
INTERNATIONAL STANDARD



3442

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

Self-centring chucks for machine tools with two-piece jaws (tongue and groove type) — Sizes for interchangeability and acceptance test specifications

Mandrins pour machines-outils, à serrage concentrique et à mors rapportés (assemblage cruciforme par tenon et languette) — Dimensions d'interchangeabilité et conditions de réception

First edition — 1975-11-01

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[ISO 3442:1975](https://standards.iteh.ai/catalog/standards/sist/295a03d8-77b7-4026-8db8-7f0c8d6452f1/iso-3442-1975)

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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 3442 was drawn up by Technical Committee ISO/TC 39, *Machine tools*, and circulated to the Member Bodies in May 1974.

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

Australia	Hungary	Spain
Austria	India	Sweden
Belgium	Italy	Switzerland
Brazil	Japan	Thailand
Canada	Korea, Rep. of	Turkey
Czechoslovakia	Poland	U.S.A.
Egypt, Arab Rep. of	Romania	U.S.S.R.
France	South Africa, Rep. of	Yugoslavia

The Member Bodies of the following countries expressed disapproval of the document on technical grounds :

Germany
United Kingdom

Self-centring chucks for machine tools with two-piece jaws (tongue and groove type) – Sizes for interchangeability and acceptance test specifications

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0 INTRODUCTION

This International Standard is the first of a series relating to self-centring chucks with two-piece jaws; however, only types in common use are considered.

Because of its wide usage, the type called "tongue and groove" has been made the subject of this International Standard.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the sizes for interchangeability, and describes, with reference to ISO/R 230, *Machine tool test code*, the geometrical tests on self-centring chucks with two-piece jaws and the corresponding permissible deviations which apply.

Sizes for interchangeability

Though the internal mounting parts and the fixing screws are not respectively interchangeable, depending whether they are manufactured in conformity with the metric sizes or the inch sizes, there is direct interchangeability for the same type between the base or master jaws in metric sizes and top jaws in inches, or vice versa.

Acceptance test specifications

According to the type of chuck considered, i.e. wrench- or drawbar-operated, the main purpose of these tests is to allow either a top jaw mounting compatible with the machining accuracy of the chuck or a precise setting for top jaws on the chuck after carrying out preliminary centring, straightening or locking operations on a jig out of the machine.

This International Standard deals only with the inspection of rotational accuracy of the chuck and the positioning of the assembling elements of top jaws. It does not apply to other dynamic qualities, such as measurement of lack of balance during rotation, balancing or measurement of gripping powers.

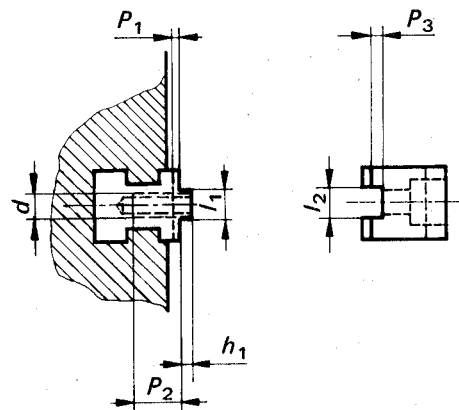
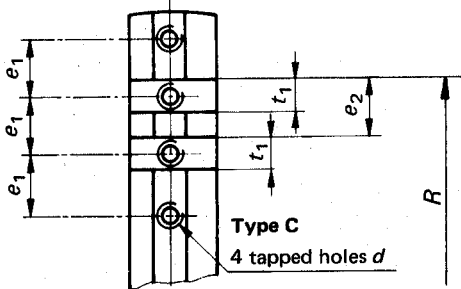
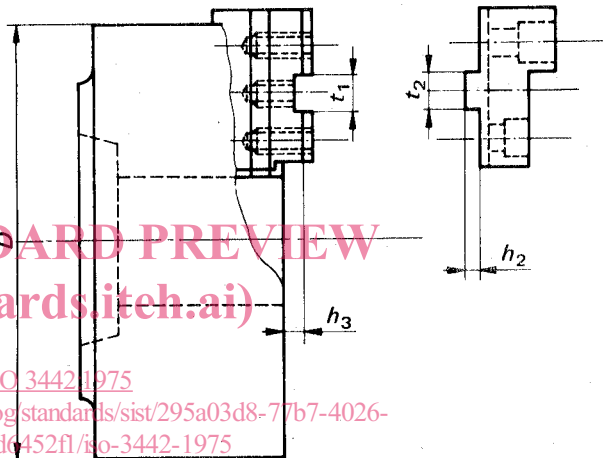
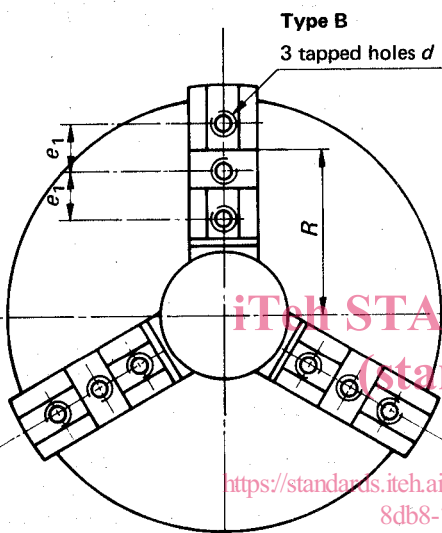
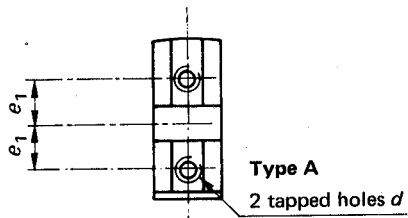
2 PRECISION CLASSES

