AEROSPACE RECOMMENDED PRACTICE

ARP1915™	REV. E
Issued 1985-03 Revised 2016-05 Reaffirmed 2021-04 Superseding ARP1915D	

(R) Aircraft Tow Bar

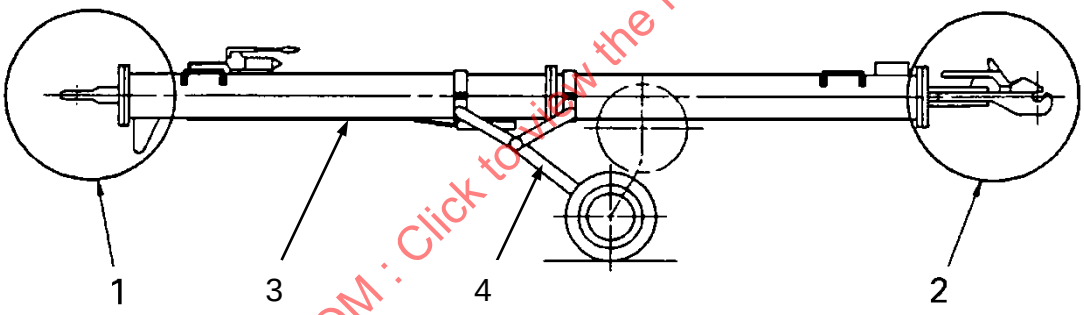
RATIONALE

Complete revision (chapters 1 to 7) for harmonization with ISO 9667. Minor editorial and figures update.

1. SCOPE

This SAE Aerospace Recommended Practice (ARP) specifies dimensional and physical requirements of tow bar connections to tractor and aircraft (see Figure 1). It is applicable to all types of commercial transport category aircraft tow bar.

The purpose of this SAE Aerospace Recommended Practice (ARP) is to standardize tow bar attachments to airplane and tractor according to the mass category of the towed aircraft, so that one tow bar head with different shear levels can be used for all aircraft that are within the same mass category and are manufactured in compliance with AS1614 or ISO 8267.



Key

1 Tractor connection
2 Aircraft connection
3 Tow bar body
4 Tow bar undercarriage

Figure 1 - Tow bar

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https://www.sae.org/standards/content/ARP1915E

2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

ARP1247 Aircraft Ground Support Equipment - General Requirements

AIR1375 Minimum Safety Requirements for Special Purpose Airline Ground Support Equipment

AS1614 Main Line Aircraft Tow Bar Attach Fitting Interface

AS5488 Regional Aircraft Towbar Attach Fitting Interface

2.2 ISO Publications

Available at http://webstore.ansi.org/.

ISO 8267-1 Aircraft - Towbar attachment fittings interface requirements - Part 1: Main line aircraft

ISO 8267-2 Aircraft - Towbar attachment fittings interface requirements - Part 2: Regional aircraft

ISO 9667 Aircraft ground support equipment - Towbars

2.3 European Standards

Available from CEN, Comité Européen de Normalisation, rue de Stassart 36, B1050 Brussels, Belgium, TEL: 32 2 550 08 11 or any European national standardization institutes, members of C.E.N.

EN 12312-7 Aircraft ground support equipment - Specific requirements - Part 7: Aircraft movement equipment

NOTE: Applicable to tow bars to be operated in Europe, as one recognized means to demonstrate compliance with the E.U. Machinery Directive.

2.4 IATA Publications

Available from International Air Transport Association, Publications Assistant, 800 Place Victoria, P.O. Box 113, Montreal, Quebec H4Z 1M1, Canada, Tel: 1-514-874-0202, www.iata.org.

Airport Handling Manual AHM 958 Functional specification for an aircraft tow bar

Airport Handing Manual AHM 916 Basic requirements for towing vehicle interface (hitch)

2.5 Airworthiness Standards

Federal Aviation Regulations (FAR) 14 CFR Part 25, Airworthiness Standards : Transport category airplanes, paragraphs 25.301, Loads, and 25.509, Towing loads). www.faa.gov

European Aviation Safety Agency Certification Specifications and Acceptable Means of Compliance for Large Aeroplanes EASA CS-25, paragraphs 25.301, Loads, 25.509, Towing loads, 25.745(d), Nose-wheel steering, and AMC 25.745(d). www.easa.europa.eu.

2.6 Airframe Manufacturers: Aircraft Characteristics for Airport Planning Manual, Maintenance Facility and Equipment Planning Document or equivalent for each aircraft type.

3. AIRCRAFT MASS CATEGORIES

The aircraft mass categories shall be in accordance with AS1614 /AS5488 or ISO 8267.

A given tow bar type may be used on several aircraft types within the same AS1614 or ISO 8267 weight category, providing

- their nose landing gear towing interface meets the AS1614 /AS5488 or ISO 8267 requirements for that category
- the protective provisions shall be chosen to meet or exceed the minimum requirement for each aircraft

4. TOW BAR GENERAL REQUIREMENTS

As a safety feature the tow bar (body or head holding section or retaining feature) shall be designed to sustain at least 150% of the protective device(s) functioning point or as otherwise specified by the customer.

The tow bar, when unladen, shall be both towable and stable at speeds up to 25 km/h (15 mph). The maximum towing speed shall be suitably placarded.

5. AIRCRAFT CONNECTION

5.1 Dimension of Tow Bar Connection to Aircraft

The standard configuration of the tow bar connection to the aircraft shall be compatible with the horizontal pin of the aircraft tow bar attachment fitting as specified in AS1614/AS5488 or ISO 8267.

NOTE: Several common aircraft types designed prior to publication of AS1614 /AS5488 or ISO 8267 still use non standard nose gear tow bar attachment fittings. Refer to the aircraft type manufacturer's documentation for interface requirements.

