DRAFT INTERNATIONAL STANDARD

ISO/DIS 21634

ISO/TC **31**	Secretariat: **ANSI**
Voting begins on: **2018-11-30**	Voting terminates on: **2019-02-22**

Rubber flaps for automotive vehicles — Technical requirements and test methods

ICS: 83.160.10

This document is circulated as received from the committee secretariat.

Reference number
ISO/DIS 21634:2018(E)

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Published in Switzerland

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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 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 31, Tyres, rims and valves.

Rubber flaps for automotive vehicles — Technical requirements and test methods

1 Scope

This International Standard is applicable to rubber flaps which are used in tube type tyres in automotive vehicles (excluding 2/3 wheelers).

The purpose of this standard is to insure that vehicles (excluding 2/3 wheelers) using tube type tyres that require flaps are protected against damages to the inner tube caused by the rim or tyre.

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 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 48, *Rubber, vulcanized or thermoplastic — Determination of Hardness (Hardness between 10 IRHD and 100 IRHD)*

ISO 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 4209-2, *Truck and bus tyres and rims (metric series) — Part 2: Rims*

ISO 4250-3, *Earth-mover tyres and rims — Part 3: Rims*

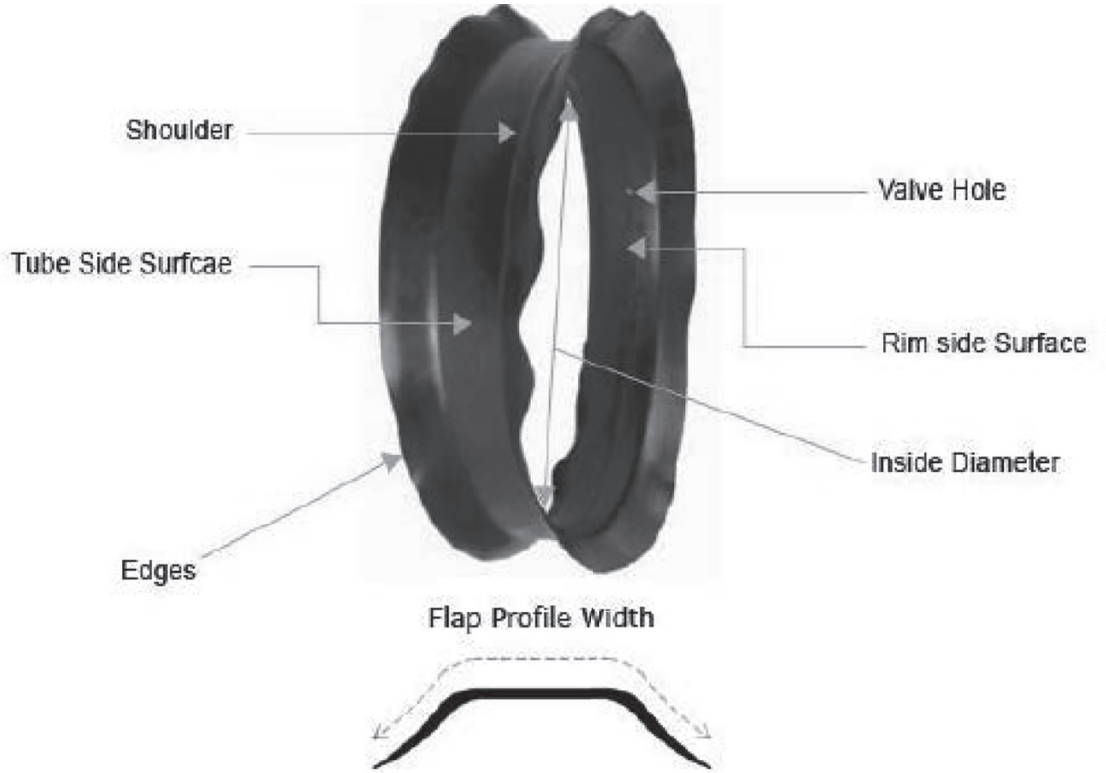
3 Materials, form and fit

3.1 Flaps shall be manufactured, using a suitable compound of natural or synthetic rubber or a blend thereof, to the design requirements (see 3.2 and 3.3) and shall be of the endless type.

3.2 Flaps shall be free from flaws and shall be suitable for tyre/rim/inner tube combinations, for which the minimum widths are given in Annex A.

3.3 The inner diameter of flap determined by measuring the circumference of the flap surface coming in contact with rim at centre region, using an inextensible tape, shall be more than the nominal rim diameter (i.e. nominal rim diameter code marked on the flap × 25.4 mm) but less than nominal rim diameter plus 25 mm. To determine the circumference, paste the inextensible tape in the inner surface, then cut the tape and measure the length of the tape using a measuring tape of least count 1.0 mm. Calculate the diameter by dividing the circumference so obtained by 3.14159.

NOTE Other equivalent measurement methods may be used.



3.4 A valve hole shall be provided in each flap of diameter at least 12 mm depending on the tube valve stem. It shall be positioned at the centre of the flap sectional width except where meant for fitment to rims having an off – central valve hole. A working tolerance of ±8 mm is allowed on the design location of the valve hole in the flap.

