INTERNATIONAL STANDARD

# ISO 11995

First edition
1996-06-15

# Aircraft — Stability requirements for loading and servicing equipment

*Aéronefs — Exigences de stabilité des matériels de chargement et de service*



Reference number
ISO 11995:1996(E)

## 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.

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.

International Standard ISO 11995 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 9, *Air cargo and ground equipment*.

Annex A of this International Standard is for information only.





International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

## Introduction

Throughout this International Standard, 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 equipment. Deviation from the recommended criteria should occur only after careful consideration, extensive testing, and thorough service evaluation have shown alternate methods to be satisfactory.

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# Aircraft — Stability requirements for loading and servicing equipment

## 1 Scope

**1.1** This International Standard specifies:

a) the criteria to be used to determine stability of aircraft loading and servicing equipment, including wind loads;

b) the classification of systems recommended to achieve stability;

c) the formula to be used for calculating steady-state wind stability;

d) the recommended test methods applicable to equipment.

**1.2** The intent of this International Standard is not to specify equipment design, but rather to define uniform criteria, calculation and testing methods in order to provide a safe work environment under all predictable circumstances for the users of aircraft loading and servicing equipment.

**1.3** This International Standard specifies the worldwide requirements recognized by aircraft and equipment manufacturers as well as airlines and handling agencies.

In addition, it shall be applied with due reference to national governmental regulations of the country where the equipment is to be operated.

**1.4** This International Standard applies to aircraft loading and servicing equipment, typically but not exclusively defined as follows:

— container and pallet loaders (see ISO 6967 and ISO 6968);

— catering trucks (see ISO 10841);

— passenger stairs (see ISO 12056);

— maintenance and fueling access platforms,

when operated in a static position on an aircraft.

**1.5** This International Standard does not apply to:

— forklifts;

— aircraft de-icers;

— any equipment with rotating booms,

and more generally any equipment the normal mode of operation of which includes moving in the elevated position.

## 2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 6966:1993, *Aircraft — Basic requirements for aircraft loading equipment.*

## 3 Definitions

For the purposes of this International Standard, the following definitions apply.

**3.1 wind:** Movement of air which causes a force imposed on surfaces of aircraft loading and servicing equipment.

NOTE 1 Wind in this context includes

— steady-state natural wind;

— wind gusts (temporary peak intensities);

— the effect of jet blast from other aircraft's engines.

**3.2 stabilizers:** Structural devices capable of supporting the weight of the equipment and any additional forces resulting from wind or other sources, used to reduce the lateral deflection of vehicles, when extended within the outer planview envelope of the vehicle.

NOTE 2 Stabilizers will normally eliminate or reduce the part of the vehicle's weight supported by tyres and suspensions.

**3.3 outriggers:** Stabilizers which, when extended, project outside the outer planview envelope of the vehicle.

NOTE 3 Outriggers enlarge the supporting base of the vehicle.

**3.4 tip point:** Condition where the vehicle center of gravity has been rotated by the combined effect of load distribution, ramp slope, structural deformation if any, and the force of wind up to a point directly above the vehicle's pivot point.

**3.5 pivot point:** That point of the vehicle in contact with the ground located farthest out on the most heavily loaded side or the side opposite to that to which the force of wind is applied.

**3.6 stability:** Condition where

— the laden or unladen vehicle's center of gravity is located within the outer support perimeter, i.e. inward of the tip point; and

— the vehicle's weight as well as the force of wind and any other forces are entirely supported by rigid structural elements.

NOTE 4 Where all or part of the vehicle's weight and additional forces are supported by elastic elements such as tyres, suspension springs, etc., a dynamic condition may be created that can exceed static and wind stability conditions as defined in 3.6.1 and 3.6.2. In such a case, appropriate additional safety margins should be determined to take into account possible dynamic effects resulting from support elasticity.

**3.6.1 static stability:** Stability achieved in a condition where, there being no wind or other additional forces, the vehicle's tipping risk is determined only by load distribution (i.e. center of gravity location) and ramp slope.

**3.6.2 wind stability:** Stability achieved in a condition where the force of wind constitutes the predominant factor of the vehicle's tipping risk.

## 4 Objectives

**4.1** The static stability objective for any piece of aircraft loading and servicing equipment shall be for the vehicle to remain stable as defined in 3.6 when

a) the vehicle is at maximum elevation, and

b) the maximum allowable payload is concentrated on only one half side of the vehicle (all on the same side of the vehicle's centre line), and

c) the vehicle, with stabilizers or outriggers extended when applicable, is standing on a surface at a slope of 3° (5 %) perpendicular to the vehicle's centre line and sloping on the loaded side of the vehicle.



**4.2** The wind stability objective for any piece of aircraft loading and servicing equipment shall be for the vehicle to remain stable as defined in 3.6 when the vehicle

a) is at maximum elevation, and

b) is empty, and

c) is standing on a horizontal surface, with stabilizers or outriggers extended when applicable, and

d) is subjected to a steady-state wind of 120 km/h (65 kn), perpendicular to one long side of the vehicle.

**4.3** The objectives for combined static and wind stabilities shall be as follows.

a) The vehicle shall remain stable in the following conditions based on those defined for static stability in 4.1: