

The Distinguishing Features of the Guvenal Ejector Pins from the Similar Products

Stable fitting-operation possibilities (rigid system & tight fitting) with the head top surface grinding processes (Ra 3.2/).



During press, it does not adhere to raw material in mould - slippery surface.

Improved radius geometry which prevents head breaking & chamfer forms which are suitable for pin head and body structure.



- Abrasion resistant surface with oxidation coating.
- Increased mould working life and perfect dry operation feature.
- High corrosion protection and unstainable surface.
- More durable than the traditional (common) pins.

Minimum roughness and minimum friction ($^{\text{Ra}} \bigcirc ^{0.8}$) = more durable operation life compared to the similar products.



1.2343 / Plasma-Nitriding with Oxidation Coating offers stable operation, protection against humidity / water, and high temperature resistance.

Type: Plastic Injection

Type: Metal and Plastic Injection

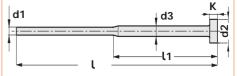
"As Guvenal - GTH, we use our missions in favour of our customers by adding value and try to meet their expectations best. We always aim better for you with our team which works customer oriented, our innovative and efficient business approach." **ATTENTION:** Each black looking pins are not oxidation coating pins (like cheap series from Far East). You can use Guvenal oxidation coating pins with confidence.

Note: Our products are designed more quality and economic by Guvenal - GTH engineers.

d1	ι	d2	k	d1	l	d2	k	d1	ι	d2	k												
	100				100				100											N.			
	125			5.4	125	6.5	0.5	3.9	125	5.0	0.5												
9.0	160	11	1.0		160				160														
7.0	200	• •	1.0		100				100														
	250				125				125														
				5.5	160	7.0	0.5	4.0	160	5.5	0.5												
	100			3.3	200	7.0	0.5	4.0	200	5.5	0.5												
9.5	125	12	1.0		250				250			Fier	tor l	Din .	. Cor	nical	Неа	4 / [NN 1	530-	ח ר	ode:	HRI
	160				315				315			-				iicai						oue.	(וטוו
	200				100				100				rial: 1.		WS 15 ± 2	UDC.				: 220º m ce: 130		nm2	
	100			5.6	125	7.0	0.5	4.1	125	5.5	0.5				60 ± 2		16113	ile ne	SISLAII	CC. 1301	0 14 / 11	1111	,
	125				160				160			,							_				1
10	160	12	1.0		100				100			. ↓							5 ±0	.5		/ - a	
'0	200	12	1.0	5.7	125	7.0	0.5	4.2	125	5.5	0.5	d1 g6									1	d2 -0.2	-60°
	250				160				160			6 T									\mathbb{R}	J.i.	
	315			5.8	100	7.0	0.5	4.3	100 125	5.5	0.5						0			K		_ \	1
	100			5.8	125 160	7.0	0.5	4.3	160	5.5	0.5		4			ι-	+2				-		
	125				100				100			d1	ι	d2	k	d1	ι	d2	k	d1	lι	d2	k
10.5	160	13	1.0	5.9	125	7.0	0.5	4.4	125	5.5	0.5		100				100				100		
	200			0.7	160	7.0	0.5	7.7	160	0.0	0.5	2.9	125	4.0	0.5		125				125		
	100				100				100				160			2.0	160	3.0	0.5	1.0	160	1.8	0.5
	125				125				125				100			2.0	200	3.0	0.5		200		
11	160	13	1.0		160		0.5	1	160				125				250				100		
		13	1.0	6.0	200	8.0	0.5	4.5	200	6.0	0.5	3.0	160	4.5	0.5		315			1.1	125	1.8	0.5
	200				250				250				200		0.0		100		0.5		160		
	250				315				315				250			2.1	125 160	3.2	0.5		100		
	100				100				100				315				100			1.2	125	2.0	0.5
	125				125			4.6	125	6.0	0.5	3.1	100 125	4.5	0.5	2.2	125	3.2	0.5		160		
12	160	14	1.0	6.5	160	9.0	1.0		160			3.1	160	4.5	0.5		160	0.2	0.0	4.0	100		0.5
	200				200				100				100				100			1.3	125	2.0	0.5
	250				100			4.7	125	6.0	0.5	3.2	125	4.5	0.5	2.3	125	3.5	0.5		160		
	315				125				160				160				160			1 4	125	22	0.5
	100				160				100				100				100			1	160	2.2	0.5
	125			7.0	200	9.0	1.0	4.8	125	6.0	0.5	3.3	125	4.5	0.5	2.4	125	3.5	0.5		100		
13	160	15	1.0		250				160 100				160				160			1	125		
	200				315			4.9	125	6.0	0.5		100				100	-		1.5	160	2.2	0.5
	250				100			4.7	160	0.0	0.5	3.4	125	4.5	0.5		125 160	-			200		
	100			7.5	125	10	1.0		100				160			2.5	200	3.5	0.5		100		
	125				160				125				100				250	1		1.6	125	2.5	0.5
	160				200				160				125				315	1			160		
14	200	16	1.5		100			5.0	200	6.5	0.5	3.5	160 200	5.0	0.5		100				100		
	250				125 160				250				250			2.6	125	4.0	0.5	1.7	125	2.5	0.5
	315			8.0	200	10	1.0		315				315				160				160		
	100				250	-			100				100				100				100	0.0	0.5
	125				315	1		5.1	125	6.5	0.5	3.6	125	5.0	0.5	2.7		4.0	0.5	1.8	125	2.8	0.5
					100				160				160				160				160		
16	160	18	1.5		125				100				100			2.8	100 125	4.0	0.5	1.9	100 125	2.8	0.5
	200			8.5	160	11	1.0	5.2	125	6.5	0.5	3.7	125	5.0	0.5	2.8	160	4.0	0.5	1.9	160	2.0	0.5
	250				200				160				160				100				100		
	315				250				100				100			Reliable	Label	Inie	ction	T	了	Pag	ge
	7	0	rder:	HRI	. d1	v I		5.3	125	6.5	0.5	3.8	125	5.0	0.5	GT	H		ulds				73
		U	uer:	וטוו	. ui	χι			160				160			Canada da	enaline					4	

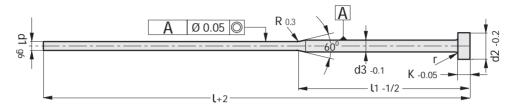


For your order of special dimensions, technical drawing can be used:



As per request / Custom-made orders.

Cylinder Head Stepped Ejector Pin / DIN ISO 8694



Code: SBKAH

Type: AH

Code: SBKAH

d1	ι	lı	d3	d2	k	
	63	25				
	80	35				
0.0	100		2	4	2	
8.0	125	50	2	4	2	
	150					
	160	75				
	63	25				
	80	35				
	100					
1.0	125	50	2	4	2	
	150					
	160	75				
	200	75				
	63	25				
	80	35				
1.1	100		2	4	2	
1.1	125	50		4	2	
	150					
	160	75				
	63	25				
	80	35		4		
1.2	100		2		2	
1.2	125	50		4	2	
	150					
	160	75				
	63	25				
	80	35				
1 2	100		2	4	ا م	
1.3	125	50		4	2	
	150					
	160	75				

d1	l l	lı	d3	d2	k	
	63	25				
	80	35				
1.4	100		2	4	2	
1.4	125	50	2			
	150					
	160	75				
	63	25				
	80	35				
	100					
1.5	125	50	3	6	3	
	150					
	160	75				
	200	75				
	80	35				
	100					
1.6	125	50	3	6	3	
	150				Ü	
	160	75				
	200					
	80	35				
	100			6		
1.7	125	50	3		3	
	150 160					
	200	75				
	80	35				
	100					
1.0	125	50	,	,	2	
1.8	150		3	6	3	
	160	75				
	200	75				

d1	ι	lı	d3	d2	k	
	80	35				
	100					
2.0	125	50	3	,	3	
2.0	150			6		
	160	75				
	200	75				
	80	35				
	100					
2.2	125	50	3	6	3	
2.2	150		3	0	3	
	160	75				
	200	75				
	100					
	125	50				
2.5	150		3	6	3	
	160	75				
	200	/3				
	100					
	125	50		6		
2.6	150		3		3	
	160	75				
	200	75				
	100					
	125	50				
2.7	150		3	6	3	
	160	75				
	200	7.5				
	100					
	125	50		6		
2.8	150		3		3	
	160	75				
	200	73				

Page Injection Moulds



Order: SBKAH. d1 x d3 x l1 x l

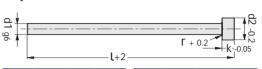
d1	ι	d2	k	d1	ι	d2	k
	100				100		
	125				125		
	160						
	200				160	10	
	250			7.5	200	12	5.0
12	315	18	7.0		250		
12		10	7.0		315		
	400				400		
	500				100		
	630				125		
	800				160		
	1000						
	160				200		
13	200	20	7.0				
13	250	20	7.0	8.0	315	14	5.0
	315				400		
	100				500		
	125				630		
	160						
	200				800		
	250				1000		
14	315	22	7.0		100		
	400			8.2	160	14	5.0
	500				250		
	630				100		
	800				125		
				8.5 160 200 250 315 400			
	100					14	
	125						5.0
	160				-		
	200				315		
16	250	22	7.0		400		
. •	315		500				
	400				100		
	500		125				
	630						
	800				160		
	100			9.0	200	14	5.0
	125			7.0	250		0.0
	160				315		
	200				400		
18	250	24	7.0		500		
. •	315				100		
	400				-		
					125		
	500				160		
	630				200		
	100				250		
	125			10	315	16	5.0
	160				400		
	200				500		
	250						
20	315	26	8.0		630		
	400				800		
	500				1000		
	630			10.2	125	16	5.0
	800			10.2	250	10	3.0
	1000				100		
	100				125		
	125			10.5		16	5.0
	160				160		
	200				200		
	250				100		
25	315	32	10		125		
_5	400	32	'		160		
				11	200	16	5.0
	500				250	-	
	630						
	800		1 I	1	315		
	1000				400		



Ejector Pin - Cylinder Head / ISO 6751, DIN 1530 Form: AH

Material: 1.2516 WS Head Hardness: 45 ± 2 HRC Body Hardness: 60 ± 2 HRC

Heat Resistance: 220° max.
Tensile Resistance: 1300 N / mm²



	d1	ι	d2	k		d1	ι	d2	k		
	5.2	100	10	3.0		3.2	100	6.0	3.0		
	J.Z	200	10	3.0		3.2	160	0.0	3.0		
		100					100				
		125					125				
		160					160				
		200	10	2.0		3.5	200	7.0	3.0		
	5.5	250	10	3.0		0.0	250	7.0	3.0		
ı		315					315				
İ		400					400				
İ		500					500				
İ		100				3.7	100	6.0	3.0		
İ		125				0.7	160	0.0	3.0		
ı		160					100				
		200					125				
ŀ		250					160				
	6.0	315	12	5.0	5.0		200		2.0		
	0.0	400		0.0			250				
		500					4.0	315	8.0	3.0	
		630					400				
		800					500				
		1000					630			П	
		1000					800				
	6.2		12	5.0			1000				
ł	0.2	160	12	5.0		4.2	100	8.0	3.0	П	
		250					200				
		100					100 125	8.0	3.0		
ŀ		125					160				
		160					200				
		200	10	5.0	_	4.5	250			Н	
	6.5	250	12		0		315				
		315					400				
		400					500				
		500					100				
		630					125				
		100					160				
		125					200				
		160					250				
		200	4.5	F 0		5.0	315	10	3.0		
	7.0	250	12	5.0			400				
		315					500				
		400					630				
		500					800				
		1000					1000				

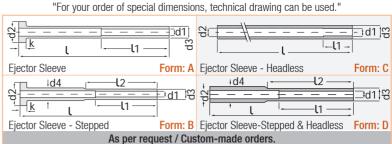
Orde

Order: SBIAH. d1 x l

d1 d2 k ι 100 1.0 125 1.2 2.5 160 100 1.2 2.5 1.2 160 100 1.3 3.0 1.5 160 100 1.4 3.0 1.5 160 100 125 3.0 1.5 1.5 160 200 100 3.0 1.6 1.5 160 100 1.7 3.0 1.5 160 100 1.8 3.0 1.5 160 100 1.9 3.0 1.5 160 100 125 160 200 2.0 4.0 2.0 250 315 400 500 100 2.2 4.0 2.0 160 100 5.0 2.0 2.4 160 100 125 160 200 2.5 5.0 2.0 250 315 400 500 100 5.0 2.7 2.0 160 100 125 160 200 3.0 250 6.0 3.0 315 400 500

630





Material: 1.2343

Head Hardness: 45 ± 2 HRC

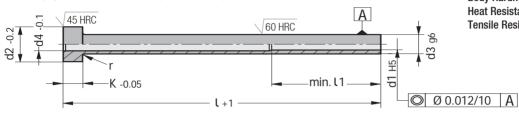
Body Hardness: 60 ± 2 HRC Heat Resistance: $500 - 550^{\circ}$ max.

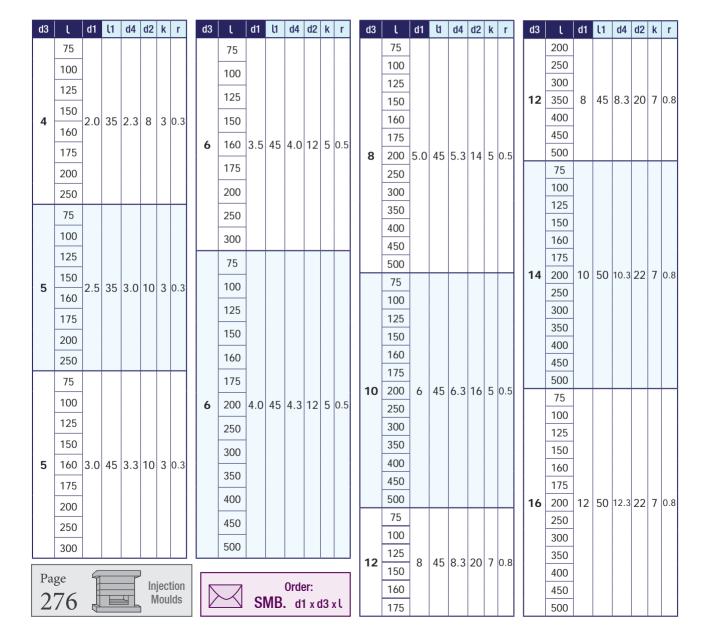
Tensile Resistance: 1450 N / mm²

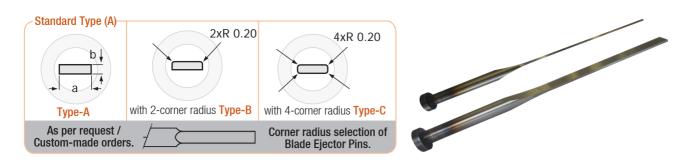
Ejector Sleeve - Nitrided / DIN ISO 8405

Code: SMB

Rear part of inner hole is ground in 30 - 45mm Ejector Pin working tolerance. Drilled roughly with drill to rearward (until the head).







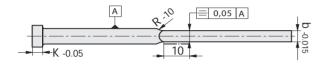
Material: 1.2516 WS (Hardened) Head Hardness: 45 ± 2 HRC Body Hardness: 60 ± 2 HRC

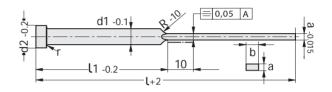
Heat Resistance: 220º max.

Blade Ejector Pin - Hardened / ISO 8693 (DIN 1530 F)

Code: SPLAH

Our standard stocks are created from Type-A (sharp corner). Type-B & Type-C are as per request.





a	b	d1	ι	l1
			100	50
			125	60
1 -			160	80
1.5	5.5	6.0	200	100
			250	125
			315	160
			100	50
			125	60
			160	80
1.5	7.5	8.0	200	100
			250	125
			315	160
			400	200
			160	80
			200	100
1.5	9.5	10	250	125
			315	160
			400	200
			100	50
	5.5	6.0	125	60
			160	80
2.0			200	100
			250	125
			315	160
			125	60
			160	80
	7.5		200	100
2.0		8.0	250	125
			315	160
			400	200
			160	80
			200	100
2.0	9.5	10	250	125
			315	160
			400	200
			160	80
			200	100
2.0	11.5	12	250	125
			315	160
			200	100
2.5	11.5	12	250	125
	0		315	160
			0.10	100

		80	40
		100	50
2.5	4.0	125	60
3.5	4.0	160	80
		200	100
		250	125
		80	40
		100	50
		125	60
4.5	5.0	160	80
		200	100
		250	125
		315	160
		80	40
5.5	6.0	100	50
		125	60
		160	80
		200	100
		250	125
		315	160
		80	40
		100	50
		125	60
7.5		160	80
7.5	8.0	200	100
		250	125
		315	160
		400	200
		100	50
		125	60
4.5	F 0	160	80
4.5	5.0	200	100
		250	125
		315	160
		4.5 5.0 5.5 6.0 7.5 8.0	3.5 4.0 100 125 160 200 250 80 100 125 80 100 125 160 200 250 315 80 100 125 160 200 250 315 80 100 125 160 200 250 315 400 100 125 160 200 250 315 400 100 125 160 200 250 315 400 200 250 315 400 200 250 315 400 200 250 325

d1

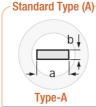
			80	40
0.8	3.5	4.0	100	50
0.6	3.3	4.0	125	60
			160	80
			100	50
			125	60
0.8	4.5	5.0	160	80
			200	100
			250	125
			100	50
			125	60
0.8	5.5	6.0	160	80
			200	100
			250	125
	4.5		80	40
		5.0	100	50
			125	60
1.0			160	80
			200	100
			250	125
			315	160
			80	40
			100	50
			125	60
1.0	5.5	6.0	160	80
			200	100
			250	125
			315	160
			100	50
			125	60
1.0	7.5	0.0	160	80
1.0	7.5	8.0	200	100
			250	125

d1



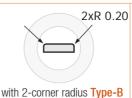


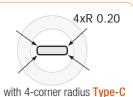




As per request /

Custom-made orders.





Corner radius selection of Blade Ejector Pins.

Code: SPW

Blade Ejector Pin - Nitrided and Oxidation Coated / ISO 8693 (DIN 1530 F)

d1

6.0

100

125

160

200

l1

50

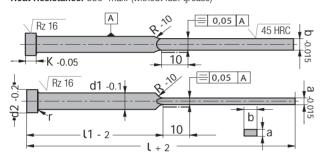
60

80

100

Our standard stocks are created from Type-A (sharp corner). Type-B & Type-C are as per request.

Material: 1.2343 Plasma Nitrided + Oxidation Coated Heat Resistance with Lubricating Grease: 1400° max. Heat Resistance: 650° max. (without lub. grease)



1.5

5.5

a	b	d1	ι	l1
			80	40
8.0	3.5	4.0	100	50
			125	60
			80	40
1.0	4.5	5.0	100	50
1.0	4.5	5.0	125	60
			160	80
			80	40
1.0	5.5	6.0	100	50
1.0	5.5	0.0	125	60
			160	80
			80	40
1 2	3.5	4.0	100	50
1.2	3.5	4.0	125	60
			160	80
			80	40
1.2	4.5	5.0	100	50
1.2			125	60
			160	80
			80	40
1.2		6.0	100	50
1.2	5.5	0.0	125	60
			160	80
			80	40
			100	50
1.2	7.5	8.0	125	60
			160	80
			200	100
			100	50
1.5	4.5	5.0	125	60
1.5	4.5	5.0	160	80

	 l .				
50				125	60
60	4.5	7.5	0.0	160	80
80	1.5	7.5	8.0	200	100
40				250	125
50				160	80
60	1.5	9.5	10	200	100
80	1.5	9.5	10	250	125
40				315	160
50				100	50
60	2.0	5.5	6.0	125	60
80	2.0	3.5	0.0	160	80
40				200	100
50				160	80
60	2.0	7.5 9.5	8.0	200	100
80	2.0			250	125
40				315	160
50				200	100
60	2.0		10	250	125
80	2.0		10	315	160
40				400	200
50				200	100
60	2.0	11.5	12	250	125
80	2.0	11.5	12	315	160
100				400	200
50				200	100
60	2.5	11.5	12	250	125
80	2.0	11.5	12	315	160
100				400	200
	1		0	rdor.	



200

Page

Order:
SPW. a x b x d1x l

(Standard Type-A)



High Temperature Ejector Pin Greases

High temperature lubricating greases for Ejector Pins & Core Systems.

Our special greases are consists well refined mineral oils and EP additives providing lubricity as film strip between other mould parts and mould parts that do not affect from high temperature of ejector systems and core systems in working mould in high temperature such as metal injection. Thanks to solid lubricants and additives, it has comfortable operation (working without load). It has high heat insulation and provides resistance up to 1400°C. It is in film strip position of surfaces between parts.

Even at very high temperature, it prevents sticking each other. It is produced from vegetable oils and not harmful to the health.

Advantage of using AWF1400 lubricating greases:

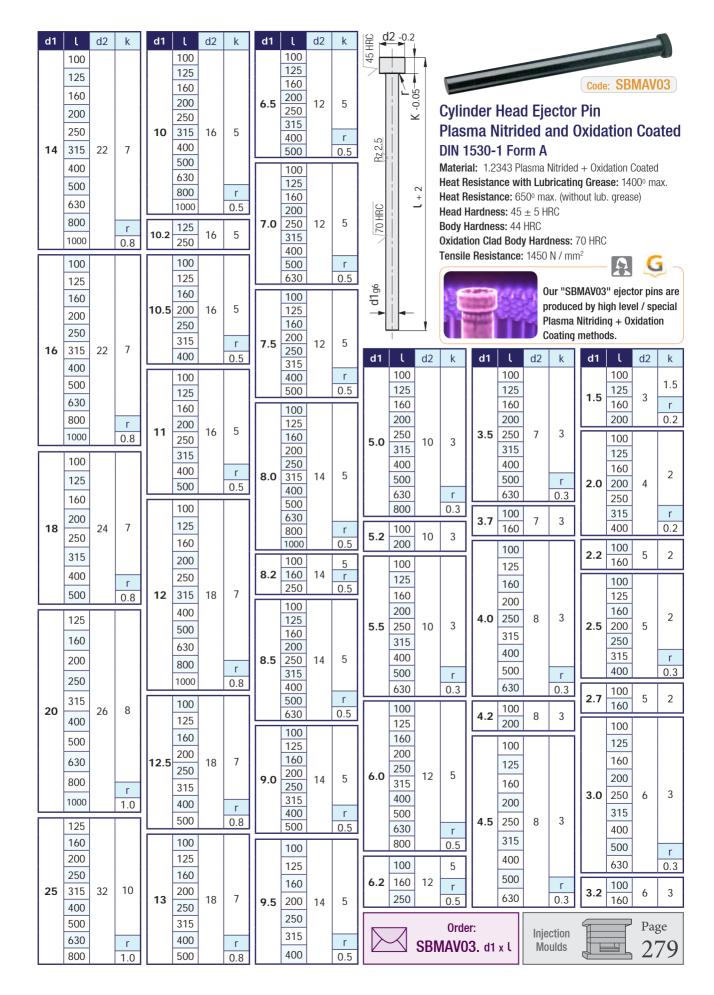
- * It is resistant against oxidization and friction.
- * It is resistant to corrosion and abrasion.
- * It is silicium and white (it does not make any contamination on mould).
- * It is resistant against water and humidity (water proof).
- * Due to dust atmosphere as casting moulds, the user's hands are not painted black. It is a very good protector.
- * It does not cause any reaction on surfaces.



Order:	(custom-engineered)			
AWF1400.01	1Kg. (plastic can)			
AWF1400.03	40g. (mini tube with sponge)			

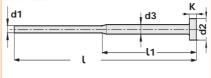


Order:	(economic type)
W150200	1Kg. (plastic can)
W160200	400ml. (spray)





For your order of special dimensions, technical drawing can be used:

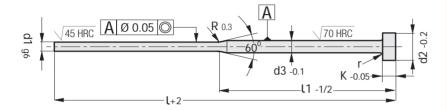


As per request / Custom-made orders.

Stepped Ejector Pin - Nitrided and Oxidation Coated ISO 8694 (DIN 1530 Form C)

Code: SBW

Material: 1.2343 Plasma Nitrided + Oxidation Coated Heat Resistance with Lubricating Grease: 1400° max. Heat Resistance: 650° max. (without lub. grease)



Code: SBW

d1	ι	l1	d3	d2	k	r
	100	50				
8.0	125	50	2	4	2	0.2
	160	75				
	100	50				
0.9	125	50	2	4	2	0.2
	160	75				
	100	50				
1.0	125	50	2	4	2	0.2
	160	75	2	4	2	0.2
	200	75				
	100	50		2 4		0.2
1.1	125	50	2		2	
	160	75				
	100	50				
1.2	125	50	2	4	2	0.2
	160	75				
	100	50				
1.3	125	50	2	4	2	0.2
	160	75				

d1	ι	l l1	d3	d2	k	r
	100	50				
1.4	125	50	2	4	2	0.2
	160	75				
	100	50				
1.5	125	50	3	6	3	0.3
1.5	160	75	J	0	3	0.5
	200	75				
	100	50				
2.0	125	50		6	3	0.3
2.0	160	75	3	0	3	0.3
	200	75				
	100	50				
2.5	125	50	3	6	3	0.3
2.5	160	75	J	O		0.3
	200	75				





Order: SBW. d1 x d3 x l1 x l

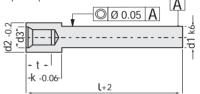


Ejector Pin - Threaded DIN 1530 - A / ISO 6751

In-mould (ejector plate & core/lifter) usage. It has pin mounting feature without dismantling other mould parts.

 $\begin{tabular}{ll} \textbf{Material:} & 1.2343 & Ground and Hardened \\ \textbf{Tensile Resistance:} & 1400 & N \ / \ mm^2 \end{tabular}$

Our custom-made production is available as per request.



Code: SBD

d1	ι	d3	t	k	d2	
3	63	M4	5	10	6	
	125	1014	5	10	0	
4	63	M5	7	12	8	
4	125	IVIO	,	12	0	
5	80	M6	9	14	9	
	160	IVIO	7	14	7	
6	80	MA	9	14	10	
	160	IVIO		14	10	
8	80	MA	10	16	13	
	160	- M6 9 - M6 10	10	13		
10	100	M10	12	18	15	
	200	IVITO	12	10	13	
12	100	M12	14	22	10	
12	200	10112	14	~~	18	
14	100	M12	14	22	20	
14	200	10112	14	22	20	



Order: **SBD.** d1 x l x d3

Ejector Pin with Locking Head Code: SDI (Anti-Rotating) The new generation of ejector pins with locking head allows the precise centring of individually contoured ejector or core pins in the mould. The centring ensures a precise mounting position within the mould. d1 g6

Type-1

Type-2

Material: 1.2516 WS Head Hardness: 45 ± 2 HRC Body Hardness: 60 ± 2 HRC Heat Resistance: 220º max. Tensile Resistance: 1300 N / mm²

Type-1

Type-2

Material: 1.2343 Plasma Nitrided + Oxidation Coated Heat Resistance with Lubricating Grease: 14000 max.

Heat Resistance: 6500 max. (without lub. grease)

Body Hardness: 44 HRC

r + 0.2

Oxidation Clad Body Hardness: 70 HRC Tensile Resistance: 1450 N / mm²

Head Hardness: 45 ± 5 HRC

d1	ι	d2	K	a	S		d1	ι	d2	K	a	S															
	100							100																			
	125							125																			
	160						5.5	160	10	3	2.75	7.75															
3.0	200	6	3	1.5	4.5			200																			
3.0	250		٦	1.5	4.5			250																			
	315							100																			
	400							125																			
	500							160																			
	100						6.0	200	12	5	3	9															
	125							250																			
3.5	160	7	3	1.75	5.25			315																			
	200							400																			
	250							100																			
	100	-						125																			
	125	-						160		_																	
	160		_			6	7.0	200	12	5	3.5	9.5															
4.0	200	8	3	2	6		250																				
	250	-						315																			
	315	-						100																			
	400																						125				
	100	-						160																			
4.5	125	8	3	2.25	6.25		7.5	200	12	5	3.75	9.75															
4.5	160 200	8	3	2.25	0.25			250																			
	250	-						315																			
	100							100																			
	125	-						125																			
	160							160																			
	200							200																			
5.0	250	10	3	2.5	7.5		8	250	14	5	4	11															
	315						315	-																			
	400							400																			
	500							500																			
						1						ш															

	100				
	125				
8.5	160	14	5	4.25	11.25
6.5	200	14	5	4.25	11.20
	250				
	315				
	100				
	125				
9	160	14	5	4.5	11.5
7	200	14	5	4.5	11.5
	250				
	315				
	100				
	125				
	160			5	
10	200	16	5		13
	250	10	5	5	13
	315				
	400				
	500				
	100				
	125				
	160				
11	200	16	5	5.5	13.5
	250				
	315				
	400				
	100				
	125				
	160				
12	200	18	7	,	15
12	250	ΙŎ	/	6	15
	315				
	400				
	500				

d2

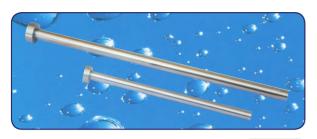
100

14	d1	ι	d2	K	a	S
14		100				
14		125				
200 250 315 100 125 160 200 250 315 400 500 100 125 160 200 250 315 400 500 26 8 10 23 27 8 19 28 19 29 7 8 19 20 250 315 400 500 20 250 315 400 500 21 25 28 5	11	160	22	7	7	10
315	14	200	22	,	,	10
100 125 160 220 7 8 19 19 19 19 19 19 19		250				
125 160 200 250 315 400 500 100 125 160 200 250 315 400 500 26 8 10 23 27 8 19 28 19 29 7 8 19 20 250 315 400 315 400 500 20 8 10 23 21 10 12.5 28.5		315				
160 200 250 315 400 500 100 125 160 200 250 315 400 500 26 8 10 23 315 400 500 27 8 19 28 7 8 19 29 7 8 19 20 250 100 125 160 200 250 315 400 250 315 400 315 400		100				
200 250 315 400 500		125				
250 22 7 8 19 19 15 16 10 12 10 10		160				
250 315 400 500 100 125 160 200 250 315 400 500 100 100 125 160 200 250 315 400 500 100 125 160 200 250 315 400 500 100 125 160 200 250 315 400 500 100 125 160 200 250 315 400 500 100 125 160 200 250 315 400 100 100 100 100 100 100 100	14	200	22	7	0	10
400 500 100 125 160 200 250 315 400 500 250 100 125 160 200 250 315 400 500 125 160 200 250 315 400 500 125 160 200 250 315 400 500 125 160 200 250 315 400 125 160 200 250 315 400 125 160 200 250 315 400 125 160 200 250 250 250 250 250 250 25	10	250	22	/	0	19
500 100 125 160 200 250 315 400 500 250 100 125 160 200 250 315 400 315 400 250 315 400		315				
20 200 26 8 10 23 315 400 500 12.5 160 200 250 315 400 250 315 400 315 400		400				
200 200 250 315 400 500 250 100 125 160 200 250 315 400 250 315 400 250 315 400 250 315 400 250 250 250 250 250 250 250 2		500				
200 250 315 400 500 100 125 160 200 250 315 400 200 315 400 200 315 400 200 315 400 200 250 315		100				
200 250 315 400 500 100 125 160 200 250 315 400 210 220 250 315 400		125				
20 250 26 8 10 23 315 400 500		160		0	10	23
250 315 400 500 100 125 160 200 250 315 400	20	200	24			
400 500 100 125 160 200 250 315 400 12.5 28.5	20	250	20	Ö		
500		315				
25 100 125 160 200 250 315 400		400			10	
25 160 200 32 10 12.5 28.		500				
25 200 250 315 400		100				
250 250 315 400 250 315		125				
25 250 32 10 12.5 28.5 315 400		160				
250 315 400	0.5	200	22	10	12 5	20 E
400	23	250	32	10	12.5	20.5
		315				
500		400				
300		500				

Order: SDI. d1 xlx Type

Page Injection Moulds

Note: Our custom-made production is available as per request.



Ejector Pin - Stainless / INOX ISO 6751, DIN 1530 Form: AH

Code: SPI

Code: SFI

"SPI" Ejector Pins are compatible with medicine and food industry standards. The ejector pins has been produced to avoid corrosion problems. They are anti-magnetic products resistant to corrosion and acids for production in severe climate conditions in chemistry / medicine and food industry, also in hygienic places.

Material: 1.4125 INOX Bo Heat Resistance: 180° max.

Body Hardness: 56 + 2 HRC Head Hardness: 45 ± 5 HRC



Code: SPI

d1	ι	d2	k	r		d1	ι	d2	k	r
	100						100			
4.5	160	8	_	0.3		2.0	160	4	2	0.2
4.5	200	0	2	0.3		2.0	200	4		0.2
	250						250			
	100						100			
5.0	160	10	2	0.3		2.5	160	5	2	0.2
5.0	200	10	2	0.3		2.5	200	5	2	0.3
	250						250			
	100						100			
5.5	160	10	2	0.3		3.0	160	6	2	0.3
5.5	200	10	2			3.0	200	0		
	250						250			
	100						100			
6.0	160	12	5	0.5		3.5	160	7	2	0.3
6.0	200	12	Э	0.5		3.5	200	,	2	0.3
	250						250			
	100					4.0	100			
8.0	160	14	_	0.5			160			0.3
8.0	200	14	5	0.5		4.0	200	8	2	0.3
	250						250			





Order: SPI. d1 x l



Ejector Pin - Copper Alloy

Code: SPPAV07

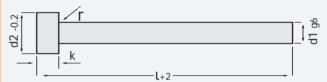
ISO 6751, DIN 1530 Form: AH

"SPPAV07" Ejector Pins are produced with added copper / Cbn (nickel bornite) into material during production. Considerably higher heat conductivity. The cooling for the desired area of mould is provided very quickly without deviating the targeted area. Due to thermal optimisation, very high quality product is obtained from moulds under optimum temperature. Also, due to thermal optimisation again, production time per part is shortened as 30%. By changing according to the material, the heat conductivity is 6 times higher than standard ejector pins. There is no need to use pin lubricating oil for Copper Ejector Pins. Even after cooling, it does not lose its conductivity, does not deform, it can be welded, soldered, ground and polished. However, coated products cannot be machining on the lathe or milling machine.

Material: Copper Alloy

Body Hardness: HRC min. 180 HB
Tensile Resistance: ~650 N/mm² Heat Conductivity: ~200 W/mK

Surface Roughnes: Ra < 0.8 Micron



Code: SPPAV07

d1	ι	d2	k	r	
2.0	100	4	2	0.2	
2.0	160	4		0.2	
2.5	100	5	2	0.3	
2.0	160	<u> </u>		0.5	
	100				
3.0	160	6	3	0.3	
	250				
3.5	100	7	3	0.3	
3.5	160	,	J	0.5	
	100				
4.0	160	8	3	0.3	
	250				
4.5	100	8	3	0.3	
4.5	160	0	3	0.3	
	100				
5.0	160	10	3	0.3	
	250				
	100				
6.0	160	12	_	0.5	
0.0	250	12	5	0.5	
	315				

1 / /	
SPPAV07. d	χl

		Coue.	OI I A	101
d1	ι	d2	k	r
7.0	100 160	12	5	0.5
	250			
	100			
8.0	160	11	5	0.5
8.0	250	14	J	0.5
	315	100		
	100			
	160			
10	250	16	5	0.5
	315			
	400			
	100			
	160		14 5 16 5 18 7 22 7	
12	250	18		0.8
	315			
	400			
	160			
14	250	22	7	0.8
	400			
	160			
16	250	22	7	0.8
10	400	22	/	0.0
	500			



Infrared Thermometer

Features:

- * More stable performance in high precision with Heimann infrared probe.
- * Built-in laser pointer.
- * Illuminated LCD screen.
- * Data storage.
- * Max. / min. / average / DIF data storage.
- * High / low heat alarm function.
- * Alert function on pre-set temperature.
- * Set to zero function.
- * Unit symbol indication.
- * Low battery warning.
- * Automatically shut-off (to save battery).

Technical Specifications:

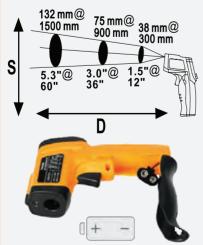
Measurement Range:

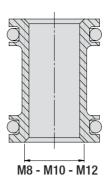
-50°C~ 550°C / -58°F~1022°F

Accuracy (Deviation): ± 1.5 °C or ± 1.5 %

Measurement Unit Selection: .. °C / °F Distance / Target Ratio: D:S=12:1 Auto power off Appr............. 6 Sec.

Measurement speed: ≤ 0.5 seconds Adjustable ignition ratio:..... $0.1 \sim 1$ Led screen display:............ 3 digits







Cooling Junction

Code: GSK

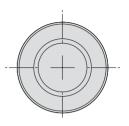
It reduces number of cooling channels and improves your designs.

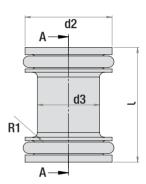
It is a system which will ensure circulation of water under a certain pressure and speed in water circulation channel arrangements and creating of entries / exits in mould cooling system.

Features:

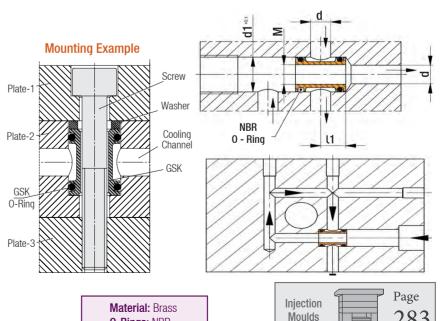
- It provides homogeneous temperature distribution.
- It provides quick mounting and facilitates demounting.
- It saves time and cost.
- Minimum pressure loss in water flow rate.
- No rust in cooling channels.
- "NBR O-ring" is used (resistant to temperature).
 Please check O-rings in mountings and demountings.
 Do not use damaged and torn / worn O-Rings.

0-Rings: NBR

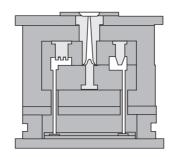




Order Code	d	d1 +0.1	d2 -0.05	d3 -0.05	เา	l -0.2	M	0-Ring
GSK06	06	11.5	11.1	9	10	20	M8	Ø8 x 1.5
GSK08	80	15	14.6	11	10	20	M10	Ø11 x 2
GSK10	10	18.5	18.2	13	12	24	M12	Ø13.9x2.4





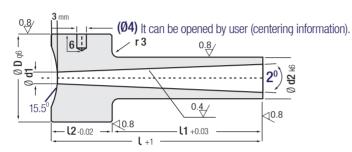


Sprue Bush for Metal Injection

Code: MEY

High heat resistant / Hot-work tool steel / Cold runners.

Material: 1.2344 Hardness: 48-50 HRC Max. Temperature: 500°C



d2	ι	d1	D	l1	l2	
	55			35		
12	65	6.2	20	45	20	
	75			55		
	55			30		
	65			40		
	75			50		
12	85	6.2	6.2 28	60	25	
	95			70		
	105			80		
	115			90		
	55			30		
	65			40		
	75			50		
14	85	6.5	28	60	25	
	95			70		
	105			80		
	115			90		

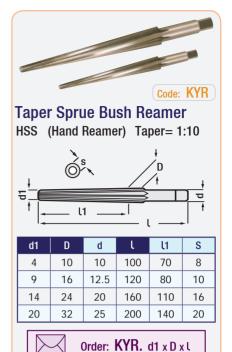
d2	ι	d1	D	เา	2
	55 65	30			
	65			40	
	75			50	
16	85	6.5	28	60	25
	95			70	
	105			80	
	115			90	
	55			30	25
	65	6.5 28	28	40	
	75			50	
18	85			60	
	95			70	
	105			80	
	115			90	
	55			30	
	65			40	25
20	75			50	
	85	9.0	28	60	
	95			70	
	105			80	
	115			90	





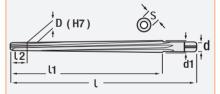
Page Injection Moulds

As per request / Custom-made orders.

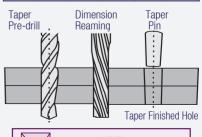




Taper Pin Reamer Code: KPR
DIN 9, HSS (Hand Reamer) Taper= 1:50

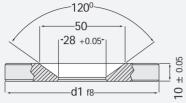


D	d1	d	ι	l1	S
3	4.06	4	80	58	3.15
4	5.26	5	93	68	4
5	6.36	6.3	100	73	5
6	8.0	8	135	105	6.3
8	10.8	10	180	145	8
10	13.4	12.5	215	175	10
12	16	14	255	210	11.2
14	18	14	255	210	11.2
16	20.4	18	280	230	14









Order	d1
DYF.60	60
DYF.70	70
DYF.80	80
DYF.90	90
DYF.100	100

Order	d1
DYF.125	125
DYF.150	150
DYF.175	175
DYF.200	200

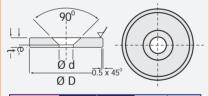
Note: Fitting holes are opened as per request.



Locating Ring

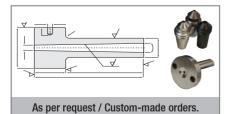
Code: KYF

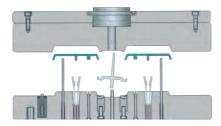
Material: CK 45 (Ground)



Order	Ø D	Ød	t	е
KYF.60	60	28	15	8
KYF.80	80	28	15	8
KYF.100	100	28	20	10
KYF.125	125	28	20	10
KYF.150	150	28	20	10
KYF.175	175	28	20	10
KYF.200	200	28	20	10

Note: Fitting holes are opened as per request.





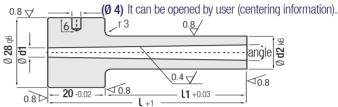


Sprue Bush - DIN 16752

Code: EYM

Material: 1.2826

Two Different Angle Options: Standard Angle; d1 3.3 : angle 1.50 / Wide Angle; d1 4.3 : angle 20



Code: EYM

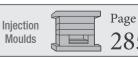
d2	ι	d1	l1
	50		30
	65		45
	75		55
	85	3.3	65
12	95	0.0	75
12	105		85
	115	4.3	95
	125		105
	135		115
	150		130
	50		30
	65		45
	75		55
	85		65
	95	3.3	75
14	105		85
14	115	4.3	95
	125		105
	135		115
	150		130
	200		180

d2	ι	d1	l1
	50		30
	65		45
	75		55
	85		65
	95	3.3	75
16	105		85
	115	4.3	95
	125		105
	135		115
	150		130
	200		180
	50		30
	65		45
	75		55
	85		65
	95	3.3	75
18	105		85
	115	4.3	95
	125		105
	135		115
	150		130
	200		180





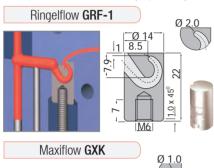


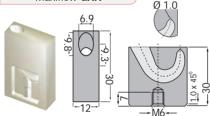




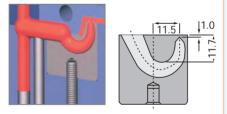
Tunnel Gate Inserts

- * Long life, clearly defined separating edge for precise degating.
- * Superior balance in multiple gating operations.
- * High wear resistance.
- * 60 HRC RA: 08 1.3 surface quality.
- * Compact dimensions due to single-part design.

