



TECHNIFAST

*A leading supplier & manufacturer of
precision engineered components*

T: +44 (0) 1536 461140

F: +44 (0) 1536 461662

E: sales@technifast.co.uk

W: www.technifast.co.uk

TECHNIFAST

T: +44 (0) 1536 461140

F: +44 (0) 1536 461662

E: sales@technifast.co.uk

W: www.technifast.co.uk

Technifast is an established distributor of engineering fasteners, specialising in pins, dowels, spacers, compression limiters, inserts and keys. Our manufacturing facility also produces non-standard parts.

We offer a wide range of precision components that can usually be shipped the same day. This coupled with our competitive pricing, high stock levels and extensive technical knowledge make Technifast the smart choice for all your engineering component requirements.

Top reasons to choose Technifast:

- **Certified to BS EN ISO 9001:2008 under Certificate No C1127SW issued by Q C Systems Ltd**
- **No voice-mail**
- **UK-based sales office**
- **Established supplier with over twenty years experience**
- **Products produced to ISO and DIN standards (or inch equivalents)**
- **Huge product range for fast despatch**
- **Competitive prices**



CONTENTS

PINS AND DOWELS

Turned parts	4
Dowel pins	6 – 9
Taper pins	10 – 11
Grooved pins	12 – 13
Slotted spring pins	14 – 15
Coiled spring pins	16 – 17
Cotter pins	18
Retaining pins (R-clips)	19
Clevis pins	20
Linch pins	21
Shaft locking pins	21

SPACERS AND CONNECTORS

Clearance spacers	22 – 23
Threaded spacers	24 – 25
Studding connectors	26
Compression Limiters	27

THREADED INSERTS

Self-tapping inserts	28 – 29
Ultrasonic inserts	30
Expansion inserts	31

ENGINEERS KEYS

Parallel keys	32
Woodruff keys	33
Gib Head Keys	34
Special Keys	35

OTHER PRODUCTS

Keysteel	36
Threaded rod	36
Silver steel bar	36
Stainless ground bar	36
Blind captive nuts	5

TECHNICAL PAGES

Standards and tolerances	37
Materials data	38
Double shear tests	39
Pin economics	40 – 41



SPECIAL PINS AND PRECISION TURNED PARTS

As well as fast delivery and a wide portfolio of parts in stock, we also have a manufacturing division which can produce high quality special turned parts.

Most of our special pins and turned parts are manufactured using CNC machinery to obtain high precision and an excellent surface finish.




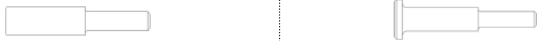






















Our knowledgeable sales team provide fast quotations and we pride ourselves on producing excellent specialist parts in short lead times. We can also supply material certification and maintain production records for complete traceability for your peace of mind.

Special pins which we can manufacture fall into two categories:

- Pins for which there's a published standard, but where the dimensions, tolerances or material differ from the standard
- Pins not based on a published standard

We can produce special pins up to 20mm diameter in a range of materials including mild steel, carbon steel, brass and stainless grades 303, 316 and 416. We can also provide quotations for specialist parts in other materials.

Non-standard pins include:

Headed pins		
Stepped pins		
Pins with flats (for air release or other purposes)		
Cross-drilled pins & screwdriver slotted pins		 
Annular grooved pins		
Knurled pins		
Split taper pins		
Threaded pins		
Round nose pins		
Diamond locating pins		
Pins with cut-out slot		
Pins with bevelled or pointed ends		 

BLIND CAPTIVE NUTS



Blind captive nuts provide an economical alternative to threaded rivets as they are easy to install and remove without special tooling. This feature makes them ideal for use in low volume or on-site applications, but larger users also benefit from the ease of assembly and in place performance.

FEATURES

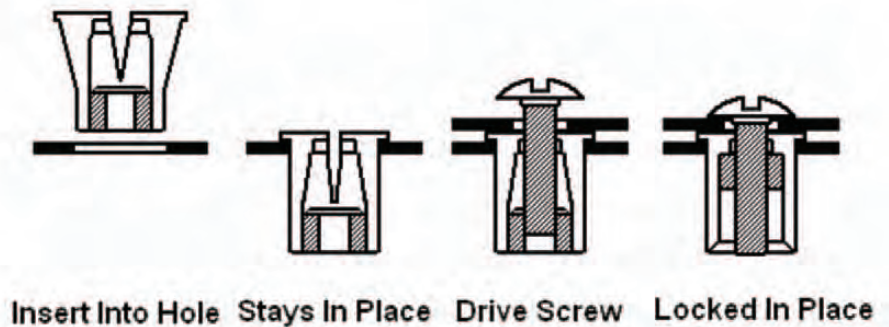
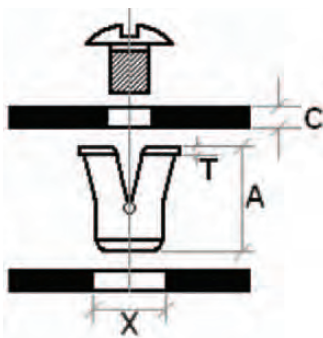
- No special installation tooling needed
- Covers all grip thicknesses
- Spring tension nylon cage holds the nut securely until final assembly is made
- Protects brittle or painted surfaces as only the nylon cage comes into contact with the sheet or other metal
- Made from corrosion resisting material



MATERIAL

Blind captive nuts are produced with white or black nylon cages and brass or stainless steel inserts. We can also supply these inserts in many imperial thread sizes.

