International Standard 3070/0

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Acceptance conditions for boring and milling machines with horizontal spindle — Testing of the accuracy — Part 0: General introduction

Conditions de réception des machines à aléser et à fraiser, à broche horizontale — Contrôle de la précision — Partie 0: Introduction générale

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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 3070/0 was developed by Technical Committee ISO/TC 39, *Machine tools*.

This second edition was submitted directly to the ISO Council, in accordance with clause 6.10.1 of part 1 of the Directives for the technical work of ISO. It cancels and replaces the first edition (i.e. ISO 3070/0-1975), which had been approved by the member bodies of the following countries:

Austria
Bulgaria
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Romania
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Spain
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The member body of the following country had expressed disapproval of the document on technical grounds:

Belgium

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Acceptance conditions for boring and milling machines with horizontal spindle — Testing of the accuracy — Part 0: General introduction

1 Scope and field of application

So as to avoid any confusion when performing the tests, this part of ISO 3070 defines the machining operations carried out on boring and milling machines with horizontal spindle and describes the different types of such machines.

These machines are classified according to the three following groups:

a) table type machines (see 3.1);

b) planer type machines (see 3.2);

c) movable column machines or floor type machines (see 3.3).

In addition, the terminology of certain elements in the English, French, Russian, German and Italian languages is given.

NOTE — In addition to terms used in the three official ISO languages (English, French and Russian), this part of ISO 3070 gives the equivalent terms in German and Italian; these have been included at the request of ISO Technical Committee 39 and are published under the responsibility of the member bodies for Germany, F.R. (DIN) and Italy (UNI). However, only the terms given in the official languages can be considered as ISO terms.

2 Definitions of the machining operations carried out on these machines

2.1 Boring operations

Boring consists in machining to the required size the diameter of cylindrical, conical, blind or through holes.

In the case of coaxial bores situated on opposite faces of the same workpiece, the operation may be carried out using a boring bar, the driving taper of which is engaged into the spindle nose of the machine boring spindle (see figure 4) and the other end of which is rotating within the bearing of the steady block.

Due to the significant amount of dead time incurred by such an operation it is becoming more and more frequent to bore with a special toolholder directly mounted into the spindle nose, then turn the table 180° to bore the opposite side of the workpiece (reverse boring).

Although more economical, this latter method requires closer tolerances for table positioning.

2.2 Milling operations

Milling operations mostly involve face milling or end milling. The tools are mounted either in the boring spindle taper (see figure 4) or, as for face milling cutters, on the milling spindle nose.

3 Definition and brief description of the various types

The machines referred to below are machines with a horizontal spindle. The technical development of tooling and the efforts to limit workpiece mounting and removal operations have led to the production of machines able to bore and mill.

There is a tendency to use both expressions "boring and milling machines" and "milling and boring machines". However, the latter expression would appear preferable when the spindle is mounted in a sleeve, quill or ram, with the spindle axis passing through the spindle head (see figure 6).

It is generally accepted that these machines fall into three categories characterized by their particular configuration.

3.1 Table type machines (see figure 1)

Machines à montant fixe (F)
Tischbohrwerke (D)

With this type of machine the column is fixed to the bed.

The cutting movement is generated by the rotation of the spindle(s) and possibly of the facing head.

The feed movements are as follows:

a) longitudinal, transverse and possibly rotary movements of the table;

b) vertical movement of the spindle head;

c) axial movement of the spindle;

d) possibly movement of radial facing slide.

3.2 Planer type machines (see figure 2)

Machines à banc en croix (F)
Kreuzbettbohrwerke (D)

This type of machine may include three beds, the column and the steady beds being placed on each side of the table bed. The steady bed and the steady block are not shown in figure 2, since they are not integral parts of the machine.

The cutting movements are the same as for type 3.1.

The feed movements are as follows:

a) transverse and possibly rotary movement of table;

b) vertical movement of the spindle head;

c) axial movement of the spindle;

d) axial movement of the column on its bed, parallel to the spindle axis;

e) possibly movement of radial facing slide.

3.3 Movable column machines or floor type machines (see figure 3)

Machines à montant mobile ou machines à taque (F)
Plattenbohrwerke (D)

When the floor is utilized, the phrase "floor type machine" should be used instead of "movable column machine" to avoid any misunderstanding concerning planer type machines which also have a movable column. With floor type machines the column is movable along the bed alongside which is installed a fixed table to support workpieces which are too bulky or too heavy to be moved during machining.

The cutting movements are the same as for type 3.1.