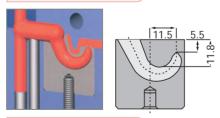




Maxiflow GXK-1

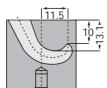


Maxiflow GXK-2



Maxiflow GXK-3

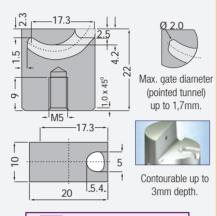






Konturflow - Gate Insert

- * For tunnel gating of small to mediumsized mouldings contoured in the gate area.
- * Usable for all thermoplastics including fillers up to 50 % glass fibre.







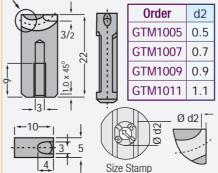
Order: GTK.10x22

Code: GTM

Miniflow - Gate Insert

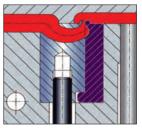
For tunnel gating of small, thin-walled mouldings. This gate insert possesses no calotte and is therefore suitable for very thin-walled mouldings.

- * Available gate diameters from 0,5 to 1,1 mm.
- * Usable for all thermoplastics including fillers up to 50 % glass fibre.





Viscosity Continuation -Auxiliary Insert



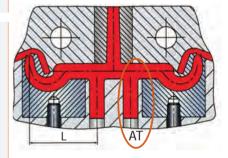


To reduce loss of raw material while flow that is injected or to minimize sliding, an auxiliary insert is added in front of Tunnel Gate Insert.

Machining methods of cove on insert at EDM machine, please refer the **CAD** files at www.exaflow.com

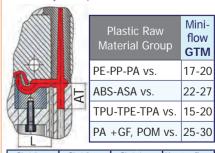
The insert dimensions depend on selected Gate Insert





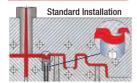
"AT" Tunnel Gate Insert Distances

Recommended distances "L" from the injection point to the sprue ejector are given above for the various material groups. The distance "AT" describes the correlated ejector depth.



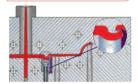
Ø 10 _{mm}		Ø 12 _{mm}		Ø 14 _{mm}			
GTR A	/ GTE	GTR A	/ GTE	GTR /	/ GTE	G G	ГК
20	25	22	27	24	30	30	35
25	30	27	32	30	35	33	38
15	25	17	27	20	30	25	35
30	35	32	37	35	40	40	45

Tunnel Gate Inserts



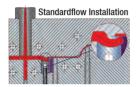
The front of the gate insert is sealed off by the mould cavity.

Flat Parts



The front of the gate insert is fully sealed off by a companion calotte (baffle) on the cavity or by an auxiliary insert.

Thin-Walled Parts



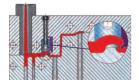
The front of the gate insert is sealed off by the cavity to the height of the parting line.

Thin-Walled Parts



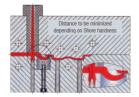
Designed for particularly thin-walled parts (0,5 to 1,2 mm wall thickness). The tunnel gate insert has no calotte. Gating will occur flush with the moulding.

Nozzle-Side



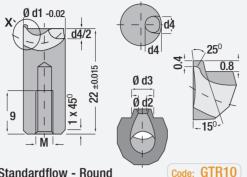
The gate insert is screwed into the nozzle side of the mould. The front of the gate insert is sealed off by the cavity.

Thermoplastic Elastomers





Standardflow - Gate Insert Code: GTR Round



Stand

dardflow - Round	Code:	GIKI

d1 d2		d3	d4 M		Viscosity - Grams						
uı	uz	นอ	u4	IVI	High	Regular	Poor				
	0.8	2.1			8	7	5				
	1.0	2.3							14	12	9
10	1.2	2.5	4	4	20	16	10				
	1.4	2.7			30	23	15				
	1.6	2.9			40	30	20				

Usable for all thermoplastics including fillers up to 50% glass fibre. Order Example: GTR10. d2

Standardflow - Round

Code:	GT	R12	2

d1	d2	d3	d4	М	Visco	sity - Gra	ms		
uı	uz	uo	u4	IVI	High	Regular	Poor		
	0.8	2.1			8	7	5		
	1.0	2.3			14	12	9		
	1.2	2.5		5	20	16	10		
12	1.4	2.7	5		30	23	15		
	1.6	2.9			40	30	20		
	1.8	3.1			54	40	27		
	2.0	3.3			68	52	34		
	Order Example: GTR12. d2								

Standardflow - Round

Code: GTR14

d1	d2	d3	44	d4 M	Visco	sity - Gra	ms
uı	uz	uə	u4		High	Regular	Poor
	1.2	2.5			20	16	10
	1.4	2.7			30	23	15
	1.6	2.9		6	40	30	20
14	1.8	3.1	6		54	40	27
	2.0	3.3			68	52	34
	2.2	3.5			85	65	43
	2.4	3.7			100	80	50
		Order	r Ex a	ımpl	e: GTR14	. d2	

When processing thermoplastic elastomers, please observe the following recommendations to ensure reliable demoulding:

- Shore hardness value.
- * A centering cone should be provided.
- * This application instruction applies to elastomers in the medium Shore hardness range up to 100 Shore A.

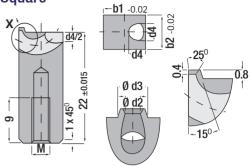








Standardflow - Gate Insert Code: GTE Square



Standardflow - Square

Code: GTE10

b1	b2	d2	d3	44	44	dΛ	d4	N/I	Viscosity - Grams			
וט	IJΖ	uz	uə	u4	14 IVI	High	Regular	Poor				
		0.8	2.1			8	7	5				
		1.0	2.3			14	12	9				
10	8	1.2	2.5	4	4	20	16	10				
		1.4	2.7			30	23	15				
		1.6	2.9			40	30	20				

Usable for all thermoplastics including fillers up to 50% glass fibre. Order Example: GTE10. d2

Standardflow - Square

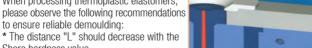
Code: GTE12

b1	b2	d2	d3	44	d4 M	Viscosity - Grams			
וט	DZ.	uz	uə	u4		High	Regular	Poor	
		0.8	2.1			8	7	5	
		1.0	2.3			14	12	9	
		1.2	2.5			20	16	10	
12	10	1.4	2.7	5	5	30	23	15	
		1.6	2.9			40	30	20	
		1.8	3.1	1		54	40	27	
		2.0	3.3			68	52	34	
		0r	der Ex	amı	ole:	GTE12.	d2		

Standardflow - Square

Code: GTE14

b1	b2	d2	d3	44	d4 M	Viscosity - Grams			
DI	DZ.	uz	uə	u4		High	Regular	Poor	
		1.2	2.5			20	16	10	
		1.4	2.7			30	23	15	
		1.6	2.9			40	30	20	
14	12	1.8	3.1	6	6	54	40	27	
		2.0	3.3			68	52	34	
		2.2	3.5			85	65	43	
		2.4	3.7			100	80	50	
		0r	der Ex	amı	ple:	GTE14.	d2		















Code: IYP

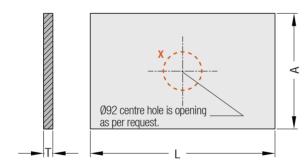
Impact and heat insulation processes of injection moulds.

Heat Insulation Plates help reduce heat loss between the mould and the plate. They are preferred in order to avoid heat dissipation / clearance among mould plates or between machine clamping block plate and mould upper plates, especially in moulds produced with thermoplastic and thermosets raw material.

- Asbestos-Free = plates do not contain asbestos.
- They are not affected by impacts, water, friction and electricity.
- They are resistant to 1600 tons pressure per cm.
- Heat Insulation Plates also raise the view standards of moulds used.

Material:

Glassfibre and an impact resistant, thermosetting resinbonded mix. **Recommended Operating Temp.:** Max. 120°C (continuous exposure) **Compressive Strength:** Temperature at 120°C $= 160 \text{ N} / \text{mm}^2$ **Thermal Conductivity:** Temperature at 200°C $= 3.0 \times 10^{-3} \text{ W/mK}$ **Moisture Absorption:** 0.06 %



Tolerance = Thickness: + 0.50 mm Cutting: + 1.0 mm / Machining: + 0.05 mm

		Code:	IYP
Order	Α	L	T
YP.3535.6	342	342	6

Cutting: + 1.0 mm/ Machining: + 0.05 mm						
Order	Α	L	T			
IYP.1515.6	152	152	6			
IYP.1520.6	152	192	6			
IYP.1525.6	152	242	6			
IYP.2020.6	192	192	6			
IYP.2025.6	192	242	6			
IYP.2030.6	192	292	6			
IYP.2035.6	192	342	6			
IYP.2525.6	242	242	6			
IYP.2530.6	242	292	6			
IYP.2535.6	242	342	6			
IYP.2540.6	242	392	6			
IYP.2550.6	242	492	6			
IYP.3030.6	292	292	6			
IYP.3035.6	292	342	6			
IYP.3040.6	292	392	6			
IYP.3045.6	292	442	6			
IYP.3050.6	292	492	6			
IYP.3055.6	292	542	6			

Page	Injection
288	Moulds

	uraer	Α	L	- 1
	IYP.3535.6	342	342	6
	IYP.3540.6	342	392	6
	IYP.3545.6	342	442	6
	IYP.3550.6	342	492	6
	IYP.3560.6	342	592	6
	IYP.4040.10	342	392	10
	IYP.4045.10	342	442	10
	IYP.4050.10	392	492	10
	IYP.4060.10	392	592	10
	IYP.4545.10	442	442	10
	IYP.4550.10	442	492	10
	IYP.4560.10	442	592	10
	IYP.4570.10	442	692	10
	IYP.4580.10	442	792	10
	IYP.5050.10	492	492	10
	IYP.5055.10	492	542	10
	IYP.5060.10	492	592	10
1	IYP.5070.10	492	692	10
	IYP.5080.10	492	792	10

Other dimensions available upon request (for example: thickness 4 or 8mm).



Digital Thermometer / "K-Type"

Code: DT610C

As a set with 2 sensor probes (thermocouple) in protection bag. This device is a portable 3 1/2 digit display, compact-sized digital thermometer designed to use external K-Type probe as temperature thermocouple. It has 2 heat sensors (thin type thermocouple & contact probe).

Measurement Range: -50°C to 1300°C / -58°F to 2000°F / 223K to 2000K Resolution: 1°C or 1°F / 0.1°C or 0.1°F / 1 K

Accuracy (Deviation): Accuracy is specified for operating temperatures over the range of 18°C to 28°C (64°F to 82°F), for I year, not including thermocouple error.

Temperature Coefficient: 0.1 times the applicable accuracy specification per °C from 0°C to 18°C and 28°C to 50°C (32°F to 64°F and 82°F to 122°F). **Input Protection:** 60V dc or 24V rms ac maximum input voltage on any combination of input pins.

Measurement Rate: 2.5 times per second.

Input Connector: It has 2 heat sensors (thin type thermocouple & contact probe).

Ambient Operating Range: 0°C to 50°C (32°F to 122°F)
Storage Temperature: -20°C to 60°C (-4°F to 140°F)

Digital Display: 3 1/2 Backlit digit liquid crystal display (LCD) with maximum reading of 1999.

Battery: 9V battery

Dimensions: 162mm (H) x 76mm (W) x 38.5mm (D)

Weight: 210g

Operating Instructions

Selecting the Temperature Scale:

Readings are displayed in either degrees Celsius (°C), degrees Fahrenheit (°F) or degrees Kelvin (K). When the thermometer is turned on, it is set to the temperature scale that was in use when the thermometer was last turned off. To change the temperature scale, press the For °C / °F or K key.

Selecting the Display Resolution:

The thermometer allows two choices of resolution;

High resolution: 0.1°C or 0.1°F Low resolution: 1°C or 1°F

Battery Replacement: When the display shows the low battery sign, 9V battery should be replaced.

- 1 Remove device cover and probe (thermocouple).
- 2 Remove screws of battery box behind the device, insert battery, then close the cover and mount it again.

WARNING!

- To avoid electrical shock, do not use this device when voltages at the measurement surface exceed 24V AC or 60V DC.
- To avoid damage or burns, do not make temperature measurements in microwave ovens etc.
- Repeated sharp flexing can break the probe (thermocouple) leads. To prolong lead life, avoid sharp bends in the leads, especially near the connector.



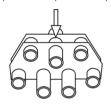


Magnetic Separator for Injection Machine

It keeps unwanted metal particles in raw material.

Especially in your injection machine, the unwanted metal particles mixed in the raw material damages the extruder of injection machine. This is for screening / elimination process at the bottom of fluid raw material. Stainless magnetic rods are excellently powerful in keeping metal particles and cylindrical magnetic rods can be used in liquids since they are compatible with fluidity compliance of raw material.

Additionally / Example: Its also keeping metal particles in liquid tank of Spark Erosion EDM.





"EGM" Magnetic Separator is the cheapest insurance of your injection machine.

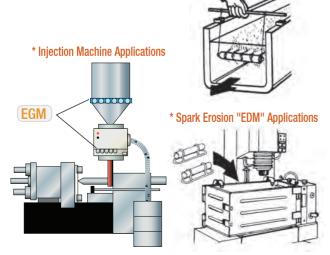
Order	Product Dimensions	Weight
EGM20C	width: 170 x length: 180 x height: 75mm	2.7 kg.
EGM25C	width: 220 x length: 230 x height: 75mm	4.0 kg.

It is for raw material feed hopper of injection machines.

It is quick and practical in all metal screening / eliminating processes, a toolkit which should be used.

Usage: It is inserted to raw material feed hopper of injection machine. It is equipped with very powerful neodymium (Nd Fe B) magnets and materials are from stainless steel, also can keep very thin metal particles. When "EGM" Magnetic Separator is used, the extruder life of injection machine is prolonged considerably. The main advantage of magnetic magnet is its demagnetization opportunity. The cleaning of metal particles on stainless rods can be done rapidly and comfortably.

Heat Resistance: 60°C





Teknoclean Cleaning Agent (Cleanser & Colour Changing Agent)

Order Code: GTH1000

Teknoclean Specifications: It provides quick and efficient transition in thermoplastic raw material and colour changing. It also cleans extruder area of injection machine. Less raw material consumption in raw material colour changing process. It easily cleans oxidized, burnt and stubborn dirts in injection machine extruder, thus it provides economical profit. It is efficient in colour changing processes of raw materials such as P and C, PP, TPU, PPS, PA6, PA66, POM, HDPE, LDPE, EVA, PS, ABS, PMMA, PC, SAN, SBS, SEBS, CA, PBT, PET and in injection machines, all hot and cold runner systems. It can be safely used during machine cleaning and colour changing process in extrusion machines (compounding, metal sheet, profile, cable and pipe) and blowing machines (packaging, film).

Fields of Usage:

- * Decrease the injection / screw temperatures 20-30° from the current temperatures. Please check temperature / proportion table.
- * Nozzle area temperature should be normal processing temperature (don't decrease 20-30°C).
- * Hotrunner and nozzle temperatures should be increased 50°C above normal.
- * Shake Teknoclean bottle well before use.
- * Put %3-4 Teknoclean into natural color PP granules and mix very well.

 To adjust total amount please check screw diameter/mixture amount table.
- * Decrease the screw speed up to %50 or lower and let the cleaning mixture go through from feed hopper to machine.
- * Increase back pressure slightly.
- * Use total injection stroke for cleaning.
- * This agent can also be injected into opened mould to clean tooling, cold runner & hot runner system to clean dirty channels.
- * Use pure PP natural for rinsing machine, the raw material you added is purely sprayed out of the machine.



You can obtain the full user manual from our technical department or your sales representative.

Highly Productive "Guvenal" Product



"Teknoclean" usage according to injection machine screw diameter:

Screw	20 - 40	40 - 50	50 - 60	60 - 80	80 - 100	100 - 120	
Diameter	mm	mm	mm	mm	mm	mm	
Carrier	0.5 - 1.0	1.0 - 3.0	3.0 - 5.0	5.0 - 10.0	10.0 - 25.0	25.0 - 35.0	
Polymer PP	kg.	kg.	kg.	kg.	kg.	kg.	
Teknoclean	25-50	50 - 150	150 - 250	250 - 500	500 - 1250	1250 - 1750	
Amount	gram	gram	gram	gram	gram	gram	

120 - 150	175 - 100	100 - 120
mm	mm	mm
35.0 - 70.0	70.0 - 90.0	90.0 - 150.0
kg.	kg.	kg.
1750-3500	3500-4500	4500-7500
gram	gram	gram







Precision Deburring Blade with Handle

Handle: Zinc compression moulding robust body; handle with non-slip plastic structure and mounting holes with two screws for blade. Non-slip plastic protection cover and one piece of blade.

TiN coated cutting end; it reduces the time which spent for deburring in objects with its sharp blade for low cutting end wearing and long life. It provides easy and precise deburring for curved contours and thin protrusions.

* It is designed only for deburring.





Precision Deburring Blade

Order Code: PCBU

Blade Kit (100 blades in safe dispenser):

It provides high operation safety thanks to its angled cutting end, it is strongly positioned with two screws. It is economical in safe dispenser / 100 pcs.

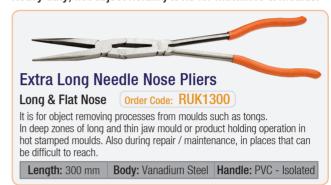


Page Injection Moulds



In-Mould Application Mechanical Pliers

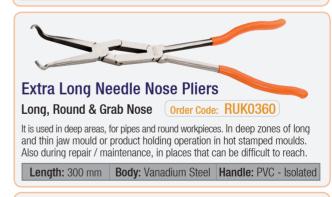
Heavy duty, hot object holding tools for machines & moulds.





It is used to remove smaller parts from the mould with the help of curve nose. In deep zones of long and thin jaw mould or product holding operation in hot stamped moulds. Also during repair / maintenance, in places that can be difficult to reach.

Length: 300 mm **Body:** Vanadium Steel **Handle:** PVC - Isolated





Extra Long Needle Nose Pliers

Long & Combination

Order Code: RUK2345

In workpieces requiring deep repair, clamping, holding and removing. In deep zones of long and thin jaw mould or product holding operation in hot stamped moulds. Also during repair / maintenance, in places that can be difficult to reach.

Length: 300 mm **Body:** Vanadium Steel **Handle:** PVC - Isolated



Order Code: 1231

Diagonal Side Cutter for Plastic - 90°

In plastic parts, especially in deburring processes. Serial usage thanks to spring mechanism. For zero / sharpest cuts.

Attention: It is not used in metal cutting (wire etc.)

Length: 150 mm **Handle:** PVC - Dipped









Order Code: 1233

Diagonal Side Cutter for Plastic - 35^o

In plastic parts, especially in deburring processes. Serial usage thanks to spring mechanism. For zero / sharpest cuts.

Attention: It is not used in metal cutting (wire etc.)

Length: 165 mm **Handle:** PVC - Dipped

Straight Cutting





In plastic parts, especially in deburring processes. Serial usage thanks to spring mechanism. For zero / sharpest cuts. Attention: It is not used

in metal cutting (wire etc.)

Diagonal Side Cutter for Plastic - 300

Order: E0944-0160 **Length:** 160 mm

Order: E0944-0140 **Length:** 140 mm



Diagonal Side Cutter for Wire

Cutting edges for very hard (such as piano wires) wires. Extra hardened special tool steel with indiction technique, high perforance cutting edges and ergonomical handle.

Order: E0841-0180 **Length:** 180 mm Wire Cutting: Ø2 mm

Order: E0841-0200 Length: 200 mm Wire Cutting: Ø2.2 mm





Multi-Purpose Scissors

Straight cutting stainless steel blades with spring mechanism for cutting light metal folios, fabrics, cardboards and plastic etc,. Ergonomical handle with fixing mechanism.

Straight Cutting

Order: CETA17-190 | Length: 190 mm Cutting Length: 40 mm **Curve Cutting**

Order: CETA17-1908 Length: 190 mm Cutting Length: 40 mm





Nipper with Heat Control Unit for Plastic

Code: HT180





It can be performed applications for cutting plastic and other resin material. hard and thick plastic materials that are hard to cut with special cutting blades by without cracking, breaking and by heating (heat controlled). You can obtain clean cutting surface. Especially; in cutting operations of plastic materials of engineering (autolamps etc.) for precise, rapid and quality surfaces.

The cutting blade is heated by a heat control unit for cutting, due to adjustable heat, degree of heat can be selected according to the material.

This nippers are also with spare resistance and aluminum base plate as burning inhibitor base plate.

Order	Length	Body	Cutting	Capacity
HT180	190 mm	with Heating	25°	Ø4.0 mm
111100	190 11111	Unit	Length: 16 mm	Ψ4.U IIIII



Nipper with Heat Control Unit for Plastic

Code: HT200





It can be performed applications for cutting plastic and other resin material, hard and thick plastic materials that are hard to cut with special cutting blades by without cracking, breaking and by heating (heat controlled). You can obtain clean cutting surface. Especially; in cutting operations of plastic materials of engineering (autolamps etc.) for precise, rapid and quality surfaces.

The cutting blade is heated by a heat control unit for cutting, due to adjustable heat, degree of heat can be selected according to the material.

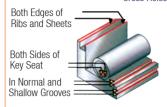
This nippers are also with spare resistance and aluminum base plate as burning inhibitor base plate.

Order	Length	Body	Cutting	Capacity
HT200	190 mm	with Heating	16°	Ø7.0 mm
ПІΖОО	190 111111	Unit	Length: 23 mm	W7.0 mm

"Guvenal - GTH offer special solutions"



Deburring Tools Usage **NOGA** Straight Edge Curved Fdae Holes Edges Cross Holes



Burrs: They are unwanted metal particles remained at the edge of workpiece after machining process. For safety and quality production, these particles should be cleaned. Deburring process on machine bench is both long term and hard to make balanced process. Hence. it will take more time, also surface roughness is important. All of this may not be economical. Noga Deburring Sets: With two component, plastic handle and cutting blades (telescopic) and have withdrawal spring for opening and closing handle locks. 3 pieces spare cutting blades are stored in rear covered chamber.



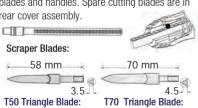
NogaGrip Handle (3 different models)

● NG-1 Ø 3.2 mm / for all "S" blades

● NG-2 Ø 2.6 mm / for all "N" blades

NG-3 Ø 7.0 mm / for all "T" blades

Handles: It is adapted to part contour automatically. With options for the processing of very different materials, it is used for deburring of contours rationally. With the ergonomic difference from other holders, it is suitable for your hand. For maximum comfort of your hand, hard and soft - light robust structure. Rapid replacement blades and handles. Spare cutting blades are in rear cover assembly.



This HSS blades are used with NG-3 handle.

This HSS blades are used with NG-3 handle.





External cranked countersink Length: 150mm For internal thread operations. Length: 150mm

Page

Deburring Tool Kits



Promo Set Deburrs: Steel, Aluminum and Plastic

S Promo Set - NG8150

Contains: 1 pcs = NG-1 Handle 10 pcs = S10 Blades.

Order: NG8150

N Promo Set - NG8000

Contains: 1 pcs = NG-2 Handle 10 pcs = N1 Blades.

Order: NG 8000



Tele Set Deburrs: Steel, Aluminum, Plastic, Brass and Cast Iron.

S Tele Set - NG8350

Contains: 1 pcs = NG-3 Handle

1 pcs = S Holder5 pcs = S10 Blades 5 pcs = S20 Blades.

Order: NG8350

N Tele Set - NG8300

Contains: 1 pcs = NG-3 Handle

1 pcs = N Holder 5 pcs = N1 Blades

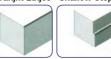
5 pcs = N2 Blades.

Order: NG8300



Deburring Tools

Straight Edges Shallow Steps Curved Edges





Holes

Cross Holes



Deburring Tools: The tools have replaceable ends at rotary position and are adapted to workpiece contour with handy, cutting edge automatically and they are excellent / quality brand hand tools in deburring different types of materials rationally.

Multipurpose Deburring Tools

Order: LB1000

Liza Burr





Double end blade holder to utilize both N and S blades. Telescopes from 20-110 mm with N Blades. Telescopes from 20-94 mm with S Blades. Contains: Uni-handle, SN-holder, N1 & N2 blades.

Order: SG1000 Soft Grip





Two holes accepts both heavy and light duty S & N Blades.

Contains: SG Handle, S100 and N10 Cobalt Blades. Ergonomically held handle.

Order: TB1000

Teddy Burr



Designed for hard to reach locations. 8 mm painted hexagonal aluminum handle and N1 blade. Blade is replaceable. Holder: 2.6 mm blades.

Light Duty Deburring Blades

Order	Blade	Work best on
BN1010 (40°)	N1	steel, aluminium and plastic
BN2010 (80°)	L/R N2	brass and cast iron
BN2012 (80°)	N2 TIN	stainless steel
BN1310 (45°)	N10	plastic and hard materials
BN3010 (50°)	N3	both int. and ext. burrs
BN6001 (40°)	N6	cross holes in difficult to reach

Deburring Tools



Order: NG1003

Noga Burr 3 Contains: NG-1 Handle BS1010 / BS2010 BS3510

Order: NG1005

Noga Burr 5

Same as NG1003 but with 2 extra blades S101 Blade - BK1010 / S202 Blade - BK2010 Suitable for extra fine deburring operations.

Order: NG1000

NG-1 Handle

NogaGrip-1 holds all S blades(3.2mm). Spare blades are kept inside back cap.



Order: **E02000**

Plastic Edge Off Most competitive tool.

Holds all S blades (3.2mm).

The blade is replaceable. Contains: plastic handle with a handy pocket clip S10 blade.



Order: NG3003

Super Burr

For heavy duty works. Contains:

EL02003 / BS2010 BS3010 / BS1018



Order: SC8000

Adjustable Scraper

Ideal for scraping, trimming and deburring almost all materials. Contains: SC Handle - SC1300

T80 - BT8001

SC Handle Heavy Duty - SC1400

Heavy Duty Deburring Blades

Order	Blade	Work best on
BS1010 (40°-S10)		steel, aluminium and plastic
BS2010 (60°-S20)	L/R	brass and cast iron
BS2012 (60°-S20)	TiNL/R	stainless steel
BS3010 (40°-S30)		both int. and ext. burrs
BS3510 (55°-S35)	L/R	straight edges on most materials
BS1018 (45°-S100)	Cobalt	plastic and hard materials
BK1010 (40°-S101)		All precise edges(finish)
BK3010 (45°-S150)		holes as small as 1.5 mm dia.
BS7001 (45°-70)		straight edges and flat surfaces
BS6001 (40°-S60)		cross holes in difficult to reach places

Scraper Tools

Parting Line Straight Edges Finish





Bushing Scraping





Order: NG3700

Mini Scraper

Ideal for mould and die makers. An M3 setscrew is holding the blade. Contains: NG-3 Handle - NG3000 D Holder - EL05003 D50 - BD5010



Order: NG3600

Triangular Scraper

Used for standard scraping. Contains: NG-3 Handle T Holder

T50 / T70 Scraper Blades



Order: SC1000

Heavy Duty Scraper

Heavy Duty Double end scraper for longer tool life. Can be locked in required position.

Contains:

Uni-Handle UH1000

Double Ended T120 - BT1200 Triangular Scraper.

Scraper Blades

Order	Blade	Dimension
BD5010 (60°-D50)		3.2 x 50 mm
BD5501 (60°-D55)	Carbide	3.2 x 50 mm
BD6610 (50°-D66)		3.2 x 48 mm
BD7510 (60°-D75)		3.2 x 75 mm
BD7710 (50°-D77)		3.2 x 73 mm
BT5000 (60°-T50)		3.2 x 51 mm
BT7000 (60°-T70)		4.2 x 57 mm
BT8001 (60°-T80)		≥ 2.5 x 80 mm
BT3001 (60°)		Double Side

Double Deburring Tools



Order: DB1000

Double Burr

Simultaneously removes burrs from both sides of sheet metal. DB Handle with safety quard to protect your hand. Unique

round cutting blades can be rotated and reversed for long life. For corners, use one blade only. Range: 0 - 12 mm / Contains: N80 - BN8010



Order: NG3200

Noga V Cut

For deburring sheet metal 1 - 8 mm. Contains:

NG-3 Handle - NG3000 L Holder - EL07013

L3 - BL3001





Order: NG3300

Kevway Burr

Effectively removes burrs from internal and external keyways.

Range: 2.4 - 11 mm

Contains: NG-3 Handle - NG3000 K Holder - EL04003 / N80K - BN8110



Order: NG3710

Inner Hole Scraper

Ideal for cross-holes deburring. Contains:

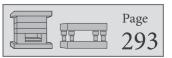
NG-3 Handle - NG3000

D Holder - EL05003 D66 - BD6610



Deburring Blades

Order	Blade	Range
BN8010 (55°-N80)	0	0 - 12 mm
BN7001 (55°-N70K)		1.2 - 8 mm
BN8110 (55°-N80K)	•	2.4- 11 mm
BN9009 (55°-N90K)	•	3 - 15 mm
BL3001 (50°-L3)		1 - 8 mm
BL4004 (50°-L4)		0 - 2.5 mm
BC3201 (90 ⁰ -RD3.2)		0 - 3 mm
BC1001 (90°-TC)		Max. 3 mm pitch



Deburring & Countersink Tools

Holes

Pipe Cross Holes Extarnal Shaft







Order: NG1100

Noga O-Ring Burr

Removes burrs from internal O-ring grooves. Range 0-3(groove width).

Contains: NG-1 Handle - NG1000 0-Ring - B01001





Order: NG1200

Internal Rotodrive

The quickest way to chamfer by hand. Single flute countersink provides a smoother cut. Range: 1 - 10.4 mm Contains:

NG-1 Handle - NG1000 RD10.4 - BC1041





External Rotodrive

Chamfer the O.D. of bars and tubes. Quickest way to chamfer O.D on almost all materials.



Contains: NG-1 Handle / EX18 - EX2001

Deburring & Countersink Blades

Order	Blade	Range
B01001 (40°)	0-Ring	1 - 3 mm
BC8301 (90°-RD8.3)		1 - 8.3 mm
BC1041 (90°-RD10.4)		1 - 10.4 mm
BC1651 (90°-RD16.5)		1 - 16.5 mm
EX2001 (90°-EX18)		4 - 18 mm
EX3011 (90°-EX28)	<u> </u>	8 - 28 mm





Order: NG3100

Contersink

The standard tool for countersinking, Useful for chamfering deep holes. Contains:

NG-3 Handle - NG3000 C20 - BC2011 C Holder - CH3000





Order: NG3400

Heavy Duty Rotodrive

40mm displacement allows for heavy duty burrs to be removed. Contains:

NG-3 Handle - NG3000 C20 - BC2011

H.D. Ext. RotoDrive Holder - EL0902



Reversible Countersinks

Order: RC1000

Mini Reversible

Very fine tool for deburring both back and front side of holes. Range: 3 - 5.5 mm Contains: R1 - BR1001



Order: RC2000

Medium Reversible

For deburring both back and front side of holes. Range: 5 - 10 mm / Contains: R2 - BR2001



Order: RC3000

Large Reversible

For deburring both back and front side of holes. Range: 10 - 22 mm / Contains: R3 - BR3001

Countersink Blades

Order	Blade	Range
BC1211 (90° - C12)		1 - 12 mm
BC2011 (90° - C20)		3 - 20 mm
BC3011 (90° - C30)		3 - 30 mm
BR1001 (90° - R1)		3 - 5.5 mm
BR2001 (90° - R2)		5 - 10 mm
BR3001		10 - 22 mm

Ceramic Tools 11111111111

Thin Sheet Metal





Parting Line Flash

Straight Edges



Surface Scraping



Order: CR2000

Convexed Cera-Cut

Ideal for surface scraping and parting line deflashing. Ideal for all plastic materials and soft metals.

Blade can be replaced.

Contains: CERA-CUT Handle - CR2100 CONVEXED BLADE - CR2200

R.15

Order: CR2300

Convexed Cera-Cut

Ideal for curved edges and small ridges. Ideal for all plastic materials and soft

metals. Blade can be replaced. Contains: CERA-CUT Handle - CR2100 CONCAVED BLADE - CR2500



Order: CR1100

Cera-Cut

Ideal for deburring plastics and other soft materials. Extremely long life. Disposable tool. Contains: 250mm convexed radius ceramic blade, mounted in ergonomically



Order: DB5000

Ceramic Double Burr

Ideal for simultaneously double edge deburring. Range 1 - 11 mm. Contains: DB handle, hand guard and V-shaped ceramic blade.



Spare Ceramic Blades

Convexed Order: CR2200

Concaved Order: CR2500

V Shaped Order: CR5100



Deburring Tool Kits - Economic



Promo-1 Set

Contains:

- * 1 pcs. = Handle
- * 1 pcs. = Telescopic Holder
- * 10 pcs = C20 Blades.

Order: RCP84059



Promo-2 Set

Contains:

- * 1 pcs. = Handle
- * 10 pcs = C20 Blades.

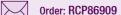
Order: RCP84069



Universal Deburring Kit

Specification:

- * 5 pcs. = D-SD, T-SD, R-SD Plastic Handles
- * 21 pcs. = Deburring Blades 3.2 mm
- * C-30, C-121, C-100, C-15 & C60
- * 5 pcs. = Scraper Blades 6 mm
- \star 2 pcs. = R10 (S)/3 pcs. = R15 (S10)
- * 2 pcs. = Scraper Blades SCR-3 (75 mm) CR- 612
- * 1 pcs. = V-2 & V-4 Blades and VT Telescopic Holder
- * 1 pcs. = Deburring Blade with KW Telescopic Holder
- * 1 pcs. = DTO Holder for C Type Blades
- * 1 pcs. = CS-20 Countersink Blade Set
- * 1 pcs. = C-1 Ceramic Tool Set





Mould Endoscope Camera



Order:

CFMRS150

Contains of Product Box:

- * Software CD
- * USB Cable
- * Carrier Bag
- * Video Output Line
- * DC Power Adapter
- * Endoscope Camera
- * User Manual
- * 3.7 Lithium Battery
- * Mirror, Magnet & Hook

Specification:

- + With the help of a waterproof gooseneck camera, it can easily take photos and videos.
- + On-site inspection by photos and videos.
- + Image rotation by pressing up and down buttons under video mode. And images display with current time / date.

Gooseneck Length :..... 1 Metre

Display Screen - LCD :...... 3.2" Colour TFT

Display Resolution: 320 x 240

Photosensitive Devices :...... 1/4 Inch CMOS

Max. Number of Frames(FPS):.................................. 30 FPS / S (max.)

Memory: Internal / SD Card up to 32GB.

Viewing Angle :.... 0 to 180° Viewing Distance: 5 to 15

Power Supply:..... Li Battery 3.7V / 2000mA

LED Lighting: 10° Adjustable TV Out: PAL / NTSC System

On-Screen Supported Languages:...... English, German, Spanish, French & Turkish







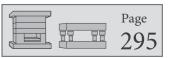
Machine Repair



Car Repair & Maintenance



" You can visit our website for products video & advantages. www.guvenal.net "







Nozzle Filter

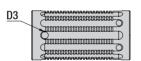
Code: MTMF

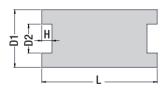
Recommended for use whenever a high quality filtered melt is desired, for example; whenever processing with a hot-runner system. Also, the use of this filter is especially for smaller gate diameters and when processing regrind materials.



"MTMF" Nozzle Filters offer a simple, effective, and economic way of preventing metal particles and other contaminants from clogging gates or entering the mould. The channel and groove forms of the filter cartridge have been optimized for maximum flow at minimum pressure loss.







Order	der D1 L D2		Н	D3		
MTMF1	Ø14	44.3	6	5	Ø3	
MTMF2	Ø20	45	12	3	Ø3.5	
MTMF3	Ø30	60	20	9	Ø4	
MTMF5	Ø50	80	40	9	Ø5	

Page Injection Moulds



Order Code: SYT

Hot Tip Mould Sprue Cleaner

The Hot Tip Mould Sprue Cleaner is a quick heating flexible tool for melting raw material (plastic) from plugged nozzles and sprues.

While beginning operation, the selected compatible copper tip is connected to the heat gun end with mounting ring in appropriate manner. It is used ergonomically thanks to flexible hose of heat gun.



Copper Tips related to unit with compatible selection:



Technical Specifications:

Voltage: 220V / 230V
Power: 100W min 200W max.
Weight: 250 g.
Cable Length: 2.5 Metre
Copper Nozzle Tip Temp.: max. 350°

- * 12 seconds heating duration / waiting is 48 seconds.
- * It is suitable for all plastic raw materials.

Application:

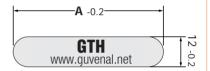
During the process, 12 seconds after pressing the trigger of the heat gun, the copper tip reaches to the required temperature - 350°C to open the plugged area. While gun is working, please do not pull the trigger continuously. After pulling the trigger for 12 seconds (on), wait for 48 seconds (off) by removing your hand from the trigger. This process cycle can be repeated in accordance with specified time values. It can be extended according to the hard plastic materials. Damage to mould or nozzle is impossible due to use of copper tips.

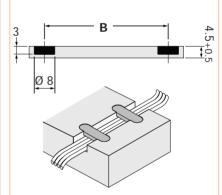


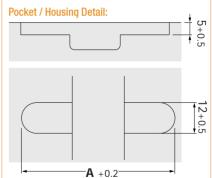
Code: GTH

Cable Retainer Cap - Magnetic (Magnetic & does not require extra hole)

Especially in hot runner moulds, it keeps the diffused cables clean and smooth in channel. The product is a magnetic material, it is self adhesive, and there is no need to drill and tap extra holes. We recommend keeping maximum mould temperature under 80°C. Because, plastic and even magnets can be affected and broke down due to high temperature.







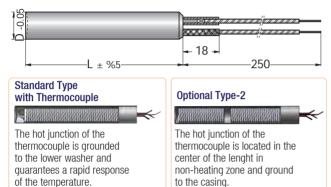
Order	Α	В	Material	Max.Temp.
GTH40	40	28	ABS + NfFeB	80°C
GTH60	60	48	ABS + NfFeB	80°C





Cartridge Heater with Thermocouple

The Cartridge Heaters produced with advanced technology, provide a good performance in difficult use conditions, in short distances and small areas due to its high watt. By insulating resistance wire wrapping on ceramic piece in equal and common pitch ranges with high resistant magnesium oxide powder, is created at a very close point to the stainless tube. The thickness of insulation between resistance wire and stainless tube provides excellent heat transmission.



L	40	50	60	80	100	130	160	200	250	300	400
D		WATT (230V)									
6.5 -0.02 -0.04	80 100 125 160 200	125 160 200 250 315	125 160 200 250 315	160 200 250 315	200 250 315 400	250 315 400 500	250 315 400 500	-	-	-	-
8.0 -0.03 -0.05	125 160 200	125 160 200 250	160 200 250 315	200 250 315 400	200 250 315 400	250 315 400 500	250 315 400 500	-	-	-	-
10 -0.03 -0.06	125 160 200 250 315	160 200 250 315 400 500	160 200 250 315 400 500	200 250 315 400 500 630	250 315 400 500 630 800	315 400 500 630 800 1000	400 500 630 800 1000	-	-	-	-
12.5 -0.04 -0.07	160 200 250 315	160 200 250 315 400	200 250 315 400 500	200 250 315 400 500 630	315 400 500 630 800 1000	315 400 500 630 800 1000	400 500 630 800 1000 1250	500 630 800 1000 1250 1600	630 800 1000 1250 1600 2000	630 800 1000 1250 1600 2000	-
16 -0.05 -0.08	-	200 250 315 400	200 250 315 400 500	250 315 400 500 630 800	315 400 500 630 800 1000	400 500 630 800 1000 1250	500 630 800 1000 1250 1600	630 800 1000 1250 1600 2000	630 800 1000 1250 1600 2000	800 1000 1250 1600 2000 2500	800 1000 1250 1600 2000 2500
20 -0.06 -0.10	-	-	-	400 500 630	400 500 630	500 630 800 1000	630 800 1000 1250	800 1000 1250 1600	1000 1250 1600 2000	1000 1250 1600 2000	1250 1600 2000 2500

- * The slot / housing that Cartridge Heater will be inserted should be even and smooth.
- * The suitable / main temperature control should be done to prolong heater life.
- * Custom-made orders as per request.

Order: FR. DxLxwatt



Band Heater

Code: KR

l-Lenath-

With its economical prices, excellent insulation, outlets reinforced for long use, inner sleeve rolling it is excellent. The fasteners are stainless screws.

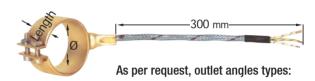
It can be produced as thermocouple as per request.

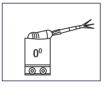
Standard 300mm wire is used, it can be extended as per request. Also, as per request special production can be made.

Power: 5 W/cm² - 230V

Sleeve / Band Material: Copper, tin alloy / Cr - Ni wire in brass. Energy Wire: Pure nickel 300mm length, glassfiber fireproof wire

outside, external armour 304 stainless steel mesh wire. Fasteners: Stainless, cylinder head cap screw - M5 x 30.









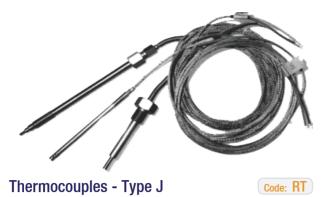
Ø	Length	Watt
25	30	120
	25	120
30	30	140
30	35	165
	40	185
	25	135
	30	165
35	35	190
	40	220
	45	235
	25	155
	30	190
40	35	220
	40	250
	45	280
	25	165
42	30	200
42	35	230
	40	265
	25	175
45	30	210
	35	250

	i	
Ø	Length	Watt
	40	280
45	45	320
	50	350
	25	195
	30	235
50	35	275
	40	315
	50	390
	25	215
	30	260
55	35	300
	40	345
	50	430
	25	235
	30	280
60	35	330
60	40	375
	50	470
	60	565
	25	255
65	35	355
	50	510

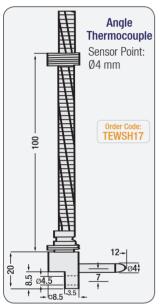
	Code:	KR)
Ø	Length	Watt
	25	270
	30	330
70	35	385
/0	40	440
	50	550
	60	660
	30	355
75	40	470
/5	50	590
	60	705
	25	310
	30	375
80	35	440
80	40	500
	50	630
	60	750
	25	390
	30	470
100	35	550
100	40	630
	50	785
	60	940

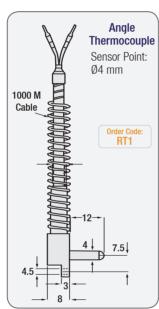


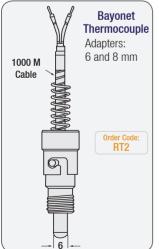
Order: KR. Øx Length

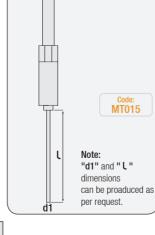


The thermocouples (type J) makes measurement as mini volt from contact surface, sends values to the screen. Thus, it maintains heat measurement. Cables are isolated with glassfiber coating. Thermocouples are the first component sensors of heat measurement from -200°C up to +800°C. Thermocouples are produced in various types as "Type J", "Type K" and "PT100". "Type J" standard type thermocouples that we produce are shown below. Except these, we produce thermocouple according to the different special type samples.





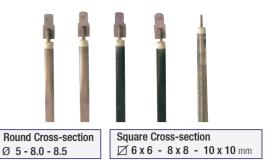




Mantle

Thermocouple





Flexible Rod Heater

Code: CR

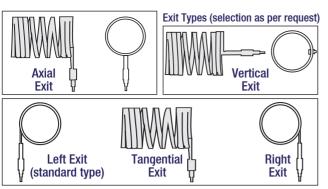
Flexible Rod Heaters can be produced up to 4.400 mm length. They can be delivered straight, bentable annealed or to bent according to customer drawing. In heating of liquid and air flow, especially is used as resistance to manifold channels (by closing with resin), it can be mounted to hexagon flange.

It is presented in two different types;

1 - in round cross-section 2- in square cross-section.
Energy cables are from pure nickel and covered by fire proof glass fibre cable.

Cross Section	6 x 6 mm	8 x 8 mm	10 x 10 mm 8.5 mm	Bendable Type according to
Flex Type	Base-flex	Base-flex	Base-flex	Manifold Shape:
Min. Bending Radius	12 mm	15 mm	20 mm	\cap
Unheated Length	25 mm	30 mm	40 mm	
Total Length		Power (W) 23	30 V	
250 mm	200 W	-	-	\mathcal{I}
300 mm	250 W	-	-	
350 mm	300 W	550 W	-	· /
400 mm	350 W	650 W	-	
450 mm	400 W	750 W	-	
500 mm	450 W	800 W	-	
550 mm	500 W	900 W	-	
600 mm	550 W	1000 W	-	
650 mm	600 W	1100 W	-	
700 mm	650 W	1200 W	-	Manifold
750 mm	700 W	1300 W	-	Housing Detail:
800 mm	750 W	1350 W	-	0 .
850 mm	800 W	1450 W	-	1x45°
900 mm	850 W	1550 W	2100 W	/
950 mm	900 W	1650 W	-	0.5 8 mm
1000 mm	950 W	1750 W	23000 W	00.
1050 mm	1000 W	1850 W	-	
1100 mm	-	1950 W	2.500 W	Mounting
1150 mm	-	2000 W	-	Example:
1200 mm	-	2100 W	2.700 W	KR
1250 mm	-	2200 W	-	Band Heater
1300 mm	-	2300 W	2.900 W	
1350 mm	-	2400 W	-	
1400 mm	-	2500 W	3100 W	
1450 mm	-	2600 W	-	0
1500 mm	-	2700 W	3300 W	
1550 mm	-	2800 W	-	Nozzle
1600 mm	-	-	3500 W	
1700 mm	-	-	3700 W	RT
1800 mm	-	-	3900 W	Thermocouple
1900 mm	-	-	4100 W	CR
2000 mm	-	-	4300 W	Flexible Rod Ht.









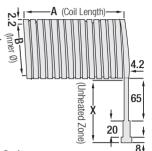


In Coil Heaters, coiled section is from 321 quality stainless steel material

and heater wires inside the tube is from 8020 chrome nickel (Cr-Ni 8020),

energy wires are prepared and delivered by coiling as per request with pure

nickel conductive, high quality fireproof cable resistant to 400°C and teflon



- 1 Orange (thick) Phase
- 2 Gray (thick) Neutral 3 - Red (thin) + Thermocouple
- 4 Blue (thin) Thermocouple

Wattage (W)

Heated Length

L (mm)

5 - Green (thick) Earthing

200 225 250

250 280 335

(Coaled Insulation.												
290	350	400	470	620	690	850	950	1100	1200	1400	1600		
385	460	520	600	760	900	1100	1200	1400	1550	1750	1950	i	

Coil Heaters of Nozzle Used in Hot Runner Systems:

Heated (coiled) Zone / "A" Length and Wattage Values:

A (coil)	20	40	60	80	100	120	140	160	180	200	220	240	260
B (inner Ø)					Heat	ted Zor	ie Watt	tage Va	lues				
10 mm	-	200	250	350	350	350	400	470	470	620	-	-	-
12 mm	-	225	290	400	400	400	470	620	620	620	-	-	-
12.5 mm (1/2")	-	225	290	400	400	400	470	620	620	690	-	-	-
14 mm	-	250	350	400	400	470	620	620	690	690	-	-	-
15 mm	-	250	400	470	470	620	620	620	690	-	-	-	-
16 mm (5/8")	-	250	400	470	470	620	620	690	690	-	-	-	-
18 mm	-	290	400	620	620	620	690	690	-	-	-	-	-
19 mm (3/4")	-	290	470	620	620	620	690	850	950	950	1100	1200	120
20 mm	-	290	470	620	620	690	690	850	950	1100	1100	1200	120
22 mm (7/8")	200	350	620	690	690	690	850	950	1100	1100	1200	1200	-
24 mm	200	400	620	690	690	850	950	950	1100	1200	1200	1200	-
25 mm (1")	225	400	620	690	690	850	950	1100	1100	1200	1200	-	-
28 mm	225	470	690	850	850	950	1100	1200	1200	1200	-	-	-
30 mm	250	470	690	950	950	1100	1200	1200	1200	-	-	-	-
32 mm (1 1/4")	250	470	690	950	950	1100	1200	-	-	-	-	-	-
35 mm	290	620	690	950	950	1100	1200	-	-	-	-	-	-
38 mm (1 1/2")	290	620	850	1100	1100	1200	-	-	-	-	-	-	-
40 mm	290	620	850	1100	1100	1200	-	-	-	-	-	-	-
42 mm	350	620	950	1200	1200	1200	-	-	-	-	-	-	-
45 mm	350	690	950	1200	1200	1200	-	-	-	-	-	-	-
48 mm	400	690	1100	1200	-	-	-	-	-	-	-	-	-
50 mm (2")	400	690	1100	1200	-	-	-	-	-	-	-	-	-

Standard Series:

It is produced up to 2200 wattage and has 1000 mm lead wire. Standard "J" Type Thermocouple is used in our products.

As per request; N Type & K Type Thermocouple options can be produced for precision works.

Custom-made close fit heaters / coiling formula:

Inner \emptyset x "P" number (3.14) x Coil number = ...

Total Length Straight Include Unheated Zone (65 mm):

P at 230 V	2.2 x 4.2 mm 2.5 x 4.5 mm with and without TC J
200 Watt	315 mm
225 Watt	345 mm
250 Watt	400 mm
290 Watt	450 mm
330 Watt	-
350 Watt	525 mm
400 Watt	585 mm
470 Watt	665 mm
550 Watt	-
620 Watt	825 mm
690 Watt	965 mm
700 Watt	-
800 Watt	-
850 Watt	1165 mm
950 Watt	1265 mm
1000 Watt	-
1100 Watt	1465 mm
1200 Watt	1615 mm
1400 Watt	1750 mm
1600 Watt	1950 mm
1800 Watt	-
2000 Watt	-
2200 Watt	-



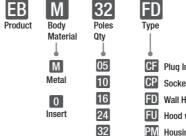
For correct heaters selection:

Pls. complete system by requesting information from our Hot Runner Department (with used plastic raw material information).

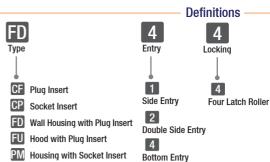








48



5 Poles - 10 Amperage



- Socket Insert - 5 Poles
- Order: EBO 05CP



- Plug Insert: - 5 Poles Order: EBM 05CF
- Hood with Socket Insert - 5 Poles
- Order: EBM 05PU



- Hood with Plug Insert
- 5 Poles Order: EBM 05FU



- Socket Insert with Latch
- 5 Poles Order: EBM 05PM

■ 16 Poles - 16 Amperage



- Socket Insert
- 16 Poles Order: EBO 16CP

PU Hood with Socket Insert



- Plua Insert:
- 16 Poles Order: EBO 16CF



- Hood with Socket Insert
- 16 Poles

Order: EBM 16PU



- Hood with Plug Insert
- 16 Poles

Order: EBM 16FU



- Wall Housing with Plua Insert
- 16 Poles

Order: EBM 16FD14 **EBM** 16FD24

32 Poles - 16 Amperage



- Socket Insert
- 32 Poles
- (1-16 & 17-32) Order: EBO 32CP



- Plua Insert - 32 Poles
- (1-16 & 17-32)
- Order: EBO 32CF



- Hood with Socket Insert
- 32 Poles

Order: EBM 32PU



- Hood with Plug Insert
- 32 Poles

Order: EBM 32FU



- Wall Housing with Plua Insert
- 32 Poles

Order: EBM 32FD44

10 Poles - 16 Amperage



- Socket Insert - 10 Poles
- Order: EBO 10CP



- Plua Insert
- 10 Poles
- Order: EBO 10CF



- Hood with Socket Insert
- 10 Poles

Order: EBM 10PU



- Hood with Plug Insert
- 10 Poles

Order: EBM 10FU



- Wall Housing with Plug Insert
- 10 Poles

Order: EBM 10FD14 **EBM** 10FD24

24 Poles - 16 Amperage



- Socket Insert - 24 Poles
- Order: EBO 24CP



- Plua Insert
- 24 Poles
- Order: EBO 24CF



- Hood with Socket Insert
- 24 Poles

Order: EBM 24PU



- Hood with Plug Insert
- 24 Poles

Order: EBM 24FU



- Wall Housing with Plug Insert
- 24 Poles

Order: EBM 24FD14 **EBM** 24FD24

48 Poles - 16 Amperage



- Socket Insert
- 48 Poles
- (1-24 & 25-48)
- Order: EBO 48CP



- Plug Insert
- 48 Poles
- (1-24 & 25-48)





- Hood with Socket Insert
- 48 Poles

Order: EBM 48PU



- Hood with Plug Insert
- 48 Poles

Order: **EBM** 48FU



- Wall Housing with Plug Insert
- 48 Poles

Order: EBM 48FD44









HCC. (zone qty)

Code: HCC

Hot Runner Temperature Controller

"HCC" Hot Runner Temperature Controllers have been produced from microprocessor-based devices and specially designed for Hot Runners.

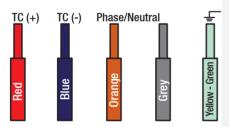
Specifications:

- * 1.00 controlling accuracy.
- * PID Control System.
- * Soft Start Mode (working system increases resis tance mode up to 8 times with soft start mode).
- * Standby Mode; provides electricity saving.
- * Proportional working mode (without thermocouple).
- * Compatible with "J Type Thermocouple".
- * 0-600 degree operation scale.
- * Structure not requiring calibration (ability to resto re factory calibration settings to avoid shifting).
- * Automatic parameter settings with Auto Tuning feature.
- * Warning alarm output for over and under values.
- * 25A Solid State Relay (ssr) output for each channel.
- * Siemens 10A rapid fuse for each channel.
- * With standard 3-meter connecting cable.
- * 4-meter power cable with 5-unit feeder plug.
- * Stranded and specially alloyed thermocouple cable in cable line (fe const).
- * Servicing is quick and easy,

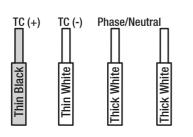
Cable Selection and its Importance:

The device / controller and cables used here are very important in terms of mould, the colors that are used are also important. It should be inserted to the device / controller by considering these colours.

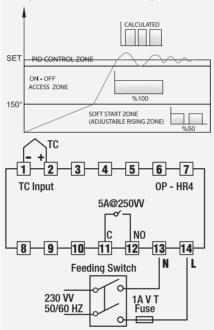
Heaters Cable Connection of Nozzles:



Heaters Cable Connection of Manifold:



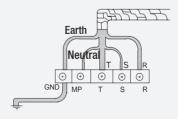
Temperature Control Technique:



Warnings (things to do before operation):

Before fastening "HCC" Controller to the mould, ensure that the network is grounded and your mould is connected to the earth connection. Electrical leakages which may occur in heaters in mould due to that there is no earth connection may pose risk for human health. Also, this leakage will damage the heater and thermocouple.

The occurring leakages can be misread of temperature value or damage the device by transferring via thermocouple cable.



Attention!

Neutral (N) and Earth (GND) are different than each other. Due to current switching from neutral line, please do not use this line for earthing. In order not to pose risk for human health and to operate your device normally, the earth terminal at power cable absolutely should be connected to actual earth line in your mains.

"HCC" Operation Procedure:

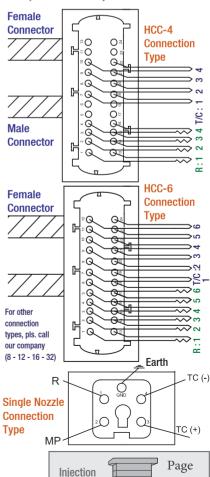
Before operating, make connection of heater and thermocouple in accordance with socket connection diagram given to you.

After ensuring that socket connection is applied in accordance with the diagram, insert connecting cable into sockets on mould.

Before giving energy to controller, switch rear fuses to off position, set pacco switch to zero position, plug power plug into appropriate socket and set pacco switch to position-1, then open the fuses in order, make sure that the

temperature in zones opened its fuses is increased. By entering program menu, you can adjust the desired temperature values.

Example: Cable / Plug Connection Series



Moulds

Multiple of Clamping Force Viscosity

Table - A		
Raw Material	Factor for Clamping Force ton / cm²	Viscosity
GPPS	0.155-0.31	1
GPPS (x)	0.465-0.62	1
HIPS (+)	0.155-0.31	1
HIPS (+) (x)	0.388-0.543	1
ABS	0.388-0.62	1.3 - 1.5
SAN (AS)	0.388-0.465	1.3 - 1.5
SAN (AS) (*)	0.465-0.62	1.3 - 1.5
LDPE	0.155-0.31	1.0 - 1.3
HDPE	0.233-0.388	1.0 - 1.3
HDPE (*)	0.388-0.543	1.0 - 1.3
PP	0.233-0.388	1.0 - 1.2
PP (*)	0.388-0.543	1.0 - 1.2
PPVC	0.233-0.388	2
UPVC	0.31-0.465	2
PA6,PA66	0.62-0.775	1.2 - 1.4
PMMA	0.31-0.62	1.5 - 1.7
PC	0.465-0.775	1.7 - 2.0
POM	0.465-0.775	1.2 - 1.4
PET	0.31-0.388	1.7 - 2.0
PET	0.62-0.93	1.7 - 2.0
PBT	0.465-0.62	1.7 - 2.0
CA	0.155-0.31	1.3 - 1.5

Table - A:

(*): Bang Flow / (x): Wall Thickness < 1mm / (+): Anti Shock

Right clamping forces block the overflow on products. For sure, it depends on various parameters but we try to help you by a smart method to calculate the forces approximately.

Practical Method:



Cavity Projection Area: It is the largest vertical projection area seen when looked cavity from injection side.

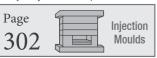
Multiple (coefficient): It is given on Table - A general using raw materials .

Example: A GPPS glass having 40mm radius will be produced. The thinnest wall thickness of glass is 0.6mm. Please find clamping force required for this production.

Projection Area: π x $r^2 = 50$ cm² Multiple of GPPS = 0.32 (From Table - A)

Clamping Force is $= 50 \times 0.62 = 31 \text{ Ton}$

In order to avoid surface quality problems on injected parts, drying the raw material before injection is priority according to test form. Drought injection is required.



Solution Methods for Injection Problems

Solution Methods	ו וטו	njec	liui	111	סוטכ	1113		
Problems		Fol	lowing	g of Sc	lution	Meth	ods	
Very Fragile Parts	M 1 E 6	E 6 4/ 6	E 8	M 2	M 3 M 1	М 3		
Short Shot	E 9	E11	E 1	E 3	E 6	K 1	4/5	K 7
Entrapped Air	E 9	E11	E 5 3/ 5	E 3	E 6 K 1	K 5 E10	K 7	K 5
Burn Marks	E 6	E 2	E 4 M 3	К7	M 3 K 5	E 8	K 5 K 6	K 8
Warpage	K 3	M 3 E11	E11 3/4	3/ 4 E 5	E 5	4/ 5 K 2	K 6 E 6	K 8 5/ 6
Weld Lines	M 1 K 7 E 1	E 1	E 3 E11	E11 K 1	K 1 E 6	E 6 M 1 K 7	K 6 4/ 6	K 8
Sink Marks	E 9	E 5	E11	K 2 E 6	K 5	K 6	M 6	K 8
Plate Out (parts are sticking to mould)	К 3	K 9 4/ 5	E11	E 4 M 6	E 5 K 9	M 6 K 8	K 8	
Surface Appearance Damaged	M 1 K 1	E11	E 6	E 3	K 7	K 4	K 6	
Plastic Deformation	E 6	E10	E 8	E12				
Burr or Overflow	E 2	E13	E 4 E 5	K 8	E 6	M 4 M 6		
Flash / Jetting	E 2	E 7	K 1	E 6	K 5	K 6	K 8	
Wrinkles on Surface	E 1	E 6	K 1	M 5	4/ 5			

Solutions > Injection Machine

- Increase injection velocity / pressure.
- **E 2** Decrease injection velocity / pressure.
- Increase velocity / pressure of pack-hold.
- Decrease velocity / pressure of pack-hold.
- **E 5** Optimize the pack-hold time.
- E 6 Optimize the melt / area temperature.
- **E7** Control the nozzle heater and its temperature.
- Control the suitability of part weight to machine capacity.
- **E 9** Control the packing / injection weight ratio.
- Control the back pressure / pack-hold ratio.
- E11 Control the pass point of injection to pack-hold.
- E12 Control the range of getting material time.
- **E13** Increase the clamping force.

Solutions > Raw Material

- M 1 Optimize the drying of raw material.
- M 2 Check the ratio of recycle raw material.
- M 3 Check the ratio of master batches
- M 4 Decrease the viscosity of raw material.
- M 5 Increase the viscosity of raw material.
- M 6 Check the type of raw material.

Solutions > Mould

- K 1 Increase mould temperature.
- **K 2** Decrease mould temperature.
- **K 3** Control the cooling channels & cooling balancing.
- **K 4** Control the runner length.
- **K 5** Control the runner diameters.
- **K 6** Control the runner injection.
- K7 Check the air gas vents / outs.
- Review your mould design and change it if necessary.
- K 9 Control your part extractor design.

Thermoplastics Raw Materials Melting & Drawing Ratios:

	Meitille	,	g Rauos:
	laterial Type	Melting Temp. Range °C	Draw Ratio in Mould %
S	ABS	170 - 200	0.4 - 0.7
tic	PS	130 - 160	0.3 - 0.6
las	SB	130 - 160	0.3 - 0.6
Amorphous Thermoplastics	SAN	140 - 170	0.4 - 0.6
ᄩ	CA	130 - 170	0.3 - 0.7
T	CAB	130 - 170	0.3 - 0.7
Sľ	CP	130 - 170	0.3 - 0.7
hol	PC	220 - 260	0.5 - 0.8
r D	PMMA	150 - 180	0.4 - 0.8
E	PP0	240 - 270	0.5 - 0.8
⋖	PVC	130 - 160	0.4 - 0.8
	PE	~ 110	1 - 3
S	PE	~ 130	1.5 - 4
sti	PP	~ 165	1 - 2.5
pla	PA66	~ 255	1.2 - 2.5
۱ ا	PA6	~ 220	0.8 - 2
er	PA610	~ 220	0.8 - 2
È	POM	~ 175	1.5 - 3.5
ine	POM	~ 165	1.5 - 3.5
Crystalline Thermoplasti	PBTP	~ 225	1.2 - 2.8
ysı	PETP	~ 255	1.2 - 2
ت	FEP	~ 270	3.5 - 5
	ETFE	~ 270	3.5 - 5

Hot Runner Nozzles Selection Table according to Plastic Raw Material:

			"A" Ser	ies Nozz	les			"B"	Series I	Vozzles		Runner Mu		Multi	Multi Valve Gate Nozzles			
	lozzle											R 01	R 04	SMM	E 04	Y 01	Y 02	Y 03
	Туре	A 01	A 02	A 03	A 04	A 05	B 01	B 02	B 03	B 04	B 05		TP TP	Sivilvi				A
	ABS	V		Ш					Ш					V	<u> </u>			
	PC	0	•	0	0		0	0	0	0	0	0	0	0	0	0		
	PMMA	0	0	0	0		0	0	0	0	0	0	0	0	0	0		
	PS					0		0		0		0		0	0			
als	PUR	0	0			0	0	0			0	0		0				
ater	PVC						0										0	0
≥	SAN	0		0	0		0	0	0	0	0	0	0	0	0	0	0	
Plastic Raw Materials	PA	0								0		0	0	0	0	0		
astic	PBT	0					0					0						
E	PE	0			0	0	0				0	0	0			0		
	PET								0			0			0	0		
										0		0	0		0	0		
	POM		0							0								
* [PP Please co	ontoot u	ith our	Hot Dun	nor Don	t in one	o of unit	og oposi		0	O	0	O		U	U		0
	nease co nateria		illi our	not Kuli	пег рер	i. III cas	e or usir	ig speci	ai [O Vei	y Good	O :	Suitable		Consul	t Us	Not S	uitable
	Glass			0			0	•	0		•	0			0	0	0	o
Sases	Hatte	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Special Cases	coloutage	•	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
s & Sp	ى. ا	•	0	0	0	0	0	0	0	•	0	•	0	•	0	0	0	0
Additives &	Costiliace	0	0	0	0	0	0	0	•	0	0	0	0	0	0	0	0	•
Ā	Our de los	•	0	0	0	0	0	0	0	0	0	•	0	0	0	0	0	0

Selection Table of Nozzle Tip Diameters:

Nozzle Tip		"A" Series Nozzle					"B" Series Nozzle					ner U		"D" Series Multi Nozzle					
	Ø	18	22	25	32	40	18	22	25	32	40	15	17	19	16	22	28	34	1
sls	PE PP PS SB	25	60	200	800	2000	20	45	150	600	1500	45	150	600	30	60	140	200	
aw Materia	ABS ASA PA POM SAN	15	40	100	500	1200	12	32	80	400	950	32	80	400	25	50	120	170	
Plastic Raw Materials	PBTP PC PES PMMA PPO PPS PSU TPU	12	25	60	300	800		•	55	270	750	•	55	270	•	•	•	•	

- * Values in the table are in gram (g).
- * Please contact us for grammages which are not available in the table and marked with ___ points.

Note:

The following table is prepared for our customers for information purposes. Real working conditions; it can differ depending on part volume, average wall thickness, viscosity, machine capacity and gate diameter.





Hot Runner Nozzles

Hot Runner Nozzles are consisted from the following equipments, all of them have a separate task in system. **Bushings** provide bearing of nozzle and avoiding of its motion. **Heaters** are made heating task to provide injecting of fluid material without problem. **Sealing plug** is to avoid flowing of plastic raw material out that is passed between manifold and nozzle with high pressure. Nozzle types should be selected by determining according to the raw material and grammage and considering mould conditions.

1- Bushing

5- Heater

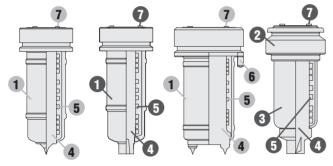
2- Nozzle Head

6- Nozzle Centring Pin

3- Nozzle Outer Case

7- Sealing Plug

4- Nozzle



Nozzle Selection:

The success of hot runner application depends on many factors. Using suitable raw material, making good part / mould design and selecting the right injection machine are critic factors. Besides these, the location of runner inlet on part and selection of inlet type are essential in the same manner. During part design, while deciding runner inlet location, filling the part in balance and pressure resistance created by runner inlet should be considered. When deciding the runner inlet location, right selection among various hot runner types should be done.

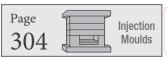
While deciding runner inlet type, then runner inlet dimension, first the compatibility of plastic material to this inlet type should be considered.

Nozzle tips are the elements having direct contact with the product and affecting the result in the hot runner systems.

Thus, the selection of **nozzle tip** should be selected according to the aforementioned criteria;

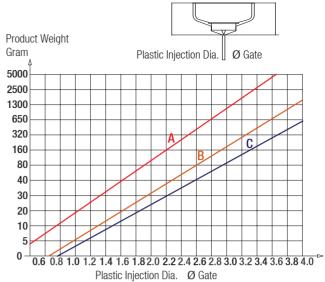
- * Technical data of the part & weight.
- * Raw material type to be used & colour change.
- * Distances between cavities (in X & Y axis).
- * Is injection point on the cavity? Is it on the runner?
- * Number of mould cavities.
- * Location of cooling system.
- * With information such as melting temperature of material etc.

In the event that this data is provided, performance expected from nozzle tips will be achieved.





Nozzle Gate Selection Guide



A	Low Density Plastics	PE P	PP	TPU	i20	HDPE
B	Medium Density Plastics	SAN	ABS	POM	PA	TPE
C	High Density Plastics	PES P	СРМ	MA P	PS F	PPRC

Selection of Nozzle Diameter according to the Part Weight:

The following table is prepared for our customers for information purposes. Real working conditions; it can differ depending on part volume, average wall thickness, viscosity, machine capacity and gate diameter.

Nozzle	Densi	ty of Raw Ma	Product Wall Thick.		
Dia.	Α	В	С	≤2 mm	≥ 2 mm
Ø 18	~25 gr.	~15 gr.	~12 gr.	~12 gr.	~25gr.
Ø 22	~60 gr.	~40 gr.	~25 gr.	~25 gr.	~60 gr.
Ø 25	~200 gr.	~100 gr.	~60 gr.	~60 gr.	~200gr.
Ø 32	~800 gr.	~500 gr.	~300 gr.	~ 300 gr.	~800gr.
Ø 40	~2000gr.	~1200gr.	~800 gr.	~ 800 gr.	~2000gr.

Feature in Usage of Hot Runner Mould:

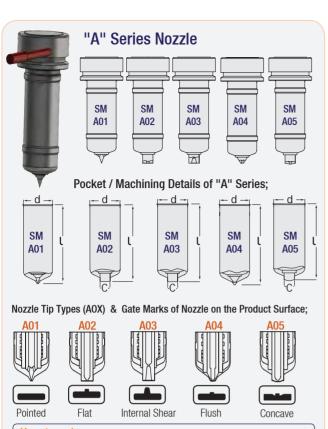
Even though cost of hot runner mould is higher than cold runner mould, in the long term hot runner moulds provide economy in part costs as well as it idealizes part quality.

Advantages of Hot Runner Systems:

* Provides saving from created labour.

Any of process (such as runner cleaning / separating / storage / crushing etc.) are not done.

- * Short injection cycle period.
- * Mould is worked full automatically mould efficiency is high.
- * Provides savings from material (in hot runner system, there are no missing material in runner).
- * Provides saving at machine capacity (hot runner moulds can be used in all injection moulds / there is no machine limitation).
- * Excellence in part quality, due to making moulding with low pressures, internal stresses of moulded parts is very lower than cold runner mould, however heater elements should be under control of hot runner system.



How to order:

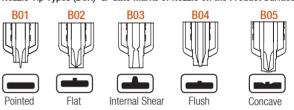
SMA (code) X d (nozzle Ø) X l (nozzle length) X AOX (nozzle tip type)

Order Code	d	ι	С	AOX	Heaters Wattage
	4.0	46	,		200 - 225
	18	56	6		225 - 250
		46		Nozzle	200 - 225
	22	56	7	Tip	225 - 250
	22	66	′	Types:	250 - 290 - 350
		76		A01	290 - 350 - 400
		46		AUT	225 - 250
		56		A02	250 - 290 - 350
	25	66	8		290 - 350 - 400
	25	76	0	A03	350 - 400 - 470
		86		A04	400 - 470
SMA		96			400 - 470 - 620
SIVIA	32	46		A05	250 - 290
		56			290 - 350
		66	10		350 - 400
		76	10		400 - 470
		86			400 - 470 - 620
		96			400- 470- 620- 690
		46			290 - 350
		56		Α	350 - 400 - 470
	40	66	14	Fixed	400 - 470
	40	76	14		470 - 620
		86			620 - 690
		96			620 - 690 - 850





Nozzle Tip Types (BOX) & Gate Marks of Nozzle on the Product Surface;



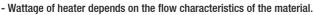
How to order:

SMB (code) X **d** (nozzle Ø) X **l** (nozzle length) X **BOX** (nozzle tip type)

Order Code	d	ι	С	вох	Heaters Wattage
		46			200 - 225
	22	56	8		225 - 250
	22	66	0	Nozzle	200 - 225
		76		Tip Types:	225 - 250
		46		турсз.	250 - 290 - 350
		56		B01	290 - 350 - 400
	25	66	10	B02	225 - 250
		76	10		250 - 290 - 350
		86		B03	290 - 350 - 400
		96		B04	350 - 400 - 470
SMB	32	46			400 - 470
		56		B05	400 - 470 - 620
		66	12		250 - 290
		76	. –		290 - 350
		86			350 - 400
		96			400 - 470
		46			400 - 470 - 620
		56		В	400- 470- 620- 690
	40	66	14	Insert	290 - 350
	40	76			350 - 400 - 470
		86			400 - 470
		96			470 - 620

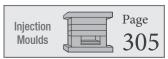






- Gate diameters will be determined in accordance with the order information.

Please create your orders with form on page - 310















How to order:

RMM (code) X d (nozzle Ø) X l (nozzle length) X KX (insert tip qty)

Multi-Tip Hot Runner Nozzle

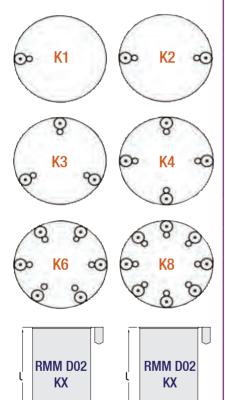
Economic Model

Nozzle with insert tip which is the last / new R & D work.

Heaters and insert tips of Multi-Tip Hot Runner Nozzle are easily replaced. An external thermocouple is available in nozzle body for precise temperature measurement.

Important:

Multi-Tip Hot Runner Nozzles are not suitable for all types of materials and grammage. When selecting, please ask technical help from Guvenal - Hot Runner Department. Precise adjustments are necessary for mounting and operation. Wattage of heater depends on the flow characteristics of the material.



Page 306	Injection Moulds	

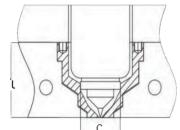
Please create your orders with form on page - 310

Order Code	d	ι	D02 - KX	Heaters Wattage
		46	K1 - K2 - K3 - K4	290 - 350 - 400
		56	K1 - K2 - K3 - K4	290 - 350 - 400
	14	66	K1 - K2 - K3 - K4	470 - 620 - 690
	16	76	K1 - K2 - K3 - K4	620 - 690 - 850
		86	K1 - K2 - K3 - K4	690 - 850 - 950
		96	K1 - K2 - K3 - K4	690 - 850 - 950
		46	K1 - K2 - K3 - K4	350 - 400 - 470
		56	K1 - K2 - K3 - K4	470 - 620 - 690
	22	66	K1 - K2 - K3 - K4	620 - 690 - 850
	22	76	K1 - K2 - K3 - K4	690 - 850 - 950
		86	K1 - K2 - K3 - K4	690 - 850 - 950 - 1100
DNANA		96	K1 - K2 - K3 - K4	850 - 950 -1100
RMM	28	46	K1 - K2 - K3 - K4 - K6	350 - 400 - 470
		56	K1 - K2 - K3 - K4 - K6	470 - 620 - 690
		66	K1 - K2 - K3 - K4 - K6	620 - 690 - 850
		76	K1 - K2 - K3 - K4 - K6	690 - 850 - 950
		86	K1 - K2 - K3 - K4 - K6	850 - 950 - 1100
		96	K1 - K2 - K3 - K4 - K6	950 - 1100
		46	K1 -K2 -K3 -K4 -K6 -K8	400 - 470 - 620
		56	K1 -K2 -K3 -K4 -K6 -K8	620 - 690 - 850
	34	66	K1 -K2 -K3 -K4 -K6 -K8	690 - 850 - 950
	34	76	K1 -K2 -K3 -K4 -K6 -K8	690 - 850 - 950 - 1100
create		86	K1 -K2 -K3 -K4 -K6 -K8	850 - 950 -1100
rders rm on · 310		96	K1 -K2 -K3 -K4 -K6 -K8	950 - 1100

Runner Bushing Types

How to order: BY02 (bushing tip) X C (nozzle Ø)

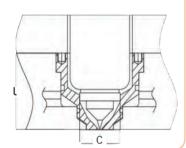
Code	С	J
BY02	15	24
BY02	17	24
BY02	19	24



How to order:

CBY02 (bushing tip) X **C** (nozzle Ø)

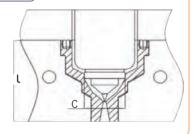
Code	С	ι
CBY02	15	24
CBY02	17	24
CBY02	19	24



How to order:

BY03 (bushing tip) X C (nozzle Ø)

Code	С	J
BY03	15	32
BY03	17	32
BY03	19	32



Selection Table of Runner Series Nozzle Tip Diameters:

- * Values in the table are in gram (g).
- * Refer to page "303" for nozzle selection based on grammage.
- * The following table is prepared for our customers for information purposes. Real working conditions; it can differ depending on part volume, average wall thickness, viscosity,

machine capacity and gate diameter.

Nozzle	Density of Raw Material			
Dia.	Α	В	С	
RSM 15	60	40	25	
RSM 17	200	100	60	
RSM 19	800	500	300	

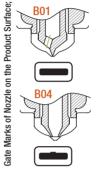
ı	Raw Material Group						
	Α	В	С				
ľ		ABS					
		SAN	PC				
	PP	POM	PPS				
	PE	PMMA	TPE				
	SS	PA	PUR				
		PBT	PC - ABS				
		PET					

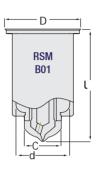
Runner Series Nozzle

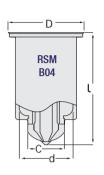










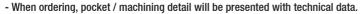


How to order:

RSM (code) X d (nozzle Ø) X l (nozzle length) X BOX (nozzle tip type)

Order Code	D	ι	С	d	ВОХ	Heaters Wattage
		49				250
		59				290
	30	69	15	25		350
	30	79	15	25		400
		89			Nozzle Tip	400
		99			Types:	470
		49			B01	250
RSM	32	59	17	25	B04	290
		69				350
		79				400
		89				470
		99				470
	34	49				290
		59				350
		69	19	27	M	400
		79	17	21	Spinning	470
		89				470
		99				620





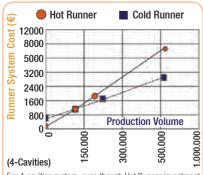


- Wattage of heater depends on the flow characteristics of the material.

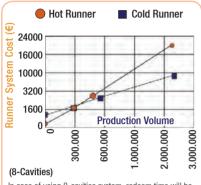




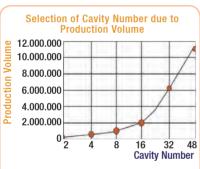
Investment Cost Comparison of Cold Runner & Hot Runner Mould:



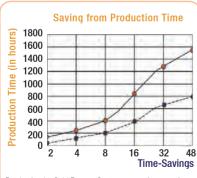
For 4-cavities system, even though Hot Runner investment cost is more expensive than Cold Runner, after 20.000 cycles system pays for itself and increases your profit.



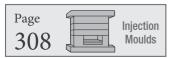
In case of using 8-cavities system, redeem time will be shorter than using 4-cavities system.



Cavity number must be chosen carefully according to the production volume. The diagram above is our suggestion.



Production by Cold Runner System cause time wasting. Hot Runner Moulds can save half of your production time.



Operating Conditions of the Plastic Raw Material

Raw Material	Degree	Time	Melting	Operating	Mould			
	C ₀	(Hour)	Temp.	Temp.	Temp.	Good	Moderate	Poor
Amorphous Material	ls:							
POP (Polycehenylene Oxide)	80 -120	2	120	300	80			
PEI (Polyetherimide)	150	4	215	370	100			
PMMA (Polymethyl Methacrylate)	70 -100	2 - 4	100	245	70			
ABS Acrylonitrile Butadiene Styrene)	70 - 80	2	110	250	75			
ASA (Acrylic Styrene Acrylonitrile)	80 - 90	2	105	245	75			
SAN (Styrene Acrylonitrile)	85	2 - 4	115	255	80			
PS (Polystyrene)	-	-	100	225	45			
SB (Styrene Butadiene)	-	-	100	225	70			
PES (Polyethersulfone)	135-150	3 - 4	230	350	150			
PSU (Polysulfone)	135-150	3 - 4	200	315	150			
PVC (Polyvinyl Chloride)	-	-	100	195	35			
PC (Polycarbonate)	120	46	220	300	90			
CAB (Cenlulose Acetate Butyrate)	50	3	140	215	55			
TPU (Thermoplastic Urethanes)	100-110	2	150	210	35			
Crystalline Materia	ls:							
PE (Polyethylene)	-	-	140	250	25			
PP (Polypropylene)	-	-	165	255	35			
LCP (Liquit - Crystal Polymer)	150-160	4	330	400	175			
PA 11 (Polyamide 11)	70 -80	8 -15	175	230	60			
PA 12 (Polyamide 12)	70 -80	8 -15	175	230	60			
PET (Polyethylene Terephthalate)	75 -90	3 -4	245	285	140			
PBT (Polybutadiene Terephthalate)	120	4	225	265	60			
PPS (Polyphenylene Sulfide)	150-170	4	290	330	110			
PEEK (Polyetheretherketone)	150	3	335	370	160			
PA610 (Polyamide 610)	70 -80	8 -12	215	250	90			
PA 6 (Polyamide 6)	80	8 -15	220	250	90			
PA 66 (Polyamide 6.6)	80	8 -15	255	285	90			
POM (Polyacetal)	110	2	180	200	100			

Multi-Tip Hot Runner Nozzle

Standard type Multi-Tip Hot Runner Nozzles. An external thermocouple is available in nozzle body for precise temperature measurement.



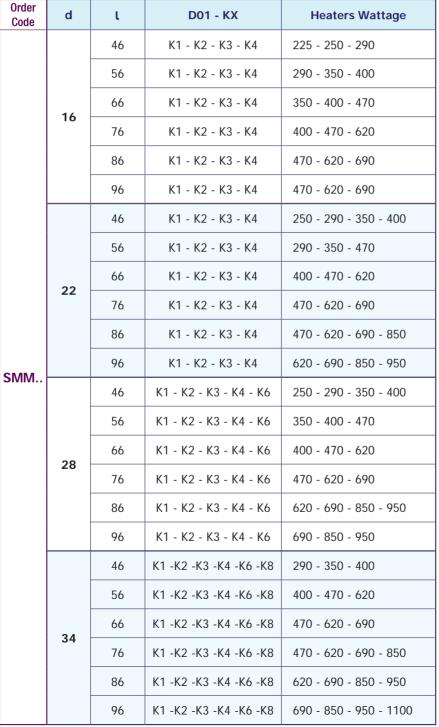




Please create your orders with form on page - 310



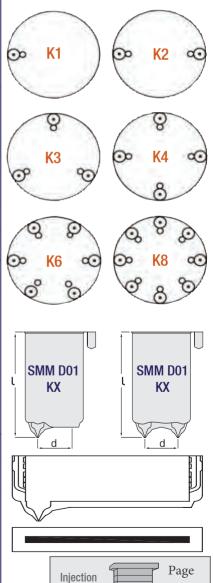
SMM (code) X d (nozzle Ø) X l (nozzle length) X KX (tip qty)





Important:

Multi-Tip Hot Runner Nozzles are not suitable for all types of materials and grammage. When selecting, please ask technical help from Guvenal - Hot Runner Department. Precise adjustments are necessary for mounting and operation. Wattage of heater depends on the flow characteristics of the material.

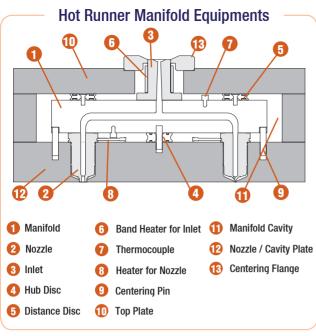


Moulds

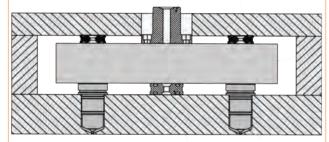
Güven Die & Mould Comp	onents	-G	IH Info	rma	tion - Inqui	iry 8	& Orde	r Foi	m
Company:						Date):		
Contact Person:						Tel.:			
E-Mail:									
Address:									
Subject:									
- Raw Material T - Additive:	ype:								
Cavity Qty:			Product Grammag	e:		Wa	all Thickne	ss:	
Nozzle Ø:			Nozzle Type:			Co	lour Chang	je:	□ Yes □ No
Nozzle Length:			יםזכוע פחו זכבו	⊒ Yes ⊒ No	Mould Dimension			up Rac	
Cavity Zones			(B) Mould	Dim. =	mm	Vi	ew from In	jectio	n Surface
			Cable	Output	. Top				
	(A) Mould Dim. = mm	Cable Output ?				Cable Output ?			
			Cable	Output	? Lower	r			
Other Required Products:									
Notes:						Аррі	oved By:	Sign	& Stamp:
□INFO		QU	IRY ORD	ER					





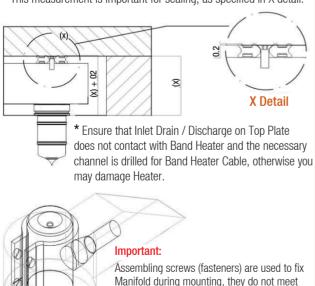


Recommended Assembly Process of Hot Runner Manifold



- * Ensure that manifold is clean and dry.
- * Place the Hub Disc and fasten Centering Pins to mould.
- * Use Centering Pins between Top Plate and Nozzle / Cavity Plate.
 All plates on the fixed side should be centered by pins.
- * Ensure that Distance Discs are 0.1 mm above from Manifold Cavity.

 This measurement is important for sealing, as specified in X detail.



forces occurring during injection, therefore do

not remove Distance Discs on manifold, do not

tighten screws excessively.



