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DINJISO GLOBAL SUPPLIES CO., LTD

久 富 全 球 企 業 有 限 公 司

DINJISO

More Motion & Solution

Reliable Quality & Technology

● STANDARD COMPONENTS FOR PRESS DIES

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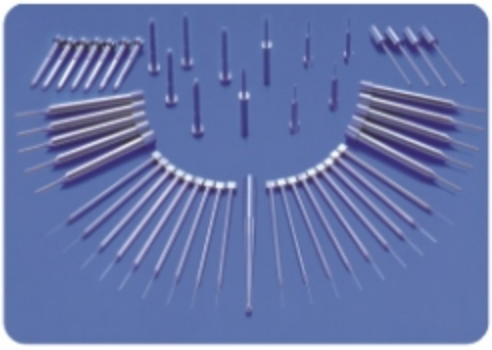


More Motion & Solution
Reliable Quality & Technology

COMPANY INFO

DINJISO GLOBAL SUPPLIES CO., LTD is a one of the Asia largest supplier of custom components for assembly Mold, Automation & Medical industry, Our Company provides more than 1000 unique components manufactured to the Inch & Metric standard.

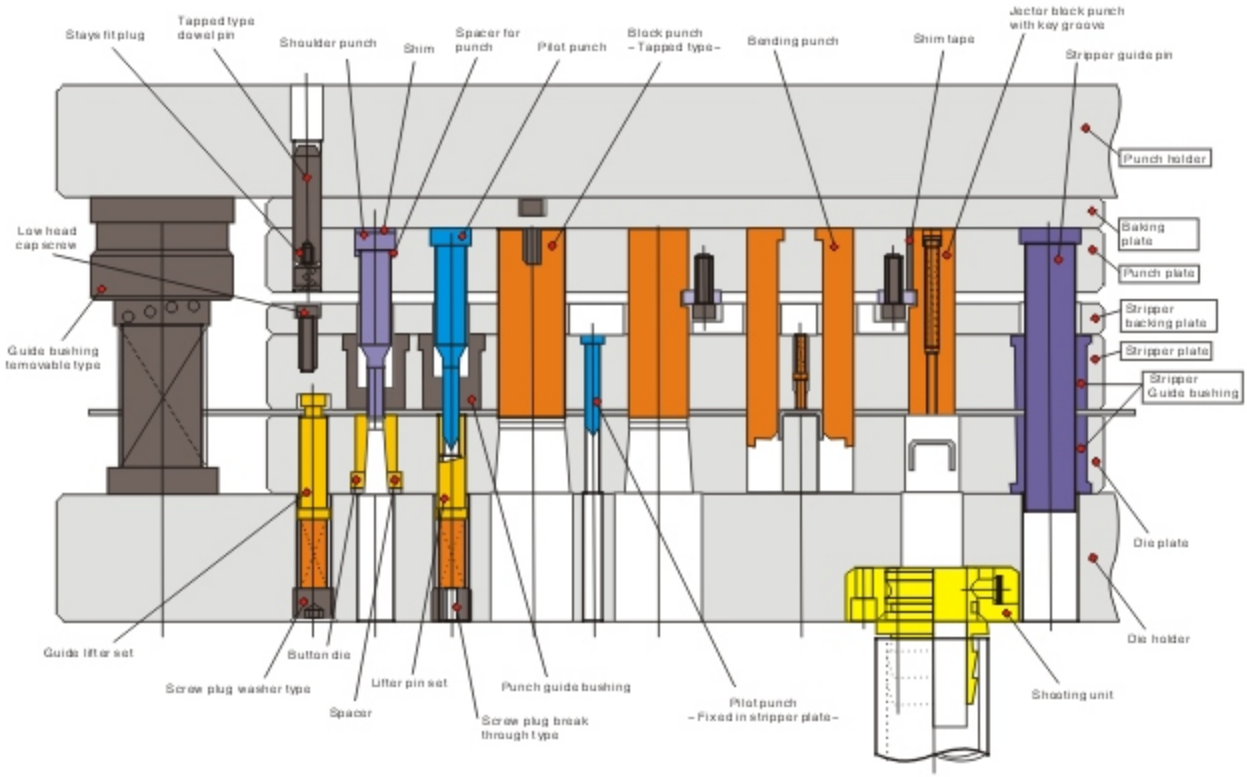
Our specialty is providing these components fast, high quality, low prices and a short delivery period.

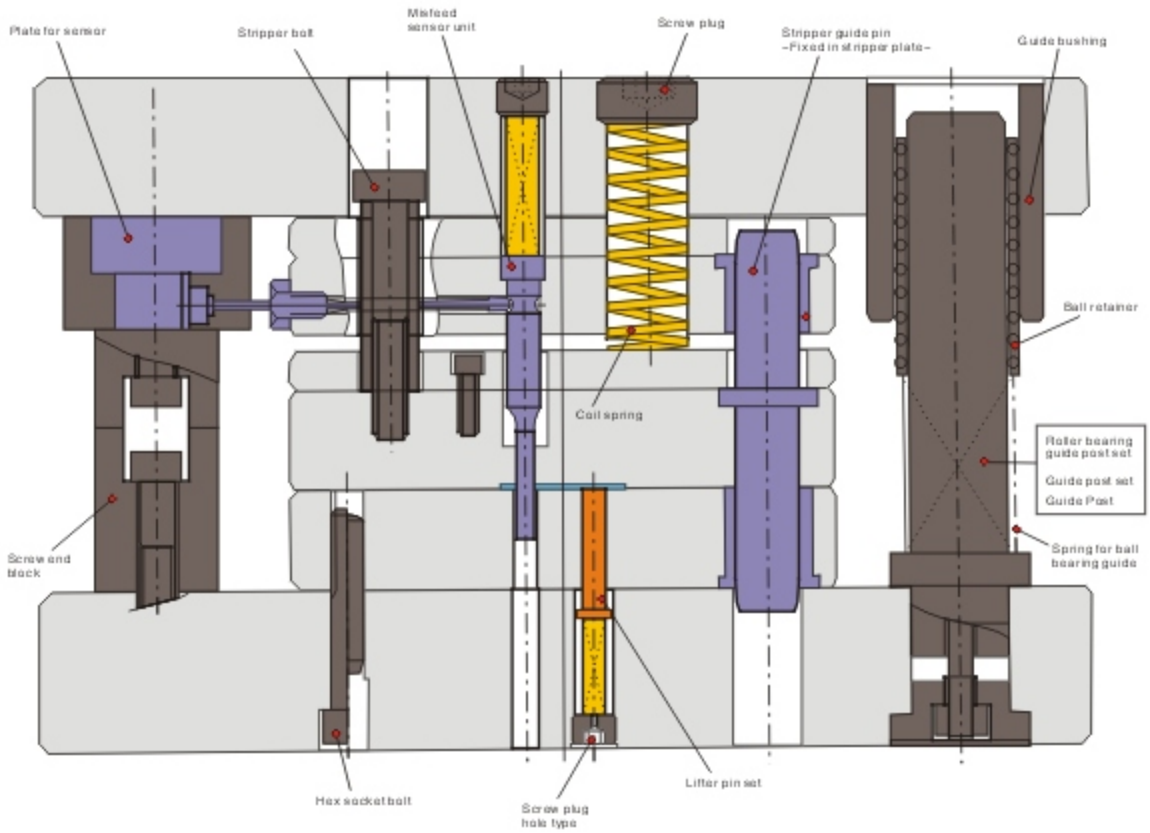
We are currently supplying mechanical components for factory automation, press die, plastic mold and cutting tools. Our products are seen in a diverse range of industries including Automotive, Electronic, Semiconductor, Medical, IC packaging, etc, and has been deliver to all around the world such as Latin America, USA, Europe and Southeast Asia.

DINJISO GLOBAL SUPPLIES is a leader specializing in the development for OEM and standard components of plastic mold and automation accessories for various industrial and consumer sectors. Dedicated to high-quality production and customer service, therefore, we will constantly searching for state-of-the-art products and technologies for both standardized and customized applications.

Our mission is to provide more high-quality products and best service to our customers by offer convenient resilience communication to retailer and dealer as the main goal to achieve our position in current globalization.

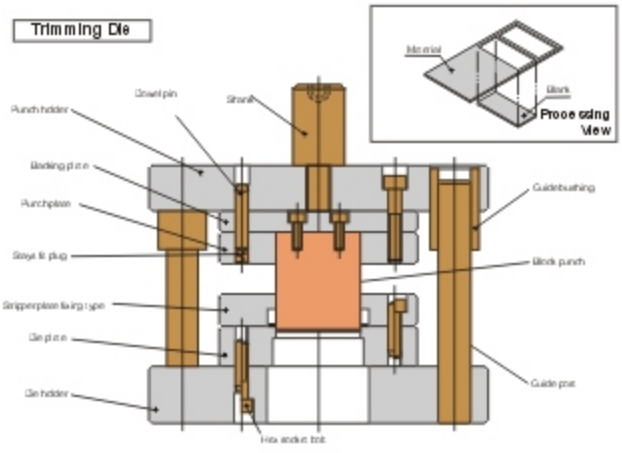
Bending & Transfer Die (1)



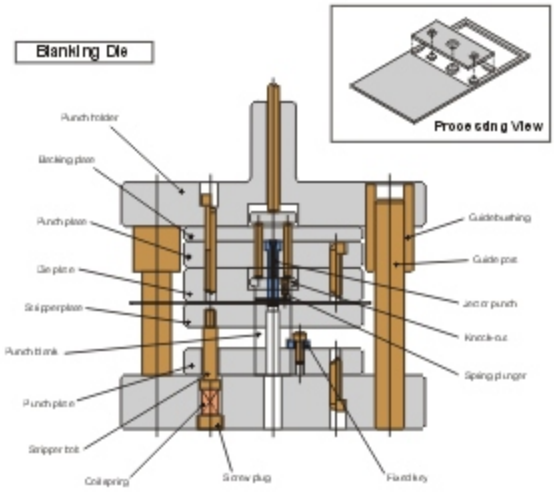


Bending & Transfer Die (2)

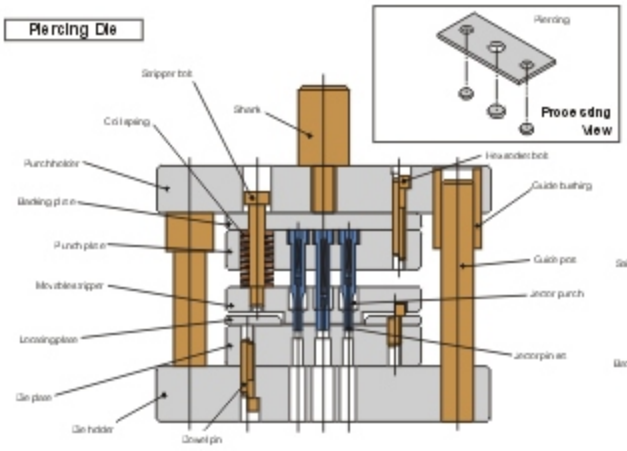
Trimming Die



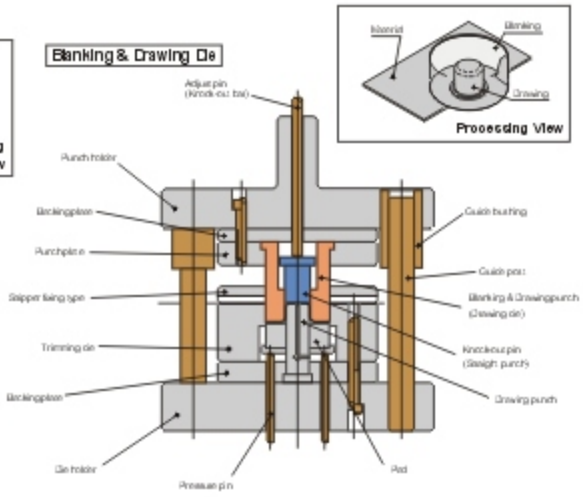
Blanking Die



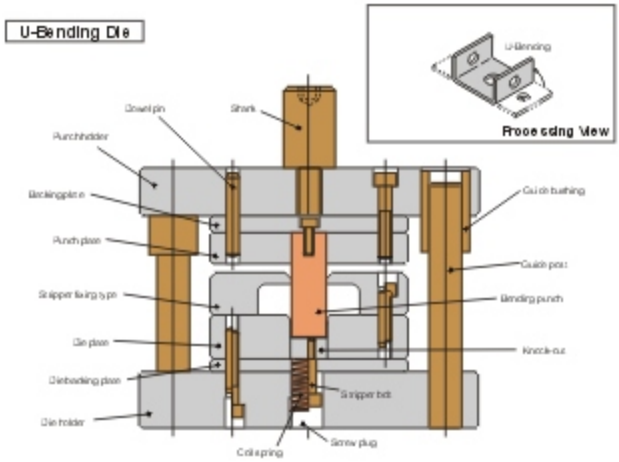
Piercing Die



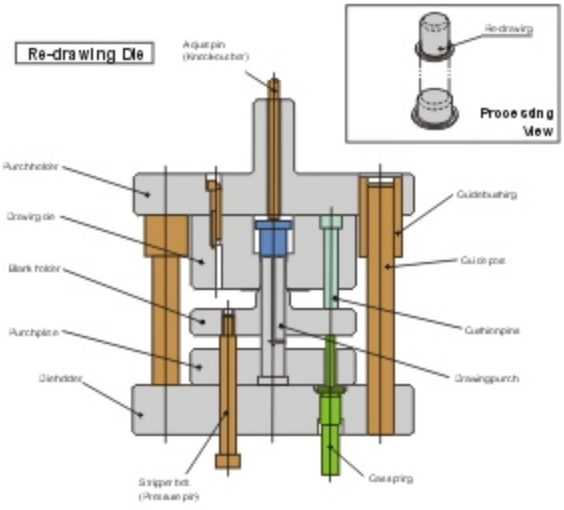
Blanking & Drawing Die



U-Bending Die



Re-drawing Die



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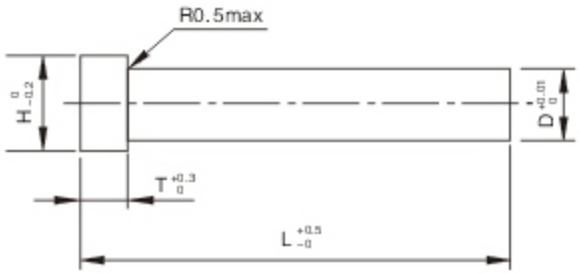
Straight Punch



Type: JS01 & JS02

Material: JS01 - SKD11 - D2 - Alloy Tool Steel
JS02 - SKH51 - HSS - High Speed Steel

Hardness: JS01 - HRC60~62 Through Hardened
JS02 - HRC61~64 Through Hardened

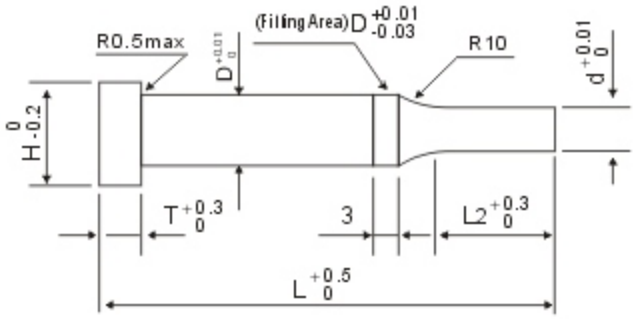
D	H	T	L						
			40	50	60	70	80	90	100
1.0	1.6	5	●	●	●	●			
1.1~1.5	2		●	●	●	●			
1.6~2.0	4		●	●	●	●	●		
2.1~2.5	4.5		●	●	●	●	●		
2.6~3.0	5		●	●	●	●	●		
3.1~3.5	5.5		●	●	●	●	●		
3.6~4.0	6		●	●	●	●	●		
4.1~4.5	6.5		●	●	●	●	●	●	●
4.6~5.0	7		●	●	●	●	●	●	●
5.1~5.5	7.5		●	●	●	●	●	●	●
5.6~6.0	8		●	●	●	●	●	●	●
6.1~6.5	8.5		●	●	●	●	●	●	●
6.6~6.9	9		●	●	●	●	●	●	●
7.0~7.9	10		●	●	●	●	●	●	●
8.0~8.9	11		●	●	●	●	●	●	●
9.0~9.9	12		●	●	●	●	●	●	●
10.0~10.9	13		●	●	●	●	●	●	●
11.0~11.9	14			●	●	●	●	●	●
12.0~12.9	15			●	●	●	●	●	●
13.0~13.9	16			●	●	●	●	●	●
14.0~14.9	17			●	●	●	●	●	●
15.0~15.9	18			●	●	●	●	●	●
16.0~16.9	19			●	●	●	●	●	●
17.0~17.9	20			●	●	●	●	●	●
18.0~18.9	21			●	●	●	●	●	●
19.0~19.9	22			●	●	●	●	●	●
20.0~20.9	23			●	●	●	●	●	●
21.0~21.9	24			●	●	●	●	●	●
22.0~22.9	25			●	●	●	●	●	●
23.0~23.9	26			●	●	●	●	●	●
24.0~24.9	27			●	●	●	●	●	●
25.0~25.9	28			●	●	●	●	●	●

Order Example:

Type	-	D	-	L
JS01	-	6	-	50

■ Customize are also available
■ Tungsten carbide are also available

Shoulder Punch



Type: JS03 & JS04

Material: JS03 - SKD11 - D2 - Alloy Tool Steel
JS04 - SKH51 - HSS - High Speed Steel

Hardness: JS03 - HRC60~62 Through Hardened
JS04 - HRC61~64 Through Hardened

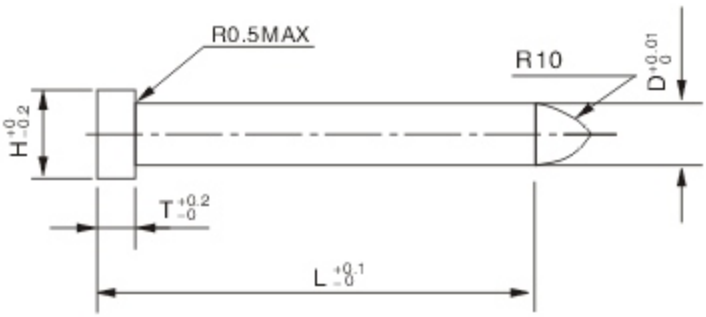
D	H	0.1mm Increment d	T	L2		L						
						40	50	60	70	80	90	100
3	5	1.0~2.9	5	8	13	●	●	●	●	●	●	●
4	6	1.0~3.9				●	●	●	●	●	●	●
5	7	2.0~4.9				●	●	●	●	●	●	●
6	8	2.0~5.9				●	●	●	●	●	●	●
8	11	3.0~7.9		13	19	●	●	●	●	●	●	●
10	13	4.0~9.9				●	●	●	●	●	●	●
13	16	8.0~12.9				●	●	●	●	●	●	●
16	19	10.0~15.9		19	25	●	●	●	●	●	●	●
20	23	14.0~19.9				●	●	●	●	●	●	●
25	26	19.0~24.9				●	●	●	●	●	●	●

Order Example:

