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ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 702

SPINDLE NOSES AND FACE PLATES TYPES A AND CAMLOCK

SIZES FOR INTERCHANGEABILITY

1st EDITION

March 1968

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BRIEF HISTORY

The ISO Recommendation R 702, *Spindle noses and face plates—Types A and Cam-lock—Sizes for interchangeability*, was drawn up by Technical Committee ISO/TC 39, *Machine tools*, the Secretariat of which is held by the Association Française de Normalisation (AFNOR).

Work on this question by the Technical Committee began in 1951 and led, in 1965, to the adoption of a Draft ISO Recommendation.

In February 1966, this Draft ISO Recommendation (No. 931) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies:

Belgium	Israel	Switzerland
Chile	Italy	Turkey
Czechoslovakia	Japan	U.A.R.
Denmark	Netherlands	United Kingdom
France	Poland	U.S.A.
Germany	Portugal	U.S.S.R.
Hungary	Spain	
India	Sweden	

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in March 1968, to accept it as an ISO RECOMMENDATION.

CONTENTS

ISO Recommendation R 702 March 1968

SPINDLE NOSES AND FACE PLATES TYPES A AND CAMLOCK

SIZES FOR INTERCHANGEABILITY

1. SCOPE

This ISO Recommendation is the first of a series of ISO Recommendations specifying the sizes for interchangeability for lathe spindle noses and face plates and covering the three types selected for international standardization, i.e. A and Camlock types and bayonet type.

The first two types, which are presently in use in most countries, are the subject of this ISO Recommendation, the third type being the subject of ISO Recommendation R ...,* *Spindle noses and face plates—Bayonet type—Sizes for interchangeability—Metric series.*

2. INTERCHANGEABILITY

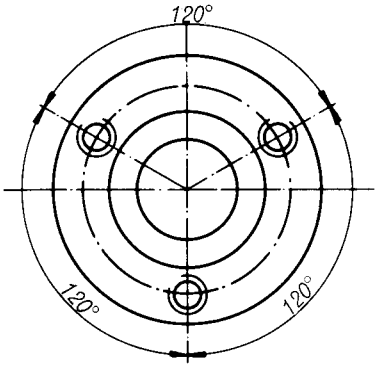
Although internal mounting components and assembly screws are not respectively interchangeable, as they may conform with either metric or inch series, there is complete interchangeability for the same type (A or Camlock) between metric spindle noses and face plates in inches and *vice versa.*

* At present Draft ISO Recommendation No. 1327.