Two precision classes are specified, namely :

- Class I, corresponding to precision chucks;
- Class II, corresponding to normal accuracy chucks.

For purposes of information, and particularly concerning Class I drawbar-operated chucks, it should be noted that these can be provided, if necessary, with specially adjusted base or master jaws which are not interchangeable with other base or master jaws.

3 SIZES FOR INTERCHANGEABILITY



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3.1 Wrench-operated chucks

Dimensions in millimetres

$D \pm 5\%$		100	125	160	200	250	315	400	500	630	800	1 000
Type		A	A	A	A	A	B	B	C	D	D	D
Base or master jaw	d	M 6	M 8	M 10	M 10	M 12	M 12	M 16	M 20	M 20	M 20	M 20
	$e_1 \pm 0,15$	12	16	19	22,2	27	31,75	38,1	38,1	38,1	38,1	38,1
	e_2	—	—	—	—	—	—	—	38,1	38,1	38,1	38,1
	h_1	2,5	3	3	3	3	3	3	3	3	3	3
	h_3 min.	3,2	4,7	5	5	5	5	8	8	8	8	8
	l_1 h9	7,94	7,94	7,94	7,94	12,7	12,7	12,7	12,7	12,7	12,7	12,7
	P_1	3,5	4	4	4	4	4	7	7	7	7	7
	P_2	12	14,5	18	18	20	20	28	33	33	33	33
	t_1 H8	9,5	12,675	12,675	12,675	19,025	19,025	19,025	19,025	19,025	19,025	19,025
Top jaw	h_2	2,5	3	3	3	3	3	6	6	6	6	6
	l_2 E9	7,94	7,94	7,94	7,94	12,7	12,7	12,7	12,7	12,7	12,7	12,7
	P_3	3,5	4	4	4	4	4	4	4	4	4	4
	t_2 h8	9,5	12,675	12,675	12,675	19,025	19,025	19,025	19,025	19,025	19,025	19,025

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Dimensions in inches

$D \pm 5\%$		4	5	6	8	10	12	15	18	21	24	28	32	36
Type				A	A	A	B	B	C	D	D	D	D	D
Base or master jaw	d			0.375	0.375	0.500	0.500	0.625	0.750	0.750	0.750	0.750	0.750	0.750
	UNC-3B			— 16	— 16	— 13	— 13	— 11	— 10	— 10	— 10	— 10	— 10	— 10
	$e_1 \pm 0.006$			0.750	0.875	1.062	1.250	1.500	1.500	1.500	1.500	1.500	1.500	1.500
	e_2			—	—	—	—	—	1.500	1.500	1.500	1.500	1.500	1.500
	h_1 max.			0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
	min.			0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
	h_3			0.20	0.20	0.20	0.20	0.32	0.32	0.32	0.32	0.32	0.32	0.32
	l_1 max.			0.312	0.312	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
	min.			0.310	0.310	0.498	0.498	0.498	0.498	0.498	0.498	0.498	0.498	0.498
	P_1 max.			0.18	0.18	0.18	0.18	0.30	0.30	0.30	0.30	0.30	0.30	0.30
min.			0.16	0.16	0.16	0.16	0.28	0.28	0.28	0.28	0.28	0.28	0.28	
P_2			0.65	0.65	0.80	0.80	1.10	1.30	1.30	1.30	1.30	1.30	1.30	
t_1 max.			0.500	0.500	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	
min.			0.499	0.499	0.749	0.749	0.749	0.749	0.749	0.749	0.749	0.749	0.749	
Top jaw	h_2 max.			0.12	0.12	0.12	0.12	0.25	0.25	0.25	0.25	0.25	0.25	0.25
	min.			0.10	0.10	0.10	0.10	0.23	0.23	0.23	0.23	0.23	0.23	0.23
	l_2 max.			0.315	0.315	0.503	0.503	0.503	0.503	0.503	0.503	0.503	0.503	0.503
	min.			0.313	0.313	0.501	0.501	0.501	0.501	0.501	0.501	0.501	0.501	0.501
	P_3 max.			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
	min.			0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
t_2 max.			0.499	0.499	0.749	0.749	0.749	0.749	0.749	0.749	0.749	0.749	0.749	
min.			0.498	0.498	0.748	0.748	0.748	0.748	0.748	0.748	0.748	0.748	0.748	