Type	-	D	-	d	-	L
JS03	-	4	-	3	-	50

■ Customize are also available
■ Tungsten carbide are also available

Straight Pilot Punch



Type: JS05 & JS06

Material: JS05 - SKD11 - D2 - Alloy Tool Steel
JS06 - SKH51 - HSS - High Speed Steel

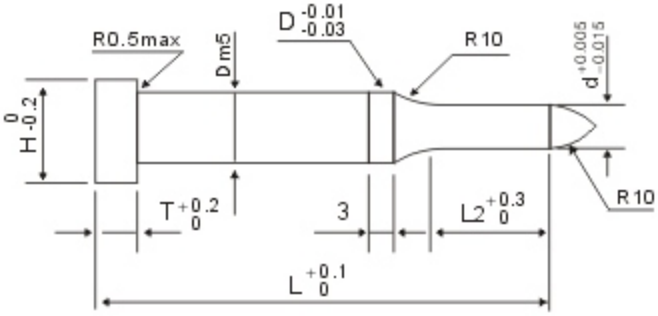
Hardness: JS05 - HRC60~62 Through Hardened
JS06 - HRC61~64 Through Hardened

D	H	D range 0.1mm Increment	T	L					
				42	52	62	72	82	92
3	5	2.0~3.0	5	●	●	●	●		
4	6	3.0~4.0		●	●	●	●		
5	7	4.0~5.0		●	●	●	●		
6	8	5.0~6.0		●	●	●	●		
8	11	6.0~8.0		●	●	●	●		
10	13	8.0~10.0		●	●	●	●		
13	16	10.0~13.0		●	●	●	●	●	●
16	19	13.0~16.0		●	●	●	●	●	●

Order Example: Type - D - L
JS05 - 3 - 52

■ Customize are also available
■ Tungsten carbide are also available

Shoulder Pilot Punch



Type: JS07 & JS08

Material: JS07 - SKD11 - D2 - Alloy Tool Steel
JS08 - SKH51 - HSS - High Speed Steel

Hardness: JS07 - HRC60~62 Through Hardened
JS08 - HRC61~64 Through Hardened

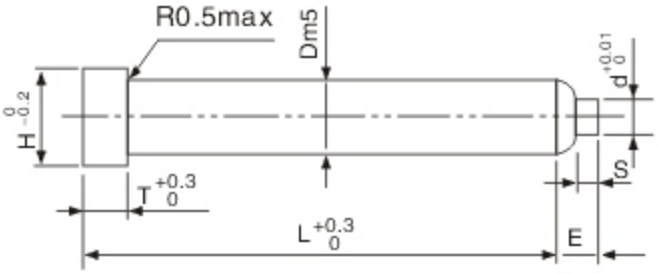
D	H	d	T	L2	L						
		0.1mm Increment			42	52	62	72	82	92	102
3	5	1.0~2.9	5	10	●	●	●	●	●		
4	6	1.0~3.9			●	●	●	●	●		
5	7	2.0~4.9		15	●	●	●	●	●	●	●
6	8	2.0~5.9			●	●	●	●	●	●	●
8	11	3.0~7.9		10	●	●	●	●	●	●	●
10	13	5.0~9.9		15	●	●	●	●	●	●	●
13	16	8.0~12.9		21	●	●	●	●	●	●	●
16	19	10.0~15.9		21	●	●	●	●	●	●	●

Order Example:

Type	-	D	-	d	-	L	-	L2
JS07	-	3	-	1.0	-	52	-	10

■ Customize are also available
■ Tungsten carbide are also available

Straight Burring Punch



Type: JS09 & JS10

Material: JS09 - SKD11 - D2 - Alloy Tool Steel
JS10 - SKH51 - HSS - High Speed Steel

Hardness: JS09 - HRC60~62 Through Hardened
JS10 - HRC61~64 Through Hardened

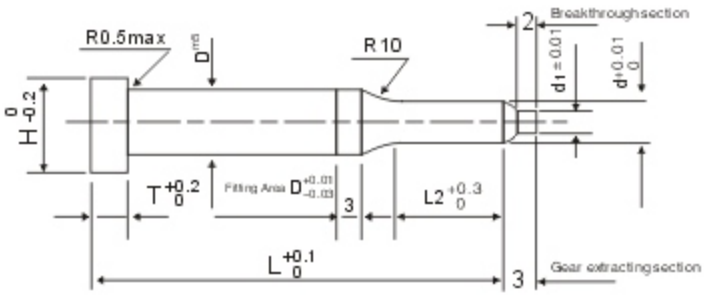
D	H	d	T	E	S	L			
						41	51	61	71
4	6	2.00~3.20	5	2.7	2	●	●	●	●
5	7	2.00~3.80		3.7	3	●	●	●	●
6	8	2.00~4.30		4.1		●	●	●	●
8	11	5.00~5.44		5.6	4	●	●	●	●

Order Example:

Type	-	D	-	d	-	L
JS09	-	5	-	2	-	51

■ Customize are also available
■ Tungsten carbide are also available

Shoulder Burring Punch



Type: JS11 & JS12

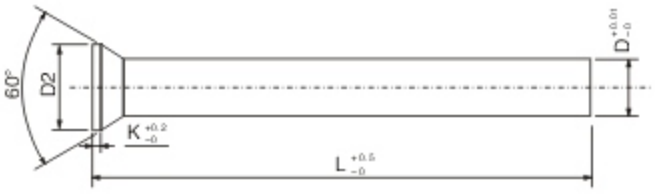
Material: JS11 - SKD11 - D2 - Alloy Tool Steel
JS12 - SKH51 - HSS - High Speed Steel
Hardness: JS11 - HRC60~62 Through Hardened
JS12 - HRC61~64 Through Hardened

D	d	d1	H	L2	T	Bolt	L			
							41	51	61	71
4	1.65	1.0	6	6	5	M2.0	●	●	●	●
	2.2	1.3	6	8		M2.6	●	●	●	●
5	2.2	1.3	7	8		M2.6	●	●	●	●
	2.6	1.5	7	8		M3.0	●	●	●	●
6	2.2	1.3	8	8		M2.6	●	●	●	●
	2.5	1.5	8	8		M3.0	●	●	●	●
	2.6	1.5	8	8		M3.0	●	●	●	●
	2.7	1.6	8	8		M3.0	●	●	●	●
	3.2	1.9	8	10		M4.0	●	●	●	●
	3.4	1.9	8	10		M4.0	●	●	●	●
	3.6	2.1	8	10		M4.0	●	●	●	●
	4.2	2.4	8	12		M5.0	●	●	●	●
8	5.2	2.6	10	12		M6.0	●	●	●	●

Order Example: Type - D - d - L
JS11 - 5 - 2.2 - 51

■ Customize are also available
■ Tungsten carbide are also available

Conical Punch



Type: JS13 & JS14

Material: JS13 - SKD11 - D2 - Alloy Tool Steel
JS14 - SKH51 - HSS - High Speed Steel

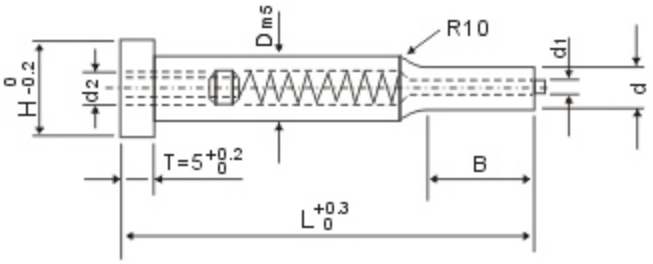
Hardness: JS13 - HRC60~62 Through Hardened
JS14 - HRC61~64 Through Hardened

D	D2	K	L						
			40	50	60	70	80	90	100
1.0,1.1	1.8	1.2~1.1	●	●	●	●			
1.2,1.3	2.0	1.2~1.1	●	●	●	●			
1.4,1.5	2.2	1.2~1.1	●	●	●	●			
1.6,1.7	2.5	1.3~1.2	●	●	●	●			
1.8,1.9,2.0	3.0	1.5~1.4	●	●	●	●	●		
2.1,2.2	3.2	1.5~1.4	●	●	●	●	●		
2.3,2.5	3.5	1.5~1.4	●	●	●	●	●		
2.6,2.9	4.0	1.7~1.5	●	●	●	●	●		
3.0,3.4	4.5	1.8~1.5	●	●	●	●	●	●	●
3.5,3.9	5.0	1.8~1.5	●	●	●	●	●	●	●
4.0,4.4	5.5	1.8~1.5	●	●	●	●	●	●	●
4.5,4.9	6.0	1.8~1.5	●	●	●	●	●	●	●
5.0,5.4	6.5	1.8~1.5	●	●	●	●	●	●	●
5.5,5.9	7.0	1.8~1.5	●	●	●	●	●	●	●
6.0,6.4	8.0	2.2~1.9	●	●	●	●	●	●	●
6.5,7.0	9.0	3.2~2.7	●	●	●	●	●	●	●
7.1~8.0	10.0	3.5~2.7	●	●	●	●	●	●	●
8.1~9.0	11.0	3.5~2.7	●	●	●	●	●	●	●
9.1~10.0	12.0	3.5~2.7	●	●	●	●	●	●	●
10.1~11.0	13.0	3.5~2.7	●	●	●	●	●	●	●
10.1~11.0	14.0	3.5~2.7	●	●	●	●	●	●	●

Order Example: Type - D - K - L
JS13 - 2.0 - 1.5 - 50

■ Customize are also available
■ Tungsten carbide are also available

Ejector Punch



Type: JS15 & JS16

Material: JS15 - SKD11 - D2 - Alloy Tool Steel
JS16 - SKH51 - HSS - High Speed Steel

Hardness: JS15 - HRC60~62 Through Hardened
JS16 - HRC61~64 Through Hardened

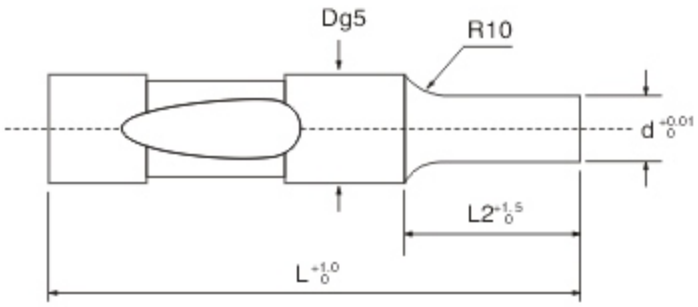
D	H	d	B	d1	d2	L					
						50	60	70	80	90	100
5	7	2.00~4.99	8	0.7	2.5	●	●	●	●	●	●
6	8	2.00~5.99				●	●	●	●	●	●
8	11	3.00~7.99	13	1	3.3	●	●	●	●	●	●
10	13	3.00~9.99				●	●	●	●	●	●
13	16	6.00~12.99		1.5	4.2	●	●	●	●	●	●
16	19	10.00~15.99	19	2	5.2	●	●	●	●	●	●
20	23	13.00~19.99				●	●	●	●	●	●
25	28	18.00~24.99		2.5		●	●	●	●	●	●

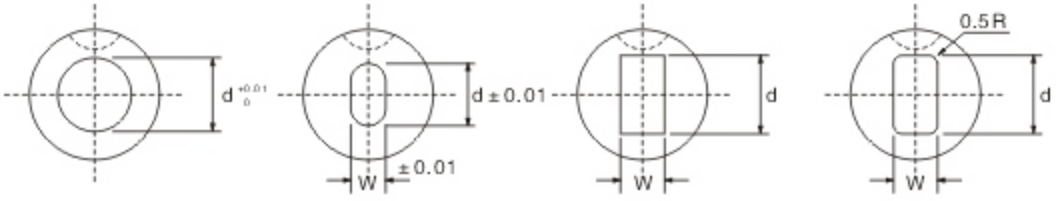
Order Example:

Type	-	D	-	d	-	L
JS15	-	6	-	2	-	60

■ Customize are also available
■ Tungsten carbide are also available

Ball Lock Ejector Punch





SHAPE: A B C D

Type: JS17 & JS18

Material: JS17 - SKD11 - D2 - Alloy Tool Steel
JS18 - SKH51 - HSS - High Speed Steel

Hardness: JS17 - HRC60~62 Through Hardened
JS18 - HRC61~64 Through Hardened

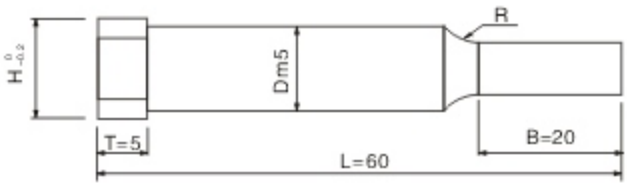
SHAPE	D	L2	L							A	B C D	
			50	56	63	71	80	90	100	d	d	W
A B C D	6	8 13	●	●	●	●	●			1.60~5.97	5.97	1.60
	10	13 19	●	●	●	●		●	●	1.60~9.97	9.97	1.60
	13									5.00~12.97	12.97	4.50
	16	13 19 25								8.00~15.97	15.97	6.00
	20			●	●	●	●	●	●	12.00~19.97	19.97	8.00
	25									16.00~24.97	24.97	10.00
	32					●	●	●	●	24.00~31.97	31.9	12.50
	38						●	●	●	28.00~37.97	37.97	14.00

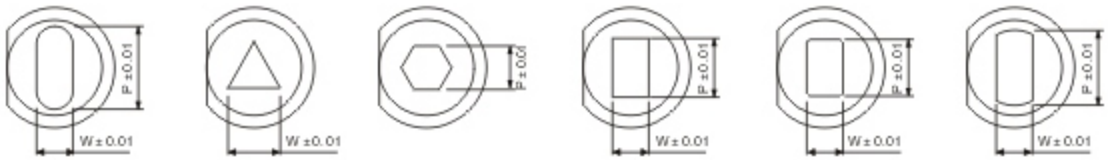
Order Example:

Type	SHAPE	D	L2	L	d	W
JS17	B	10	13	50	9.97	1.60

- Customize are also available
- Tungsten carbide are also available

Special Shape Shoulder Punch





A B C D E F

Type: JS19 & JS20

Material: JS19 - SKD11 - D2 - Alloy Tool Steel
JS20 - SKH51 - HSS - High Speed Steel
Hardness: JS19 - HRC60~62 Through Hardened
JS20 - HRC61~64 Through Hardened

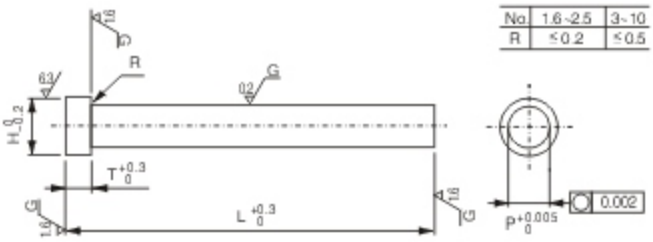
SHAPE	D	H	L	T	B	Elliptical	Triangle	Hexagon	Square	Square R	Sharpe both side
A	4	6	60	5	20	A	B	C	D	E	F
B	5	7									
C	6	8									
D	7	9									
E	8	10									
F	10	12									
	11	13									
	12	14									
	13	15									
	14	19									
	15	17									
	16	18									
	17	19									
	18	20									
	20	22									
	21	24									
	22	24									
	24	26									
	25	27									
	26	28									
	27	30									
	28	30									
	30	32									
	32	34									
	35	38									

Order Example: Type - SHAPE - D - H
JS19 - A - 5 - 7

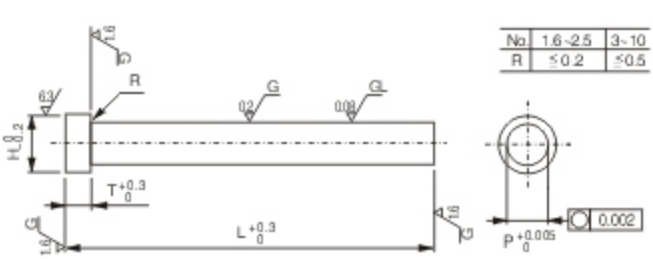
- Customize are also available
- Tungsten carbide are also available

Tungsten Carbide Straight Punch

Type：JS21 & JS22



Type：JS23 & JS24
(INCL. POLISHING)



Type：JS21 ~ JS24

Material：JS21 & JS23 - V30 - KG7 - Metal Forming Tool Steel
JS22 & JS24 - WF20 - K20 - Submicron Steel

Hardness：JS21 & JS23 - HRA88~89 Through Sintering
JS22 & JS24 - HRA90~92 Through Sintering

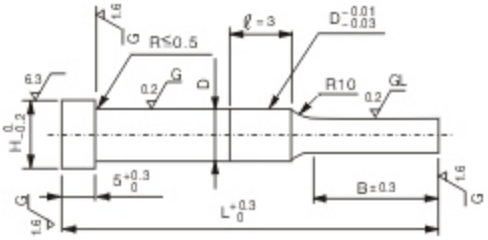
L									0.001mm Increment Ⓐ min.P max.	H	T
20	25	30	35	40	50	60	70				
●	●	●							1.000~1.600	2.6	3
●	●	●	●						1.600~2.000	3.0	
●	●	●	●	●	●				2.000~2.500	3.5	
				●	●	●			2.000~3.000	5	5
				●	●	●	●		3.000~4.000	7	
				●	●	●	●		4.000~5.000	8	
				●	●	●	●		5.000~6.000	9	
				●	●	●	●	●	6.000~8.000	11	
				●	●	●	●	●	8.000~10.000	13	

Order Example：

Type	–	L	–	P
JS21	–	30	–	1.0

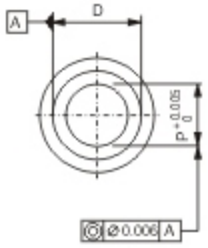
■ Customize are also available

Type: JS 25=Dm5
JS 26=D(0,+0.005)

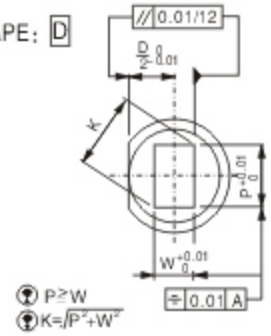


REMARK: Front length (B) L>S

SHAPE: Ⓐ

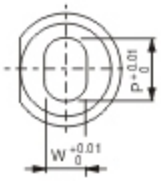


SHAPE: Ⓓ



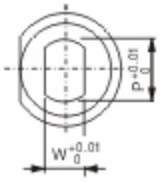
P≥W
K=√(P²+W²)

SHAPE: Ⓔ



P>W

SHAPE: Ⓖ



P>W

Type: JS25 & JS26

Material: V30 - KG7 - Metal Forming Tool Steel
Hardness: HRA 88~89 Through Sintering

