

# INTERNATIONAL STANDARD

**ISO**  
**7440-1**

Second edition  
1991-12-01

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## Road vehicles — Fuel injection equipment testing —

### Part 1: Calibrating nozzle and holder assemblies (standards.iteh.ai)

*Véhicules routiers — Essai des équipements d'injection de  
combustible —*

*Partie 1. Ensembles porte-injecteur et injecteur de calibration*



Reference number  
ISO 7440-1:1991(E)

## 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 7440-1 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Sub-Committee SC 7, *Injection equipment and filters for use on road vehicles*.

ISO 7440-1:1991

This second edition cancels and replaces the first edition (ISO 7440-1:1985), of which 3.2.3 and figures 5 and 6 have been technically revised; clause 5 and table 1 (1985 edition) have been deleted.

ISO 7440 consists of the following parts, under the general title *Road vehicles — Fuel injection equipment testing*:

- *Part 1: Calibrating nozzle and holder assemblies*
- *Part 2: Orifice plate flow-measurement*

Setting and maintenance requirements for fuel injection equipment are specified in ISO 4008-3:1987, *Road vehicles — Fuel injection pump testing — Part 3: Application and test procedures*.

Annex A of this part of ISO 7440 is for information only.

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## Introduction

The calibrating nozzle and holder assemblies are intended to simulate closely the function of the nozzle and holder assemblies in the fuel injection system of a compression-ignition (diesel) engine. They are flow gauges and require careful handling and maintenance.

The manufacturer of the injection equipment and/or the manufacturer of the engine will need to specify the type of calibrating nozzle and holder assembly, the appropriate single hole orifice plate size or pintle nozzle (as applicable), high pressure pipes, exact limits, etc. to be used.

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## Road vehicles — Fuel injection equipment testing —

### Part 1:

### Calibrating nozzle and holder assemblies

#### 1 Scope

This part of ISO 7440 specifies two types of calibrating nozzle and holder assemblies intended for the testing and setting of diesel fuel injection pumps on test benches.

It applies to

- a) a calibrating nozzle and holder assembly with a single hole orifice plate;
- b) a calibrating nozzle and holder assembly with a delay pintle type nozzle.

The approximate range of the calibrating nozzle and holder assembly is up to

- 300 mm<sup>3</sup>/stroke with the single hole orifice plate
- 150 mm<sup>3</sup>/stroke with the delay pintle type nozzle.

#### 2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 7440. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 7440 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4010:1977, *Road vehicles — Calibrating nozzle, delay pintle type.*

#### 3 Requirements

##### 3.1 Calibrating nozzle and holder assemblies

###### 3.1.1 With single hole orifice plate

The two alternative designs of the calibrating nozzle and holder assembly with a single hole orifice plate are shown in figure 1.

###### 3.1.2 With delay pintle type nozzle

The two alternative designs of the calibrating nozzle and holder assembly with the delay pintle type nozzle specified in ISO 4010 are shown in figure 2.

#### 3.2 Components

The calibrating nozzle and holder assemblies consist of the components specified in 3.2.1 to 3.2.8 with their functionally critical dimensions.

##### 3.2.1 Holder body

The holder body is shown in figure 3. It may have two different executions: with and without vent.

##### 3.2.2 Spring

The spring is shown in figure 4.

##### 3.2.3 Inlet stud with edge filter

The inlet stud with edge filter is shown in figure 5. It may be flow-tested as shown diagrammatically in figure 6. The outlet of the fixture (within the dotted lines) shall be at ambient pressure.

