International Standard 7716

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Air cargo equipment — Unit load devices transport vehicle (UTV) — Functional requirements

Équipement pour le fret aérien — Véhicules de transport d'unités de charge (VTU) — Caractéristiques fonctionnelles

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Foreword

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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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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Air cargo equipment — Unit load devices transport vehicle (UTV) — Functional requirements

0 Introduction

This International Standard shall be read in conjunction with ISO 4116, ISO 6966 and ISO 7715.

1 Scope and field of application

This International Standard specifies minimum functional requirements for type 3, class A, air cargo unit load device (ULD) chassis in accordance with the terminology defined in ISO 7715.

This International Standard outlines the functional requirements for a ULD transport vehicle, capable of carrying unit load devices over airport and public roads and transferring them to/from rollerized ULD handling equipment.

2 References

ISO 1161, *Series 1 freight containers — Corner fittings — Specification.*

ISO 4116, *Ground equipment requirements for compatibility with aircraft unit load devices.*

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

ISO 7715, *Air cargo equipment — Ground handling and transport systems for unit load devices — Minimum requirements.*

3 Dimensions and weights of unit load devices

Dimensions (length × width × height) and weights[1] of applicable unit load devices are as follows:

a) 1 562 mm × 1 534 mm × 1 626 mm (61.5 in × 60.4 in × 64.0 in), maximum gross weight 1 588 kg (3 500 lb);

NOTE — The overall length of the container may be up to 2 337 mm (92.0 in).

b) 3 175 mm × 2 235 mm × up to 2 438 or 2 997 mm (125.0 in × 88.0 in × up to 96.0 or 118.0 in), maximum gross weight 6 804 kg (15 000 lb);

c) 3 175 mm × 2 438 mm × up to 2 438 or 2 977 mm (125.0 in × 96.0 in × up to 96.0 or 118.0 in), maximum gross weight 6 804 kg (15 000 lb);

d) 2 991 mm × 2 438 mm × 2 438 mm (117.75 in × 96.0 in × 96.0 in), maximum gross weight 5 670 kg (12 500 lb);

e) 6 058 mm × 2 438 mm × up to 2 438 or 2 977 mm (238.5 in × 96.0 in × up to 96.0 or 118.0 in), maximum gross weight 11 340 kg (25 000 lb);

f) 12 192 mm × 2 438 mm × 2 438 mm (480.0 in × 96.0 in × 96.0 in), maximum gross weight 20 412 kg (45 000 lb).

4 Structure and overall dimensions of the vehicle

4.1 The vehicle shall be constructed on a standard automotive truck, trailer, or semi-trailer chassis.

It shall provide a ULD transport platform with one of the following capabilities:

a) two 2 235 mm × 3 175 mm or 2 438 mm × 3 175 mm (88 in × 125 in or 96 in × 125 in) units, or four 1 562 mm × 1 534 mm (60.4 in × 61.5 in) units, or one 2 438 mm × 6 058 mm (96 in × 238.5 in) unit;

b) three 2 235 mm × 3 175 mm or 2 438 mm × 3 175 mm (88 in × 125 in or 96 in × 125 in) units, or six 1 562 mm × 1 534 mm (60.4 in × 61.5 in) units, or one 2 438 mm × 6 058 mm (96 in × 238.5 in) unit;

c) four 2 235 mm × 3 175 mm or 2 438 mm × 3 175 mm (88 in × 125 in or 96 in × 125 in) units, or eight 1 562 mm × 1 534 mm (60.4 in × 61.5 in) units, or two 2 438 mm × 6 058 mm (96 in × 238.5 in) units, or one 2 438 mm × 12 192 mm (96 in × 480.0 in) unit.

4.2 The overall height of the entire loaded unit shall not exceed 3 965 mm (156 in), when transported on roads with 2 438 mm (96 in) high ULDs.

The height of any part of the conveyor surface shall be within the range of 1 219 mm (48 in) to 1 575 mm (62 in) under any normal operating conditions.

1) The term "weight" is retained in this International Standard instead of the correct technical term "mass" in order to conform to current commercial usage.

4.3 The overall dimensions and weight of the vehicle shall satisfy all applicable national or international regulations for road vehicles used on public roads. A greater maximum weight may be allowed within an airport, at reduced speeds, in accordance with local airport regulations.

