

Toggle Clamps

Mechanical Toggle Clamps are one solution for all your positive clamping needs. They are carefully designed and manufactured to give easy and quick clamping release. They allow maximum clearance for easy loading and unloading of work piece. Once in clamp position, they give positive holding pressure. They are suitable for use in lings and fixtures for assembly, bonding, machining, drilling, fabrication, etc. and also can be used in existing tooling.

Salient Features: The clamping and release is achieved in seconds. This give tremendous time saving per cycle in production.

Easy To Incorporate: No additional accurate machining, tooling, slotting etc. is needed while using these clamps in any tooling.

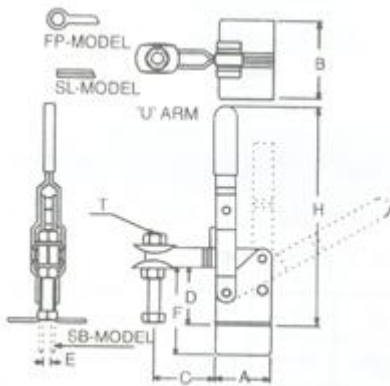
Versatility: Available in push, pull, hold-down, latch type, plier type, these clamps can handle clamping irrespective of shape and size of the work piece.

Durability: All vital components are hard and zinc plated giving adequate wear and corrosion resistance ensuring longer work life.

Low Maintenance: These clamps are virtually maintenance free. Occasionally few drops of lubricating oil is all that is needed to keep them in good working condition.

Cost Saving: Tooling costs are reduced as tool design and tool making becomes simpler. Reduced production cost by increasing productivity.

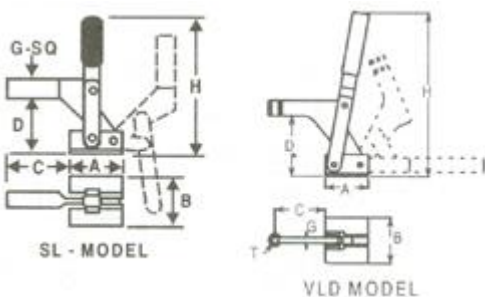
HLDV Series



Hold vertical handle clamps available in : Standard , 'U' slot arm, FP- Fixed position arm, SL - Solid bar arm, SB- Straight base.

MODEL	A mm	B mm	C mm	D mm	E mm	F mm	H mm	T	CLAMPING FORCE
HLDV-06	30	50	40	28	6	45	125	M6	100KG
HLDV-10	45	78	50	50	6.5	85	235	M10	250KG
HLDV-10L	45	78	100	50	6.5	85	235	M10	175KG
HLDV-12	50	90	125	62	8	100	245	M12	350KG

VLD Series

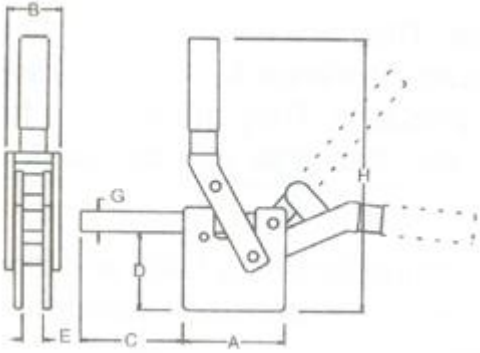


Hold down medium duty vertical handle clamps available in FP- fixed position - VLD, SL- Solid bar have moderate opening

MODEL	A mm	B mm	C mm	D mm	G mm	H mm	T mm	HOLDING FORCE
VLD -12	75	80	90	105	10	320	12.5	750KG
VLD -12L	75	80	120	105	10	320	12.5	750KG
VLD - SL	60	57	70	70	20	225	-	350KG

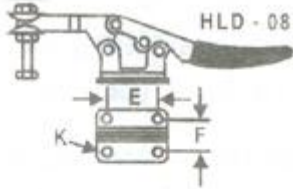
HLDVHY Series

Specially designed for heavy loads. A solid arm is provided which can be drilled welded or adopted to suit specific requirement. Available in SL- Solid bar model



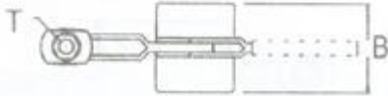
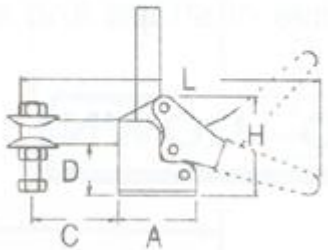
MODEL	A mm	B mm	C mm	D mm	E mm	G mm	H mm	HOLDING FORCE
HLDVHY-20	100	60	100	75	20	20	260	700 KG
HLDVHY-25	125	75	125	100	25	25	330	1250KG

HLD Series



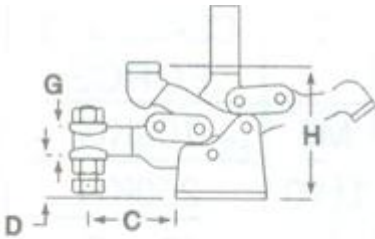
Hold Down action clamps are useful in variety of tooling where both clamping thickness and distance from the base play a major role.

