
INTERNATIONAL STANDARD



1971

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

Aircraft — Accessory drives and mounting pads

Aéronefs — Fixation et entraînement d'accessoires sur moteurs et boîtes-relais

First edition — 1975-03-15

UDC 629.7.03-233

Ref. No. ISO 1971-1975 (E)

Descriptors : aircraft equipment, aircraft engines, gearboxes, accessories, couplings, quick-release fasteners

ISO 1971-1975 (E)



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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 1971 was drawn up by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, and circulated to the Member Bodies in March 1970.

It has been approved by the Member Bodies of the following countries :

Belgium	India	Spain
Brazil	Israel	Switzerland
Canada	Italy	Thailand
Egypt, Arab Rep. of	Japan	Turkey
France	Netherlands	United Kingdom
Germany	New Zealand	
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The Member Bodies of the following countries expressed disapproval of the document on technical grounds :

Czechoslovakia
U.S.A.
U.S.S.R.

Aircraft — Accessory drives and mounting pads

1 SCOPE AND FIELD OF APPLICATION

1.1 This International Standard provides a design for quick-release couplings with involute spline drive, intended primarily for aircraft engine/gearbox accessories which require to be removed whilst the engine/gearbox is in service.

1.2 This International Standard comprises

- clauses 3 to 12 : Design notes and recommendations;
- figure 1/tables 1a) to 1e) : Accessory flanges up to spigot reference 250;
- figure 2/tables 2a) to 2d) : Engine/gearbox pads up to spigot reference 250;
- figure 3/tables 3a) to 3e) : Accessory flanges above spigot reference 250;
- figure 4/tables 4a) to 4e) : Engine/gearbox pads above spigot reference 250;
- figure 5/tables 5a) and 5b) : Coupling clamps;
- figure 6/tables 6a) and 6b) : Selected involute splines.

1.3 Items subject to agreement between engine/gearbox manufacturer and accessory manufacturer are listed in an annex.

2 REFERENCES

ISO 48, *Vulcanized rubbers — Determination of hardness*.

ISO/R 468, *Surface roughness*.

ISO/R 1078, *Dimensions of elastomeric toroidal sealing rings for aircraft (Inch series — Class 1 tolerances)*.

3 REQUIREMENTS FOR ASSEMBLY SEQUENCE

3.1 The engine/gearbox pads and accessory flanges shall be dimensioned so that the locating pin (or transfer tube) is engaged in its mating hole before the interference on the spigot sealing rings prevents rotation of the accessory casing.

3.2 In fixing the protrusion of the drive shaft, consideration shall be given to engaging the spline before the locating pin (or transfer tube) is engaged, in order to ease assembly.

3.3 In the case of heavy accessories, the design shall preclude the fitter allowing the weight of the unit to hang on the splines rather than on the spigot. This can usually be arranged by keeping the amount of spline engagement to a minimum before the spigot is engaged.

3.4 The quill shaft shall be as long as practicable in relation to the length of the splines, to reduce the effect of out-of-alignment due to manufacturing tolerances. Unless otherwise agreed, the engine/gearbox manufacturer shall be responsible for design and supply.

4 SEALING RINGS FOR TRANSFER TUBES AND FLANGE SPIGOTS

4.1 The radial compression on cross-section, and the stretch during assembly, allowed for in this International Standard are based on nitrile, fluorocarbon and silicone elastomers having a capability of 80 % stretch and a hardness of the order of 70 IRHD (see ISO 48). It may be necessary to modify the groove and "land" dimensions should materials of different characteristics be used.

4.2 The materials shall be selected by the engine/gearbox manufacturer, who shall also be responsible for the supply of the rings.

5 TRANSFER TUBES AND LOCATING AND/OR TORQUE REACTING PINS

5.1 Any transfer tubes or locating pins shall be retained in the engine/gearbox mounting pad.

5.2 If more than one transfer tube or locating pin is to be fitted, the angular positions shall be agreed between the engine/gearbox manufacturer and the accessory manufacturer.

5.3 The method of retention and the supply of tubes or pins shall be the engine/gearbox manufacturer's responsibility.

5.4 The provision for accepting the torque reaction of the accessory shall be as agreed between the engine/gearbox manufacturer and the accessory manufacturer.

6 COUPLING CLAMPS

6.1 The coupling clamp design and supply shall be the engine/gearbox manufacturer's responsibility.

6.2 A fail-safe device shall be fitted to obviate the possibility of straining the bolt (or bolts) on assembly. All nuts and bolts shall be locked in accordance with the requirements of the Design Authority.