4.4 The vehicle shall be capable of supporting and restraining in the three directions (fore and aft, sidewards, upward) the following loads:

a) 1 588 kg (3 500 lb) on any one single 1 562 mm × 1 534 mm (60.4 in × 61.5 in) unit position;

b) 6 804 kg (15 000 lb) on any one single 3 175 mm (125 in) unit position;

c) 11 340 kg (25 000 lb) on any one single 6 058 mm (238.5 in) unit position or two 3 175 mm (125 in) unit positions;

d) 20 412 kg (45 000 lb) on any one single 12 192 mm (480 in) unit position or four 3 175 mm (125 in) unit positions.

4.5 The clearance under the vehicle shall satisfy the current automotive industry practice for road vehicles.

5 Platform design, guide rails and stops

5.1 The platform shall provide a roller surface, allowing longitudinal movement of load units.

5.2 The platform shall be designed for powered end transfer of load units. The powered system shall be divided into as many sections as the platform can accommodate 3 175 mm (125 in) units. It shall be possible to control these sections individually or collectively.

5.3 The powered system shall be able to drive loaded units at a speed of approximately 0,3 m/s (60 ft/min).

5.4 Guide rails, at least 102 mm (4.0 in) high, in accordance with ISO 4116, shall be provided along both sides of the platform. They can be retractable in order either to meet the applicable national or international overall width requirements, when carrying units 2 438 mm (96.0 in) wide, or to allow for the opening of container doors on the vehicle.

They shall be adjustable symmetrically to ensure either guidance and side restraint of units 2 235 mm (88.0 in) wide or guidance of units 2 438 mm (96.0 in) wide on each section 3 175 mm (125.0 in) long.

When applicable, any spacing between guide rail ends shall not exceed 763 mm (30.0 in). In order to minimize impact loads, the guide rails located at the transfer end of the platform shall be laterally adjustable to form a distinct funnel-shaped lead-in, with a minimum angle of 15° and 203 mm (8.0 in) extra width between guide rails.

5.5 Restraint devices shall be provided on the platform to restrain unit load devices (see clause 3) in forward, aft, side and upward directions. They shall ensure restraint of each individual unit at its maximum gross weight, each restraint device being capable of withstanding 75 % of the total load (see figure 2).

In addition, they shall withstand the impact of the largest acceptable unit, at its maximum gross weight, travelling at a speed of 0,3 m/s (60 ft/min).

The shape and dimensional tolerances of restraint devices are shown in figure 1.

5.6 Size a) units in clause 3, with base dimensions of 1 562 mm × 1 534 mm (61.5 in × 60.4 in), shall be guided into position with their 1 534 mm (60.4 in) side along either of the guide rails, adjusted to the 2 235 mm (88.0 in) width position. They shall be restrained on the three other sides of their base.

5.7 The bases of sizes b), c), d), e) and f) units in clause 3 shall be end-restrained at two points at each end, as shown in figure 2.

Size b) units in clause 3 shall be side-restrained by the guide rails, adjusted to the 2 235 mm (88.0 in) width position.

Sizes c), d), e) and f) units in clause 3 shall be side-restrained, either by the guide rails adjusted to the 2 438 mm (96.0 in) width position, or by the end restraint devices interfacing with the side restraint end blocks, located on the 2 438 mm (96.0 in) side of the unit, as shown in figure 2.

6 Platform operation and loading

6.1 The platform shall be such that one man, standing at ground level, without tools of any kind, is able to operate it.

All power system and restraint devices controls shall be accessible from one side of the vehicle, and shall be located in such a way as not to expose the operator to injury and to guard against inadvertent operation of the platform during ULD transfer or road transportation.

6.2 A manual override system shall be provided in the event of a power system failure. Manual override shall be achieved by the operator, without the use of tools and within 1 min.

6.3 Platform design shall permit manual movement of unit load devices, and shall provide adequate walk area for that purpose. A walk area for two men shall be provided in the centre of the platform. Each walk area shall be made of an antiskid material and be at least 300 mm (12 in) wide.

6.4 The mechanical efficiency of the conveyor system shall be equal to or in excess of 97 %, when measured with the maximum unit weight.

6.5 In order to ease the transfer of unit load devices from and onto the vehicle and to absorb the initial impact load, lead-in

rollers shall be provided that have the maximum possible diameter compatible with the design and, in any case, not less than 100 mm (4.0 in).