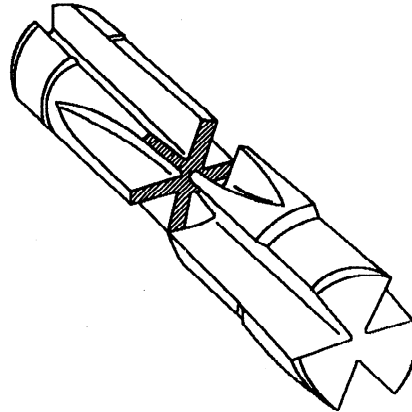




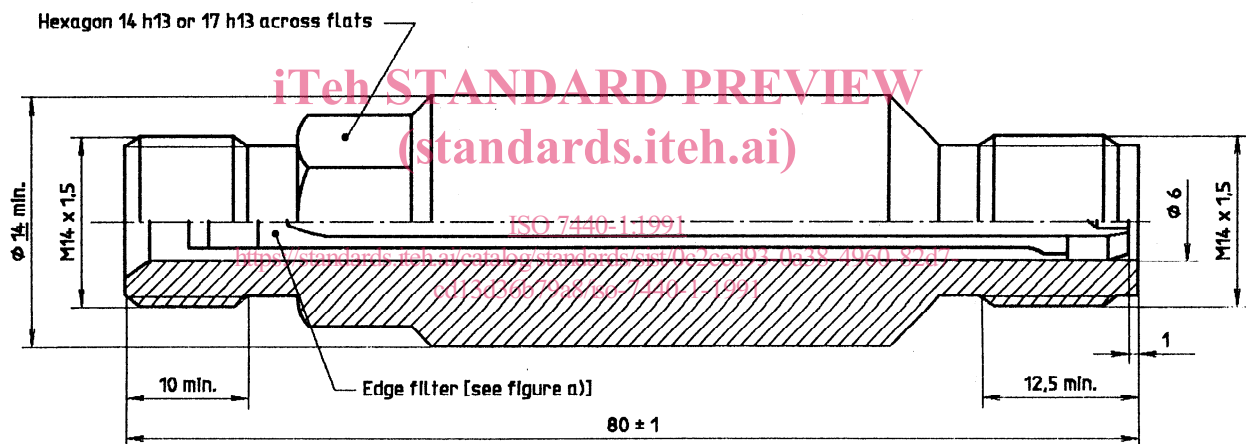




Dimensions in millimetres



a) Edge filter with flutes (schematic)