MODEL	A mm	B mm	C mm	D mm	E mm	F mm	H mm	K mm	L mm	T mm	HOLDING FORCE
HLD-8	57	35	55	40	40.5	25	55	7	235	M-8	120KG
HLD-10	50	67	65	42	--	--	75	--	230	M-10	250KG
HLD-12	75	80	110	70	--	--	125	--	375	M-12	500KG

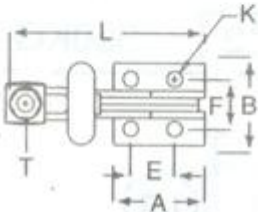


FLD Series

Hold Down front handle clamps, smallest of the clamps, available in 'U' slot type.

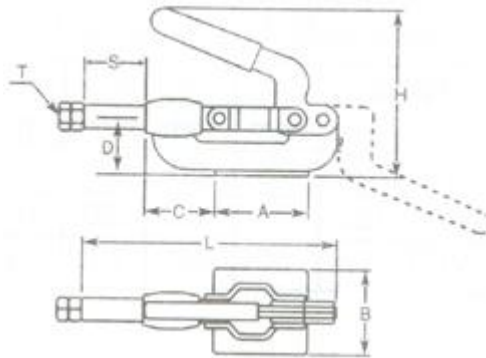


MODEL	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	K mm	L mm	T mm	HOLDING FORCE
FLD05	27	25	26	13	13	14.5	8.5	42	4.5	60	M5	30KG



Straight Line

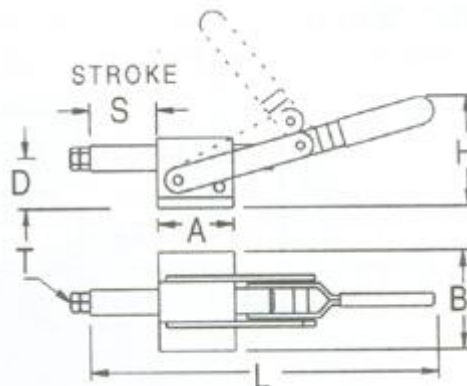
PSH-FB Series



Straight-line action clamp ensures quick action and exert high force for their size and can be used both as push and pull action clamp.

MODEL	A mm	B mm	C mm	D mm	H mm	L mm	S mm	T mm	HOLDING FORCE
PSHFB-08	50	50	37	35	100	140	30	M8	350 KG
PSHFB-10	85	65	40	55	130	200	50	M10	800 KG
PSHFB-12	100	80	70	70	145	265	60	M12	1200 KG

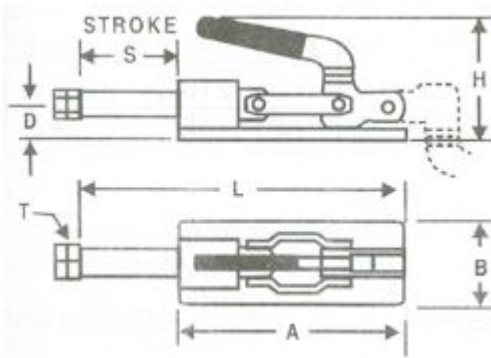
RAPSH Series



Reversed action clamps locks only in extended position.

MODEL	A mm	B mm	D mm	H mm	L mm	S mm	T mm	HOLDING FORCE
RAPSH-08	50	75	25	75	210	30	M8	900KG
RAPSH-10	55	75	32	80	250	40	M-10	1400KG
RAPSH-12	63	80	38	90	290	50	M12	2000KG
RAPSH-16	75	100	50	110	340	65	M16	4000KG

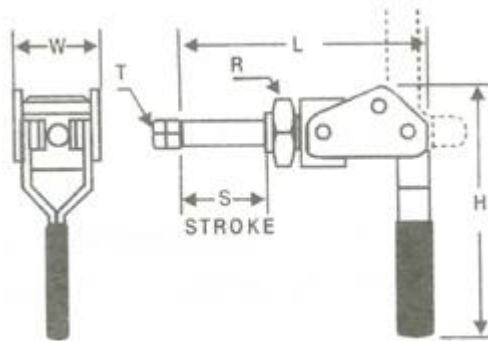
LAPSH Series



Straight-line action clamp ensures quick action and exert high force for their size and can be used both as push and pull action clamp.

