INTERNATIONAL STANDARD

ISO 22760-1

First edition
2019-12

Road vehicles — Dimethyl Ether (DME) fuel system components —

Part 1: General requirements and definitions

Véhicules routiers — Composants des systèmes de combustible Diméthyle Ether (DME) —
Partie 1: Exigences générales et définitions

Reference number
ISO 22760-1:2019(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 41, *Specific aspects for gaseous fuels*.

A list of all parts in the ISO 22760 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.

Road vehicles — Dimethyl Ether (DME) fuel system components —

Part 1: General requirements and definitions

1 Scope

This document specifies general requirements and definitions of Dimethyl Ether (DME) fuel system components, intended for use on the types of motor vehicles defined in ISO 3833. It also provides general design principles and specifies requirements for instructions and marking.

This document is applicable to vehicles (mono-fuel, bi-fuel or dual-fuel applications) using Dimethyl Ether in accordance with ISO 16861 and ASTM D7901. It is not applicable to the following:

a) fuel containers;

b) stationary gas engines;

c) container mounting hardware;

d) electronic fuel management;

e) refuelling receptacles.

NOTE 1 It is recognized that miscellaneous components not specifically covered herein can be examined to meet the criteria of this document and tested according to the appropriate functional tests.

NOTE 2 All references to pressure in this document are considered gauge pressures unless otherwise specified.

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 22760 (all parts), *Road vehicles — Dimethyl Ether (DME) fuel system components*

ISO 6722-1, *Road vehicles — 60 V and 600 V single-core cables — Part 1: Dimensions, test methods and requirements for copper conductor cables*

ISO 6722-2, *Road vehicles — 60 V and 600 V single-core cables — Part 2: Dimensions, test methods and requirements for aluminium conductor cables*

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
valve
device by which the flow of a fluid may be controlled

3.1.1
manual valve
valve (3.1) which is operated manually

3.1.2
automatic valve
valve (3.1) which is not operated manually

3.1.3
automatic tank valve
automatic valve (3.1.2) rigidly fixed to the tank which controls the flow of *Dimethyl Ether* (3.10) out of the tank to the fuel system

3.1.4
check valve
automatic valve (3.1.2) which allows *Dimethyl Ether* (3.10) to flow in only one direction

3.1.5
excess flow valve
automatic valve (3.1.2) which automatically shuts off, or limits, the *Dimethyl Ether* (3.10) flow when the flow exceeds a set design value

3.1.6
manual tank valve
manual valve (3.1.1) rigidly fixed to the tank

3.1.7
pressure relief valve
PRV
self-closing device which opens to prevent a pre-determined pressure being exceeded

3.1.8
service valve
manual valve (3.1.1) which is closed only during vehicle maintenance

3.2
filter
protective device which removes foreign debris or substances from the gas stream

3.3
fitting
connector used in joining a piping, tubing, or hose system

3.4
flexible fuel line
flexible tubing or hose through which *Dimethyl Ether* (3.10) flows

3.5
rail pressure sensor
device which gives rail pressure feedback to electronic control unit (ECU)

3.6
rail pressure control valve
RPCV
inlet metering valve
IMV
device which performs feedback-based control of common rail pressure by variation of high pressure (above tank pressure) pump's volumetric efficiency in real time

3.7
gas tight housing
device which vents gas leakage to outside the vehicle including the gas ventilation hose, the clear opening of which is at least 450 mm^2

3.8
Dimethyl Ether vehicle
road vehicle powered by *DME* (3.10)

3.8.1
mono-fuel
road vehicle which operates on *Dimethyl Ether* (3.10) only

Note 1 to entry: Also known as "dedicated *Dimethyl Ether vehicle* (3.8)".

Note 2 to entry: In Europe and in India the term mono-fuel also applies to a light duty vehicle with a maximum 15 litre gasoline tank.

3.8.2
bi-fuel
road vehicle that has two independent fuel systems (one of them for DME) and can run alternatively on either fuel, but only on one at a time

3.8.3
dual-fuel
vehicle that has two independent fuel systems (one of them for DME) and can run on both fuels simultaneously

Note 1 to entry: It also may run on one fuel alone.