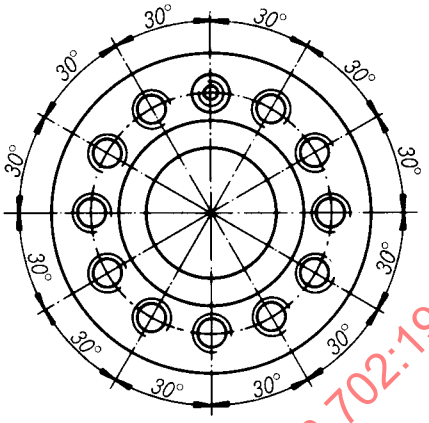
3. TYPE A

3.1 Spindle noses - Type A

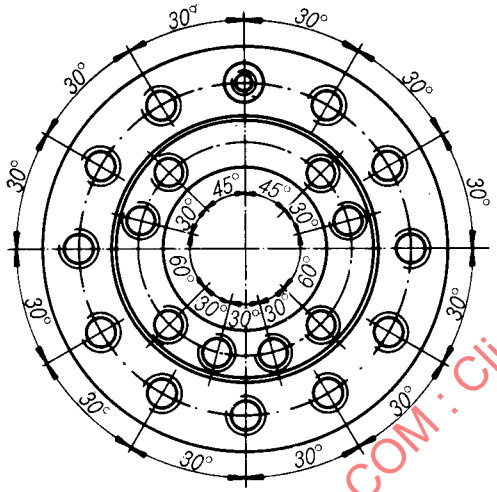
No. 3



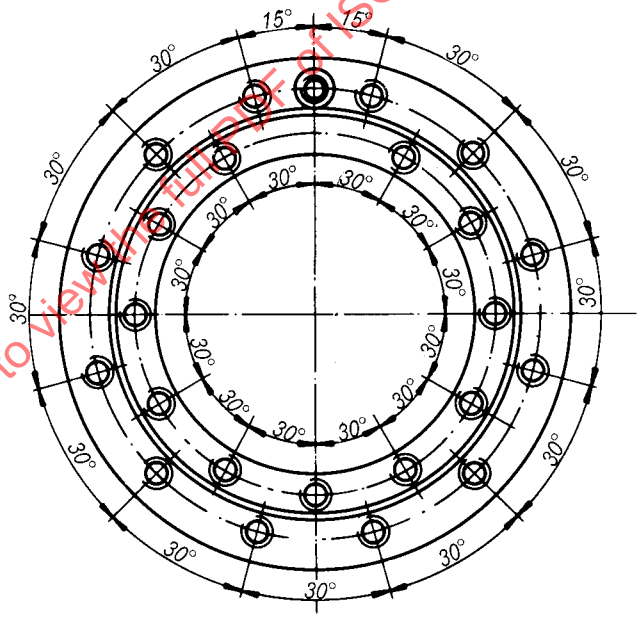
No. 4

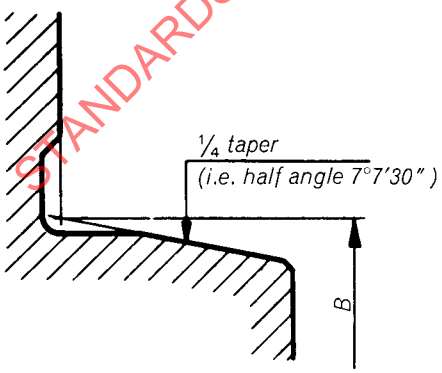


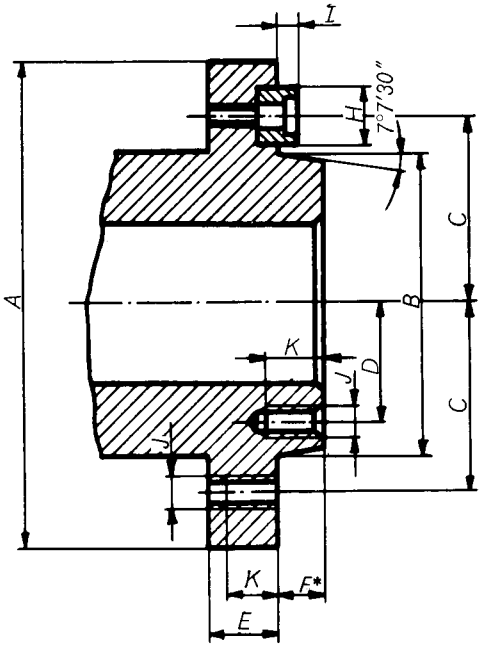
Nos. 5 to 11



Nos. 15 to 28







Dimension B is taken at the theoretical point of intersection between the generating line of the cone and the face of the flange

* F_1 *for type* A_1, *with inner bolt circle*
F_2 *for type* A_2, *without inner bolt circle*

3.1.1 *Sizes in millimetres*

Type A_1: Two bolt circles with radius *C* and *D*

Type A_2: Only the outer bolt circle with radius *C*
(Type A_2 for Nos. 3 and 4; types A_1 and A_2 for Nos. 5 to 28)

No. / Dimension	3	4	5	6	8	11	15	20	28	Tolerances
A	92	108	133	165	210	280	380	520	725	
B	53.975	63.513	82.563	106.375	139.719	196.869	285.775	412.775	584.225	$\pm$ IT 4 / ^{0} (3)
C	35.3	41.3	52.4	66.7	85.7	117.5	165.1	231.8	323.8	(1)
D			30.95	41.3	55.55	82.55	123.8	184.15	265.1	(1)
E	16	20	22	25	28	35	42	48	56	
F_1*			14.288	15.875	17.462	19.050	20.638	22.225	25.400	(2)
F_2*	11	11	13	14	16	18	19	21	24	
H		14.25	15.9	19.05	23.8	28.6	34.9	41.3	50.8	H8/h8
I		5	5	5	6	8	8	8	8	
J	M 10	M 10	M 10	M 12	M 16	M 18	M 22	M 24	M 30	
K	14	17	19	22	25	32	37	42	50	

* F_1 for type A_1, F_2 for type A_2.

(1) 0.1 mm for Nos. 3 to 11 } buttons and
0.15 mm for Nos. 15 to 28 } fixing holes } Tolerance of position (radial deviation with respect to the theoretical position)

(2) — 0.025 mm for Nos. 5 to 28

(3) $^{+\ 0.023}_{0}$ mm for No. 28

NOTE. — General tolerance for untoleranced dimensions: $\pm$ 0.4 mm.

3.1.2 *Sizes in inches*

Type A_1: Two bolt circles with radius *C* and *D*

Type A_2: Only the outer bolt circle with radius *C*
(Type A_2 for Nos. 3 and 4; types A_1 and A_2 for Nos. 5 to 28)

No. / Dimension	3	4	5	6	8	11	15	20	28	Tolerances
A	3 5/8	4 1/4	5 1/4	6 1/2	8 1/4	11	15	20 1/2	28 1/2	
B	2.125 0	2.500 5	3.250 5	4.188 0	5.500 75	7.750 75	11.251 0	16.251 0	23.001 0	(3)
C	1.391	1.625	2.062 5	2.625	3.375	4.625	6.500	9.125	12.750	(1) (2)
D			1.218 75	1.625 0	2.187 5	3.250 0	4.875 0	7.250 0	10.437 5	(2)
E	5/8	3/4	7/8	1	1 1/8	1 3/8	1 5/8	1 7/8	2 1/4	
F_1*			0.562 5	0.625	0.687 5	0.750	0.812 5	0.875	1.000	(5)
F_2*	7/16	7/16	1/2	9/16	5/8	11/16	3/4	13/16	15/16	
H		0.562 5	0.625	0.750	0.937 5	1.125	1.375	1.625	2.000	(4)
I		3/16	3/16	3/16	1/4	5/16	5/16	5/16	5/16	
J	7/16-14 UNC	7/16-14 UNC	7/16-14 UNC	1/2-13 UNC	5/8-11 UNC	3/4-10 UNC	7/8-9 UNC	1-8 UNC	1 1/4-7 UNC	
K	9/16	11/16	3/4	7/8	1 1/16	1 1/4	1 7/16	1 5/8	2	

* F_1 for type A_1, F_2 for type A_2.

(1) 0.003 in for Nos. 4 to 8 } buttons
0.006 in for Nos. 11 to 28 }

(2) 0.006 in for Nos. 3 to 8 } fixing holes
0.008 in for Nos. 11 to 28 }

} Tolerance of position (radial deviation with respect to the theoretical position)

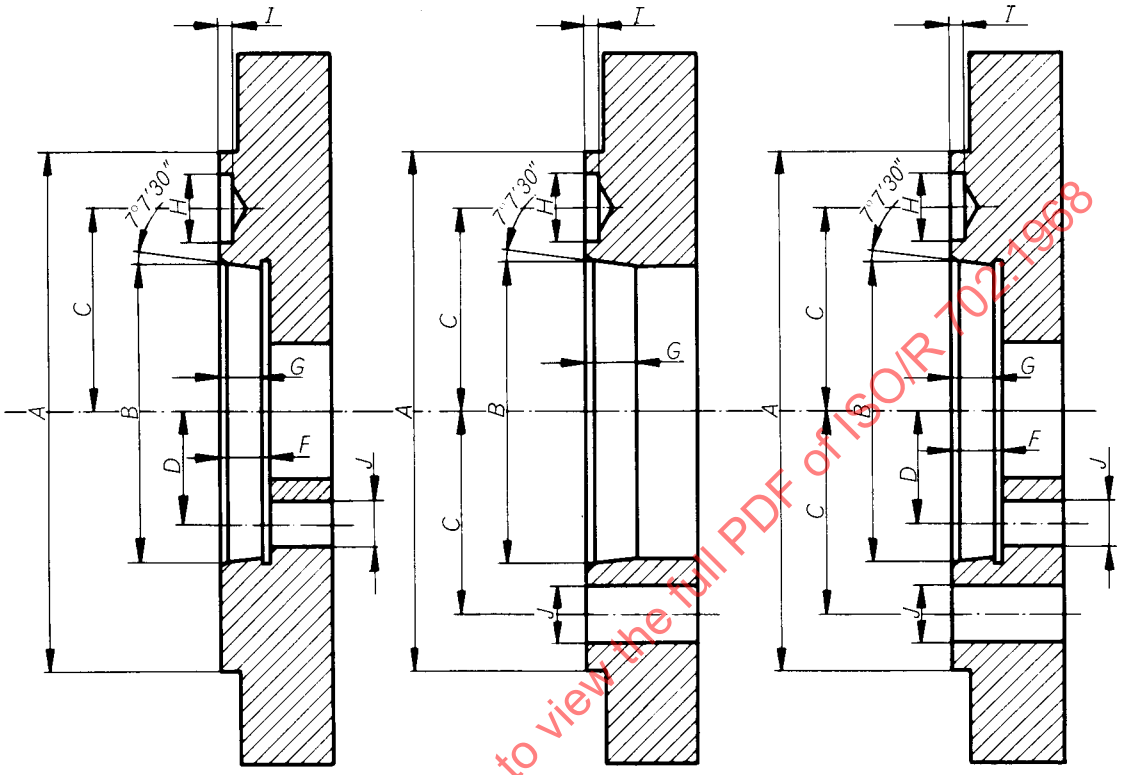
(3) + 0.000 25 in for No. 3
+ 0.000 5 in for Nos. 4 to 11
+ 0.001 in for Nos. 15 to 28

(4) − 0.001 in for buttons
+ 0.002 in for button-holes

(5) − 0.001 in for Nos. 5 to 28

NOTE.—General tolerance for untoleranced dimensions: ± 1/64 in.

3.2 Face plates - Type A



Machining with inner bolt circle (for mounting on spindle nose A_1 by means of its inner bolt circle)

Machining with outer bolt circle (for mounting on spindle nose A_1, or spindle nose A_2 by means of its outer bolt circle)

Machining with two bolt circles (for mounting either on spindle nose A_2, or on spindle nose A_1 by means of inner or outer bolt circle)

3.2.1 *Sizes in millimetres*

Three possible ways of machining (see figures, page 9).

No. / Dimension	3	4	5	6	8	11	15	20	28	Tolerances
A	92	108	133	165	210	280	380	520	725	
B	53.975	63.513	82.563	106.375	139.719	196.869	285.775	412.775	584.225	+ (IT4-IT3) −IT3 (2)
C	35.3	41.3	52.4	66.7	85.7	117.5	165.1	231.8	323.8	(1)
D			30.95	41.3	55.55	82.55	123.8	184.15	265.1	(1)
F_1*			14.288	15.875	17.462	19.050	20.638	22.225	25.400	+ 0.025
F_2*			15	16	18	20	21	23	26	min.
G	10	10	12	13	14	16	17	19	22	
H		14.7	16.3	19.45	24.2	29.4	35.7	42.1	51.6	+ 0.1
I		6.5	6.5	6.5	8	10	10	10	10	
J	12	12	12	14	18	20	24	26	33	

• F_1 for type A_1; F_2 for type A_2 (and possibly for type A_1 also, if the face plate is rigid enough not to risk bending when the screws are clamped on the inner bolt circle).

(1) 0.1 mm for Nos. 3 to 11 } buttons and } Tolerance of position (radial deviation
0.15 mm for Nos. 15 to 28 } fixing holes } with respect to the theoretical position)

(2) + 0.006 mm } for No. 28
− 0.017 mm }

NOTE.—General tolerance for untoleranced dimensions: ± 0.4 mm.

3.2.2 *Sizes in inches*

Three possible ways of machining (see figures, page 9).

No. / Dimension	3	4	5	6	8	11	15	20	28	Tolerances
A	3 5/8	4 1/4	5 1/4	6 1/2	8 1/4	11	15	20 1/2	28 1/2	
B	2.125 0	2.500 5	3.250 3	4.187 8	5.500 55	7.750 55	11.250 5	16.250 5	23.000 0	(3)
C	1.391	1.625	2.062 5	2.625	3.375	4.625	6.500	9.125	12.750	(1) (2)
D			1.218 75	1.625 0	2.187 5	3.250 0	4.875 0	7.250 0	10.437 5	(2)
F			0.562 5	0.625	0.687 5	0.750	0.812 5	0.875	1.000	+ 0.001
G	3/8	3/8	7/16	1/2	9/16	5/8	11/16	3/4	7/8	
H		0.578	0.641	0.766	0.953	1.156	1.406	1.656	2.031	+0.004
I		1/4	1/4	1/4	5/16	3/8	3/8	3/8	3/8	
J	15/32	15/32	15/32	17/32	21/32	51/64	59/64	1 3/64	1 19/64	

(1) 0.003 in for Nos. 4 to 8 } buttons
0.006 in for Nos. 11 to 28 }

(2) 0.006 in for Nos. 3 to 8 } fixing holes
0.008 in for Nos. 11 to 28 }

} Tolerance of position (radial deviation with respect to the theoretical position)

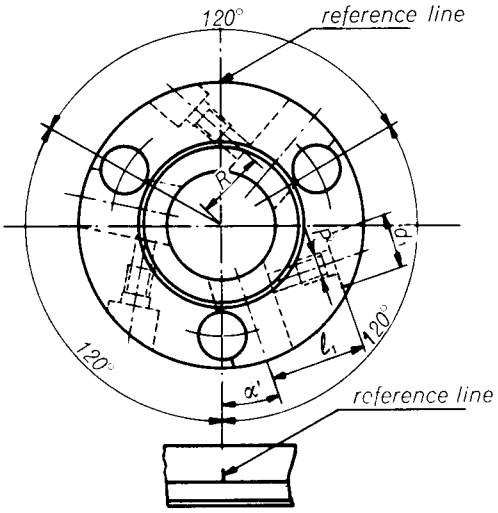
(3) — 0.000 5 in for Nos. 3 to 11
— 0.001 in for Nos. 15 to 28

NOTE.—General tolerance for untoleranced dimensions: ± 1/64 in.

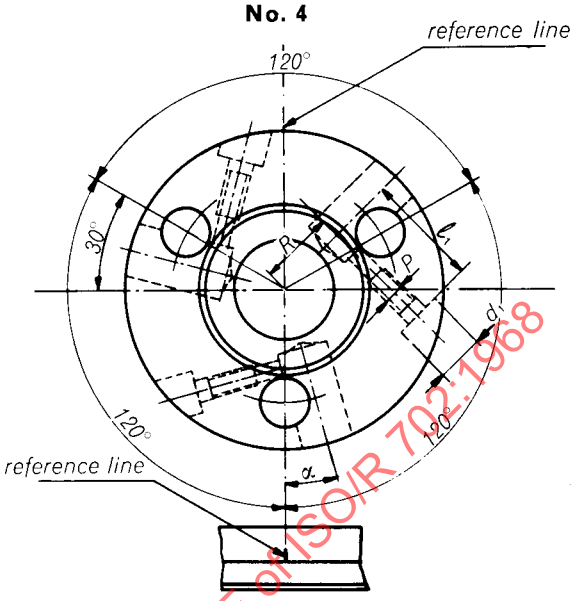
4. TYPE CAMLOCK

4.1 Spindle noses - Type Camlock

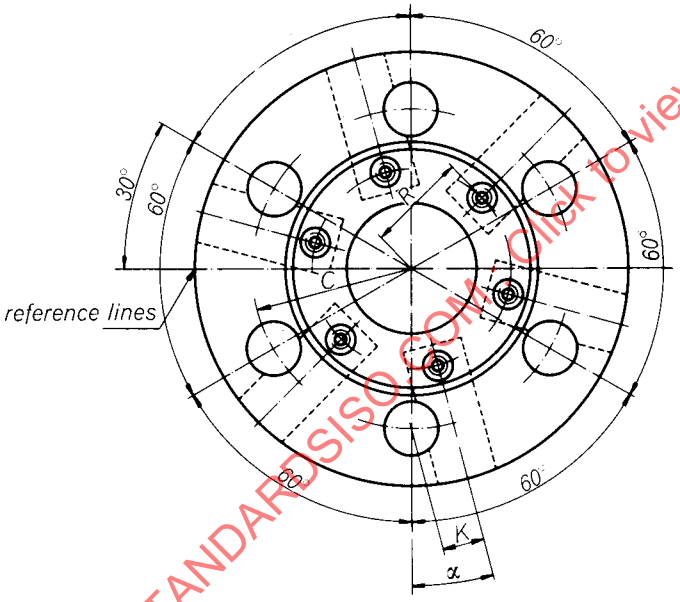
No. 3

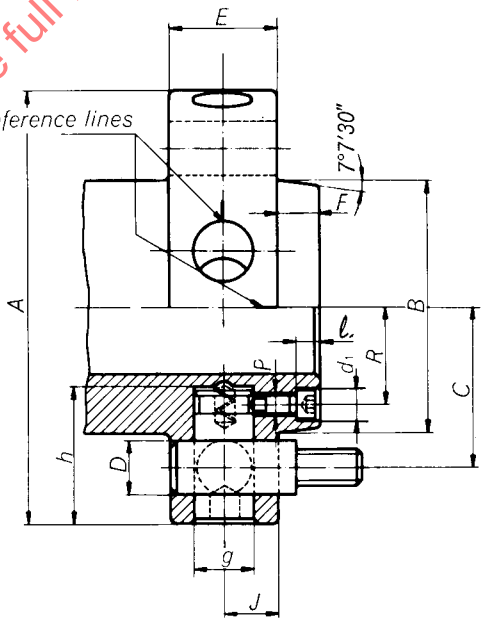


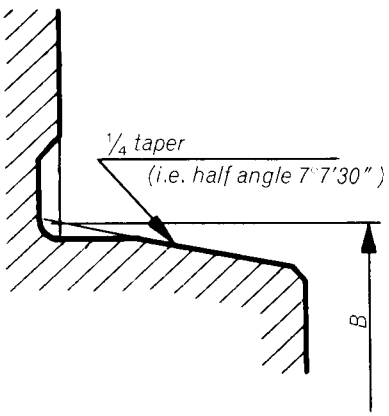
No. 4



Nos. 5 to 20







Dimension B is taken at the theoretical point of intersection between the generating line of the cone and the face of the flange.

4.1.1 *Sizes in millimetres*

No. / Dimension	3	4	5	6	8	11	15	20	Tolerances
A	92	117	146	181	225	298	403	546	
B	53.975	63.513	82.563	106.375	139.719	196.869	285.775	412.775	+ IT 4 0
C	35.3	41.3	52.4	66.7	85.7	117.5	165.1	231.8	(1)
D	15.1	16.7	19.8	23.0	26.2	31.0	35.7	42.1	+ 0.05 0
E	32	34	38	45	50	60	70	82	min.
F	11	11	13	14	16	18	19	21	
K	11.1	11.1	13.5	15.9	18.25	21.45	24.6	28.6	± 0.1
R	22.6	27.0	32.5	41.0	57.0	86.0	129.0	190.0	(2)
J	17.5	17.5	20.6	23.8	27.0	31.8	36.5	42.9	
α	18° 18.6′	15° 36′	14° 55′	13° 46′	12° 18′	10° 30′	8° 35′	7° 05′	
g	19	19	22	26	29	32	35	42	H8
h	27.5	36	46	57	64	75	84	94	+ 0.2 0
d_1	15.5	15.5	10.5	13.5	13.5	13.5	16.5	16.5	
ℓ			7	9	9	9	11	11	
ℓ_1	30	40							± 0.2
P	M 8	M 8	M 6	M 8	M 8	M 8	M 10	M 10	

(1) 0.05 mm for No. 3
0.075 mm for Nos. 4 to 20
} Tolerance of position (radial deviation with respect to the theoretical position)

(2) ± 0.05 mm for Nos. 3 and 4
± 0.1 mm for Nos. 5 to 20

NOTE.—General tolerance for untoleranced dimensions: ± 0.4 mm.

4.1.2 *Sizes in inches*

No. / Dimension	3	4	5	6	8	11	15	20	Tolerances
A	3 5/8	4 5/8	5 3/4	7 1/8	8 7/8	11 3/4	15 7/8	21 1/2	
B	2.125 0	2.500 5	3.250 5	4.188 0	5.500 75	7.750 75	11.251 0	16.251 0	(1)
C	1.391	1.625	2.062 5	2.625	3.375	4.625	6.500	9.125	(2)
D	0.593 7	0.656 2	0.781 25	0.906 25	1.031 25	1.218 75	1.406 25	1.656 25	+ 0.002
E	1 1/4	1 5/16	1 1/2	1 3/4	2	2 3/8	2 3/4	3 1/4	
F	7/16	7/16	1/2	9/16	5/8	11/16	3/4	13/16	
K	0.437	0.437	0.531	0.625	0.719	0.844	0.969	1.125	± 0.004
R	0.890	1.062	1.250	1.625	2.250	3.375	5.062 5	7.500	(3)
J	11/16	11/16	13/16	15/16	1 1/16	1 1/4	1 7/16	1 11/16	
α	18° 18.6′	15° 36′	14° 55′	13° 46′	12° 18′	10° 30′	8° 35′	7° 05′	
g	0.75	0.75	0.875	1.00	1.125	1.25	1.375	1.625	+ 0.002
h		1.453	1.875	2.250	2.531	2.937 5	3.312 5	3.687 5	+ 0.016
d_1	29/64	29/64	29/64	37/64	37/64	37/64	37/64	37/64	
ℓ			11/32	13/32	13/32	13/32	13/32	13/32	
ℓ_1	1.195	1.600							± 0.008
P	5/16-18 UNC	5/16-18 UNC	5/16-18 UNC	3/8-16 UNC	3/8-16 UNC	3/8-16 UNC	3/8-16 UNC	3/8-16 UNC	