MODEL	A mm	B mm	C mm	D mm	H mm	L mm	S mm	T mm	HOLDING FORCE
PSHFB-08	50	50	37	35	100	140	30	M8	350 KG
PSHFB-10	85	65	40	55	130	200	50	M10	800 KG
PSHFB-12	100	80	70	70	145	265	60	M12	1200 KG

NPL Series

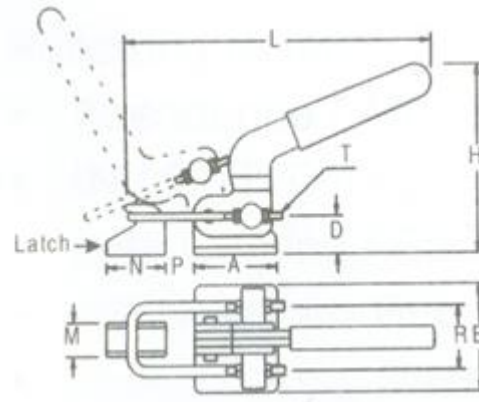


Flange mounting clamps anchored by locknut, handle position can be adjusted in 360°

MODEL	H mm	L mm	R mm	S mm	T mm	W mm	HOLDING FORCE
NPL-08	125	125	M-20	40	M-8	40	150 KG
NPL-10	160	175	M-27	65	M-10	50	250KG

Pull Type

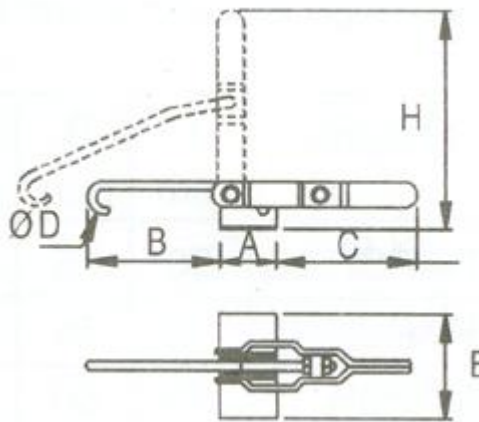
UPL Series



PULL 'U' Bolt type provided with adjustable bolt..

MODEL	A mm	B mm	D mm	H mm	L mm	M mm	N mm	P mm	R mm	T mm	HOLDING FORCE
UPL-05	35	40	15	70	145	14	25	15	25	M5	200KG
UPL-08	50	52	22	95	188	55	35	5	42	M8	800KG
UPL-10	85	80	30	115	270	80	40	20	46	M10	2000KG

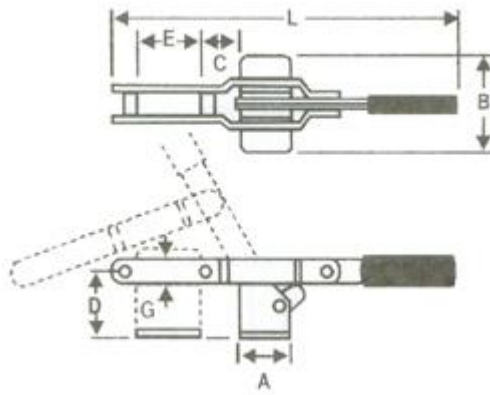
HPL Series



Pull action clamps can be used in number of latching operations for pressure vessels, access doors and lids. Pull rod/ 'u' bolt is threaded for easy adjustment.

MODEL	A mm	B mm	C mm	D mm	E mm	H mm	R mm	HOLDING FORCE
HPL-04	30	70	75	4	58	117	10	150KG
HPL-06	45	110	120	6	75	130	15	250KG

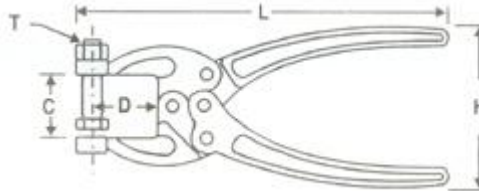
LPL Series



Pull latch type, fixed position type.

MODEL	A mm	B mm	C mm	D mm	E mm	G mm	L mm	HOLDING FORCE
LPL-04	30	50	25	31	35	12	210	125KG
LPL-06	45	78	30	55	20	18	305	250KG

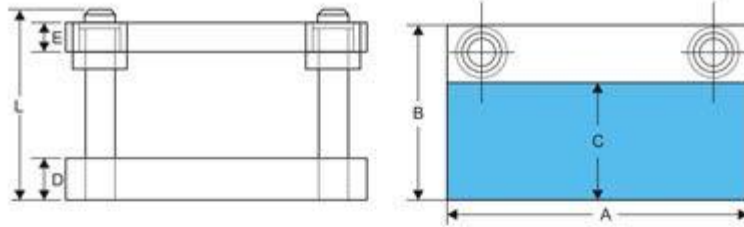
PPT Series



These are portable type clamps. Precisely designed cams ensure easy and quick motion. Adjusting blot and locking nut is provided. They give positive holding pressure.

