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## **Aircraft — Tow bar attachment fittings interface requirements —**

### **Part 1: Main line aircraft**

*Aéronefs — Exigences d'interface des ferrures d'attache de barre de tractage —*

*Partie 1: Aéronefs de ligne*



Reference number  
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 8267-1 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 9, *Air cargo and ground equipment*.

This first edition of ISO 8267-1, together with ISO 8267-2, cancels and replaces ISO 8267:1997, which has been technically revised.

ISO 8267 consists of the following parts, under the general title *Aircraft — Tow bar attachment fittings interface requirements*:

- *Part 1: Main line aircraft*
- *Part 2: Regional aircraft*

## **Introduction**

The aim of this part of ISO 8267 is to standardize main line aircraft tow bar attachment fittings according to aircraft mass category (which determines tow bar forces), so that one tow bar can be used for all aircraft within that mass category.

Throughout this part of ISO 8267, the minimum essential criteria are identified by the use of the key-word 'shall'. Recommended criteria are identified by the use of the key-word 'should' and, while not mandatory, are considered to be of primary importance in providing safe aircraft towing arrangements. Deviation from recommended criteria should only occur after careful consideration, extensive testing, and thorough service evaluation have shown alternative methods to be satisfactory.

# Aircraft — Tow bar attachment fittings interface requirements —

## Part 1: Main line aircraft

### 1 Scope

This part of ISO 8267 specifies the interface requirements for tow bar attachment fittings on the nose gear (when towing operations are performed from the nose gear) in conventional tricycle type landing gears of commercial civil transport passenger and freight aircraft.

Its purpose is to achieve tow bar attachment fittings interface standardization by aircraft mass category (which determines tow bar forces) in order to ensure that a single type of tow bar with a standard connection can be used for all aircraft types within or near that mass category, so as to assist operators and airport handling companies in reducing the number of different tow bar types used.

This part of ISO 8267 is applicable to all new models of main line aircraft within the specified maximum ramp mass range, entering service or designed after its date of publication.

This part of ISO 8267 is applicable to main line commercial transport aircraft of airworthiness certified under FAR/JAR Parts 25 with a maximum ramp mass of > 50 000 kg (110 000 lb).

It does not apply to aircraft of airworthiness certified under FAR/JAR Parts 25 but with a maximum ramp mass of  $\leq$  50 000 kg (110 000 lb), which are covered by ISO 8267-2.

Where a family of existing or contemplated aircraft types bridges two mass categories, use a single tow bar attachment fitting interface for all of them, and consider the use of the standard dimensions for the higher mass category throughout the family.

**NOTE** As far as practical, this part of ISO 8267 was defined in order to be compatible with as many existing aircraft types as possible in the mass category concerned.

### 2 Normative references

The following referenced documents are indispensable for the application 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.

Federal Aviation Regulations (FAR) 14CFR Part 25, *Airworthiness Standards: Transport category airplanes*, paragraph 25.509, Towing loads <sup>1)</sup>

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1) FAR Part 25 constitute the USA government transport aircraft airworthiness regulations, and can be obtained from the following address:

US Government Printing Office, Mail Stop SSOP, Washington DC 20402-9328, USA.

Joint Airworthiness Regulations (JAR) Part 25, *Airworthiness Standards: Transport category aeroplanes*, paragraph 25.509, Towing loads <sup>2)</sup>

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1

##### **main line aircraft**

civil passenger and/or freight transport aircraft with a maximum ramp mass of > 50 000 kg (110 000 lb)

#### 3.2

##### **regional aircraft**

civil passenger and/or freight transport aircraft with a maximum ramp mass of > 10 000 kg (22 000 lb) and ≤ 50 000 kg (110 000 lb)

#### 3.3

##### **maximum ramp mass**

##### **MRW**

maximum mass allowable for an aircraft type when leaving its parking position either under its own power or towed, comprising maximum structural take-off mass (MTOW) and taxiing fuel allowance

### 4 Requirements

#### 4.1 Fitting location

The fitting shall be designed to enable straightforward attachment of the tow bar at the front and, where applicable, the rear of the aircraft nose landing gear for push/pull towing operations.

NOTE An axle fitting may be used in the event of two-wheel nose landing gear. This is acceptable providing the towing loads do not exceed those specified in this part of ISO 8267 and the aircraft is designed accordingly.

#### 4.2 Towing loads

**4.2.1** The allowable towing forces on the nose landing gear shall be specified by the aircraft manufacturer and shall conform to 4.2.2 to 4.2.6.

**4.2.2** The towing loads shall be applied to the tow bar attachment fittings and to the structure to which they are immediately attached.

**4.2.3** The towing loads specified in 4.2.6 shall be considered separately. These loads shall be applied at the towing fittings and shall act parallel to the ground. In addition,

- a) a vertical load factor equal to 1,0 shall be considered as acting at the centre of gravity of the aircraft, and
- b) the shock struts and tyres shall be in their stationary positions.

**4.2.4** If  $M_r$  is the design maximum ramp mass of the aircraft and  $g$  is the mean acceleration due to gravity, the towing load,  $F_{TOW}$  (N), is equal to  $0,15 M_r \times g$ .