HOW IT WORKS



SIZE RANGE – BLIND CAPTIVE NUTS

Series No	Thread Size	Cage Length 'A'	Head Thickness 'T'	Hole Size 'X'	Minimum Screw Length	Average Pull-Out	Suggested Installation Torque
BN21	M3 x 0.5	9.5mm	0.76mm	7.9 +0.1/-0mm	9.5mm + Dim 'C'	0.4Kn	2.3 – 3.4NM
BN31	M4 x 0.7	M5 x 0.8	12.7mm	0.76mm	10.3 +0.1/0mm + Dim 'C'	1.1Kn	2.3 – 5.7NM
BN41	M6 x 1.0	15.9mm	0.76mm	12.7 +0.15/-0mm	15.9mm +Dim 'C'	1.2Kn	3.4 – 11.4NM

DOWEL PINS AND EXTRACTABLE DOWELS

Dowels are solid pins, usually precision ground to narrow limits to permit accurate fitting, they are traditionally used to hold parts together in a fixed alignment, relying on the tightness of fit to stay in place.

Some applications for solid pins require clearance or transition fits on at least one of the components to be fastened. There are three factors that determine the size of hole needed:

- **The tolerance on the dowel**
- **The tightness of fit needed**
- **The hardness of the components into which the dowel is to be fitted**



TOLERANCES AND FITS

Our range standardises on m6 tolerance, which corresponds to the ISO and DIN standards*. The m6 tolerance is a 'plus tolerance' range and is normally used for interference fits. Also available are the minus tolerance ranges, h7 and h8.

HOLE TOLERANCE GUIDE

Hole material	Hardened steel	Mild steel	Aluminium / zinc / brass
Interference fit	Pin Ø less 5 microns	Pin Ø less 25 microns	Pin Ø less 35 microns
Transition fit	Pin Ø less 2 microns	Pin Ø less 5 microns	Pin Ø less 5 microns
Clearance fit	Pin Ø plus 25–60 microns	Pin Ø plus 25–60 microns	Pin Ø plus 25–60 microns

FITTING DOWELS INTO BLIND HOLES

When a dowel is interference-fitted into a blind hole, it increases the pressure of the air trapped in the hole. It is recommended that the dowel should have an air release flat ground along its full length to prevent the dowel being ejected under the pressure of compressed air, or bursting the component into which it is driven.

MATERIALS**

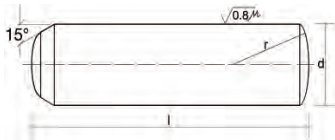
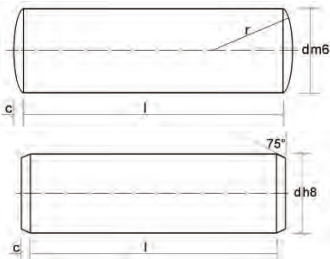
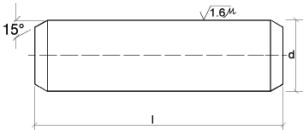
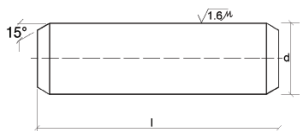
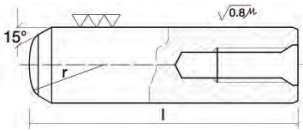
Through hardened steel	100Cr6, WS 1.3505 hardened and tempered to HV 550-650
Mild steel, unhardened	WS 1.0718 (9SMnPb28)
Stainless a2	WS 1.4305 or 303S31
Stainless a4	WS 1.4571 or 316S11

*See page 37 for full details.

**Other materials are listed under 'special pins'. See page 38 for material compositions.

STANDARDS

Dowel pins are made to several national or international standards, each with slight differences in chamfer forms, length tolerances and available materials.

STANDARD	STOCKED	MADE TO ORDER
DIN 6325 	Diameters 1–20mm in steel, through-hardened and ground to m6	Other tolerances Stainless steel Diameters not shown overleaf
DIN 7 <i>Note; overall length is greater than nominal length. See dimension C and refer to table on next page</i> 	Diameters 1–30mm in mild steel ground to m6 Diameters 0.8–25mm in stainless A2 Diameters 1–12mm in stainless A4	Other tolerances Diameters not shown overleaf Dowels 14-25mm in stainless A4
ISO 2338 (1998) 	Diameters 1–25mm in mild steel ground to m6 Diameters 1–25mm in stainless A2	Other tolerances Stainless A4 Diameters not shown overleaf
ISO 8734 (1998) 		Diameters 1–20mm Through-hardened steel ground to m6 (8734A) Case-hardened steel ground to m6 (8734B) Through hardened martensitic stainless (8734C)
DIN 7979D 	Diameters 4–20mm in steel, through-hardened and ground to m6 Diameters 4–20mm in stainless A2	

ADDITIONAL STANDARDS

BS 1804 PART 1	Solid dowels in inch sizes in low carbon steel, case-hardened for diameters 1/8"-1
BS 1804 PART 2	Solid dowels in metric sizes in low or high carbon steel, hardened for diameters of 4mm and above
BS 1804 PART 3	Extractable dowels and taper pins
BS 7055	Equivalent to ISO 8734
ISO 8733	Equivalent to DIN 7979A (unhardened)
ISO 8735	Equivalent to DIN 7979D (hardened)

SIZE RANGES

SIZE RANGE – DOWEL PINS TO DIN 6325 m6 TOLERANCE

Nominal Diameter, DIN 6325	1	1.5	2	2.5	3	4	5	6	8	10	12	14	16	20
Available Materials	Steel, Through Hardened and Ground to m6 tolerance													
Double Shear Strengths tested to ISO 8749, kN	1.5	3.4	5.5	8	13	22	31	53	88	132	210	260	350	485
Lengths in mm														
4														
5														
6														
8														
10														
12														
14														
16														
18														
20														
24														
28														
30														
32														
36														
40														
45														
50														
55														
60														
70														
80														
90														
100														
110														
120														
Length Tolerances	to js 14													