The feed movements are as follows:

a) transverse movement of the column on the bed;

b) vertical movement of the spindle head;

c) axial movement of the spindle;

d) possibly movement of radial facing slide.

It should be noted that the column may be mounted on slideways to achieve small additional longitudinal feed movement of the column parallel with the spindle axis.

4 Special remarks concerning particular elements

4.1 Spindle heads

Reference should be made to the drawings (figures 4, 5 and 6) to consider examples of the various types of head.

Facing heads generally have a radial facing slide and are either integral or removable; the latter is considered an accessory.

It should be noted that the integral facing head may not always be mounted onto the milling spindle and may have its own bearing independent from the main spindle bearings.

4.2 Workpiece table

Workpiece tables may have various rectilinear and rotary movements for positioning and feed.

The two main rectilinear movements, the directions of which are perpendicular to each other, are used either for positioning the table or giving specified work feeds.

The rotary movement of the table may be used

a) for angular positioning in the plane of the table rotation;

b) as a circular work feed for milling operations;

c) for circular cutting movements for turning operations.

4.3 Steady blocks

Due to the decreasing use of long boring bars, there is an increasing tendency to treat steady blocks as optional parts or auxiliary equipment.

Feed movement

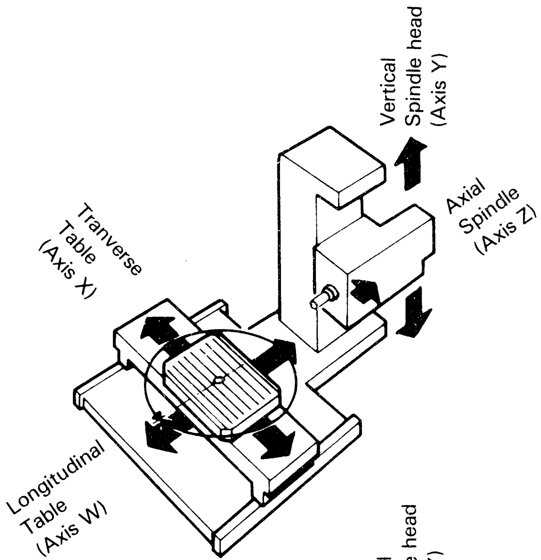


Figure 1

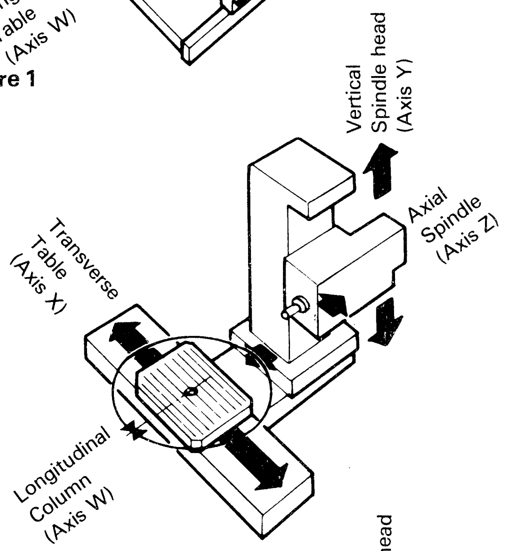


Figure 2

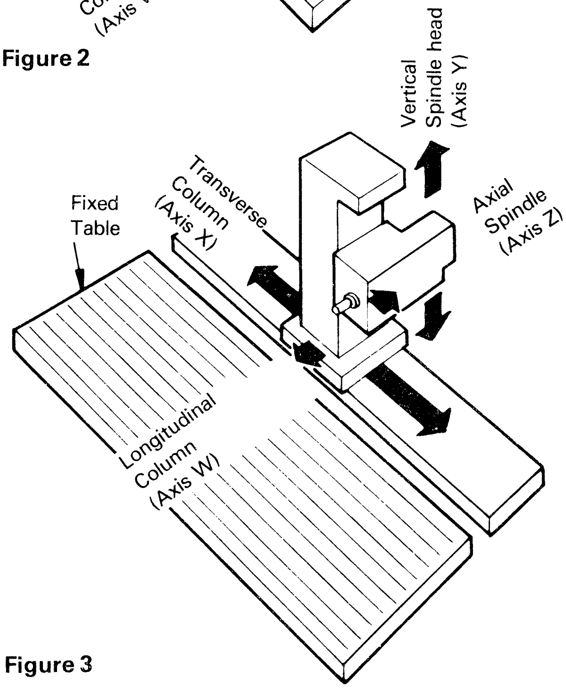


Figure 3

Spindle heads

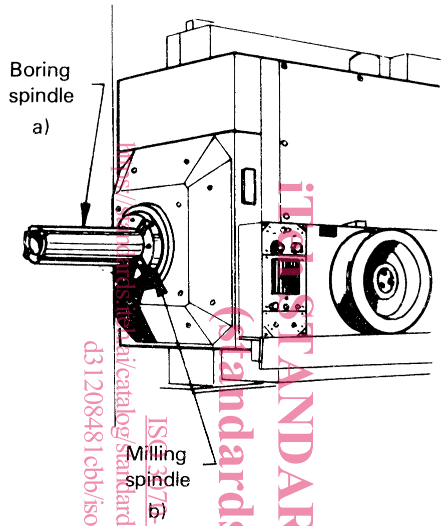


Figure 4

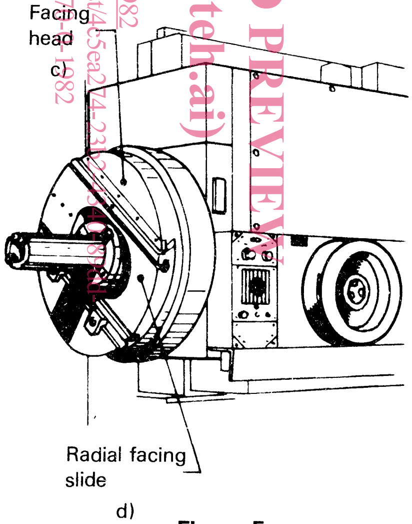


Figure 5

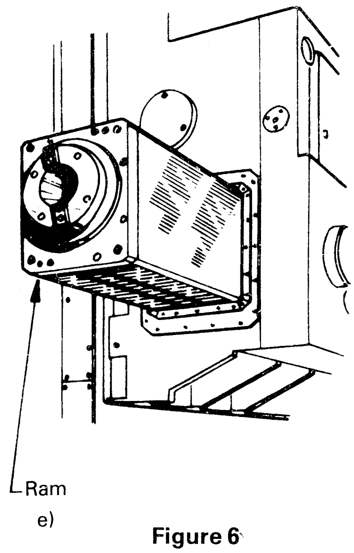
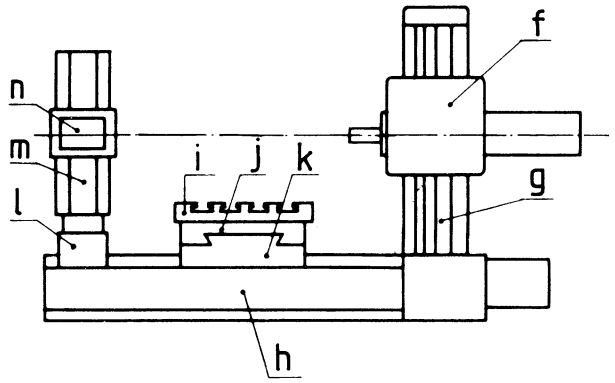
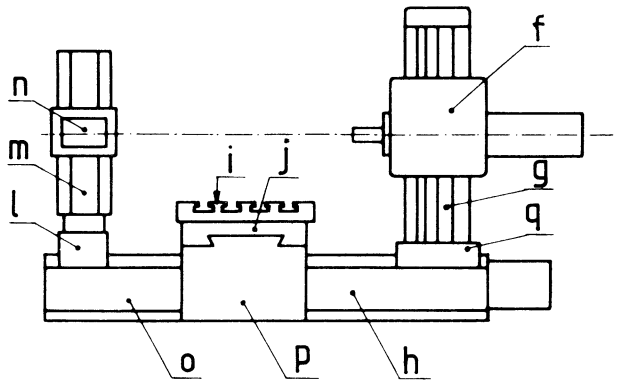
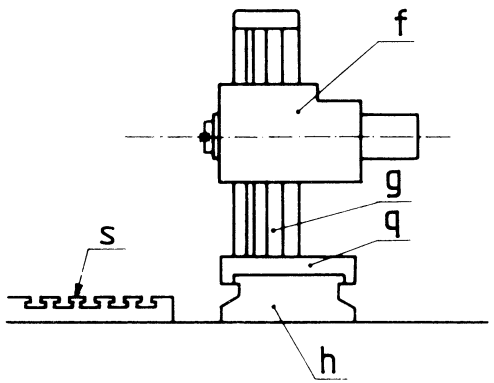
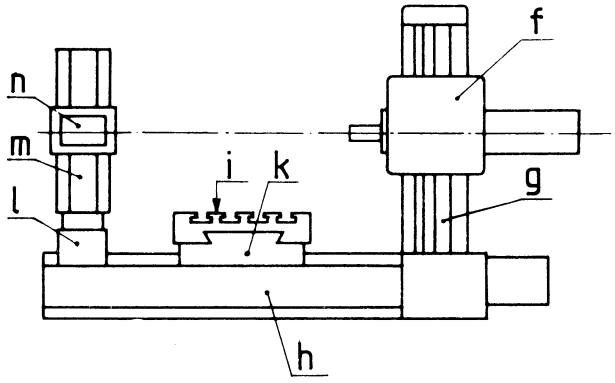
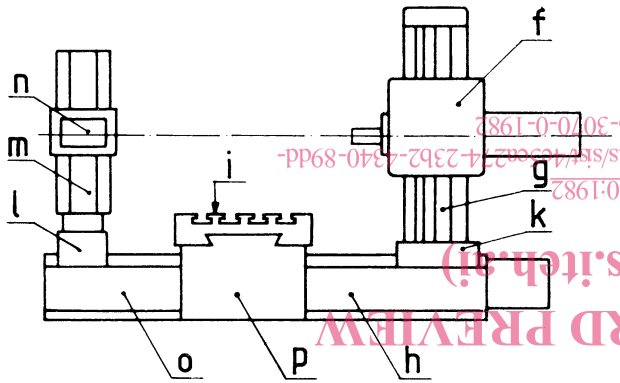
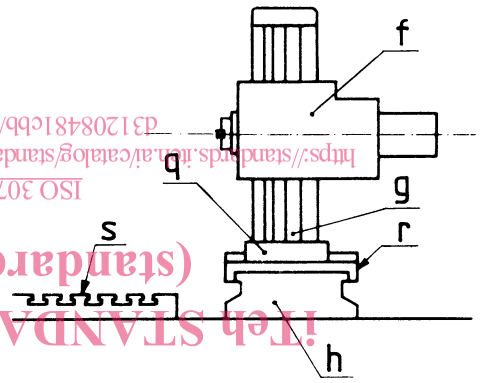