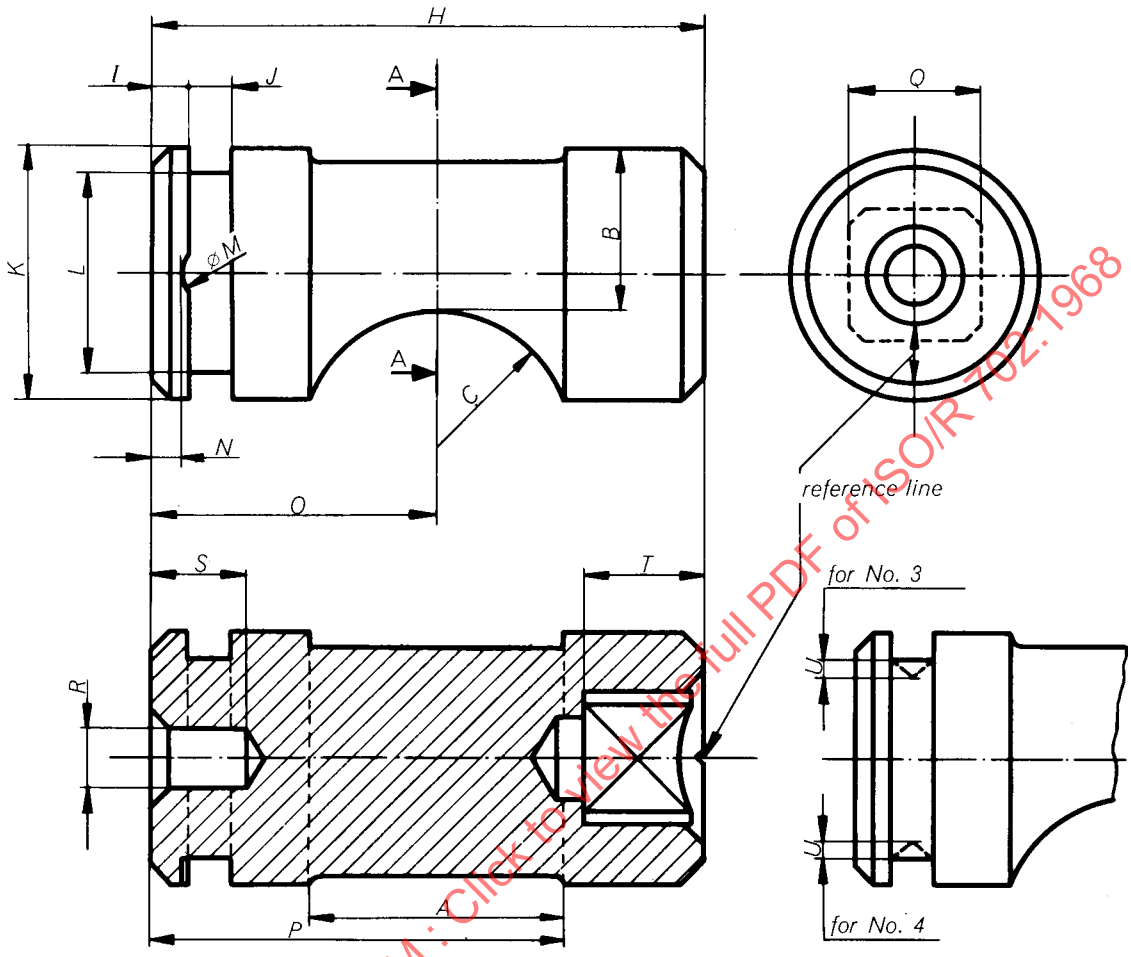
(1) + 0.000 25 in for No. 3
+ 0.000 5 in for Nos. 4 to 11
+ 0.001 in for Nos. 15 to 20

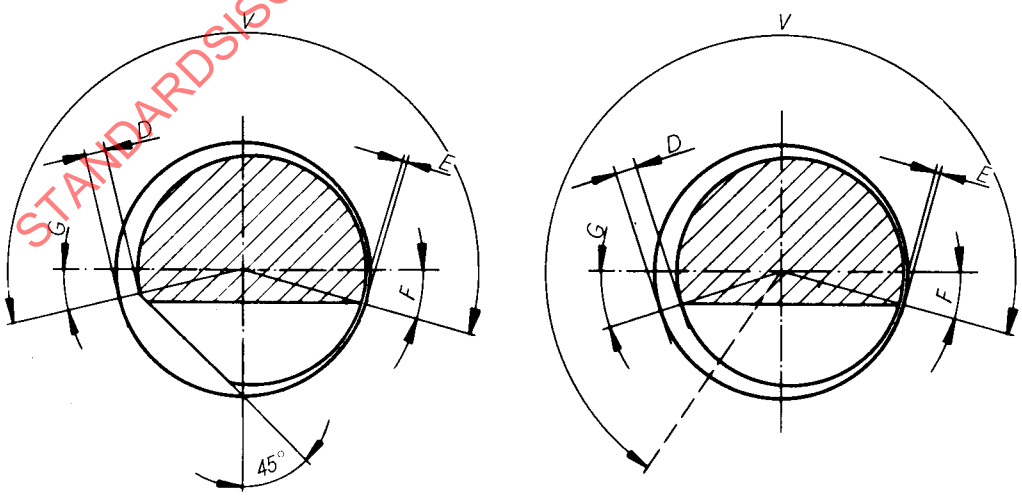
(2) 0.002 in for No. 3
0.003 in for Nos. 4 to 20
} Tolerance of position (radial deviation with respect to the theoretical position)

(3) ± 0.002 in for Nos. 3 and 4
± 0.004 in for Nos. 5 to 20

NOTE.—General tolerance for untoleranced dimensions: ± 1/64 in.