Shape	B	D	L					0.001mm Increment Ⓐ	0.001mm Increment Ⓓ Ⓔ Ⓖ		B	H
			40	50	60	70	80	min.P max.	P·Kmax.	P·Wmin.		
Ⓐ Ⓓ	S	3	●	●	●			1.000~2.990	–	–	8	5
		4	●	●	●	●		1.000~3.990	3.97	1.50		7
		5	●	●	●	●		2.000~4.990	4.97	2.00		8
		6	●	●	●	●		2.000~5.990	5.97	2.50		9
		8	●	●	●	●	●	3.000~7.990	7.97	3.00	13	11
		10	●	●	●	●	●	3.000~9.990	9.97	4.00		13
		13	●	●	●	●	●	6.000~12.990	12.97	5.00		16
		16	●	●	●	●	●	10.000~15.990	15.97	6.00	19	19
Ⓔ Ⓖ	L	3		●	●			1.000~2.990	–	–	13	5
		4		●	●	●		1.000~3.990	3.97	2.00		7
		5		●	●	●		2.000~4.990	4.97	2.00		8
		6		●	●	●		2.000~5.990	5.97	2.00		9
		8		●	●	●	●	3.000~7.990	7.97	2.50	19	11
		10		●	●	●	●	3.000~9.990	9.97	2.50		13
		13		●	●	●	●	6.000~12.990	12.97	3.00		16
		16			●	●	●	10.000~15.990	15.97	4.00	25	19

- When L(40) ⟶ B=8 Front length all has tobe 8mm.
- When Ⓐ: P>D-0.03 ⟶ ℓ=0 ,P>D-0.03, "D" Cannot reach (-0.01,-0.03)。
- When Ⓓ Ⓔ Ⓖ: P K>D-0.05 ⟶ ℓ=0 P K>D-0.05, "D" Cannot reach (-0.01,-0.03)。

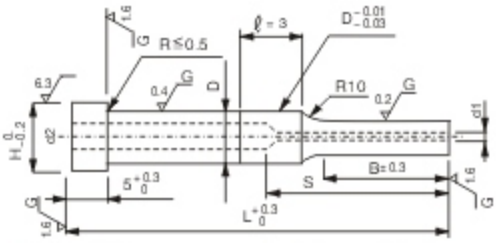
Order Example:

Type	SHAPE	B	D	L	P	W
JS25	D	S	6	50	3	2

■ Customize are also available

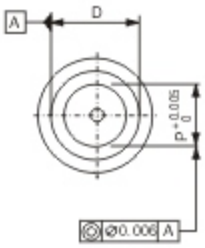
Tungsten Carbide Shoulder Punch - With Air Hole -

Type: JS 27=Dm5
JS 28=D(0,+0.005)

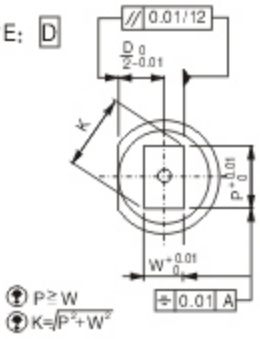


Front "R" has to process with the button plate of press mold.
REMARK: Front length (B) L>S

SHAPE: Ⓐ

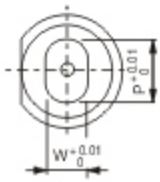


SHAPE: Ⓓ



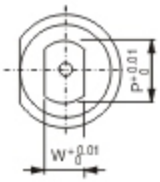
P≥W
K=√(P²+W²)

SHAPE: Ⓔ



P>W

SHAPE: Ⓖ



P>W

Type: JS27 & JS28

Material: V30 - KG7 - Metal Forming Tool Steel
Hardness: HRA 88~89 Through Sintering

Shape	B	D	L					0.001mm Increment	0.01mm Increment		B	d1	S	d2	H
			40	50	60	70	80	Ⓐ	Ⓓ Ⓔ Ⓖ						
								min.P max.	P·Kmax.	P·Wmin.					
Ⓐ	S	3	●	●	●			1.000~2.990	–	–	8	0.3	–	0.3	5
Ⓐ Ⓓ Ⓔ Ⓖ	S	4	●	●	●			1.000~3.990	3.97	1.50	8	0.5	20	1.2	7
	S	5	●	●	●	●		2.000~4.990	4.97	2.00		0.8		2.1	8
	S	6	●	●	●	●		2.000~5.990	5.97	2.00				2.6	9
	S	8	●	●	●	●	●	3.000~7.990	7.97	3.00	13	1.2	27	3.4	11
	S	10	●	●	●	●	●	3.000~9.990	9.97	3.00		1.6	28	4.4	13
	S	13	●	●	●	●	●	6.000~12.990	12.97	6.00		1.9			16
	S	16	●	●	●	●	●	10.000~15.990	15.97	6.00	19	2.9	36		19
Ⓐ	L	3		●	●			1.000~2.990	–	–	13	0.3	–	0.3	5
Ⓐ Ⓓ Ⓔ Ⓖ	L	4		●	●			1.000~3.990	3.97	2.00	13	0.5	20	1.2	7
	L	5		●	●	●		2.000~4.990	4.97	2.00		0.8		2.1	8
	L	6		●	●	●		2.000~5.990	5.97	2.00				2.6	9
	L	8		●	●	●	●	3.000~7.990	7.97	3.00	19	1.2	27	3.4	11
	L	10		●	●	●	●	3.000~9.990	9.97	3.00		1.6	28	4.4	13
	L	13		●	●	●	●	6.000~12.990	12.97	6.00		1.9			16
	L	16			●	●	●	10.000~15.990	15.97	6.00	25	2.9	36		19

Please find the below front length (B) When "L" reach to 40 & 50

L	(40)	(50)
B	8	13

D \ L	(40)
5~16	S=7

D \ L	(50)
16	S=24

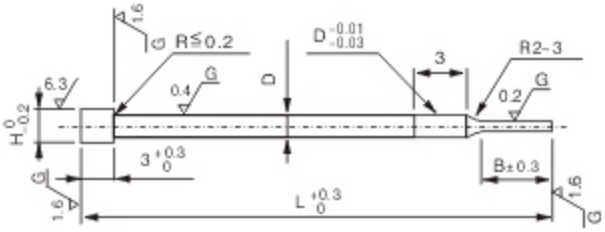
When Ⓐ: P>D-0.03 ⟶ ℓ=0 P>D-0.03, "D" Cannot reach (-0.01, -0.03)
When Ⓓ Ⓔ Ⓖ: P·K>D-0.05 ⟶ ℓ=0 P·K>D-0.05, "D" Cannot reach (-0.01, -0.03)

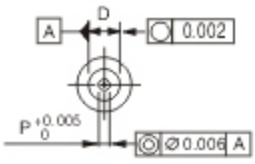
Order Example:

Type	SHAPE	B	D	L	P	W
JS27	D	S	8	50	4	2

■ Customize are also available

Tungsten Carbide Single Step Punch





Type：JS29=Dm5
JS30=D(0,+0.005)

Type：JS29 & JS30

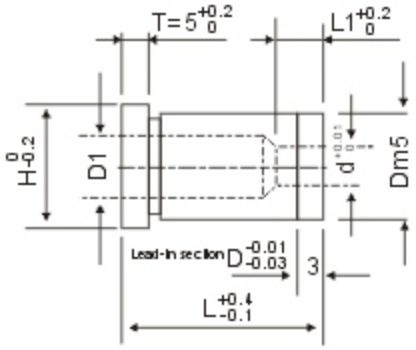
Material：V30 - KG7 - Metal Forming Tool Steel
Hardness：HRA88~89 Through Sintering

Shape	D	L					0.001mm Increment Ⓐ min.P max.	B	H
		20	25	30	35	40			
S	1.0	●	●	●	●	●	0.150~0.249	3	2.0
	1.1								2.6
	1.2								
	1.3						0.250~0.990	4	
	1.4								
	1.5								
L	1.0	●	●	●	●	●	0.250~0.399	5	2.0
	1.1								2.6
	1.2								
	1.3						0.400~0.990	6	
	1.4								
	1.5								

Order Example: [Type] - [SHAPE] - [D] - [L] - [P]
[JS29] - [S] - [1] - [20] - [0.2]

■ Customize are also available

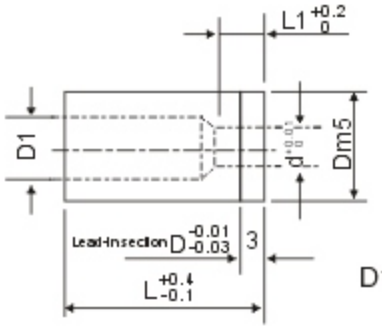
TYPE：JS31



SHAPE：A

D1=d+0.3~0.5mm

TYPE：JS32



SHAPE：B

D1=d+0.3~0.5mm

Type：JS31 & JS32

Material：JS31 - SKH51 - HSS - High Speed Steel
JS32 - SKD11 - D2 - Alloy Tool Steel

Hardness：JS31 - HRC61~64 Through Hardened
JS32 - HRC60~62 Through Hardened

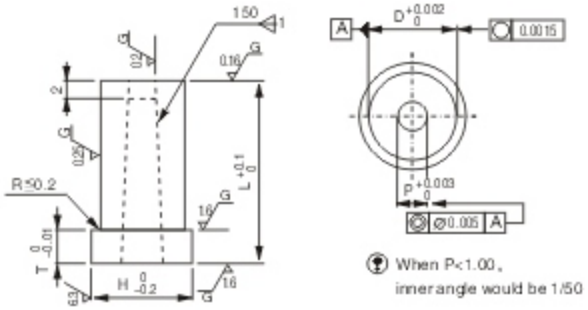
Shape	D	d	L1	H	L					
					16	19	22	25	28	32
A B	4	1.0~2.0	2	6	●	●	●	●	●	●
	5	1.0~2.5		7	●	●	●	●	●	●
	6	1.0~3.0	3	8	●	●	●	●	●	●
	8	1.5~4.0	4	11	●	●	●	●	●	●
	10	2.0~6.0	5	13	●	●	●	●	●	●
	13	3.0~8.0		16	●	●	●	●	●	●
	16	4.0~10.0		19	●	●	●	●	●	●
	20	7.0~12.0	6	23	●	●	●	●	●	●
	25	10.0~16.0		28	●	●	●	●	●	●
	32	14.0~20.0		35	●	●	●	●	●	●
	38	18.0~26.0	8	41	●	●	●	●	●	●

Order Example：

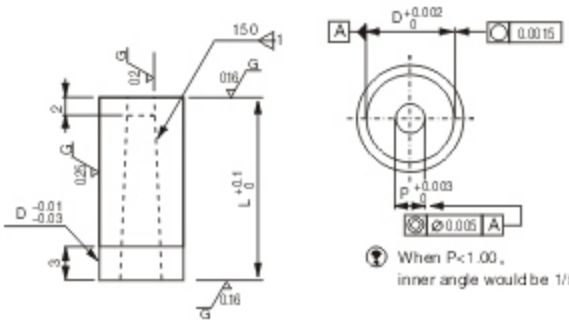
Type	-	SHAPE	-	D	-	d	-	L
JS31	-	A	-	5	-	2	-	22

■ Customize are also available

JS33 & JS34



JS35 & JS36



Type: JS33 ~ JS36

Material: JS33 & JS35 - V30 - KG7 - Metal Forming Tool Steel
JS34 & JS36 - WF20 - K20 - Submicron Steel

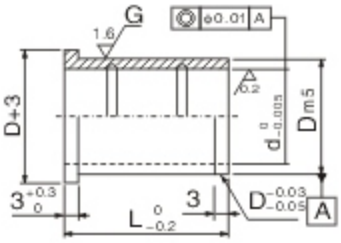
Hardness: JS33 & JS35 - HRA88~89 Through Sintering
JS34 & JS36 - HRA90~92 Through Sintering

D	L	0.001mm Increment min. P max.	H	T
3	13 16 20 22 25	0.500~1.000	4	3
4		0.500~1.500	5	
5		0.500~2.500	6	
6		1.000~3.000	9	5
8		1.000~4.000	11	
10		2.000~6.000	13	

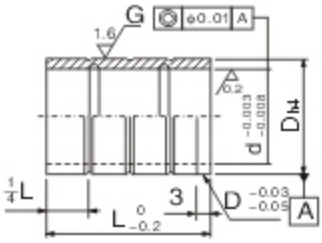
Order Example:

Type	-	D	-	L	-	P
JS33	-	6	-	20	-	2.5

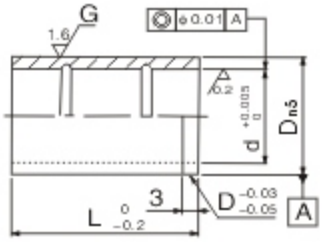
■ Customize are also available



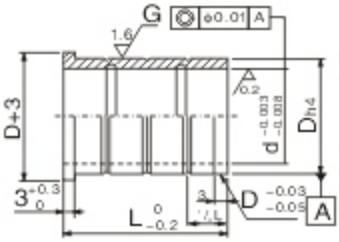
TYPE: JS37



TYPE: JS38



TYPE: JS39



TYPE: JS40

Type: JS37 ~ JS40

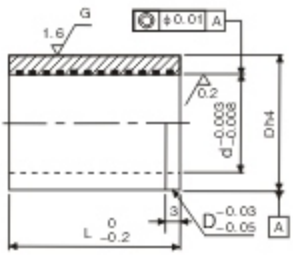
Material: SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel
Hardness: HRC58+4 Through High Frequency Quenching

d	L								D
	10	13	16	20	22	25	30	35	
8	●	●	●	●					12
10	●	●	●	●	●	●			14
13		●	●	●	●	●	●	●	18
16		●	●	●	●	●	●	●	22
20			●	●	●	●	●	●	25
25				●	●	●	●	●	32

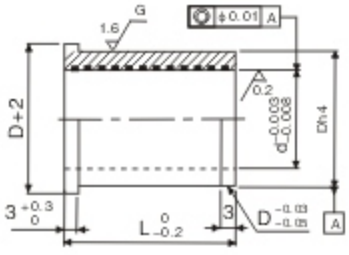
Order Example: Type - d - L
JS37 - 8 - 10

■ Customize are also available

TYPE：JS41



TYPE：JS42



Type：JS41 & JS42

Material：SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel
MoS2 (Groove)

Hardness：HRC58+4 Through High Frequency Quenching

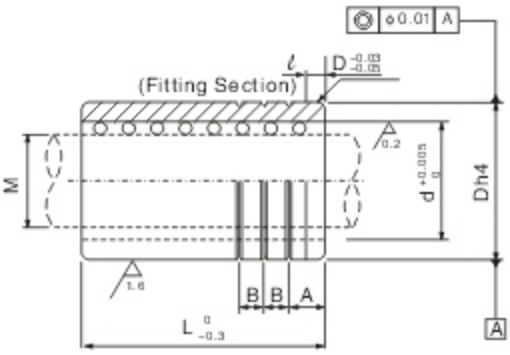
d	L								Dh4	
	10	13	16	20	22	25	30	35		
8	●	●	●	●					13	0 −0.005
10	●	●	●	●	●	●			16	
13		●	●	●	●	●	●		20	
16		●	●	●	●	●	●	●	24	0 −0.006
20			●	●	●	●	●	●	28	
25					●	●	●	●	34	0 −0.007

Order Example：

Type	–	D	–	L
JS41	–	8	–	10

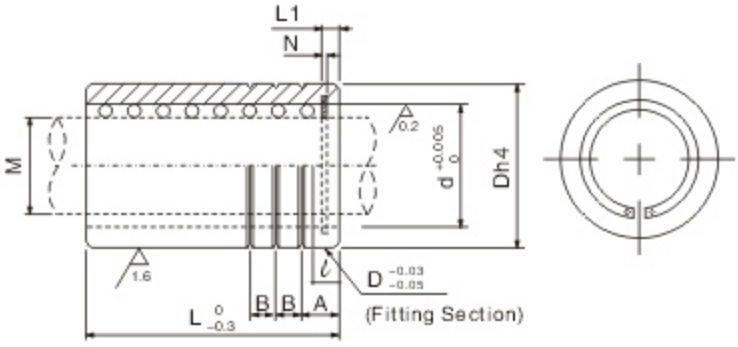
■ Customize are also available

TYPE: JS43



TYPE: JS44

(Include Clipper)



Type: JS43 & JS44

Material: SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel

Hardness: HRC58+4 Through High Frequency Quenching

M		d	Dh4		ℓ	A	B	L1	N	L				
										50	60	80	100	120
20	+0.020 +0.015	26	37	−0 −0.007	4	10	6	4.0	1.35	●				
22		28	40							●	●			
25		31	45								●	●		
28	+0.025 +0.020	36	50		5	12	7	4.5	1.65		●	●		
32		40	55	−0 −0.008					1.9			●	●	
38	+0.030 +0.025	48	64		6	15	10					●	●	
45		55	74										●	●
50	+0.035 +0.030	60	83	−0 −0.010				5.0	2.2				●	●
60		70	95					6.0	2.5				●	●

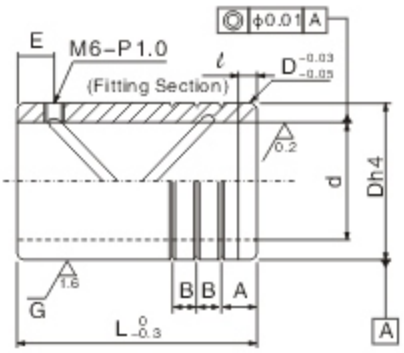
Order Example: Type - M - L

JS43 - 20 - 50

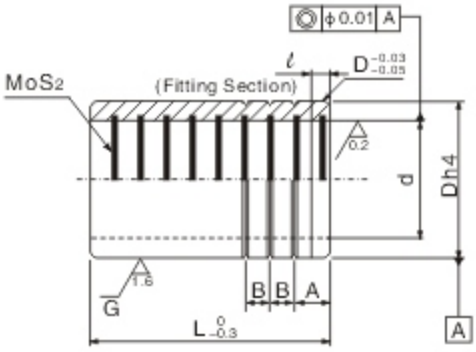
■ Customize are also available

Guide Bushing For Die Set - With MoS_2 & Groove -

TYPE: JS45



TYPE: JS46



Type: JS45 & JS46

※Only JS45 has section "E"

※Only JS46 has MoS_2

Material: SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel + MoS_2

Hardness: HRC58+4 Through High Frequency Quenching

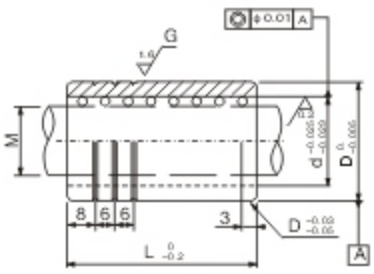
d		Dh4		ℓ	A	B	E	L				
								50	60	80	100	120
20	+0.027 +0.022	31	−0 −0.007	4	10	6	10	●				
22		34						●	●			
25		37							●	●		
28	+0.032 +0.027	42		5	12	7			●	●		
32		46					L80 »E10 L100»E15			●	●	
38	+0.037 +0.032	54	−0 −0.008	6	15	10				●	●	
45	+0.040 +0.035	62					15				●	●
50	+0.045 +0.040	70									●	●
60		80	−0 −0.010								●	●

Order Example: Type - d - L

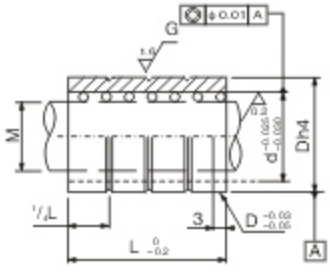
JS45 - 20 - 50

■ Customize are also available

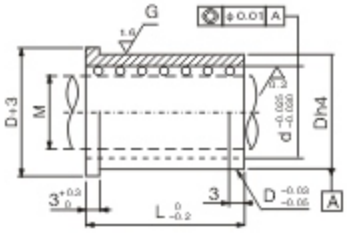
TYPE: JS47



TYPE: JS48



TYPE: JS49



Type: JS47 ~ JS49

Material: SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel
Hardness: HRC58+4 Through High Frequency Quenching