Two rows of lead-in rollers shall be provided, the first row being installed lower than the second one in order to cope with bridging and cresting conditions.

The distance between the centreline of the first row of rollers and the extreme projection of the vehicle structure shall not exceed 127 mm (5.0 in).

6.6 The distance between the first powered drive element and the extreme projection of the vehicle structure shall not exceed 508 mm (20.0 in).

6.7 Resistant padding shall be provided at the transfer end of the structure to prevent equipment damage during docking.

6.8 Personnel handrails are not required on the platform.

6.9 The power for operating the platform conveyor system may be supplied either by a self-contained power unit or by means of an external electric power supply.

The external electric power shall be supplied at the transfer end (rear left side) of the vehicle (from the transferring equipment or a fixed facility), and, as an option, at the connection with the towing vehicle, for a trailer or semi-trailer vehicle.

In both cases, a standard electric power connection shall be provided for the purposes of easy interface.

6.9.1 For operation on the North American continent, the electric power connections shall meet the following requirements:

a) drive motor voltage — 230 V a.c., 3 phase, 50 to 60 Hz;

b) conveyor speed — 0,3 m/s (60 ft/min) at nominal 60 Hz;

c) a safety interlock shall be provided for umbilical connections; interlock voltage shall not exceed 24 V a.c., 50 to 60 Hz;

d) auxiliary circuit — 24 V d.c.;

e) the connector used for electrical circuits shall be an 8-pin type as shown in figure 3, wired as specified. Any deviation from this wiring which does not provide a totally safe control system, free of added potential for inadvertent actuation, shall use a different connector which will not mate with a connector of the configuration shown in figure 3.

6.9.2 For operation on the European continent, the electrical power connections shall meet the following requirements:

a) drive motor voltage — 380 V a.c., 3 phase, 50 Hz;

b) conveyor speed — 0,3 m/s (60 ft/min) at nominal 50 Hz;

c) a safety interlock shall be provided for umbilical connections; interlock voltage shall not exceed 24 V a.c., 50 Hz;

d) no auxiliary circuit is required;

e) the connector used for electrical circuits shall be a 6-pin type as shown in figure 4, wired as specified. Any deviation from this wiring which does not provide a totally safe control system, free of added potential for inadvertent actuation, shall use a different connector which will not mate with a connector of the configuration shown in figure 4.

7 Mobility and stability

7.1 The vehicle shall be capable of being driven at normal road speeds, in accordance with applicable government regulations.

7.2 The choice of the basic standard automotive chassis shall take into account the need to keep the overall dimensions and the swept turning radius to a minimum, in order to allow the best possible vehicle manœuverability.

7.3 During transfer operations, the combined suspension movement and normal tyre deflection shall not result in a variation in the level of any part of the conveyor surface outside the range of 1 220 mm (48.0 in) to 1 575 mm (62.0 in) nor a slope on the conveyor surface (in relation to a level ground surface) exceeding 2 %.

8 Controls

All powered system controls shall be located in one weatherproof box, located on the left side, at the transfer end of the vehicle.

9 Options

In addition to restraint provisions laid down in 5.7, 2 438 mm × 6 058 mm (96.0 in × 238.5 in) and 2 438 mm × 12 192 mm (96.0 in × 480.0 in) pallets and containers may be restrained by twistlocks compatible with corner fittings in compliance with ISO 1161.