3.2 Drawbar-operated chucks

Dimensions in millimetres

$D \pm 5\%$		100	125	160	200	250	315	400	500	630	800	1 000	
Type				A	A	A	B	B	C	D			
Base or master jaw	d			M 10	M 12	M 16	M 16	M 20	M 20	M 20			
	$e_1 \pm 0,15$			19	22,2	27	31,75	38,1	38,1	38,1			
	e_2			—	—	—	—	—	38,1	38,1			
	h_1			3	3	3	3	3	3	3			
	h_3 min.			5	5	5	5	8	8	8			
	l_1 h9			7,94	7,94	12,7	12,7	12,7	12,7	12,7	12,7		
	P_1			4	4	4	4	7	7	7	7		
	P_2			20	22	27	30	38	38	38	38		
	t_1 H8			12,675	12,675	19,025	19,025	19,025	19,025	19,025	19,025		
Top jaw	h_2			3	3	3	3	6	6	6			
	l_2 E9			7,94	7,94	12,7	12,7	12,7	12,7	12,7			
	P_3			4	4	4	4	4	4	4			
	t_2 h8			12,675	12,675	19,025	19,025	19,025	19,025	19,025			

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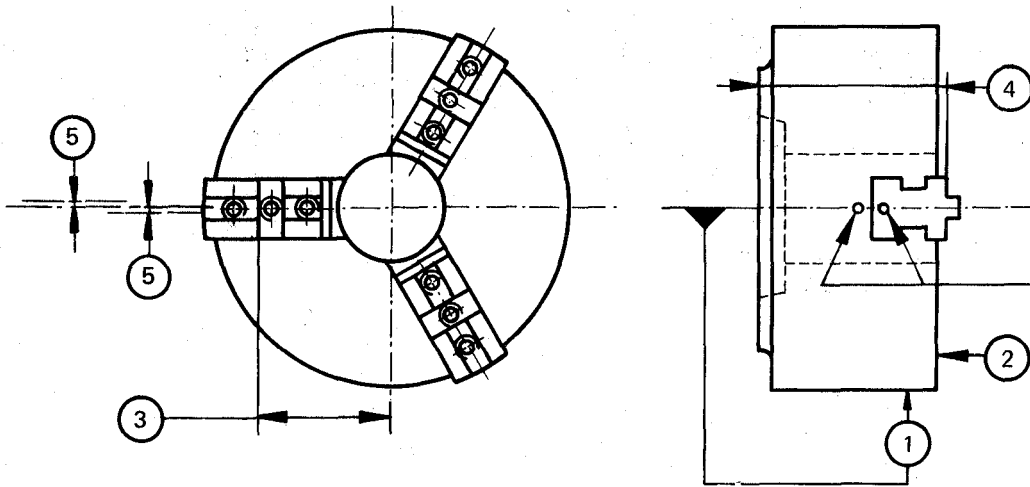
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Dimensions in inches