Hot Runner Manifold Systems

Hot Runner System is the continuation of injection group. It is an independent system in mould, its design and engineering requires special knowledge and experience. The system equipments are relevant to each other from tip to toe. Hot Runner Systems are Manifold, Hot Runner Nozzle, Heater and Thermocouple in base. The equipment contacting with products directly and affecting the result is Hot Runner Nozzle. To give desired performance by hot runner nozzle, the production of all equipment should be correct. Manifold works as a casing / body in system. Also, it is an important element that collects and distributes material. The system is heated via Heaters placed on it. The equipments that keep the heaters temperature in specified range and measure the temperature are Thermocouples. The Thermocouples that detect the temperature decrease, allow Heaters to work by triggering electric energy.

Inlet is the first element that provides the start of distribution of melt raw material into Manifold. To reach melt raw material into Manifold with the same pressure and temperature, **Band Heaters** (Guvenal product code: **"KR"** page-297) is inserted around Inlet.

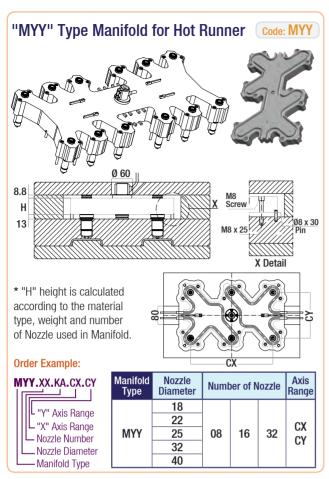
Other Equipments with Important Roles in System:

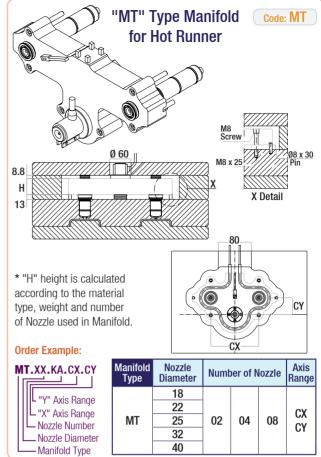
Hub Disc, Distance Disc and Fasteners. They are used to mount system to Mould in the most correct way. Another section that is effective in working of Hot Runner Systems continuously and smoothly are Mould Plates and Manifold Cavity. As well as system and labour, also precision machining of the Mould should be in the desired values.

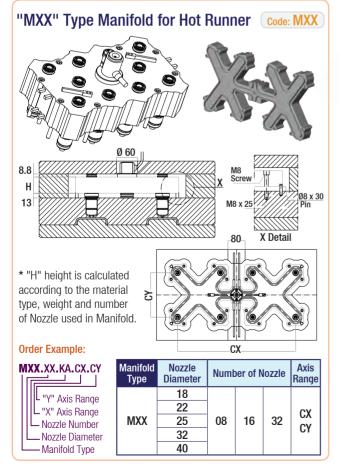
All of our Hot Runner Systems & Components are produced in Turkey. We present spare parts, services and maintenance guarantee. In selection and installation of all these systems, we will help together with our technical team. In addition, we will continue to follow it.

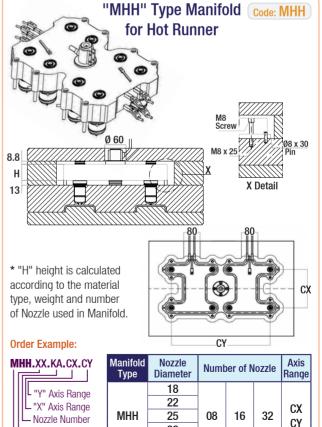










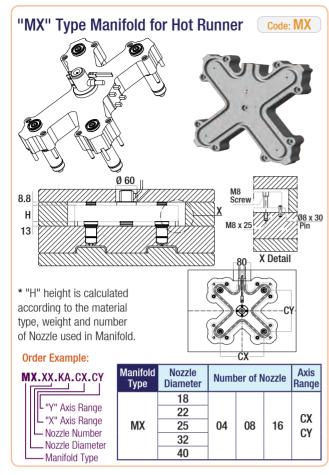


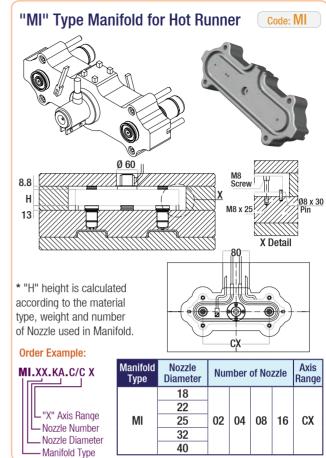
32

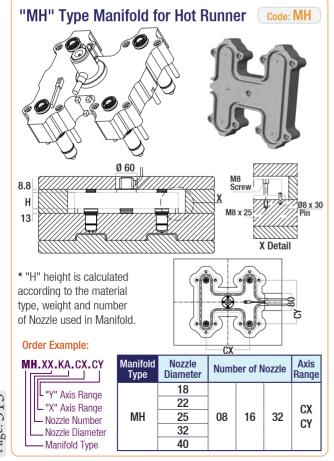
40

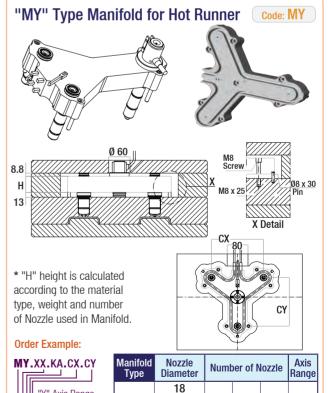
Nozzle Diameter

- Manifold Type









22

25

32

40

02

04

80

MY

CX

CY

"Y" Axis Range

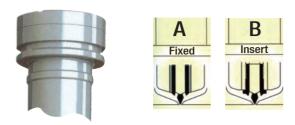
"X" Axis Range

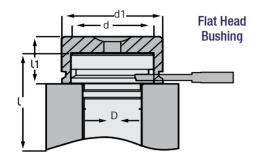
Nozzle Number

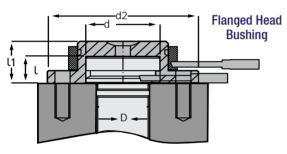
. Nozzle Diameter

Manifold Type

Flanged & Flat Head Bushings for Hot Runner Nozzles







Standard Hot Runner Nozzles with Head Bushings are produced / designed for using the Nozzles as Main / Single Nozzles in the operation of molding raw plastic materials with high melting temperature to protect it against colding. Head Bushings are produced for the "SM" Series Nozzles.

Order Code	Туре	D	ι	d	
SS22Z00	Flat	Ø 22	13mm	Ø 29	
SS22Z01	Flanged	W 22	1311111	W 29	
SS25Z00	Flat	Ø 25	13mm	Ø 32	
SS25Z01	Flanged	W 25	1311111	W 32	
SS32Z00	Flat	Ø 32	13mm	Ø 39	
SS32Z01	Flanged	W 32	1311111	W 39	
SS40Z00	Flat	Ø 40	20mm	Ø 49	
SS40Z01	Flanged	W 40	20111111	W 49	

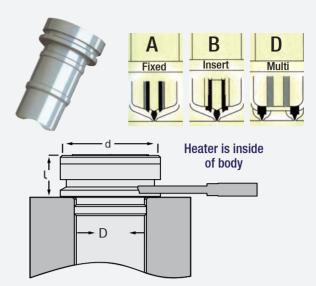
Order Code	d1	d2	l1	Wattage
SS22Z00	Ø 39	Ø 4E	19.8	-
SS22Z01		Ø 65	19.0	150 Watt
SS25Z00	Ø 39	Ø 65	19.8	-
SS25Z01	W 39	W 03	19.0	175 Watt
SS32Z00	Q 1/	Ø 72	19.8	-
SS32Z01	Ø 46	W 12	19.8	225 Watt
SS40Z00	α Γ /	Ø 72	24.0	-
SS40Z01	Ø 56	W 12	26.8	290 Watt

Page Injection Moulds





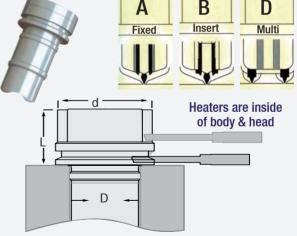
Hot Runner Main / Single Nozzle



The Sealing Plug of the Hot Runner Nozzles are cancelled and the thickness of the Nozzle Head are decreased in the operations of general plastic injection (PP, POM, ABS, PE, HDPE, PS etc.).
The "ASM" type Main / Single Nozzles are produced for the "SM" & "SSM" Series Nozzles.

Order Code	D	ι	d
ASM18	Ø 18		Ø 25
ASM22	Ø 22		Ø 29
ASM25	Ø 25		Ø 32
ASM32	Ø 32	15 mm	Ø 39
ASSM22	Ø 22		Ø 27
ASSM25	Ø 25		Ø 30
ASSM32	Ø 32		Ø 27

Hot Runner Main / Single Nozzle with Head Heater



The heat controller of the Hot Runner Nozzle is supplied with 2 pieces of Thermocouples. Hot Runner Nozzles with Head Heater are produced for the "SM" & "SMM" Series Nozzles. This type should be use with following plastic raw materials; PC, PA, PBT, PET, PVC and PBBT.

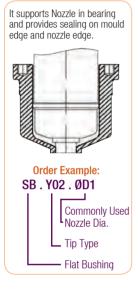
Order Code	D	ι	d	Wattage
ASMR25	25	25	31	150
ASMR32	32	25	38	175
ASMR40	40	30	48	200
ASMMR16	28	30	39	175
ASMMR22	35	30	46	200
ASMMR28	41	30	52	225
ASMMR34	47	30	58	225

Standard Nozzle Outer Bushing



Outer Bushings are used as aid components for additional cooling of Hot Runner Nozzle or for installing our standard products to the incorrectly produced Nozzle slots.

Flat Bushings

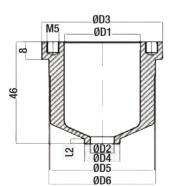


Bushings with Cooling Channel

With o-ring and cooling channels. They provide perfect solutions for cosmetic surfaces.



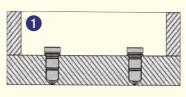
Order Example:
SCB . Y02 . ØD1
Commonly Used
Nozzle Dia.
Tip Type
Cooling Bushing



Material: 1.2344 Hardness: 52 HRC

Order Code	D1	D3	D4	ι2	Cooling
SBY02	25	44	13	2	None
SCBY02	25	44	13	2	Available
SBY02	22	51	15	2.2	None
SCBY02	32	51		2.2	Available
SBY02	40	59	19	2.5	None
SCBY02	40		19	∠.5	Available

Hot Runner System Assembly Process



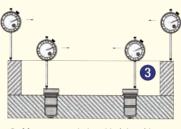
1- Check the nozzle cavities if they are in specified tolerances or not.



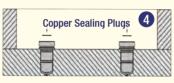




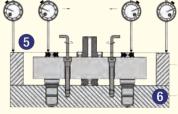
- **2-** Place the nozzle using rubber hammer without sealing plug in balance.
- * Do not use iron or steel tools to place the nozzle into cavity. Do not place nozzle crooked and prevent winding.



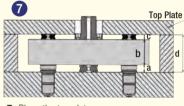
3- Measure nozzle head height with dial gauge and zeroing.



4- Place the copper sealing plugs in the channel top of the nozzles.

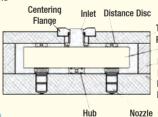


- **5-** Place the manifold and bridge / wedge plates.
- **6-** Tighten manifold fixing screws, slowly and simultaneously by controlling manifold corners.



- **7-** Place the top plate.
- * For sealing; a + b + c > d sealing can be performed in necessary places.

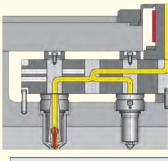
Assembly Drawing



Disc

Top
Plate
-Manifold
Bridge / Wedge
Plate
Nozzle / Cavity
Plate







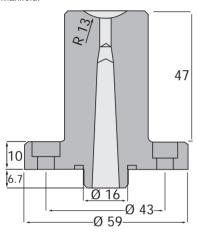
Fittings used in Hot Runner Systems: Inlet, Stopping Disc, Hub Disc & Extractor Tool for Nozzle



Manifold Inlet

Code: SA

Inlet is the first element that provides the start of distribution of melt raw material into Manifold.

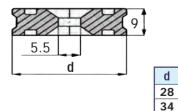




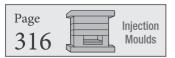


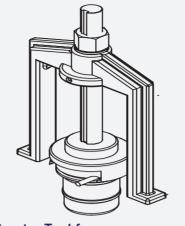
Stopping Disc

Code: SD03







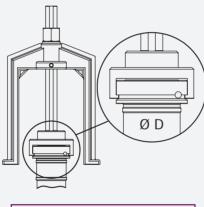


Extractor Tool for Hot Runner Nozzle

Code: MCA

In extractor process of Hot Runner Nozzles from mould plate, it is used in extractor / dismantle processes not to damage Hot Runner Nozzles.

D: 18 - 22 - 25 - 32 - 40

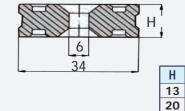






Hub Disc

Code: SD02







For necessary information; please refer to **page-299**.

Heaters (wattage)
200
225
250
290
350
400
470
620

Mantle Thermocouple

Code: MT015

In Valve Gate System Hot Runner Nozzles. It is a Thermocouple providing to make precision temperature from body.

Note: "d1" and " \(\bar{L} \)" dimensions can be produced as per request.

Order Code	d1	ι
MT01580	a	80
MT015100	0 1.5	100
MT015120	111111	120





Valve Gate Hot Runners

High Quantities, Short Cycle Times & High-Class Gate Quality



Medical / Pharmaceutical









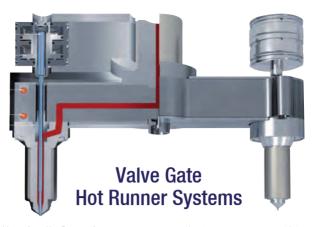
Engineered Parts



Cosmetics / Personal Care



- * High-class gate appearance.
- * Minimum pressure drop.
- * Large gate diameter.
- * Minimum abrasion in long operating hours.
- * Short cycle times.
- * Optimal temperature control.



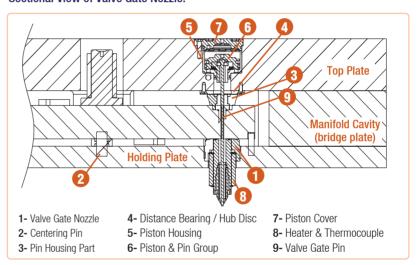
Manifold:

- * Sealing not affected from temperature.
- * Leakproof.
- * Naturally balanced material flow.
- * No stagnation areas.
- * Suitable for colour changes.
- * Hardened manifold block.

Valve Gate Hot Runner Systems are new generation hot runner systems which are used when classic hot runner systems cannot meet parameters such as quality, continuity and production volume. Its provide production to be done lower pressure without wearing injection machine. Mould-makers also prefer Valve Gate Systems to get better surface / gating on moulded parts and preferred for products to be used with engineering plastics. Valve Gate assembled moulds able to reduce cycle times with better product quality and productivity.

If you need even one of the parameters mentioned above for any product and classic hot runner system cannot meet expectations, the injection mould should be designed with Valve Gate Hot Runner System.

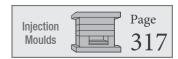
Sectional View of Valve Gate Nozzle:



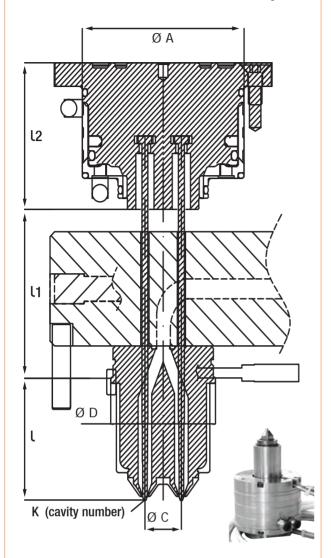
Key Features of Valve Gate System at the Start of Production:

- * The gate is opened and closed by applying air pressure to the valve piston using a solenoid valve which is controlled by signals from the injection
- ★ Gate Open before the start of the injection operation the valve piston is operated to the open position, and is held open until the injection operation has been completed.
- * Gate Close after the completion of the injection operation the valve piston position is reversed to close the gate by applying air pressure to the close side of the piston.
- ★ The air pressure must be maintained in this reversed direction on the valve piston to ensure that the gate is properly closed, and held in this position until the next gate open signal is given by the injection machine.
- ★ Required minimum air pressure in order to operate Valve Gate Nozzle Piston is 6.0 bar. You should control air pressure in your system and use Air Booster if it is not sufficient.

- * Additional lubrication is required for the Valve Gate Nozzle Piston if the air supply is generated "oil-free". You can do this lubrication from couplings or air hoses additionally.
- * If you mount air hoses which will provide motion for the piston so as to contact with mould top plate, you should prefer a hose which may operate with high heat.
- ★ Before operating your nozzle, ensure that temperatures in Hot Runner Temperature Controller device reach to values set in regime and wait for 15-20 minutes before starting injection in these conditions.
- * If you move piston before plastic raw material in hot runner nozzle melts completely, you may tense and force piston or cause breaking of pin. Make temperature adjustments delicately and consider waiting duration.



"MVG-M1" Manifold Valve Gate - Multi Hot Runner System

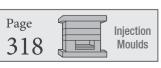


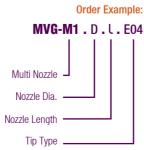
"MVG-M1" Manifold Valve Gate - Multi Hot Runner System:

If mould planned to injection with multi hot runner nozzles, also if mould parameters are get over of our open gate multi hot runner nozzles (cavity dimensions, colour change, engineering raw materials and cavity quantity for each hot runner nozzle etc.), you can use Multi Valve Gate Hot Runner Systems on your moulds.

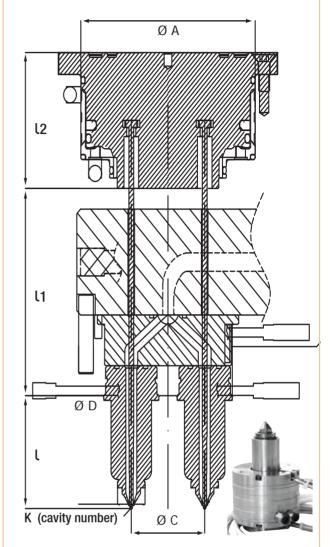
Code	Ø D	ι	ØС	K	เา	L2	ØA
MVG-M1	46-70	49-109	16-40	2-8	67.8	50-55	72-96

- * "L1" length depends on the manifold thickness.
- * Bigger axis diameters (C) increase cavity number (K).
- Please check the next page for Nozzle Tip selection.





"MVG-M2" Manifold Valve Gate - Multi Hot Runner System

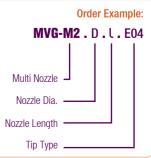


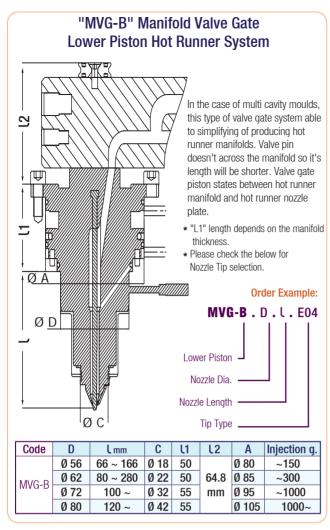
"MVG-M2" Manifold Valve Gate - Multi Hot Runner System:

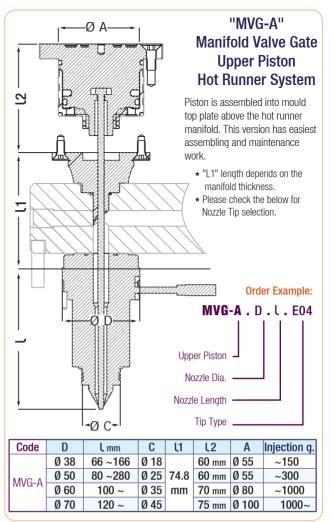
If mould planned to injection with multi hot runner nozzles, also if mould parameters are get over of our open gate multi hot runner nozzles (cavity dimensions, colour change, engineering raw materials and cavity quantity for each hot runner nozzle etc.), you can use Multi Valve Gate Hot Runner Systems on your moulds.

Code	Ø D	ι	ØС	K	l1	L2	Ø A
MVG-M2	15 - 32	49-109	40 - 80	2-8	89.8	55-65	95-135

- "L1" length depends on the manifold thickness.
- * Bigger axis diameters (C) increase cavity number (K).
- ★ Please check the next page for Nozzle Tip selection.

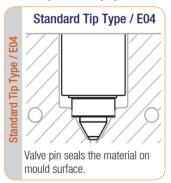


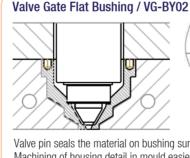


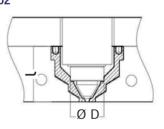


Tip / Bushing Types for "MVG" Valve Gate Nozzles:

* Bushings are changing the nozzle tip type on valve gate applications. All bushings are suitable for the nozzles with same diameter.





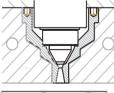


For MVG-A		
Code	Ø D	ι
	18	
VG-BY02	25	40
VG-D102	35	mm
	4 =	
	45	
For MVG-B	10	
For MVG-B Code	10	ι
For MVG-B Code	3:	l
Code	8: Ø D	L 40
	Ø D 18	L 40 mm

For MIVIC A.

Valve pin seals the material on bushing surface. Machining of housing detail in mould easier.

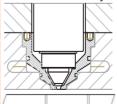
Valve Gate Internal Shear Bushing / VG-BY03



If hot runner nozzle feeds the cold runner channel or due to the part geometry if nozzle can't be reach to part surface then Internal Shear Bushing must be used for succeeding the application. This type bushing leaves conical runner / gate mark on the surface.

	For MVG-A	For MVG-A:			For MVG-B:			
19 19	Code	Ø D	ι	Code	Ø D	ι		
	1	18			18			
	VG-BY03	25	50	VG-BY03	22	50		
Q D	VG-D103	35	mm	VG-D103	32	mm		
)	45			42			

Valve Gate Cooling Bushing / VGC-BY03



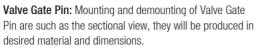
If additional cooling is necessary around the hot runner nozzle, Cooling Bushings are the solution and should be used for cosmetic. transparent and optical parts.

				For MVG-B:			
	Code	Ø D	ι	Code	Ø D	ι	
V	GC-BY03	18 25 35 45	40 mm	VGC-BY03	18 22 32 42	40 mm	



Valve Gate Pin & Bushing (custom-made production) Code: VGP





Valve Gate Pin Bushing: The seconds Bushing in nozzle is to avoid expansion and bending of movable pin under load and heat. It can be change by demounting. As per request in order, technical drawing or sample is required.

The products will be produced in precision and faithfully.

Valve Gate Pin - Order Example:



Screw

Assembly Steps

Navel Disc

Assembly Process of Valve Gate Systems

Thermocouple

Inlet Band Heater

Manifold

Valve Gate Pin

Piston Cover

Piston Group

Disc

Disc

Nozzle

Ceramic Connector

Distance Bearing

Distance

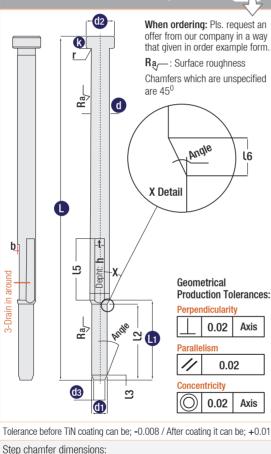
Holding Plate:

Centering Pin

- * Insert the hot runner nozzles to the cavities / housings same axis with centering pin. Put the copper sealing plugs.
- * Put the manifold with centering pins secondly, tight manifold screws well-balancedly.
- * Insert the pin housing and distance disc into the manifold from upper side.

Top / Mould Cover Plate:

- * Tighten the distance bearing disc.
- * Put the manifold bridge plate (cavity plate) with taking care of hot runner systems heater and thermocouple wires.
- * Center the cover plate with pins, put on to bridge plate and tighten the screws.
- * Insert piston housing parts.
- * Insert piston-pin group into housing.
- * Close the piston with cover part, tighten the
- * Check the movement of valve pins by air pressure before starting production.
- * Lay the mould in a way that nozzle tips can be seen, insert thermocouples and heaters in to their place and secure with retaining ring that given.
- * While making plug connection, external thermocouple wires in hot runner nozzles will be used, their own thermocouple wires of heater will be left idle.



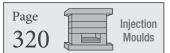
Groove slotted machining dimensions:

Material / Hardness: 1.2344 or HSS

TiN coating area & its length:

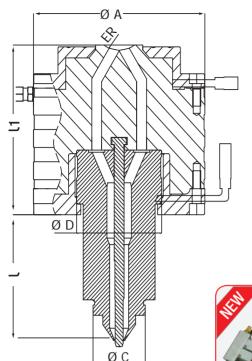
General tolerance values ±:

Full length & tolerance:



Quantity:

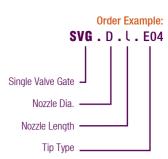
Important: For precision production of Valve Gate Pin, sending the previous existing pin or bushing sample offers good production.



"SVG" Single Valve Gate Hot Runner System

This range of Valve Gate Systems are able to inject single cavity large mould parts with a clean surface. Single Valve Gate Nozzles cut out the leakage and reduce the injection pressures. Our Single Valve Gate Nozzle's Pin can active both pneumatic and hydraulics power.

* Please check the below for Nozzle Tip selection.



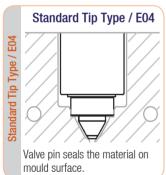
Code	D	L mm	С	l1	ER	Α	Injection g.
	Ø 42	60 ~180	Ø 22	84 mm	15 mm	Ø 90	~300
SVG	Ø 52	70 ~	Ø 32	94 mm	15 mm	Ø 105	~1000
	Ø 62	90 ~	Ø 42	104 mm	15 mm	Ø 120	1000~

Prewired Valve Gate Systems

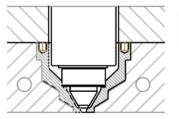
It provides all advantages of common valve gate hot runner systems and Prewired Systems which are delivered pre-mounted provide saving on time by shortening mould assembly time. Since system is delivered as mounted, all kinds of hot runner problems are under warranty of our company. System can be operated sequentially thanks to external valve of each nozzle mounted on the system. In case that it is stated during ordering stage, Valve Gate Hot Runner Systems are produced as hydraulic or pneumatic according to working fields. Please contact Guvenal for details.

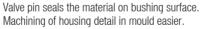
Tip / Bushing Types for "SVG" Valve Gate Nozzles:

* Bushings are changing the nozzle tip type on valve gate applications. All bushings are suitable for the nozzles with same diameter.



Valve Gate Flat Bushing / VG-BY02

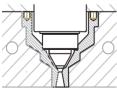




For SVG:

Code	Ø D	ι
	18	
VG-BY02	22	40
VG-D102	32	mm
	42	

Valve Gate Internal Shear Bushing / VG-BY03



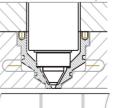
ØD

If hot runner nozzle feeds the cold runner channel or due to the part geometry if nozzle can't be reach to part surface then Internal Shear Bushing must be used for succeeding the application. This type bushing leaves conical runner / gate mark on the surface.

For SVG:

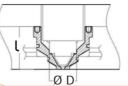
Code	Ø D	l
	18	
VIC DVO2	22	50
VG-BY03	32	mm
	12	

Valve Gate Cooling Bushing / VGC-BY03



If additional cooling is necessary around the hot runner nozzle, Cooling Bushings are the solution and should be used for cosmetic, transparent and optical parts.

For SVG:



Code	Ø D	l
	18	
VGC-BY03	22	40
VGC-D103	32	mm
	42	

Injection Mould Cooling Components



Quick-release Couplings Series: 590

Fields of Usage: It is used in cooling systems of plastic, zinc - aluminium diecasting moulds and steam lines - hot oil circuits, water, washing & cooling systems of machines.

Material Info:

Body & Cover Valve = Brass / O-Ring = Viton **Spring - Ring & Ball = Stainless / Coupling Fitting = Brass** Operating Pressure = 0 - 15 bar / Flow Capacity = 9 mm Operating Temperature = $-5 / +180^{\circ}$



Valved: Controlled water flow is provided. When fitting is removed, water flow is closed in coupling.

O I FOOLC (See section)

Non-valved: When fitting is removed, open circuit.

Injection Mould Cooling Components / Systems:

Cooling of Moulds; for providing suitable cooling, features of moulded material, material shape, mould structure and quantity of heat to be transfered should be known. In cooling with water, cooling channels should not be very close to mould surface. Otherwise, temperature changes can cause thermal shocks on mould surface. Cooling channels should not be so far from mould surface, because in this case, heat transfer should not be provided sufficiently.

Cooling channels may be created 2/3 times far of mould plate channel diameters. Water flowing should be provided to keep mould in certain temperature.

Effect of Cooling Time on Mould:

Injection Errors:

Tensile - Distortion Sinking - Fragility Cracking - Shrinkage Visible Ejector Traces Tension Whitening.

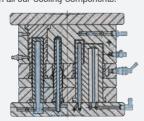
Solution Methods:

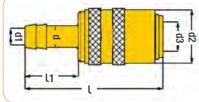
Cooling period should be increased and cooling system / channels should be controlled.

Quick-release Couplings:

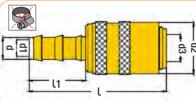
Quick-release Couplings and fittings compatible with mould cooling systems and injection machines are commonly used in plastic - metal injection moulds. To use in water - air and oil flowing, different types are available and when desired mounting / demounting facilities on mould, Quick-release Couplings should be used.

For accurate and efficient cooling in mould cooling system, to choose Couplig / Fitting System to be most suitable to the temperature of your mould and mounting area in the correct way is important. Wide options related to this systems are presented at following pages. We have custom-made production service in all our Cooling Components.

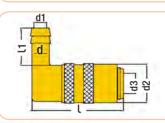




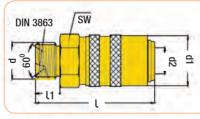
Quick-release	Code:	590l	1G	(no	n-val	ved)
Coupling	Code:	590H	HGB		(val	ved)
Order Example	d	d1	d2	d3	ι	เา
Code x 10	10	7.5	23	12	EΩ	23
Code x 13	13	10		13	59	23



	Telease	Code:	2901	-u	(no	n-vai	vea)
Coupli	ng	Code:	590F	GB		(val	ved)
ੇ Order	Example	d	d1	d2	d3	ι	เา
Cod	de x 10	10	7.5	23	12	<i>4 1</i>	20
Cod	de x 13	13	10		13	04	28

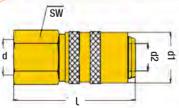


Quick-release	Code:	590L	.G	(nor	ı-val	ved)
Coupling / 90 ⁰	Code:	590L	.GB		(val	ved)
Order Example	d	d1	d2	d3	ι	เป
Code x 10	10	7.5	22	12	52	20
Code x 13			13	52	29	



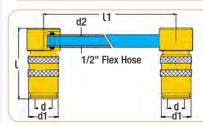
Quick-release	Code: 59	90E	G	(nor	ı-valı	/ed)
Coupling / Male	Code: 5	90E	GB		(valv	/ed)
Order Example	d	d1	d2	ι	เา	SW
Code x 13	BSP 1/4"		13	52		
Code x 17	BSP 3/8"	22			9	21
Code x 21	BSP 1/2"	23				21
Code x 16M	M16x1.5				10	

Code: 590DG (non-valved)



	Coupling / Fema	ale Code:	590D	GB	` (\	/alved)
	Order Example	d	d1	d2	ι	SW
í	Code x 13	BSP 1/4"		13		21
ŧ.	Code x 17	BSP 3/8"	23		52	21
	Code x 21	BSP 1/2"	23	13	52	24
	Code x 16M	M16x1.5				21

Quick-release



Diverting	Code:	590	KG (r	non-valv	/ed)
Coupling Bridge	Code:	ode: 590KGB		(valved)	
0.1.5.1		14	10		1.4

Order Example	d	d1	d2	ι	เ1
Code x 125					125
Code x 250	13	23	10x1	52	250
Code x 500					500

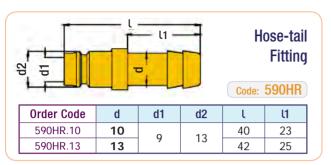


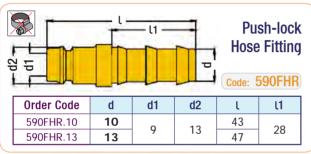
Fittings

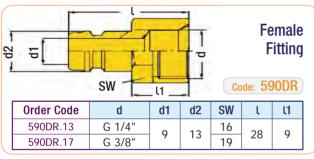
Series: 590

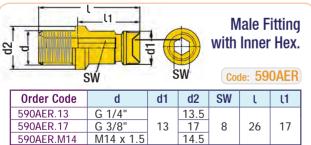
Compatible with Series-590 Quick-release Couplings

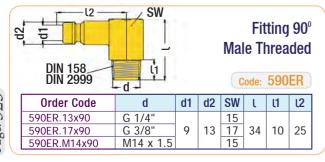
Material = Brass Operating Pressure = 0 - 15 bar Flow Capacity = 9 mm Operating Temperature = -5 / +180°





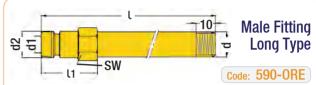








Order Code	d	d1	d2	SW	ι	เา
590-ORE.10	G 1/8"			14		
590-ORE.13	G 1/4"			14		
590-ORE.17	G 3/8"			17		
590-ORE.21	G 1/2"			21		
590-ORE.M8	M8 x 1.25	9	13		29	10
590-ORE.10.1	M10 x 1.5	9	13	14	29	10
590-ORE.M10	M10 x 1.0			14		
590-ORE.M12	M12 x 1.75					
590-ORE.M14	M14 x 1.5			21		
590-ORE.M16	M16 x 1.5			21		



Note: Our custom-made production is available as per request.

Order Code	d	d1	d2	SW	ι	l1
590-ORE.M8.60					60	
590-ORE.M8.80					80	
590-ORE.M8.100	M8 x 1.25	9	13	14	100	20
590-ORE.M8.120	IVIO X 1.25	9	13	14	120	20
590-ORE.M8.150					150	
590-ORE.M8.200					200	
590-ORE.M10.60					60	
590-ORE.M10.80					80	
590-ORE.M10.100	M10 x 1.5	0	12	14	100	20
590-ORE.M10.120	IVITU X 1.5	9	9 13	14	4 120	20
590-ORE.M10.150					150	
590-ORE.M10.200				200		
590-ORE.M12.60					60	
590-ORE.M12.80	M12 x 1.75				80	
590-ORE.M12.100		9 13	14	100	20	
590-ORE.M12.120	IVI I Z X 1./5	9	9 13	5 14	120	20
590-ORE.M12.150					150	
590-ORE.M12.200					200	
590-ORE.10.60					60	
590-ORE.10.80					80	
590-ORE.10.100	G 1/8"	9	12	13 14	100	20
590-ORE.10.120	G 1/8	9	13		120	20
590-ORE.10.150					150	
590-ORE.10.200					200	
590-ORE.13.60					60	
590-ORE.13.80					80	
590-ORE.13.100	G 1/4"	9	12	11	100	20
590-ORE.13.120	G 1/4	9	13 14	120	20	
590-ORE.13.150					150	
590-ORE.13.200					200	



Quick-release Couplings & Fittings for Large Moulds



Material Info:

Body & Cover Valve = Brass

0-Ring = NBR

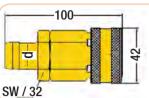
Spring - Ring & Ball = Stainless

Coupling Fitting = Brass

Operating Pressure = 0 - 35 bar / Flow Capacity = NW19

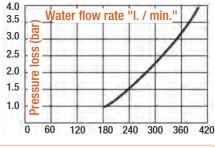
Operating Temperature = -20 / +1000

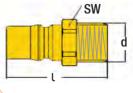




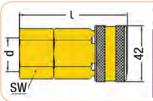
Quick-release	Code:	571HG
Coupling	5 7 1H	GB (valved)
Order Example	a e	d

	THOSE (
Order Example	d
Code x 16	16 mm - 5/8"
Code x 19	19 mm - 3/4"
Code x 25	25 mm - 1"

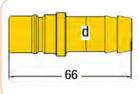




Male Fitting	Code:	57 1	IER)
Order Code	d (BSP)	ι	SW
571ER.26	3/4"	54	30
571ER.33	1"	57	36



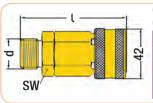
Quick-releas Coupling / Fe	57	1EG	
Order Code	d (BSP)	ι	SW
571EG.21	1/2"	79	32
571EG.26	3/4"	81	32
571EG.33	1"	83	36
571EG.42	1 1/4"	85	46



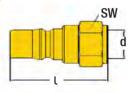
Hose-tail Fitting	Code: 571HR
Order Code	d

571ER.42 | 1 1/4" | 60 | 45

Order Code	d
571HR.16	16 mm - 5/8"
571HR.19	19 mm - 3/4"
571HR.25	25 mm - 1"



Quick-releas Coupling / M	57	1DG	
Order Code	d (BSP)	ι	SW
571DG.21	1/2"	80	32
571DG.26	3/4"	81	32
571DG.33	1"	81	40
571DG.42	1 1/4"	83	50



Series: **620**

remale Fitting	Code:	57 1	DR
Order Code	d (BSP)	ι	SW
571DR.26	3/4"	51	32

54 40

571DR.33

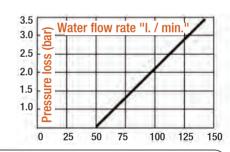
571DR.42

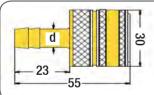


Coupling Fitting = Brass

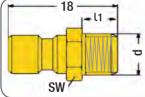
Operating Pressure = 0 - 15 bar / Flow Capacity = NW13

Operating Temperature = $-20 / +100^{\circ}$





Coupling	Code: 620HG
Order Code	d
620HG.09	9 mm
620HG.13	13 mm
620HG.16	16 mm
620HG.19	19 mm

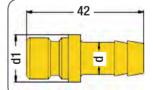


Male Fitting	Code:	62	OER)
Order Code	d (BSP)	เา	SW
620ER.13	1/4"	9	19
620ER.17	3/8"	9	19
620ER.21	1/2"	12	22
620ER.26	3/4"	14	30
620ER.33	1"	15	34

			ι –	_	
f	Ø		\otimes		
d1	8	8			9
1		8			Ц

Quick-release	Code:	620DGB
Coupling / Fem	ale, Va	llved

ocupinity / Tomato, Fairou						
Order Code	d (BSP)	ι	d1			
620DGB.26	3/4"	45	30			

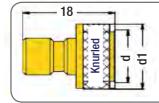


Hose-tail Fitting Code: 620HR						
Order Code	d	d1				
620HR.09	9 mm	19				
620HR.13	13 mm	19				
620HR.16	16 mm	19				
620HR.19	19 mm	23				

-	— t	_	7
- tp -	COCCOMMO		P P I

Quick-release	Code:	620DG
Coupling / Fema	le, Nor	n-valved

Order Code	d (BSP)	ι	d1
620DG.26	3/4"	30	30



Knurled Female Fitting 620DR					
Order Code	d (BSP)	d1			
620DR.13	1/4"	19			
620DR.17	3/8"	19			
620DR.21	1/2"	24			
620DR.M22	M22x1	25			
620DR.26	3/4"	30			



Quick-release Couplings & Fittings with Colour Ring Series: 600

Colour Rings: In order to prevent confusion of lines (hot / cold) during usage.

Fields of Usage: It is used in cooling systems of plastic, zinc - aluminium diecasting moulds and water, washing - cooling systems of machines.

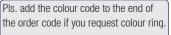
Material Info:

Body & Cover = Nickel Plated Brass / **0-Ring** = NBR

Spring - Ring & Ball = Stainless / Coupling Fitting = Nickel Plated Brass

Operating Pressure = 0 - 10 bar / Flow Capacity = 8 mm

Operating Temperature = -20 / +900



Cold → Blue = B $Hot \rightarrow Red = \mathbf{R}$

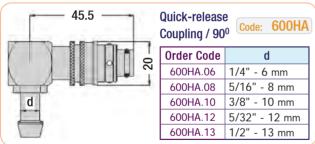
Order Example:

"600HG.10.B" or "600HG.10.R"

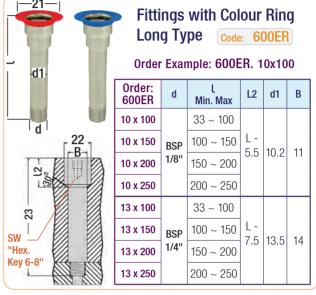


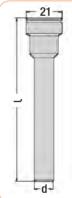












ι

31

33

24

31

33

24

31 31

31

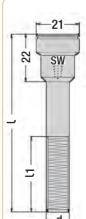
31

Extension Fitting with Colour Ring

non-threaded

Code:	6	0	0	B	U	

Order Code	d	ι	В	SW
600BU.10.50		50		
600BU.10.100	10.2	100	11	6
600BU.10.150		150	11	0
600BU.10.200		200		
600BU.13.50		50		
600BU.13.100		100		
600BU.13.150	13.5	150	14	8
600BU.13.200		200		
600BU.13.250		250		



Extension Fitting with Colour Ring

threaded

Code: 600UR

d	Order Code	d	l	l1	SW
	600UR.10.50	BSPT 1/8"	50	26	
	600UR.10.100		100	60	6
	600UR.10.150		150	60	
	600UR.13.50	BSPT 1/4"	50	27	
	600UR.13.100		100	60	8
	600UR.13.150		150	60	0
	600UR.13.200		200	60	







601DG







Body = Brass / Cover Valve = 420 Stainless **O-Ring** = Viton / Coupling Fitting = Brass

Fields of Usage: It is used in cooling systems of plastic,

zinc - aluminium diecasting moulds and steam lines - hot oil circuits, water, washing & cooling systems of machines.

Spring - Ring & Ball = Stainless

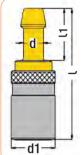
Operating Pressure = 16 bar / Flow Capacity = 6 -9-10-12-16 mm

Quick-release Couplings & Fittings (Precise & Tight Coupler)

Male Fitting

Operating Temperature = -10 / +1800

Note: Our custom-made production is available as per request.