MODEL	C mm	D mm	H mm	L mm	T mm	HOLDING FORCE
PPT-6	25	23	50	135	M-6	75 KG
PPT-8	35	50	75	200	M-8	180KG

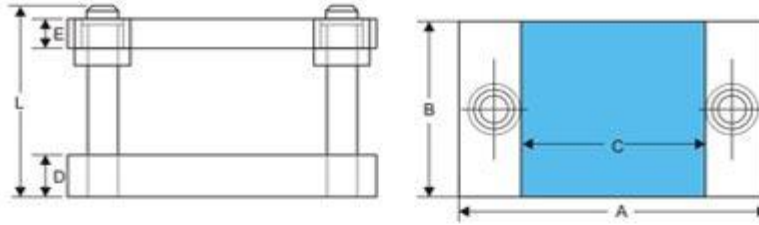
Standard Die Sets with Rear Pillars



External Dimensions					External Dimensions				
A	Die Space		D	E	A	Die Space		D	E
	B	C				B	C		
250	160	98	32	32	500	250	168	50	40
250	160	98	32	40	500	250	168	50	50
250	160	98	40	32	500	315	233	40	40
250	160	98	40	40	500	315	233	40	50
250	200	138	32	32	500	315	233	50	40
250	200	138	32	40	500	315	233	50	50
250	200	138	40	32	500	400	318	40	40
250	200	138	40	40	500	400	318	40	50
250	250	188	32	32	500	400	318	50	40
250	250	188	32	40	500	400	318	50	50
250	250	188	40	32	500	500	418	40	40
250	250	188	40	40	500	500	418	40	50
315	200	128	32	32	500	500	418	50	40
315	200	128	32	40	500	500	418	50	50
315	200	128	40	32	630	315	217	50	50
315	200	128	40	40	630	315	217	50	58
315	250	178	32	32	630	315	217	58	50
315	250	178	32	40	630	315	217	58	58
315	250	178	40	32	630	400	302	50	50
315	250	178	40	40	630	400	302	50	58
315	315	243	40	40	630	400	302	58	50
315	315	243	40	50	630	400	302	58	58
315	315	243	50	40	630	500	402	50	50
315	315	243	50	50	630	500	402	50	58
400	200	128	40	40	630	500	402	58	50
400	200	128	40	50	630	500	402	58	58
400	200	128	50	40	630	630	532	50	50
400	200	128	50	50	630	630	532	50	58
400	250	178	40	40	630	630	532	58	50
400	250	178	40	50	630	630	532	58	58
400	250	178	50	40	710	400	302	58	58
400	250	178	50	50	710	400	302	58	63
400	315	243	40	40	710	400	302	63	58
400	315	243	40	50	710	400	302	63	63
400	315	243	50	40	710	500	402	58	58
400	315	243	50	50	710	500	402	58	63
400	400	318	40	40	710	500	402	63	58
400	400	318	40	50	710	500	402	63	63
400	400	318	50	40	710	630	532	58	58
400	400	318	50	50	710	630	532	58	63
500	250	168	40	40	710	630	532	63	58
500	250	168	40	50	710	630	532	63	63

Standard daylight - 100 mm

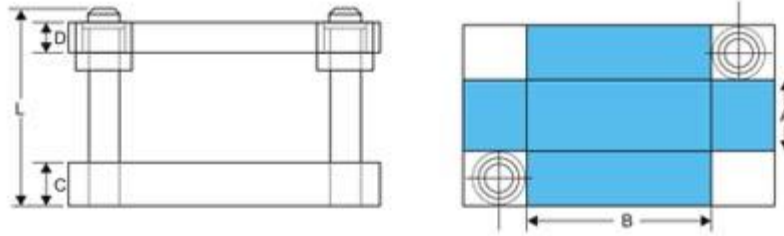
Standard Die Sets with Centre Pillars



External Dimensions					External Dimensions				
A	Die Space		D	E	A	Die Space		D	E
	B	C				B	C		
250	160	127	32	32	500	250	337	50	40
250	160	127	32	40	500	250	337	50	50
250	160	127	40	32	500	315	337	40	40
250	160	127	40	40	500	315	337	40	50
250	200	127	32	32	500	315	337	50	40
250	200	127	32	40	500	315	337	50	50
250	200	127	40	32	500	400	337	40	40
250	200	127	40	40	500	400	337	40	50
250	250	127	32	32	500	400	337	50	40
250	250	127	32	40	500	400	337	50	50
250	250	127	40	32	500	500	337	40	40
250	250	127	40	40	500	500	337	40	50
315	200	171	40	40	500	500	337	50	40
315	200	171	40	50	500	500	337	50	50
315	200	171	50	40	630	315	435	50	50
315	200	171	50	50	630	315	435	50	58
315	250	171	40	40	630	315	435	58	50
315	250	171	40	50	630	315	435	58	58
315	250	171	50	40	630	400	435	50	50
315	250	171	50	50	630	400	435	50	58
315	315	171	40	40	630	400	435	58	50
315	315	171	40	50	630	400	435	58	58
315	315	171	50	40	630	500	435	50	50
315	315	171	50	50	630	500	435	50	58
400	200	256	40	40	630	500	435	58	50
400	200	256	40	50	630	500	435	58	58
400	200	256	50	40	630	630	435	50	50
400	200	256	50	50	630	630	435	50	58
400	250	256	40	40	630	630	435	58	50
400	250	256	40	50	630	630	435	58	58
400	250	256	50	40	710	400	515	58	58
400	250	256	50	50	710	400	515	58	63
400	315	256	40	40	710	400	515	63	58
400	315	256	40	50	710	400	515	63	63
400	315	256	50	40	710	500	515	58	58
400	315	256	50	50	710	500	515	58	63
400	400	256	40	40	710	500	515	63	58
400	400	256	40	50	710	500	515	63	63
400	400	256	50	40	710	630	515	58	58
400	400	256	50	50	710	630	515	58	63
500	250	337	40	40	710	630	515	63	58
500	250	337	40	50	710	630	515	63	63