SIZE RANGE – DOWEL PINS TO DIN 7 m6 AND h8 TOLERANCE

Nominal Diameter, DIN 7	0.8	1	1.5	2	2.5	3	4	5	6	8	10	12	14	16	20	25	30
Dimension C	0.12	0.15	0.23	0.3	0.4	0.45	0.6	0.75	0.9	1.2	1.5	1.8	2	2.5	3	4	4.5
Available Materials	Mild Steel ground to m6 or h8 tolerance A2 Stainless, Grade 1.4305 ground to m6 or h8, up to 25 mm Ø A4 Stainless, Grade 1.4571 ground to m6, from 1 to 25mm Ø																
Double Shear Strengths tested to ISO 8749, kN																	
Mild Steel	0.4	0.7	1.6	2.85	4.25	6.15	10.6	16.5	22.8	40.5	63.2	91	124	156	220	300	390
Stainless Steel A2	0.4	0.7	1.7	2.9	4.4	6.6	11.7	18.1	26.0	47.0	64.1	92					
Lengths in mm																	
3																	
4																	
5																	
6																	
8																	
10																	
12																	
14																	
16																	
18																	
20																	
24																	
28																	
30																	
32																	
36																	
40																	
45																	
50																	
55																	
60																	
70																	
80																	
90																	
100																	
110																	
120																	
Length Tolerances	3 – 10 mm long + 0.3,-0					12 – 50 mm long + 0.5,-0					Over 50 mm long + 0.8,-0						

A selection kit is also available. Also stocked in inch sizes in equivalent standard.

SIZE RANGES

SIZE RANGE – DOWEL PINS TO ISO 2338 (1998)

Nominal Diameter, ISO 2338 (1998)	0.8	1	1.5	2	2.5	3	4	5	6	8	10	12	16	20	25	30	
Available Materials	Mild Steel ground to m6 or h8 tolerance A2 Stainless, Grade 1.4305 ground to m6 or h8, $\varnothing 5$ to \varnothing																
Double Shear Strengths tested to ISO 8749, kN																	
Mild Steel	0.4	0.7	1.6	2.85	4.25	6.15	10.6	16.5	22.8	40.5	63.2	91	156	220	300	390	
Stainless Steel A2	0.4	0.7	1.7	2.9	4.4	6.6	11.7	18.1	26.0	47.0	64.1	92	160				
Lengths in mm																	
3																	
4																	
5																	
6																	
8																	
10																	
12																	
14																	
16																	
18																	
20																	
24																	
28																	
30																	
32																	
36																	
40																	
45																	
50																	
55																	
60																	
70																	
80																	
90																	
100																	
110																	
120																	
Length Tolerances	3 – 10 mm long ± 0.25					12 – 50 mm long ± 0.5					Over 50 mm long ± 0.75						

SIZE RANGE – EXTRACTABLE DOWELS TO DIN 7979D WITH AIR RELEASE FLAT

Nominal Diameter, DIN 7979D with Air Release	4	5	6	8	10	12	14	16	20
Available Materials	Through Hardened Steel Grade WS 1.3505, ground to m6 tolerance A2 Stainless Steel Grade 1.4305, ground to m6								
Thread Size	M2.5	M3	M4	M5	M6	M6	M8	M8	M10
Lengths in mm									
10									
12									
14									
16									
18									
20									
24									
28									
30									
32									
36									
40									
45									
50									
55									
60									
70									
80									
90									
100									
120									
Length Tolerances	to js 15								

TAPER PINS



Our standard range of plain taper pins are made to DIN 1B, we also offer extractable taper pins to DIN 7977 and 7978.

With DIN standards the nominal diameter is always the smaller end and the taper is 2% (1 in 50). We can also supply to other metric standards, inch sizes or completely non-standard dimensions. We also stock taper pins in inch sizes to BS46 Part 3. Please contact our sales team for further details.

MATERIALS

MILD STEEL

STAINLESS 303

STAINLESS 316

STANDARDS

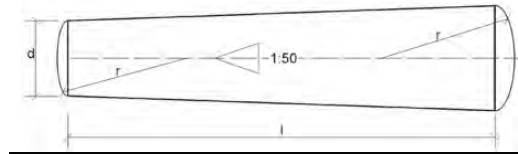
DIN 1A	Plain taper pin with ground finish (surface roughness of 0.8 microns)
DIN 1B	Plain taper pin with turned finish (surface roughness of 3.2 microns)
DIN 7978	Extractable taper pin with female thread
DIN 7977	Extractable taper pin with male thread
ISO 2339	Same as DIN 1B but length includes crowns
ISO 8736	Same as DIN 7978 with minor tolerance changes
ISO 8737	Same as DIN 7977 with minor tolerance changes
BS 46 PT 3	Inch range, with nominal diameter being the large end and a taper of 1 in 48
BS 1804 PT 3	Extractable taper pin
BS 5681	Same as ISO 2339
DIN 258	Variant form of DIN 7977

SPECIAL TAPER PINS

- Non-standard diameters up to 20mm maximum
- Non-standard taper angles
- Ground finish
- Lengths up to 190mm
- Other materials
- Split taper pins

TAPER PINS – SIZE RANGE

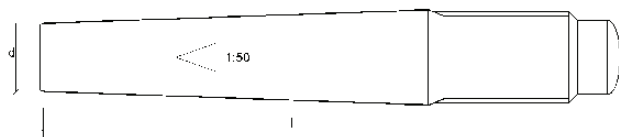
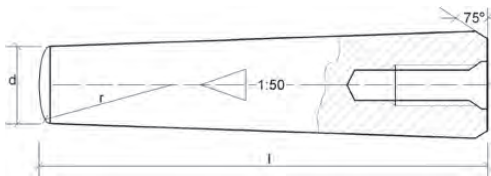
TAPER PINS TO DIN 1B



Nominal Diameter (dimension 'd'), DIN 1B	1.5	2	2.5	3	4	5	6	8	10	12	14	16	20
Dimension 'C'	0.23	0.3	0.4	0.45	0.6	0.75	0.9	1.0	1.2	1.6	1.6	2.0	2.5
Lengths in mm													
6													
8													
10													
12													
14													
16													
18													
20													
22													
24													
26													
28													
30													
32													
36													
40													
45													
50													
55													
60													
65													
70													
80													
90													
100													
110													
120													
130													
140													
150													
Length Tolerances to js 15													

A selection kit is also available.