6.3 All edges in contact with taper surfaces shall be relieved to avoid "dig in" on tightening

7 TIGHTENING THE COUPLING CLAMP

7.1 All taper and abutment surfaces shall be wiped clean and subsequently given a thin coating of a lubricant approved by the engine/gearbox manufacturer.

7.2 The clamp shall be tightened, using an approved torque wrench, to the value specified in the engine/gearbox manufacturer's instructions.

7.3 If the clamp includes more than one bolt, the nuts shall be tightened uniformly, using small increments of torque until the final value is achieved.

7.4 The nut(s) shall be slackened and retightened at least twice without altering the position of the clamp.

8 ADAPTORS

8.1 In order to avoid having to machine the taper flange on large casings, or in cases where such machining is impracticable, it is permissible to introduce an adaptor having a taper flange at one end and a bolted flange at the other, for attachment to the engine/gearbox casing.

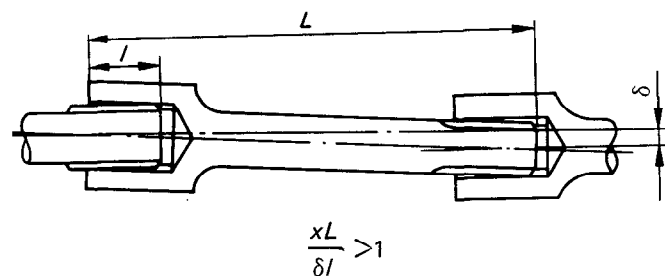
8.2 The design and supply of adaptor flanges shall be the responsibility of the engine/gearbox manufacturer.

9 SELECTION AND DESIGN OF SPLINE DRIVES

9.1 Drive shaft sizes shall be selected from the list in table 6. The size, length of engagement and other details shall be subject to agreement between the engine/gearbox manufacturer and the accessory manufacturer. Figure 6 gives male spline particulars having a 30° pressure angle, fillet root side fit to ISO . . .¹⁾, modified to provide increased circumferential clearance (backlash). The female splines shall be to ISO . . .¹⁾ without modification.

9.2 Linear and geometrical tolerances affecting the splined drive, namely squareness, concentricity and the like, shall be subject to agreement between the accessory manufacturer and the engine/gearbox manufacturer and shall be declared on the appropriate drawings.

9.3 The position and alignment of the accessory drive shall be of such accuracy as to meet the following requirements :



where

x is the minimum effective circumferential clearance in splines (backlash);

L is the length between splines (as large as possible);

l is the length of spline drive (as small as possible);

δ is the "out-of-alignment" of splines in the drive and the accessory due to manufacturing tolerances.

1) In preparation

10 LUBRICATION OF SPLINES

The arrangements for lubricating the splined drive shall be agreed between the engine/gearbox manufacturer and the accessory manufacturer; the responsibility shall rest with the former. An efficient seal shall be incorporated in the accessory to prevent ingress or egress of oil or other fluid.

11 SAFEGUARDING OF ENGINE OR GEARBOX

It shall be the joint responsibility of the engine/gearbox and accessory manufacturers to ensure that the failure of the accessory does not hazard the efficiency or safety of the

engine by, for example, vibration, overloading the drive, ingress of debris or loss or contamination of engine oil.