Standard daylight - 100 mm

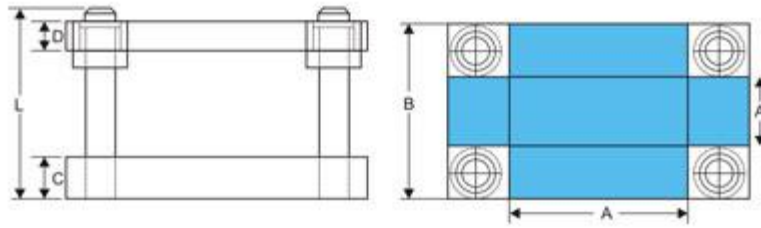
Standard Die Sets with Diagonal Pillars



Die Space				Die Space			
A	B	C	D	A	B	C	D
37	127	32	32	87	337	50	40
37	127	32	40	87	337	50	50
37	127	40	32	152	337	40	40
37	127	40	40	152	337	40	50
77	127	32	32	152	337	50	40
77	127	32	40	152	337	50	50
77	127	40	32	237	337	40	40
77	127	40	40	237	337	40	50
127	127	32	32	237	337	50	40
127	127	32	40	237	337	50	50
127	127	40	32	337	337	40	40
127	127	40	40	337	337	40	50
56	171	32	32	337	337	50	40
56	171	32	40	337	337	50	50
56	171	40	32	120	435	50	50
56	171	40	40	120	435	50	58
106	171	32	32	120	435	58	50
106	171	32	40	120	435	58	58
106	171	40	32	205	435	50	50
106	171	40	40	205	435	50	58
171	171	40	40	205	435	58	50
171	171	40	50	205	435	58	58
171	171	50	40	305	435	50	50
171	171	50	50	305	435	50	58
56	256	40	40	305	435	58	50
56	256	40	50	305	435	58	58
56	256	50	40	435	435	50	50
56	256	50	50	435	435	50	58
106	256	40	40	435	435	58	50
106	256	40	50	435	435	58	58
106	256	50	40	205	515	58	58
106	256	50	50	205	515	58	63
171	256	40	40	205	515	63	58
171	256	40	50	205	515	63	63
171	256	50	40	305	515	58	58
171	256	50	50	305	515	58	63
256	256	40	40	305	515	63	58
256	256	40	50	305	515	63	63
256	256	50	40	435	515	58	58
256	256	50	50	435	515	58	63
87	337	40	40	435	515	63	58
87	337	40	50	435	515	63	63

Standard daylight - 100 mm

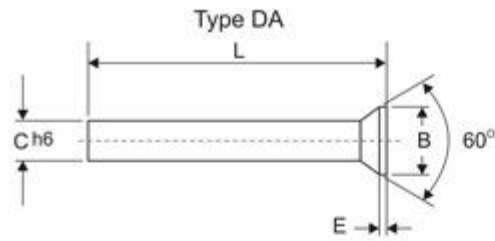
Standard Die Sets with Four Pillars



Die Space		C	D	Die Space		C	D
A	B			A	B		
160	127	32	32	250	356	50	40
160	127	32	40	250	356	50	50
160	127	40	32	315	356	40	40
160	127	40	40	315	356	40	50
200	127	32	32	315	356	50	40
200	127	32	40	315	356	50	50
200	127	40	32	400	356	40	40
200	127	40	40	400	356	40	50
250	127	32	32	400	356	50	40
250	127	32	40	400	356	50	50
250	127	40	32	500	356	40	40
250	127	40	40	500	356	40	50
200	192	32	32	500	356	50	40
200	192	32	40	500	356	50	50
200	192	40	32	315	467	50	50
200	192	40	40	315	467	50	58
250	192	32	32	315	467	58	50
250	192	32	40	315	467	58	58
250	192	40	32	400	467	50	50
250	192	40	40	400	467	50	58
315	192	40	40	400	467	58	50
315	192	40	50	400	467	58	58
315	192	50	40	500	467	50	50
315	192	50	50	500	467	50	58
200	277	40	40	500	467	58	50
200	277	40	50	500	467	58	58
200	277	50	40	630	467	50	50
200	277	50	50	630	467	50	58
250	277	40	40	630	467	58	50
250	277	40	50	630	467	58	58
250	277	50	40	400	515	58	58
250	277	50	50	400	515	58	63
315	256	40	40	400	515	63	58
315	256	40	50	400	515	63	63
315	256	50	40	500	515	58	58
315	256	50	50	500	515	58	63
400	256	40	40	500	515	63	58
400	256	40	50	500	515	63	63
400	256	50	40	630	515	58	58
400	256	50	50	630	515	58	63
250	356	40	40	630	515	63	58
250	356	40	50	630	515	63	63