EXTRACTABLE TAPER PINS



DIN 7978 (ISO 8736) – FEMALE THREAD

Nominal Diameter 'd', DIN 7978	6	8	10	12	14	16	20
Thread Size	M4	M5	M6	M8	M8	M10	M12
Lengths							
16							
18							
20							
24							
26							
28							
30							
32							
36							
40							
45							
50							
55							
60							
70							
90							
100							
110							
120							
Length Tolerances to js 15							

DIN 7977 – MALE THREAD

Nominal Diameter 'd', DIN 7977	5	6	8	10	12	16
Thread Size	M5	M6	M8	M10	M12	M16
Lengths						
40						
45						
50						
55						
60						
65						
70						
75						
80						
85						
90						
95						
100						
110						
120						
130						
140						
150						
160						
Length Tolerances to js 15						

GROOVED PINS



Grooved pins are solid pins with three swaged grooves at 120° pitch along all or part of their length. When the pin is driven into a drilled hole of suitable diameter, the material displaced by the grooving process is forced back, to partially close up the grooves and lock the pin into place.

Advantages of grooved pins:

- They do not need a precision reamed hole.
- They can have parallel grooves or tapered grooves. Parallel grooves give the pin high resistance to vibration, but need more force to insert.
- They can be grooved on only part of the length, so that where the pin has to be firmly fixed in one part of an assembly, but be a clearance fit on the other, both parts can be drilled to the same diameter.

MATERIALS

MILD STEEL

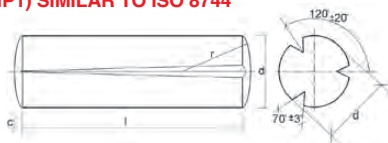
STAINLESS A2 (WS 1.4305)



STANDARDS

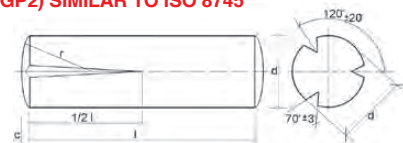
ISO standards were introduced in 1992 but in practise have not yet replaced the DIN standards. Technifast stocks DIN standards but ISO can be supplied to special order. Grooved pins are also referred to by GP numbers (see below).

DIN 1471 (GP1) SIMILAR TO ISO 8744



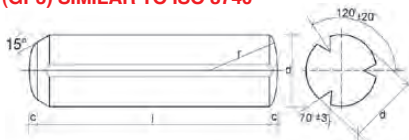
Full length taper grooves used to fix two or more components together, but with less insertion force than DIN 1473

DIN 1472 (GP2) SIMILAR TO ISO 8745



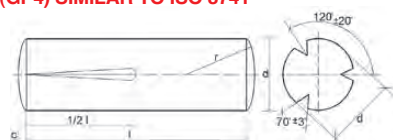
Half length taper grooves used where part of the assembly must be a free fit

DIN 1473 (GP3) SIMILAR TO ISO 8740



Full length parallel grooves used to fix two or more components together with maximum rigidity

DIN 1474 (GP4) SIMILAR TO ISO 8741



Half length reverse taper grooves used where the ungrooved portion acts as a stop or handle

DIN 1475 (GP8) SIMILAR TO ISO 8742



Third length centre grooves used on hinges or clevises where the two ends must act as pivots

GROOVED PINS

OTHER STANDARDS

BS 7047	Equivalent to DIN 1474
BS 7049	Equivalent to DIN 1475 but with half length centre grooves
BS 7050	Equivalent to DIN 1471
BS 7053	Headed groove pin
DIN 1469	Similar to DIN 1474 but with parallel grooves and a slot for Circlip at the non-grooved end
DIN 1470	Similar to DIN 1473 but with reduced diameter at one end to aid insertion
DIN 1476	Headed grooved pin (round head)
DIN 1477	Headed grooved pin (countersunk head)
GP5	Equivalent to DIN 1475 but with half length centre grooves
ISO 8739	Similar to DIN 1473 but with reduced diameter at one end to aid insertion
ISO 8743	Similar to DIN 1475 but with half length centre grooves
ISO 8746	Headed grooved pin (round head)
ISO 8747	Headed grooved pin (countersunk head)

SIZE RANGE – GROOVED PINS

Nominal Diameter, Grooved Pins	1*	1.2*	1.5	2	2.5	3	4	5	6	8	10	12
Dimension 'C' (see note below)	0.14	0.16	0.2	0.25	0.3	0.4	0.5	0.6	0.8	1	1.2	1.6
Diameter over Grooves	1.05	1.25	1.6	2.15	2.65	3.20	4.25	5.25	6.30	8.30	10.35	12.35
Tolerance on Groove Diameter	+ 0.05, - 0				± 0.05				± 0.1			
Recommended Hole Size	Max 1.025	1.225	1.525	2.025	2.525	3.025	4.075	5.075	6.075	8.090	10.090	12.110
	Min 1.000	1.200	1.500	2.000	2.500	3.000	4.000	5.000	6.000	8.000	10.000	12.000
Double Shear Strengths- tested to ISO 8749, kN (see also Page 37)												
	0.7	1.0	1.6	2.85	4.25	6.15	10.6	16.5	22.8	40.5	63.2	91
Lengths in mm												
4												
5												
6												
8												
10												
12												
14												
16												
18												
20												
22												
24												
26												
28												
30												
32												
36												
40												
45												
50												
55												
60												
65												
70												
75												
80												
	Length Tolerances to js 15											
	* Only available in DIN 1473											

NB The groove diameter must be measured using ring gauges. The groove diameter figures are valid for steel only. Stainless grooved pins have a slightly smaller diameter over the grooves.

