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# International Standard



# 6965

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## **Aircraft — Self-propelled gantry for lifting air cargo containers and outside cargoes — Functional requirements**

*Aéronefs — Portique automoteur de levage de conteneurs et de charges hors dimensions de fret aérien — Caractéristiques fonctionnelles*

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Descriptors : aircraft, aircraft equipment, lifting equipment, cargo, containers, specifications.

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6965 was developed by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, and was circulated to the member bodies in May 1981.

It has been approved by the member bodies of the following countries :

Australia	France	South Africa, Rep. of
Austria	Ireland	Spain
Belgium	Italy	Sweden
Brazil	Japan	United Kingdom
China	Korea, Rep. of	USA
Czechoslovakia	Netherlands	USSR
Egypt, Arab Rep. of	Romania	

No member body expressed disapproval of the document.

# Aircraft — Self-propelled gantry for lifting air cargo containers and outside cargoes — Functional requirements

## 0 Introduction

This International Standard is to be read in conjunction with the following documents :

- ISO 668, *Series 1 freight containers — Classification, external dimensions and ratings.*
- ISO 1496/1, *Series 1 freight containers — Specification and testing — Part 1 : General cargo containers.*
- ISO 1496/7, *Series 1 freight containers — Specification and testing — Part 7 : Air mode containers.*
- ISO 3874, *Series 1 freight containers — Handling and securing.*
- ISO 6966, *Aircraft — Basic requirements for aircraft loading equipment.*

## 1 Scope and field of application

**1.1** This International Standard specifies the functional requirements for a self-propelled gantry capable of raising from the ground, transporting and stacking two high :

- a) Corner fitting equipped air/surface intermodal containers per ISO 1496/7 with the following characteristics :

Length mm (in)	Width mm (in)	Height mm (in)	Max. gross weight kg (lb)
6 058 (238.5)	2 438 (96)	2 438 (96)	11 340 (25 000)
12 192 (480)	2 438 (96)	2 438 (96)	20 412 (45 000)

- b) Surface containers, equipped with 8 corner fittings per ISO 1161, with the following characteristics :

Length mm (in)	Width mm (in)	Height max. mm (in)	Max. gross weight kg (lb)
6 058 (238.5)	2 438 (96)	2 591 (102)	20 320 (44 800)
12 192 (480)	2 438 (96)	2 591 (102)	27 200 (60 000)

- c) Various pieces of outside cargo with the following characteristics :

Length mm (in)	Width mm (in)	Height max. mm (in)	Max. gross weight kg (lb)
Unlimited	3 660 (144)	3 000 (118)	27 200 (60 000)

**1.2** The term "weight" is retained here above instead of the correct technical term "mass", in order to conform to current commercial usage.

**1.3** The methods and devices used to lift corner fitting containers with the unit shall comply with ISO 3874.

## 2 Structure and overall dimensions

NOTE — See figure 1 for explanation of specification clearances.

**2.1** The unit shall basically consist of two gantry frames connected together by structural members so that the nominal

distance between both gantries be approximately 6 110 mm (240 in). It shall have a total of four hoisting points in order to provide adequate stability when lifting the load.

**2.2** The fully equipped unit shall provide for a minimum 5 500 mm (216 in) clear lifting height. This minimum clear height shall be maintained when remote controlled top lifting spreader option (see figure 2) is adopted.

**2.3** The unit shall provide for a minimum 3 660 mm (144 in) internal clear width.

**2.4** The overall dimensions of the unit must be kept to a minimum.

Particularly, the overall width of the unit shall not exceed 5 180 mm (204 in).

**2.5** When loaded, the unit shall have adequate clearance underneath from any portion of the equipment to the ground when negotiating two ramps that intersect at 5°.

### 3 Lifting function

**3.1** The unit shall be equipped with a remote controlled toplifting spreader for 6 058 mm (20 ft) containers, attached to the four hoisting points referred to in 2.1. It shall include provisions to allow either a fast replacement of the 6 058 mm (20 ft) spreader by a 12 192 mm (480 in) one, or the installation of an adjustable spreader to handle 6 058 mm (20 ft) and 12 192 mm (480 in) containers.

**3.2** Exterior, self-centring, gather devices shall be provided at the four upper corner fittings to ensure accurate positioning of the spreader for direct top lifting. They shall impinge on the corner fittings only. The location of the remote controlled twistlocks to engage the corner fittings shall allow for a minimum of 50 mm (2 in) clearance between the top of the container and any part of the spreader structure. (See figure 2.)

**3.3** In addition, the spreader shall be equipped with a minimum of eight lifting sling or chain attachment points, located in accordance with figure 3.

