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Aircraft ground support equipment - Specific requirements - Part 7: Air-craft movement equipment

Luftfahrt-Bodengeräte - Besondere Anforderungen - Teil 7: Luftfahrzeug-Schleppgerät

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NORME EUROPÉENNE

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Aircraft ground support equipment - Specific requirements - Part 7: Air-craft movement equipment

Matériel au sol pour aéronefs - Exigences particulières - Partie 7: Matériels de déplacement des aéronefs

Luftfahrt-Bodengeräte - Besondere Anforderungen - Teil 7: Luftfahrzeug-Schleppgerät

This European Standard was approved by CEN on 13 June 2005 and includes Amendment 1 approved by CEN on 1 March 2009.

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Foreword

This document (EN 12312-7:2005+A1:2009) has been prepared by Technical Committee CEN/TC 274 "Aircraft ground support equipment" the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2009-03-01.

This document supersedes EN 12312-7:2005.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ▌A1⟩ ⟨A1▌.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of EU Directive(s).

▌A1⟩ For relationship with EU Directives, see informative Annexes ZA and ZB, which are integral parts of this document. ⟨A1▌

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Part 1: Passenger stairs
Part 2: Catering vehicles
Part 3: Conveyor belt vehicles
Part 4: Passenger boarding bridges
Part 5: Air-craft fuelling equipment
Part 6: Deicers and deicing/antiicing equipment
Part 7: Aircraft movement equipment
Part 8: Maintenance stairs and platforms
Part 9: Container/Pallet loaders
Part 10: Container/Pallet transfer transporters
Part 11: Container/Pallet dollies and loose load trailers
Part 12: Potable water service equipment
Part 13: Lavatory service equipment
Part 14: Disabled/Incapacitated passenger boarding equipment
Part 15: Baggage and equipment tractors
Part 16: Air start equipment
Part 17: Air conditioning equipment
Part 18: Nitrogen or Oxygen units
Part 19: Aircraft jacks, axle jacks and hydraulic tail stanchions
Part 20: Ground power equipment

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Introduction

This European Standard specifies health and safety requirements, as well as some functional and performance requirements for aircraft movement equipment intended for use on all aircraft types commonly in service in civil air transport.

The minimum essential criteria are considered to be of primary importance in providing safe, serviceable, economical and practical aircraft movement equipment. Deviations from the recommended criteria should occur only after careful consideration, extensive testing, risk assessment and thorough service evaluation have shown alternative methods or conditions to be satisfactory.

This European Standard is a Type C standard as stated in EN ISO 12100.

NOTE Designers of towbarless tractors should take into accounts the requirements of SAE published documents (see Bibliography).

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this European Standard.

When provisions of this type C standard differ from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.

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1 Scope

This European Standard specifies the technical requirements to minimise the hazards listed in Clause 4 which can arise during the commissioning, operation and maintenance of aircraft movement equipment when carried out in accordance with the specifications given by the manufacturer or his authorised representative. It also takes into account some performance requirements recognised as essential by authorities, aircraft and ground support equipment (GSE) manufacturers as well as airlines and handling agencies.

This European Standard applies to:

— aircraft tractors with driver accommodation;

— pedestrian controlled aircraft movement equipment;

— moveable parts of ramp integrated systems;

— attachment bars,

used for all operations, utilizing aircraft movement equipment, e.g.:

— push back;

— maintenance towing;

— dispatch towing (operational towing).

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This European Standard does not apply to:

— ground power installations on aircraft tractors;

— fixed ramp installations of ramp integrated systems (fixed track);

— special towing equipment (e.g. for recovery).

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This European Standard does not establish requirements for noise and vibration.

Noise and vibration are dealt with respectively in EN 1915-4 and EN 1915-3.

This European Standard does not deal with hazards in respect to a standard automotive chassis and from other vehicles on the apron.

This Part of EN 12312 is not applicable to aircraft movement equipment which is manufactured before the date of publication of this European Standard by CEN.

[A1] This part of EN 12312 is intended to be used in conjunction with EN 1915-1, EN 1915-2, EN 1915-3 (for vehicles) and EN 1915-4. [A1]

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2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1005-2, *Safety of machinery — Human physical performance — Part 2: Manual handling of machinery and component parts of machinery*

EN 1050:1996, *Safety of machinery — Principles for risk assessment*

EN 1175-1, *Safety of industrial trucks — Electrical requirements — Part 1: General requirements for battery powered trucks*

EN 1837, *Safety of machinery — Integral lighting of machines*

EN 1915-1:2001, *Aircraft ground support equipment — General requirements — Part 1: Basic safety requirements*

EN 1915-2, *Aircraft ground support equipment — General requirements — Part 2: Stability and strength requirements, calculations and test methods*

[A1] EN 1915-3, *Aircraft ground support equipment - General requirements - Part 3: Vibration measurement methods and reduction*

EN 1915-4, *Aircraft ground support equipment - General requirements - Part 4: Noise measurement methods and reduction* [A1]

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

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3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 1915-1:2001, EN ISO 12100:2003 and the following apply.