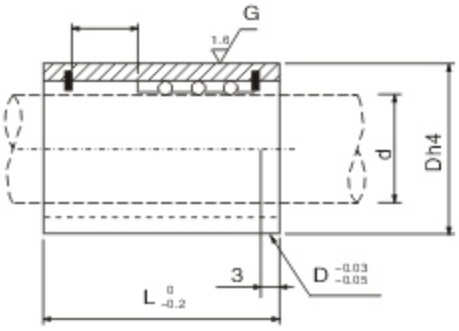
Type No.	M	L								d	Dh4	
		20	25	30	35	40	45	50	60			
JS47	13			●	●					17	24	0 −0.005
	16				●	●				20	28	
	20					●	●	●		26	34	
	25						●	●	●	31	40	
JS48 JS49	10	●	●	●						14	18	0 −0.005
	13	●	●	●						17	22	0 −0.006
	16		●	●	●					20	26	
	20		●	●	●	●				26	31	
	25				●	●				31	37	0 −0.007

Order Example: Type - M - L
JS47 - 13 - 30

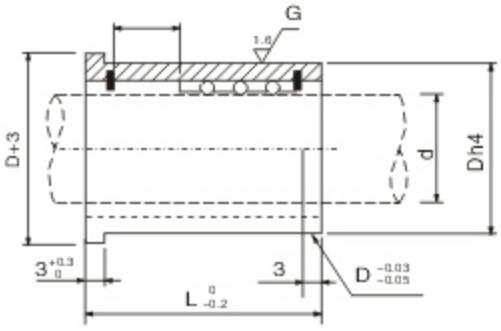
■ Customize are also available

Guide Bushing For Die Set (Include Ball Cages)

TYPE：JS50



TYPE：JS51



Type：JS50 & JS51

Material：SUJ2 -1.3505 - High Carbon Chrome Bearing Steel

Hardness：HRC58+4 Through High Frequency Quenching

d	L					Dh4		Sx2 (Maximum Stroke)
	20	25	30	35	40			
8	●					16	0 −0.005	10
		●						
10		●				20	0 −0.006	
			●					
13		●				25		
			●					
16			●			28		15
				●				
20			●			32	0 −0.007	
				●				
25					●	38		

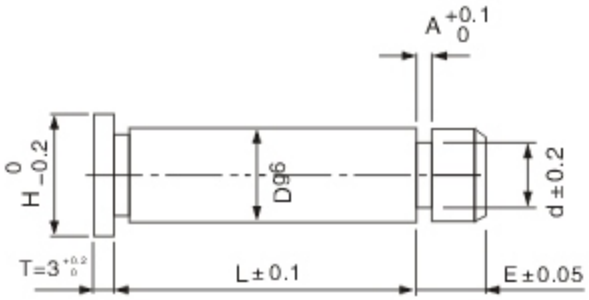
Order Example: Type – d – L

JS50 – 8 – 20

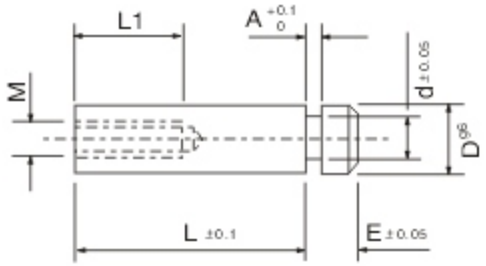
■ Customize are also available

Guide Lifter Pin

TYPE：JS52



TYPE：JS53



Type：JS52 & JS53

Material：SK3 - 1.1545 - Carbon Tool Steel

Hardness：HRC58~60 Through Hardening

Type No.	Dg6		d	E	H	A	L								
							22	25	28	30	33	36	40	50	60
JS52	4	-0.004 -0.012	2.0	5	6	0.5~0.8	●	●	●	●	●	●	●	●	●
	6		3.6	7	8	1.0~1.6	●	●	●	●	●	●	●	●	●
	8	-0.005 -0.014	5.0		10	1.0~2.0	●	●	●	●	●	●	●	●	●
	10		6.0		13	1.6~2.5	●	●	●	●	●	●	●	●	●
	13	-0.006 -0.017	7.0		16	2.5~3.6	●	●	●	●	●	●	●	●	●
	16		8.0	12	19	2.5~4.0	●	●	●	●	●	●	●	●	●
	20	-0.007 -0.020	10.0		23	3.6~5.0	●	●	●	●	●	●	●	●	●

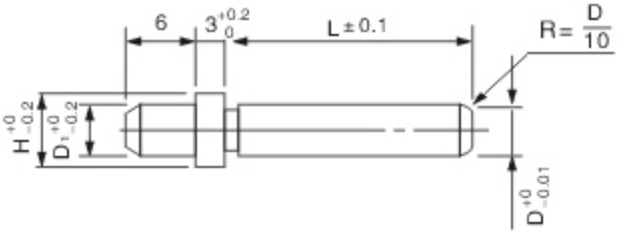
Type No.	Dg6	d	D1	T	M	H	L1	L2	A	L							
										22	25	28	30	36	40	50	60
JS53	6 -0.004 -0.012	3.6	8	3	M3X0.5	5.5	15	9	0.5~3.0	●	●	●	●	●	●	●	●
	8 -0.005 -0.014	5.0	10	3	M4X0.7	7.0	15	9	1.0~3.0	●	●	●	●	●	●	●	●
	10 -0.005 -0.014	6.0	13	8	M4X0.7	7.0	21	11	1.0~3.0	●	●	●	●	●	●	●	●
	13 -0.006 -0.017	7.0	16	9	M5X0.8	8.5	21	11	1.6~3.6	●	●	●	●	●	●	●	●

Order Example：

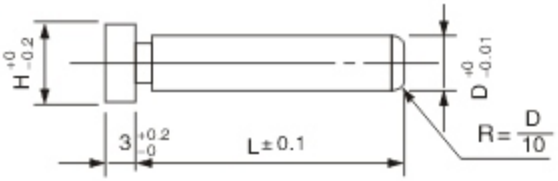
Type	-	D	-	A	-	L
JS52	-	10	-	2.8	-	22

■ Customize are also available

TYPE: JS54



TYPE: JS55



Type: JS54 & JS55

Material: SK3 - 1.1545 - Carbon Tool Steel

Hardness: HRC58~60 Through Hardening

※Only JS54 has section "D1"

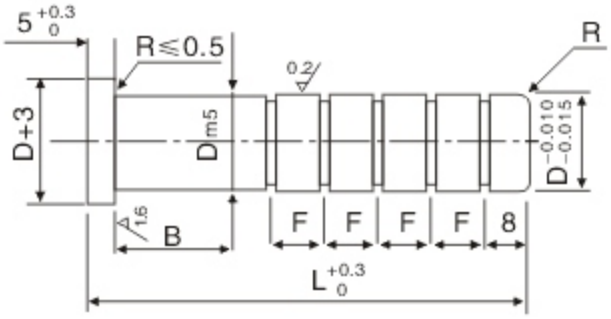
D	H	D1	L							
			15	20	25	30	35	40	45	50
3	5	3	●	●	●	●	●	●	●	●
4	6	4	●	●	●	●	●	●	●	●
5	7	4	●	●	●	●	●	●	●	●
6	8	5	●	●	●	●	●	●	●	●
8	10	7	●	●	●	●	●	●	●	●
10	12	9	●	●	●	●	●	●	●	●

Order Example: Type - D - L

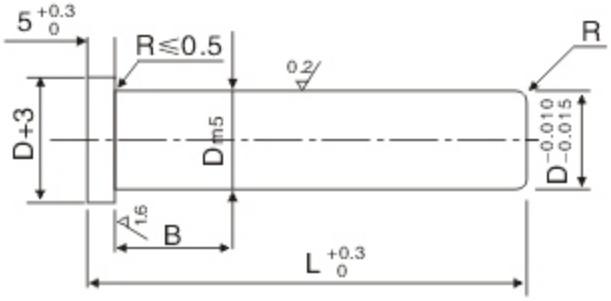
JS54 - 3 - 25

■ Customize are also available

TYPE: JS56



TYPE: JS57



Type: JS56 & JS57

Material: SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel

Hardness: HRC58+4 Through High Frequency Quenching

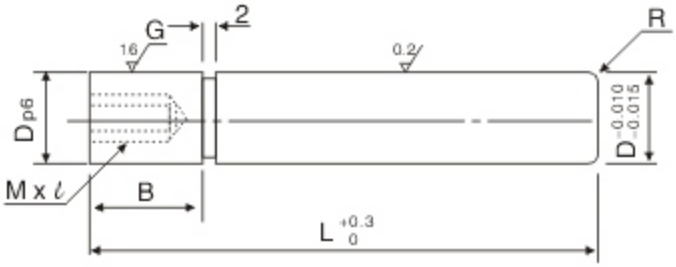
D	L (10mm increments)	Groove / Unit							Dm5		R	B
		40~	50~	70~	80~	90~	160~	180~				
8	40~120	2	3	4	5	6			8	+0.012 +0.006	1.0	10
10	40~150	2	3	4	5	6			10			13
13	40~180	2	3	4	5	6	7	8	13	+0.015 +0.007	1.5	16
16	50~200	2	3	4	5	6	7	8	16			20
20	60~200	2	3	4	5	6	7	8	20	+0.017 +0.008	2.0	25
25	70~200	2	3	4	5	6	7	8	25			28

Order Example: Type - D - L

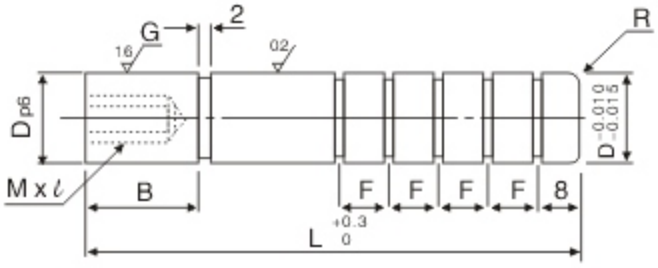
JS56 - 8 - 50

■ Customize are also available

TYPE: JS58



TYPE: JS59



Type: JS58 & JS59

Material: SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel

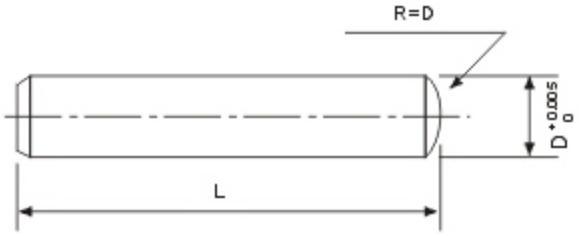
Hardness: HRC58+4 Through High Frequency Quenching

D	L (10mm increments)	Groove / Unit							Dp6		M x ℓ Pitch	R	B
		40~	50~	70~	80~	90~	160~	180~					
8	40~120	2	3	4	5	6			8	+0.024 +0.015	M5x12 P0.8	1.0	10
10	40~150	2	3	4	5	6			10				13
13	40~180	2	3	4	5	6	7	8	13	+0.029 +0.018	M6x15 P1.0	1.5	16
16	50~200	2	3	4	5	6	7	8	16				20
20	60~200	2	3	4	5	6	7	8	20	+0.035 +0.022	M8x20 P1.25	2.0	25
25	70~200	2	3	4	5	6	7	8	25				28

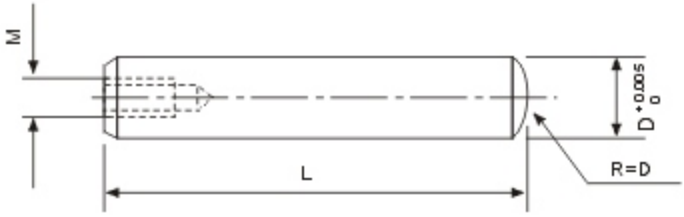
Order Example:

Type	-	D	-	L
JS58	-	8	-	50

■ Customize are also available



TYPE：JS60



TYPE：JS61

Type：JS60 & JS61

Material：S45C - 1.1191 - Carbon Steel for Machinery Structures
Hardness：HRC53~58 Through Hardening

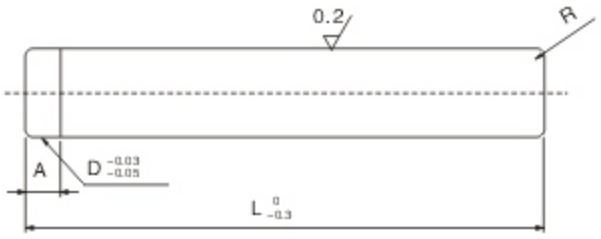
D	L															
	15	20	25	30	35	40	45	50	55	60	65	70	75	80	90	100
3	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
4	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
5	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
6	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
8	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
10	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
12	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
14				●	●	●	●	●	●	●	●	●	●	●	●	●
16				●	●	●	●	●	●	●	●	●	●	●	●	●

Order Example：

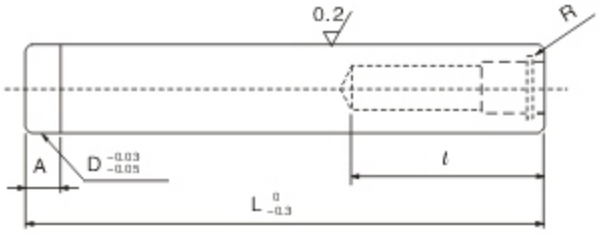
Type	–	D	–	L
JS60	–	3	–	50

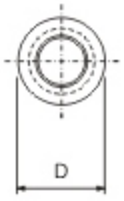
■ Customize are also available

Guide Pillar For Die Set - Without Flange -

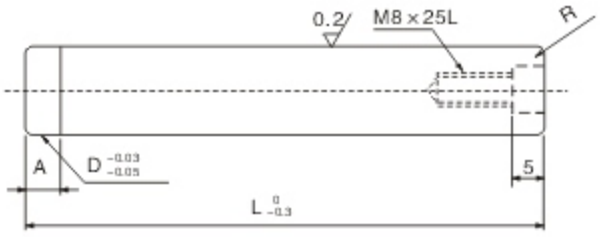


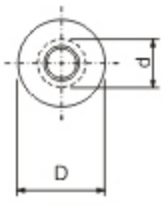
TYPE: JS62
(Regular)





TYPE: JS63
(For Adjustable Stopper)





TYPE: JS64
(For Fixed Stopper)

Type: JS62 ~ JS64

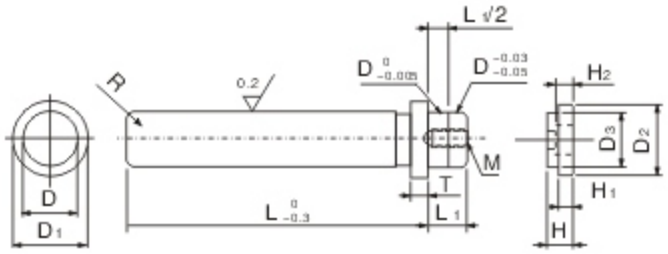
Material: SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel
Hardness: HRC58+4 Through High Frequency Quenching

D		A	R	ℓ	d	L (10mm increments)
20	+0.020 +0.015	4	2.0	38	14	100~300
22			3.0	42		120~300
25				50		120~350
28	+0.025 +0.020	5	3.5	50		140~400
32				60		160~400
38	+0.030 +0.025	6	4.0	60	20	180~450
45				70		180~450
50	+0.035 +0.030	7	5.0	70		200~450
60				70		200~500

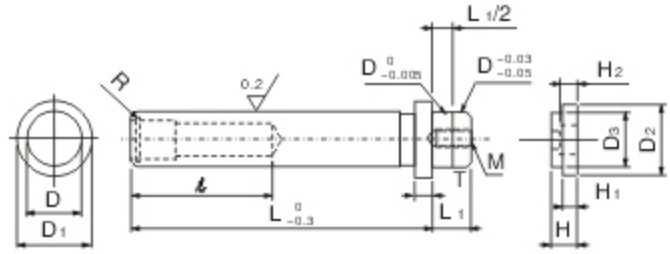
Order Example: Type - D - L
JS62 - 20 - 150

■ Customize are also available

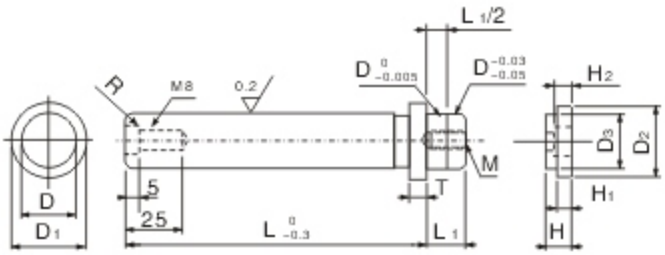
Guide Pillar For Die Set - With Flange -



TYPE: JS65
(Regular)



TYPE: JS66
(For Adjustable Stopper)



TYPE: JS67
(For Fixed Stopper)

Type: JS65 ~ JS67

Material: SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel

Hardness: HRC58+4 Through High Frequency Quenching

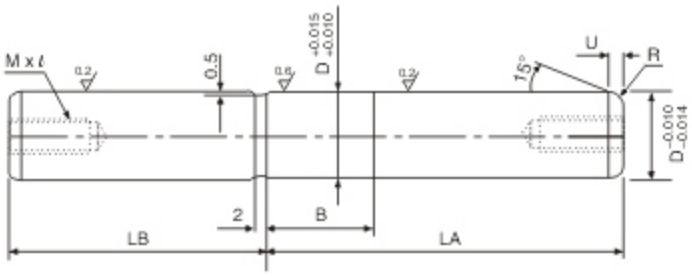
D		ℓ	D1	R	T	L1	D2	D3	H	H1	H2	d	M	L (10mm increments)
20	+0.020 +0.015	38	29	2.0	5	15	28	19.5	14	7	8	14	M8x20	80~250
22		42	31	3.0	8	16	30	21.5						80~250
25		50	36			18	35	24.5						80~300
28	+0.025 +0.020	50	39	3.5	10	20	36	27.5	16	8	10		M10x25	100~300
32		60	44			23	40	31.5						120~300
38	+0.030 +0.025	60	53	4.0	12	27	49	37.5	18	10	12	20	M12x30	140~400
45		70	59			32	55	44.5						140~400
50	+0.035 +0.030	70	69	5.0	15	35	62	49.5	20	12	14		M14x35	160~400
60		70	79			42	72	59.5						160~400

Order Example: Type - D - L

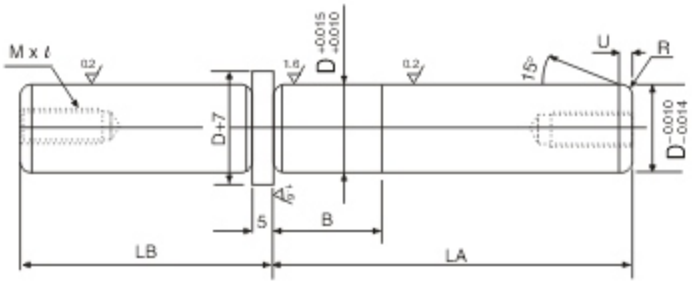
JS65 - 20 - 100

■ Customize are also available

TYPE: JS68



TYPE: JS69



Type: JS68 & JS69

Material: SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel
Hardness: HRC 58+4 Through High Frequency Quenching