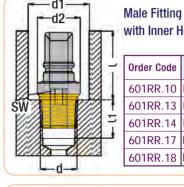


601HG

Quick-release	Code:	601H	G (nor	ı-valved)
Coupling	Code:	601H	GB	(valved)
Order Example	d	d1	ι	l1
Code x 08	08	19	60	23
Code x 12	12	25	69.5	28
Code x 13	13	31	82	28
Code x 14	16	31	82	28
Code x 16	16	32	109	28
Code x 19	19	38	114	33

004110

Code: 601FG (non-valved)



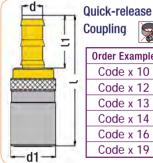
with Inner Hex.						
Order Code	d	d1	d2	ι	l1	
601RR.10	BSPT 1/8"	20	10	26	9	
601RR.13	BSPT 1/4"	20	14	27	12	
601RR.14	BSPT 1/4"	26	14	26	12	
601RR.17	BSPT 3/8"	26	17	28	13	
601RR.18	BSPT 3/8"	33	18	31	13	

Series: 601

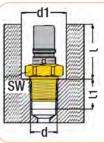
Code: 601RR

Code: 601TR

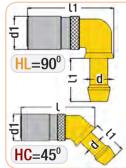
Code: 601RRB



(Coupling	Code:	601FG	iB	(valved)
	Order Example	d	d1	ι	l1
	Code x 10	10	19	60	24
	Code x 12	10	25	69.5	24
	Code x 13	13	25	69.5	28
	Code x 14	13	31	92	38
	Code x 16	16	38	109	38
	Code x 19	19	38	109	38



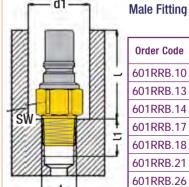
•		601RR			
Order Code	d	d1	ι	Į1	SW
601TR.17	NPT 3/8"	36	29	11	24
601RR.21	BSPT 1/2"	33	29	15	22
601TR.22	NPT 1/2"	33	29	15	22
601RR.26	BSPT 3/4"	40	47	19	27



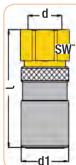
Code: 601HL	or 60	1HC	(non-v	alved)
Code: 601HL	B or 6	01HC	B (v:	alved)
Order Example	d	d1	l	lı
	00	40	F0	00

Quick-release Coupling / 900 & 450

Order Example	d	d1	ι	l1
HL or HLB x 08	08	19	59	23
HL or HLB x 10	10	25	60	28
HL or HLB x 12	12	25	65	28
HL or HLB x 16	16	31	82	28
HL or HLB x 19	19	38	132	60
HC or HCB x 08	08	19	59	23



Order Code	d	d1	ι	l1	SW
601RRB.10	BSPT 1/8"	26	33	9	17
601RRB.13	BSPT 1/4"	26	33	12	17
601RRB.14	BSPT 1/4"	29	38.5	12	19
601RRB.17	BSPT 3/8"	29	38.5	13	20
601RRB.18	BSPT 3/8"	36	46.5	13	24
601RRB.21	BSPT 1/2"	36	46.5	15	24
601RRB.26	BSPT 3/4"	46	67	16	32



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Quick-release Coupling / Female

Code: 601DG or 601NG (non-valved)

Code: 601DGB or 601NGB (valved)

Order Example	d	d1	ι	SW
DG or DGB x 13	BSP 1/4"	19	46	17
DG or DGB x 17	BSP 3/8"	25	53	22
DG or DGB x 21	BSP 1/2"	31	67	27
NG or NGB x 21	NPT 1/2"	31	67	27
DG or DGB x 26	BSP 3/4"	38	90	35
NG or NGB x 26	NPT 3/4"	38	90	35









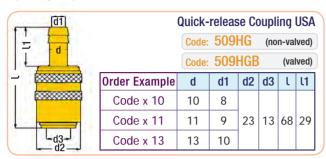
Quick-release Couplings USA System

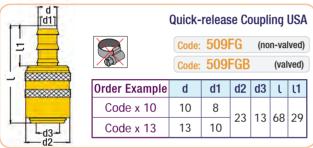
Fields of Usage: It is used in cooling systems of plastic, zinc - aluminium diecasting moulds and steam lines - hot oil circuits, water, washing & cooling systems of machines.

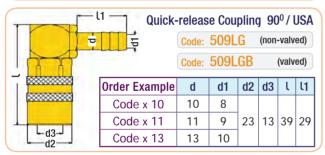
Material Info:

Body & Cover Valve = Brass / O-Ring = Viton
Spring - Ring & Ball = Stainless / Coupling Fitting = Brass
Operating Pressure = 0 - 15 bar / Flow Capacity = 9 mm

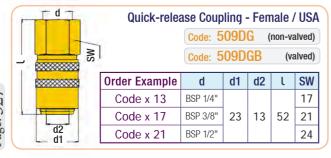
Operating Temperature = -5 / +1800











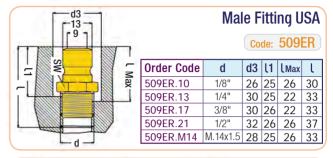


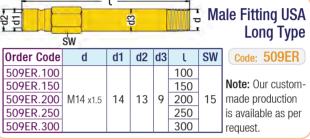


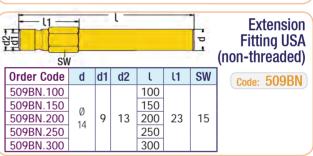
Valved: Controlled water flow is provided. When fitting is removed, water flow is closed in coupling.

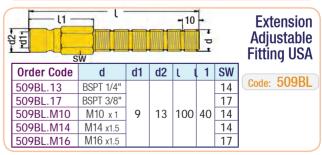
Series: 509

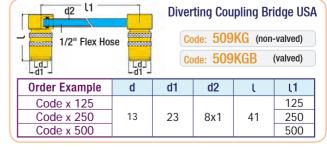
Non-valved: When fitting is removed, open circuit.











Multi Coupling Plate Systems for Injection Moulds



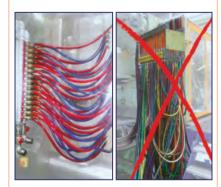


Please contact our company for technical details and information of products.

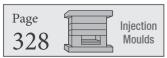
They are used in Injection Mould Cooling Systems. These complicated sets prevent faulty and incorrect fastening and arrange complicated fastening system. It reduces mould changing time minimum and enables simple / easy fastening.

Our systems provide from 3 inlets - 3 outlets up to 12 inlets - 12 outlets according to the requirement of users. Your Guvenal support assistant will assist you in order formation.

High quality Viton O-rings are used in our products. They can be operated at "10 Bar" & 180 $^{\circ}$ C.



With **Multi Coupling Plate System**, undesired miscibility on machine and mould can be avoided.

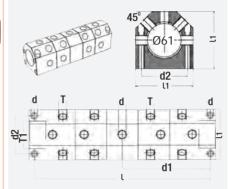




Manifold Blocks Code: AK1017 for Injection Mould Cooling Systems

Distribution of injection mould cooling water, inlet and outlet regulation system.

Material: Aluminium + Eloxal Coating



Manifold (distribution) Blocks:

with 1/4" - 3/8" quick-release coupling.

Order Code	ι	t1	d	d1	d2
AK1017.3310	172			86	43.4
AK1017.3320	236		7	118	
AK1017.3330	300	55		150	
AK1017.3340	364			182	

T	T1	Inlet qty.	Outlet qty.
1/4"		5	5
1/4" or	1"	10	10
3/8"	i i	15	15
		20	20

Please specify the "T" dimension when ordering, specify the selection "T" at the end of order code.

Order Example: AK10173320. 1/4

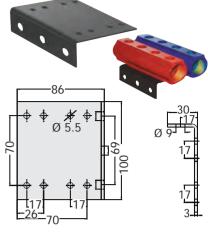
Manifold (distribution) Blocks:

with 1/2" quick-release coupling.

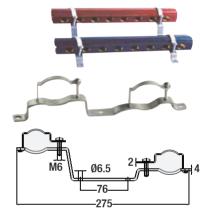
Order Code	l	l1	d	d1	d2
AK1017.4210	191			95.5	
AK1017.4220	267	80	9	133.5	62.5
AK1017.4230	343			171	

T		T1	Inlet qty.	Outlet qty.
			5	5
1/2"		1" 1/4	10	10
			15	15

Connector Plate Code: DK80 for Manifold Block



Clamp Code: DK275 for Manifold Block



Mounting System & Fasteners:

- 1 When ordering, specify desired colour.
- **2 -** Select your Manifold (distribution) Block type from the table next.
- **3 -** Determine fastening type for position of mould mounting (Connector Plate or Clamp).
- **4 -** Specify the "T" dimension when ordering, specify the selection "T" at the end of order code.
- **5 -** Complete Manifold (distribution) Block selected with Ball Valve (1") and Detent Plug (1").
- **6** As per request; Hose diameter & lengths can be specified and also order can be completed with other sealing products.

Mini Ball Valve

Order	Thread
KKV.13	1/4"
KKV.21	1/2"
KKV.26	3/4"
KKV.33	1"

Detent Plug	l
A FLE	

Order	Thread
OKS.13	1/4"
OKS.17	3/8"
OKS.21	1/2"
OKS.33	1"



Extra Long Drill

Code: MG

GT100 type & for cooling channels

It is a long chip channel drill bit having great helix angle than normal.

Especially, "10XD" perforation machining is provided on the deep surfaces. Due to its helix structure, it works comfortably and does not sticking into the middle hardened steel and aluminium materials by evacuating chip outside during drilling.

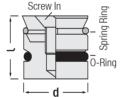


		Co	de: MG
Order Code	Ø D	ι	เา
MG35.165		165 mm	115 mm
MG35.210	3.5 mm	210 mm	145 mm
MG35.265		265 mm	180 mm
MG04.175		175 mm	120 mm
MG04.220	4 mm	220 mm	150 mm
MG04.280		280 mm	190 mm
MG05.198		198 mm	135 mm

MG04.175		175 mm	120 mm
MG04.220	4 mm	220 mm	150 mm
MG04.280		280 mm	190 mm
MG05.198		198 mm	135 mm
MG05.245	5 mm	245 mm	170 mm
MG05.315		315 mm	210 mm
MG55.205		205 mm	140 mm
MG55.260	5.5 mm	260 mm	180 mm
MG55.330		330 mm	225 mm
MG06.205		205 mm	140 mm
MG06.260	6 mm	260 mm	180 mm
MG06.330		330 mm	225 mm
MG65.215		215 mm	150 mm
MG65.275	6.5 mm	275 mm	190 mm
MG65.350		350 mm	235 mm
MG07.225		225 mm	155 mm
MG07.290	7 mm	290 mm	200 mm
MG07.370		370 mm	250 mm
MG75.225		225 mm	155 mm
MG75.290	7.5 mm	290 mm	200 mm
MG75.370		370 mm	250 mm
MG08.240		240 mm	165 mm
MG08.305	8 mm	305 mm	210 mm
MG08.390		390 mm	265 mm
MG85.240		240 mm	165 mm
MG85.305	8.5 mm	305 mm	210 mm
MG85.390		390 mm	265 mm

Order Code	Ø D	ι	เา
MG10.265		265 mm	185 mm
MG10.340	10 mm	340 mm	235 mm
MG10.430		430 mm	295 mm
MG105.265		265 mm	185 mm
MG105.340	10.5 mm	340 mm	235 mm
MG105.430		430 mm	295 mm
MG11.280		280 mm	195 mm
MG11.365	11 mm	365 mm	250 mm
MG11.455		455 mm	310 mm
MG115.280		280 mm	195 mm
MG115.365	11.5 mm	365 mm	250 mm
MG115.455		455 mm	310 mm
MG12.295		295 mm	205 mm
MG12.375	12 mm	375 mm	260 mm
MG12.480		480 mm	330 mm
MG125.295		295 mm	205 mm
MG125.375	12.5 mm	375 mm	260 mm
MG125.480		480 mm	330 mm
MG13.295		295 mm	205 mm
MG13.375	13 mm	375 mm	260 mm
MG13.480		480 mm	330 mm





Detent Plug with 0-Ring

It is adjusted fixing plug in order to use canceling (inactive) of unwanted holes in cooling channel of injection moulds or to direct flow motions of cooling water.



Mounting Information:

The diameter of cooling channel should be at least 0.1 mm larger than "GCP product". Any machining (threading etc.) on channel mounting and any mechanical process on product should not be done.

"GCP" is never rusting, wall thickness of diameter on unit can be adjusted via O-ring.

Operating Temp. Range: 10 - 2000 Pressure Capacity:

 \emptyset 6 - 8 mm = 16 Kg./ cm² \emptyset 10 - 12 mm = 18 Kg./cm² \emptyset 14 - 16 mm = 25 Kg./cm²

175 mm

220 mm

280 mm

175 mm

220 mm

280 mm

250 mm

320 mm

410 mm

250 mm

320 mm

410 mm

9 mm

9.5 mm

Order Code	d	ι	Mounting Dia.
GCP.06	Ø6	10	6.1 mm
GCP.08	Ø 8	10	8.1 mm
GCP.10	Ø 10	11	10.1 mm
GCP.12	Ø 12	12	12.1 mm
GCP.14	Ø 14	14	14.1 mm
GCP.16	Ø 16	14	16.1 mm
GCP.20	Ø 20	14	20.1 mm







Code: SDT

Detent Plug - Straight

It is to plug / close unwanted cooling holes in injection moulds.

Mounting: It is inserted acc. to the product diameter by threading.

Material: Brass

Order Code	R / Thread	d	ι	SW
SDT.18	G 1/8"	9.4	11.2	5
SDT.14	G 1/4"	12.8	12.5	7
SDT.38	G 3/8"	15.9	14.1	8
SDT.12	G 1/2"	20.5	17.8	10

Order Code	M / Thread	ι	SW
SDT.M06	M6 x 0.75	7	3
SDT.M08	M8 x 0.75	8	4
SDT.M10	M10 x 1.0	10	5
SDT.M12	M12 x 1.5	10	6
SDT.M14	M14 x 1.5	10	7





Material: Steel + Black Coating Max. Temp.: 160⁰



Detent Plug - Conical

Order Code	R / Thread	d	ι	SW
SKT.18	NPT 1/8"	9.4	11.2	5
SKT.14	NPT 1/4"	12.8	12.5	7
SKT.38	NPT 3/8"	15.9	14.1	8
SKT.12	NPT 1/2"	20.5	17.8	10

Order Code	M / Thread	ι	SW
SKT.M06	M6 x 0.75	7	3
SKT.M08	M8 x 0.75	8	4
SKT.M10	M10 x 1.0	8	5
SKT.M12	M12 x 1.5	10	6
SKT.M14	M14 x 1.5	10	7

CKT / Steel Type:

Order Code	R / Thread	d	ι	SW	
CKT.18	NPT 1/8"	9.4	11.2	5	
CKT.14	NPT 1/4"	12.8	12.5	7	
CKT.38	NPT 3/8"	15.9	14.1	8	
CKT.12	NPT 1/2"	20.5	17.8	10	

MG09.250

MG09.320

MG09.410

MG95.250

MG95.320

MG95.410



Flexible Cooling Hose Code: PSE

Even at high pressures, it guarantees the directional stability. Resistant to all chemicals. Combine system with modular passing feature.

1/4" Operating Pressure:

6 Bar / Flow Rate 15 I. / min.

3/8" Operating Pressure:

6 Bar / Flow Rate 25 I. / min.

Order Code	Thread	Length
PSE.14	1/4"	280 mm
PSE.38	3/8"	320 mm

It can be supported with "Ball Valve" as per request.



0-Ring Set



- * 368 pcs.
- * 30 different sizes.
- * NBR Rubber resistant to oils and acids.
- * 60-90 hardness.

Content:

From Ø 3 to Ø 30 mm. Thickness: 2 - 2.5 - 3 - 4 mm.

Order Code: ORING SET

Cooling Adapter

Code: DSN



Order	Thread	Length	Hexagon
DSN.02	1/8"	22	14
DSN.03	1/4"	26	17
DSN.04	3/8"	26	22
DSN.05	1/2"	30	27

Teflon Sealing Tape

Order Code: TEFLON



12 Metre x 12 mm

Cooling Adapter

Code: ONE



Order	Thread	Length
ONE.01	1/8"-1/8"	21
ONE.02	1/8"-1/4"	23
ONE.03	1/4"-1/4"	23
ONE.04	1/4"-3/8"	23
ONE.05	1/4"-1/2"	29
ONE.06	3/8"-3/8"	23
ONE.07	3/8"-1/2"	29

Rubber Hose (gas & air) Code: HSG

- * Double layer hoses with rope.
- * When ordering, specify desired meter.



Order	Inner	Outer	
HSG.08	5	8.5	
HSG.10	8	10.5	
HSG.13	10	13.5	
HSG.16	9.5	15.4	
HSG.19	12.5	18.5	

Liquid Gasket Sealant

* 3000 heat resistance sealing.

Order Code: SK404 Red

Order Code: SM404 Blue



Reduction Fitting

Code: DEN



Order	Female	Male
DEN.01	G 1/8"	G 1/4"
DEN.02	G 3/8"	G 1/4"
DEN.03	G 1/8"	G 3/8"
DEN.04	G 1/8"	G 1/2"
DEN.05	G 1/4"	G 3/8"
DEN.06	G 1/4"	G 1/2"
DEN.07	G 3/8"	G 1/2"

Mini Ball Valve

Code: KKV



- * Manual controlled.
- * Button type ball valves.
- * 1/4 male threaded regulator.

(
À	

Order Code	Female	Male
KKV.13	G 1/4"	G 1/4"
KKV.17	G 3/8"	G 3/8"
KKV.21	G 1/2"	G 1/2"
KKV.26	G 3/4"	G 3/4"
KKV.33	G 1"	G 1"

Thread & Pipe Sealant

Order Code: 678.511



Max. Thread: M80 Hand-tight: 20 - 40 minutes Functional Hardening: 1 - 3 hours Temp. Resistance: - 55°C to + 150°C

Usage Area:

It is a sealing product made of Teflon which is used in pipes and metals in which fluid passes through.

Cooling Fitting -**Flbow**

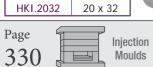




Order	Male
KDR.10	G 1/8"
KDR.13	G 1/4"
KDR.17	G 3/8"
KDR.21	G 1/2"
KDR.26	G 3/4"
KDR.33	G 1"

Hose Clamp (stainless) Code: HKI

Order Code	Capacity
HKI.1016	10 x 16
HKI.1220	12 x 20
HKI.1319	13 x 19
HKI.1623	16 x 23



Repair Paste

Order Code: SUNFIX

It is especially for water leakage. Easy to use and versatile problem solver paste for repair, maintenance and construction.

Cold-curing two-component paste suitable for sealing, bonding, moulding, repairing and filling.



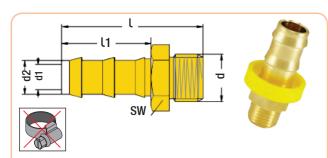
Hose Fitting

Code: HBE & HBF





Order	Order	Male
HBE.6	HBF.6	6.0 mm
HBE.9	HBF.9	9.5 mm
HBE.13	HBF.13	12.5 mm
HBE.16	HBF.16	13.5 mm
HBE.19	HBF.19	18.5 mm



Hose Fitting

Code: FHR

Material = Brass Flow Capacity = 8 mm Operating Pressure = 0 - 15 bar Operating Temperature = $-5 / +180^{\circ}$

Order Code	d	d1	d2	٦	เา	SW
FHR.1310	G 1/4"	5.5	9.5	43	28	17
FHR.1313	G 1/4"	8	12.5	43	28	17
FHR.1710	G 3/8"	5.5	9.5	46	33	19
FHR.1713	G 3/8"	8	12.5	46	33	19
FHR.2113	G 1/2"	8	12.5	46	33	23

Rubber Hose

It is resistant to bending with its flexible structure reinforced with polyester for hot and cold water. It is suitable to be used according to fitting feature / with our without clamp.



Order Code	Inner Ø	Outer Ø	Operating Pressure	Blast Pressure	Roll Length	Colour
FLEX.10B	9.5	15.4				Blue
FLEX.10R	9.5	15.4	28	60	20	Red
FLEX.13B	12.5	18.5	Bar	Bar	Metre	Blue
FLEX.13R	12.5	18.5				Red

Operating Temp. = $-20 / +90^{\circ}$

Flow Capacity = 9.5 / 12.5 mm







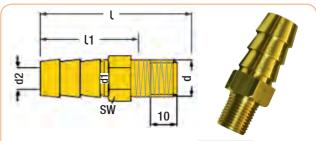
out nose end straightly in desired length.

Cut hose end straightly Insert hose into fitting.

Insert hose into plastic yellow slot by pushing hose settled on fitting.

There is no need to insert clamp in this way. You need to cut hose end in order to remove hose from fitting.



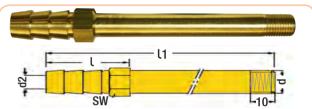


Hose Fitting

Code: HRE

Material = Brass Flow Capacity = 8 mm Operating Pressure = 0 - 15 bar Operating Temperature = $-5 / +180^0$

Order Code	d	d1	d2	ι	l1	SW
HRE.M8	M8 x 1.25			36		13
HRE.M10	M10 x 1.50			36		13
HRE.M12	M12 x 1.75	12	7	40	28	13
HRE.M14	M14 x 2.0			40		14
HRE.M16	M16 x 2.0			40		16
HRE.1/8"	G 1/8"			36		13
HRE.1/4"	G 1/4"	12	7	40	28	14
HRE.3/8"	G 3/8"			40		17



Hose Fitting Long Type

Code: HRU

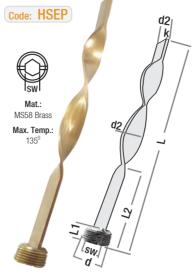
Long Typo						
Order Code	d	d1	d2	l	l1	SW
HRU.M08060				60		
HRU.M08080				80		
HRU.M08100	M8 x 1.25	12	7	100	28	13
HRU.M08120				120		
HRU.M08150				150		
HRU.M10060				60		
HRU.M10080]			80		
HRU.M10100	M10 x 1.5	12	7	100	28	13
HRU.M10120]			120		
HRU.M10150]			150		
HRU.M12060				60		
HRU.M12080				80		
HRU.M12100	M12 x 1.75	12	7	100	28	13
HRU.M12120]			120		
HRU.M12150				150		
HRU.M1/8060				60		
HRU.M1/8080				80		
HRU.M1/8100	G 1/8"	12	7	100	28	13
HRU.M1/8120]			120		
HRU.M1/8150				150		
HRU.M1/4060				60		
HRU.M1/4080]			80		
HRU.M1/4100	G 1/4"	12	7	100	28	14
HRU.M1/4120]			120		
HRU.M1/4150]			150		

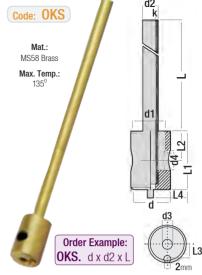
Material = Brass Flow Capacity = 8 mm Operating Pressure = 0 - 15 bar Operating Temp. = -5 / +1800 Injection Page 331

Cooling Baffles & Water Flow Pipes

Baffles are used to direct the flow of water or cooling liquid within the mould. They are allows machined water-lines to be separated into multiple channels.







Threaded Flat Baffle

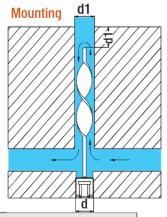
Order	SW	d	d1	d2	L	L1	k
SEP.08100	4	M8 x 0.75	6	5.8	100	8	1.6
SEP.08200	4	IVIO X U./O	U	5.0	200	0	1.0
SEP.10100		M10 x 1.0	0		100		
SEP.10125	5	M10 x 1.5	8	7.8	125	8	1.6
SEP.10200	J	M10 x 1.0	mounting)	7.0	200	0	1.0
SEP.10300		M10 x 1.0	юш)		300		
SEP.12125	6	M12 x 1.5	10	9.8	125	8	2.0
SEP.12250	U	WHZ X 1.5	10	9.0	250	O	2.0
SEP.16150	8	M16 x 1.5	14	13.8	150	10	2.4
SEP.16300	O	C.I X OI IVI	14	13.0	300	10	2.4
SEP.20150			10		150		
SEP.20200	10	M20 x 1.5	18	17.8	200	10	2.4
SEP.20300	10	IVIZU X 1.5	mounting)	17.0	300	10	2.4
SEP.20400			om)		400		
SEP.24150	10	M24 x 2.0	20	19.8	150	12	2.4
SEP.24300	10	IVIZ4 X Z.U	20	19.0	300	12	2.4

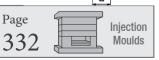
Threaded Spiral Baffle

Order	SW	d	d1	d2	L	L1	L2	k
HSEP.10100					100		51	
HSEP.10120	5	1/8"	8.5	8.2	120	8		1.6
HSEP.10150	Э	1/0	mounting)	0.2	150	0	102	1.0
HSEP.10200			low)		200			
HSEP.13100					100		51	
HSEP.13120			11.5		120			
HSEP.13150	7	1/4"		11.2	150	10	102	2.4
HSEP.13200			(mounting)	11.2	200		102	
HSEP.13250			(mo		250			
HSEP.17150					150		51	
HSEP.17175			15		175			2.4
HSEP.17200	10	3/8"		14.7	200	10	100	۷.4
HSEP.17250			mounting)		250		102	
HSEP.17300			(mo		300			
HSEP.21200	10	1/011	10 F	10.0	200	10	76	0.4
HSEP.21400	12	1/2"	18.5	18.2	400	12	127	2.4
HSEP.26500	12	3/4"	23.5	23.3	500	12	153	3.2

Water Flow Cooling Pipe

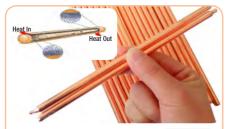
· · · ·	LOI	1 10	W O	001	iiiy	ı ıp	•			
d	d1	d2	d3	d4	L	L1	L2	L3	L4	k
10	4	2.6	2	4	100 200	16	9	3.5	4	0.3
10	5	3	2.4	4	100 200	16	9	3.5	4	0.3
10	6	4	3	4	100 200	16	9	3.5	4	0.5
12	8	5	4	6	160 315	18	9	4 4.5	6	0.5
16	12	6	5	6	160 315	18	9	6	6	0.5
18	14	8	6	6	160 315	18	9	7	6	1
20	16	10	8	8	160 315	20	10	8	8	1
25	20	12	10	10	160 315	25	13	9.5	10	1







Order Code	d	d1 +0.1	d2 -0.05	d3 -0.05	เา	l -0.2	M	0-Ring
GSK06	06	11.5	11.1	9	10	20	M8	Ø8 x 1.5
GSK08	08	15	14.6	11	10	20	M10	Ø11 x 2
GSK10	10	18.5	18.2	13	12	24	M12	Ø13.9 x 2.4



Heat Transfer Pipe

Code: GH

In Cores, Core Slides, Cavities & Other Areas of Injection Mould:

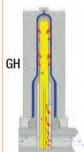
The cooling process is formed by rising heat to the upper sides via compressed gas in pipe quickly. In mounting, at least 70% of Heat Transfer Pipe remains inside the core, 30% of Heat Transfer Pipe should remain in cooling channel.

Advantages of this System:

It minimizes the number of defective final products during production resulting from shrinkage or cold deformation. Because it provides fast control of temperature, very high product precision is obtained. Thus, pore formation inside the produced product is avoided. During the injection, it ensures obtaining products in right colours. By ensuring mould life longer, it lowers main costs.



D	L	D	L		D	L
	40		60			80
	60		80			100
Ø	80	Ø	100	Ш	Ø	120
3	100	5	120	П	8	150
	120		150	П	·	185
	150		200	П		200
	40		60	ŀ		250
	60		80	П		100
	80		100	П		120
Ø	100	ø	120	П		150
				П	Ø	185
4	120	6	150		10	200
	150		185		220	
	185		200)		250
	200		250	П		300



Order: GH. DxL

Mounting:

Cooling channel should be 1 mm larger than diameter of Heat Transfer Pipe - GH.

After mounting, open holes should be filled with Repair Paste.

Repair Paste

Order Code: 200017



It is a product used againts water. Especially, it can be applied for pipe and metal cracks. **Packing:** 56g.





Material:



Code: STA Code: STB Code: ST "Fast Cooling System Flow Method"

Page

Injection

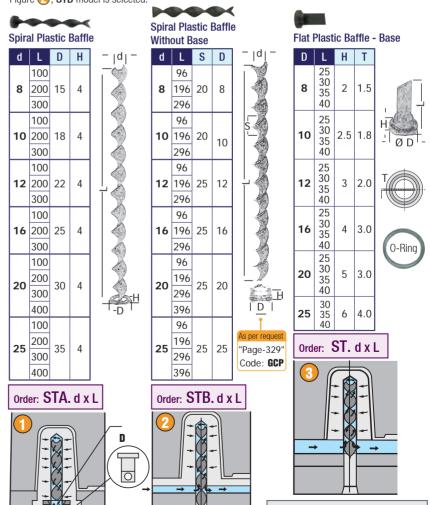
Moulds

Plastic Baffles for Injection Mould Cooling

It provides effective flow opportunity by creating balanced turbulent in fluid flow hole. The cooling water flows by following Baffles helixes (such as cascade). Since Plastic Baffle material is Fibreglass reinforced, it always remains cold, it never causes clogging and corrosion in cooling channels. Useful Information:

1- At technical drawing in Figure and Figure if cooling water flow enters by striking at the entrance of Baffle or to the close area, Based or Base Reinforced model should be selected (**STA** or **ST** models).

2- If cooling water flow enters by striking at the medium or top side of Baffle, don't use Based model. Because; water flow continues its turbulent flow by exiting from the level it entered, in such cases in Figure (2), STB model is selected.



Quick Connect Pneumatic Fittings - Plastic Models

Plastic structure, quick connect and for pneumatic / air distribution mounting systems. Max. Temperature: 40°C. Quick Connect Pneumatic Fittings also can be used in cooling system of Injection Moulds, it is recommended to keep the environment temperature and water temperature circulating - max. 40°C. Thermometers may be used for temperature measurement (page-283 & page-288). Attention: Possible temperature increases (over 40°C. max.) may cause water leakages in time!

"PH" Air Hose (page-335) is recommended for installation of cooling system.















"T" Fitting









6 mm

8 mm

10 mm

















8 mm

10 mm

12 mm

Thread: 1/4"

Shaft: 8 x 5mm

Quick Connect Pneumatic Fittings - Metal Models

"AIR HOSES"
When ordering, pls. specify the desired metre.

Metal structure, quick connect and for pneumatic / air distribution mounting systems. Max. Temperature: 60°C.

Quick Connect Pneumatic Fittings also can be used in cooling system of Injection Moulds, it is recommended to keep the environment temperature and water temperature circulating - max. 60°C. Thermometers may be used for temperature measurement (page-283 & page-288).

Attention: Possible temperature increases (over 60°C. max.) may cause water leakages in time!

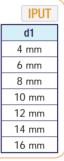
"POLB" or "TEF" Air Hoses are recommended for installation of cooling system.





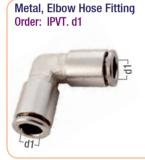




















	IBDG
d	d3
1/8"	1/4"
1/8"	3/8"
1/8"	1/2"
1/4"	3/8"
1/4"	1/2"
3/8"	1/2"

TEF



	IBBG	
d	d3	
1/8"	1/4"	
1/8"	3/8"	
1/4"	3/8"	
1/4"	1/2"	
3/8"	1/2"	





	Order Example	Ø In / Out
	Code x 04	2 x 4
	Code x 06	4 x 6
1	Code x 08	6 x 8
	Code x 10	8 x 10
	Code x 12	10 x 12

Air Hose - Polyamide (Max. 100°) POLB

Air Hose - Teflon (Max. 180°)



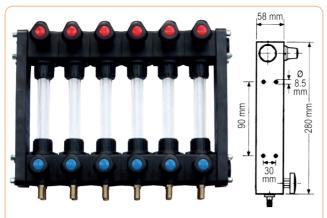
Air Hose - Polyurethane

(Max. 60°)

	Order	Ø In / Out	
	PH4	2 x 4	
	PH6	4 x 6	
,	PH8	6 x 8	
	PH10	7 x 10	
	PH12	9 x 12	

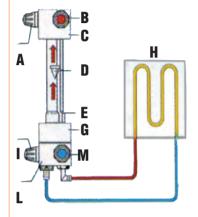
PH





Water Flow Regulator

Code: ESR



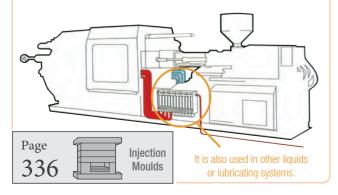
- A: Adjusting Valve
- **B:** Water Outlet
- C: Flow Manifold
- D: Float
- **E:** Flow Tube
- **G:** Receiver Section
- H: Mould
- : Cut-Off Valve
- L: Supply Manifold
- M: Water Inlet

Flow Rate: 0-18 L / min. Inlet - Outlet: R 3/8
Max. Temperature: 95°C

It is used as Water Flow Regulator / Indicator of cooling water in injection systems. It is designed to control circulation flow and to repeat settings regularly. Measurement scale of tubes is monitored at desired level, accurate / safe flow is supplied with monitoring the deviation status and on-off valves.

Code: ESR

Order Code	Number of Tubes	Connections	Width x Length (mm)
ESR.04	4		280 x 280
ESR.05	5	R:1/4" Hose= 10 mm	340 x 280
ESR.06	6		400 x 280
ESR.08	8		520 x 280
ESR.10	10		640 x 280
ESR.12	12		760 x 280





Manual Pressure Test Pump

Order Code: SSY.6

Testing of System with Manual Pressure Test Pump:

Complete the mounting of Tie Bar (handle) with screw and screwdriver involved in product that you purchased.

Fill Test Hose (2) with water (air inside the hose should be discharged). Close Valve (1) on the tie bar (handle), connect testing hose to the mould (ensure that system is closed completely).

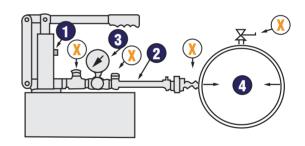
Fill the tank with water and run pump by pushing keep Valve (1) open, continue to pumping.

When Manometer (3) pressures is reached to desired level, close the Valve (1).

If the pressure does not fall, the result is positive.

If the pressures fall, there is a leak.

Operating Pressure	Flow Rate
6.3 Mpa	25 ml / s.



- 1- ON / OFF Valve
- 2- Testing Hose
- 3- Manometer / Pressure Indicator
- 4- Water Circuit of Mould
- X- As per request, Mini Ball Valve can be added.

Descaling Liquid

Order Code: 800598



In order to avoid clogging due to intense lime in machines and moulds running with water at places that urban water and well water are quite limy, 1 kg. Descaling Liquid is used in 10 kg. of water (according to the lime status). It does not harm the system in moulds and machines.

It is a concentrated product.























(150 414 110)

Connector R1/8

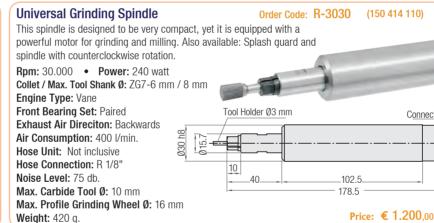
Made in

Germany









from our company.



High-speed Oil-free Spindle Order Code: TR-1785 (150 401 400) The oil-free drive of this grinding spindle based on a vane motor is unique and patented. Its great advantage: It provides the high performance of a vane motor and can still work completely oil-free. Rpm: 85.000 • Power: 100 watt Collet / Max. Tool Shank Ø: ZG5 / 3 mm Engine Type: Vane Connector M5 Tool Holder Ø3 mm Front Bearing Set: Paired .2 h8 Exhaust Air Direciton: Backwards Air Consumption: 170 I/min. Hose Unit: Inclusive Hose Connection: M5 26 29 Noise Level: 70 db. Max. Carbide Tool 0: 4 mm Max. Profile Grinding Wheel Ø: 6 mm Made in Price: € 1.050.00 Germany Weight: 130 g.

Please ask for information from our company.







Rpm: 60.000 Collet Ø: 3.0 mm

Dimensions: Ø 20 x Length: 160 mm

Hose Unit: Inclusive Weight: 140 g.







Please use protective goggles, masks and ear plugs.

During Operation: Please operate with 2-3 drops of oil per minute.

Rotary Air Grinder Tool Order Code: AG-360

High torque, silent and well balance. Ideal for precision grinding and finishing works. For applications such as grinding, milling. brushing and polishing with felts. During Operation: Please use protective goggles, ear plugs and masks.



Rpm: 60.000

Collet Ø: 2.35 mm - 3.0 mm

Dimensions: Ø 17 x Length: 159 mm

Hose Unit: Inclusive Weight: 130 q.



During Operation: Please operate with 2-3 drops of oil per minute.



Please use protective goggles, masks and

ear plugs.

Rotary Air Grinder Tool Order Code: AG-460

High torque, heavy-duty, general purpose applicable on deburring, chamfering, milling, pre-polishing and finishing. Compact design and comfortable usage. During Operation: Please use protective goggles, ear plugs and masks.



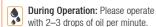


Rpm: 35.000

Collet Ø: 3.0 mm - 6.0 mm

Dimensions: Ø 22 x Length: 180 mm

Hose Unit: Inclusive Weight: 170 q.



During Operation:

Please use protective goggles, masks and ear plugs.

Micro Rotary Air Grinder Tools



During Operation: Please operate with 2–3 drops of oil per minute.

Micro Types: Composite coated Air Tools, aluminium body, non-skid coating, strong engine, high-speed and adjustable speed. In mould workshops and general grinding processes.

Order	Technical Information / 6.3 Bar	Price
DG-M5	Rpm: 54.000 ◆ Collet Ø: 3 mm ◆ Length: 134 mm Air Hose Ø: 8 mm ◆ Weight: 200 g.	€ 70,00
	Rpm: 70.000 • Collet Ø: 3 mm • Length: 134 mm Air Hose Ø: 8 mm • Weight: 200 g.	
	Rpm: 82.000 • Collet Ø: 3 mm • Length: 134 mm Air Hose Ø: 8 mm • Weight: 200 g.	
ET-1	Rpm: 3.800 • Collet Ø: 6 mm • Length: 171 mm Air Hose Ø: 8 mm • Weight: 200 g.	€ 140,00

Rotary Air Grinder Tools (for mounted points)



Rpm: 35.000 Collet Ø: 3.0 mm

Dimensions: (NAK-A90) Ø 19 x Length: 158 mm • Weight: 220 g. Dimensions: (NAK-A45) Ø 19 x Length: 162 mm • Weight: 250 g

Hose Unit: Inclusive

Accessories for Rotary Air Grinder Tool



Ø 3.0 Ø 6.0 **Spare Collets**

Collet Type	Order Code
Ø 2.35	AG-672
Ø 3.0	AG-673
Ø 6.0	AG-676







Ø 30 Wheel

Ø 30 Rubber

Ø 30 Abrasive

Suitable	Spare Part	Order
Tools	Spare rait	Code
AG-90 AG-45	Ø 30 Grinding Wheel	AGC01
	Ø 30 Rubber Band	AGS01
	Ø 30 Abrasive Disc	AGP01



Hose Unit: Inclusive

During Operation: Please operate

Weight: 200 a.









Dimensions: (AG-90) Ø 17 x Length: 140 mm • Weight: 170 g.

Dimensions: (AG-45) Ø 17 x Length: 153 mm • Weight: 180 g

Hose Unit: Inclusive



Standard Holder
(available in box)

Optional Holder

Incompatible

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Ultrasonic Polishing Machine

Order Code: U-LAP106

"U-LAP 106" can assist in reducing finishing time by up to 50% on hardened tools steel working on very small mould cavity & core details, extrusion dies and more. It is an advanced technological product realizing all diffucult works.

Power Source: AC 220 Ultrasonic Power: 45W. 2 levels Stroke Length: 10 - 35 mm Vibration: 15 - 25 khz **Dimensions:** 152 x 100 x 72 mm



Corded Rotary Tool

Order Code: STRONG

With electronic cycle adjusted control unit, it starts with micro motor rotary tool at desired speed. It can work faster and serially with foot switch, desktop precision operations can be done with practical and powerful electronic machine. It is economical.

Rpm: 50.000 • **Collet Ø:** 3mm

50 hz / 220 V



Order Code	Specifications
BM21A	Rpm: 15.000 Power: 125 Watt
BM23A	Rpm: 25.000 Power: 200 Watt
BM26A	Rpm: 25.000 Power: 300 Watt
BM24A	Rpm: 22.500 Power: 500 Watt

Electrical Spiral Motor

Code: BM..A

Economical and modular for levelling and polishing.

Powerful motors provide facilities for users in levelling and polishing processes. Rotary spiral spring in Spiral Rod is only for tool to be used with 2.35 - 3 & 4 mm collets. However, in some cases, 6 mm collet also can be used softly / without pressing. To avoid rising heat at long uses, waiting at short intervals can be required. To provide continuance of work in uses, a spare Spiral Rod can be kept.

Note: Spiral Rod should be ordered separately.

Spare Parts

Order Code	Specifications
M19KK	Spiral Rod for Spiral Motor / 965 mm
M19FTK	Spiral Rod with Latch
YPØ	Spare Collets / 2.35 - 3 - 4 - 6 mm
BMW	Foot Switch for Spiral Motor (when ordering: specify current motor watt)

Hanger for Spiral Motor

Order Code: M18A



Foot Switch and cable connections of Electrical Spiral Motors are presented in packing. To use motor stably, we recommended you to use Hanger.

Page



Service and Spare Parts of all equipments are provided by our company.

190-Piece conomic Set



Polishing Kit / Multiple

- Grinding Wheels

- Wire Brushes

- Mounted Points

- Mounted Felts - Collets

- Brushes

Order Code: 6128001001

* Contents:

- Electrical Rotary Tool

- Cutting Discs - Drills

- Diamond Endmills - Polishing Stones

- Abrasive Rolls
- Diamond Compounds
- * Tool Specifications: - Power: 130 Watt - Voltage: 230 V - Frequency: 50 Hz.

- Speed Control: 1000 - 3000 Rpm - Collets: Ø16 mm / 2.4 mm - 3.2 mm

145-Piece Economic Set



Mini Polishing Kit

Order Code: 6128002001



* Contents:

- Abrasive Rolls

- Cutting Discs

- Drills

- Diamond Endmills

- Polishing Stones

- Diamond Compounds

- Grinding Wheels

- Brushes

- Wire Brushes

- Mounted Points - Mounted Felts

- Collets



EDM Polishing Stones

Code: EG..

EDM Polishing Stones are produced to make excellent levelling / polishing on rough surfaces. It takes the shape of the surface it works with by making fast cutting. It works precisely on figured surfaces. EDM Polishing Stones are suitable for manual and Air File Tool use. Hard and complex, especially in deep areas, long polishing stones can be selected. At flat and wide areas, short polishing stones can be less fragile by avoiding skidding.

When using by hand, use a holder. Different type holders at our Air File Tools present extensive usage opportunity.

For softer and clean polishing stone usage, you can use your polishing stone by steeping in low oil liquid etc. To use right graduation from coarse polishing stone to fine one on surface is important. Cleaning of operation area is also important.

