

International Standard



4020/2

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

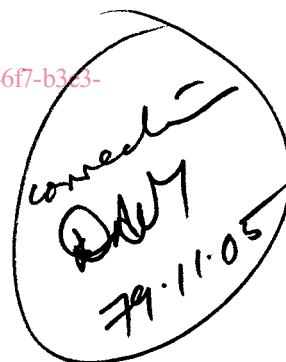
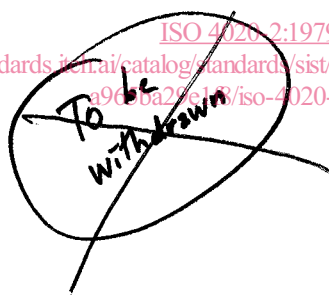
Road vehicles — Fuel filters for automotive compression ignition engines — Part 2 : Test values and classification

Véhicules routiers — Filtres à combustible pour moteurs à combustion interne à allumage par compression — Partie 2 : Valeurs d'essai et classification

First edition — 1979-06-01

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UDC 621.436-732

Ref. No. ISO 4020/2-1979 (E)

Descriptors : road vehicles, internal combustion engines, diesel engines, fluid filters, classification, test results.

Price based on 4 pages

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4020/2 was developed by Technical Committee ISO/TC 22, *Road vehicles*, and was circulated to the member bodies in March 1977.

It has been approved by the member bodies of the following countries :

Austria	India	Romania
Belgium	Iran	South Africa, Rep. of
Brazil	Italy	Spain
Bulgaria	Japan	Sweden
Czechoslovakia	Korea, Rep. of	Switzerland
Egypt, Arab Rep. of	Mexico	Turkey
France	New Zealand	USSR
Germany, F. R.	Philippines	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Australia
United Kingdom

Road vehicles — Fuel filters for automotive compression ignition engines —

Part 2 : Test values and classification

1 SCOPE

This International Standard specifies the test values and the classification of fuel filters. Test methods are specified in ISO 4020/1.

2 FIELD OF APPLICATION

This International Standard applies to fuel filters provided for motor vehicles with diesel engines and for test installations for injection equipment.

This International Standard is limited to filters having a rated flow of up to 200 l/h.

3 REFERENCE

ISO 4020/1, *Road vehicles — Fuel filters for automotive compression ignition engines — Part 1 : Test methods.*

4 FILTER TYPES — APPLICATION OF TESTS

Test* \ Type	Fine filters	Prefilters	Strainers	Sedimenters
6.1	x	Optional	Optional	Optional
6.2	Optional	Optional	—	—
6.3	x	x	x	x
6.4	x	x	—	—
6.5	Optional	Optional	—	—
6.6	x	Optional	Optional	—
6.7	x	x	x	x
6.8	x	x	Optional	Optional
6.9	Optional	Optional	Optional	Optional

* Refers to tests specified in ISO 4020/1.

NOTE — Pressures are indicated in bars; to obtain them in kPa, multiply by 10^2 (1 bar = 10^5 Pa).

5 REQUIREMENTS

Each test shall be carried out on at least four samples. However, for tests 6.8 and 6.9 the number of samples to be tested shall be agreed between engine manufacturer and filter manufacturer. In accordance with general experimental practice, obviously rogue points in tests 6.4 and 6.5 shall be ignored.

5.1 Test of cleanliness (6.1*)

The limits shall be agreed between the filter manufacturer and the engine manufacturer.

5.2 Bubble test (6.2*)

This test is useful for internal production quality control. The limit value of air for fine filters is 200 cm³/min; for "depth type" prefilters, 500 cm³/min; no limit value is specified for the other types of prefilters.

5.3 Test for pressure difference (6.3*)

The pressure difference measured could serve for comparison of new and used filters of the same make and type.

5.4 Test for particle retention (6.4*)

See paragraph 6.1 of this International Standard.

5.5 Test for filter life (6.4*)

See paragraph 6.2 of this International Standard. The corrected values may serve for comparison purposes.

5.6 Test for water separation efficiency (6.5*)

See paragraph 6.4 of this International Standard.

5.7 Collapse/burst test of the filter element (6.6*)

See paragraph 6.5 of this International Standard.

5.8 Burst test of complete filters (6.7*)

See ISO 4020/1.

5.9 Pulsating pressure fatigue test (6.8*)

See ISO 4020/1.

5.10 Vibration resistance fatigue test (6.9*)

See ISO 4020/1.

6 FILTER CATEGORIES

The filter performance is defined by a six-figure number. Each individual figure, representing a category, shall be determined by the most unfavourable result obtained for the four or more filters tested.

* Refers to tests specified in ISO 4020/1.

6.1 Particle retention efficiency

%	≥ 95	≥ 90 and < 95	≥ 80 and < 90	≥ 70 and < 80	≥ 60 and < 70	≥ 20 and < 60	< 20
Category	1	2	3	4	5	6	7

To categorize filter efficiency, two figures shall be allocated.

For filters with a total test time of more than 20 min, the first figure shall be derived from the result nearest to 10 % of the test time. For filters with a total test time of less than 20 min, the first figure shall be derived from the efficiency result at the 2 min point.

The second figure shall be that corresponding to the average efficiency result obtained from one filter test. To evaluate the test results for allocating a category, the figures to be chosen need not be derived from the same filter.

6.2 Filter life

Life min	< 10	≥ 10 and < 20	≥ 20 and < 30	≥ 30 and < 40	≥ 40 and < 60
Category	1	2	3	4	5

Life min	≥ 60 and < 80	≥ 80 and < 100	≥ 100 and < 150	≥ 150
Category	6	7	8	9

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6.3 Flow rate at which filter is tested

Test flow rate l/h	10	25	50	75	100	125	150	175	200
Category	1	2	3	4	5	6	7	8	9

The test flow rate [ISO 4020/1, sub-clause 6.4.3.4 b)], shall be specified by the filter manufacturer in accordance with the table above.

6.4 Water separation efficiency

%	≥ 95	≥ 90 and < 95	≥ 80 and < 90	≥ 70 and < 80	≥ 60 and < 70	≥ 50 and < 60	< 50
Category	1	2	3	4	5	6	7

Test results according to ISO 4020/1 shall be converted into percentage of water applied and quoted as retention efficiency.

6.5 Pressure difference for collapse/burst test of the filter element

Pressure differential bar	< 0,5	≥ 0,5 and < 1	≥ 1 and < 1,5	≥ 1,5 and < 2
Category	1	2	3	4

Pressure differential bar	≥ 2 and < 2,5	≥ 2,5 and < 3	≥ 3
Category	5	6	7

7 EXPLANATION OF FILTER RATING NUMBERS

The following is a typical example of a filter rating number

2 3 3 3 2 7
a₁ a₂ b c d e

This defines a filter with

a₁ : Retention efficiency of particles : $\geq 90\%$ and $< 95\%$
at 10 % test time or at 2 min.

a₂ : Average retention efficiency of particles : $\geq 80\%$
and $< 90\%$.

b : Filter life : ≥ 20 min and < 30 min.

c : Test flow rate : 50 l/h.

d : Water separation : $\geq 90\%$ and $< 95\%$.

e : Burst/collapse pressure difference of filter element :
 ≥ 3 bar.

A zero (0) in the filter rating number indicates that the
corresponding test is not applicable or was not carried out.

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