$D \pm 5\%$		4	5	6	8	10	12	15	18	21	24	28	32	36
Type				A	A	A	B	B	C	C	D	D	D	D
Base or master jaw	d			0.437 5	0.500	0.625	0.625	0.750	0.750	0.750	0.750	0.875	0.875	0.875
	UNC-3B			- 14	- 13	- 11	- 11	- 10	- 10	- 10	- 10	- 9	- 9	- 9
	$e_1 \pm 0,006$			0.750	0.875	1.062	1.250	1.500	1.500	1.500	1.500	1.500	1.500	1.500
	e_2			—	—	—	—	—	1.500	1.500	1.500	1.500	1.500	1.500
	h_1 max.			0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
	min.			0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
	h_3			0.20	0.20	0.20	0.20	0.32	0.32	0.32	0.32	0.32	0.32	0.32
	l_1 max.			0.312	0.312	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500	0.500
	min.			0.310	0.310	0.498	0.498	0.498	0.498	0.498	0.498	0.498	0.498	0.498
	P_1 max.			0.17	0.17	0.17	0.17	0.30	0.30	0.30	0.30	0.30	0.30	0.30
min.			0.15	0.15	0.15	0.15	0.28	0.28	0.28	0.28	0.28	0.28	0.28	
P_2			0.76	0.88	1.06	1.20	1.50	1.50	1.50	1.50	1.50	1.50	1.50	
t_1 max.			0.500	0.500	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	0.750	
min.			0.499	0.499	0.749	0.749	0.749	0.749	0.749	0.749	0.749	0.749	0.749	
Top jaw	h_2 max.			0.12	0.12	0.12	0.12	0.25	0.25	0.25	0.25	0.25	0.25	0.25
	min.			0.10	0.10	0.10	0.10	0.23	0.23	0.23	0.23	0.23	0.23	0.23
	l_2 max.			0.315	0.315	0.503	0.503	0.503	0.503	0.503	0.503	0.503	0.503	0.503
	min.			0.313	0.313	0.501	0.501	0.501	0.501	0.501	0.501	0.501	0.501	0.501
	P_3 max.			0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
min.			0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
t_2 max.			0.499	0.499	0.749	0.749	0.749	0.749	0.749	0.749	0.749	0.749	0.749	
min.			0.498	0.498	0.748	0.748	0.748	0.748	0.748	0.748	0.748	0.748	0.748	
R				2.44	3.06	3.81	4.50	5.62	7.12	8.62	10.12	12.12	14.12	16.12

4 ACCEPTANCE TEST SPECIFICATIONS

(Geometrical tests)



Identification to be marked on when the master jaws are not interchangeable. Example : Drawbar-operated chucks with adjusted master jaws.

4.1 Class I

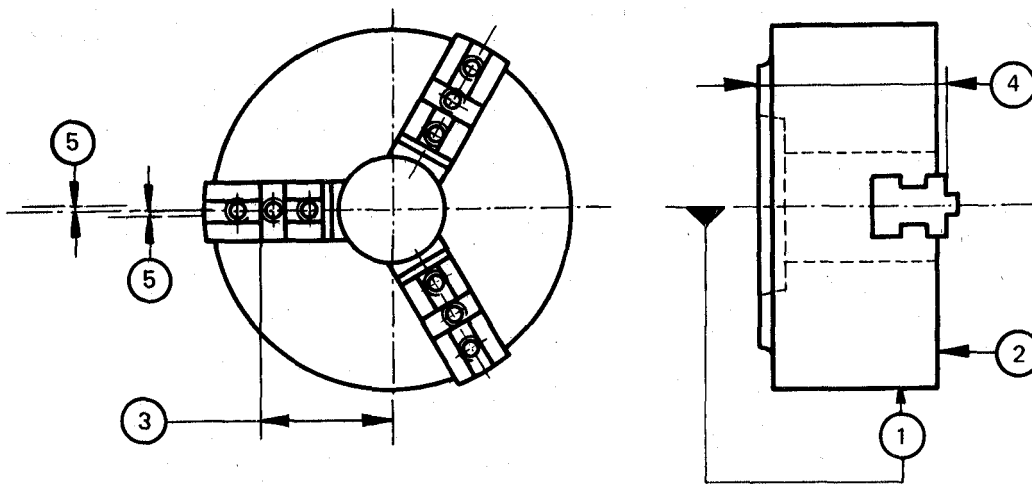
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No.	Object	Diameter of chuck D		Full indicator movement (F.I.M.) (Nos. 1, 2, 3 and 4) or permissible deviation (No. 5)			
		https://standards.iteh.ai/catalog/standards/sist/295a03d8-77b7-4026-8db8-7f0c8d5452f1/iso-3442-1975		Wrench-operated chuck		Drawbar-operated chuck	
		mm	in	mm	in	mm	in
1	Concentricity of outside diameter	$D \leq 160$	$D \leq 6$	0,05	0,002	0,04	0,001 5
		$160 < D \leq 315$	$6 < D \leq 12$	0,08	0,003	0,05	0,002
2	Axial run-out of face of chuck	$315 < D \leq 630$	$12 < D \leq 24$	0,10	0,004	0,06	0,002 5
		$630 < D \leq 1\ 000$	$24 < D \leq 36$	0,12	0,005		
3	Concentricity of outer surface of top jaw locating key slot	$D \leq 160$	$D \leq 6$	0,12	0,005	0,025	0,001
		$160 < D \leq 315$	$6 < D \leq 12$	0,16	0,006	0,04	0,001 5
		$315 < D \leq 630$	$12 < D \leq 24$	0,20	0,008	0,05	0,002
		$630 < D \leq 1\ 000$	$24 < D \leq 36$	0,25	0,01		
4	Deviation of dimension between top of master jaws and mounting face of chuck	$D \leq 160$	$D \leq 6$	0,10	0,004	0,025	0,001
		$160 < D \leq 315$	$6 < D \leq 12$	0,12	0,005	0,04	0,001 5
		$315 < D \leq 630$	$12 < D \leq 24$	0,16	0,006	0,05	0,002
		$630 < D \leq 1\ 000$	$24 < D \leq 36$	0,20	0,008		
5	Permissible deviation between top jaw locating tongue centre line and parallel plane through centre line of chuck	$D \leq 160$	$D \leq 6$	0,12	0,005	0,05	0,002
		$160 < D \leq 315$	$6 < D \leq 12$	0,16	0,006	0,08	0,003
		$315 < D \leq 630$	$12 < D \leq 24$	0,20	0,008	0,1	0,004
		$630 < D \leq 1\ 000$	$24 < D \leq 36$	0,25	0,01		