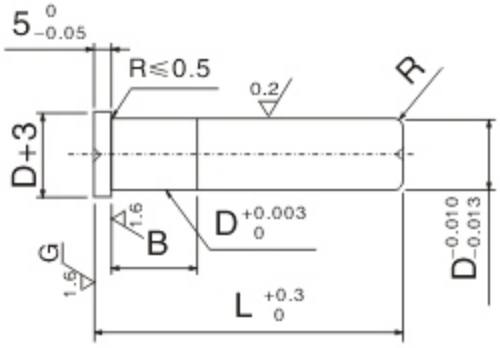
D	LA	LB (10mm increments)	B (10mm increments)	U	R	M x ℓ
13	60	30~50	10~30	2	1.5	M5 x 22
	70	30~60				
	80	40~60				
16	70	30~60		3	2	M6 x 25
	80	30~70				
	90	40~80				
20	80	40~70				M8 x 25
	90	40~70				
	100	50~80				
25	90	50~70		4	3	
	100	50~80				
	110	60~90				

Order Example:

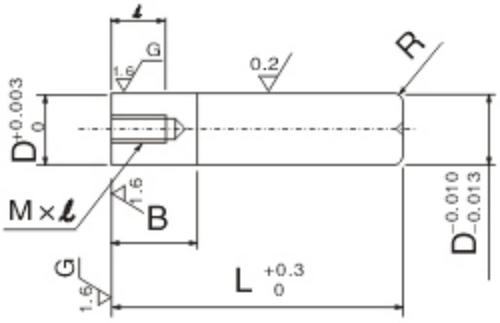
Type	-	D	-	LA	-	LB	-	B
JS68	-	13	-	60	-	30	-	10

■ Customize are also available

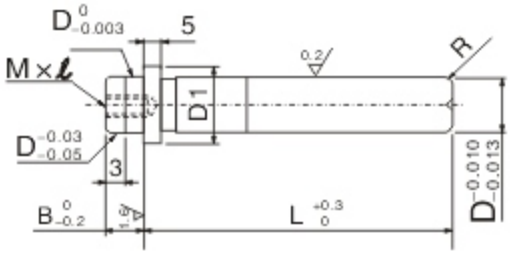
TYPE: JS70



TYPE: JS71



TYPE: JS72



Type: JS70 ~ JS72

Material: SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel

Hardness: HRC58+4 Through High Frequency Quenching

Type No.	D	L (10mm increments)	M x ℓ Pitch	R	B
JS70 JS71	10	40~100	M5 x12 P0.8	1.0	13
	13	50~120	M6 x15 P1.0	1.5	16
	16	50~140		1.5	20
	20	70~140	M8 x20 P1.25	2.0	25

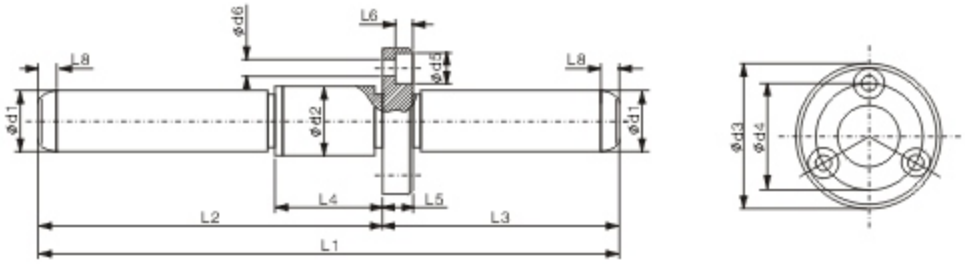
Type No.	D	L (10mm increments)	M x ℓ Pitch	D1	R	B
JS72	10	40~60	M5 x12 P0.8	16	1.0	8
	13	40~70	M6 x15 P1.0	20	1.5	10
	16	40~100		23		
	20	40~100	M8 x20 P1.25	27	2.0	13

Order Example:

Type	-	D	-	L
JS70	-	10	-	50

■ Customize are also available

Guide Pillar For Die Set - With Flange & Bolt -



Type: JS73

Material: SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel

Hardness: HRC58+4 Through High Frequency Quenching

d1	d2	d3	d4	d5	d6	L1	L2	L3	L4	L5	L6	L8
12 $^{0}_{-0.003}$	15±0.0025	28	20	6	3.4	90	50	40	12	6	3.4	3
						120	60	60				3
16 $^{0}_{-0.003}$	18±0.0025	38	28	8	4.5	132	70	62	16	8	4.6	5
						152	90	62				5
						180	90	90				5
19 $^{0}_{-0.004}$	22±0.003	42	32	8	4.5	160	90	70	20	8	4.6	5
						180	110	70				5
25 $^{0}_{-0.004}$	26±0.003	53	40	11	6.6	170	85	85	25	12	6.8	5
		48	38	8	4.5	200	100	100	22	8	4.6	5
		53	40	11	6.6	212	140	72	25	12	6.8	5
						254	140	114				5
32 $^{0}_{-0.004}$	32.5±0.0035	60	46	11	6.6	175	90	85	27	12	6.8	5
						192	120	72				5
						212	120	92				5
						252	140	112				5
40 $^{0}_{-0.004}$	42±0.0035	70	56	11	6.6	220	120	100	27	12	6.8	5
						240	130	110				5
						260	140	120				5

Order Example: Type - d1 - L1

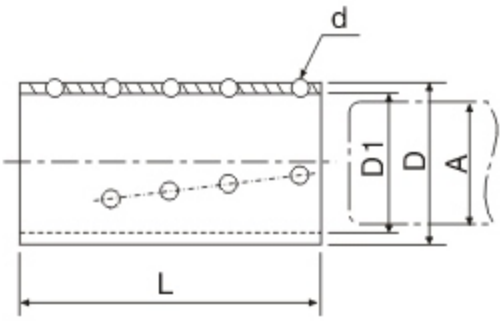
JS73 - 16 - 132

■ Customize are also available

Ball Cages For Die Set - Regular Type -

TYPE: JS74
(Aluminum)

TYPE: JS75
(Plastic)



Type: JS74 & JS75

Cage Material: JS74 - A6061 - Aluminum
JS75 - POM - Plastic

Steel Ball Material: SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel
(JIS - Grade 10)

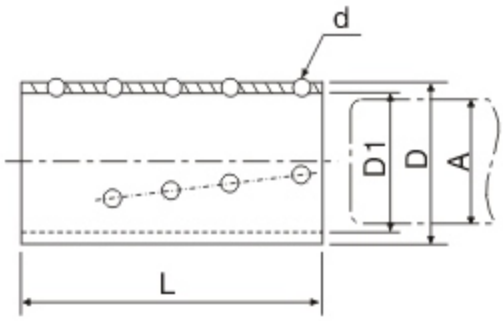
A	L	ϕD	ϕD1	ϕd
19	50	24.5	19.5	3
20	50	25.5	20.5	3
22	50	27.5	22.5	3
22	60	27.5	22.5	3
25	50	30.5	25.5	3
25	60	30.5	25.5	3
25	75	30.5	25.5	3
28	60	35.5	28.5	4
28	75	35.5	28.5	4
32	60	39.5	32.5	4
32	75	39.5	32.5	4
32	90	39.5	32.5	4
38	70	47.5	38.5	5
38	75	47.5	38.5	5
38	90	47.5	38.5	5
45	90	54.5	45.5	5
45	110	54.5	45.5	5
50	90	59.5	50.5	5
50	110	59.5	50.5	5
60	90	69.5	60.5	5
60	100	69.5	60.5	5
60	110	69.5	60.5	5

Order Example: Type - A - L
JS74 - 20 - 50

■ Customize are also available

TYPE: JS76
(Aluminum)

TYPE: JS77
(Plastic)



Type: JS76 & JS77

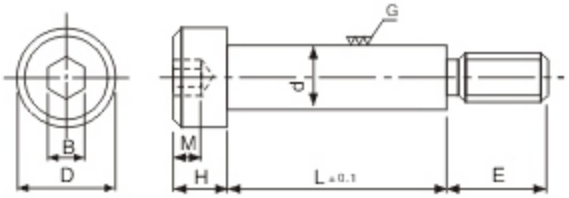
Cage Material: JS76 - A6061 - Aluminum
JS77 - POM - Plastic
Steel Ball Material: SUJ2 - 1.3505 - High Carbon Chrome Bearing Steel
(JIS - Grade 10)
Characteristic: Steel ball quantity increase twice higher than JS74 & JS75

A	L										ϕD	ϕD1	ϕd
	25	30	35	40	45	50	60	75	90	110			
10	●	●	●								13.7	10.3	2
13	●	●	●								16.7	13.3	
16		●	●	●							19.7	16.3	
20		●	●	●	●	●					25.5	20.5	3
22						●	●				27.5	22.5	
25			●	●	●	●	●	●			30.5	25.5	
28							●	●			35.5	28.5	4
32								●	●		39.5	32.5	
38								●	●		47.5	38.5	5
45									●	●	54.5	45.5	
50									●	●	59.5	50.5	
60									●	●	69.5	60.5	

Order Example: Type - A - L
JS76 - 20 - 50

■ Customize are also available

Stripper Bolts -Male Screw Type-



Type: JS78

Material: SCM435 -1.7220 - Chrome Molybolenum Steel

Hardness: HRC38~44 Through Carburizing

Size		ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20
d	Max	5.981	7.981	9.987	11.984	15.984	19.980
	Min	5.951	7.951	9.951	11.941	15.941	19.928
Pitch		M5-P0.8	M6-P1.0	M8-P1.25	M10-P1.5	M12-P1.75	M16-P2.0
E		9.75	11.25	13.25	16.40	18.40	22.40
D		10.0	13.0	16.0	18.0	24.0	30.0
H		4.5	5.5	7.0	9.0	11.0	14.0
B		3.0	4.0	5.0	6.0	8.0	10.0
M		2.4	3.3	4.2	4.9	6.6	8.8

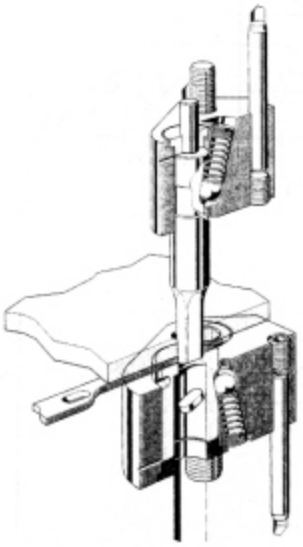
L \ d	ϕ5	ϕ6	ϕ8	ϕ10	ϕ12	ϕ16	ϕ20	ϕ24
	M4-P0.7	M5-P0.8	M6-P1.0	M8-P1.25	M10-P1.5	M12-P1.75	M16-P2.0	M20-P2.5
6	●	●						
8	●	●	●					
10	●	●	●	●				
12	●	●	●	●	●			
14					●			
15			●	●				
16	●	●	●	●	●	●		
18				●				
20	●	●	●	●	●	●	●	
25	●	●	●	●	●	●	●	
30	●	●	●	●	●	●	●	
35	●	●	●	●	●	●	●	
40	●	●	●	●	●	●	●	
45	●	●	●	●	●	●	●	
50	●	●	●	●	●	●	●	●
55	●	●	●	●	●	●	●	●
60	●	●	●	●	●	●	●	●
65		●	●	●	●	●	●	●
70		●	●	●	●	●	●	●
75		●	●	●	●	●	●	●
80		●	●	●	●	●	●	●
85		●	●	●	●	●	●	●
90		●	●	●	●	●	●	●
95		●				●		
100		●	●	●	●	●	●	●
110			●	●	●	●	●	●
120			●	●	●	●	●	●
130			●	●	●	●	●	●
140			●	●	●	●	●	●
150			●	●	●	●	●	●

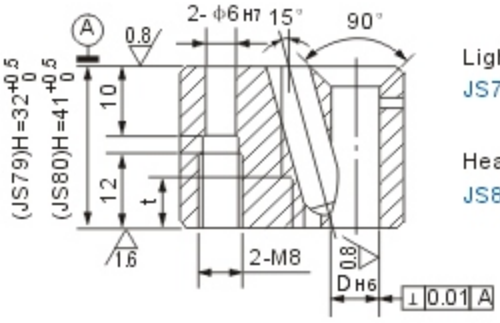
Order Example:

Type	–	L	–	d
JS78	–	40	–	6

■ Customize are also available

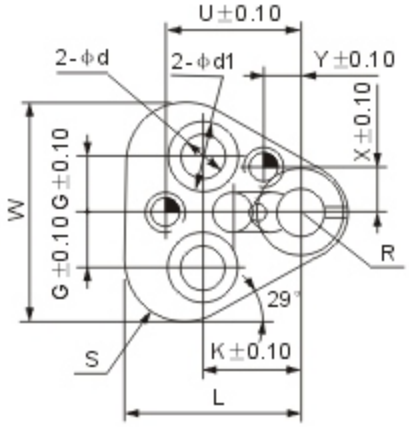
Ball Lock Retainer For Punches





Light Type:
JS79-Thickness 32

Heavy Type:
JS80-Thickness 41



Accessory	Q'TY
STEEL BALL	1
SPRING	1
SCREWS	2
DOWEL PIN	2
FIXED PLATE	1
SCREW CAP	2
TEMPLATE	1

Type: JS79 & JS80

Material: S45C - 1.1191 - Carbon Steel For Machinery Structures
(With Surface treatment Fe3O4)

Hardness: HRC42~50

TYPE NO.		D_{H6}	W	S	L	R	G	U	K	d	d1	t	X	Y	SD	
															JS79	JS80
JS79-10	JS80-10	10	43.7	12.0	35.0	9.5	11.1	26.93	19.05	9.0	14	10	9.0	7.5	8	10
JS79-13	JS80-13	13	50.0	15.2	38.1	12.7	14.3	29.97	19.05	9.0	14	10	12.0	6.5		
JS79-16	JS80-16	16	53.2	16.8	39.7	14.3	15.9	31.75	19.05	9.0	14	10	13.5	6.0		
JS79-20	JS80-20	20	59.5	20.0	42.8	17.5	17.5	33.75	19.05	11.0	17	12	16.5	5.0		12
JS79-25	JS80-25	25	69.1	24.7	47.7	22.2	19.8	40.64	23.82	13.0	19	14	22.0	7.0		
JS79-32	JS80-32	32	69.1	24.7	47.7	22.2	19.8	40.64	23.82	13.0	19	14	22.0	7.0		
JS79-38	—	38	76.7	28.5	51.4	26.0	24.0	43.99	27.00	13.0	19	14	26.0	10.0		
—	JS80-40	40	76.7	28.5	51.4	26.0	24.0	43.99	27.00	13.0	19	14	26.0	10.0		

*SD — STEEL BALL DIMENSION

Order Example: Type No.
JS79-10

■ Customize are also available

Technical Data

CONVERSION TABLE OF HARDNESS
Excerpt From SAE J417

Conversion table approximate values for steel according to Rockwell hardness C scale[1]

Rockwell hardness C scale (HRC)	Vickers hardness (HV)	Brinell hardness(HB) Ball:10mm diameter/ Load:3,000kgf		Rockwell hardness[2]			Rockwell superficial hardness Diamond conical penetrator			Shore hardness (HS)	Tensile strength (Approximate value) Mpa (kgf/mm²) (2)	Rockwell hardness c scale[3] (HRC)
		Standard ball	Tungsten carbide ball	A scale (HRA) Load:60kgf Diamond conical penetrator	B scale (HRB) Load:100kgf Ball of 1.6mm (1/16") dia.	D scale (HRD) Load:100kgf Diamond conical penetrator	15-N Scale Load:15kgf	30-N Scale Load:30kgf	45-N Scale Load:45kgf			
68	940	—	—	85.6	—	76.9	93.2	84.4	75.4	97	—	68
67	900	—	—	85.0	—	76.1	92.9	83.6	74.2	95	—	67
66	865	—	—	84.5	—	75.4	92.5	82.8	73.3	92	—	66
65	832	—	(739)	83.9	—	74.5	92.2	81.9	72.0	91	—	65
64	800	—	(722)	83.4	—	73.8	91.8	81.1	71.0	88	—	64
63	772	—	(705)	82.8	—	73.0	91.4	80.1	69.9	87	—	63
62	746	—	(688)	82.3	—	72.2	91.1	79.3	68.8	85	—	62
61	720	—	(670)	81.8	—	71.5	90.7	78.4	67.7	83	—	61
60	697	—	(654)	81.2	—	70.7	90.2	77.5	66.6	81	—	60
59	674	—	(634)	80.7	—	69.9	89.8	76.6	65.5	80	—	59
58	653	—	615	80.1	—	69.2	89.3	75.7	64.3	78	—	58
57	633	—	595	79.6	—	68.5	88.9	74.8	63.2	76	—	57
56	613	—	577	79.0	—	67.7	88.3	73.9	62.0	75	—	56
55	595	—	560	78.5	—	66.9	87.9	73.0	60.9	74	2075(212)	55
54	577	—	543	78.0	—	66.1	87.4	72.0	59.8	72	2015(205)	54
53	560	—	525	77.4	—	65.4	86.9	71.2	58.5	71	1950(199)	53
52	544	(500)	512	76.8	—	64.6	86.4	70.2	57.4	69	1880(192)	52
51	528	(487)	496	76.3	—	63.8	85.9	69.4	56.1	68	1820(186)	51
50	513	(475)	481	75.9	—	63.1	85.5	68.5	55.0	67	1760(179)	50
49	498	(464)	469	75.2	—	62.1	85.0	67.6	53.8	66	1695(173)	49
48	484	451	455	74.7	—	61.4	84.5	66.7	52.5	64	1635(167)	48
47	471	442	443	74.1	—	60.8	83.9	65.8	51.4	63	1580(151)	47
46	458	432	432	73.6	—	60.0	83.5	64.8	50.3	62	1530(156)	46
45	446	421	421	73.1	—	59.2	83.0	64.0	49.0	60	1480(151)	45
44	434	409	409	72.5	—	58.5	82.5	63.1	47.0	58	1435(146)	44
43	423	400	400	72.0	—	57.7	82.0	62.2	46.7	57	1385(141)	43
42	412	390	390	71.5	—	56.9	81.5	61.3	45.5	56	1340(136)	42
41	402	381	381	70.9	—	56.2	80.9	60.4	44.3	55	1295(132)	41
40	392	371	371	70.4	—	55.4	80.4	59.5	43.1	54	1250(127)	40
39	382	362	362	69.9	—	54.6	79.9	58.6	41.9	52	1215(124)	39
38	372	353	353	69.4	—	53.8	79.4	57.7	40.8	51	1180(120)	38
37	363	344	344	68.9	—	53.1	78.8	56.8	39.6	50	1160(118)	37
36	354	336	336	68.4	(109.0)	52.3	78.3	55.9	38.4	49	1115(114)	36
35	345	327	327	67.9	(108.5)	51.5	77.7	55.0	37.2	48	1080(110)	35
34	336	319	319	67.4	(108.0)	50.8	77.2	54.2	36.1	47	1055(108)	34
33	327	311	311	66.8	(107.5)	50.0	76.6	53.3	34.9	46	1025(105)	33
32	318	301	301	66.3	(107.0)	49.2	76.1	52.1	33.7	44	1000(102)	32
31	310	294	294	65.8	(106.0)	48.4	75.6	51.3	32.7	43	980(100)	31
30	302	286	286	65.3	(105.5)	47.7	75.0	50.4	31.3	42	950(97)	30
29	294	279	279	64.7	(104.5)	47.0	74.5	49.5	30.1	41	930(95)	29
28	286	271	271	64.3	(104.0)	46.1	73.9	48.6	28.9	41	910(93)	28
27	279	264	264	63.8	(103.0)	45.2	73.3	47.7	27.8	40	880(90)	27
26	272	258	258	63.3	(102.5)	44.6	72.8	46.8	26.7	38	860(88)	26
25	266	253	253	62.8	(101.5)	43.8	72.2	45.9	25.5	38	840(86)	25
24	260	247	247	62.4	(101.0)	43.1	71.6	45.0	24.3	37	825(84)	24
23	254	243	243	62.0	100.0	42.1	71.0	44.0	23.1	36	805(82)	23
22	248	237	237	61.5	99.0	41.6	70.5	43.2	22.0	35	785(80)	22
21	243	231	231	61.0	98.5	40.9	69.9	42.3	20.7	35	770(79)	21
20	238	226	226	60.5	97.8	40.1	69.4	41.5	19.6	34	760(77)	20
(18)	230	219	219	—	96.7	—	—	—	—	33	730(75)	(18)
(16)	222	212	212	—	95.5	—	—	—	—	32	705(72)	(16)
(14)	213	203	203	—	93.8	—	—	—	—	31	675(69)	(14)
(12)	204	194	194	—	92.3	—	—	—	—	29	650(66)	(12)
(10)	196	187	187	—	90.7	—	—	—	—	28	620(63)	(10)
(8)	188	179	179	—	89.5	—	—	—	—	27	600(61)	(8)
(6)	180	171	171	—	87.1	—	—	—	—	26	580(59)	(6)
(4)	173	165	165	—	85.5	—	—	—	—	25	550(56)	(4)
(2)	166	158	158	—	83.5	—	—	—	—	24	530(54)	(2)
(0)	160	152	152	—	81.7	—	—	—	—	24	515(53)	(0)

※ Notes (1) The figures in bite are based on Table 1 of ASTM E 140 (adjusted by SEA, ASM and ASTM in collaboration)

(2) The values and units parentheses have have been converted from psi based on conversion tables of JIS Z 8413 and Z 8438. 1Mpa=1N/mm²

(3) The figures in parentheses are less frequently used values and are for reference only.

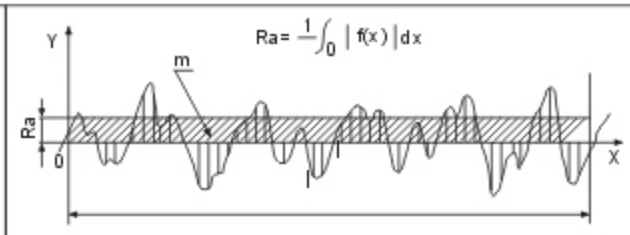
1. Categories of surface roughness

Definitions and indications for surface roughness parameters(for industrial products)are specified.The yare arithmetical mean roughness (Ra),maximum height(Ry),ten-point mean roughness(Rz), mean spacing of profile irregularities(Sm),mean spacing of local peaks of the profile(S)and profile bearing length ratio(tp).Surface roughness is given as the arithmetical mean value for a randomly sampled area. [Mean center line roughness(Ra75)is defined in the annexes of JIS B0031 and JIS B(0061)] .

Table 1 Typical ways for obtaining surface roughness

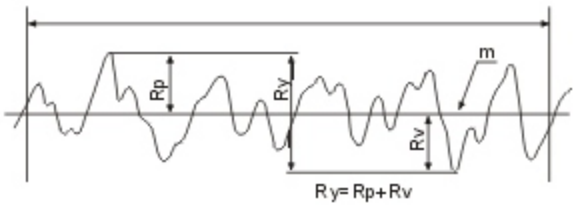
Arithmetical mean roughness (Ra)

A section of standard length is sampled from the mean line on the roughness chart.The mean line is laid on a Cartesian coordinate system wherein the mean line runs in the direction of the x-axis and magnification is the Y-axis.The value obtained with the formula on the right is expressed in micrometer(μm) when y=1(X)



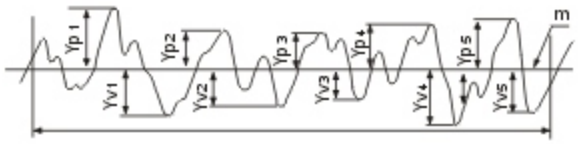
Maximum peak(Ry)

A section of standard length is sampled from the mean line on the roughness chart.The distance between the peaks and valleys of the sampled line is measured in the y direction .The value is expressed in micrometer(μm).
Notes: To obtain Ry,sample only the standard length .The part, where peaks and valleys are wide enough to be interpreted as scratches,should be avoided.



Ten-point mean roughness (Rz)

A section of standard length is sampled from the mean line on the routhness chart,The distance between the peaks and valleys of the sampled line is measured in the y direction. Then , the average peak is obtained among 5 tallest peaks (Yp), as is the average valley between 5 lowest valleys (Yv), The sum of these two values is expressed in micrometer(μm).



$$Rz = \frac{|Yp1+Yp2+Yp3+Yp4+Yp5| + |Yv1+Yv2+Yv3+Yv4+Yv5|}{5}$$

Yp1、Yp2、Yp3、Yp4、Yp5: Tallest 5 peaks within sample

Yv1、Yv2、Yv3、Yv4、Yv5: Lowest 5 peaks within sample

Reference: Relationship between arithmetical mean roughness(Ra) and conventional symbols

Arithmetical mean roughness Ra			Max.Height Ry	Ten-point mean roughness Rz	Standard length of Ry · Rz ℓ(mm)	Triangular indication
Preferred number series	Cut-off value C(mm)	Indication of surface texture on drawings	Preferred number series			
0.012 a	0.08	0.012 ~ 0.2	0.05s	0.05 z	0.08	▽▽▽▽
0.025a			0.1 s	0.1 z		
0.05 a	0.25		0.2 s	0.2 z	0.25	
0.1 a			0.4 s	0.4 z		
0.2 a			0.8 s	0.8 z		
0.4 a	0.8	0.4 ~ 1.6	1.6 s	1.6 z	0.8	▽▽▽
0.8 a			3.2 s	3.2 z		
1.6 a			6.3 s	6.3 z		
3.2 a	0.25	3.2 ~ 6.3	12.5s	12.5 z	0.25	▽▽
6.3 a			25 s	25 z		
12.5 a	8	12.5 ~ 25	50 s	50 z	8	▽
25 a			100s	100 z		
50 a	–	50 ~ 100	200s	200 z	–	–
100 a			400	400 z		

※The interdependence for 3 classes is not strictly enforced.
※The evaluation eengths of Ra,Ry and Rz:Five times the cut-off value and standard length respectively.

Kinds and symbols of geometrical tolerances

Kinds of tolerance		Symbol	Definition of tolerance zone	Examples of diagrammatical indication and its interpretation
Form tolerance	Straightness tolerance	—	Where symbol ϕ is attached before the numerical value indicating a tolerance zone, this tolerance zone is a zone in a cylinder of diameter t.	ϕ 0.08 — Where a tolerance frame is connected to the dimension showing the diameter of a cylinder, the axis of the cylinder shall be contained a cylinder of 0.08mm diameter.
	Flatness tolerance	▱	The tolerance zone is a zone held between two parallel planes a distance t apart.	0.08 — This surface shall be contained between two parallel planes 0.08mm apart.
	Circularity tolerance	○	The tolerance zone in the considered plane is a zone between two concentric circles a distance t apart.	0.1 — The circumerence in any section normal to the axis shall be contained between two concentric circles 0.1mm apart on the same plane.
	Cylindricity tolerance	⌭	The tolerance zone is a zone contained between two coaxial cylinder surfaces a distance t apart.	0.1 — The considered surface shall be contained between two coaxial cylinder surfaces 0.1mm apart.
	Profile tolerance of line	⌒	The tolerance zone is a zone held between two lines enveloping circles of diameter t, the centers of which are situated on a theoretically exact profile line	0.04 — In any cross section parallel to the projection plane the considered profile shall be contained between two lines enveloping circles of 0.04mm in diameter, the centers of which are situated on a line having the theoretically exact profile.
	Profile tolerance of surface	⌓	The tolerance zone is a zone held between the two surfaces enveloping the spheres of diameter t, the centers of which are situated on a theoretically exact profile surface.	0.02 — The considered surface shall be contained between two surfaces enveloping the spheres of diameter 0.02mm, the centers of which are situated on a surface having the theoretically exact profile.
Orientation tolerance	Parallelism tolerance	//	The tolerance zone is a zone held between two parallel planes parallel to the datum plane and a distance t apart from each other.	0.01 A — The surface shown by the arrow of the leader line shall be contained between two planes parallel to the datum plane A and 0.01mm apart from each other in the direction of the arrow of the leader line.
	Perpendicularity tolerance	⊥	Where symbol is attached before the numerical value indicating the tolerance, the tolerance zone is a zone within a cylinder of diameter t perpendicular to the datum plane.	ϕ ⊥ ϕ 0.01 A — The axis of the cylinder shown by the arrow of the leader line shall be contained within a cylinder of diameter 0.01mm perpendicular to the datum plane A.
	Angularity tolerance	∠	The tolerance zone is a zone held between two parallel planes inclined at the specified angle to the datum plane and distance t apart from each other.	∠ 0.08 A — 40° — The surface shown by the arrow of the leader line shall be contained between two parallel planes which are inclined at 40° with the oretical exactness to the datum plane A and which are 0.08mm apart from each other in the direction of the arrow of the leader line.
Location tolerance	Positional tolerance	⌖	True location — The tolerance zone is a zone within a circle or sphere of diameter t having its center at the theoretically exact location, hereinafter referred to as the true location.	B — ϕ 0.03 A B — 60 — 100 — A — The point shown by the arrow of the leader line shall be contained within a circle of 0.03mm diameter having its center at the true location 60mm and 100mm apart respectively, from the datum straighline A and from the datum straighline B.
	Coaxiality tolerance of concentricity tolerance	◎	Where symbol ϕ is attached before the numerical value indicating the tolerance, the tolerance zone is a zone within a cylinder of diameter t whose axis agrees with the datum axis straighline.	A — ϕ 0.01 A — The axis shown by the arrow of the leader line shall be contained within a cylinder of 0.01mm diameter whose axis agrees with the datum axis straighline A.
	Symmetry tolerance	⌯	The tolerance zone is a zone held between two parallel planes a distance t apart from each other and arranged symmetrically about the datum median plane.	A — 0.08 A — The median surface shown by the arrow of the leader line shall be contained between two parallel planes 0.08mm apart from each other and arranged symmetrically about the datum median plane A.
Run-out tolerance	Circular run-out tolerance	↗	measuring plane — Toleranced surface — The tolerance is a zone between two concentric circles whose centers agree with the datum axial straighline on any measuring plane normal to the datum axial straighline and which are a distance t apart from each other in the radial direction.	↗ 0.1 A-B — A — B — The run-out in the radial direction of the cylinder surface shown by the arrow of the leader line shall not exceed 0.1mm on any measuring plane normal to the datum axial straighline when the cylinder is rotated by one rotation about the datum axial straighline A-B.
	Total run-out tolerance	⌰	The tolerance zone is a zone between two coaxial cylinders having axes agreeing with the datum axial straighline and a distance t apart from each other in the radial direction.	⌰ 0.1 A-B — A — B — The total radial run-out of the cylinder surface shown by the arrow of the leader line shall not exceed 0.1mm at any point on the cylinder surface when the cylinder part is rotated about the datum axial straighline A-B with a relative movement in the axial direction.

Lines used in the drawing in the column of "defintion of tolerance zone" indicate the following meanings:

- Thick solid line or broken line: Feature
- Thick alternate long and short dash line: Datum
- Thin solid line or broken line: Tolerance zone
- Thin alternate long and short dash line: Center line
- Thin alternate long and two short dashes line: Supplementary projection plane or sectional plane
- Thin alternate long and two short dashes line: Projection of a feature to Supplementary Projection plane or sectional plane

Stainless steels・Heat resisting steels and related materials

Japan Industrial Standards		Steel Type Related to Foreign Standards					
Standard Number Name	Code	ISO 683/1, 10, 11*)	AISI SAE	BS 970 Part1,3 BS EN 10083—1,2	DIN EN 10084 DIN EN 10083—1,2	NF A3—6551 NF EN 10083—1,2	「OCT 4543
JIS G 4051 Carbon steel for machine structral use	S10C	C10	1010	040A10 045A10 045M10	C10E C10R	XC10	–
	S12C	–	1012	040A12	–	XC12	–
	S15C	C15E4 C15M2	1015	055M15	C15E C15R	–	–
	S17C	–	1017	–	–	XC18	–
	S20C	–	1020	070M20 C22 C22E C22R	C22 C22E C22R	C22 C22E C22R	–
	S22C	–	1023	–	–	–	–
	S25C	C25 C25E4 C25M2	1025	C25 C25E C25R	C25 C25E C25R	C25 C25E C25R	–
	S28C	–	1029	–	–	–	25「
	S30C	C30 C30E4 C30M2	1030	080A30 080M30 C30 C30E C30R	C30 C30E C30R	C30 C30E C30R	30「
	S33C	–	–	–	–	–	30「
	S35C	C35 C35E4 C35M2	1035	C35 C35E C35R	C35 C35E C35R	C35 C35E C35R	35「
	S38C	–	1038	–	–	–	35「
	S40C	C40 C40E4 C40M2	1039 1040	080M40 C40 C40E C40R	C40 C40E C40R	C40 C40E C40R	40「
	S43C	–	1042 1043	080A42	–	–	40「
	S45C	C45 C45E4 C45M2	1045 1046	C45 C45E C45R	C45 C45E C45R	C45 C45E C45R	45「
	S48C	–	–	080A47	–	–	45「
	S50C	C50 C50E4 C50M2	1049	080M50 C50 C50E C50R	C50 C50E C50R	C50 C50E C50R	50「
	S53C	–	1050 1053	–	–	–	50「
	S55C	C55 C55E4 C55M2	1055	070M55 C55 C55E C55R	C55 C55E C55R	C55 C55E C55R	–
	S58C	C60 C60E4 C60M2	1059 1060	C60 C60E C60R	C60 C60E C60R	C60 C60E C60R	60「
	S09CK	–	–	045A10 045M10	C10E	XC10	–
	S15CK	–	–	–	C15E	XC12	–
	S20CK	–	–	–	–	XC18	–

ISO: International Organization for Standazation
AISI: Amencan Iron Steel Lnstitute
SAE: Society of Automotive Engineers
BS: British Standards

Japan Industrial Standards		Steel Type Related to Foreign Standards					
Standard Number Name	Code	ISO 683/1, 10, 11*)	AISI SAE	BS 970 Part1,3 BS EN 10083—1,2	DIN EN 10084 DIN EN 10083—1,2	NF A3—6551 NF EN 10083—1,2	「OCT 4543
JIS G 4102 Nickel-chrome steel	SNC236	–	–	–	–	–	40XH
	SNC415	–	–	–	–	–	–
	SNC631	–	–	–	–	–	30XH3A
	SNC815	15NiCr13	–	655M13	15NiCr13	–	–
	SNC836	–	–	–	–	–	–
JIS G 4103 Nickel-chrome molybdenum steel	SNCM220	20NiCrMo2 20NiCrMoS2	8615 8617 8620 8622	805A20 805M20 805A22 805M22	20NiCrMo2 20NiCrMoS2	20NCD2	–
	SNCM240	41CiNiMo2 41CiNiMoS2	8637 8640	–	–	–	–
	SNCM415	–	–	–	–	–	20XM2DM
	SNCM420	–	4320	–	–	–	–
	SNCM431	–	–	–	–	–	–
	SNCM439	–	4340	–	–	–	–
	SNCM447	–	–	–	–	–	–
	SNCM616	–	–	–	–	–	–
	SNCM625	–	–	–	–	–	–
	SNCM630	–	–	–	–	–	–
	SNCM815	–	–	–	–	–	–
JIS G 4104 Chrome steel	SCr415	–	–	–	17Cr3 17CrS3	–	15X 15XA
	SCr420	20Cr4 20CrS4	5120	–	–	–	20X
	SCr430	34Cr4 34CrS4	5130 5132	34Cr4 34CrS4	34Cr4 34CrS4	34Cr4 34CrS4	30X
	SCr435	34Cr4 34CrS4 37Cr4 37CrS4	5132	37Cr4 37CrS4	37Cr4 37CrS4	37Cr4 37CrS4	35X
	SCr440	37Cr4 37CrS4 41Cr4 41CrS4	5140	530M40 41Cr4 41CrS4	41Cr4 41CrS4	41Cr4 41CrS4	40X
	SCr445	–	–	–	–	–	45X
JIS G 4105 Chrome molybdenum steel	SCM415	–	–	–	–	–	–
	SCM418	18CrMo4 18CrMoS4	–	–	18CrMo4 18CrMoS4	–	20XM
	SCM420	–	–	708M20	–	–	20XM
	SCM421	–	–	–	–	–	–
	SCM430	–	4131	–	–	–	30XM 30XMA
	SCM432	–	–	–	–	–	–
	SCM435	34CrMo4 34CrMoS4	4137	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	35XM
	SCM440	42CrMo4 42CrMoS4	4140 4142	708M40 709M40 42CrMo4 42CrMos4	42CrMo4 42CrMos4	42CrMo4 42CrMos4	–
	SCM445	–	4145 4147	–	–	–	–
	SCM822	–	–	–	–	–	–

DIN:Deutsches Institut fur Normumg
EN:European Standards
NF:Norme Francaise
「OCT:National standard of the former USSR