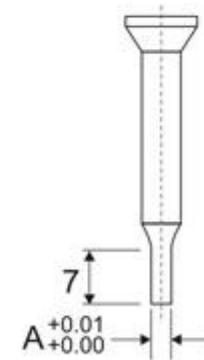
Standard daylight - 100 mm

Countersunk Headed Punches



Stock lengths 50 / 70 / 80 / 100
Intermediate and longer point lengths available
Any alternative dimensions to the above can be specified.

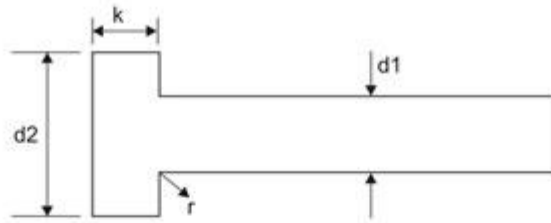
Shank Size C	Head Dia B	Head Thk E
1.0-1.1	1.8	0.5
1.15-1.3	2.0	0.5
1.35-1.5	2.2	0.5
1.55-1.7	2.5	0.5
1.75-1.9	2.8	0.5
1.95-2.0	3.0	0.5
2.05-2.2	3.2	0.5
2.25-2.5	3.5	0.5
2.55-2.95	4.0	0.5
3.0-3.4	4.5	0.5
3.5-3.9	5.0	0.5
4.0-4.4	5.5	0.5
4.5-4.9	6.0	0.5
5.0-5.4	6.5	0.5
5.5-5.9	7.0	0.5
6.0-6.4	8.0	0.5
6.5-7.4	9.0	1.0
7.5-8.4	10.0	1.0
8.5-9.4	11.0	1.0
9.5-10.4	12.0	1.0
10.5-11.4	13.0	1.0
11.5-12.4	14.0	1.0
12.5-13.4	15.0	1.0
13.5-14.4	16.0	1.0



Step type punches also available on order.

We can also give punches in Type A, Type B and Type C.
Any other specialised punches can also be made in specified material, specific drawing.
Profiled punches are also made on order.

Ejector Pins with Straight Head



TYPE 'D' AS PER DIN 1530

MATERIAL : HOT DIE STEEL H 11

d1	d2	k	r	100	125	160	200	250	315
3	6	3	0.3	•	•	•	•	•	•
3.2	6	3	0.3	•	•	•	•	•	•
3.4	6	3	0.3	•	•	•	•	•	•
3.5	7	3	0.3	•	•	•	•	•	•
3.7	7	3	0.3	•	•	•	•	•	•
3.9	7	3	0.3	•	•	•	•	•	•
4	8	3	0.3	•	•	•	•	•	•
4.2	8	3	0.3	•	•	•	•	•	•
4.4	8	3	0.3	•	•	•	•	•	•
4.5	8	3	0.3	•	•	•	•	•	•
4.7	10	3	0.3	•	•	•	•	•	•
4.9	10	3	0.3	•	•	•	•	•	•
5	10	3	0.3	•	•	•	•	•	•
5.2	10	3	0.3	•	•	•	•	•	•
5.4	10	3	0.3	•	•	•	•	•	•
5.5	10	3	0.3	•	•	•	•	•	•
5.7	12	5	0.3	•	•	•	•	•	•
5.9	12	5	0.3	•	•	•	•	•	•
6	12	5	0.5	•	•	•	•	•	•
6.2	12	5	0.5	•	•	•	•	•	•
6.4	12	5	0.5	•	•	•	•	•	•
6.5	12	5	0.5	•	•	•	•	•	•
6.7	12	5	0.5	•	•	•	•	•	•
6.9	12	5	0.5	•	•	•	•	•	•
7	12	5	0.5	•	•	•	•	•	•
7.2	12	5	0.5	•	•	•	•	•	•
7.8	12	5	0.5	•	•	•	•	•	•
8	14	5	0.5	•	•	•	•	•	•
8.2	14	5	0.5	•	•	•	•	•	•
8.4	14	5	0.5	•	•	•	•	•	•
8.5	14	5	0.5	•	•	•	•	•	•
9	14	5	0.5	•	•	•	•	•	•
9.7	14	5	0.5	•	•	•	•	•	•
10	16	5	0.5	•	•	•	•	•	•
10.2	16	5	0.5	•	•	•	•	•	•
10.5	16	5	0.5	•	•	•	•	•	•
11	16	5	0.5	•	•	•	•	•	•
12	18	7	0.8	•	•	•	•	•	•
12.2	18	7	0.8	•	•	•	•	•	•
12.5	18	7	0.8	•	•	•	•	•	•
14	22	7	0.8	•	•	•	•	•	•
16	11	7	0.8	•	•	•	•	•	•

