injection and atomizing of fuel

3.3.83

open nozzle

fuel injection valve ([3.3.82](#)), without the valve, which controls opening pressure between the injection pump and injection valve

3.3.84

closed nozzle

fuel injection valve ([3.3.82](#)), with the valve, which controls opening pressure between the injection pump and injection valve

3.3.85

automatic injection valve

fuel injection valve ([3.3.82](#)) which automatically opens or closes depending on inlet fuel pressure

3.3.86**mechanical injection valve**

fuel injection valve (3.3.82) which mechanically opens or closes independently of inlet fuel pressure

3.3.87**electromagnetic injector**

fuel injection valve (3.3.82) which operates with electromagnetic force, usually produced by electromagnetic actuator or solenoid valve

3.3.88**piezo injector**

injector which is operated by a piezoelectric actuator

3.3.89**fuel injection nozzle**

nozzle valve assembly

main parts of *fuel injection valve* (3.3.82) which consists of *nozzle* (3.2.64), *nozzle tip* (3.3.92), and needle valve

3.3.90**nozzle body**

portion of *nozzle* (3.2.64) which guides the needle valve

3.3.91**nozzle needle**

valve needle

valve with sharp tip which is a part of the *nozzle* (3.2.64)

3.3.92**nozzle tip**

spray tip

part with fuel injection hole which is a part of the *nozzle* (3.2.64)

Note 1 to entry: See [Figure 4](#).

3.3.93**nozzle sac**

space inside the *nozzle tip* (3.3.92) of multi-hole nozzle between the needle valve and the fuel injection hole

3.3.94**pintle nozzle**

nozzle (3.2.64) which has a needle with a profiled protrusion (the pintle) which extends through a coaxial hole in the body

[SOURCE: ISO 7876-2:1991, 8.2]

3.3.95**throttle nozzle**

pintle nozzle (3.3.94) with a needle protrusion profile which throttles the fuel flow during initial lift of the needle

[SOURCE: ISO 7876-2:1991, 8.3]

3.3.96**hole nozzle**

nozzle (3.2.64) with one or more injection holes

Note 1 to entry: This is the general term for the nozzles other than the *pintle nozzle* (3.3.94).

3.3.97**long-stem nozzle**

hole nozzle (3.3.96) with relatively long distance between sliding portion and valve seat of the needle valve

3.3.98

poppet nozzle

nozzle ([3.2.64](#)) which has a mushroom shape needle valve (poppet valve)

3.3.99

internal cooled nozzle

nozzle ([3.2.64](#)) with internal cooling configuration

3.3.100

nozzle sleeve

sleeve of internally cooling nozzle which forms cooling chamber

3.3.101

nozzle hole

hole ([3.2.67](#)) for fuel injection in a *nozzle* ([3.2.64](#))

3.3.102

hole angle

conic angle formed by the centrelines of the injection holes in a multi-hole nozzle

3.3.103

nozzle holder

part which supports the *nozzle* ([3.2.64](#))

3.3.104

nozzle assembly nut

nozzle retaining nut

nut for fixing the *nozzle* ([3.2.64](#)) to the *nozzle holder* ([3.3.103](#))

3.3.105

injection-valve opening pressure

fuel pressure at the time of opening of the needle valve

3.3.106

injection-valve closing pressure

fuel pressure at the time of closing of the needle valve

3.3.107

fuel injection pressure

fuel pressure inside of the *fuel injection valve* ([3.3.82](#)) during fuel injection

3.3.108

fuel injection line pressure

pressure in the fuel injection pipe during fuel injection

3.3.109

residual pressure

average fuel pressure in the *injection pipe* ([3.3.49](#)) after the end of fuel injection and before the starting of the next injection