AVAILABLE TO SPECIAL ORDER

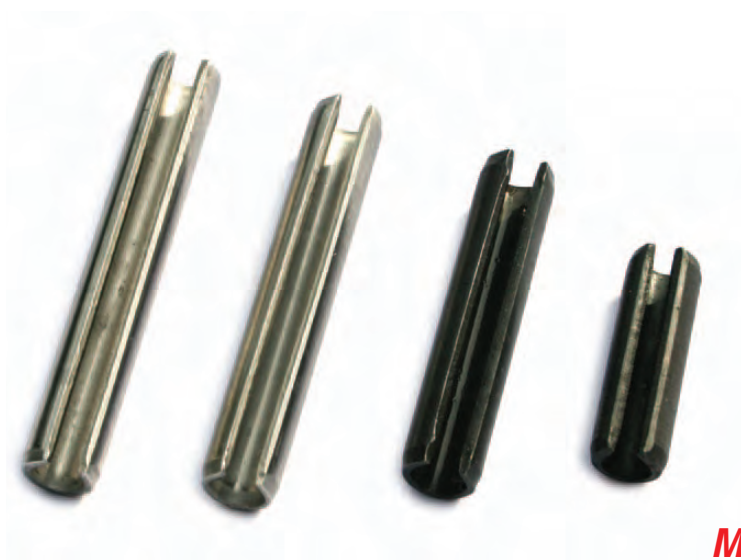
- Diameters 14, 16, 20mm
- Stainless steel A4 (WS 1.4571)
- Brass
- Hardened steel

SLOTTED SPRING PINS (SPRING TENSION PINS)

Slotted spring pins consist of a single coil of spring steel or stainless steel with an open slot sufficiently wide to enable the pin to reduce in diameter as it is driven into a hole of appropriate size. The ends of the pin have a bevelled chamfer. They are designed for plain drilled holes but a countersink makes assembly easier, especially for the ISO 8752 type. Slotted pins are normally supplied in the heavy duty form to ISO 8752, but a light duty version can be supplied to ISO 13337.

As an alternative to ISO 8752, we can offer in some sizes JIS B 2808 (Japan Industry Standard). This has an expanded diameter relatively smaller in relation to the nominal diameter (hole size) which makes assembly easier as a countersink in the hole is not needed and the slot is narrower so does not entangle in bulk processing, such as plating or hopper-fed assembly machines.

It is possible to increase the shear strength of slotted pins by inserting a small diameter inside a large one. This should always be done by inserting the larger pin first, then inserting the smaller one, taking care that the slot is between 90° and 180° away from the slot in the larger pin. Suitable combinations for pins to ISO 8752 are:



Outer pin	Inner pin
3.5	2
5	3
6	3.5
8	5
10	6
12	7
14	8
16	10
20	12

MATERIALS

SPRING STEEL

CS70 / AISI 1070 / C67

STAINLESS STEEL A2

AISI 304

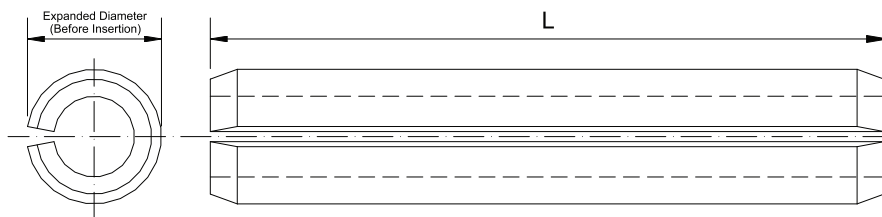
STANDARDS

ISO 8752	Heavy duty (stocked)
DIN 7346	Light duty slotted spring pin
ISO 13337	Light duty slotted spring pin
BS 7060	Equivalent to ISO 8752
DIN 1481	Equivalent to ISO 8752 but with plus only length tolerances
JIS B 2808	Equivalent to ISO 8752 but with reduced expanded diameter for easier assembly

FINISHES

Slotted spring pins are supplied in plain oiled finish. Steel pins may also be given a protective finish such as zinc or phosphate. Where electrolytically applied finishes are used it is essential to de-embrittle the pins immediately after plating. Since the de-embrittlement process is not completely reliable, non-electrolytic finishes should be used for safety-critical applications. Where pins are to be installed in plastic it is recommended that they are de-oiled before use to avoid embrittlement of the plastic.

SIZE RANGE – SLOTTED PINS*



Nominal Diameter, ISO 8752	1	1.5	2	2.5	3	3.5	4	5	6	7	8	10	12	14	16	20	
Available Materials	Carbon Steel, Stainless Steel A2													Carbon Steel Only			
Expanded Diameter Min	1.2	1.7	2.3	2.8	3.3	3.8	4.4	5.4	6.4	7.45	8.5	10.5	12.5	14.5	16.5	20.5	
Expanded Diameter Max	1.3	1.8	2.4	2.9	3.5	4.0	4.6	5.6	6.7	7.75	8.8	10.8	12.8	14.8	16.8	20.9	
Recommended Min Hole Size (H12)	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0	7.0	8.0	10.0	12.0	14.0	16.0	20.0	
Hole Size (H12) Max	1.1	1.6	2.1	2.6	3.1	3.62	4.12	5.12	6.12	7.15	8.15	10.15	12.18	14.18	16.18	20.21	
Material Thickness	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1	1.2	1.2	1.5	2	2.5	3	3	4	
Minimum Double Shear Strengths tested to ISO 8749, kN (see also Page 37)																	
Carbon Steel	0.7	1.58	2.82	4.38	6.32	9.06	11.24	17.54	26.04	30.0	42.76	70.16	104.1	144.7	171	280	
Stainless Steel	0.4	0.98	1.81	2.84	4.07	5.80	7.25	10.75	16.17		26.46	42.14					
Lengths in mm																	
4																	
5																	
6																	
8																	
10																	
12																	
14																	
16																	
18																	
20																	
22																	
24																	
26																	
28																	
30																	
35																	
40																	
45																	
50																	
55																	
60																	
65																	
70																	
75																	
80																	
85																	
90																	
95																	
100																	
120																	
130																	
140																	
150																	
160																	
180																	
200																	
Length Tolerances	1 – 10 mm long ± 0.25					12 – 50 mm long ± 0.50					Over 50 mm long ± 0.75						