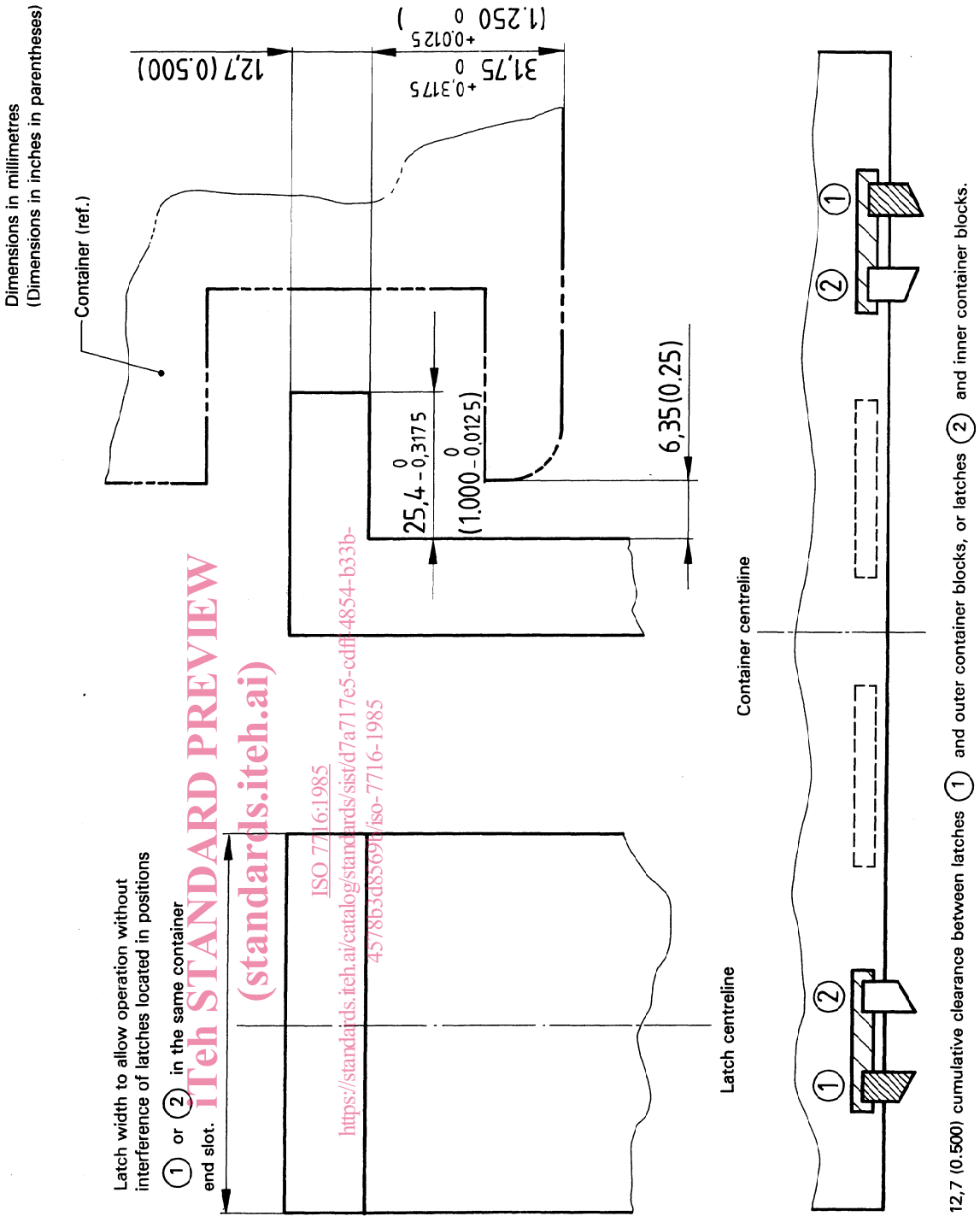