Japan Industrial Standards		Steel Type Related to Foreign Standards					
Standard Number Name	Code	ISO 683/1, 10, 11[1])	AISI SAE	BS 970 Part1, 3 BS EN 10083—1,2	DIN EN 10084 DIN EN 10083—1,2	NFA35—551 NF EN 10083—1,2	ГОСТ 4543
JIS G 4106 Structural manganese steel for machine Structural use and manganese chrome steel	SMn420	22Mn6	1522	150M19	–	–	–
	SMn433	–	1534	150M36	–	–	30 ГЛ 35 ГЛ
	SMn438	36Mn6	1541	150M36	–	–	35 ГЛ 40 ГЛ
	SMn443	42Mn6	1541	–	–	–	40 ГЛ 45 ГЛ
	SMnC420	–	–	–	–	–	–
	SMnC443	–	–	–	–	–	–
JIS G 4202 Aluminum chrome molybdenum steel	SACM645	41CrAlMo74	–	–	–	–	–
JIS G 4052 Structural steel with guaranteed hardenability (H steel)	SMn420H	22Mn6	1522H	–	–	–	–
	SMn433H	–	–	–	–	–	–
	SMn438H	36Mn6	1541H	–	–	–	–
	SMn443H	42Mn6	1541H	–	–	–	–
	SMnC420H	–	–	–	–	–	–
	SMnC443H	–	–	–	–	–	–
	SCr415H	–	–	–	17Cr3 17CrS3	–	15X
	SCr420H	20Cr4 20CrS4	5120H	–	–	–	20X
	SCr430H	34Cr4 34CrS4	5130H 5132H	34Cr4 34CrS4	34Cr4 34CrS4	34Cr4 34CrS4	30X
	SCr435H	34Cr4 34CrS4 37Cr4 37CrS4	5135H	37Cr4 37CrS4	37Cr4 37CrS4	37Cr4 37CrS4	35X
	SCr440H	37Cr4 37CrS4 41Cr4 41CrS4	5140H	41Cr4 41CrS4	41Cr4 41CrS4	41Cr4 41CrS4	40X
	SCM415H	–	–	–	–	–	–
	SCM418H	18CrMo4 18CrMoS4	–	–	18CrMo4 18CrMoS4	–	–
	SCM420H	–	–	708H20	–	–	–
	SCM435H	34CrMo4 34CrMoS4	4135H 4137H	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	34CrMo4 34CrMoS4	–
	SCM440H	42CrMo4 42CrMoS4	4140H 4142H	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	42CrMo4 42CrMoS4	–
	SCM445H	–	4145H 4147H	–	–	–	–
	SCM822H	–	–	–	–	–	–
	SNC415H	–	–	–	–	–	–
	SNC631H	–	–	–	–	–	–
	SNC815H	15NiCr13	–	655H13	15NiCr13	–	–
	SNCM220H	20NiCrMo2 20NiCrMoS2	8617H 8620H 8622H	805H17 805H20 805H22	–	20NCD2	–
	SNCM420H	–	4320H	–	–	–	–

Japan Industrial Standards		Steel Type Related to Foreign Standards					
Standard Number Name	Code	ISO 683/1, 10, 11[1])	AISI SAE	BS 970 Part1, 3 BS EN 10083—1,2	DIN EN 10084 DIN EN 10083—1,2	NFA35—551 NF EN 10083—1,2	ГОСТ 4543
JIS G 4107 High-temperature alloy steel for bolts	SNB5	–	501	–	–	–	–
	SNB7	42CrMo4 42CrMoS4	4140 4142 4145	708M40 709M40 42CrMo4[1])	42CrMo4[2])	42CrMo4[4])	–
	SNB16	–	–	40CrMoV4-6[1])	40CrMoV47[2])	40CrMoV4-6[4])	–
JIS G 4108 Steel bar for special-purpose alloy steel bolts	SNB21-1 ~ 5	–	–	40CrMoV4-6[1])	40CrMoV47[2])	40CrMoV4-6[4])	–
	SNB22-1 ~ 5	42CrMo4 42CrMoS4	4142H	–	42CrMo4[2])	–	–
	SNB23-1 ~ 5	–	E4340H	–	–	–	–
	SNB24-1 ~ 5	–	4340	–	–	–	–

Note : 1) BS EN 10259
2) DIN 1654 Part 4
3) NF EN 10259
4) ISO683-1,10,11 have been issued as JIS G 7051,G7052,G7053 by Translation JIS.

Names of tool steel

Rolled steel for general structures	SS400 ····· Steel - Structure - 400N/mm²
Carbon steel for machinery structures	S45C ····· Steel - 0.45%C
Chrome molybdenum steel	SCM435 ··· Steel - Cr - Mo435
Nickel chrome molybdenum steel	SNCM220··· Steel - Ni - Cr - Mo220
Carbon tool steel	SK105 ····· Steel - Kagu(Tool) - 105 types (Old SK3)
Alloy tool steel	SKS3 ····· Steel - Kagu(Tool) - Special - 3 types
	SKD11 ····· Steel - Kagu(Tool) - Dies - 11 types
High speed tool steel	SKD51 ····· Steel - Kagu(Tool) - High Speed - 51 types
High carbon chrome bearing steel	SUJ2 ····· Steel - Use - Jikuuke(Bearing) - 2 types
Stainless steel	SUS304·····Steel - Use - Stainless - 304 types
Gray iron	FC250 ····· Ferrum(Iron) - Cast - 250N/mm²

Carbon steels for machine structural use · Alloy steel and related materials

Japan Industrial Standards: Standard Number/Name (stainless steel abbreviation)	JIS	Industrial Standards: ISO TR 15510 L-No.	United States: UNS	United States: AISI	United Kingdom: BS	Germany: DIN	France: NF	Russia (Former USSR): ГОСТ	European Standards EN: Type	European Standards EN: Number
JIS G 4303 ~ 4306	SUS201	12	S20100	201			Z12CMN17-07Az	12X17Г9АН4	X12CrMnNiN17-7-5	1.4372
	SUS202		S20200	202	284S16				X12CrMnNiN18-9-5	1.4373
Rods	SUS301	5	S30100	301	301S21	X12CrNi17 7	Z11CN17-08	07X16H6	X5CrNi17-7	1.4319
Hot-rolled stainless steel strip	SUS301L	4				X2CrNiN18-7			X2CrNiN18-7	1.4318
Cold-rolled stainless steel strip	SUS301J1					X12CrNi17 7				
JIS G 4308 ~ 4309	SUS302		S30200	302	302S25		Z12CN18-09	12X18H9		
	SUS302B		S30215	302B						
Wire	SUS303	13	S30300	303	303S21	X10CrNiS18 9	Z8CNF18-09		X8CrNiS18-9	1.4305
Cable	SUS303Se		S30323	303Se	303S41			12X18H10E		
	SUS303Cu									
JIS G 4313 ~ 4315	SUS304	6	S30400	304	304S31	X5CrNi18 10	Z7CN18-09	08X18H10	X5CrNi18-10	1.4301
	SUS304L	1	S30403	304L	304S11	X2CrNi19 11	Z3CN19-11	03X18H11	X2CrNi19-11	1.4307
		2								1.4307
Spring strips	SUS304N1	10	S30451	304N			Z6CN19-09Az		X5CrNi18-9	1.1306
Spring wire	SUS304N2		S30452							
Cold pressed wire	SUS304LN	3	S30453	304LN		X2CrNiN18 10	Z3CN18-10Az		X2CrNiN18-10	1.4311
JIS G 4317 ~ 4320	SUS304J1									
	SUS304J2									
	SUS304J3		S30431	S30431						
Hot-rolled equal angle steel	SUS305	8	S30500	305	305S19	X5CrNi18 12	Z8CN18-12	06X18H11	X4CrNi18-12	1.4303
	SUS305J1									
Cold-rolled rods	SUS309S	X6CrNi23-14 (1)	S30908	309S			Z10CN24-13			
Steel fragments of cast objects	SUS310S	X6CrNi25-21	S31008	310S	310S31		Z8CN25-20	10X23H18	X6CrNi25-20	
	SUS315J1									
Cold-rolled equal angle steel	SUS315J2									
	SUS316	26	S31600	316	316S31	X5CrNiMo17 12 2	Z7CND17-12-02		X5CrNiMo17-12-2	1.4401
	SUS316F	27				X5CrNiMo17 13 3	Z6CND18-12-03		X3CrNiMo17-13-3	1.4436
	SUS316L	19	S31603	316L	316S11	X2CrNiMo17 13 2	Z3CND17-12-02		X2CrNiMo17-12-2	1.4404
		20				X2CrNiMo17 14 3	Z3CND17-13-03	03X17H14M3	X2CrNiMo17-13-3	1.4432
									X2CrNiMo18-14-3	1.4435
	SUS316N		S31651	316N						
	SUS316LN	22	S31653	316LN		X2CrNiMoN17 12 2	Z3CND17-11Az		X2CrNiMoN17-11-2	1.4406
		23				X2CrNiMoN17 13 3	Z3CND17-12Az		X2CrNiMoN17-13-3	1.4429
	SUS316Ti	28	S31635			X6CrNiMoTi17 12 2	Z6CNDT17-12	08X17H13M2T	X6CrNiMoTi17-12-2	1.4571
	SUS316J1									
	SUS316J1L									
	SUS317		S31700	317	317S16					
	SUS317L	21	S31703	317L	317S12	X2CrNiMo18 16 4	Z3CND19-15-04		X2CrNiMo18-15-4	1.4438
	SUS317LN	24	S31753				Z3CND19-14Az		X2CrNiMoN18-12-4	1.4434
	SUS317J1								X2CrNiMoN17-13-5	1.4439
	SUS317J2									
	SUS317J3L									
	SUS836L		N08367							
	SUS890L	31	N08904	N08904	904S14		Z2NCDU25-20		X1NiCrMoCu25-20-5	1.4539
	SUS321	15	S32100	321	321S31	X6CrNiTi18 10	Z6CNT18-10	08X18H10T	X6CrNiTi18-10	1.4541
	SUS347	17	S34700	347	347S31	X6CrNiNb18 10	Z6CNNb18-10	08X18H12Б	X6CrNiNb18-10	1.4550
	SUS384	9	S38400	384			Z6CN18-16			
	SUSXM7	D26(1)	S30430	304Cu	394S17		Z6CNU18-10		X3CrNiCu18-9-4	1.4567
	SUSXM15J1		S38100				Z15CNS20-12		X1CrNiSi18-15-4	1.4381
	SUS329J1		S32900	329						
	SUS329J3L	33	S39240	S31803			Z3CNDU22-05Az	08X21H6M2T	X2CrNiMoN22-5-3	1.4462
	SUS329J4L	34	S39275	S31260			Z3CNDU22-07Az		X2CrNiMoCuN25-6-3	1.4507

Japan Industrial Standards: Standard Number/Name (stainless steel abbreviation)	JIS	Industrial Standards: ISO TR 15510 L-No.	United States: UNS	United States: AISI	United Kingdom: BS	Germany: DIN	France: NF	Russia (Former USSR): ГОСТ	European Standards EN: Type	European Standards EN: Number
	SUS 405	40	S40500	405	405S17	X6CrAl13	Z8CA12		X6CrAl13	1.4002
	SUS 410L						Z3C14			
	SUS 429		S42900	429						
	SUS 430	41	S43000	430	430S17	X6Cr17	Z8C17	12X17	X6Cr17	1.4016
	SUS 430F	42	S43020	430F		X7CrMoS18	Z8CF17		X6CrMoS17	1.4105
	SUS 430LX	44	S43035			X6CrTi17	Z4CT17		X3CrTi17	1.4510
						X6CrTiNb17			X2CrTi17	1.4520
	SUS 430J1L						Z4CNb17		X3CrNb17	1.4511
	SUS 434	43	S43400	434	434S17	X6CrMoS17 1	Z8CD17-01		X6CrMo17-1	1.4113
	SUS 436L		S43600	436					X1CrMoTi16-1	1.4513
	SUS 436J1L									
	SUS 444	46	S44400	444			Z3CDT18-02		X1CrMoTi18-2	1.4521
	SUS 445J1									
	SUS 445J2									
	SUS 447J1		S44700							
	SUS XM27		S44627				Z1CD26-01			
	SUS 403		S40300	403						
	SUS 410	48	S41000	410	410S21	X20Cr13	Z13C13		X12Cr13	1.4006
	SUS 410S	39	S41008	410S	403S17	Z8C12	Z8C12	08X13	X6Cr13	1.4000
	SUS 410F2									
	SUS 410J1		S41025							
	SUS 416	49	S41600	416	416S21		Z11CF13		X12CrS13	1.4005
	SUS 420J1	50	S42000	420	420S29	X20Cr13	Z20C13	20X13	X20Cr13	1.4021
	SUS 420J2	51	S42000	420	420S31	X30Cr13	Z33C13	30X13	X30Cr13	1.4028
	SUS 420F		S42020	420F			Z30CF13		X29CrS13	1.4029
	SUS 420F2									
	SUS 429J1									
	SUS 431	57	S43100	431	431S29	X20CrNi17 2	Z15CNi6-02	20X17H2	X19CrNi17-2	1.4051
	SUS 440A		S44002	440A			Z70C15		X70CrMo15	1.4109
	SUS 440B		S44003	440B						
	SUS 440C		S44004	440C			Z100CD17	95X18	X105CrMo17	1.4125
	SUS 440F		S44020	S44020						
	SUS 630	58	S17400	S17400			Z6CNU17-04		X5CrNiCuNb16-4	1.4542
	SUS 631	59	S17700	S17700		X7CrNiAl17 7	Z9CNA17-07	09X17H7Ю	X7CrNiAl17-7	1.4568
	SUS 632J1									
JIS G 4311 ~ 4312	SUH 31				331S42		Z35CNWS14-14	45X14H14B2M		
	SUH 35	X53CrMnNiN21 9 (2)			349S52		Z52CMN21-09Az			
Heat resisting steel bar	SUH 36		S63008		349S54	X53CrMnNiN21 9	Z55CMN21-09Az	55X20Г9АН4		
	SUH 37		S63017		381S34					
Heat resisting steel plate	SUH 38									
	SUH 309		S30900	309	309S24		Z15CN24-13			
	SUH 310		S31000	310	310S24	CrNi2520	Z15CN25-20	20X25H20C2		
	SUH 330		N08330	N08330			Z12NCS35-16			
	SUH 660		S66286				Z6NCTV25-20			
	SUH 661		R30155							
	SUH 21					CrAl1205				
	SUH 409	37	S40900	409	409S19	X6CrTi12	Z6CT12			
	SUH 409L	36					Z3CT12		X2CrTi12	1.4512
	SUH 446	X15CrN26	S44600	446			Z12C25	15X28		
	SUH 1	X45CrSi9-3	S65007		401S45	X45CrSi9 3	Z45CS9			
	SUH 3						Z40CSD10	40X10C2M		
	SUH 4				443S65		Z80CSN20-02			
	SUH 11	X50CrSi8-2						40X9C2		
	SUH 600							20X12ВНМФ		
	SUH 616		S42200							

Notes: 1. ISO is according to ISO TR 15510:1997. The notation is the same as for the English. However, (1) is based on ISO 4954 and (2) is based on ISO 683 - 15
2. We referred to the UNS registration numbers and AISI material manual for American data.
3. European standards are based upon EN10088-1:1995.
4. We referred to standards of the individual countries in Europe BS DIN and NF but the standards will be abolished due to the EN regulations.
5. ГОСТ is based on 5632.

Tool steels and related materials

Japan Industrial Standard		Steel Types Related to Foreign Standards					
Standard Number Name	Code	ISO	AISI SATM	BS	DIN VDEh	NF	ΓOCT
JIS G 4401 Carbon tool steel	SK140 (Old SK1)	TC140	–	–	–	C140E3U	Y13
	SK120 (Old SK2)	TC120	W1–11½	–	–	C120E3U	Y12
	SK105 (Old SK3)	TC105	W1–10	–	C105W1	C105E2U	Y11
	SK95 (Old SK4)	TC 90	W1–9	–	–	C 90E2U	Y10
	SK85 (Old SK5)	TC 90 TC 80	W1–8	–	C 80W1	C 90E2U C 80E2U	Y8 Γ Y9
	SK75 (Old SK6)	TC 80 TC 70	–	–	C 80W1	C 80E2U C 70E2U	Y8 Y7
	SK65 (Old SK7)	–	–	–	C 70W2	C 70E2U	P18
JIS G 4403 High-speed tool steel	SKH 2	HS18-0-1	T1	BT 1	–	HS 18-0-1	–
	SKH 3	HS18-1-1-5	T4	BT 4	S18-1-2-5	HS18-1-1-5	–
	SKH 4	HS18-0-1-10	T5	BT 5	–	HS18-0-2-9	–
	SKH10	HS12-1-5-5	T15	BT15	S12-1-4-5	HS12-1-5-5	–
	SKH51	HS 6-5-2	M2	BM 2	S 6-5-2	HS 6-5-2	–
	SKH52	–	M3-1	–	–	–	–
	SKH53	HS 6-5-2-3	M3-2	–	S 6-5-3	HS 6-5-3	–
	SKH54	–	M4	BM 4	–	HS 6-5-4	–
	SKH55	HS 6-5-2-5	–	BM35	S 6-5-2-5	HS 6-5-2-5HC	P6M5K5
	SKH56	–	M36	–	–	–	–
	SKH57	HS10-4-3-10	–	BT42	S10-4-3-10	HS10 -4-3-10	–
	SKH58	HS 2-9-2	M47	–	–	HS 2-9-2	–
	SKH59	HS 2-9-1-8	M42	BM42	S2-10-1-8	HS 2-9-1-8	–
JIS G 4404 Alloy tool steel	SKS11	–	F2	–	–	–	XB4
	SKS 2	105WCr1	–	–	105WCr6	105Wcr5	XB Γ
	SKS21	–	–	–	–	–	–
	SKS 5	–	–	–	–	–	–
	SKS51	–	L6	–	–	–	–
	SKS 7	–	–	–	–	–	–
	SKS 8	–	–	–	–	C140W3UCr4	13X
	SKS 4	–	–	–	–	–	–
	SKS41	–	–	–	–	–	–
	SKS43	TCV105	W2-9½	BW2	–	100V2	–
	SKS44	–	W2-8	–	–	–	–
	SKS 3	–	–	–	–	–	9XB Γ
	SKS31	105WCr1	–	–	105WCr6	105WCr5	XB Γ
	SKS93	–	–	–	–	–	–
	SKS94	–	–	–	–	–	–
	SKS95	–	–	–	–	–	–
	SKD 1	210Cr12	D3	BD3	X210Cr12	X200Cr12	X12
	SKD11	–	D2	BD2	–	X160CrMoV12	–
	SKD12	100CrMoV5	A2	BA2	–	X100CrmoV5	–
	SKD 4	30WCrV5	–	–	–	X32WCrV3	–
	SKD 5	30WCrV9	H21	BH21	–	X30WCrV9	–
	SKD 6	–	H11	BH11	X38CrMoV51	X38CrMoV5	4X5MφC
	SKD61	40CrMoV5	H13	BH13	X40CrMoV51	X40CrMoV5	4X5Mφ1C
	SKD62	–	H12	BH12	–	X35CrWMoV5	3X3M3φ

Japan Industrial Standard		Steel Types Related to Foreign Standards					
Standard Number Name	Code	ISO	AISI SATM	BS	DIN VDEh	NF	ΓOCT
JIS G 4404 (Continued)	SKD 7	30CrMoV3	H10	BH10	X32CrMoV33	32CrMoV12-18	–
	SKD 8	–	H19	BH19	–	–	–
	SKT 3	–	–	–	–	55CrNiMoV4	–
	SKT 4	55NicrMov2	–	BH224/5	55NiCrMoV6	55NiCrMoV7	5XHM