Selection kits are also available in carbon steel and A2 stainless steel

Nominal Diameter JIS B 2808	2	2.5	3	4	5
Material	Carbon Steel				
Expanded Diameter Min	2.15	2.65	3.15	4.20	5.20
Expanded Diameter Max	2.25	2.75	3.25	4.40	5.40
Recommended Min Hole Size	2.00	2.50	3.00	4.00	5.00
Hole Size Max	2.09	2.59	3.09	4.12	5.12
Material Thickness	0.40	0.50	0.60	0.80	1.00
Double Shear Strength tested to ISO 8749, KN	2.76	4.31	6.20	10.80	17.25

***Also stocked in inch sizes**

Other diameters to special order

COILED SPRING PINS TO ISO 8748 AND 8750



Coiled spring pins consist of 2 1/4 coils of spring steel or stainless steel and have swaged chamfers at each end. They are designed for plain drilled holes, but countersinking makes insertion easier.

Advantages of coiled pins:

- The coiled design improves shock absorption as the load is spread over more than one coil.
- Assembly is easier as the insertion force needed is lower.
- The pins cannot interlock when in bulk, which is a benefit when they are to be barrel plated or installed using bowl-fed equipment.

MATERIALS

SPRING STEEL

CS 67 and DIN 17222, hardened and tempered to HV 420-520

STAINLESS STEEL A2

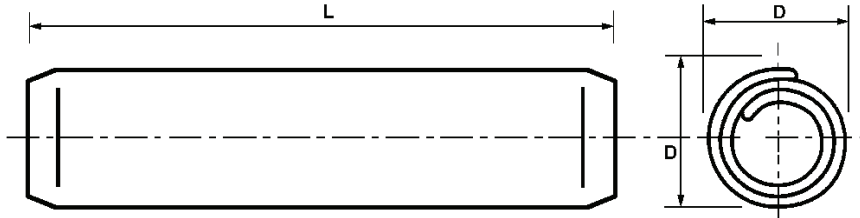
STANDARDS

ISO 8748	Heavy duty
BS 7057	Heavy duty
DIN 7344	Heavy duty
ISO 8750	Standard duty
BS 7058	Standard duty
DIN 7343	Standard duty
BS 7059	Light duty
ISO 8751	Light duty
Superelastic	Light duty with 1 1/2 coils

FINISHES

Coiled pins are normally supplied with a plain oiled finish. Steel pins may be given a protective finish such as zinc, phosphate, etc but for electrolytically applied finishes it is essential to de-embrittle the pins immediately after plating. Since the de-embrittlement process is not completely reliable, non-electrolytic finishes or stainless should be used for safety-critical applications. Where pins are to be used in plastic assemblies, it is recommended that they be de-oiled before use to avoid embrittlement of the plastic.

SIZE RANGE – COILED PINS*



Nominal Diameter	0.8	1	1.2	1.5	2	2.5	3	3.5	4	5	6	8	10	12	14	16	
Available Materials	Spring Steel CS70 In All Diameters																
	Stainless Steel A2																
Expanded Diameter 'D'																	
Standard Duty Max	0.91	1.15	1.35	1.73	2.25	2.78	3.30	3.84	4.40	5.50	6.50	8.63	10.80	12.85	14.45	16.45	
ISO 8750 Min	0.85	1.05	1.25	1.62	2.13	2.65	3.15	3.67	4.20	5.25	6.25	8.30	10.35	12.40	14.95	17.00	
Heavy Duty Max				1.71	2.21	2.73	3.25	3.79	4.3	5.35	6.40	8.55					
ISO 8748 Min				1.61	2.11	2.62	3.12	3.64	4.15	5.15	6.18	8.25					
Recommended Hole Size Max	0.84	1.04	1.24	1.60	2.10	2.60	3.10	3.62	4.12	5.12	6.13	8.17	10.20	12.22	14.25	16.25	
Min	0.80	1.00	1.20	1.50	1.99	2.49	2.99	3.48	3.98	4.95	5.95	7.93	9.93	11.90	13.85	15.85	
Minimum Double Shear Strengths tested to ISO 8749, kN (see also Page 37)																	
Carbon Steel																	
Standard Duty	0.4	0.6	0.9	1.45	2.5	3.9	5.5	7.5	9.6	15	22	39	62	89	120	160	
Heavy Duty				1.9	3.5	5.5	7.6	10	13.5	20	30	53					
A2 Stainless Steel																	
Standard Duty				1.05	1.9	2.9	4.2		7.6	11.5	16.8	30					
Lengths in mm (ISO 8750) Steel																	
4																	
5																	
6																	
8																	
10																	
12																	
14																	
16																	
18																	
20																	
22																	
24																	
26																	
28																	
30																	
32																	
35																	
40																	
45																	
50																	
55																	
60																	
65																	
70																	
75																	
80																	
85																	
90																	
95																	
100																	
120																	
140																	
160																	
180																	
Length Tolerances	1 – 10 mm long ± 0.25					12 – 50 mm long ± 0.50					Over 50 mm long ± 0.75						

*Also stocked in inch sizes

SPLIT COTTER PINS

Our range of cotter pins are stocked in diameters 1mm to 13mm in mild steel (usually zinc plated), 1mm to 6.3mm in stainless steel A4 and brass.

Our specifications follow DIN 94, which is equivalent to ISO 1234 and BS 1574. Due to the loose fit required for cotter pins, the metric range doubles for inch sizes.