Such slings or chains will be used :

- either to lift a 6 058 mm (20 in) container from its bottom corner fittings, as an alternate method, when either the upper corner fittings or the spreader remote controlled twistlocks are unserviceable;
- or to lift a 6 058 mm (20 ft) pallet or other non-corner fitting equipped ULD, through adequate attachment devices;
- or to lift various pieces of outsize cargo.

**3.4** The system of slings or chains system shall be designed to avoid any interference between the slings or chains and the container structures. The devices engaging and lifting the container shall be designed to avoid any damage to cast aluminium corner fittings.

**3.5** The gantry and spreader design, as well as the length and design of the slings or chains, when used between the spreader and the load, shall allow stacking 2 438 mm (96 in) high containers on two levels.

**3.6** For maintenance purposes or in order to allow interchange of various spreaders, it shall be possible to deposit the spreader or to pick it up, on, or from the ground.

**3.7** A variety of (additional) sling attachment points may be provided on the spreader, as specified by the buyer, to allow safe slinging and lifting of various pieces of outsize cargo to be handled.

**3.8** Provisions for using common lifting hardware shall be made to that effect.

An adjustable lifting speed, preferably in the range of 1,83 m/min (6 ft/min) to 5,50 m/min (18 ft/min) under the maximum load of 27 200 kg (60 000 lb) shall be provided.

**3.9** The lifting speed shall be the same when hoisting or lowering.

It shall be possible to raise each end of the container or outsize load independently.

**3.10** Lateral spreader movement shall be provided over a total range not less than 610 mm (24 in). The lateral movement speed shall be adjustable from 0 to at least 0,61 m/min (0 to 2 ft/min). Lateral movement of fore and aft ends of spreader shall be independently and/or simultaneously controlled.

**3.11** Statutory safety regulations relating to mobile lifting equipment shall be applied.

### 4 Mobility and stability

**4.1** Ground stabilizers or stabilizing devices shall not be necessary for the operation of the unit.

**4.2** In order to provide adequate stability, the unit's wheel base shall equal or exceed 6 058 mm (20 ft).

**4.3** The unit shall be capable of being driven with the maximum load of 27 200 kg (60 000 lb) at speeds up to 10 km/h (6 mph) for at least 3 km (2 miles). The unit shall effectively and safely control the maximum load up to the maximum driving speed.

**4.4** Power steering shall be provided.

**4.5** The unloaded unit shall be able to start moving on a 5° slope.

**4.6** The swept turn radius, measured at the outermost part, shall be kept to a minimum and shall not exceed 9,15 m (30 ft), not including the spreader, if designed for 12 192 mm (480 in) container capacity.

**4.7** The unloaded unit in the raised position shall be safe in wind velocities up to 193 km/h (120 mph).

**4.8** The wheel footprint shall be such that pressure on the ground does not exceed 14 bar (170 lb/sq. in) when the unit is loaded with the maximum load of 27 200 kg (60 000 lb).

## **5 Controls**

**5.1** All controls necessary to move and operate the unit shall be located in the driver's position.

**5.2** In addition, an electrical remote control box, of minimum weight and size, of the type most currently used on lifting gantries, may be provided on the side of the unit opposite to the driver's position, for lifting functions only.