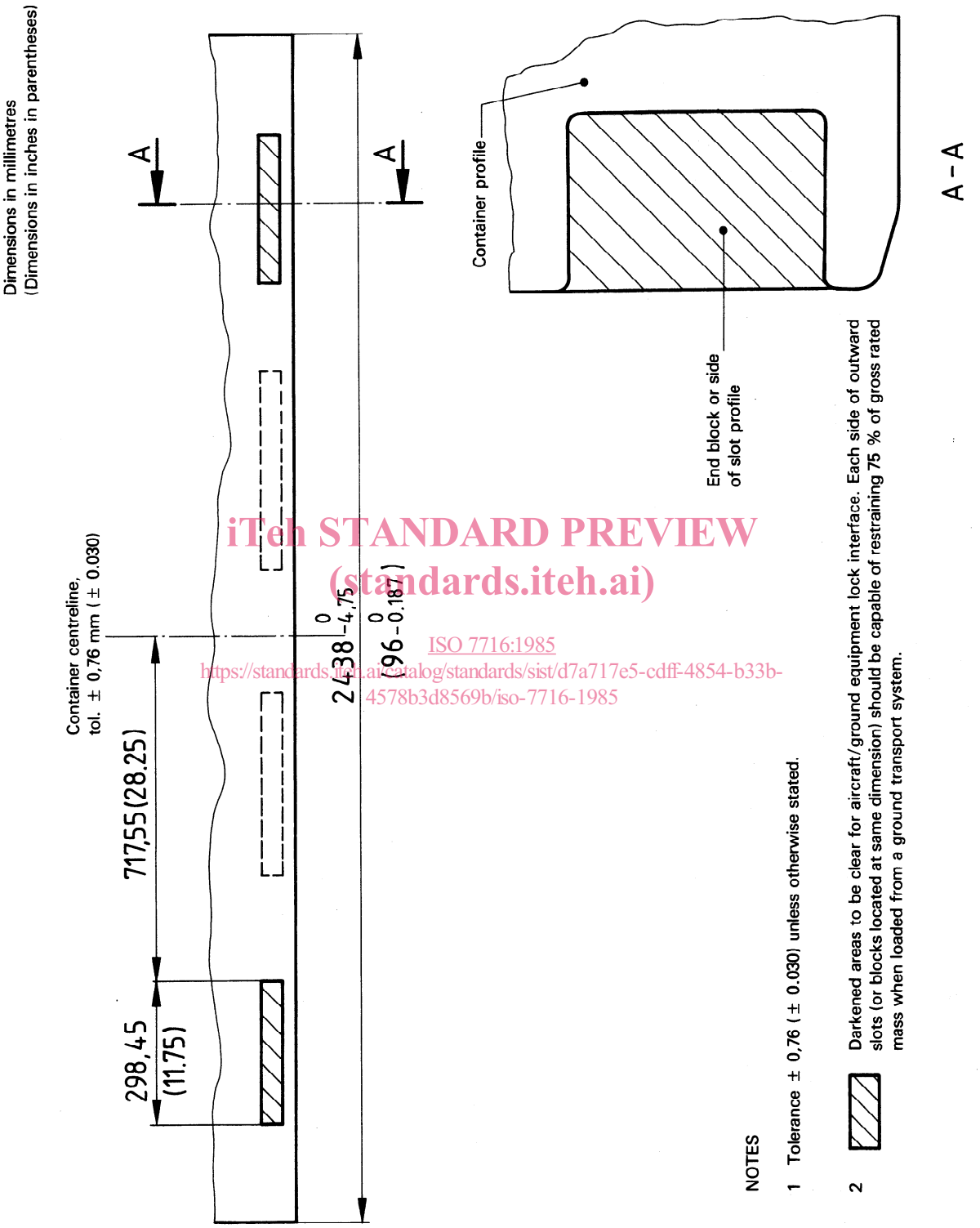