3.5 Indicative main dimensions (thicknesses) of finished tyre flaps (in mm).

NOTE The thickness of flap is specified by category and size. However, the thickness is determined by know-how of each company such as rubber properties and/or severity in market. Therefore these values are indicative and manufacturers may use their own dimensions as agreed with tyre manufacturer.

Light Truck

Section Width	Centre Thickness	Edge Thickness (Max.)
6.0 to 7.50	4.0	1.0
>7.50	4.0	1.5

Truck

Section Width	Centre Thickness	Edge Thickness (Max.)
7.00 to 8.25	4.0	1.5
9.00	4.5	1.5
10.00	5.0	1.5
11.00	5.5	1.5
12.00	6.5	1.5
>12.00	8.0	1.5

3) OTR / Earthmoving

Section Width	Centre Thickness	Edge Thickness (Max.)
Up to 10.00	4.0	1.5
13.00/14.00 – 20	5.0	1.5
13.00/14.00/15.00 – 25	6.0	1.5
13.00/14.00/16.00 – 24	6.5	1.5
16.00 – 25	7.0	2.0
17.5 – 25	7.5	2.0
18.00 – 24/25,20.5-25,23.0-26,23.5-25	8.0	2.0
26.5-25	9.0	2.0

(Other sizes can be added to the table)

NOTE The flap manufacturer can use different values if that is decided in agreement with the tyre manufacturer.

3.6 Around the valve hole additional thickness may be provided on the flap to prevent the flap from flowing in to the valve slot on the rim. This may be provided in the form of additional thickness of rubber, layers of rubberized fabric and/or metal or plastic strips – the total thickness in the region shall be less than valve bent height of the tube that is used along with the flap.

4 Designations

Designation shall include the nominal rim diameter code and flap width code

(See Annex A)

5 Physical tests and other requirements

5.1 Tensile Strength and Elongation:

The test piece having ‘type -1 / type S2 dumb bell shape’ shall be prepared from the flap according to ISO 37/ ASTM D412/ DIN 53504 . Dumb bells of type -1 punched directly from the flap from a portion having best possible flatness may also be used for testing.

5.2 Hardness

The hardness shall be measured at or on test piece cut from centre of the flap as per test method ISO 48/ ASTM D2240.

5.3 Ageing

The dumb bells shall be subjected to ageing in an air oven at 100° ± 2° C for 24 hours according to ISO 188. (Higher aging temperatures such as 100 - 120° ± 2° C; or 98° C minimum is also allowed).

5.4 Properties

The tensile strength, elongation and hardness before and after ageing shall as given below: -

NOTE Flaps with different properties may be used, as long as they ensure the required function of protecting the inner tube if that is decided in agreement with the tyre manufacturer.

a) Properties before heat ageing

   i) Hardness, Shore A 60 ± 10

ii) Tensile strength, MPa 9.0(Min.)

iii) Elongation at break, % 300 Min.

b) Properties after heat Ageing:

i) Hardness Shore A

ii) Tensile strength, MPa

iii) Elongation at break

±15 units of actual measured value

± 30% of actual measured value

-50% Max. of actual measured value

5.5 Joint Adhesion Strength:

5.5.1 Moulded Flap: As there is no joint in the moulded flaps, no need to test joint strength.

5.5.2 Flap with Overlap Joint: Where the joint is visible in a finished flap, the adhesion strength at the joint may be checked and shall be not less than 1Mpa, when tested in accordance with the test procedure outlined in Annex B.

6 MARKING

The flaps shall be permanently and legibly marked with the following:

a) Manufacturer's name or trade name

b) Flap size designation as in clause 4 above

c) The applicable tyre size designation(s) and rim combination(s) (optional).

d) Indication of month and year of manufacture as per scheme given in Annex C

Annex A

(Clauses 3.2 and 4)

Flap widths and flap width codes

Minimum width of flaps and the corresponding width codes shall be as given in Table 1

Table 1 — Minimum width of Flaps and Flap Width Codes

Sl.No.	Flap Width Code	Nominal Tyre Section (Where Code not Used)	Flap Width Min.(mm)
i)*	K	Marking optional	100
	KM		124
	M		153
	N		176
	RR		207
	V		225
ii)**	– 18.00	To be followed by the nominal rim diameter size code	350
	– 21.00		426
	– 24.00		426
	– 26.5		565

(Other sizes may be added to the table)

NOTE 1 When Flap width code is used:

Flap width codes are preceded by the nominal rim diameter size code.

Examples

*A flap of 153mm width and meant for fitment to a rim of nominal diameter code 20 is designated as '20M'.

**A flap of 426 mm width and meant for fitment to a rim of nominal diameter code 24 and for tyre having section width code 18.00 is designated as '18.00-24 426'.

NOTE 2 Flap width shall be measured using a flexible tape, in its vulcanized shape, over that side of the flap which comes adjacent to the rim during use.

The flap widths are the minimum acceptable widths for the tyre on the recommended or alternate rim sizes indicated in ISO 4209-2 and ISO 4250-3.