**5.3** Ample lighting is required for night operations and to illuminate the load and close surroundings.

**5.4** Normal power system warning and indicator lights shall be provided.

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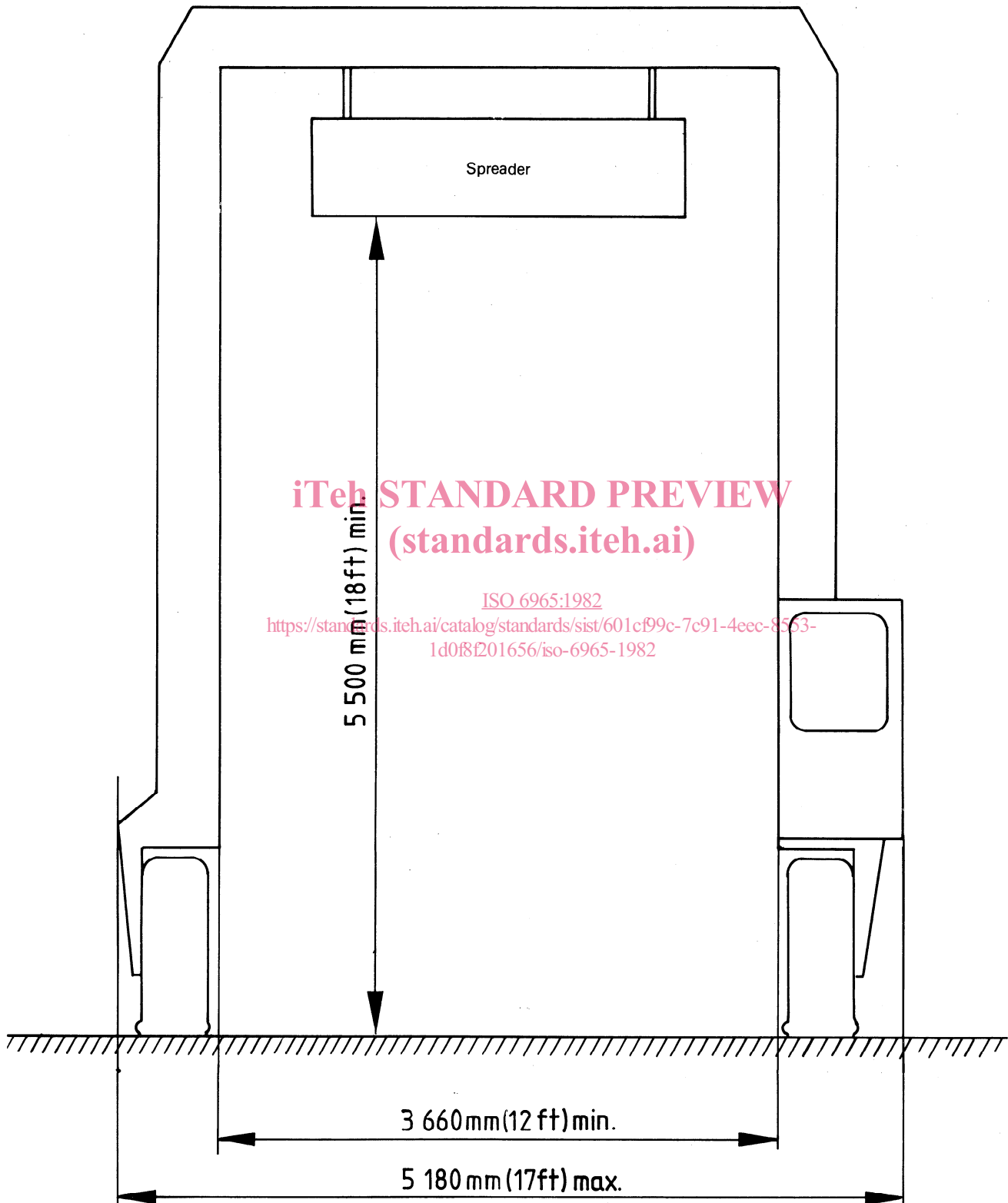