3.1
aircraft tractor
mobile machinery specially developed and designed for aircraft movement operations

3.2
towbar tractor
aircraft tractor which needs a supplementary apparatus for aircraft movement operations

3.3
towbarless tractor
aircraft tractor which can carry out aircraft movement operations without the aid of any supplementary apparatus

3.4
nose landing gear operation
operation where a tractor or movement device is connected to the nose landing gear of the aircraft in order to move the aircraft. Aircraft and tractor are forming a manoeuvrable unit

3.5
main landing gear operation
operation where a tractor is connected to the main landing gear of the aircraft in order to move the aircraft. Steering of the aircraft is performed by the nose landing gear

3.6
ramp integrated system
system for aircraft movement which has a remotely controlled carriage to which the nose landing gear of the aircraft is locked during the movement and which rides on fixed tracks embedded in the ramp pavement

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3.7
attachment device
apparatus for aircraft movement operations by hand or tractor, e.g. towbar, steering bar

3.8
towbar
device coupled between towbar tractor and towing lug of the nose landing gear

3.9
steering bar
device coupled to the nose landing gear used for steering the aircraft externally during movement

3.10
push back
moving of an aircraft from the parking position at the terminal, e.g. to the taxiway. A push back basically consists of a rear movement of the aircraft after which a short forward movement can be performed, e.g. for alignment

3.11
maintenance towing
moving of an aircraft for maintenance purposes, e.g. between the terminal and a maintenance hangar. Maintenance towing is characterized by:

— unladen aircraft with or without fuel;

— engines of the aircraft are out of operation

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3.12
dispatch towing (operational towing)
moving of a loaded revenue aircraft between the terminal and a remote location. Dispatch towing is characterized by:

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— loaded revenue aircraft;

— engines of the aircraft are not operating during the main part of the towing

4 List of hazards

The list of risks and hazards (see Annex B) is based on EN 1050 and contains the hazards and hazardous situations, as far as they are dealt with in this European Standard, identified by risk assessment as significant for aircraft movement equipment and which require action to eliminate or reduce risks.

5 Safety requirements and/or measures

5.1 General requirements

5.1.1 ⟨A1⟩ Aircraft movement equipment shall conform to the relevant requirements of EN 1915-1, EN 1915-2, EN 1915-3 and EN 1915-4 unless otherwise specified in this standard. ⟨A1⟩ It shall also conform to the specific requirements of this European Standard.

5.1.2 Stability and strength calculations shall be carried out in accordance with EN 1915-2.

5.1.3 Where a driver's cabin is provided, it shall meet the requirements of Annex A.

5.1.4 Tractors with driver's cabin shall have an alternative means of exit for the driver in the event of an emergency. It shall be positioned as far as possible away from the normal exit.

5.1.5 Restraint systems shall be fitted to all seats on tractors with driver accommodation, a lap type seatbelt as a minimum.

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5.1.6 A tractor shall be capable of being equipped with a communication system, where there is a need for communication from the operator's position to the cockpit or between operating positions (see Clause 0 of EN 1915-1:2001 — negotiation).

5.1.7 The body of aircraft tractors shall be designed to facilitate easy access for the removal of wheels and tyres by using suitable lifting equipment.

5.1.8 Where an aircraft tractor is provided with a tow-hitch lift, this shall be secured against unintended movements, e.g. by a positive mechanical locking pin.

5.1.9 Structural parts of pedestrian controlled aircraft movement equipment shall not obstruct the operating range of the tiller.

5.1.10 The electrical system of battery powered aircraft movement equipment shall conform to EN 1175-1 with the exception of standard automotive chassis.

5.1.11 Safety related parts of control systems shall be designed in accordance with EN 1915-1:2001, 5.25.1.

5.2 Steering devices

5.2.1 Tractors designed with more than one steering mode shall be equipped with an interlock to prevent mode change unless all wheels are in the straight ahead position and unless travelling speed is 5 km/h or less. The steering mode chosen shall be clearly indicated to the operator in the driving position.