3.9
fuel pump
device to establish the supply of liquid *DME* (3.10) from the tank to the engine, fuel pump may be located inside or outside tank

3.10
Dimethyl Ether
DME
organic compound with the formula CH_3OCH_3, simplified to C_2H_6O

Note 1 to entry: DME is also known as methoxymethane.

3.11
pressure relief device
PRD
one time use device triggered by excessive temperature or temperature and pressure which vents gas to protect the tank from rupture

3.12
rigid fuel line
metallic tubing which has been designed not to flex in normal operation and through which *Dimethyl Ether* (3.10) flows

3.13
test pressure
pressure to which a component is taken during acceptance testing

3.14
working pressure
maximum pressure to which a component is designed to be subjected to and which is the basis for determining the strength of the component under consideration

3.15
burst pressure
pressure which causes failure and consequential fluid loss through the component envelope

3.16
injector
device for introducing gaseous fuel in liquid phase into the engine or associated intake system

3.17
dry air
air with moisture content such that the dew point of the air at the required *test pressure* (3.13) is at least 11 °C below the ambient test temperature

3.18
hydrostatic pressure
pressure to which a component is taken to verify the structural strength of the component

3.19
level indicator
device which indicates the volumetric fuel level in the tank

3.20
85 % stop valve
device that limits the filling at maximum 85 % of the capacity of the container

3.21
pressure sensor
device which measures pressure

3.22
temperature sensor
device which measures temperature

3.23
rail pressure reducing valve
device which reduces common rail pressure

3.24
multivalve
device consisting of all or part of the accessories of the tank

3.25
power supply bushing
device which establishes an isolated and gas-tight electrical connection through the pressure boundary of the fuel supply container to provide power for the *fuel pump* (3.9), actuators and fuel level sensor

3.26
pressure regulator
device used to control the delivery pressure of gaseous fuel to the engine

4 Construction and assembly

4.1 Components shall be made of materials suitable for use with DME.

4.2 Jointing components shall provide gas tight sealing performance. Where joints are required to be disassembled, it is recommended that any tapered thread fittings be replaced.

4.3 Threads for components attached to the tank shall be clean cut, even, without surface discontinuities, to gauge and conform to International Standards applied to the DME tank threaded ports.

4.4 Components shall comply with the following temperatures ranges, see Table 1:

Table 1 — Temperature range for on-board components

	Engine compartment	On-Board (except engine compartment)	Container accessories
Moderate	−20 °C to 120 °C	−20 °C to 85 °C	−20 °C to 65 °C
Cold	−40 °C to 120 °C	−40 °C to 85 °C	−40 °C to 65 °C

4.5 All non-metallic materials used in seals and diaphragms shall comply with the oxygen ageing test specified in ISO 22760-2.

4.6 All non-metallic materials in contact with Dimethyl Ether shall comply with the non-metallic material immersion test specified in ISO 22760-2.

4.7 All components subject to weather exposure and other corrosive conditions shall be made of corrosion resistant material or otherwise protected and comply with the corrosion resistance tests specified in this document and subsequent applicable part of ISO 22760.

4.8 It is recognised that multifunctional components may be made up of several components, as defined in the relevant part of ISO 22760. Such components shall be examined for conformance to this document and tested according to the appropriate functional tests.

4.9 Automatic tank valves shall be normally closed when not electrically energized. They shall be energized when the engine is running in DME mode and when the ignition switch is in the running mode.

5 Electrical equipment and wiring

5.1 Any openings of the component(s) out of which electrical wiring is coming shall be equipped with means to prevent chafing and abrasion of the wire insulation.

5.2 Electrical equipment and circuit wiring in components shall comply with ISO 6722-1 and ISO 6722-2 with respect to mechanical strength, insulation and current carrying capacity.

5.3 Materials used for electrical construction shall be suitable for their particular application. Electrical insulating material shall provide the necessary mechanical strength, dielectric strength, and resistance to deformation by heat, to safely perform under the expected service and hazardous conditions.

5.4 DME containing components shall not be used to conduct electrical current.