Figure 1 – Explanation of specification clearances

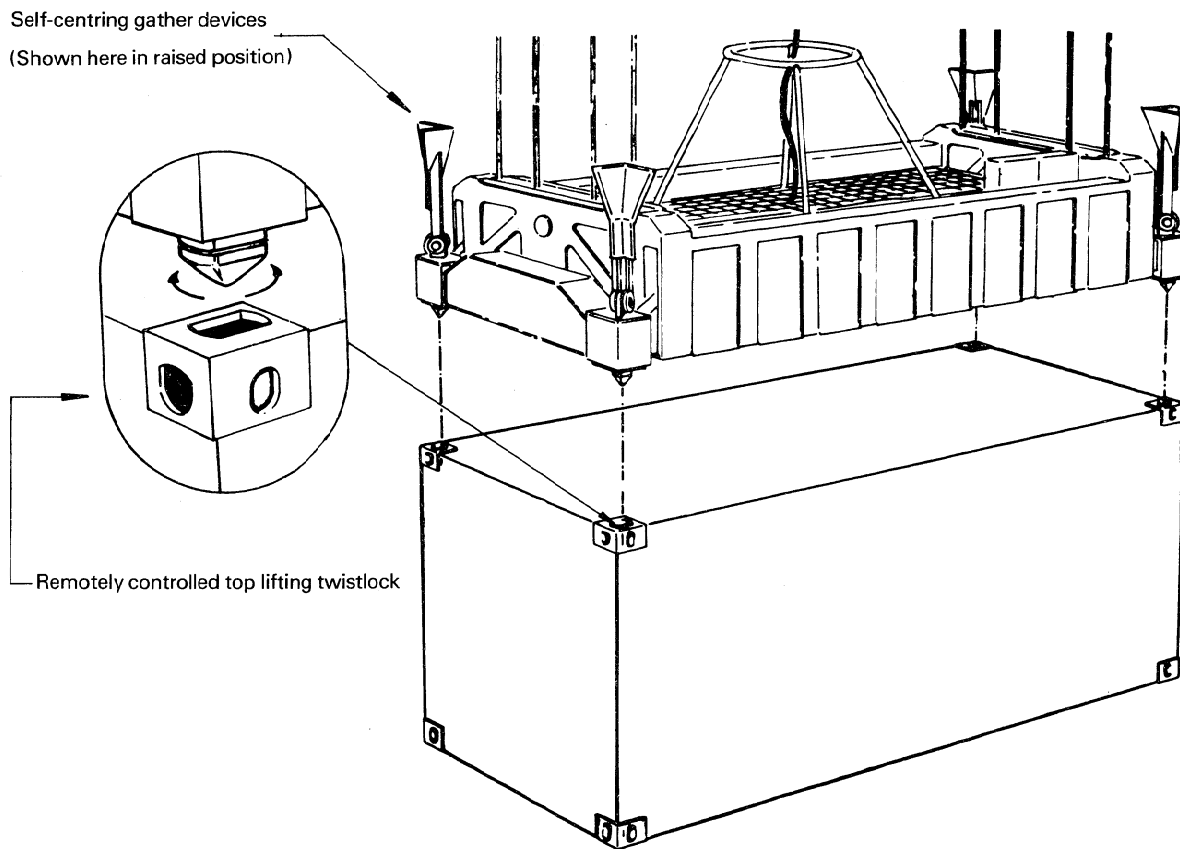


Figure 2 – Remotely controlled spreader

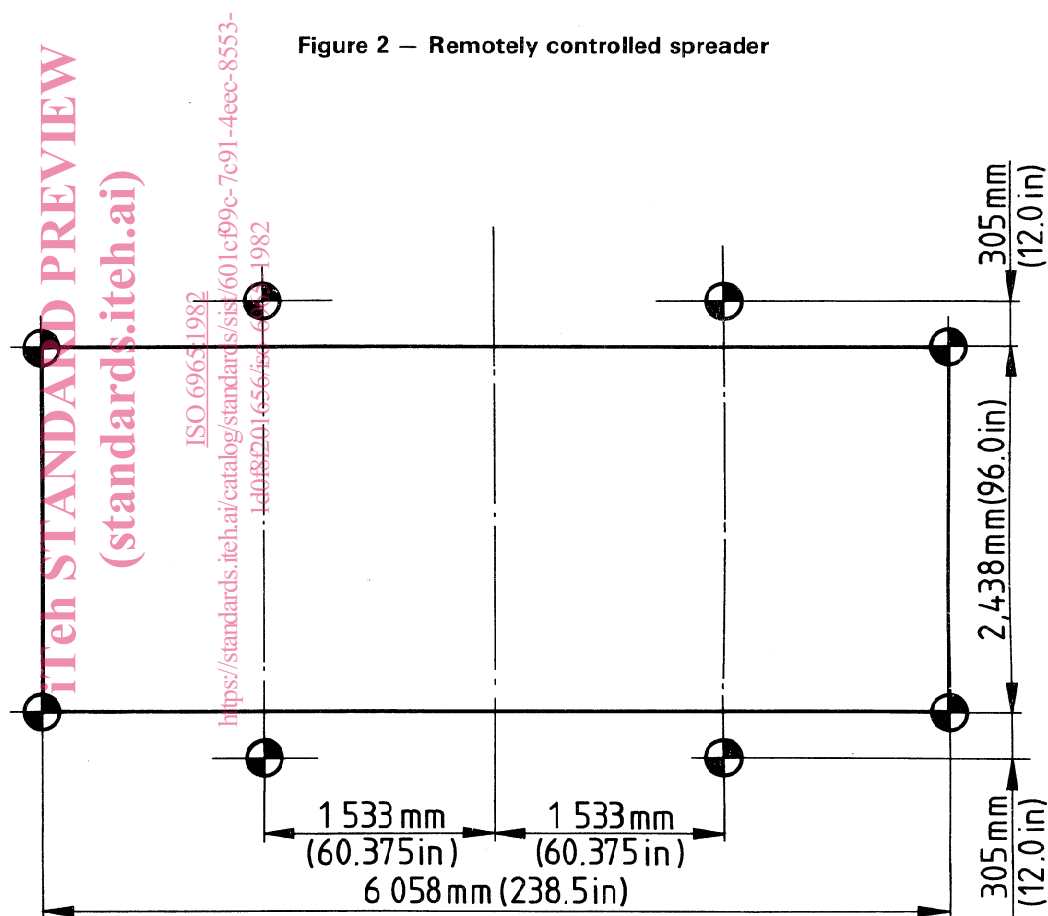


Figure 3 – Nominal location of the eight lifting sling/chain attachment points

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