Special purpose steels

Japan Industrial Standard		Steel Types Related to Foreign Standards					
Standard Number Name	Code	ISO	AISI SAE	BS	DIN	NF	ΓOCT
JIS G 4801 Spring steel	SUP 3	–	1075 1078	–	–	–	75 85 80
	SUP 6	59Si7	–	–	–	60Si7	60C2
	SUP 7	59Si7	9260	–	–	60Si7	60C2 Γ
	SUP 9	55Cr3	5155	–	55Cr3	55Cr3	–
	SUP 9A	–	5160	–	–	60Cr3	–
	SUP10	51CrV4	6150	–	50CrV4	51CrV4	XφA50X Γ φA
	SUP11A	60CrB3	51B60	735A51,735H51	–	–	50X Γ P
	SUP12	55SiCr63	9254	–	54SiCr6	54SiCr6	–
	SUP13	60CrMo33	4161	685A57, 685H57	–	60CrMo4	–
JIS G 4804 Sulfur and sulfur combined free cutting steel	SUM11	–	1110	705A60, 705H60	–	–	–
	SUM12	–	1108	–	–	–	–
	SUM21	9S20	1212	–	–	–	–
	SUM22	11SMn28	1213	–	9 SMn28	9 SMn28	–
	SUM22L	11SMnPb28	12L13	(230M07)	9 SMnPb28	9 SMnPb28	–
	SUM23	–	1215	–	–	–	–
	SUM23L	–	–	–	–	–	–
	SUM24L	11SMnPb28	12L14	–	9 SMnPb28	9 SMnPb28	–
	SUM25	12SMn35	–	–	9 SMn36	9 SMn36	–
	SUM31	–	1117	–	15S10	15S10	–
	SUM31L	–	–	–	–	–	–
	SUM32	–	–	–	–	–	–
	SUM41	–	1137	210M15,210A15	–	–	–
	SUM42	–	1141	–	–	–	–
	SUM43	44SMn8	1144	–	–	–	–
JIS G 4805 High carbon-chrome bearings steel	SUJ1	–	51100	(226M44)	–	–	–
	SUJ2	B1 or 100Cr6	52100	–	100Cr6	100Cr6	ШX15
	SUJ3	B2 or 100 CrMnsi4-4		–	–	–	–
	SUJ4	–	–	–	–	–	–
	SUJ5	–	–	–	–	–	–

(Unit: μm) Tolerance zone for shaft						
zone / Tolerance	1 up to 3	over 3 up to 6	over 6 up to 10	over 10 up to 18	over 18 up to 30	over 30 up to 50
h3	0 −2	0 −2.5	0 −2.5	0 −3	0 −4	0 −4
h4	0 −3	0 −4	0 −4	0 −5	0 −6	0 −7
h10	0 −40	0 −48	0 −58	0 −70	0 −84	0 −100
h11	0 −60	0 −75	0 −90	0 −110	0 −130	0 −160
j6	+4 −2	+6 −2	+7 −2	+8 −3	+9 −4	+11 −5
js8	±7	±9	±11	±13.5	±16.5	±19.5
js9	±12.5	±15	±18	±21.5	±26	±31
js13	±70	±90	±110	±135	±165	±195
js14	±125	±150	±180	±215	±260	±310
k7	+10 0	+13 +1	+16 +1	+19 +1	+23 +2	+27 +2
m4	+5 +2	+8 +4	+10 +6	+12 +6	+14 +8	+16 +9

(Unit: μm) Tolerance zone for hole						
zone / Tolerance	1 up to 3	over 3 up to 6	over 6 up to 10	over 10 up to 18	over 18 up to 30	over 30 up to 50
H5	+4 0	+5 0	+6 0	+8 0	+9 0	+11 0
H11	+60 0	+75 0	+90 0	+106 0	+130 0	+160 0
H12	+100 0	+120 0	+150 0	+180 0	+210 0	+250 0
J6	+2 −4	+5 −3	+5 −4	+6 −5	+8 −5	+10 −6
J7	+4 −6	+6 −6	+8 −7	+10 −8	+12 −9	+14 −11
J55	±2	±2.5	±3	±4	±4.5	±5.5
K8	0 −14	+5 −13	+6 −16	+8 −19	+10 −23	+12 −27
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–
–	–	–	–	–	–	–

Deviations of Hole to be used in commonly used fits

Basic size step (mm)		Tolerance zone class of Hole																														Unit: μm
Over	or less	B10	C9	C10	D8	D9	D10	E7	E8	E9	F6	F7	F8	G6	G7	H6	H7	H8	H9	H10	JS6	JS7	K6	K7	M6	M7	N6	N7	P6	P7	R7	S7	T7	U7	X7
-	3	+180 +140	+85 +60	+100 +60	+34 +20	+45 +20	+60 +20	+24 +14	+28 +14	+39 +14	+12 +6	+16 +6	+20 +6	+8 +2	+12 +2	+6 0	+10 0	+14 0	+25 0	+40 0	±3	±5	0 -6	0 -10	-2 -8	-2 -12	-4 -10	-4 -14	-6 -12	-6 -16	-10 -20	-14 -24	-	-18 -28	-20 -30
3	6	+188 +140	+100 +70	+118 +70	+48 +30	+60 +30	+78 +30	+32 +20	+38 +20	+50 +20	+18 +20	+22 +10	+28 +10	+12 +4	+16 +4	+8 0	+12 0	+18 0	+30 0	+48 0	±4	±6	+2 -6	+3 -9	-1 -9	0 -12	-5 -13	-4 -16	-9 -17	-8 -20	-11 -23	-15 -27	-	-19 -31	-24 -36
6	10	+208 +150	+116 +80	+138 +80	+62 +40	+76 +40	+98 +40	+40 +25	+47 +25	+61 +25	+22 +13	+28 +13	+35 +13	+14 +5	+20 +5	+9 0	+15 0	+22 0	+36 0	+58 0	±4.5	±7	+2 -7	+5 -10	-3 -12	0 -15	-7 -16	-4 -19	-12 -21	-9 -24	-13 -28	-17 -32	-	-22 -37	-28 -43
10	14	+220	+138	+165	+77	+93	+120	+50	+59	+75	+27	+34	+43	+17	+24	+11	+18	+27	+43	+70	±5.5	±9	+2	+6	-4	0	-9	-5	-15	-11	-16	-21	-	-26	-33 -51
14	18	+150	+95	+95	+50	+50	+50	+32	+32	+32	+16	+16	+16	+6	+6	0	0	0	0	0			-9	-12	-15	-18	-20	-23	-26	-29	-34	-39		-44	-38 -56
18	24	+244	+162	+194	+98	+117	+149	+61	+73	+92	+33	+41	+53	+20	+28	+13	+21	+33	+52	+84	±6.5	±10	+2	+6	-4	0	-11	-7	-18	-14	-20	-27	-	-33	-46
24	30	+160	+110	+110	+65	+65	+65	+40	+40	+40	+20	+20	+20	+7	+7	0	0	0	0	0			-11	-15	-17	-21	-24	-28	-31	-35	-41	-48	-33 -54	-40 -61	-56 -77
30	40	+270 +170	+182 +120	+220 +120	+119	+142	+180	+75	+89	+112	+41	+50	+64	+25	+34	+16	+25	+39	+62	+100	±8	±12	+3 -13	+7 -18	-4 -20	0 -25	-12 -28	-8 -33	-21 -37	-17 -42	-25 -50	-34 -59	-39 -64 -45	-51 -76 -61	-
40	50	+280 +180	+192 +130	+230 +130	+80	+80	+80	+50	+50	+50	+25	+25	+25	+9	+9	0	0	0	0	0													-70	-86	
50	65	+310 +190	+214 +140	+260 +140	+146	+174	+220	+90	+106	+134	+49	+60	+76	+29	+40	+19	+30	+46	+74	+120	±9.5	±15	+4 -15	+9 -21	-5 -24	0 -30	-14 -33	-9 -39	-26 -45	-21 -51	-30 -60	-42 -72	-55 -85	-76 -106	-
65	80	+320 +200	+224 +150	+270 +150	+100	+100	+100	+60	+60	+60	+30	+30	+30	+10	+10	0	0	0	0	0											-32 -62	-48 -78	-64 -94	-91 -121	
80	100	+360 +220	+257 +170	+310 +170	+174	+207	+260	+107	+126	+159	+58	+71	+90	+34	+47	+22	+35	+54	+87	+140	±11	±17	+4 -18	+10 -25	-6 -28	0 -35	-16 -38	-10 -45	-30 -52	-24 -59	-38 -73	-58 -93	-78 -113	-111 -146	-
100	120	+380 +240	+267 +180	+320 +180	+120	+120	+120	+72	+72	+72	+36	+36	+36	+12	+12	0	0	0	0	0											-41 -76	-66 -101	-91 -126	-131 -166	
120	140	+420 +260	+300 +200	+360 +200																											-48 -88	-77 -117	-107 -147		
140	160	+440 +280	+310 +210	+370 +210	+208 +145	+245 +145	+305 +145	+125 +85	+148 +85	+185 +85	+68 43	+83 +43	+106 +43	+39 +14	+54 +14	+25 0	+40 0	+63 0	+100 0	+160 0	±12.5	±20	+4 -21	+12 -28	-8 -33	0 -40	-20 -45	-12 -52	-36 -61	-28 -68	-50 -90	-85 -125	-119 -159	-	-
160	180	+470 +310	+330 +230	+390 +230																											-53 -93	-93 -133	-131 -171		
180	200	+625 +340	+355 +240	+425 +240																											-60 -106	-105 -151			
200	225	+665 +380	+375 +260	+445 +260	+242 +170	+285 +170	+355 +170	+146 +100	+172 +100	+215 +100	+79 +50	+96 +60	+122 +60	+44 +15	+61 +15	+29 0	+46 0	+72 0	+115 0	+185 0	±14.5	±23	+5 -24	+13 -33	-8 -37	0 -46	-22 -51	-14 -60	-41 -70	-33 -79	-63 -109	-113 -159	-	-	-
225	250	+605 +420	+395 +280	+465 +280																											-67 -113	-123 -169			
250	280	+690 +480	+430 +300	+510 +300	+271	+320	+400	+162	+191	+240	+88	+108	+137	+49	+69	+32	+52	+81	+130	+210	±16	±26	+5 -27	+16 -36	-9 -41	0 -52	-25 -57	-14 -66	-47 -79	-36 -88	-74 -126	-	-	-	-
280	315	+750 +540	+460 +330	+540 +330	+190	+190	+190	+110	110	+110	+56	+66	+66	+17	+17	0	0	0	0	0											-78 -130				
315	355	+830 +600	+500 +360	+590 +360	+299	+350	+440	+182	+214	+265	+98	+119	+151	+54	+75	+36	+57	+89	+140	+230	±18	±28	+7 -29	+17 -40	-10 -46	0 -57	-26 -62	-16 -73	-51 -87	-41 -98	-87 -144	-	-	-	-
355	400	+910 +680	+540 +400	+630 +400	+210	+210	+210	+125	+125	+125	+62	+62	+62	+18	+18	0	0	0	0	0											-93 -150				
400	450	+1010 +760	+595 +440	+690 +440	+327	+385	+480	+198	+232	+290	+108	+131	+165	+60	+83	+40	+63	+97	+155	+250	±20	±31	+8 -32	+18 -45	-10 -50	0 -63	-27 -67	-17 -80	-55 -95	-45 -108	-103 -166	-	-	-	-
450	500	+1090 +840	+635 +480	+730 +480	+230	+230	+230	+135	+135	+135	+68	+68	+68	+20	+20	0	0	0	0	0											-109 -172				

Note: This table shows that the upper figures are the upper deviation and the lower figures are the lower deviation.

Deviations of shafts to be used in commonly used fits

Unit: μm

Basic size step (mm)		Tolerance zone class of shaft																												
Over	or less	b9	c9	d8	d9	e7	e8	e9	f6	f7	f8	g5	g6	h5	h6	h7	h8	hg	js5	js6	js7	k5	k6	m5	m6	n5*	n6	p6	r6	s6	t6	u6	x6
-	3	-140 -165	-60 -85	-20 -34	-20 -45	-14 -24	-14 -28	-14 -39	-6 -12	-6 -16	-6 -20	-2 -6	-2 -8	0 -4	0 -6	0 -10	0 -14	0 -25	±2	±3	±5	+4 0	+6 0	+6 +2	+8 +2	+8 +4	+10 +4	+12 +6	+16 +10	+20 +14	-	+24 +18	+26 +20
3	6	-140 -170	-70 -100	-30 -48	-30 -60	-20 -32	-20 -38	-20 -50	-10 -18	-10 -22	-10 -28	-6 -4	-4 -12	0 -6	0 -8	0 -12	0 -18	0 -30	±25	±4	±6	+6 +1	+9 +1	+9 +4	+12 +4	+13 +8	+16 +8	+20 +12	+23 +15	+27 +19	-	+31 +23	+36 +28
6	10	-150 -186	-80 -116	-40 -62	-40 -76	-25 -40	-25 -47	-25 -61	-13 -22	-13 -28	-13 -35	-5 -11	-5 -14	0 -6	0 -9	0 -15	0 -22	0 -36	±3	±4.5	±7	+7 +1	+10 +1	+12 +6	+15 +6	+16 +10	+19 +10	+24 +15	+28 +19	+32 +23	-	+37 +28	+43 +34
10	14	-150	-95	-50	-50	-32	-32	-32	-16	-16	-16	-6	-6	0	0	0	0	0	±4	±5.5	±9	+9	+12	+15	+18	+20	+23	+29	+34	+39		+44	+51 +40
14	18	-193	-138	-77	-93	-50	-59	-75	-27	-34	-43	-14	-17	-8	-11	-18	-27	-43				+1	+1	+7	+7	+12	+12	+18	+23	+28	-	+33	+56 +45
18	24	-160	-110	-65	-65	-40	-40	-40	-20	-20	-20	-7	-7	0	0	0	0	0	±4.5	±6.5	±10	+11	+15	+17	+21	+24	+28	+35	+41	+48	-	+54 +41	+67 +54
24	30	-212	-162	-98	-117	-61	-73	-92	-33	-41	-53	-16	-20	-9	-13	-21	-33	-52				+2	+2	+8	+8	+15	+15	+22	+28	+35	+54 +41	+61 +48	+77 +64
30	40	-170 -232	-120 -182	-80	-80	-50	-50	-50	-25	-25	-25	-9	-9	0	0	0	0	0	±5.5	±8	±12	+13	+18	+20	+25	+28	+33	+42	+60	+59	+64 +48	+76 +60	-
40	50	-180 -242	-130 -192	-119	-142	-75	-89	-112	-41	-50	-64	-20	-25	-11	-16	-25	-39	-62				+2	+2	+9	+9	+17	+17	+26	+34	+43	+70 +54	+86 +70	
50	65	-190 -264	-140 -214	-100	-100	-60	-60	-60	-30	-30	-30	-10	-10	0	0	0	0	0	±6.5	±9.5	±15	+15	+21	+24	+30	+33	+39	+51	+60 +41	+72 +53	+85 +66	+106 +87	-
65	80	-200 -274	-150 -224	-146	-174	-90	-106	-134	-49	-60	-76	-23	-29	-13	-19	-30	-46	-74	±7.5	±11	±17	+2	+2	+11	+11	+20	+20	+32	+62 +43	+78 +59	+94 +75	+121 +102	
80	100	-220 -307	-170 -257	-120	-120	-72	-72	-72	-36	-36	-36	-12	-12	0	0	0	0	0				+18	+25	+28	+35	+38	+45	+59	+73 +51	+93 +71	+113 +91	+146 +124	-
100	120	-240 -327	-180 -267	-174	-207	-107	-126	-159	-68	-71	-90	-27	-34	-15	-22	-35	-54	-87	±8.7	±12.5	±20	+3	+3	+13	+13	+23	+23	+37	+76 +54	+101 +79	+126 +104	+166 +144	
120	140	-260 -360	-200 -300																										+88 +63	+117 +92	+147 +122		
140	160	-280 -380	-210 -310	-145 -208	-145 -245	-85 -125	-85 -148	-85 -185	-43 -68	-43 -83	-43 -106	-14 -32	-14 -39	0 -18	0 -25	0 -40	0 -63	0 -100	±9	±12.5	±20	+21 +3	+28 +3	+33 +15	+40 +15	-	+52 +27	+68 +43	+90 +65	+125 +100	+159 +134	-	-
160	180	-310 -410	-230 -330																										+93 +68	+133 +108	+171 +146		
180	200	-340 -455	-240 -355																										+106 +77	+151 +122			
200	225	-380 -495	-260 -375	-170 -242	-170 -285	-100 -146	-100 -172	-100 -215	-50 -79	-50 -96	-50 -122	-15 -35	-15 -44	0 -20	0 -29	0 -46	0 -72	0 -115	±10	±14.5	±23	+24 +4	+33 +4	+37 +17	+46 +17	-	+60 +31	+79 +50	+109 +80	+159 +130	-	-	-
225	250	-420 -535	-280 -395																										+113 +84	+169 +140			
250	280	-480 -610	-300 -430	-190	-190	-110	-110	-110	-56	-56	-56	-17	-17	0	0	0	0	0	±11.5	±16	±26	+27	+36	+43	+52	-	+66	+88	+126 +94	-	-	-	-
280	315	-540 -670	-330 -460	-271	-320	-162	-191	-240	-88	-108	-137	-40	-49	-23	-32	-52	-81	-130				+4	+4	+20	+20		+34	+56	+130 +98				
315	355	-600 -740	-360 -500	-210	-210	-125	-125	-125	-62	-62	-62	-18	-18	0	0	0	0	0	±12.5	±18	±28	+29	+40	+46	+57	-	+73	+98	+144 +108	-	-	-	-
355	400	-680 -820	-400 -540	-299	-350	-182	-214	-265	-98	-119	-151	-43	-54	-25	-36	-57	-89	-140				+4	+4	+21	+21		+37	+62	+150 +114				
400	450	-760 -915	-440 -595	-230	-230	-135	-135	-135	-68	-68	-68	-20	-20	0	0	0	0	0	±13.5	±20	±31	+32	+45	+50	+63	-	+80	+108	+166 +126	-	-	-	-
450	500	-840 -995	-480 -635	-327	-385	-198	-232	-290	-108	-131	-165	-47	-60	-27	-40	-63	-97	-155				+5	+5	+23	+23		+40	+68	+172 +132				

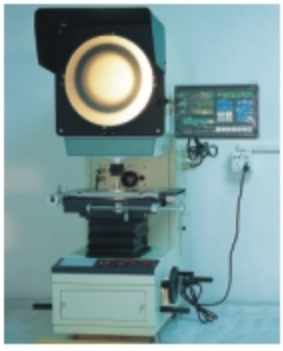
Note : This table shows that the upper figures are the upper deviation and the lower figures are the lower deviation.

PRODUCTION MACHINERY EQUIPMENT & QC MEASURING EQUIPMENT

MACHINERY EQUIPMENT			MEASURING EQUIPMENT		
List of equipment	Q'ty	Origin	List of Machine	Q'ty	Origin
CNC Lathe	10	Taiwan	3D Check Master Coordinate Measuring Machine	1	Taiwan
CNC Lathe	1	Taiwan	2D Trimos Coordinate Measuring Machine	1	Germany
CNC Milling Machine	5	Japan	Rockwell hardness tester	1	Taiwan
CNC Internal Grinder Double axle	3	Taiwan	Vickers hardness tester	1	Japan
CNC Surface Grinder	1	Taiwan	Trimos length tester	1	Germany
CNC External Grinder	4	Japan	Surface roughness tester	1	Swiss
Internal Honing Machine	2	USA	SUNNEN Internal micrometer	1	USA
Cutting Machine	2	Taiwan	Profile projector	1	Japan



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