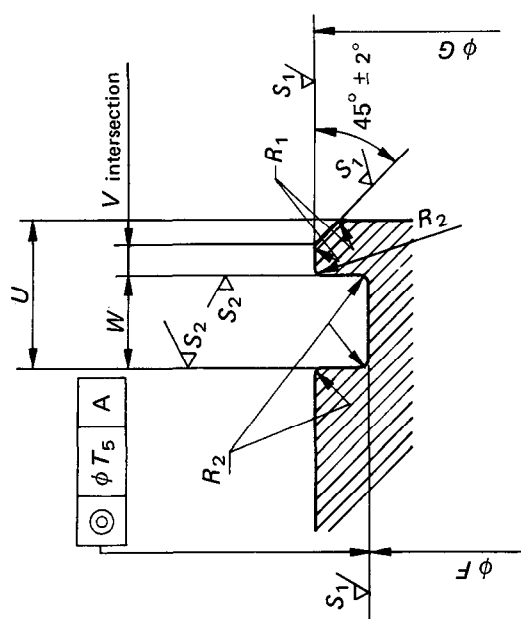
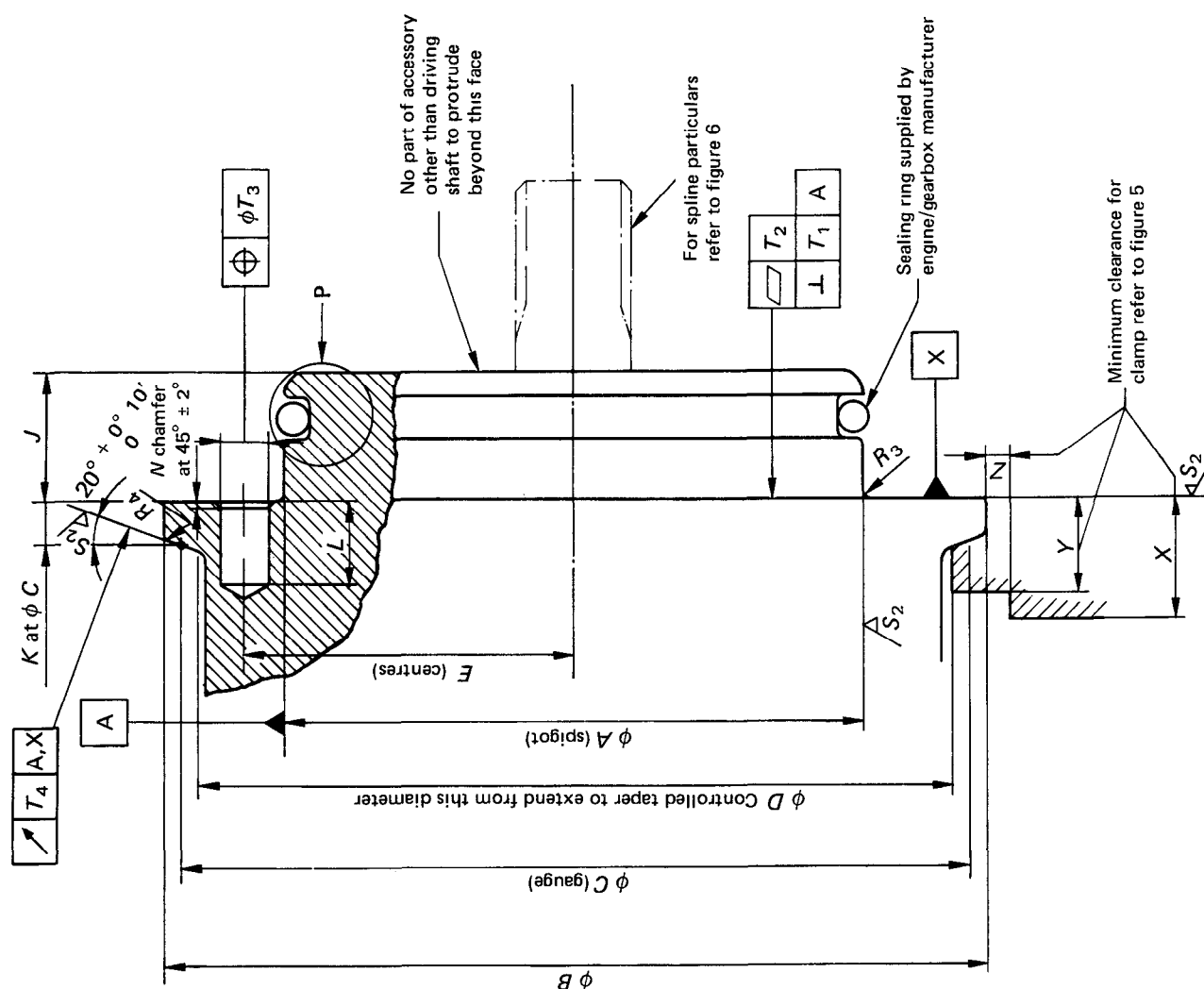
12 IDENTIFICATION

The number of this International Standard, followed by the nominal spigot diameter and the required spline drive, shall be specified as in the following example :

ISO 1971, MOUNTING PAD AND DRIVE

SPIGOT REFERENCE 412

DRIVE : 11 SPLINES 24/48 PITCH [11,64 mm (0.458 3 in)].



Enlarged section at P

Refer to figure 2 for particulars of mating engine/gearbox pad.
Machine where marked ✓ Surface roughness values to ISO/R 468.

FIGURE 1 – Accessory flanges (up to spigot reference 250)