Polyurethane Elastomers

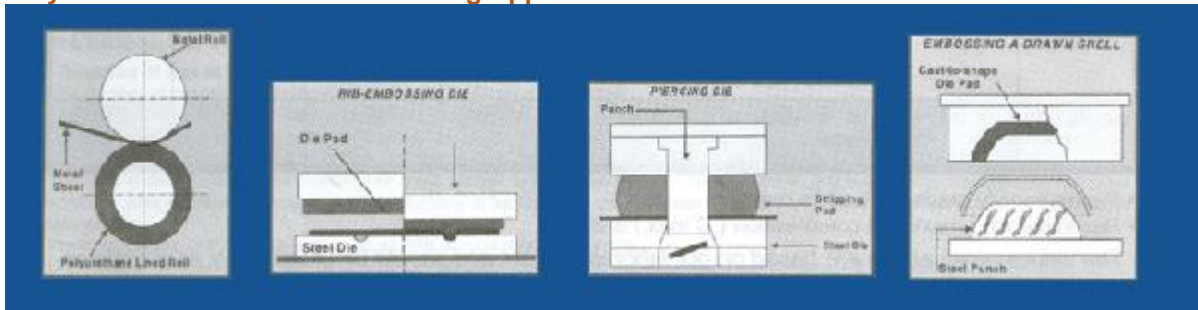
Polyurethane is a new wonder material, which combines the strength of plastic and elasticity of rubber. P.U. can sustain very high loads at higher hardness than rubber. Unlike rubber it does not take part in weathering or chemical actions under normal condition and does not disintegrate easily. Life expectancy is very high. Because of these exceptional properties Polyurethane Springs and pads are ideally suited Press Tools, Jigs, Fixtures, Conveyors, Machine Tools etc. where the action of stripping, forming, damping cushioning, resting or rolling are involved. For optimum performance, best results and longer life, selection of variety of applications.

Polyurethane Springs: Polyurethane Springs are available in Tubular as well as Rod form. The dimensional $\text{Ø}16\text{mm}$ to $\text{Ø}120\text{mm}$. These are standard internal diameters, selected taking proper care of section area for maximum load bearing capacity.

Pads/Mats: The Pads and Mats are available in standard size where thickness ranges from 3mm to 40mm. Minimum size available in any thickness is 250mm x 250mm.

TPP Strippers: Turret Punch Press Strippers are used as strippers in high speed presses where the speed is 120 strokes/min. The high resilience of the material is made use of in this application.

Polyurethane Pads Used For Forming Application:



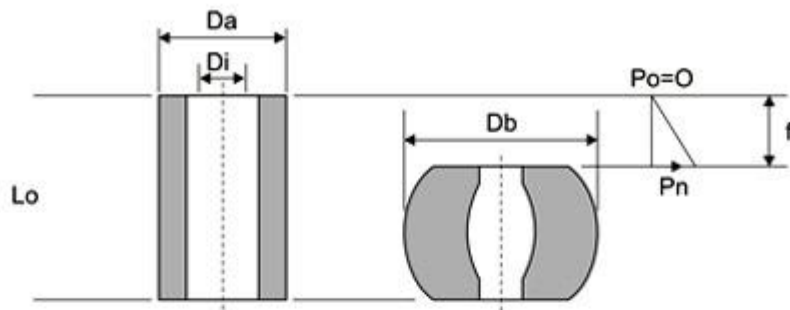
Polyurethane Stripper Springs:



Specification:

Colour	Green
Hardness (Shore A)	90+/-4
Specific Gravity	1.3
Ultimate Tensile Strength	4500 psi
Tear Strength	75 lb/inch
NBS abrasion index	175 %
Max Compressibility	40 %
Ultimate Elongation	450 %
Compression Set (%) (After 22 Hrs. at 70°C)	Max. 28%
Compression Modulus	95 Kg/cm ²
Rebound resilience	45%