Figure 1 – Latch dimensions



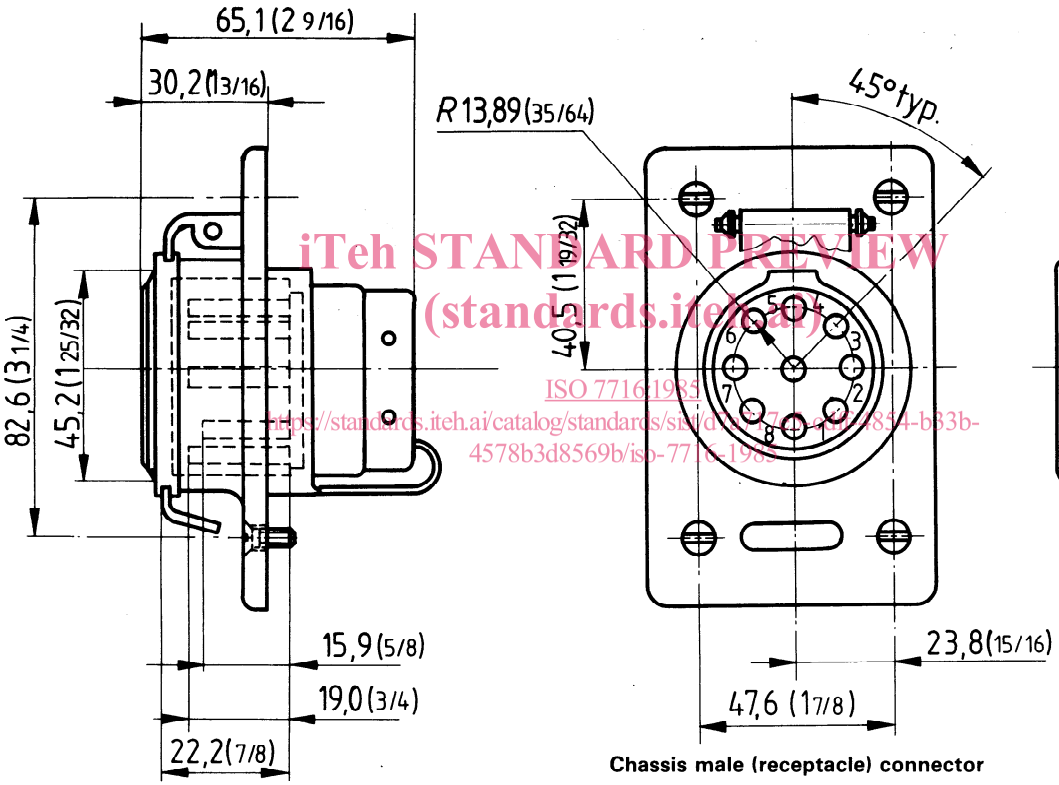
NOTES

1 Tolerance ± 0,76 (± 0.030) unless otherwise stated.

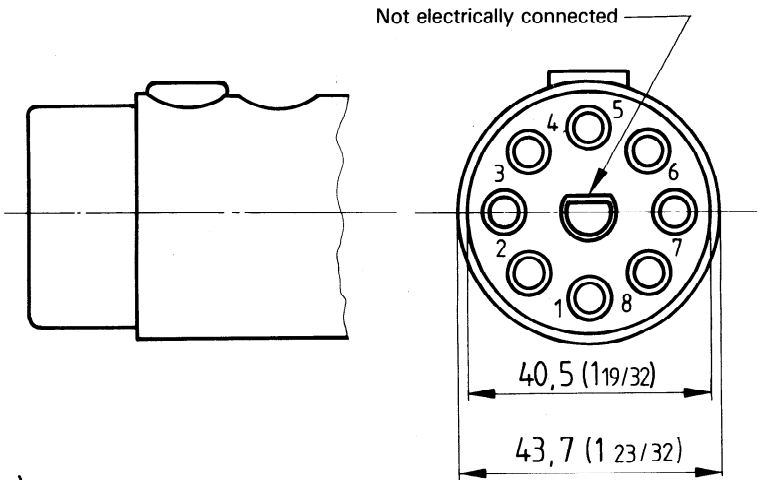
2 Darkened areas to be clear for aircraft/ground equipment lock interface. Each side of outward slots (or blocks located at same dimension) should be capable of restraining 75 % of gross rated mass when loaded from a ground transport system.

Figure 2 — Pallet/container end slots or blocks (both ends)

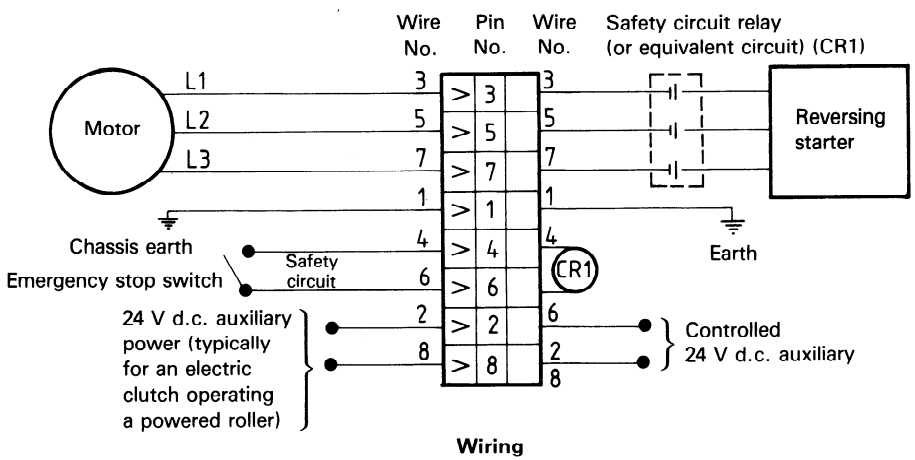
Dimensions in millimetres
(Dimensions in inches in parentheses)



Chassis male (receptacle) connector



Dock female portable connector



Wiring

NOTES

1 All pins have a 4,76 (3/16) diameter.
2 The connection between the No. 1 pin and the mounting (earth) may be removed.
3 Pins Nos. 2 and 8 are shortened by 3,2 (1/8).
4 The polarizing pin is not electrically connected.
5 The chassis connector is mounted inboard at the rear on the left side.
6 Mounting is standard for type FS and type FSD boxes.