MATERIALS

MILD STEEL, ZINC PLATED

STAINLESS A4

BRASS

STANDARDS

DIN 94 (stocked)

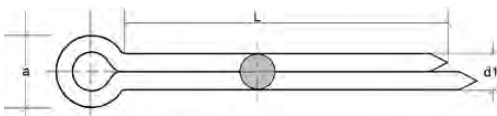
BS 1574

BS 7724

ISO 1234



SIZE RANGE – COTTER PINS



Nominal Diameter, Cotter Pins		1	1.2	1.6	2	2.5	3.2	4	5	6.3	8	10	13
Available Materials		Mild Steel, Zinc Plated Stainless Steel Brass									Mild Steel, Zinc Plated Only		
Dimension 'd1'	Max	0.9	1.0	1.4	1.8	2.3	2.9	3.7	4.6	5.9	7.5	9.5	12.4
	Min	0.8	1.09	1.3	1.7	2.1	2.7	3.5	4.4	5.7	7.3	9.3	12.1
Dimension 'a'	Max	1.8	2.0	2.8	3.6	4.6	5.8	7.4	9.2	11.8	15.0	19.0	24.8
	Min	1.6	1.7	2.4	3.2	4.0	5.1	6.5	8.0	10.3	13.1	16.6	21.7
Lengths in mm													
	6												
	8												
	10												
	12												
	16												
	18												
	20												
	22												
	25												
	28												
	32												
	36												
	40												
	45												
	50												
	56												
	63												
	71												
	80												
	90												
	100												
	112												
	125												
	140												
	160												

RETAINING PINS (R-CLIPS)

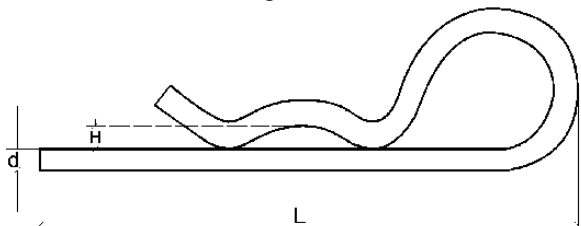


Retaining pins or R-clips are stocked in two designs – the single coil for most applications and the double coil for more demanding use.

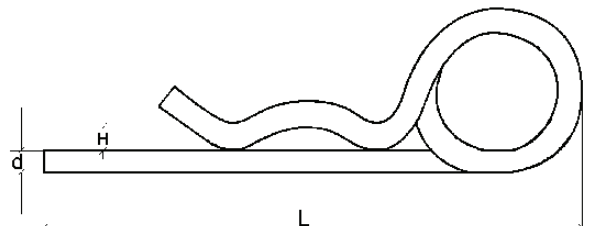
They are manufactured in either zinc plated or spring steel and the size range is 1.2mm to 8mm wire diameters

SIZE RANGE – RETAINING PINS (R-CLIPS)

Single coil



Double coil



Type	Diameter 'd'	Dimension 'H' (Ref on l y)	Overall Length 'L'	Recommended Hole Diameter	Range of Shaft Diameter	Available Material
Single Coil	1.2	2	22	1.5	5 – 8	Steel
	1.6	2	25	2.0	6 – 10	Steel
	1.8	2.5	36	2.2	8 – 13	Steel
	2	5	48	2.5	15 – 25	Steel
	2	3	56	2.5	9 – 14	Steel & Stainless
	2.5	4	48	3.0	9 – 14	Steel & Stainless
	2.5	5.5	72	3.0	16 – 27	Steel
	3	4.5	72	3.5	10 – 20	Steel & Stainless
	4	6.5	76	4.5	16 – 25	Steel & Stainless
	4.5	7	90	5.0	20 – 30	Steel & Stainless
Double Coil	5	7	102	5.5	20 – 35	Steel & Stainless
	6	8	124	7.0	28 – 40	Steel
	7	10	124	8.0	28 – 45	Steel
	8	11	128	9.0	30 – 45	Steel
	2	4	56	2.5	8 – 14	Steel
	3	5	72	3.5	14 – 20	Steel
	4	6	92	4.5	17 – 24	Steel
	5	6	108	5.5	18 – 30	Steel
	6	8	138	6.5	24 – 36	Steel
	7	9	148	8.0	26 – 40	Steel
8	8	149	9.0	24 – 40	Steel	

All dimensions are in mm

CLEVIS PINS



We supply Clevis Pins to ISO 2341B (DIN 1444) which has a cross-drilled hole for R-Pins or Cotter Pins (see pages 18 and 19). Also available are ISO 2341 with grooves for Circlips to DIN 471.

When specifying Clevis Pins, it should be noted that the nominal length is the total length from under the head to the end of the pin, but the grip length is from under the head to the inside edge of the hole or groove. This is shown in the table under references L1 and G1.

STANDARDS

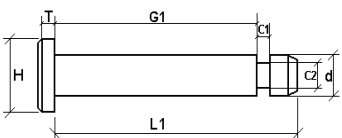
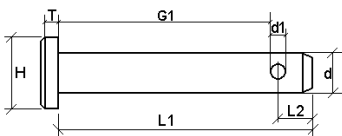
ISO 2341A	same as 2341 but without hole
ISO 2341B	our stocked programme
ISO 2341 – Circlip	(for Circlips to DIN 471)
ISO 2340A	Headless, without hole
ISO 2340B	Headless, with cross-drilled hole at each end
BS 5894	obsolete, replaced by ISO 2341
DIN 1433	Headless, with or without hole
DIN 1434	Similar to ISO 2341 but with smaller diameter head
DIN 1435	Similar to ISO 2341 but with larger diameter head
DIN 1436	Similar to ISO 2341 but with larger diameter head
DIN 1443	Same as ISO 2340
DIN 1444	Same as ISO 2341