Poly Urethane Rod



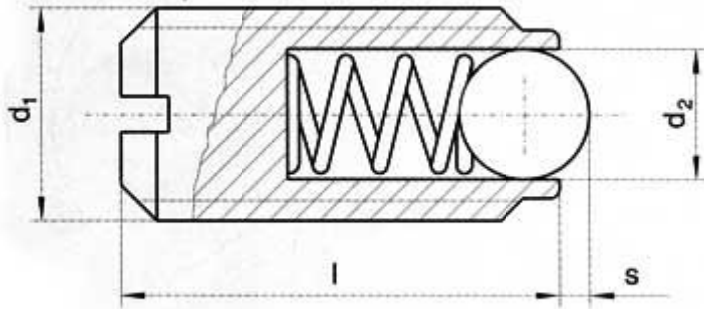
Material Polyurethane

Shore Hardness 90A

P = Force (Kilo) f=deflection (mm) D_b = buldge diameter (mm)

D_a	D_i	L_o	P	f	D_b	P	f	D_b	P	f	D_b
16	6	12	32	1.2	17	52	1.8	17.5	66	2.4	18
			16	1.6		52	2.4		70	3.2	
			20	2.0		52	3.0		70	4.0	
			25	2.5		50	3.75		70	5.0	
			16	1.6		21	115		2.4	22	
20	8	20	85	2.0	21	115	3.0	22	145	4.0	23
			25	2.5		110	3.75		135	5.0	
			32	3.2		100	4.8		130	6.4	
			25	2.0		27	175		3.0	28	
25	8	20	125	2.0	27	165	3.75	28	215	5.0	28
			25	2.5		160	4.8		210	6.4	
			32	3.2		150	6.0		200	8.0	
			40	4.0		150	6.0		200	8.0	
32	10/12	32	150	3.2	34	250	4.8	35	330	6.4	37
			40	4.0		215	6.0		300	8.0	
			50	5.0		215	7.5		300	10.0	
			63	6.3		215	9.45		310	12.6	
40	12	32	400	3.2	42	530	4.8	44	650	6.4	46
			40	4.0		480	6.0		600	8.0	
			50	5.0		480	7.5		650	10.0	
			63	6.3		450	9.54		610	12.6	
			80	8.0		430	12.0		600	16.0	
50	15	32	400	3.2	52.5	650	4.8	54.5	880	6.4	57
			40	4.0		625	6.0		800	8.0	
			50	5.0		600	7.5		850	10.0	
			63	6.3		580	9.45		800	12.6	
			80	8.0		530	12.0		750	16.0	
			100	10.0		500	15.0		770	20.0	
63/80	17	32	780	3.2	66	1200	4.8	69	1400	6.4	72
			40	4.0		1050	6.0		1500	8.0	
			50	5.0		1000	7.5		1350	10.0	
			63	6.3		1150	9.45		1450	12.6	
			8	8.0		1100	12.0		1470	16.0	
			100	10.0		1050	15.0		1380	20.0	
			125	12.5		1000	18.75		1380	25.0	
80	21	32	1600	3.2	86	2200	4.8	90	2800	6.4	94
			40	4.0		1700	6.0		2300	8.0	
			50	5.0		1800	7.5		2600	10.0	
			63	6.3		1800	9.45		2500	12.6	
			80	8.0		1700	12.0		2200	16.0	
			100	10.0		1650	15.0		2300	20.0	
			125	12.5		1600	18.75		2100	25.0	
100	21	32	2400	3.2	108	3100	4.8	113	4000	6.4	118
			40	4.0		2900	6.0		3700	8.0	
			50	5.0		2800	7.5		3800	10.0	
			63	6.3		2800	9.45		3800	12.6	
			80	8.0		2800	12.0		3800	16.0	
			100	10.0		2700	15.0		3700	20.0	
			125	12.5		2900	18.75		4000	25.0	

SPRING PLUNGER



MATERIAL : Steel class 5.8 SURFACE TREATMENT : Black Oxidation BALL :
Hardened and polished stainless steel

d1	I	S	d2	Weight	Initial Force	Final Force
M4	9	0.8	2.5	0.5	6	12
M5	12	0.9	3.0	0.8	7	13
M6	14	1.0	3.5	1.7	9	15
M8	16	1.5	5.0	3.5	20	35
M10	19	2.0	6.0	6.0	25	45
M12	22	2.5	8.0	10.0	35	60
M16	24	3.5	10.0	22.5	65	110

Ball Cages



Hardened & Ground Guide Pin / Bush

Non Standard Sizes against specific requirements.
(Please send necessary drawings along with requirements)

Technical Specifications

Available in different sizes in Aluminum and Brass. Standard Sizes are available as under :

Sr. No.	Pillar Diameter	Bush Diameter	Ball Diameter	Length (MM)
1	17	25	4	60
2	17	25	4	70
3	18	25	4	60
4	18	26	4	70
5	23	31	4	70
6	23	31	4	80
7	24	32	4	80
8	24	32	4	80
9	28	36	4	80
10	28	38	4	90
11	30	38	4	80
12	30	38	4	90
13	34	42	4	90
14	34	42	4	100
15	36	44	4	90
16	36	44	4	100
17	40	48	4	100
18	40	48	4	110
19	42	50	4	100
20	42	50	4	110