EDM Polishing Stone Types

	-	•			
EGK	EGD	EGY	EGU	Grit	Operation
				# 120	
4				# 150	Levelling
				# 180	
width x length (mm)	width x length (mm)	diameter x length (mm)	width x length (mm)	# 220	
4 × 4 × 100	C v 2 v 1F0	Ø C v 1F0	0 11 0 11 150	# 280	Pre-
4 x 4 x 100	6 x 3 x 150	Ø 6 x 150	8 x 8 x 150	# 320	polishing
6 x 6 x 150	13 x 3 x 150	Ø 8 x 150	10 x 10 x 150	# 400	
8 x 8 x 150	13 x 6 x 150	Ø 10 x 150	_	# 600	
				# 800	Finishing
10 x 10 x 150	-	Ø 12 x 150		# 1000	

Order: Type. Dimension. Grit

EDM Polishing Stone Holders

	Manually Operated		Air File Tool Operated							
Product					İ				1	
Capacity	6 x 3	13 x 3	4 - 6	8 - 10	13 x 3	13 x 6	AR-	AR-	AR-	AR-
Order Code	GT-	613	GT-468		GT-133		661		666	662



Polishing Block Stone Code: BG..

For wide surface levelling and chamfering / deburring. **EKR**: General Steel • **SCG**: Hard Steel

Order Example	Α	Н	L
BG100. EKR or SCG	16	25	100
BG125. EKR or SCG	20	40	125
BG150. EKR or SCG	25	50	150
BG200. EKR or SCG	25	50	200



Mini Cutting Disc

Code: KS..

It is used in cutting operation of all metals including hard steels at Rotary Tools.

Order Code	d	k	Mandrel
KS25	25	0.65	Ø 0 0F
KS40	40	1.0	Ø 2.35 mm Ø 3.0 mm
KS60	60	1.5	0.0111111



Fiber Ceramic Polishing Stones

Code: SG

"SG" Fiber Ceramic Polishing Stones are the excellent stones for detail polishing. They preparead by pressing with resin binder spraying screened, gauged micron diamond particles on powerful fiber textured ceramic, "SG" Ceramic Stones have the feature of resistance with flexible structure againts breakage.

Optimal for premium polishing of flat surfaces, hard to reach slots, ribs and corners. High polishing productivity can be obtain without clogging. "SG" Ceramic Stones can be used in our Air File Tools or by hand (please see below for manual holders).

Fiber Ceramic Polishing Stones Types

Tiber ceramic reneming element types						
Grit Code						
CSC	# 180					
CSO	# 250					
CSD	# 280	Thickness: 1 mm	Diameter: 3 mm			
CSN	# 360	Width x Length	Diameter			
CSB	# 400	1 x 4 x 100				
CSY	# 700	1 x 6 x 100	Ø 3 x 100			
CSR	# 1200	1 x 10 x 100				

Order: SG. Grit Code. Dimension Order Example:
SG. CSO. 1 x 6 x 100

Fiber Ceramic Polishing Stone, Manual Holders



"Strong Fiber Texture & Durable Structure"









"SG" Ceramic Stones suitable to be used in Air File Tools. Refer to "page-341" for Air File Tools.







Shank Dia, 3 mm

612A

6 x 12

80B

Ø 8

616J

6 x 16

816K

8 x 16

816A

8 x 16

100B

Ø 10

816J

8 x 16

132E

13 x 2

1016A

10 x 16

120B

Ø 12

1016J

10 x 16

133E

13 x 3

813R

8 x 13

1224R

12 x 24

609S

6 x 9

162E

16 x 2

Order: SPT. Code

Mounted Points

L

Ø 3 mm

256A

2.5 x 6

30B

03

310T

3 x 10

815P

410A

4 x 10

50B

Ø 5

710T

7 x 10

412K

10 x 18 4 x 12

308A

3 x 8

40B

04

412T

4 x 12

510A

5 x 10

60B

Ø 6

412J

4 x 12

515K

5 x 15

Form

A/R

Shank

3 mm

Code:

D x L

Form

B/R

Shank

3 mm

Code:

D x L

308T

3 x 8

612P

Order Example: - SPT. 410A

Pink Mounted Points

Code: SPT

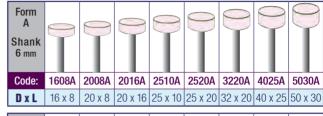
"SPT" Mounted Points are suitable to soft and hard surfaces. With formation of aluminium oxide & ceramic grain textured in fast material removal feature, the mounted points provide the desired performance on all kinds of surfaces. After process, it can be ready for polishing by cleaning off point traces on surface with Rubber Mounted Polishing Points. There should be at least 10 mm fastening length at collet.

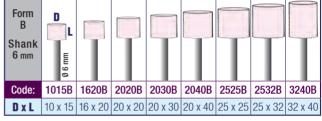
Operation should be soft without pressing.

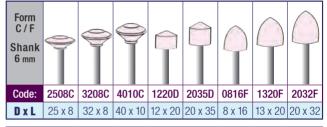
Cutting speed max.: 50 m / s. Calculation: $\frac{n = V \text{ (m/s) } \times 60.000}{D = (mm) \times 3.14}$

Mounted Points Sha

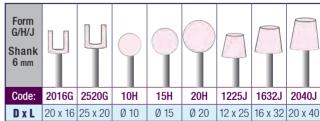
Shank Dia, 6 mm













1018P





Grinder Disc

Because it is circular, it is mostly used at thread ranges, cutting tool edges and mould / machine production.

Order Code	Specification			
DP25	Ø 25 x thickness: 3.2 mm / 80 Grit			
VM03	Mandrel / 2.35 & 3.00 mm			



Mounted Wire Brushes

These products are very successful in cleaning EDM and deep burrs traces (especially with Guvenal - Diamond Compound Order Code: SDP14).





As per request: Shank 2.35 mm is available.







Self-adhesive Abrasive Disc

For Abrasive:



Order: DZ.. x Grit

Order Example: DZ18 x 320

For Holder: -



Order: DZL.. x Shank

Order Example: DZL80 x 3

Code	Abrasive	Grit	Holder	Shank
DZ10	Ø 10		Ø 10	
DZ18	Ø 18	# 80	Ø 18	
DZ30	Ø 30	# 120	Ø 30	3 mm
DZ45	Ø 45	# 220	Ø 45	
DZ70	Ø 70	# 320	Ø 70	6 mm
DZ80	Ø 80	# 400	Ø 80	
DZ100	Ø 100		Ø 100	



Mini Abrasive Roll Set Code: ML

Mini Abrasive Rolls & Holder.

It is sold in package: 5 + 5 coarse / fine grit and holder (10 pcs abrasive + 1 pcs holder).





Order Code	Abrasive	Grit
ML04	Ø 4 x 15 mm	
ML05	Ø 5 x 15 mm	# 120 (5 pcs.)
ML06	Ø 6 x 15 mm	, , ,
ML08	Ø 8 x 20 mm	# 320 (5 pcs.)
ML10	Ø 10 x 20 mm	



As per request / Custom-made orders.







Mini Abrasive Rolls

Order: Code. Grit Order Example: - SPZ12. 80

Code	Abrasive	Grit
SPZ12	Ø 12 x 25	
SPZ15	Ø 15 x 25	# 80
SPZ20	Ø 20 x 30	// 00
SPZ25	Ø 25 x 30	# 100
SPZ30	Ø 30 x 30	# 120
SPZ40	Ø 40 x 30	" 000
SPZ50	Ø 50 x 30	# 220
SPZ60	Ø 60 x 35	

Holder for Abrasive Rolls

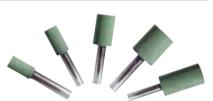
Order Code	Holder	Shank - Length
SPL12	Ø 12	Ø 6 - 60
SPL15	Ø 15	Ø 6 - 60
SPL20	Ø 20	Ø 6 - 60
SPL25	Ø 25	Ø 6 - 60
SPL30	Ø 30	Ø 6 - 60
SPL40	Ø 40	Ø 6 - 65
SPL50	Ø 50	Ø 6 - 65
SPL60	Ø 60	Ø 6 - 65



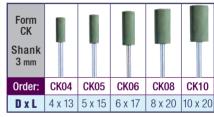
Rubber Mounted Polishing Point Rubber, Soft Type & Finishing

Form RK Shank 3 mm					
Order:	RK04	RK05	RK06	RK08	RK10
DxL	4 x 13	5 x 15	6 x 17	8 x 20	10 x 20

Form RB Shank 6 mm					
Order:	RB15	RB20	RB25	RB30	RB35
DxL	15 x 25	20 x 25	25 x 25	30 x 30	35 x 35



Rubber Mounted Polishing Point Ceramic, Hard Type & Pre-polishing



Form CB Shank 6 mm					
Order:	CB15	CB20	CB25	CB30	CB35
DxL	15 x 25	20 x 25	25 x 25	30 x 30	35 x 35



Polishing Rubbers

 Cylinder (Ø6x22)
 Order:
 Disc (Ø20x3)
 Order:

 Red (medium)
 : KK06
 Red (medium)
 : DK06

 Black (hard)
 : KS06
 Black (hard)
 : DS06

 Mandrel
 : DM03
 Mandrel
 : VM03



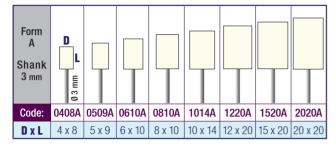




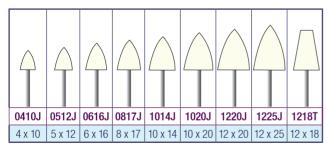
- Order Example: -SPK. 1014A

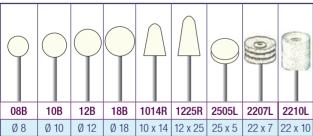
Mounted Polishing Felts

Shank Dia. 3 mm



Form C/H Shank 3 mm								
Code:	0408C	0509C	0610C	0810C	1013C	1214C	1520C	1218H
DxL	4 x8	5 x 9	6 x 10	8 x 10	10 x 14	12 x 20	15 x 20	20 x 20





Adhesive Felt Discs Code: Y..D





Order	Dimension	Hole
Y18D	Ø 18 x 4 mm	7 mm
Y30D	Ø 30 x 4 mm	12 mm
Y45D	Ø 45 x 4 mm	18 mm

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"Y..D" Adhesive Felt Discs suitable to be used with "DZL" Holders. Refer to "page-345" for "DZL" Holders.

Mounted Polishing Felts

Code: SPK

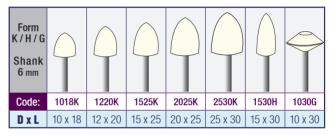
It is used at finishing with Diamond Compounds. Also, it can be applied with other polishers. Even it is used at very high cycles, it does not burn. Our felts are produced as double layer fired. In operation, avoid extreme high pressing.

Mounted Polishing Felts

Shank Dia. 6 mm

Form A/B Shank 6 mm	D L ww 90						
Code:	1520A	2020A	2025A	2530A	3040A	14B	20B
DxL	15 x 20	20 x 20	20 x 25	25 x 30	30 x 40	Ø 14	Ø 20







Mounted Felt Sticks Code: S..D

Usage with Electrical or Air Tools.

Order Code	Dimension	Shank
S06D	6 x 6 x 25 mm	
S10D	10 x 10 x 35 mm	Ø3 mm
S12D	12 x 12 x 45 mm	



Felt Polishing Sticks Code: E..K

Suitable for manual usage.

Order Code	Dimension
E06K	6 x 6 x 150 mm
E10K	10 x 10 x 150 mm
E12K	12 x 12 x 150 mm
GT-133	Holder (suitable for tool usage)



Polishing Felt Sheets Code: P...

It can be adhered to your tool by cutting.

Order Code	Dimension	
P325	6 x 250 x 250 mm	
P625	10 x 250 x 250 mm	
P1025	12 x 250 x 250 mm	



Mounted Hair Brushes

Code: SKF

Mounted Hair Brushes facilitating polishing process and not requiring extra tool. These brushes form the perfect surface with fine micron Diamond Compounds at final polishing.







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Order: SKF022 Order: SKF168

68 Order: SKF016

Shank: 3 mm

Ø 16 x 8 mm

Order: SKF06





Plexiglass Polishing Sticks

Code: PC...

It becomes a precision Diamond File when used with Diamond Compounds. GT-133 is a suitable holder for tool usage.

Order Code	Dimension	Type
PC.08	8 x 8 x 150 mm	Square
PC.10	10 x 6 x 150 mm	Rectangular
PC.13	13 x 6 x 150 mm	Rectangular
PC.06	Ø 6 x 150 mm	Round
GT-133	Holder (suitable for tool usage)	





Wooden Types

Code: ASK

Code: AC...

It is suitable to polish with Wooden Felts at narrow and radius areas of moulds, areas unsuitable to use polishing stones.

Mounted Wooden Points

Wooden Lapping Sticks

Order Code	Dimension	
ASK.06	Ø 6 x 15	
ASK.10	Ø 10 x 20	
ASK.15	Ø 15 x 25	
ASK.20	Ø 20 x 30	
ASK.010	Ø 10 (spherical)	

Dimension	Type
6 x 6 x 150	Square
10 x 10 x 150	Square
12 x 12 x 150	Square
6 x 3 x 150	Rectangular
13 x 6 x 150	Rectangular
20 x 8 x 150	Rectangular
Ø 6 x 150	Round
Ø 8 x 150	Round
	6 x 6 x 150 10 x 10 x 150 12 x 12 x 150 6 x 3 x 150 13 x 6 x 150 20 x 8 x 150 Ø 6 x 150



Diamond Compounds Code: SDP

Our Diamond Compounds have been formulated using a blend of high quality diamond grit, polisher chemical mixture and herbal oil. It is highly concentrated. Economical price and in box packaged as 20 g. syringe. From rapid stock removal process to final polishing process, it cleans EDM traces in hard areas by removing burrs (stock removal).

Our Diamond Compounds are soluble in both oil and water.

During operation, the compound may get lumpy / dry, in this case, it can be moisturised with 1-2 drops of Diamond Compound Moisturiser (order code: SDS200).

Order Code	Micron (µm)	Approx. Mesh	Content	Application
SDP.01	0/1	#60.000	20 g.	
SDP.02	2/1	#14.000	20 g.	Final
SDP.03	3/2	#8.000	20 g.	Polishing
SDP.05	5/3	#4.000	20 g.	
SDP.07	7/5	#3.000	20 g.	
SDP.10	10 / 7	#1.700	20 g.	Pre-
SDP.14	14 / 7	#1.500	20 g.	polishing
SDP.20	20 / 14	#1.100	20 g.	
SDP.28	28 / 20	#800	20 g.	Rapid
SDP.40	40 / 28	#550	20 g.	Stock
SDP.60	60 / 40	#500	20 g.	Removal

Application: Application is usually done with circular movements. During operation, cleaning is very important and it absolutely should be done at every stage. The sequence should be followed from coarse to fine micron. Polishing tools for each micron compound should be specified and should be used only at that micron, absolutely don't mix with other micron compounds. For cleaning of mould surface, our Cleaning Spray (order code: W170104) is an effective, economic and provide easiness. As a surface protector our new product (order code: W160113) is perfect as flexible surface coating.

Diamond Compound Moisturiser

Order Code: SDS200

During operation, the compound may get lumpy / dry, in this case, it can be moisturised with 1-2 drops of Diamond Compound Moisturiser.

Content: 200 g.

polishes.



Metal Polisher Paste

Metal work pieces lose their gloss in time and can be oxidized. In this case, Metal Polisher Paste cleans surfaces and purifies from rust and dirt's. It is a very good dirt remover, it does not remove burrs and only cleans and









Tapered Abrasive Cartridge Rolls

It is ideal for grinding in limited and narrow areas. When the outermost abrasive is worn down, non-worn abrasive found is lower layers appears.

Application: Please always grind by using tip instead of surface. During operation, wear protective goggles. Cutting speed: 11 m / s max.

Code	Abrasive	Grit
RZ06	6 x 38	# 00
RZ10	10 x 38	# 80
RZ13	13 x 38	# 120
RZ16	16 x 38	# 220
RZ20	20 x 38	π Δ Δ0

Code	Mandrel
TM03	3 x 30
TM06	6 x 60



Order Example: -RZ16. 220



Abrasive C	loth Rolls
------------	------------

Code: BZ

Order Code	Grit	Operation	Width	Package
BZ40	#40			
BZ60	#60			
BZ80	#80	Coarse	Coarse	
BZ100	#100			
BZ120	#120			_
BZ150	#150	Medium	450	
BZ180	#180		150 mm	1 Metre
BZ220	#220			Wiche
BZ280	#280			
BZ320	#320			
BZ400	#400	Fine		
BZ600	#600			
BZ800	#800			



Waterproof Abrasive Paper

Tratorproof Abraoiro Lapor				
Order Code	Grit	Operation	Dim.	Package
SZ40	#40			
SZ60	#60			
SZ80	#80	Coarse		1 pcs.
SZ100	#100			
SZ120	#120			
SZ150	#150		230 x 280 mm	
SZ180	#180			
SZ220	#220	Medium		
SZ280	#280			
SZ320	#320			
SZ400	#400			
SZ600	#600	Fine		
SZ800	#800			
SZ1000	#1000			
SZ1200	#1200			



Clip-on Abrasive Disc Code: KZD



Abrasive Disc

Code	Disc	Grit
KZD38	Ø 38	# 36
KZD51	Ø 51	# 80
KZD76	Ø 76	#120

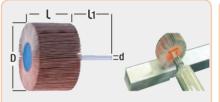
Mandrel

Order Code	Shank	Rubber Ø
KLT63	6 mm	38 mm
KLT65	6 mm	51 mm
KLT67	6 mm	76 mm



Order Example: -KZD51.80





Abrasive Mop Whells

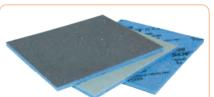
Code: MZ

During operation, wear protective goggles. Cutting speed: 15 - 20 m / s max.

Code	D	L	d	lı	Grit
MZ3.1515	15	15	3.0	40	
MZ3.2020	20	20	3.0	40	#40
MZ6.2015	20	15		40	
MZ6.2020	20	20		40	#60
MZ6.2515	25	15		40	#80
MZ6.2525	25	25		40	"400
MZ6.3015	20	15		40	#100
MZ6.3025	30	25		40	#120
MZ6.4020	40	20	6.0	40	#180
MZ6.4030	40	30		40	#100
MZ6.5020	50	20		40	#220
MZ6.5030	50	30		40	#320
MZ6.6020	co	20		40	
MZ6.6040	60	40		40	#400
MZ6.8040	80	40		40	



Order Example: MZ6.2515 x 80



Waterproof Abrasive Paper

with Sponge Code: SM

Order Code	Grit	Width	Package
SM150	#150		
SM220	#220	446	
SM280	#280	115 mm	1 Metre
SM320	#320	""""	WIGUG
SM400	#400		



Note:

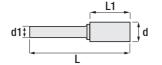
All sides of the product can be used. Easy to clean, you can use repeatedly.

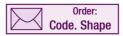
Foam - Abrasive Pads Code: EZ

Order Code	Grit	Dimension	Package
EZ60	#60	100	
EZ100	#100	×	
EZ150	#150	68 x	pcs.
EZ220	#220	27 n	F30.
EZ320	#320	mm	

Carbide Rotary Burrs







Order Example:SA14. B

Code: SA









Shape B: Double cut for general purpose use. Improves control and reduces chips. The cross toothing provides a higher cutting capacity compared with the simple toothing.

Shape A: Standard cut for general operations.

Shape C: Diamond cut for hardest materials and finest finishes.

Shape D: Aluminium toothing. Usage area; non-ferrous metals, aluminium, brass, copper, diecasts, zinc and plastics. To debur, break edges, trim and surface machining.







During Operation: Please use protective goggles, masks and ear plugs.



Cylinder Type DIN 8033

טווע סטטט)				
Code	d	d1	L1	L	Shape
SA42	2.5	3	11	38	
SA43	3.0	3	14	38	В
SA14	5.0		16	50	А
SA1	6.0	6	16	50	С
SA3	9.5	6	19	63	D
SA5	12.7		25	69	



Cylinder Type with Endcut

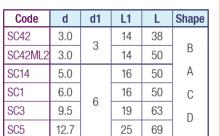


Code	d	d1	L1	L	Shape
SB42	2.5	3	11	38	
SB43	3.0	3	14	38	В
SB14	5.0		16	50	Α
SB1	6.0	6	16	50	С
SB3	9.5	U	19	63	D
SB5	12.7		25	69	



Radius Cylindirical Type

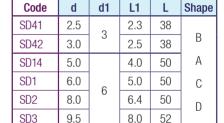
			\sim	\sim
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Ball Type

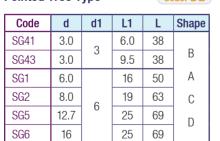
Code: SD





Pointed Tree Type

Code: SG





Flame Type

Code: SH

Code	d	d1	L1	L	Shape
SH41	3.0	3	6.3	38	
SH41ML	3.0	3	6.3	50	В
SH1	6.0		9.5	50	Α
SH2	8.0	6	19	63	С
SH5	12.7	U	32	76	D
SH6	16		36	80	



Radius Cone Type

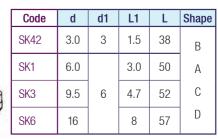
Code: SL

Code	d	d1	L1	L	Shape
SL41	3.0	3	9.5	38	_
SL42	3.0) 	12.7	38	В
SL1	6.0		16	50	Α
SL2	8.0	6	22	69	С
SL4	12.7	6	28	76	D
SL6	16		33	80	



90° Cone Type

Code: SK







CBN Grinding Points

Code: PEF

These grinding points produced with electroplated method. They are designed for shaping and finishing hard materials including Tungsten Carbide and Ceramics. It is used at mould processing, mostly polishing runners or lapping other channels / holes areas making burrs and finishing. Shank: Ø3 mm • Full Length of Products: 45 mm



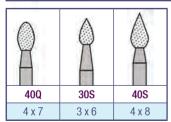
Order: PEF. Code

Order Example: -PEF. 50B

Shank: 3 mm Full Length: 45 mm		Bosososos	E8888888						
Code:	10A	15A	20A	25A	30A	35A	40A	50A	30V
D x L	1x8	1.5x8	2x8	2.5x8	3x10	3.5x10	4x10	5x10	3x10

Å			(3555555)						
20B	30B	50B	15C	20C	25C	30C	35C	40C	50C
Ø 2	Ø 3	Ø 5	1.5x8	2 x 8	2.5x8	3x10	3.5x10	4x10	5x10

A			8886				C. Commonweal	December 1	
20F	30F	50F	20P	30P	15R	20R	30R	20T	30T
2x10	3x10	5x10	2x12	3x15	1.5x10	2x12	3x14	2x10	3x10





Diamond CBN Set - 30 pcs.

Order Code: BMS-30



Contains one each of below:

PEF-10A, 15A, 20A, 25A, 30A, 35A, 40A, 50A, 20B, 30B, 50B, 15C, 20C, 25C, 30C, 35C, 40C, 50C, 20P, 30P, 15R, 20R, 30R, 30S, 20F, 30F, 50F, 20T, 30T and 30V.

Diamond CBN Set - 20 pcs.

Order Code: BMS-20

Contains one each of below:

PEF-10A, 15A, 20A, 25A, 30A, 35A, 15C, 20C, 25C, 30C, 20P, 30P, 15R, 20R, 30R, 20B, 30B, 20F. 30F and 20T.

Diamond CBN Set - Economic

Order Code: T20 20 pcs.

Order Code: T30 30 pcs.



* Contents are the same as the BMS Set.

Diamond CBN Set 50 pcs. - Economic

Order Code: C280300



Needle File Set -12 pcs.

Order Code: BSE12

Contains one file each of:

Hand, flat, triangular, square, half round, crossing, round, knife, barrette, slitting, round-edge joint and marking. Type of cut: Fine, medium & coarse. * 3 x 160 mm



Needle File Set - 6 pcs.

Order Code: BSE06 Bahco

Contains one file each of: Hand, flat, half round, round, triangular and square. Type of cut: Medium * 3 x 160 mm



Needle File Set - 6 pcs.

Order Code: 1720 Beta

Contains one file each of: Hand, flat, half round, round, triangular and square.

Type of cut: Medium

* 3 x 160 mm

Needle File Set - 10 pcs. **Economic**

Order Code: SE10

Type of cut: Medium * 3 x 140 mm





Coarse: For material removing and deburring. Medium: For general purpose and levelling. Fine: Precision filling and smoothing.

Order: Code. Cut

Order Example: –LHE150. Course

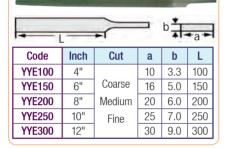
Code	Inch	Cut	а	b	L
LHE100	4"		10	2.5	100
LHE150	6"	Coarse	16	4.0	150
LHE200	8"	Medium	20	5.0	200
LHE250	10"	Fine	25	6.5	250
LHE300	12"		30	7.0	300

Engineers File - Half Round





Order Example: YYF100. Medium



Engineers File - Round





Order Example: YTE250, Fine

Inch	Cut	Ø	L
4"		Ø 4	100
6"	Coarse	Ø 6	150
8"	Medium	Ø 8	200
10"	Fine	Ø10	250
12"		Ø12	300
	4" 6" 8" 10"	4" Coarse Medium Fine	4" Ø 4 6" Coarse Ø 6 8" Medium Ø 8 10" Fine Ø10

Engineers File - Triangular







Order Example: UTE300. Medium

Code	Inch	Cut	а	L
UTE100	4"		7	100
UTE150	6"	Coarse	9	150
UTE200	8"	Medium	11	200
UTE250	10"	Fine	14	250
UTE300	12"		17	300

Engineers File - Mill Saw

odo. MTE



Order Example: MTE200. Medium



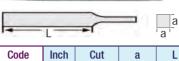
Code	Inch	Cut	a	b	L
MTE100	4"		10	2.5	100
MTE150	6"	Coarse	16	3.0	150
MTE200	8"	Medium	20	4.0	200
MTE250	10"	Fine	25	5.0	250
MTE300	12"		30	6.5	300

Engineers File - Square

Code: KTE



Order Example: KTE150, Medium



Code	Inch	Cut	a	L
KTE100	4"		4	100
KTE150	6"	Coarse	5	150
KTE200	8"	Medium	6	200
KTE250	10"	Fine	8	250
KTE300	12"		10	300

Engineers File - Aluminium

Code: ALE

ESSE



Order Code	Inch	Cut	а	b	L
ALE250	10"	Coarse	25	6.0	250
ALE300	12"	Coarse	30	6.5	300

Plastic Handle for Files



			ESSE
Order Code	Type	File	Inch
ESY04		A	4"
ESY06		A	6"
ESY08			8"
ESY10		:**:	10"
ESY12		::	12"
ESD04			4"
ESD04 ESD06	_		4" 6"
ESD06	•		6"
ESD06 ESD08	•		6" 8"

Handle for Needle Files

Steel Needle Files

It is ideal to work in the smallest surfaces, profiles and angles. It can be used with our without handles.



6.2 x 1.45

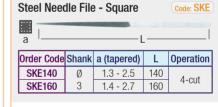
3

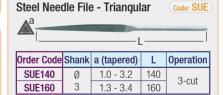
SLE160





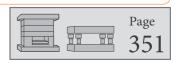
SYE140 Ø 1.1 - 2.8 140 SYE160 3 1.2 - 3.0 160 all sides	Order Code	Shank	a (tapered)	L	Operation
SYE160 3 1.2 - 3.0 160 all slues	SYE140	Ø	1.1 - 2.8	140	all aidea
	SYE160	3	1.2 - 3.0	160	all sides







1737



145 mm / Brass Wire





Diamond File Set - 5 pcs.

Order Code: RKE1005 Contains one file each of:

Flat, triangular, square, half round and crossing.



Diamond File Set - 10 pcs.

Order Code: 13710 * 4 x 160 mm



Diamond Course File Set 5 pcs. Order Code: 13711

* 4 x 160 mm



Die Sinkers Diamond Riffler File Set - 5 pcs.

Order Code: **13726**

* 3 x 140 mm







Diamond Files

Economic Series

Code: ELE

Diamond File - Hand

Order Code	Shank	d x L1 x L
ELE140	Ø4	5 x 70 x 140
ELE160	Ø5	8 x 50 x 160
ELE200	Ø5.5	8 x 70 x 200

Diamond File - Half Round

Code: EYY



Order Code	Shank	d x L1 x L
EYY140	Ø4	5 x 70 x 140
EYY160	Ø5	8 x 50 x 160
EYY200	Ø5.5	8 x 70 x 200

Diamond File - Round

Code: EYE



Order Code	Shank	d x L1 x L
EYE140	Ø4	Ø 3 x 70 x 140
EYE160	Ø5	Ø 4 x 50 x 160
EYE200	Ø5.5	Ø 4 x 70 x 200

Diamond File - Square

Code: DEE



Order Code	Shank	d x L1 x L
DEE140	Ø4	3.0 x 70 x 140
DEE160	Ø5	3.6 x 50 x 160
DEE200	Ø5.5	3.6 x 70 x 200

Diamond File - Triangular

Code: UEE



Order Code	Shank	d x L1 x L
UEE140	Ø4	3.7 x 70 x 140
UEE160	Ø5	5.0 x 50 x 160
UEE200	Ø5.5	5.0 x 70 x 200

Diamond Tapered Files - Hand

Code: CF..

Order Code	Cross Section	Diamond Length	Total Length
CF503	6.1	60 mm	
CF502	8.2 0.6	60 mm	180 mm
CF501	10.2 0.7	70 mm	

Diamond File - Round

Order Code: IF503



Shank	Cross Section	Length
5 x 5	5.2	Diamond: 80 mm Total: 215 mm

Diamond File - Half Round Order Code: IF502



Shank	Cross Section	Length
11 x 4	9.0-	Diamond: 80 mm Total: 215 mm

Diamond File - Flat

Order Code: IF501



Shank	Cross Section	Length
11 x 4	11.0-	Diamond: 80 mm Total: 215 mm

Diamond File - Triangular Order Code: IF505



Shank	Cross Section	Length
11 x 4	-8.0-	Diamond: 80 mm Total: 215 mm

Diamond File - Square

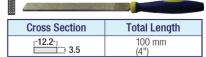
Order Code: IF504



Shank	Cross Section	Length
6 x 6	6.0	Diamond: 80 mm Total: 215 mm

Diamond File with Handle - Flat

Order Code: HX4

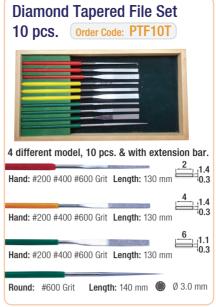


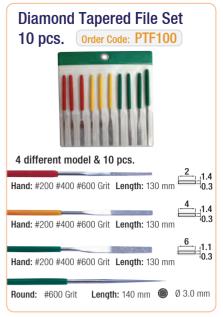
Diamond File with Handle - Flat

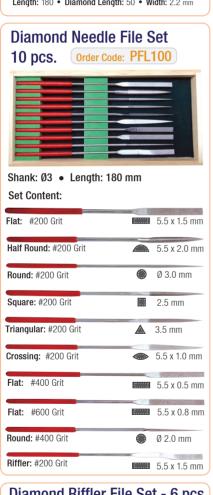
Order Code: HX10



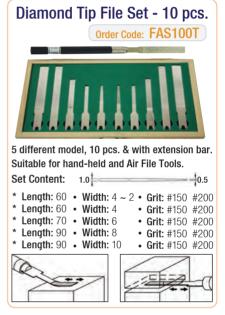










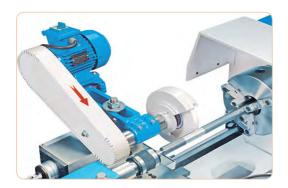








Diamond Tapered File Set



Tool Post Grinders

Code: ST..

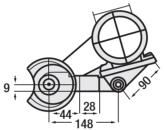
On Lathe / for Internal & External Grinding

It is an excellent machine for internal / hole grinding with easy to mount to the lathe. During the internal works, it maintains many diffucult operation, in addition to external grinding operation together.

- 15 / 20% material removal.
- Internal grinding up to 150 mm (up to 600 mm with additional apparatus).
- Surface / flat grinding operation with Cup Grinding Wheel.

The installation is made by placing a flange on the part of the lathe where the tool holder is located. As all lathes have different axis, the lathe axis is referenced. You can request assistance from our company for installation and training.

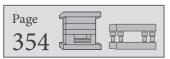




Specification	Order Code: ST175
Motor Power	0.5 HP / 380 V ~ 50 Hz
Rpm	2800
Grinding Wheel	175 x 20 x 20 (25 / 32)
Suitable Lathe	1000 and 1500 mm

Specification	Order Code: ST201
Motor Power	1 HP / 380 V ~ 50 Hz
Rpm	2800
Grinding Wheel	200 x 20 x 20 (25 / 32)
Suitable Lathe	2000 mm

Specification	Order Code: ST202
Motor Power	2 HP / 380 V ~ 50 Hz
Rpm	3000
Grinding Wheel	200 x 20 x 20 (25 / 32)
Suitable Lathe	2000 mm and over





Polishing & Cleaner Block

Code: KS..

It is for lapping, polishing and cleaning. Polishing & Cleaner Block is a multi-purpose abrasive cleaner, impregnated throughout with sharp abrasive grit. Removes light rust or tarnish restoring a bright metal finish. Suitable for dry or wet use.

Block Dimension: 80 x 50 x 20 mm.

Extra Coarse - 36 grit (wine) Coarse - 60 arit (blue)

Medium - 120 grit (grey) - 240 grit (brown) Fine



Order Example:

KS. 60





Mini Abrasive Pen

Code: KZ310

It provides opportunity to use each sides of abrasive by pressing tension spring and turning abrasive band. It is suitable to use at areas that are hard to reach. Multi-purpose usage area at hard operations, it is most suitable equipment to use instead of file. Total length: 158 mm.

Spare Abrasive Bands:

It can be purchased in packages containing 10 pieces (#180 / #320 grit, 5+5 pcs).

Mini Abrasive Rod:



Spare Abrasive Bands:



Order: ZK155



Work Safety Products for Mould Polishing Operation

Order Code	Product
KBK	Ear Protection
KLK	Earplug
STM	Dust Mask
VTM	Dust Mask with Valve
KG01	Safety Goggles



Table Lamps with Magnifier & Hand Magnifier with Lamp

Order Code	Specifications
ZLA	Diopter: 5 / Glass Lens Dimension: 190 x 157 mm Light Source: 2x 9W fluorescent lamp / Voltage: 220V - 240V
MBL	Diopter: 5 / Glass Lens Dimension: Ø 88 mm Light Source: LED / Voltage: 220V
TROY	Hand-held / Zoom: 6x / Light Source: LED / Battery: AA

Clear Loupe Magnifier

Order Code: 183303



Magnification Power: 15x

This pocket magnifier is ideal for a variety of measuring tasks. Transparent draw tube enables clear imaging of the workpiece.

Headband Magnifier

Order Code: HL-09



Magnification Power: 2.5x

Light and impact resistant plastic frame. Comfortable padded headed and fully adjustable.

Mini Vacuum Base Vice

Order Code: RMM0201



Jaw Width: 70 mm

Jaw Opening Max.: 70 mm

Weight: 1.25 kg

Vacuum base mounts on any smooth surface for workholding where you need it. Vice can be rotated 360-degree. Supplied with removable soft rubber protective jaw covers.

Inspection Mirror

Order Code: 1714



It is used to get images from areas that are hard to see. Light and impact resistant plastic frame.

Diameter: 25 mm Length: 155 mm Weight: 6 g.



Tool Cabinet with Drawers

Code: HOBI...

The products used in polishing operation absolutely should be stored separatelly. In order not to mix products and to protect regularly, we are recommended our cabinets.

Order Code: HOBI-114

Dimensions	Number of Drawers
400 x 220 x 660 r	nm 22

Order Code: HOBI-113

Dimensions	Number of Drawers
400 x 220 x 500 mm	19



Industrial Cleaning Cloth Roll

It is produced completely from cellulose and absorber. It is excellent for cleaning of precision tools without leaving a trace. It does not leave feathers, not easily torn and practically used.

Stand Dimension: $450(l) \times 330(w) \times 940(h)$ Stand Weight: $2.5 \text{ kg} \bullet \text{Cloth Weight: } 11 \text{ kg}$

Cloth Length: 350 metre Cloth Width: 25 cm

Order Code	Product
P350	Cleaning Cloth Roll (350 metre)
P1000	Cloth Stand + Cloth Roll Set





Combined Bolt for T-Slot Heavy Duty Type

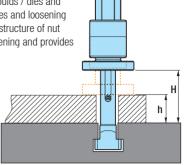
It is used to clamp the heavy workpieces.

By minimizing the vibration occuring at larger moulds / dies and workpieces on large presses or injection machines and loosening resulting from vibration due to contra tightening structure of nut system on the product, it prevents potential loosening and provides precision working.

Class: 12.9 / black coated



Environments on the 150⁰ when clamping on the thread Loctite 8150 is used.

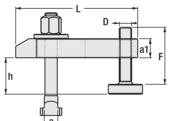


Code: 1630

Order	// a //		// a //		е	k	h - H	e1	e2	С	s	f		Clampin	g Forces	Weiaht
Code	dx	a mm	mm		mm	mm	mm	mm	mm	mm	SW	Nm	kN	(g)		
1630-20.22.200	M20 x 22 x 200	21.7	35	14	25 - 75	49	69	92	12	30	30	679	215	1635		
1630-20.22.250	M20 x 22 x 250	21.7	35	14	70 - 120	49	69	92	12	30	30	679	215	1720		
1630-24.24.200	M24 x 24 x 200	23.7	40	16	25 - 75	53	74	92	12	30	36	1163	310	2075		
1630-24.24.250	M24 x 24 x 250	23.7	40	16	70 - 120	53	74	92	12	30	36	1163	310	2250		
1630-24.28.200	M24 x 28 x 200	27.7	44	18	25 - 75	53	74	92	12	30	36	1163	310	2180		
1630-24.28.250	M24 x 28 x 250	27.7	44	18	70 - 120	53	74	92	12	30	36	1163	310	2340		
1630-30.36.200	M30 x 36 x 200	35.6	54	22	25 - 75	68	88	94	14	30	46	2258	493	3660		
1630-30.36.250	M30 x 36 x 250	35.6	54	22	70 - 120	68	88	94	14	30	46	2258	493	3910		

Combined Clamp with Adjusting Support Screw



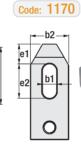


*As per request, lifting washer is provided separately.

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 $\label{eq:continuous} \begin{tabular}{ll} Heights can be adjusted with support screw. \\ Product is suitable to DIN 650 T-Slot. \\ \end{tabular}$

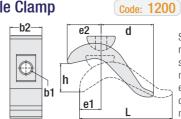


Order Code	2 a	L mm	Code: 1330 a1	b2 mm	e1 mm	e2 mm	b1 mm	Code: 1610	h mm	Code: 1490 D x F	Weight (g)
1170-1010080	10	80	15	30	15	30	11	M10 x 10 x 80	10 - 35	M10 x 42	370
1170-1212100	12	100	20	40	21	40	14.5	M12 x 12 x 100	12 - 40	M12 x 50	740
1170-1212125	12	125	20	40	21	50	14.5	M12 x 12 x 125	12 - 85	M12 x 95	940
1170-1214100	14	100	20	40	21	40	14.5	M12 x 14 x 100	12 - 40	M12 x 50	705
1170-1214125	14	125	20	40	21	50	14.5	M12 x 14 x 125	12 - 85	M12 x 95	965
1170-1616125	16	125	25	50	26	45	18.5	M16 x 16 x 125	15 - 50	M16 x 62	1115
1170-1616160	16	160	25	50	26	65	18.5	M16 x 16 x 160	15 - 85	M16 x 97	1870
1170-1618125	18	125	25	50	26	45	18.5	M16 x 18 x 125	15 - 50	M16 x 62	1540
1170-1618160	18	160	25	50	26	65	18.5	M16 x 18 x 160	15 - 85	M16 x 97	1900
1170-2020160	20	160	30	60	30	60	22.5	M20 x 20 x 160	15 - 45	M20 x 62	1675
1170-2020200	20	200	30	60	30	80	22.5	M20 x 20 x 200	15 - 80	M20 x 97	3295
1170-2022160	22	160	30	60	30	0 60 22.5 M20 x 22 x 160		22.5 M20 x 22 x 160		M20 x 62	2730
1170-2022200	22	200	30	60	30	80	22.5	M20 x 22 x 200	15 - 80	M20 x 97	3340
1170-2424160	24	160	30	70	35	60	26.5	M24 x 24 x 160	16 - 60	M24 x 81	3465
1170-2424200	24	200	30	70	35	80	26.5	M24 x 24 x 200	16 - 95	M24 x 116	4660
1170-2428160	28	160	30	70	35	60	26.5	M24 x 28 x 160	16 - 60	M24 x 81	5560
1170-2428200	28	200	30	70	35	80	26.5	M24 x 28 x 200	16 - 95	M24 x 116	4755

Stepless Height Adjustable Clamp







Stepless clamp for fast adjusting of several ranges of work height without additional supports. Low space requirement on machine table. Heavy duty type and especially suitable for clamping dies / moulds to press / injection machine.



Material: Forged and

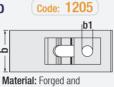


Order Code	a F	DIN 787	b1 mm	b2 x L	d mm	e1 mm	e2 mm	h	Weight (g)
1200-50.140	-	-	17	50 x 140	60	30	55	75	900
1200-60.175	-	-	21	60 x 175	80	40	70	85	1600
1200-12.125	12	M12 x 12 x 125						0 - 50	1070
1200-14.125	14	M12 x 14 x 125	17	50 x 140	60	30	55	0 - 55	1080
1200-16.160	16	M16 x 16 x 160	17	30 X 140	00	30	33	0 - 75	1270
1200-18.160	18	M16 x 18 x 160						0 - 75	1280
1200-20.200	20	M20 x 20 x 200	21		80	40	70	0 - 85	2300
1200-22.200	22	M20 x 22 x 200	21	60 x 175	00	40	70	0 - 85	2370

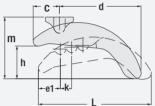
Stepped Height Adjustable Clamp

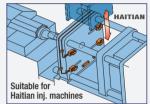


It provides using between



hardened steel / zinc coated







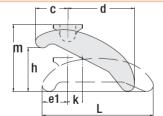
Order Code	b1 mm	a [DIN 787	m mm	h	bxL	C mm	d mm	k x3	Weight (g)
1205-017	17	16 - 18	-	93	15 - 50	65 x 165	39	128	17	2100
1205-021	21	20 - 22	-	111	20 - 65	75 x 189	43	146	19	3200
1205-025	25	24 - 28	-	126	20 - 75	85 x 213	49	164	21	4500
1205-031	31	36	-	143.5	20 - 85	95 x 238	56	182	23	6300
1205-016	17	16	M16 x 16 x 125	93	15 - 50	65 x 165	39	128	17	2500
1205-018	17	18	M16 x 18 x 125	93	15 - 50	65 x 165	39	128	17	2500
1205-020	21	20	M20 x 20 x 160	111	20 - 65	75 x 189	43	146	19	3900
1205-022	21	22	M20 x 22 x 160	111	20 - 65	75 x 189	43	146	19	3900
1205-024	25	24	M24 x 24 x 200	126	20 - 75	85 x 213	49	164	21	5700
1205-028	25	28	M24 x 28 x 200	126	20 - 75	85 x 213	49	164	21	5700
1205-036	31	36	M30 x 36 x 250	143.5	20 - 85	95 x 238	56	182	23	8800

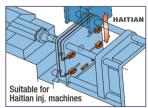
Stepped Height Adjustable Clamp



Code: 1210

Material: Forged and hardened steel / zinc coated



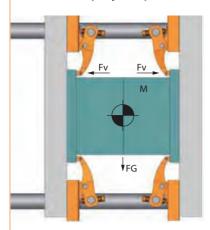


It provides using between 0-75 mm without supporting.