4.2 Cams - Type Camlock





Section A-A

for No. 3 only $V = 210°$

for Nos. 4 to 20 $V = 250°$

4.2.1 *Sizes in millimetres*

No. / Dimension	3	4	5	6	8	11	15	20	Tolerances
A	13	17	22	25	28	32	37	43	min.
B	13.4	11.9	14.2	16.7	18.9	21.2	23.5	27.8	— 0.2
C	7.5	9.5	11.1	12.7	14.2	16.7	19.0	22.2	
D	1.65	1.60	1.45	2.56	2.46	2.44	2.35	3.10	+ 0.3
E	0.15	0.15	0	0.45	0.36	0.28	0.20	0.50	+ 0.1
F	15°	10°	10°	10°	10°	15°	15°	15°	
G	15°	15°	15°	20°	20°	20°	20°	20°	
H	26.5	35	45	56	63	73	82	92	— 0.1
I	2.2	2.2	3.0	4.2	5.3	8.7	6.0	6.0	± 0.1
J	3.6	3.6	5.0	6.5	6.5	6.5	8.5	8.5	(1)
K	19	19	22	26	29	32	35	42	e 8
L	13	13	14	17	21	24	27	33	(2)
M			4.5	6	6	6	8	8	± 0.05
N			2.0	2.85	3.95	7.35	5.2	5.2	± 0.1
O	14.9	16.7	22.4	30.2	33.2	39.5	43.6	48.4	± 0.2
P	21.4	26.5	35.0	43.0	49.0	59.0	62.0	69.0	
Q	8	10	11	12	14	17	17	22	D 12
R			7	10	10	10	10	10	
S			13	15	15	15	15	15	
T	8	9	11	12	14	16	16	20	
U	1.2	1.2							
Slope on *V**	1.60	1.90	1.90	2.64	2.64	2.64	2.64	3.18	

* See tolerance on dimensions *D* and *E*.

(1) ± 0.05 mm for Nos. 3 and 4; ± 0.1 mm for Nos. 5 to 20

(2) ± 0.2 mm for Nos. 3 and 4 only.

NOTE.—General tolerance for untoleranced dimensions: ± 0.4 mm.

4.2.2 *Sizes in inches*

No. / Dimension	3	4	5	6	8	11	15	20	Tolerances
A	33/64	11/16	13/16	31/32	1 1/16	1 1/4	1 7/16	1 11/16	min.
B	0.528 0	0.469 0	0.562 5	0.640 6	0.734 0	0.828 0	0.922 0	1.078 0	(1)
C	5/16	3/8	7/16	1/2	9/16	21/32	3/4	7/8	
D	0.063	0.061	0.061	0.087	0.087	0.089	0.089	0.107	+ 0.012
E	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	± 0.004
F	15°	10°	10°	10°	10°	15°	15°	15°	
G	15°	15°	15°	20°	20°	20°	20°	20°	
H	1.046	1.406	1.844	2.219	2.500	2.875	3.250	3.625	(2)
I	0.086	0.116	0.125	0.156	0.187 5	0.250	0.250	0.250	(3)
J	0.142	0.142	0.243	0.296	0.296	0.296	0.296	0.296	(4)
K	0.746	0.746	0.871	0.996	1.121	1.246	1.371	1.621	− 0.002
L	0.500	0.500	9/16	11/16	13/16	15/16	1 1/16	1 5/16	(5)
M			0.230	0.283	0.283	0.283	0.283	0.283	± 0.002
N			0.094	0.125	0.156	0.219	0.219	0.219	± 0.004
O	0.587	0.687	0.953	1.187	1.344	1.531	1.719	1.906	± 0.008
P	27/32	1 1/32	1 3/8	1 11/16	1 7/8	2 5/32	2 7/16	2 3/4	
Q	0.314	0.379	0.441	0.504	0.566	0.629	0.691	0.816	(6)
R			5/16	3/8	3/8	3/8	3/8	3/8	
S			9/16	5/8	5/8	5/8	5/8	5/8	
T	5/16	11/32	7/16	1/2	9/16	5/8	3/4	13/16	
U	3/64	3/64							
Slope on *V**	0.063	0.075	0.075	0.104	0.104	0.104	0.104	0.125	

* See tolerance on dimensions *D* and *E*.