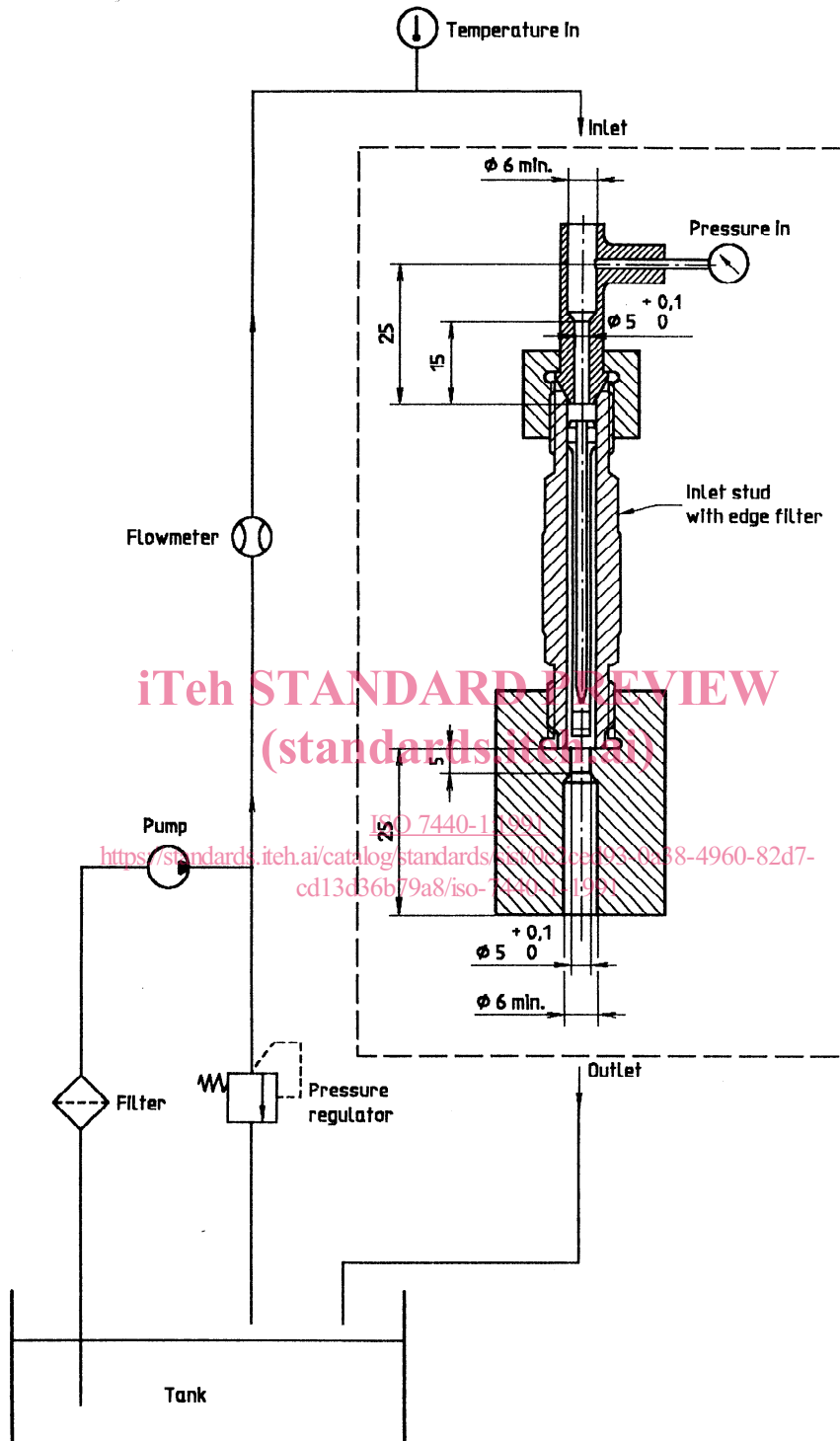


b) Inlet stud with edge filter

Characteristic	Value
Filter clearance (radial)	0,02 mm to 0,033 mm
Filter clearance area	7,3 mm <sup>2</sup> min.
Flow area for three flutes [see figure 5a)]	7,5 mm <sup>2</sup> min.
Internal volume	1 450 mm <sup>3</sup> ± 40 mm <sup>3</sup>
Filter flow at 0,3 MPa (3 bar) pressure <sup>1)</sup>	4 750 cm <sup>3</sup> /min to 6 500 cm <sup>3</sup> /min
Minimum flow of assembled holder body with inlet stud and edge filter at 0,3 MPa (3 bar) pressure <sup>1)</sup>	2 000 cm <sup>3</sup> /min

1) These tests shall be made using calibration fluid as specified in ISO 4113 at 40 °C ± 1 °C and the tolerance of the supply pressure shall be ± 0,03 MPa (0,3 bar).

Figure 5 — Characteristic dimensions and values of inlet stud with edge filter



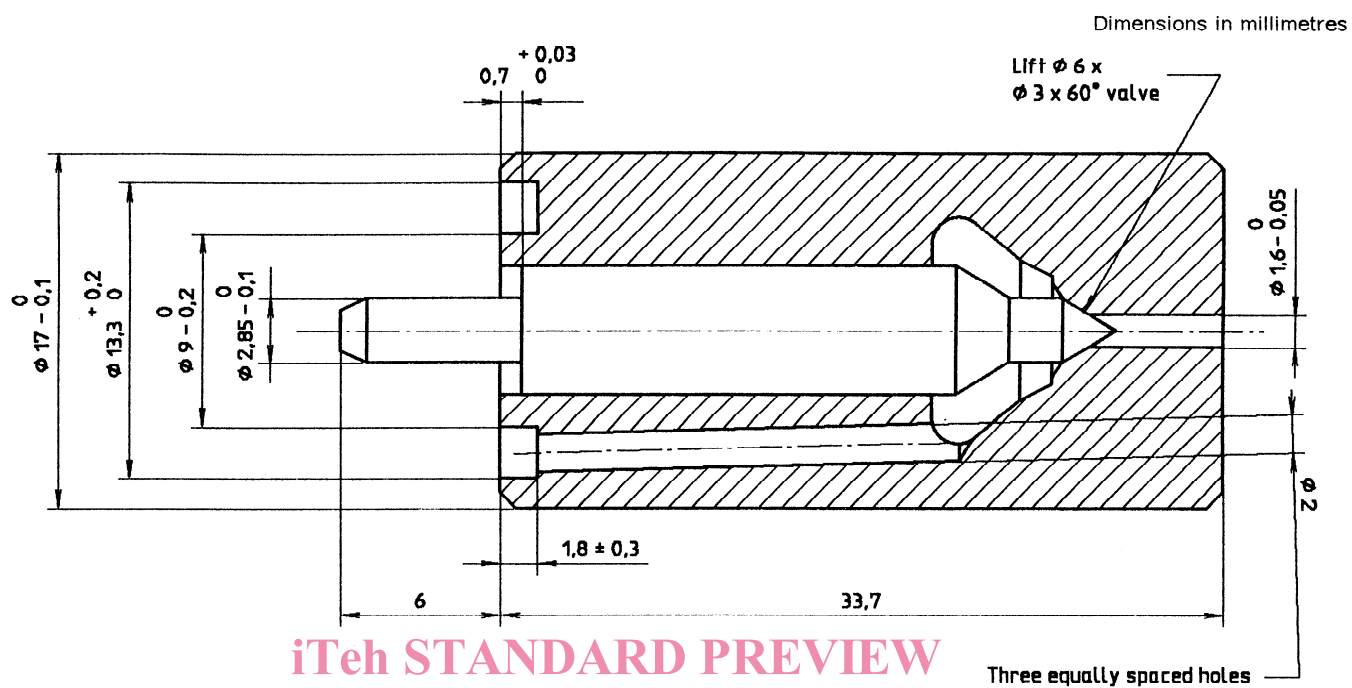
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Figure 6 — Inlet stud flow measuring system

3.2.4 Needle valve assembly

The needle valve assembly is shown in figure 7.



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Figure 7 — Needle valve assembly

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