Figure 6

5 Terminology

Table type machines	Planer type machines	Movable column machines or floor type machines
with an integral rotary table 	with an integral rotary table 	with a column movable in the transverse direction 
with a non-rotary fixed table 	with a non-rotary fixed table 	with a column movable in two directions: longitudinally and transversely 

Ref.	English language	French language	Russian language	German language	Italian language
a	boring spindle	broche d'alésage	расточный шпиндель	Bohrspindel	mandrino di alesatura
b	milling spindle	broche de fraisage	фрезерный шпиндель	Frässpindel	mandrino di fresatura
c	facing head	plateau à surfacer	планшайба (для торцовки)	Planscheibe	piattaforma a sfacciare
d	radial facing slide	coulisseau radial	ползушка кулисная; ползушка радиального супорта	Planschieber	slitta radiale
e	ram	coulant	ползун	Traghülse	cannotto
f	spindle head	chariot porte-broche	шпиндельная бабка	Spindelstock	testa
g	column	montant du chariot porte-broche	стойка шпиндельной бабки	Maschinenständer	montante
h	bed	banc	станина	Maschinenbett	bancale
i	table	table	стол	Aufspanntisch	tavola
j	table base	selle	салазки поперечные	Zwischenschilitten	slitta trasversale
k	table saddle	traînard	сани (салазки) продольные	Bettschlitten	slitta longitudinale (carro)
l	steady column base	semelle du montant de lunette	салазки люнетной стойки	Bettschlitten für den Gegenhalter	slitta del contromontante
m	steady column	montant de lunette	стойка люнетная	Gegenhalterständer	contromontante
n	steady block	lunette	люнет	Gegenhalterlager	lunetta
o	steady bed	banc de la lunette	основание люнетной стойки	Bett für den ygegenhalter	banco del contromontante
p	cross bed	banc de la table	основание стола	Bett für Aufspanntisch	banco della tavola
q	column base	socle du montant porte-broche	основание стойки шпиндельной бабки	Ständerschlitten (für den Spindelstock)	slitta longitudinale di montante
r	column saddle	traînard du montant porte-broche	сани (салазки) стойки шпиндельной бабки	Zwischenschlitten (für den Spindelstock)	slitta traversale di montante
s	fixed table	taque	плита	Aufspannplatte	tavola fissa

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