5.2.2 Hydraulic steering systems shall be capable of ensuring that the steering supply is given priority over any other hydraulic equipment supplied by the same power source.

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5.2.3 Where electronic steering controls are used, it shall be ensured that the operator is provided with an indication of any failure which adversely affects the performance of the steering system.

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5.3 Brakes

5.3.1 The service brake of aircraft tractors shall be capable of stopping the tractor when travelling at its maximum operational speed with a minimum braking ratio of 35 %.

5.3.2 The service brake shall stop the tractor and aircraft combination on a level, horizontal, clean and dry concrete floor travelling at its maximum operational towing speed with a minimum deceleration of 0,5 m/s^2.

5.3.3 The brake force distribution shall be such that the tractor and aircraft combination decelerates in a stable condition whilst travelling in a straight line.

5.3.4 Aircraft tractors shall be provided with a secondary brake which in the event of failure of the service brake system shall be able to stop the tractor travelling at maximum operating speed with a minimum braking ratio of 20 %.

5.3.5 The secondary brake can be an integral part of the service brake or if mechanically applied, it can be combined with the parking brake. Where combined with the parking brake it shall also conform to 5.3.6 and 5.3.7.

5.3.6 Aircraft tractors shall be equipped with a parking brake that secures the tractor itself against rolling away with a braking ratio of at least 18 %.

5.3.7 Where simultaneous actuation of both service and parking brake can result in an overload of the aircraft nose landing gear, this shall be prevented by the design of the braking systems, except in the event of a recordable emergency braking procedure, which is to be followed by a nose landing gear inspection.

5.4 Operating speeds

5.4.1 Aircraft tractors shall be designed so that the travelling speed of the tractor or the tractor and aircraft combination does not exceed 32 km/h.

5.4.2 The raising and lowering speed of liftable driver's cabins shall not exceed 0,2 m/s.

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5.5 Lights and reflectors

5.5.1 Aircraft tractors designed to be used for two driving directions shall have full lighting equipment according to EN 1915-1:2001, 5.10, at both ends. The respective lights shall be automatically activated when the driving direction is selected.

5.5.2 Aircraft tractors shall be provided with lights to illuminate the coupling areas. Their design shall conform to EN 1837. The minimum electrical power of the lamp shall be 25 W.

5.5.3 Interior illumination of operator's cabins shall be sufficient to read instructions.

5.5.4 Aircraft tractors shall have warning beacons fitted at positions where they are clearly visible from all sides and where they do not affect the operator's view. Aircraft tractors with driver accommodation positioned at either end shall have at least two warning beacons.

5.5.5 Towbars and steering bars shall have two amber side reflectors on each side, fitted near the coupling ends in accordance with EN 1915-1:2001, 5.10.2.

5.5.6 Towbars and steering bars with a length of more than 2,5 m shall have additional amber side reflectors, fitted in central position in accordance with EN 1915-1:2001, 5.10.2.

5.6 Aircraft related requirements

5.6.1 Forces occurring during intended use of aircraft movement equipment shall remain within the limits as specified for each aircraft.

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NOTE 1 Overload protection can be achieved by means of a movement equipment integrated system or overload protection devices like shear pins.

NOTE 2 Forces occurring during movement are e.g.:

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— acceleration and deceleration forces;
— forces from braking;
— towing forces, when towing is attempted while the aircraft brakes are applied or wheel chocks are in place;
— torsional forces;
— loads induced due to "raking".

5.6.2 Tractors shall facilitate smooth and controlled acceleration and deceleration. Pick-up and release systems, where applicable, shall facilitate a smooth and controlled operation to minimise the loads on the aircraft landing gear during the pick-up and release sequence.

5.6.3 The aircraft pick-up point (e.g. wheels, towbar attachment point) shall be designed in such a way that unintended disengagement of the aircraft from the aircraft holding device of the movement equipment is prevented by positive mechanical locking, e.g. a latch.

5.6.4 The geometry of the aircraft holding device shall be designed to prevent interference with the aircraft.

5.6.5 The connection between the aircraft holding device of the movement equipment and the aircraft shall be sufficient to transmit all forces occurring during intended operating conditions.

5.6.6 On towbarless tractors, the drive shall be automatically inhibited until the coupling procedure is completed and visually indicated.

5.6.7 Malfunction of the retaining system of towbarless tractors shall be indicated by audible and visual warning signals.

5.6.8 In case of failure of the coupling system of towbarless tractors it shall be possible to release the aircraft landing gear manually or by an emergency system.