Order Code	b1 mm	a	DIN 787	m mm	h	bxL	C mm	d mm	e1 mm	k x4	Weight (g)
1210-013	13	12 - 14	-	52	0 - 40	40 x 90	28	48	23	17	2100
1210-017	18	16 - 18	-	80	0 - 60	58 x 130	38	74	29	19	3200
1210-021	22	20 - 22	-	98	0 - 75	68 x 140	46	80	32	21	4500
1210-025	26	24 - 28	-	110	0 - 90	78 x 175	52	100	39	23	6300
1210-012	13	12	M12 x 12 x 100	52	0 - 40	40 x 90	28	48	23	17	2500
1210-014	13	14	M12 x 14 x 100	52	0 - 40	40 x 90	28	48	23	17	2500
1210-016	18	16	M16 x 16 x 160	80	0 - 60	58 x 130	38	74	29	19	3900
1210-018	18	18	M16 x 18 x 160	80	0 - 60	58 x 130	38	74	29	19	3900
1210-020	22	20	M20 x 20 x 200	98	0 - 75	68 x 140	46	80	32	23	8800

Clamping Templates



For Injection Moulds:

Formula Calculator

$$\frac{M \times FG}{1000} = kN \qquad \frac{2500 \times 9.81}{1000} = 24.52 \text{ kN}$$

$$\frac{kN}{\mu} = \text{Result} \qquad \frac{24.52}{0.14} = 175.14 \text{ kN}$$

= Number

of Clamp

Result

Fv

MxFG

Result (Lower Die) = Number

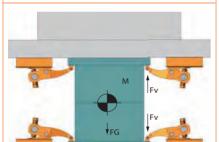
Fν

175.14 kN

25 kN

= 7 Clamp

Use 8 pcs.



For Press Dies:

Formula Calculator

5000 x 9.81

$$\frac{M \ X \ FG}{1000} = kN \qquad \frac{5000 \ X \ 9.81}{1000} = 49.050 \ kN$$

$$\frac{kN}{\mu} = \underset{\text{(Upper Die 60 \%)}}{\text{Result}} \qquad \frac{49.05}{0.14} \qquad = 350.35 \ kN \\ \underset{\text{(Lower Die 40 \%)}}{\text{(Lower Die 40 \%)}} \qquad 0.14 \qquad \underset{\text{(60 \% Upper Die)}}{\text{(66 \% Upper Die)}} = 140.14)$$

$$\frac{\text{Result}}{\text{FV}} \qquad = \underset{\text{Number}}{\text{Number}} \qquad \frac{210.21 \ kN}{\text{(Upper Die)}} \qquad = 8 \ \text{Number of Clamp}$$

$$\frac{\text{(Upper Die)}}{25 \ kN} \qquad = 100.000 \ kN$$

140.14 kN

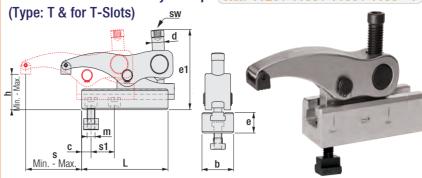
(Upper Die)

25 kN

5.6 Clamp

Use 6 pcs.





Area of Usage:

Injection machines, presses, milling machines, drilling machines and various industrial machines.

Code: 1120 - T / Standard Type (t-slot: 14-16-18)

- * M12 hex-socket screw is used with DIN 508 T-Nut.
- * Height Clamping Gap of Part: 0 50 mm
- * Back and Forth Movement Distance: 54 mm
- * Clamping Force: 1600 Kgf

Code: 1130 - T / Standard Type (t-slot:14-16-18-20-22)

- * M12 hex-socket screw is used with DIN 508 T-Nut.
- * Height Clamping Gap of Part: 0 60 mm
- * Back and Forth Movement Distance: 68 mm
- * Clamping Force: 2000 Kgf

Code: 1150 - T / Heavy Duty Type (t-slot: 18-20-22-24-28) Code: 1160 - T / Heavy Duty Type (t-slot: 22-24-28-36)

- * M16 hex-socket screw is used with DIN 508 T-Nut.
- * Height Clamping Gap of Part: 0 65 mm
- * Back and Forth Movement Distance: 78 mm
- * Clamping Force: 2500 Kgf

- * M20-24 hex-socket screw is used with DIN 508 T-Nut. * Height Clamping Gap of Part: 20 - 80 mm
- * Back and Forth Movement Distance: 73 mm
- * Clamping Force: 5500 Kgf

Order Code	T-Slot	m	h	S	s1	e1	d	sw	L	е	b	С	Weight (g)
1120-014-T	14												
1120-016-T	16	M12	Min Max. 0 - 50	12 - 66	25	100	00 M14	8	104	35.5	38	13	1700
1120-018-T	18												
1130-014-T	14												3040
1130-016-T	16												3055
1130-018-T	18	M12	Min Max. 0 - 60	15 - 83	30	113	M18	10	130	39	48	17.5	3085
1130-020-T	20		0 - 60										3135
1130-022-T	22												3150

Hoover Duty Types

I.	Heavy Duty Types	3												
l	1150-118-T	18												4410
	1150-120-T	20												4460
	1150-122-T	22	M16	Min Max. 0 - 65	18 - 96	35	125	M20	12	140	43	55	19.5	4515
	1150-124-T	24		0 00										4620
	1150-128-T	28												4725
l	1160-222-T	22	M20					1404	10	178				9030
l	1160-224-T	24		Min Max.	17 - 92	11 5	175				55	74	24	9120
	1160-228-T	28	M24	20 - 80	17 - 92	41.3	1/3	IVIZ4	12	1/0	55	/ 4	24	9180
	1160-236-T	36	IVIZ4											9600



of Clamp



Push the base component into the desired position on the carrier component.



Adjust the height of the bar with the adjusting screw and clamp the workpiece. The powerful design enables rapid and easy clamping.



Accessories for Power Clamp

Fixing Screw and T-Nut m * For 14-28 T-Slots.

* T-Nut DIN 508.

Order Code	2 a 5	m	L	d	sw
1120-512	12	M10	29	16.5	8
1120-514	14	M12	29	10.5	O
1130-614	14				
1130-616	16		30		
1130-618	18	M12		20.5	10
1130-620	20		36		
1130-622	22		30		
1150-718	18		34		
1150-720	20		54		
1150-722	22	M16		24.5	12
1150-724	24		42		
1150-728	28				
1160-822	22	M20			
1160-824	24	IVIZU	45		
1160-826	28			34	12
1160-828	28	M24	55		12
	20				

Pressure Pad

1160-832

1160-836



DP: Straight part clamping.

32



a

61

66 38.5

BSP: Lengthwise cylinder clamping.





Desired distance is reached by increasing

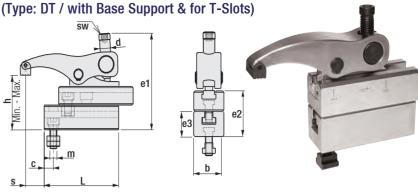


Base support is applied in T-Slot with hex-socket screw against T-Nut.



Workpiece is fixed with the hex-socket





Area of Usage:

Injection machines, presses, milling machines, drilling machines and various industrial machines.

Code: 1120 - DT / Standard Type (t-slot: 14 - 16 - 18)

- * M12 hex-socket screw is used with DIN 508 T-Nut.
- * Height Clamping Gap of Part: 36 86 mm
- * Clamping Force: 1600 Kgf

Code: 1130 - DT / Standard Type (t-slot: 14 - 16 - 18 - 20 - 22)

- * M12 hex-socket screw is used with DIN 508 T-Nut.
- * Height Clamping Gap of Part: 45 105 mm
- * Clamping Force: 2000 Kgf

Code: 1150 - DT / Heavy Duty Type (t-slot: 18 - 20 - 22 - 24 - 28)

- * M16 hex-socket screw is used with DIN 508 T-Nut.
- * Height Clamping Gap of Part: 48 113 mm
- * Clamping Force: 2500 Kgf

Code: 1160 - DT / Heavy Duty Type (t-slot: 22 - 24 - 28 - 36)

- * M20-24 hex-socket screw is used with DIN 508 T-Nut.
- * Height Clamping Gap of Part: 79 139 mm
- * Clamping Force: 5500 Kgf

Order Code	T-Slot a	m	h	S	e1	e2	d	sw	L	b	e3	С	Weight (g)
1120-014-DT	14												
1120-016-DT	16	M12	Min Max. 36 - 86	12 - 66	136	71.5	M14	8	104	38	38	13	2540
1120-018-DT	18												
1130-014-DT	14												4750
1130-016-DT	16												4775
1130-018-DT	18	M12	Min Max. 45 - 105	15 - 83	158	83	M18	10	130	48	45	17.5	4805
1130-020-DT	20		10 100										4855
1130-022-DT	22											4905	

Heavy Duty Types

1150-118-DT	18												6625
1150-120-DT	20												6690
1150-122-DT	22	M16	Min Max. 48 - 113	18 - 96	173	90	M20	12	140	55	48	19.5	6750
1150-124-DT	24		10 110										6840
1150-128-DT	28												6960
1160-222-DT	22	M20											13330
1160-224-DT	24	IVIZU	Min Max. 79 - 139	17 00	225	11/	MOA	12	178	74	59	24	13465
1160-228-DT	28	M24	79 - 139	17 - 92	233	114	IVIZ4	12	170	74	59	24	13580
1160-236-DT	36	IVIZ4											13890

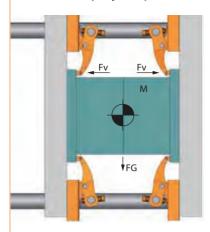


Position and secure the base





Clamping Templates

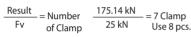


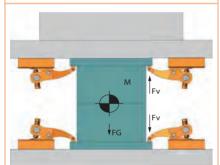
For Injection Moulds:

Formula Calculator

$$\frac{M \times FG}{1000} = kN \qquad \frac{\frac{kg}{2500 \times 9.81}}{1000} = 24.52 \text{ kN}$$

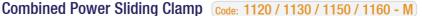
$$\frac{kN}{\mu} = \text{Result} \qquad \frac{24.52}{0.14} = 175.14 \text{ kN}$$





For Press Dies:

Formula Calculator





Area of Usage:

Injection machines, presses, milling machines, drilling machines and various industrial machines.

Advantages:

2500 - 5500 Kgf clamping force. Using in hole and T-Slot. Ability to be fixed in various positions by sliding on the tool table. It clamps high and low distances without support with hex-socket screw. It provides rapid and easy clamping due to it's practical structure.

Code: 1120 - M / Standard Type (hole: M10-M12)

- * In the threaded holes M10 M12 are used with the "order codes: 1120-310 / 1120-312" screws.
- * Height Clamping Gap of Part: 0 50 mm
- * Clamping Force: 1600 Kgf

Code: 1130 - M / Standard Type (hole: M12-M16)

- * In the threaded holes M12 M16 are used with the "order codes: 1130-412 / 1130-416" screws.
- * Height Clamping Gap of Part: 0 60 mm
- * Clamping Force: 2000 Kgf

Code: 1150 - M / Heavy Duty Type (hole: M16-M18-M20)

- * In the threaded holes M16 M18 M20 are used with the "order codes: 1150-516 / 1150-518 / 1160-520" screws.
- * Height Clamping Gap of Part: 0 65 mm
- * Clamping Force: 2500 Kgf

Code: 1160 - M (hole: M20-M22-M24-M30)

- * In the threaded holes M20 M22 M24 M30 are used with the "order codes: 1160-620 / 1160-622 / 1160-624 / 1160-724 / 1160-730 " screws.
- * Height Clamping Gap of Part: 20 80 mm
- * Clamping Force: 5500 Kgf

Order Code	m	h	S	s1	e1	d	sw	L	е	b	С	k	Weight (g)
1120-010-M	M10	Min Max.	10 66	25	100	1.11.1	8	104	35.5	20	13	20	1700
1120-012-M	M12	0 - 50	12 - 00	20	100	U IVI 14	14 0	104	33.3	J0	13	20	1700
1130-012-M	M12	Min Max.										22	3000
1130-016-M	M16	0 - 60	15 - 83	30	113	M18	10	130	39	48	17.5	26	3030
Heavy Duty Type													

Heavy Duty Types

1150-116-M	l											26	4340
1150-118-M	M18	Min Max. 0 - 65	18 - 96	35	125	M20	12	140	43	55	19.5	20	4360
1150-120-M	M20											30	4370

1160-220-M	M20											34	8880
1160-222-M	M22	Min Max. 20 - 80	17 00	/1 E	175	MOA	10	170	E E	71	24	38	8900
1160-224-M	M24	20 - 80	17 - 92	41.5	175	IVIZ4	12	170	55	74	24	44	8920
1160-230-M	M30											51	9110











Accessories for Combined Power Sliding Clamp



Order Code	T-Slot	h Min Max.	sw	SW	Weight (g)
1120-0050	14 - 18	0 - 50	8	-	860
1130-0060	14 - 22	0 - 60	10	-	1680
1150-0062	18 - 28	0 - 65	12	-	2565
1160-2080	22 - 36	20 - 80	12	24	5050

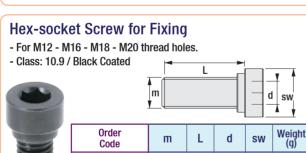
Body with T-Slide - Forged Steel / Hardened

Order Code	g (metric)	T-Slot	L	b	е	Weight (g)
1120-045	M10 / M12	14 - 18	104	38	35.5	750
1130-047	M12 / M16	18 - 28	130	48	39	1275
1150-053	M16 / M18 / M20	18 - 28	140	55	42	1700
1160-074	M20 / M22 / M24	22 - 28	178	74	22	3650
1160-075	M30	36	178	74	55	3650



Order Code	g (metric)	T-Slot	L	b	е	Weight (g)
1120-040	M10 / M12	14	104	38	38	820
1130-045	M12 / M16	14	130	48	45	1630
1150-048	M16 / M18 / M20	18	140	55	48	2070
1160-059	M20 / M22 / M24	28	178	74	55	3980



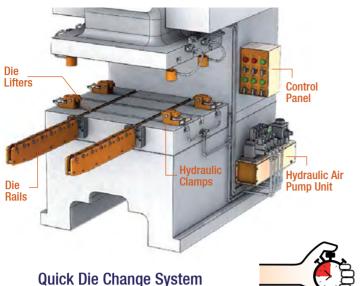


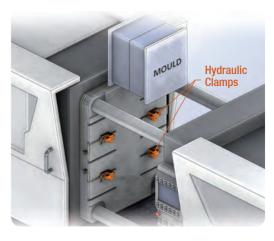
Order Code	m	L	d	SW	Weight (g)
1120-310	M10	29	16.5	8	28
1120-312	M12	29	10.3	0	34
1130-412	M12	30	20.5	10	45
1130-416	M16	34	20.5	10	75
1150-516	M16	34			75
1150-518	M18	38	24.5	12	90
1150-520	M20	38			105
1160-620	M20	45			170
1160-622	M22	49	34		295
1160-624	M24	45	34	12	390
1160-724	M24	55			405
1160-730	M30	66	38.5		400





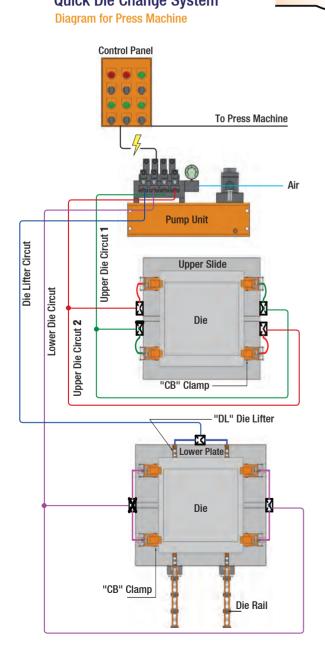
Quick Die & Mould Change Systems

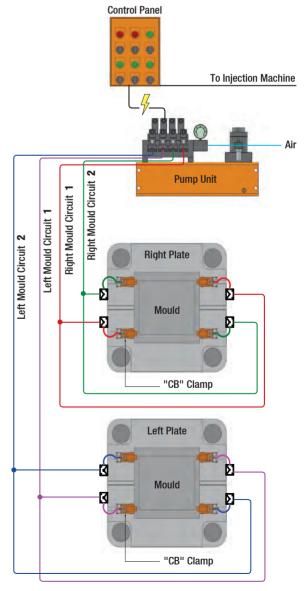




Quick Mould Change System

Diagram for Injection Machine

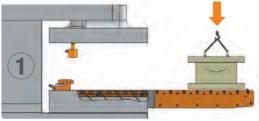




Quick Die Change System

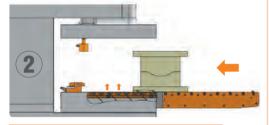
"Load the Die"

Load the die using a chain hoist or forklift. The Die Rails enable easy loading.



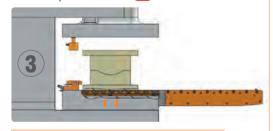
"Transfer the Die to Lower Plate (bolster)"

With the Die Rails and Die Lifters, minimal force is required to move the die. Die Lifters are set in the T - / U - slots. Die Lifter: Hydraulic Pressure ON



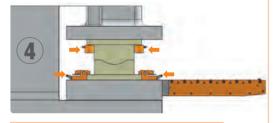
"Set the Die on the Lower Plate (bolster)"

With push-button operation, the Die Lifter releases and the die makes contact with the lower plate. Die Lifter: Hydraulic Pressure OFF



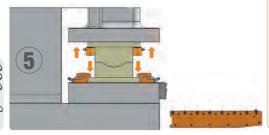
"Set the Hydraulic Clamps"

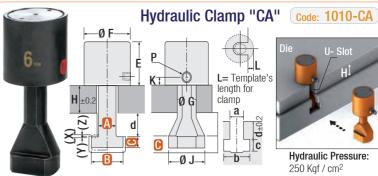
Set to clamps according to the die. Slide clamps on the T-Slot and bring them near the die. Hydraulic Clamp: Hydraulic Pressure OFF



"Fasten the Die"

With push-button operation, Hydraulic Clamps fastening / clamping the die. After safety confirmation, the Die Rails can be removed. Hydraulic Clamp: Hydraulic Pressure ON





Hydraulic Pressure: 250 Kgf / cm²

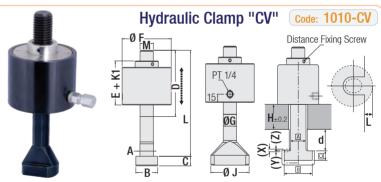
* Please indicate the dimensions of T-Slot (a-b-c-d) and the thickness of the base for the die (H) when ordering.

		. ()					- ()	
Type \longrightarrow		CA01	CA02	CA04	CA06	CA10	CA16	CA25
Capacity of Clamp	Ton	1	2	4	6	10	16	25
Total Stroke (X)	mm	6	8	8	8	8	8	8
Stroke of Clamp (Y)	mm	3	4	4	4	4	4	4
Preserved Stroke (Z)	mm	3	4	4	4	4	4	4
Total Volume of Cylinder	CC	3	7	13	21	32	54	76

- The dimensions of clamps A, B and C are made based on the dimension of T-Slot.

- If the thickness of clamp "H+d" is more than the max. value listed on the right, it will be regarded as special design. Standard Temp.: 600 Optional Temp.: 1600

	Order Code	Ø F	Ε	ø G	ø J	H+d Max.	L Max.	a Min.	K	Р
	1010-CA01	44	48	12	30	60	12	8	9.5	PT 1/8
I	1010-CA02	53	52	16	48	80	17	12	12	PT 1/8
I	1010-CA04	65	58	23	58	90	20	16	15	PT 1/4
	1010-CA06	82	65	30	64	100	25	18	15	PT 1/4
	1010-CA10	99	71	38	78	110	30	22	15	PT 1/4
	1010-CA16	126	82	45	88	120	38	28	17	PT 1/4
	1010-CA25	150	100	55	98	140	45	36	23	PT 1/4



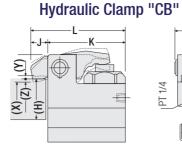
Type →		CV04	CV06	CV10
Capacity of Clamp	Ton	4	6	10
Total Stroke (X)	mm	8	8	8
Stroke of Clamp (Y)	mm	4	4	4
Preserved Stroke (Z)	mm	4	4	4
Total Volume of Cylinder	CC	13	21	32

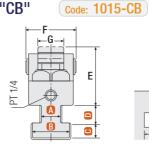
- Distance adjustment with fixing screw.

Standard Temp.: 600 Optional Temp.: 1600

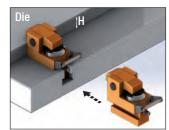
Order Code	T-Slot	Α	В	С	D	E + K1	Adjusting Distance	F	L Max.	M	ø G	Ø J
1010-CV04.20125	20	19.6	32	12	85	70	15	65	125	M20	20	58
1010-CV04.22160	20	19.6	32	12	110	70	40	65	160	M20	20	58
1010-CV04.20160	22	21.6	35	14	85	70	15	65	125	M20	20	58
1010-CV04.22125	22	21.6	35	14	110	70	40	65	160	M20	20	58
1010-CV06.24125	24	23.6	40	16	85	77	8	82	125	M24	24	64
1010-CV06.24160	24	23.6	40	16	110	77	33	82	160	M24	24	64
1010-CV06.28125	28	27.6	44	18	85	77	8	82	125	M24	24	64
1010-CV06.28160	28	27.6	44	18	110	77	33	82	160	M24	24	64
1010-CV10.27160	27	26.6	46	18	110	83	27	99	160	M27	27	78
1010-CV10.27200	27	26.6	46	18	125	83	42	99	200	M27	27	78
1010-CV10.32160	32	31.6	50	20	110	83	27	99	160	M27	27	78
1010-CV10.32200	32	31.6	50	20	125	83	42	99	200	M27	27	78











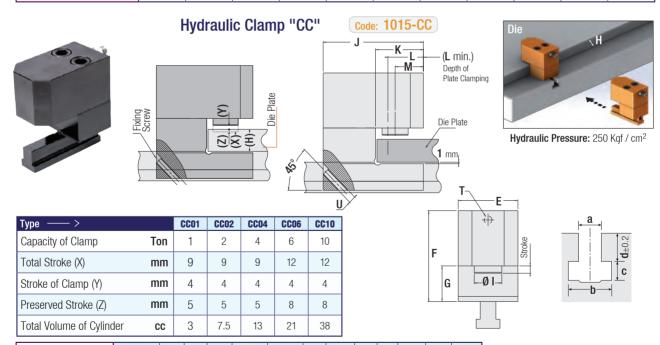
Hydraulic Pressure: 250 Kgf / cm²

Type →		CB01	CB02	CB04	CB06	CB10	CB16	CB25
Capacity of Clamp	Ton	1	2	4	6	10	16	25
Total Stroke (X)	mm	6	8	8	8	8	8	8
Stroke of Clamp (Y)	mm	2.5	3	3	3	3	3	3
Preserved Stroke (Z)	mm	3.5	5	5	5	5	5	5
Total Volume of Cylinder	CC	3	7.5	13	21	38	55	98

- * Please indicate the dimensions of T-Slot (a-b-c-d) and the thickness of the base for the die (H) when ordering.
- The dimensions of clamps (A), (B), (C) and (D) are made based on the dimension of T-Slot.

Standard Temperature: 60⁰ Optional Temperature: 160⁰

Order Code	L	К	J	Н	H + d Min. Max.	E Min.	F	G	a Min.	C Min.	Р
1015-CB01	74.5	60	14.5	25	100	42	44	20	10	6.5	PT 1/8
1015-CB02	110	90	20	25	100	73	68	32	14	10	PT 1/4
1015-CB04	134	110	24	25	130	77	79	40	18	12	PT 1/4
1015-CB06	159	130	29	30	150	92	96	46	22	14	PT 1/4
1015-CB10	189	159	30	40	140	114	117	54	24	16	PT 1/4
1015-CB16	230	200	30	40	130	126	129	58	28	20	PT 1/4
1015-CB25	265	235	30	45	120	148	156	70	36	23	PT 1/4



Order Code	H Min Max.	A Min.	C Min.	Е	F	G	1	J	K	L Min.	М	T	U (metric)	*
1015-CC01	20 - 35	10	6.5	43	G+43	H+9	16	75	33	27	21.5	1/8	M5	l b
1015-CC02	25 - 40	14	10	50	G+50	H+9	18	91	43	30	25	1/8	M5	-
1015-CC04	25 - 40	18	12	65	G+60	H+9	30	115	55	40	32.5	1/8	M8	0
1015-CC06	35 - 55	22	14	80	G+65	H+12	37.5	130	65	48	40	1/4	M10	
1015-CC10	40 - 60	24	16	100	G+82	H+12	50	160	85	60	49	1/4	M12	

- * Please indicate the dimensions of T-Slot (a-b-c-d) and the thickness of the base for the die (H) when ordering.
- The dimensions of clamps (A), (B), (C) and (D) are made based on the dimension of T-Slot.

Standard Temperature: 60⁰ Optional Temperature: 160⁰

Hydraulic Clamp "CD"



Type

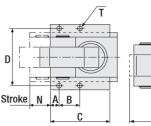
Capacity of Clamp

Stroke of Clamp (Y)

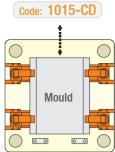
Preserved Stroke (Z)

Total Volume of Cylinder

Total Stroke (X)



5	
FW	





Tube Connector Order Code: 1036

CD02 CD04 CD06 CD10 CD16 CD25 Ton 2 10 16 25 mm 8 8 8 8 8 8 3 3 3 3 3 3 mm 5 5 mm 5 5 5 5

21

38

55

98

Hydraulic Pressure:
250 Kgf / cm ²

Standard Temperature: 600 Optional Temperature: 1600

Clamp Bracket	Order Code: CA



Order	Code	Α	В	С	D	E Min.	F	G	W	N Max.	Т
1015	-CD02	12	20	80	98	90	76	30	124	124	M10 x 20D
1015	-CD04	12	25	100	109	93	87	30	135	135	M12 x 24D
1015	-CD06	15	30	120	126	109	104	30	152	152	M12 x 24D
1015	-CD10	15	35	150	148	131	124	36	174	174	M14 x 28D
1015	-CD16	20	40	200	166	142	138	44	200	200	M18 x 36D
1015	-CD25	20	45	235	200	163	168	48	240	240	M22 x 45D



Accessories for Quick Die & Mould Change System

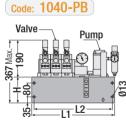
7.5

13

CC



Hydraulic Air Pump Unit



Order Code	L1	L2
PB.0801P1V	250	225
PB.0801P2V	310	285
PB.0801P3V	428	403
PB.0801P4V	487	462
PC.1201P3V	-	397

- The Hydraulic Pump is driven by air. Once the hydraulic pressure reaches the pressure setting, it stops pumping which is energy saving.
- The circuit control system is designed with the function of checking and avoiding oil leakage. If pneumatic pressure out, the hydraulic pressure still maintains.
- It is suggested to adopt pump code: 1040-PC1201P3V when used with Hydraulic Clamp type CA16-CB16 or CA25-CB25.
- With pressure control valve.
- Capacity 400 bar max. PC.12 Hydraulic Pressure (kgf/cm²) Hydraulic Pressure (kgf/cm²)



Electric Hydraulic Pump Unit

Code: 1040-VD

- It is suitable for direct connection system.
- Please specify flow speed (I/min.) before ordering.



Control Unit Order Code Circuit 1041-QDC1 1041-QDC2 2 1041-QDC3 3 1041-QDC4 4

Flow **Order Code** Valve Bar (I/min) (I/min) 1040-1P1VD 6 14 150 1 1040-1P2VD 2 6 14 150 1040-1P3VD 3 6 14 150 1040-1P4VD 6 150 4 14



Electric Hydraulic Pump Unit

Code: 1040-V

- It is suitable for quick coupling system.
- Please specify flow speed (I/min.) before ordering.

0101-	V-1	FI	Day		
Order Code	Valve	(I/min)	(I/min)	Bar	
1040-1P1V	1	6	14	150	
1040-1P2V	2	6	14	150	
1040-1P3V	3	6	14	150	
1040-1P4V	4	6	14	150	





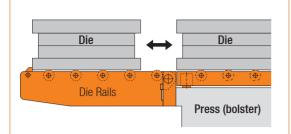
Modular Quick Coupling

Order Code: 1042-02

- Provides distribution between units in hydraulic system installation



Die Rails Systems / Bolster Extensions



Types: RC - RD - RE / RF - RS

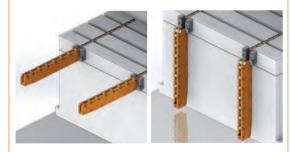


Type	Folding Method	Specification
С	Removable	580 mm
D	Vertically Foldable	760 mm
E	Foldable (short)	880 mm
F	Foldable (long)	990 mm

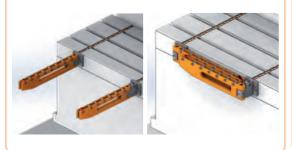
Type: RC / Removable

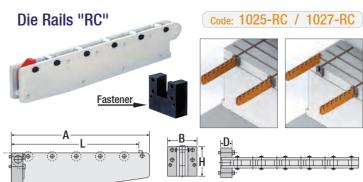


Type: RD / Vertically Foldable



Type: RE - RF / Foldable

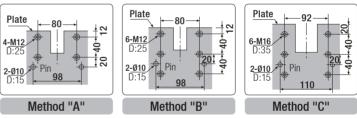


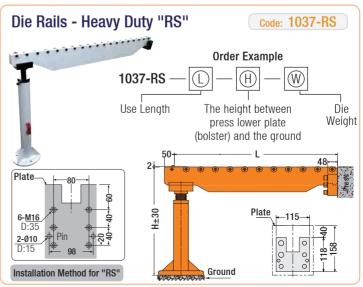


* In "RC" type, Die Rail and Fastener can be used separately.

in the type, ble hall and tacterior out be about separatory.									
Order Code	Fastener	L	Max.	A	Fastener (mm)		Hation	Number of	
Order code	Type	(mm)	Capacity	(mm)	D	В	Н	nstallation	Roller
1025-RC580	RC-12	500	800 Kgf.	550			118	Method	5 pcs.
1025-RC760	RC-12	700	600 Kgf.	750	48	115	110	"A"	7 pcs.
1025-RC880	RC-16	800	800 Kgf.	850			158	Method	8 pcs.
1025-RC990	RC-20	900	900 Kgf.	950			188	"B"	9 pcs.
1027-RC05125	RC-14H		1250 Kgf.				138		
1027-RC05160	RC-16H	500	1600 Kgf.	550	55	130	158	Method "C"	7 pcs.
1027-RC05200	RC-18H		2000 Kgf.				178		
1027-RC07125	RC-14H		1250 Kgf.				138		
1027-RC07160	RC-16H	700	1600 Kgf.	750	55	130	158	Method "C"	9 pcs.
1027-RC07200	RC-18H		2000 Kgf.				178		
1027-RC08125	RC-16H		1250 Kgf.				158		
1027-RC08160	RC-18H	800	1600 Kgf.	850	55	130	178	Method "C"	10 pcs.
1027-RC08200	RC-20H		2000 Kgf.				188		
1027-RC09160	RC-22H	900	1600 Kgf.	950	55	130	218	"C"	11 pcs.

Installation Methods

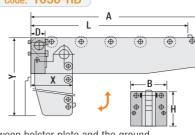


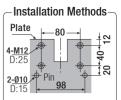


Die Rails "RD" / Vertically Foldable Code: 1030-RD



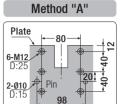






* The mounting length (Y) of type "RD	' should be less than the height between b	olster plate and the ground.
---------------------------------------	--	------------------------------

Order Code	L	Max.	Α	Folded D	im. (mm)	Fastener (ı	stener (m	m)	Number of	Installation		
Order Code	(mm)	Capacity	(mm)	Х	Υ	D	В	Н	Roller	IIIStaliäti011		
1030-RD580	500	800 Kgf.	550	140	620			118	5 pcs.	Method		
1030-RD760	700	600 Kgf.	750	140	820	52	115	110	7 pcs.	"A"		
1030-RD880	800	800 Kgf.	850	180	960	32	115	158	8 pcs.	Method		
1030-RD990	900	900 Kgf.	950	220	1100			188	9 pcs.	"B"		
1030-RD05125		1250 Kgf.		170	645			138	7 pcs.			
1030-RD05160	500	1600 Kgf.	550	190	670	62	130	158	7 pcs.	Method "C"		
1030-RD05200		2000 Kgf.		210	675			178	7 pcs.			
1030-RD07125		1250 Kgf.		170	840			138	9 pcs.			
1030-RD07160	700	1600 Kgf.	750	190	865	62	130	158	9 pcs.	Method "C"		
1030-RD07200		2000 Kgf.		210	890			178	9 pcs.			
1030-RD08125		1250 Kgf.		190	960			158	10 pcs.			
1030-RD08160	800	1600 Kgf.	850	210	985	62	130	178	10 pcs.	Method "C"		
1030-RD08200		2000 Kgf.		220	995					188	10 pcs.	
1030-RD09160	900	1600 Kgf.	950	250	1130	62	130	218	11 pcs.	"C"		



Method "B" Plate 92 6-M16 D:35 2-010 Pin 201 9 110

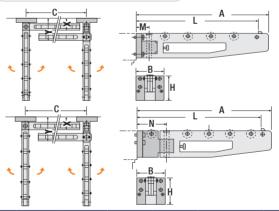
Method "C"

Die Rails "RE - RF" / Foldable



- * The distance for installing the two Die Rails of type RE and RF should be more than the distance between the installations (C).
- * The Die Rails "RE RF" can be folded to the right or left at the end of operation.

Code: 1033-RERF / 1035-RERF







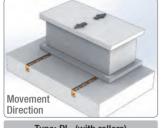
					ш	1111		<u>+</u>				
Order Code	L	Max.	Α	C	Folded D	im. (mm)	Fastene	er (mm)	Number of	M	N	Installation
Order Code	(mm)	Capacity	(mm)	(mm)	Х	Υ	В	Н	Roller	(mm)	(mm)	IIIStaliation
1033-RERF580	500	800 Kgf.	550	525				118	5 pcs.			Method
1033-RERF760	700	600 Kgf.	750	725	90	150	115	110	7 pcs.	57	120	"A"
1033-RERF880	800	800 Kgf.	850	825	90	130	110	158	8 pcs.	37	120	Method
1033-RERF990	900	900 Kgf.	950	925				188	9 pcs.			"B"
1035-RERF05160		1600 Kgf.	FF0	FOE	105	170	100	158	7	7.4	110	Method
1035-RERF05200	500	2000 Kgf.	550	525	105	170	130	178	7 pcs.	74	140	"C"
1035-RERF07160	700	1600 Kgf.	750	725	105	170	130	158	9 pcs.	74	140	Method
1035-RERF07200		2000 Kgf.	730	720	100	170	100	178	υ ρου.	, ,	140	"C"
1035-RERF08160	800	1600 Kgf.	850	825	105	170	130	178	10 pcs.	74	140	Method
1035-RERF08200		2000 Kgf.	030	023	103	170	130	188	10 μεδ.	74	140	"C"
1035-RERF09160	900	1600 Kgf.	950	925	105	170	130	218	11 pcs.	74	140	Method
1035-RERF09200	900	2000 Kgf.	900	920	100	170	130	248	i i pcs.	14	140	"C"

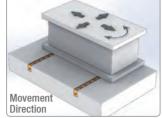
Die Lifters "DL36" & "DB36" / Hydraulic

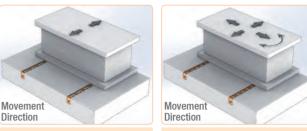
Die Lifters "DLS36" & "DBS36" / Spring Loaded









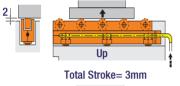


Type: DL (with rollers)

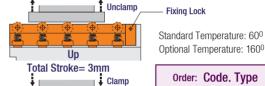
Type: DB (with balls)

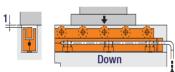
Type: DLS (with rollers)

Type: DBS (with balls)







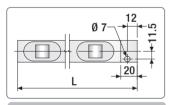


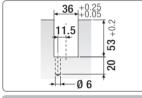
Order Example: -1020-0300. DB36

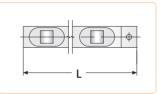
Order: Code. Type



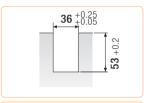








Down



Outer Dimensions DL36 / DB36

Machining Method for Plate

Outer Dimensions DLS36 / DBS36

Machining Method for Plate

Code	L	D	L36	D	B36	Hyd. (Cylinder	
Coue	(mm)	Roller	Capacity	Ball	Capacity	Piston	Capacity	
1020-0200	200	3	1050 kg.	5	600 kg.			
1020-0300	300	5	1750 kg.	7	840 kg.	2	1700 kg.	
1020-0400	400	6	1700 kg.	10	1200 kg.			
1020-0500	500	8		12	1440 kg.			
1020-0600	600	9	2600 kg.	15	1800 kg.	3	2600 kg.	
1020-0700	700	11	2000 kg.	17	2040 kg.	3	2000 kg.	
1020-0800	800	12		20	2400 kg.			
1020-0900	900	14		22	2640 kg.			
1020-1000	1000	15	3500 kg.	25	3000 kg.	4	3500 kg.	
1020-1100	1100	16		27	3240 kg.			
1020-1200	1200	17		30	3600 kg.			
1020-1300	1300	18	4400 kg.	32	3840 kg.	5	4400 kg.	
1020-1400	1400	19	4400 kg.	35	4200 kg.	J	4400 kg.	
1020-1500	1500	20		37	4400 kg.			
1020-1600	1600	22		40	4800 kg.			
1020-1700	1700	24	5200 kg	42	5040 kg.	6	5300 kg.	
1020-1800	1800	25	5300 kg.	45	5200 ka	O	JOOU KG.	
1020-1900	1900	27		47	5300 kg.			

	1	DLS36				DBS36	
Code	(mm)	Roller	Z -0-	Capacity	Ball	Z (1)	Capacity
1022-0200	200	3	3	600 kg.	5	5	500 kg.
1022-0300	300	5	5	1000 kg.	7	7	700 kg.
1022-0400	400	6	6	1200 kg.	10	10	1000 kg.
1022-0500	500	8	8	1600 kg.	12	12	1200 kg.
1022-0600	600	9	9	1800 kg.	15	15	1500 kg.
1022-0700	700	11	11	2200 kg.	17	17	1700 kg.
1022-0800	800	12	12	2400 kg.	20	20	2000 kg.
1022-0900	900	14	14	2800 kg.	22	22	2200 kg.
1022-1000	1000	15	15	3000 kg.	25	25	2500 kg.
1022-1100	1100	16	16	3200 kg.	27	27	2700 kg.
1022-1200	1200	17	17	3400 kg.	30	30	3000 kg.
1022-1300	1300	18	18	3600 kg.	32	32	3200 kg.
1022-1400	1400	19	19	3800 kg.	35	35	3500 kg.
1022-1500	1500	20	20	4000 kg.	37	37	3700 kg.
1022-1600	1600	22	22	4400 kg.	40	40	4000 kg.
1022-1700	1700	24	24	4800 kg.	42	42	4200 kg.
1022-1800	1800	25	25	5000 kg.	45	45	4500 kg.
1022-1900	1900	27	27	5400 kg.	47	47	4700 kg.

Die Lifters "DL50" & "DB50" / Hydraulic









Type: DL (with rollers)

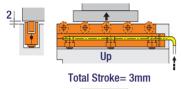
L

DL50

Type: DB (with balls)

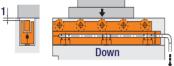
Hyd. Cylinder

DB50



Standard Temperature: 600 Optional Temperature: 1600

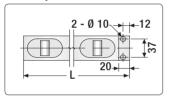
Order: Code. Type

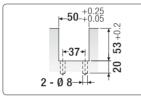


Order Example: 1020-0300. DL50

Code (mm) Roller Capacity Ball Capacity Piston Capacity 1020-0200 200 1000 kg. 640 ka. 1020-0300 300 3 1500 ka. 6 960 ka. 2200 kg. 1020-0400 400 4 2000 kg. 9 1440 kg 1020-0500 500 5 2500 kg 11 1760 kg. 1020-0600 600 6 3000 kg. 13 2080 kg. 3300 kg 3 2560 kg. 1020-0700 700 7 3300 kg 16 1020-0800 800 8 3300 kg 18 2880 kg 1020-0900 900 3200 kg. 9 20 1020-1000 1000 10 4400 kg. 3680 kg 23 4 4400 kg. 1020-1100 1100 11 25 4000 kg 1020-1200 1200 12 27 4320 kg 1020-1300 1300 29 4640 kg. 13 5500 kg 5 5500 kg. 1020-1400 1400 14 31 4960 ka. 1020-1500 1500 15 33 5280 kg 1020-1600 1600 16 35 5600 kg. 1020-1700 1700 17 38 6080 kg 6500 kg. 6600 kg. 6 1020-1800 40 1800 18 6400 kg. 1020-1900 1900 19 42 6720 kg. 1020-2000 2000 7040 kg 20 44 1020-2100 2100 21 46 7360 kg. 7700 kg. 7700 kg. 1020-2200 2200 22 48 7680 kg. 1020-2300 2300 23 50 7700 kg. 1020-2400 2400 8320 kg. 24 52 8800 kg. 8800 kg.

Drawings before "L: 2100":

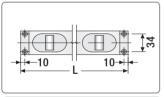


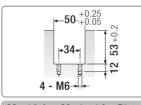


Outer Dimensions DL50 / DB50

Machining Method for Plate

Drawings "L: 2100" and after:





Outer Dimensions DL50 / DB50

Machining Method for Plate









2500

25

1020-2500



"Quick Die & Mould Change Systems Information Form"

54

8640 kg

You can request the "Quick Die & Mould Change Systems Information Form" from us or you can download it directly from Guvenal web-site. The form filled by you will be examined by our engineers and the most suitable method will be produced for you.