Figure 3 — Standard connector and typical wiring to be used on the North American continent

Dimensions in millimetres

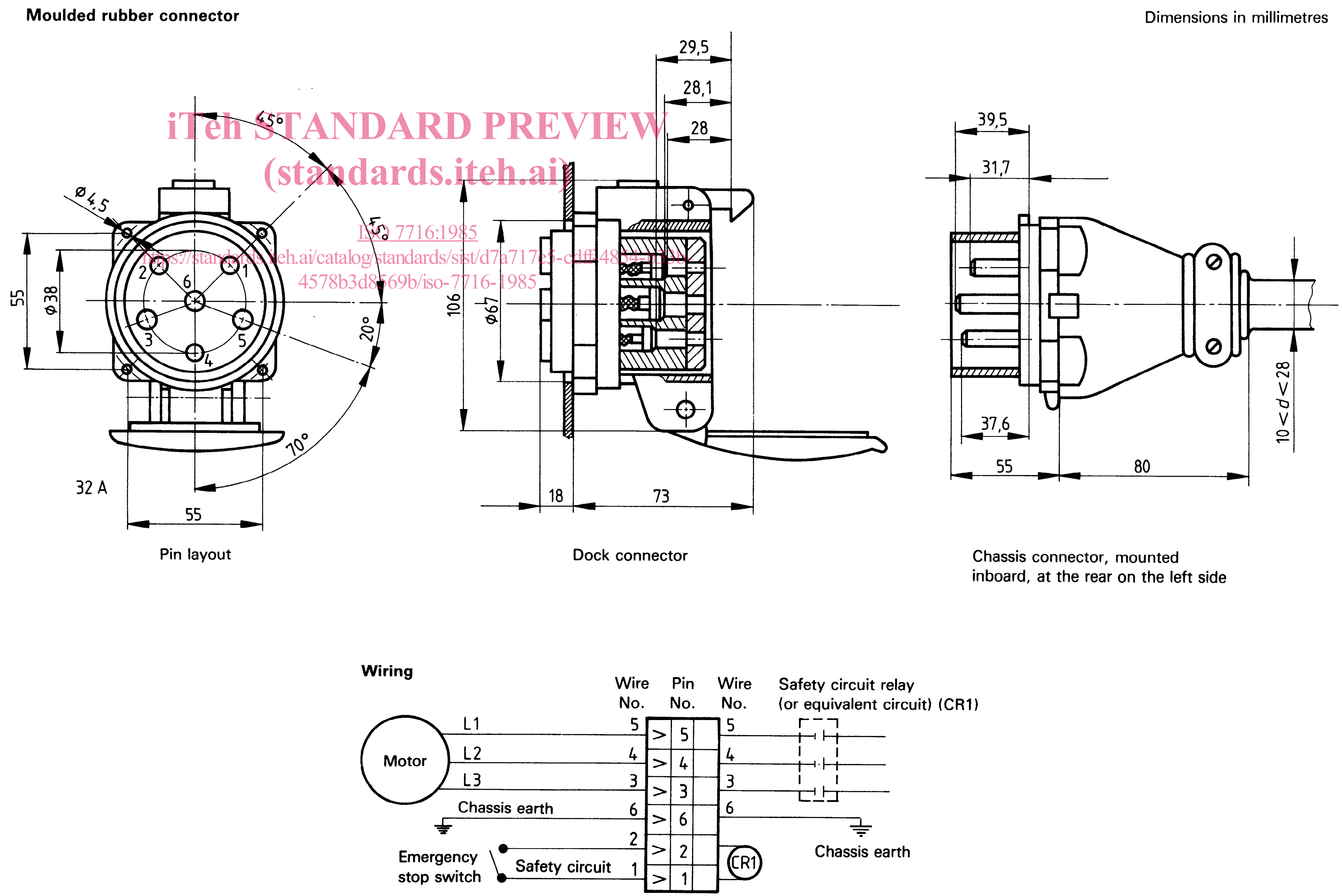


Figure 4 — Standard connector and typical wiring to be used on the European continent