5.2 Aircraft Interface Requirements

The design of the tow bar aircraft connection device that clamps to the horizontal cylindrical pin of the aircraft:

- shall grip the pin uniformly over 96 to 98% of its length of the grip area;
- shall be designed to eliminate inadvertent disengagement of the tow bar during towing or pushing operations;
- shall be designed to provide adequate clearance during engagement and disengagement of the tow bar from the aircraft connection (allowable space envelope for clearance is specified in AS1614/AS5488 or ISO 8267);
- should be adjustable to provide pressure on the pin when locked.

NOTE: Several common aircraft types designed prior to publication of AS1614/AS5488 or ISO 8267 still use non standard nose gear tow bar attachment fittings. Refer to the aircraft type manufacturer's documentation for interface requirements.

5.3 Aircraft Protective Provisions

5.3.1 General Requirements

The tow bar should be so constructed to prevent any item from becoming a Foreign Object Damage (FOD) hazard, e.g., broken parts of the shear pin and any bushings always remain captive to prevent aircraft engine ingress and tire damage.

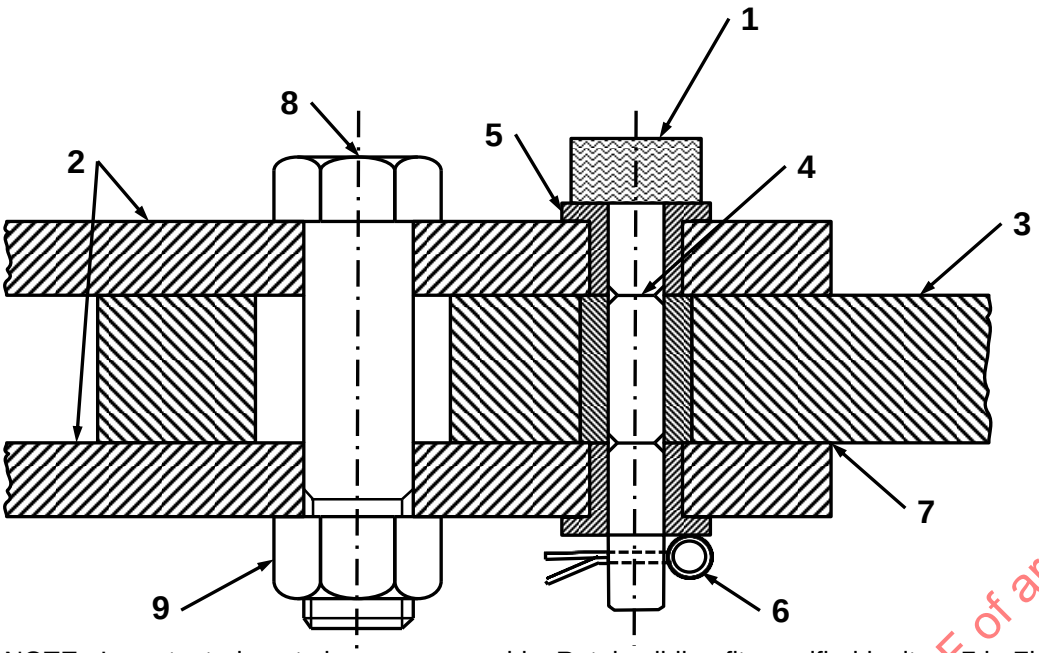
The tow bar shall incorporate a device or devices, such as shear pins (typically two, respectively for push/pull and torsion protection), to protect the aircraft from damage due to towing which shall:

- relieve fore/aft and torsional towing forces applied to the aircraft nose gear through the tow bar which exceed the maximum force recommendations of the aircraft manufacturer by means of a shock absorbing device that is designed to function at values below tow bar design values;
- have an energy-absorbing device in order to limit loads induced in the landing gear that shall be designed to function at values beyond towbar design values;
- simultaneously alert the tow tractor operator, audibly, visually, or both, that a device has been actuated;
- be replaceable or repairable with a minimum of effort;
- Transfer overload to a retaining feature preventing separation and therefore loss of control of the aircraft from the towing vehicle. The retaining feature shall allow free rotation on ±45 degrees about aircraft centerline at the retaining fastener. See Figure 2 example.

5.3.2 Shear Pins

If shear pins are used as a protective device, they shall:

- discourage hazardous replacement and encourage the exclusive use of manufacturer’s original parts and be clearly identified for their specific usage.
- shear at or below the nominal force specified by the aircraft manufacturer(s),
- have a functioning point within a relative tolerance of (+0/-10%).
- have a specific predetermined shear plane provided with hardened steel bushings (see Figure 2).



1 Shear pin
2 Head retention plates
3 Head
4 Preset shear plane
5 Hardened steel bushings
6 Retaining Clip
7 Sliding fit
8 Head retention bolt
9 Self-locking nut

NOTE: Important, do not clamp up assembly. Retain sliding fit specified by item 7 in Figure 2 so as not to increase shear value.

Figure 2 - Typical shear pin/bushing configuration

5.3.3 Marking

The tow bar shall be clearly and indelibly marked to identify the allowable type(s) of aircraft and maximum towing force.

The vendor shall rivet a metal nameplate to the tow bar, specifying:

a. Vendor name and trademark

b. Type designation or model

c. Serial number

d. Date of manufacture

e. Special characteristics

The tow bar shall be either white, yellow, or of any other high visibility colour to enhance its visibility in adverse conditions.

6. TRACTOR CONNECTION

The attachment on the tow bar for connection to the tractor

- shall be as shown in Figure 3 for all mass categories as specified in Section 3.
- shall contain a rotating tow bar eye.