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2) JAR Part 25 constitute the European governments' transport aircraft airworthiness regulations, and can be obtained from the following address:

JAA Headquarters, Saturnsstraat 8-10, P.O. Box 3000, NL 2130 Hoofddrop, Netherlands.

4.2.5 With regard to towing loads where the specified angle of swivel cannot be reached, the maximum obtainable angle shall be used.

4.2.6 The specified towing loads are given in Table 1.

**Table 1 — Specified towing loads**

Position of the nose gear	Magnitude	Load
		Direction
Swivelled forward	$1,0 F_{TOW}$	{ Forward Aft
Swivelled aft	$1,0 F_{TOW}$	{ Forward Aft
Swivelled 45° from forward	$0,5 F_{TOW}$	{ Forward <sup>a</sup> Aft <sup>a</sup>
Swivelled 45° from aft	$0,5 F_{TOW}$	{ Forward <sup>a</sup> Aft <sup>a</sup>

<sup>a</sup> Parallel and midway between the planes of the wheels.

### 4.3 Aircraft mass categories

See Table 2.

**Table 2 — Aircraft mass categories**

Masses in kilograms (Values in pounds in parentheses)

Category	Maximum ramp mass, $M_r$
I	$50\ 000\ (110\ 000) < M_r \leq 100\ 000\ (220\ 000)$
II	$100\ 000\ (220\ 000) < M_r \leq 180\ 000\ (400\ 000)$
III	$180\ 000\ (400\ 000) < M_r \leq 350\ 000\ (770\ 000)$
IV	$350\ 000\ (770\ 000) < M_r \leq 500\ 000\ (1\ 100\ 000)$
V	$M_r > 500\ 000\ (1\ 100\ 000)$

The tow bar attachment fitting category shall be selected in such a way that no change of type will become necessary during aircraft development. Aircraft of a design which is near the upper limit of a mass category may be classified in the next higher category to allow for mass growth (see Clause 1).

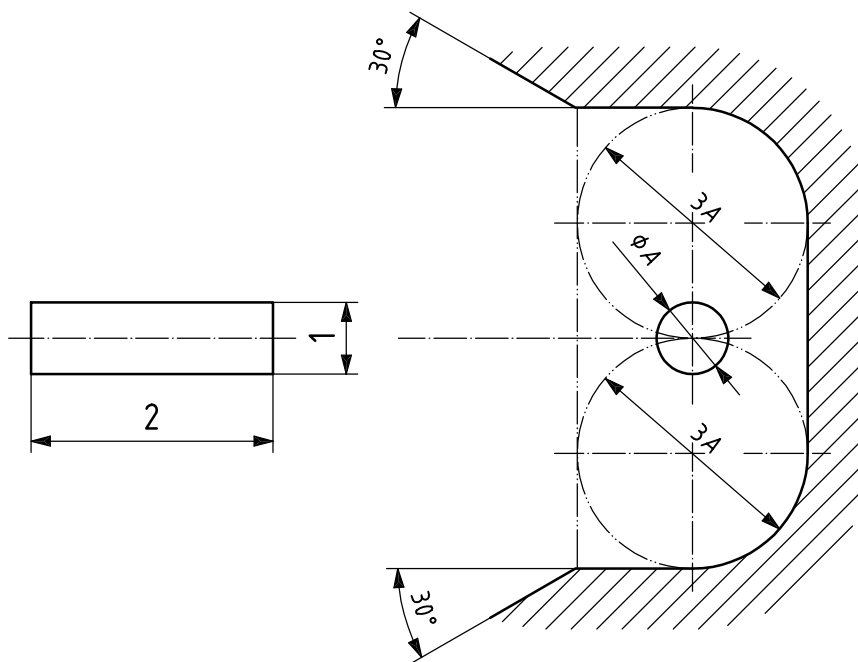
4.4 Fitting configuration, dimensions and clearances

The standard configuration of the attachment fitting shall be a horizontal cylindrical pin with the dimensions given in Figure 1 and in Table 3.

Table 3 — Dimensions of the pin

Dimensions in millimetres (Values in inches in parentheses)

Dimensions	Category				
	I	II	III	IV	V
Diameter, <i>A</i>	38,10	44,45	57,15	63,50	85,85
	(1,50)	(1,75)	(2,25)	(2,50)	(3,38)
Length, <i>B</i>	113,03	133,35	184,15	203,20	203,20
	(4,45)	(5,25)	(7,25)	(8,00)	(8,00)



Required space envelope for clearance: 3*A* above and below the towing spool centre.

Key

- 1 diameter *A*  $\begin{matrix} 0 \\ -0,125 \end{matrix}$  mm  $\left( \begin{matrix} 0 \\ -0,005 \end{matrix} \right)$  in
- 2 length *B*  $\begin{matrix} +0,5 \\ 0 \end{matrix}$  mm  $\left( \begin{matrix} +0,020 \\ 0 \end{matrix} \right)$  in

Figure 1 — Dimensions of the pin



#### 4.5 Tow bar fit

The design of the tow bar device that clamps to the horizontal cylindrical pin shall be such that it

- grips the pin uniformly over 96 % to 98 % of the length (dimension  $B$ );
- is adjustable in order to provide positive engagement on the pin when locked.

## Bibliography

- [1] ISO 8267-2, *Aircraft — Tow bar attachment fittings interface requirements — Part 2: Regional aircraft*

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