(1) − 0.004 in for No. 3 and − 0.008 in for Nos. 4 to 20

(2) − 0.016 in for No. 3 and − 0.008 in for Nos. 4 to 20

(3) ± 0.004 in for No. 3 ; ± 0.002 in for No. 4; ± 0.004 for Nos. 5 to 20

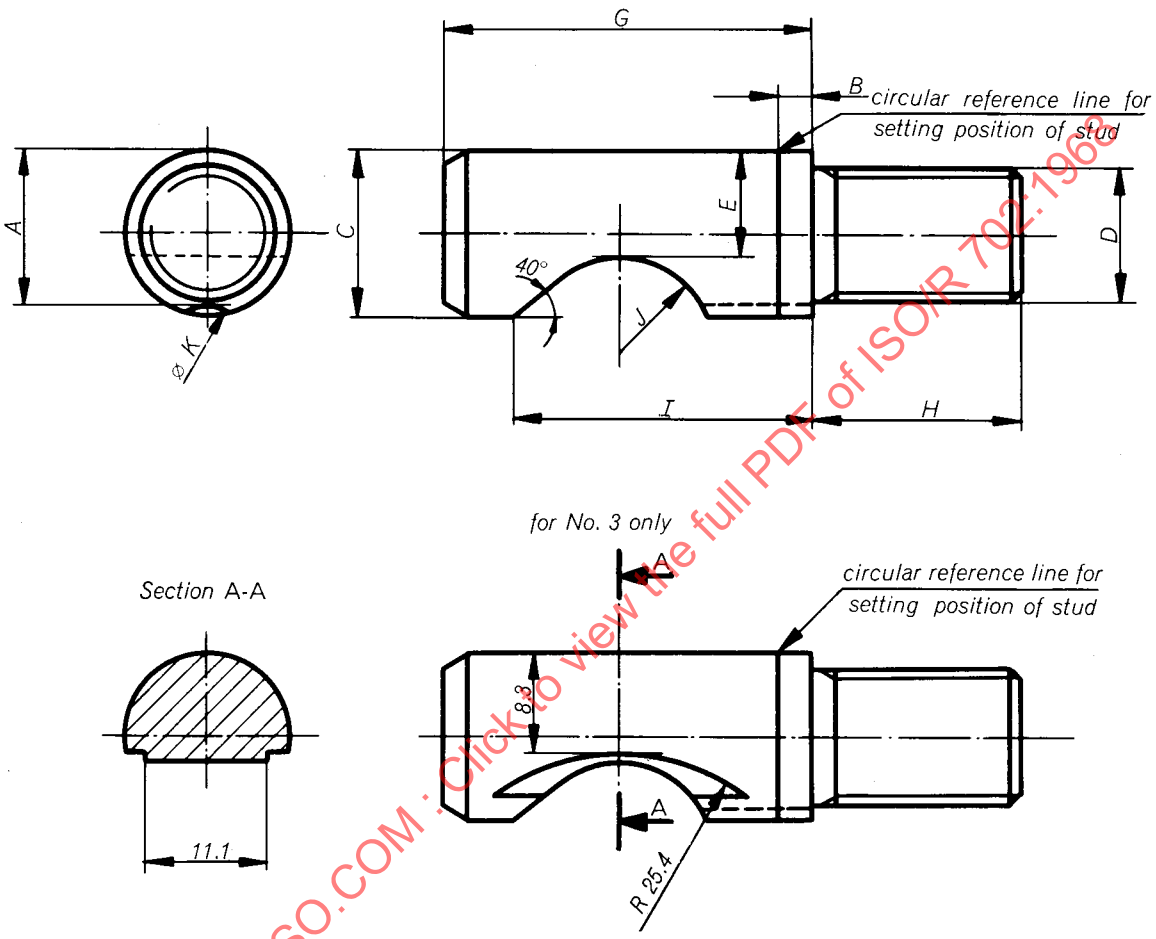
(4) ± 0.002 in for Nos. 3 and 4; ± 0.004 in for Nos. 5 to 20

(5) ± 0.008 in for Nos. 3 and 4 only

(6) ± 0.008 in for No. 3 and ± 0.012 in for Nos. 4 to 20

NOTE.—General tolerance for untoleranced dimensions: ± 1/64 in.

4.3 Studs - Type Camlock



4.3.1 *Sizes in millimetres*

No. / Dimension	3	4	5	6	8	11	15	20	Tolerances
A	12.7	13.5	16.5	19.6	23.2	26.8	32.0	38.5	± 0.1
B	4.2	4.8	4.8	4.8	4.8	6.4	6.4	6.4	± 0.2
C	14.3	15.9	19.0	22.2	25.4	30.2	34.9	41.3	— 0.1
D	M 10×1	M 10×1	M 12×1	M 16×1.5	M 20×1.5	M 22×1.5	M 24×1.5	M 27×2	
E	8.7	9.5	11.9	14.3	16.7	20.6	24.6	28.6	± 0.1
G	35	37	43	49	55.5	67	76	89	
H	19	19	22	27	30.5	35	40	44	
I	30.0	31.0	35.7	40.5	44.5	53.2	58.7	69.0	± 0.2
J	9.5	9.5	11.25	12.7	14.3	15.9	17.5	20.6	
K	11	11	11	14	14	14	14	14	

NOTE.—General tolerance for untoleranced dimensions: ± 0.4 mm.

4.3.2 *Sizes in inches*

No. / Dimension	3	4	5	6	8	11	15	20	Tolerances
A	0.516	0.547	0.640	0.766	0.891	1.078	1.266	1.516	± 0.004
B	0.166	0.187	0.187 5	0.187 5	0.187 5	0.250	0.250	0.250	± 0.008
C	0.563	0.625	0.750	0.875	1.000	1.187 5	1.375	1.625	— 0.004
D	7/16-20 UNF	7/16-20 UNF	1/2-20 UNF	5/8-18 UNF	3/4-16 UNF	7/8-14 UNF	1-12 UNF	1 1/8-12 UNF	
E	0.344	0.375	0.469	0.562	0.656	0.812	0.969	1.125	± 0.004
G	1 3/8	1 7/16	1 11/16	1 15/16	2 3/16	2 5/8	3	3 1/2	
H	3/4	3/4	7/8	1 1/16	1 3/16	1 3/8	1 9/16	1 3/4	
I	1.182	1.219	1.406	1.594	1.750	2.094	2.312	2.719	± 0.008
J	3/8	3/8	7/16	1/2	9/16	5/8	11/16	13/16	
K	3/8	13/32	13/32	15/32	15/32	15/32	15/32	15/32	

NOTE.—General tolerance for untoleranced dimensions: ± 1/64 in.