NOTES

1 For the purpose of geometrical tests Nos. 1, 3 and 5, the chuck may be mounted on a test spindle flange or adaptor. The radial run-out on the outside diameter of the flange or adaptor and the axial run-out at any point on its face shall be not more than 0,005 mm or 0,000 2 in FIM.

2 Geometrical tests Nos. 3, 4 and 5 shall be carried out with the chuck tightened, the base or master jaws locked on a dummy piece. The value of the clamping force shall be specified by the manufacturer.



4.2 Class II

No.	Object	Diameter of chuck <i>D</i>		Full indicator movement (F.I.M.) (Nos. 1, 2, 3 and 4) or permissible deviation (No. 5)			
				Wrench-operated chuck		Drawbar-operated chuck	
		mm	in	mm	in	mm	in
1	Concentricity of outside diameter	$D \leq 160$	$D \leq 6$	0,05	0,002	0,05	0,002
		$160 < D \leq 315$	$6 < D \leq 12$	0,08	0,003	0,08	0,003
2	Axial run-out of face of chuck	$315 < D \leq 630$	$12 < D \leq 24$	0,10	0,004	0,1	0,004
		$630 < D \leq 1\ 000$	$24 < D \leq 36$	0,12	0,005		
3	Concentricity of outer surface of top jaw locating key slot	$D \leq 160$	$D \leq 6$	0,25	0,01	0,12	0,005
		$160 < D \leq 315$	$6 < D \leq 12$	0,3	0,012	0,16	0,006
		$315 < D \leq 630$	$12 < D \leq 24$	0,4	0,015	0,20	0,008
		$630 < D \leq 1\ 000$	$24 < D \leq 36$	0,5	0,02		
4	Deviation of dimension between top of master jaws and mounting face of chuck	$D \leq 160$	$D \leq 6$	0,2	0,008	0,08	0,003
		$160 < D \leq 315$	$6 < D \leq 12$	0,25	0,01	0,1	0,004
		$315 < D \leq 630$	$12 < D \leq 24$	0,3	0,012	0,12	0,005
		$630 < D \leq 1\ 000$	$24 < D \leq 36$	0,4	0,015		
5	Permissible deviation between top jaw locating tongue centre line and parallel plane through centre line of chuck	$D \leq 160$	$D \leq 6$	0,25	0,01	0,12	0,005
		$160 < D \leq 315$	$6 < D \leq 12$	0,3	0,012	0,16	0,006
		$315 < D \leq 630$	$12 < D \leq 24$	0,4	0,015	0,2	0,008
		$630 < D \leq 1\ 000$	$24 < D \leq 36$	0,5	0,02		

NOTES

1 For the purpose of geometrical tests Nos. 1, 3 and 5, the chuck may be mounted on a test spindle flange or adaptor. The radial run-out on the outside diameter of the flange or adaptor and the axial run-out at any point on its face shall be not more than 0,005 mm or 0,000 2 in FIM.

2 Geometrical tests Nos. 3, 4 and 5 shall be carried out with the chuck tightened, the base or master jaws locked on a dummy piece. The value of the clamping force shall be specified by the manufacturer.