We are supporting you with customizable offers about technical and costing issues of your projects and we are producing the best solutions.

info@guvenal.net www.guvenal.net



Permanent Magnetic Clamping Block

Code: ECB

- ▶ Ideal Technology for Medium and Large Workpieces
- Can Do 5-Sides Machining
- Robust and Flexible Clamping Method
- Fast, Easy, Compact and Balanced System

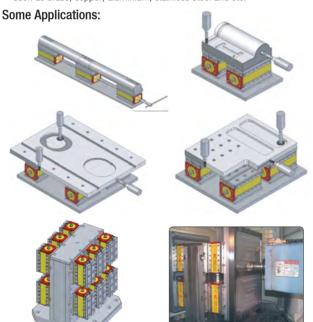
The all models of "ECB - Magnetic Clamping Blocks" are a new sense of clamping methods for metal workig on Cnc machining center and milling machine in quick clamp workpieces. Especially, it is ideal to machining parts at Mould & Die production. A special clamping and machining technology without requiring any power supply.

Specifications:

- Free to set up position, numbers and distance of Magnetic Clamping Block according to the dimension of workpiece.
- The products including changeable Induction Soft Block. It can be revised surface to be 100% accuracy on the machine for clamp workpieces. Can be also cutting, drilling, tapping and slotting directly to the Induction Soft Block during machining workpiece. Multi-function of Induction Soft Block, the user can make it by themselves according to workpiece required.
- Suitable for medium and large workpieces, not suitable for small workpieces.
- Minimum dimension of workpiece required as larger than area of two Magnetic Clamping Blocks, Compact structure, time - effort and space saving.

Important:

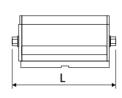
- Please always make sure the Switch was in ON position before machining.
- The Magnetic Clamping Blocks are not suitable for non-magnetic materials, such as brass, copper, aluminium, stainless steel and etc.

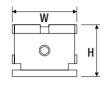




Side View:

Front View:





Order Code: ECB-50

Holding Force: 500 Kgf / per unit Min. Workpiece Thickness: 15 mm

LxWxH Dimensions: 159.5 x 76 x 78 mm Clamping Area (L x W): 126 x 76 mm

Weight: 7 kg.

Special Offer:

€ 490,00

Order Code: ECB-75

Holding Force: 750 Kgf / per unit Min. Workpiece Thickness: 15 mm LxWxH Dimensions: 207.5 x 76 x 78 mm Clamping Area (L x W): 174 x 76 mm

Weight: 9.5 kg.

Special Offer:

€ 599.00

Order Code: ECB-120

Holding Force: 1200 Kgf / per unit Min. Workpiece Thickness: 20 mm LxWxH Dimensions: 220 x 108 x 108 mm

Clamping Area (L x W): 188 x 108 mm

Weight: 18 kg.

Special Offer:

€ 850.00

Order Code: ECB-210

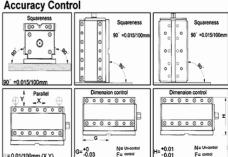
Holding Force: 2100 Kgf / per unit Min. Workpiece Thickness: 30 mm **L x W x H Dimensions:** 274 x 133 x 134 mm Clamping Area (L x W): 234 x 133 mm

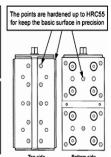
Special Offer:

€ 1.255.00

Accuracy Control

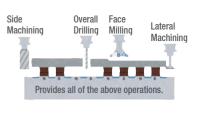
Weight: 36 kg.











Electro-Permanent Magnetic Chuck

- Super Power Magnetic Force = 1250 Kgf / per 4 Pole
- Can Do 5-Sides Machining
- Clamping within a Few Seconds
- Monoblock Design / Compact & Robust

Electro-Permanent Magnetic Chucks are most suitable for heavy duty operations on small & medium workpieces and even for rough milling. Suitable for drilling and finishing operations on workpieces. All 5-sides of the workpiece can be machined in the same setting if clamped magnetically.

Specifications:

- Perfect safety in case of power failure. No electricity needed to keep the Magnetic Chuck ON.
- A minimum of 4 alternate magnetic poles contact is necessary for optimum clamping
- More functions for cooperate with Induction Blocks (it is provided to you free by Guvenal).
- Magnetic force = 1250 Kgf / per 4 pole.
- Adjustable magnetic force (8 level).
- Can do 5-sides machining.
- Easy and practical to clamp a workpiece. It provides significant savings in clamping time.
- Recommended minimum thickness of workpiece: 10 mm.

Standard Accessories / Set Content:

- 1. Electro-Permanent Magnetic Chuck
- 2. Controller
- 3. Remote Control (to adjust the magnetic force)
- 4. Induction Blocks (according to the number of poles)
- 5. Tool Cabinet (mobile)
- 6. Fasteners & Connection Cables
- 7. User & Training Manual



Order Code: EEPM-3040

Total Holding Force: 7500 Kgf Width: 300 mm x Length: 430 mm

Height: 60 mm

Pole Dimension: 50 x 50 mm Number of Pole: 24 pcs. Voltage (single phase): 220V Controller Voltage (single phase): 220V

Chuck Net Weight: 61 kg.



Special Offer: € 1.790.00

2 pcs. Chuck + 1 Controller

€ 3.079,00

Order Code: **EEPM-4060**

Total Holding Force: 15000 Kgf **Width:** 420 mm **x Length:** 590 mm

Height: 60 mm

Pole Dimension: 50 x 50 mm Number of Pole: 48 pcs. Voltage (single phase): 220V Controller Voltage (single phase): 220V

Chuck Net Weight: 100 kg.



Special Offer: € 2.690,00

2 pcs. Chuck + 1 Controller

€ 4.930,00

Order Code: EEPM-40100

Total Holding Force: 26200 Kgf Width: 420 mm x Length: 990 mm

Height: 60 mm

Pole Dimension: 50 x 50 mm Number of Pole: 84 pcs. Voltage (single phase): 220V

Controller Voltage (single phase): 220V

Chuck Net Weight: 193 kg.



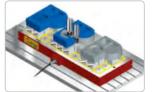
Special Offer: € 3_890_00

2 pcs. Chuck + 1 Controller

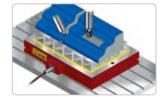
€7.060,00

Some Applications:





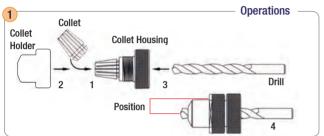






Drill Sharpening Machine

The handy Drill Sharpening Machine is ideal for resharpening HSS and Carbide drills. Practical using thanks to easy, compact and robust design.



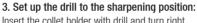


1. Set up the drill to the collet holder:

Follow up the steps 1,2,3 and 4 for set up the drill to the collet holder (without tighting), as shown on image-1.

2. Set up the diameter of drill:

- * Turn right the scale to be "0" position.
- * Adjust the scale to meet the diameter of the drill, as shown on image-2.



Insert the collet holder with drill and turn right, then tight the drill by collet holder for set up the sharpening position, as shown on image-3.

Important: Please always check the center edge of drill must be parallel with the gap of "Collet Holder", as shown on the image-1 / "position".



- * Insert the collet holder with drill and push to the sharpening wheel slowly, then move left and right repeatedly to sharpen the drill until the sharpening sound disappeared.
- * Take out the collet holder with drill and change to the other side to sharpen again in same way as above mentioned, as shown on image-4.

5. Center point sharpening base adjusting: Adjust the center point sharpening base to the suitable position. Turn right for bigger, turn left for smaller, as shown on image-5.

6. Sharpen the center point of drill:

- * Insert the collet holder with drill and push to the sharpening wheel slowly, then move left and right repeatedly to sharpen the center point of drill until the sharpening sound disappeared.
- * Take out the collet holder with drill and change to the other side to sharpen again in same way as above mentioned, as shown on image-6.



The center point suitable for carbide / hard steels, HSS E cobalt, Tin coated etc. hard materials



The center point suitable for general materials such as iron, general steel and brass.. etc.



The center point suitable for soft materials such as copper, aluminium. plastic.. etc.

Order Code: EDG-213 -

Drill Diameter: Ø 2 - 13 mm

Point Angle of Sharpening: 90° - 140° Sharpening Wheel: CBN #400 / for HSS Drills Motor / Power Supply: 250W / AC 220V

Speed: 5500 RPM Net Weight: 8.5 kg Special Offer:

€ 645,00

Order Code: EDG-1226

Drill Diameter: Ø 12 - 26 mm

Point Angle of Sharpening: 90° - 140° Sharpening Wheel: CBN #400 / for HSS Drills Motor / Power Supply: 450W / AC 220V

Speed: 4500 RPM
Net Weight: 26 kg

Special Offer:

€ 1.365,00

Standard Accessories / Set Content:

- 1. Drill Sharpening Machine
- 2. Tool Cabinet
- 3. 12 pcs ER Collet Set for EDG-213 & 15 pcs ER Collet Set for EDG-1226
- 4. CBN Sharpening Wheel for HSS Drills
- 5. Collet Holder
- **6.** Hex Keys (4 5 6 mm)
- 7. Connection Cables
- 8. User & Training Manual

Optional Sharpening Wheels:

(order code = product description)

- * EDG-213N-1D = SDC Wheel #400 for Carbide Drills / \emptyset 2 13
- * EDG-213N-1C = CBN Wheel #400 for HSS Drills / Ø 2 13
- * EDG-1226N-1D = SDC Wheel #400 for Carbide Drills / Ø 12 26
- * EDG-1226N-1C = CBN Wheel #400 for HSS Drills / \emptyset 12 26
- ▶ Drill Sharpening in 30 Seconds
- Operation is Fast and Easy
- ▶ The Left & Right Sharpening Method Gives the Sharpest and the Most Durable Drill





Please clean the sharpening chips often for avoid the chip scrape to the sharpening base and keep usage life.







End Mill Sharpening Machine

The handy End Mill Sharpening Machine is ideal for resharpening Carbide and HSS end mills. Practical using thanks to easy, compact and robust design. Easy to operate, no experience required for sharpening a precision end mill.

Standard Accessories / Set Content:

- 1. End Mill Sharpening Machine
- 2. Tool Cabinet
- 3. 10 pcs ER Collet Set for EMG-413 & 6 pcs ER Collet Set for EMG-1325
- 4. 2 pcs Sharpening Wheel
- 5. Collet Holder (for 2/4 flute end mill)
- 6. Collet Holder (for 3 flute end mill)
- 7. Hex Key (4 mm)
- 8. Connection Cables
- 9. User & Training Manual

Optional Sharpening Wheels:

(order code = product description)

- * EMG-413-1D = SDC Wheel #300 for Carbide End Mills / Ø 4 5
- * EMG-413-2D = SDC Wheel #300 for Carbide End Mills / Ø 6 13
- * EMG-413-1C = CBN Wheel #300 for HSS End Mills / Ø 4 5
- * EMG-413-2C = CBN Wheel #300 for HSS End Mills / Ø 6 13
- * EMG-1225-1D = SDC Wheel #150 for Carbide End Mills / Ø 12 25
- * EMG-1225-1C = CBN Wheel #150 for HSS End Mills / Ø 12 25
- ► End Mill Sharpening in 45 Seconds
- Operation is Fast and Easy
- Provide Savings





Please clean the sharpening chips often for avoid the chip scrape to the sharpening base and keep usage life.



















Order Code: EMG-413 -

End Mill Diameter: Ø 4 - 13 mm End Mill Angle: 60 - 200 - 300

Sharpening Wheel 1: SDC #300 / for Carbide End Mills (Ø4-5) Sharpening Wheel 2: SDC #300 / for Carbide End Mills (Ø6-13)

Motor / Power Supply: 450W / AC 220V

Speed: 6000 RPM Net Weight: 17 kg

Special Offer:

€ 1.255.00

Order Code: EMG-1325

End Mill Diameter: Ø 12 - 25 mm End Mill Angle: 60 - 200 - 300

Sharpening Wheel 1: CBN #150 / for HSS End Mills Sharpening Wheel 2: SDC #150 / for Carbide End Mills

Motor / Power Supply: 1000W / AC 220V

Speed: 4300 RPM Net Weight: 31 kg Special Offer:

€ 1.580.00



Drill & End Mill Cutter

The handy Drill & End Mill Cutter is ideal for cutting Carbide and HSS tools. Practical using thanks to easy, compact and robust design. Easy to operate, no experience required for cutting a precision tool.

Order Code: ECO-316

Diameter: Ø 3 - 16 mm

Cutting Wheel: SDC #100 / for Carbide Tools Motor / Power Supply: 600W / AC 220V

Speed: 6000 RPM Net Weight: 13 kg Special Offer:

€ 490.00

Standard Accessories:

- 1. Drill & End Mill Cutter
- 2. SDC #100 Cutting Wheel
- 3. Hex Keys (4 10 mm)
- 4. Connection Cables
- 5. User & Training Manual

Optional Cutting Wheels:

(order code = product description)

- * ECO-316-1C
- CBN Wheel #100 for HSS Tools
- * ECO-316-1D

SDC Wheel #100 for Carbide Tools

Tolerance and Fit Systems

Technical Drawing / Terms: If producer and quality supervisor can speak the same language, the products will be perfect.

Tolerance Definition: Error margins of workpieces in standard dimensions in the meaning of tolerance (indulgence).

Tolerance is the error margins within the lower and upper limit specified by taking the main dimensions as a reference. A standardization has been done around the world and certain standards have been determined due to negative situations such as difference of the products in the past, rejects and economic / labourship losse.

Selecting small tolerances in the production method improve the quality but increases the cost. Selecting large tolerances decreases both costs and quality. Therefore, tolerance values in the Machine and Die / Mould production has been standardized.

We pay attention to products that do not have different features. This system is important for product replacements and repairs. Guvenal - GTH branded Die & Mould Components are designed according to DIN / ISO norms. The different standard types of other local producers are to create problems and difficulties in the production phase. These dies and moulds shipped to other countries will create the same problems and difficulties at the destination. For this reason, we recommend you to prefer Guvenal - GTH brand products for your dies and moulds, especially systems used as sets.

There are two types according to types of writing:

1- Numerical Tolerance:

Written nearby principal dimensions (basic dimension)

Example: $40^{+0.05}_{-0.01}$ $40^{+0.05}_{-0.05}$

2- Letter Tolerance:

The letters and numbers which classified according to DIN and ISO systems are written to right hand side of the principal dimension and read according to type of micron.

Example: 40^{H7} 40_{h6}

There are two types of tolerances according to their practice:

- **1- Manufacturing Tolerance:** It is based on the difference between the largest dimension and the smallest dimension.
- 2- Fit Tolerance: It is made according to shaft and hole system that indicated by DIN and ISO system. Beside, it is the relation due to difference between dimensions of two simple components (hole and shaft) to be joined each other.

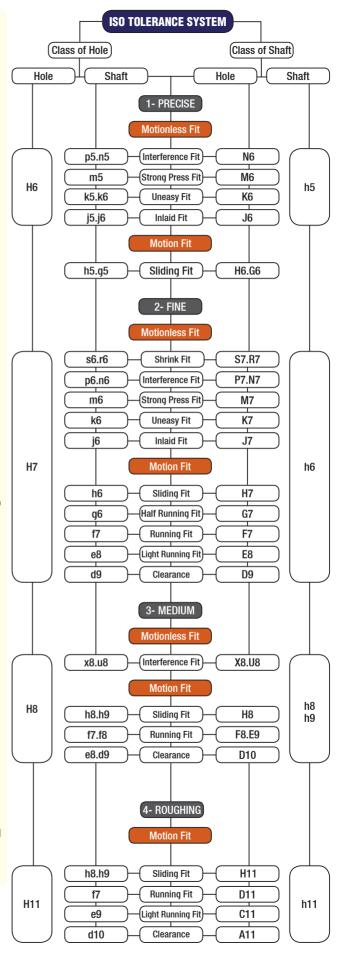
Recommendation:

It is easy to machining external surfaces of workpieces. Since it will be hard to machining internal surfaces, hole dimensions should be kept fixed and a precise machining is performed by giving tolerance to the shaft.

Comparing of DIN and ISO Systems

- **1-** Both systems have been classified according to normal hole and normal shaft system.
- **2-** Normal temperature has been accepted as 20°C in both systems.
- **3-** Tolerance differences of shafts and holes, often tolerance comparement and keeping the basis for tolerance of difference to a zero base line is the same in both.
- **4-** At DIN System there are 4 types of fit which are Precise, Fine, Medium and Roughing. At ISO System there are 18 kind different quality.
- **5-** At DIN System the product diameter were found to be arithmetic average, at ISO System it is found by diameter's geometric average.





ISO Tolerances for Holes / mm (ISO 286-2)

(micron / 0,001 mm)

ISO Tolerances for Shafts / mm (ISO 286-2)

(micron / 0,001 mm)

>	3	6	10	18	30	40	50	65	80	100
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E 6	+ 28 + 20	+ 34 + 25	+ 43 + 32	+ 53 + 40		66 50	+ +	76 60	+ +	1 <u> </u>
E7	+ 32 + 20	+ 40 + 25	+ 50 + 32	+ 61 + 40	+	75 50	+	90 60		107
E11	+ 95 + 20	+ 115 + 25	+ 142 + 32		+ 2	210 50	+ 2	250 60	+ 2	292 72
E12	+ 140	+ 175	+ 212	+ 250	+ 3	300	+ 3	360	+ 4	422
E13	+ 20 + 200	+ 25	+ 32			440	+ 5	60 520	+ 6	72 312
F6	+ 20	+ 25 + 22	+ 32 + 27	+ 40	+	50 41	+	60 49	+	72 58
F7	+ 10 + 22	+ 13 + 28	+ 16 + 34	+ 20 + 41	+	50	+	30 60	+	36 71
F8	+ 10 + 28	+ 13 + 35	+ 16 + 43	+ 20 + 53	+	25 64	+	30 76	+	36 90
G6	+ 10 + 12	+ 13 + 14	+ 16 + 17	+ 20 + 20		25 25		30 29		36 32
	+ 4 + 16	+ 5 + 20	+ 6 + 24	+ 7 + 28		34		10 40	+	12 47
G7	+ 4 + 22	+ 5 + 27	+ 6	+ 7 + 40	+	9 48	+	10 56	+	12 66
G8	+ 4	+ 5	+ 6	+ 7	+	9	+	10	+	12
Н3	+ 2.5 + 8	+ 2.5 + 9	+ 3	+ 4	+	4 16	+	5 19	+	6 22
Н6	0	0	0	0	(0		0		0
H7	+ 12	+ 15 0	+ 18 0	+ 21	(25 0		30		35 0
Н8	+ 18 0	+ 22 0	+ 27 0	+ 33 0	(39 0	(46)		54 0
Н9	+ 30 0	+ 36 0	+ 43 0	+ 52 0	(62 0	(74)		87 0
H10	+ 48 0	+ 58 0	+ 70 0	+ 84 0	(100 0		120)		140)
H11	+ 75 0	+ 90 0	+ 110 0	+ 130 0	+ .	160 0	+ 1	190)	+ 2	220)
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J7	+ 6 - 6	+ 8	+ 10 - 8	+ 12 - 9	+	14 11	+	18 12	+	22 13
J8	+ 10 - 8	+ 12 - 10	+ 15 - 12	+ 20 - 13	+	24 15	+	28 18	+	34
JS6	+ 4	+ 4.5	+ 5.5	+ 6.5 - 6.5		- 8	+ 9	9.5 9.5		11
JS7	+6	+ 7.5 - 7.5	+ 9	+10.5 - 10.5	+ 1	12.5 12.5	+	15 15		7.5
JS8	+9	+ 11	+13.5	+16.5	+ 1	19.5	+	23	+	27
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K7	- 6 + 3	- 7 + 5	- 9 + 6	- 11 + 6	+	13 · 7	+	15 9		10
K8	- 9 + 5	- 10 + 16	- 12 8	- 15 + 10	+	12	+	21 14	+	25 16
M6	- 13 - 1	- 16 + 3	- 19 - 4	- 23 - 4	-	4	-	32 5	-	38 6
M7	- 9 0	- 12 0	- 15 0	- 17 0	(20 0	(24)
	- 12 + 2	- 15 + 1	- 18 + 2	-21 + 4	+	25 · 5	+	30 5	+	35 6
M8	- 16 - 5	- 21 - 7	- 25 - 9	- 29 - 11		34 12		41 14		48 16
N6	- 13 - 4	- 16 - 4	- 20 - 5	-24 - 7	-	28 8	-	33 9	-	38 10
N7	- 16 - 2	- 19 - 3	- 23 - 3	-28 - 3	- :	33	- (39 4	-	45 4
N8	- 20 - 9	- 25 - 12	- 30 - 15	- 36 - 18		42 21	- !	50 26		58
P6	- 17	- 21	- 26	- 31	-	37	-	45	-	52
P7	- 8 - 20	- 9 - 24	- 11 - 29	- 14 - 35	-	17 42	-	21 51	-	24 59
P8	- 12 - 30	- 15 - 37	- 18 - 45	- 22 - 55	-	26 65	-	32 78	-	37 91
R6	- 12 - 20	- 16 - 25	- 20 - 31	- 24 - 37	-	29 45	- 35 - 54	- 37 - 56	- 44 - 66	- 47 - 69
R7	- 11 - 23	- 13 - 28	- 16 - 34	- 20 - 41		25 50	- 30 - 60	- 32 - 62	- 38 - 73	- 41 - 76

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h12	- 75 0	- 90 0	- 110 0	- 130 0	(60	(90	- 2)		
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<u>j5</u>	- 2 + 6	- 2 + 7	- 3 + 8	- 4 + 9		5 11		7 12	-			
<u>j6</u>	- 2	- 2	- 3	- 4	-	5	-	7	-	9		
j7	+ 8 - 4	+ 10 - 5	+ 12 - 16	+ 13 - 8	-	15 10	-	18 22	+ :	15		
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js6	+ 4 - 4	+ 4.5 - 4.5	+ 5.5 - 5.5	+ 6.5 - 6.5	+	8	+ 9	9.5 9.5	+	11		
js7	+6	+ 7.5	+ 9	+ 10.5	+ 1	2.5	+	15	+ 1	7.5		
k5	- 6 + 6	- 7.5 + 7	+ 9	- 10.5 + 11	+	2.5 13	+	15 15	- 1 +	18		
 k6	+1+9	+ 1 + 10	+ 1 + 12	+ 2 + 15	+	2 18	+	2 21	+ 1	25		
	+ 1 + 13	+ 1 + 16	+ 1 + 19	+2		2 27		2 32	+			
k7	+1	+1+12	+ 1 + 15	+ 2	+	2 20	+	2 24	+	3		
m5	+ 4	+6	+7	+ 8	+	9	+	11	+	13		
m6	+ 12 + 4	+ 15 + 6	+ 18 + 7	+ 21 + 8	+	25 9	+	30 11	+	13		
m7	+ 16 + 4	+ 21 + 6	+ 25 + 7	+ 29 + 8		34 9	++	41 11	+ +			
n5	+ 13 + 8	+ 16 + 10	+ 20 + 12	+ 24 + 15	+	28 17	+	33 20	+ :	38		
n6	+ 16	+ 19	+ 23	+ 28	+	33	+	39	+ -	45		
n7	+ 8 + 20	+ 10 + 25	+ 12	+ 15 + 36	+	17 42	+	20 50	+:	58		
	+ 8 + 17	+ 10 + 21	+ 12 + 26	+ 15 + 31		17 37		20 45	+ :			
p5	+ 12	+ 15	+ 18	+ 22	+ 26		+ 26 + 32		+ 37 + 59			
p6	+ 12	+ 24 + 15	+ 18	+ 35 + 22	+	+ 42 + 26		+ 26		32	+	37
r6	+ 23 + 15	+ 28 + 19	+ 34 + 23	+ 41 + 28		50 34	+ 60 + 41	+ 62 + 43	+ 73 + 51	+ 76 + 54		

Commonly Used Hole-basis Fits

Hata						To	lerar	ance Zone Class of Hole									
Hole		Clearance Fit						Transition Fit			Interference Fit						
Н6						g5	h5	js5	k5	m5							
ПО					f6	g6	h6	js6	k6	m6	n6*	p6					
H7					f6	g6	h6	js6	k6	m6	n6	p6*	r6*	s6	t6	u6	х6
п/				e7	f7		h7	js7									
110					f8		h7										
H8				e8			h8										
Н9			d9	е9													
пэ			d8	e8			h8										
U10		с9	d9	e9			h9										
H10	b9	с9	d9														

Commonly Used Shaft-basis Fits

						То	leran	ce Zo	ne C	lass	of Sh	aft					
Shaft		Clearance Fit						Transition Fit			Interference Fit						
h5							Н6	JS6	K6	M6	N6*	P6					
h6					F6	G6	Н6	JS6	K6	M6	N6	P6*					
110					F7	G7	H7	JS7	K7	M7	N7	P7	R7	S7	T7	U7	Х7
h7				E7	F8		H7										
117					F8		Н8										
h8			D8	E8	F8		Н8										
110			D9	E9			Н9										
			D8	E8			Н8										
h9	C9 D9 E9 H9																
	B10	C10	D10														
	*	Some	exce	ption	s for	these	fits r	nay o	ccur (deper	nding	on th	e dim	ensio	n.		

Some Tolerances Value without in Table

Basic Step Dimension	Tolerance	e Zone Clas	s of Hole	Tole	rance Zone	e Class of S	haft
from to (mm)	Н3	H4	H5	h3	h4	h5	js4
1 3	+ 2	+ 3	+ 4	0	0	0	+ 1.5
	+ 2	0	0	- 2	- 3	- 4	- 1.5
3 6	+ 2.5	+ 4	+ 5	0	0	0	+ 2
	0	0	0	- 2.5	- 4	- 5	- 2
6 10	+ 2.5	+ 4	+ 6	0	0	0	+ 2
	0	0	0	- 2.5	- 4	- 6	- 2
10 18	+ 3	+ 5 0	+ 8 0	0 - 3	0 - 5	0 - 8	+ 2.5 - 2.5
18 30	+ 4	+ 6 0	+ 9 0	0 - 4	0 - 6	0 - 9	+ 3 - 3
30 50	+ 4	+ 7	+ 11	0	0	0	+ 3.5
	0	0	0	- 4	- 7	- 11	- 3.5
50 80	+ 5	+ 8	+ 13	0	0	0	+ 4
	0	0	0	- 5	- 8	- 13	- 4
80 120	+ 6	+ 10	+ 15	0	0	0	+ 5
	0	0	0	- 6	- 10	- 15	- 5
120 180	+ 8	+ 12	+ 18	0	0	0	+ 6
	0	0	0	- 8	- 12	- 18	- 6
180 250	+ 10	+ 14	+ 20	0	0	0	+ 7
	0	0	0	- 10	- 14	- 20	- 7
250 315	+ 12	+ 16	+ 23	0	0	0	+ 8
	0	0	0	- 12	- 18	- 23	- 8
315 400	+ 13	+ 18	+ 25	0	0	0	+ 9
	0	0	0	- 13	- 18	- 25	- 9
400 500	+ 15	+ 20	+ 27	0	0	0	+ 10
	0	0	0	- 15	- 20	- 27	- 10

Tightening Torques & Tension Loads for Hex-Socket Head Cap Screws

tor Hex	(-Socke	т неаа	Cap Scre	
Nominal Diameter	Hex Key	Thread Pitch	Class Tension	12.9 Tightening
(metric)	(mm)	(mm)	Load (kgf.m)	Torque (N.m)
M2	1.5	0.40	from 1649 to 1517	from 0.52 to 0.63
M2.5	2	0.45	2746 2531	1.06 1.30
M3	2.5	0.50	4117 3800	1.84 2.26
M3.5	-	0.60	5529 5100	2.84 3.47
M4	3	0.70	7140 6585	4.22 5.16
M5	4	0.80	11683 10789	8.32 10.2
M6	5	1.00	16452 15185	14.30 17.51
M7	-	1.00	24079 22274	23.52 29.04
M8	6	1.25	30197 27897	34.44 42.31
M10	8	1.50	48075 44440	67.87 83.56
M12	10	1.75	70087 64814	116.20 143.18
M14	12	2.00	95816 88632	184.84 228.03
M16	14	2.00	132442 122729	287.36 357.10
M18	14	2.50	160424 148453	396.50 489.90
M20	17	2.50	206678 191522	560.50 969.60
M22	17	2.50	257530 238923	766.85 957.80
M24	19	3.00	297784 275946	969.15 1204.33
M27	19	3.00	390753 362615	1417.63 1772.15
M30	22	3.50	475873 441351	1933.30 2411.40
M33	24	3.50	592711 550321	2614.50 3275.20
M36	27	4.00	695526 645441	3370.30 4213.40
M39	-	4.00	835380 775921	4359.90 5470.80
M42	32	4.50	955884 887420	5404.20 6768.50
M45	-	4.50	1123036 1043387	6768.60 8503.50
M48	36	5.00	1256949 1167287	8122.00 10186.10
M52	-	5.00	1512368 1405684	10462.40 13164.30
M56	41	5.50	1742185 1618931	12953.70 16882.40
M60	-	5.50	2033432 1890903	16046.90 16282.40
M64	46	6.00	2306271 2144137	19393.30 24418.60
M68	-	6.00	2641950 2457681	23421.30 29559.10

1 kgf.m = 9.81 N.m

1 N.m = 0.102 kgf.m

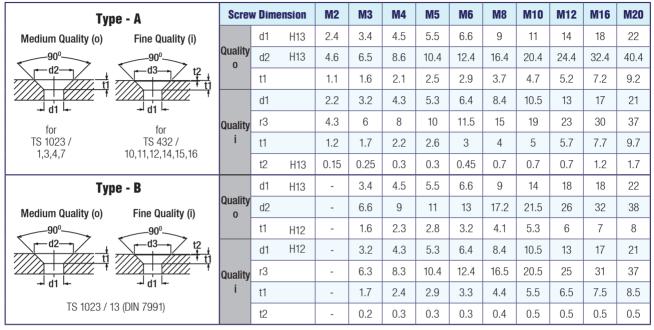
Mechanical Properties of Screws

TS 3576 (DIN ISO 898)

Material Pro	perties	3.6	4.6	4.8	5.6	5.8	6.8	8.8	9.8	10.9	12.9
Tensile Strength	Rm N/mm ²	300	4(00	50	00	600	800	900	1000	1200
Yield Strength	R eL N/mm ²	180	240	320	300	400	480	-	-	-	-
0.2 Yield Strength	Rp 0.2 N/mm ²	-	-	-	-	-	-	640	720	900	1000
% Elongation	as	25	22	14	20	10	8	12	10	9	8

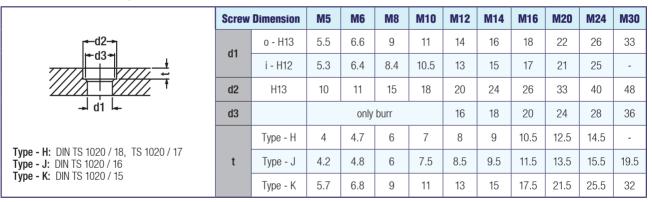
Countersunk Head Screws / Hex-Socket

DIN 74



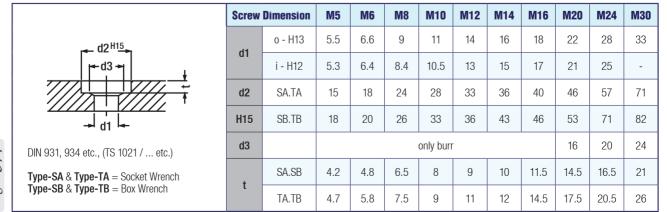
Hex-Socket Head Cap Screws

DIN 974-1 / DIN 74



Countersunk Head Screws and Fillister Head Screw

DIN 974-2 / DIN 74



Steel Hardness Conversion Table

Tensile	Vickers	Brinell	Rockwell
Strength N / mm ²	HV	НВ	HRC
835	260	247	24
850	265	252	24.8
865	270	257	25.6
880	275	261	26.4
900	280	266	27.1
915	285	271	27.8
930	290	276	28.5
950	295	280	29.2
965	300	285	29.8
1030	310	295	31
1060	320	304	32.2
1005	330	314	33.3
1125	340	323	33.4
1155	350	333	33.5
1190	360	342	36.6
1220	370	352	37.7
1255	380	361	38.8
1290	390	371	39.8
1320	400	380	40.8
1350	410	390	41.8
1385	420	399	42.7
1420	430	409	43.6
1455	440	418	44.5
1485	450	428	45.3
1520	460	437	46.1
1555	470	447	46.9
1595	480	-456	47.7
1630	490	-466	48.4
1665	500	-476	49.1
1700	510	-485	49.8
1740	520	-495	50.5
1775	530	-504	51.1
1810	540	-513	51.7
1845	550	-523	52.3
1880	560	-532	53
1920	570	-542	53.6
1955	580	-551	54.1
1995	590	-561	54.7
2030	600	-570	55.2
2070	610	-580	55.7
2105	620	-589	56.3
2145	630	-599	56.8
2180	640	-608	57.3
-	650	-618	57.8
-	660	-	58.3
-	670	-	58.8
-	680	-	59.2
-	690	-	59.7
_	700	_	60.1
-	700	_	61
-		-	61.8
-	740	-	62.5
-	760	-	
-	780	-	63.3
-	800	-	64
-	820	-	64.7
-	840	-	65.3

Bronze Alloys Comparison Table

Bronze Alloys Comparison Table							
Material	DIN	EN	NF/AFNOR	BS	ISO	JIS	SAE / AISI & Other
2.0220	CuZn5	CW500L	CuZn5	CZ125	CuZn5	C2100	C21000 . B134 - 1
2.0230	CuZn10	CW501L	CuZn10	CZ101	CuZn10	C2200	C22000
2.0240	CuZn15	CW502L	CuZn15	CZ102	CuZn15	C2300	C23000.B 134 - 6.B135-1
2.0250	CuZn20	CW503L	CuZn20	CZ102	CuZn20	C2400	C24000
2.0265	CuZn30	CW505L	CuZn30	CZ102	CuZn30	C2600	C26000.B 134 - 6.B135-2
2.0321	CuZn37	CW508L	CuZn37	CZ108	-	C2700	C27200 . MS63
2.0360	CuZn40	CW509L	CuZn40	CZ109	CuZn40	C2800	C28000
2.0598	CuZn25Al5	CC762	-	HTB3	CuZn25	-	C86300 . SAE 430B
2.0596	CuZn34Al2	-	U-Z 36 N3	HTB1	-	-	C86200 . SAE 430A
2.0592	CuZn35Al1	-	U-Z 36 N3	HTB1	CuZn35	-	C86500 . SAE 43
2.0510	CuZn37Al1	CW716R	-	-	-	-	-
2.0550	CuZn40Al2	CW713R	-	C2135	CuZn37	-	C76420 . So - MS Al2
2.0561	CuZn40Al1	CW718R	-	-	-	-	-
2.0401	CuZn39Pb3	CW614N	-	CZ121 Pb3	-	-	MS58
2.0241	CuZn39Pb2	CW617N	-	CZ123	-	-	So - MS58 Pb2
2.0460	CuZn20Al2	CW720R	-	-	-	-	-
2.0872	CuNi10Fe1Mn	-	-	-	-	-	-
2.0882	CuNi30Mn1Fe	CW354H	-	-	-	-	-
2.0936	CuAl10Fe3Mn2	-	-	-	-	-	-
2.0975	CuAl8Mn	-	-	-	-	-	-
2.0936	CuAl10Fe	CW306G	-	-	-	-	C45200 . B150 . B124
2.0975.04	CuAl10Ni	-	U - A - 10N	-	-	-	C95500
2.0978	CuAl11Fe6Ni6	CW308G	-	-	-	-	-
-	CuAl10Ni5Fe4	CW307G	-	CN102	-	-	C63000 B 171 - 95
2.1020	CuSn6	CW452K	-	-	-	-	-
2.1030	CuSn8	CW453K	-	-	-	-	-

Standard Progression of Surface Roughness (reference)

	•					
Arithmetical Average Roughness "Ra"		Max. Height "Ry"	10 Point Average Roughness "Rz"	"Ry - Rz"	Conventional	
Standard Progression	Cut-off Value ∧ c (mm)	Modern Finishing Symbols	Standard Progression		Reference Length ℓ n(mm)	Finishing Symbols
0.012	0.08		0.05	0.05	0.08	
0.025	0.25		0.1	0.1	0.00	
0.05 0.1		0.012/ 0.2/	0.2 0.4	0.2 0.4	0.25	
0.2			0.8	0.8		
0.4 0.8 1.6	0.8	0.4/_1.6/	1.6 3.2 6.3	1.6 3.2 6.3	0.8	VVV
3.2 6.3	2.5	3.2/6.3/	12.5 25	12.5 25	2.5	
12.5 25	8	12.5/25/	50 100	50 100		∇
50			200	200	8	
100	-	50 / 100 ~ V	400	400	-	-

Steel Grades Comparison Table

Case Hardening Steels

Material	ISO (683/1, 10, 11)	SAE AISI	BS 970 Part-1	DIN	NF A35 - 551 - 554	JIS G 4052
1.5713	13NiCr6	3115	-	13NiCr6	10NC6	-
1.5752	14NiCr14	3415 - 3310	655H13	14NiCr14	14NC12	-
1.5919	15CrNi6	3115	S107.970-3	15CrNi6	16NC6	-
1.5920	18CrNi8	6264	080M46	18CrNi8	-	-
1.6523	21NiCrMo2	8620	805H20.805M20	21NiCrMo2	20NCD2	SNCM220H
1.6587	17NiCrMo6	4820, 4317	820A16	17NiCrMo6	18NCD6	-
1.7015	15Cr3	5015	523M15.530A32	15Cr3	12C3.15Cr2.18C3	-
1.7034	34Cr4	5135	530A36.530M36	34Cr4	37Cr4.38C4	-
1.7035	41Cr4	5140	530A40.530M40	41Cr4	41Cr4.42C4	-
1.7131	16MnCr5	5115	527M17.590H17	16MnCr5	16MC5.16MnCr5	-
1.7139	16MnCrS5	5115	527M17.590H17	16MnCrS5	16MC5	SMnC420H
1.7147	20MnCr5	5120	-	20MnCr5	20MC5	SMnC420H
1.7149	20MnCrS5	4820, 4826	-	20MnCrS5	-	-
1.7243	18CrMo4	-	708M20	18CrMo4	18CD4	-
1.7321	20MoCr4	8620	805A22	20MoCr4	20MoCr4KD	-
1.7323	20MoCrS4	8620	-	20MoCrS4	-	-
1.7352	25CrMo4	-	-	25CrMo4	-	-
1.7326	25CrMoS4	-	-	25CrMoS4	-	-

Tempered Steels

Material	ISO (683/1, 10, 11)	SAE AISI	BS 970 Part - 1	DIN	NF A35 - 551 - 554	JIS G 4052
1.6511	-	4340, 9840	817M37, 816M40	36CrNiMo4	35NCD5, 40NCD3	-
1.6580	-	4340	823M30	30CrNiMo8	30CND8	SNCM431
1.6582	-	4340, 4337	816M40, 817M40	34CrNiMo6	35NCD3	SNCM447
1.7006	-	5045, 5046	-	46Cr2	42C2, 46Cr2	-
1.7033	34Cr4	5132	530A32, 530M32	34Cr4	32C4, 34Cr4	SCr430
1.7034	34Cr4	5135	530A36, 530M32	37Cr4	38Cr4, 38C4	SCr435
1.7035	41Cr4	5140	530A40, 530M40	41Cr4	41Cr4, 42C4	SCr440
1.7218	-	4130	708A25	25CrMo4	25CD4, 25CrMo4	SCM430
1.7220	34CrMo4	4135, 4137	708A37	34CrMo4	35CrMo4, 35CD4	SCM432
1.7225	42CrMo4	4140, 4142	708M40, 311-5/1	42CrMo4	42CD4TS	SCM440
1.7228	-	4150	708A47	50CrMo4	50CrMo4	SCM445

ISO: International Organization for Standardization

DIN: Deutsches Institut für Nörmung / German Standards AISI: American Iron and Steel Institute

SAE: Society Automotive Engineers

BS: British Standards

JIS: Japan Industrial Standards

UNI: Ente Nazionale Italiano di Unificazione **NF:** Norme Francaise

Steel Grades Comparison Table

Cold Work Tool Steels

Material	DIN	AISI	BS	NF / AFNOR	JIS
1.2080	X210Cr12	D3	BD3	Z200C12, X200Cr12	SKD1
1.2345	X50XrVMo 5 - 1	-	-	-	-
1.2379	X155CrVMo 12 - 1	D2	BD2	Z160CDV12	SKD11
H.2380	X220CrVMo 13 - 4	-	-	-	-
1.2436	X210CrW12	D6	D6	-	SKD2
1.2601	X165CrMoVa12	-	-	-	SKD11

Hot Work Tool Steels

Material	DIN	AISI	BS	NF / AFNOR	JIS
1.2343	X38CrMoV 5 - 1	H11	BH11	Z38CDV5	SKD6
1.2344	X40CrMoV 5.1	H13	BH13	Z40CDV5	SKD61
1.2365	X32CrMoV 3.3	H10	BH10	32CDV28	SKD7
1.2367	X38CrMoV 5.3	H11	BH11	-	SKD61
1.2581	X30WCRV 9.3	H21	BH21	Z30WCV9	SKD5
1.2714	X 165CrMoVa 12	6F3, L6	BS224	55NCDV7	SKT4

Plastic Mould Steels

Material	DIN	AISI	BS	ASTM	NF / AFNOR
1.2083	X42Cr13	420	SUS 420J2	-	X41CR13KU
1.2312	40CrMnMoS 8-6	P20 + S	-	-	-
1.2738	40CrMnNiMo 8 - 6 - 4	P20	SNCM	90MV8	40CMND8

Oil Hardening Tool Steels

Material	DIN	AISI	BS	NF / AFNOR	JIS
1.2510	100MnCRW4	01	-	-	SK33
1.2842	90MnCrV8	02	B02	90MV8	-

Spring Steels

Material	DIN	AISI	BS	NF / AFNOR	EN 100027-2
1.0900	38Si6	-	-	-	1.5022
1.0902	46Si7	9245	-	45S7	1.5024
1.0903	51Si7	9255	-	50S7	1.5025
1.0904	55Si7	5155H, 9225	251A58	55S7	1.5026
1.0908	60SiMn5	-	-	-	1.5142
1.0961	60SiCr7	9262	-	-	-
1.0970	38Si7	-	-	-	1.5023
1.5028	65Si7	9260H	251A61	60S7	1.5028
1.5029	71Si7	-	-	-	-
1.5225	51MnV7	-	-	-	-
1.7103	67SiCr8	9254	-	-	1.7103
1.7138	52MnCrB3	50B50	-	-	-
1.7176	55Cr3	5155	-	-	-
1.7701	51CrMoV7	-	-	-	-