MATERIALS

MILD STEEL, ZINC PLATED
STAINLESS A2
STAINLESS A4



SIZE RANGE – CLEVIS PINS



Nominal Diameter 'd'	5	6	8	10	12	14
Diameter Tolerance	h11					
Head Diameter 'H'	8	10	14	18	20	22
Hole Diameter 'd1'	1.6	1.6	2	3.2	3.2	4
Head Thickness 'T'	1.6	2	3	4	4	4
Circlip Groove 'C1'	0.7	0.8	0.9	1.1	1.1	1.1
Circlip Groove 'C2'	4.8	5.7	7.6	9.6	11.5	13.4
Length 'L2' min	2.9	3.2	3.5	4.5	5.5	6
Length 'G1'	L1 - L2 - 1/2 d1					
Lengths 'L1'						
10	6.7					
12	8.7	8				
14	10.7	10				
16	12.7	12	11.5			
18	14.7	14	13.5			
20	16.7	16	15.5	13.9		
22	18.7	18	17.5	15.9		
24	20.7	20	19.5	17.9	16.9	
26	22.7	22	21.5	19.9	18.9	
28	24.7	24	23.5	21.9	20.9	20
30	26.7	26	25.5	23.9	22.9	22
32	28.7	28	27.5	25.9	24.9	24
35	31.7	31	30.5	28.9	27.9	27
40	36.7	36	35.5	33.9	32.9	32
45	41.7	41	40.5	38.9	37.9	37
50	46.7	46	45.5	43.9	42.9	42
55		51	50.5	48.9	47.9	47
60		56	55.5	53.9	52.9	52
65			60.5	58.9	57.9	57
70			65.5	63.9	62.9	62
75			70.5	68.9	67.9	67
80			75.5	73.9	72.9	72
85				78.9	77.9	77
90				83.9	82.9	82
95				88.9	87.9	87
100				93.9	92.9	92
120					112.9	112
140						132
Length Tolerances	Up to 10 mm long ± 0.25		12 – 50 mm long ± 0.5		Over 50 mm long ± 0.75	

AVAILABLE TO ORDER

- Non-Standard dimensions
- Other materials

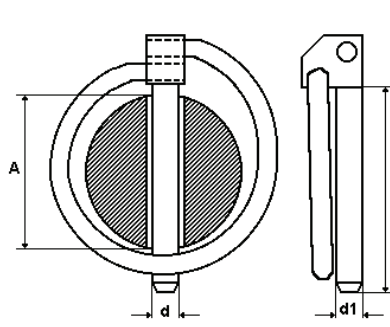
* ALSO AVAILABLE IN INCH SIZES

LINCH PINS AND SHAFT LOCKING PINS

These fasteners are supplied in mild steel, with spring steel clips and finished in zinc with yellow chromate.



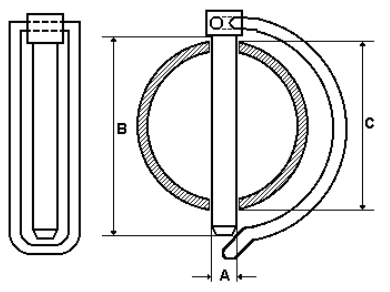
SIZE RANGE – LINCH PINS



Pin Diameter 'd'	Pin Diameter* 'd1'	Pin Length 'l'
4.5	4.5	42
6.0	6.0	42
7.0	6.0	42
8.0	7.0	42
9.0	7.5	42
10.0	8.0	42
11.0	9.0	42

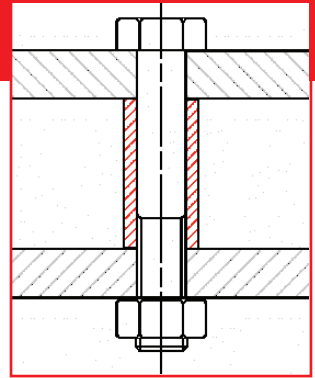
* In pin sizes 4.5 and 6 mm, there is no flat so 'd' is the same as 'd1'

SIZE RANGE – SHAFT LOCKING PINS



Pin Diameter 'A'	Pin Length 'B'	Shaft Diameter 'C' Max
4.5	32	28
4.5	40	36
6.0	32	28
6.0	40	36
6.0	45	40
8.0	40	36
8.0	45	40
8.0	50	45
8.0	60	55
10.0	40	36
10.0	50	45
10.0	60	55
11.0	45	40
11.0	55	50

SPACERS AND CONNECTORS



Spacer under compression

We offer a standard range of spacers in both clearance and threaded form. Spacers are normally used to allow two parts of an assembly to be fastened together at a controlled distance from each other.

Types of spacers:

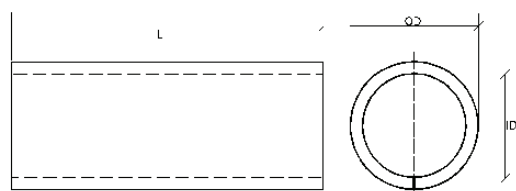
- Clearance spacers, which are fastened with a nut and bolt, and where the inside diameter of the spacer is slightly larger than the bolt diameter.
- Threaded spacers, where the inside of the spacer is tapped, to enable a screw to fasten it into place.

CLEARANCE SPACERS / ROLLED SPACERS

For applications where the lowest cost is required and where a high compression strength is not necessary, we offer our range of closed-seam rolled spacers. These are supplied in mild steel, zinc plated.

SIZE RANGE - ROLLED SPACERS

Nominal Size	2	2.5	3	3.5	4	5	6	8	10
Inside 'ID' Min Diameter	2.15	2.65	3.15	3.65	4.15	5.20	6.20	8.20	10.20
Max Diameter	2.30	2.80	3.30	3.80	4.30	5.40	6.40	8.50	10.50
Wall Thickness	0.30	0.30	0.50	0.50	0.70	0.70	0.90	1.10	1.20
Outside Diameter 'OD'	2.90	3.40	4.30	4.80	5.70	6.80	8.20	10.70	12.90
Lengths in mm									
4									
6									
8									
10									
12									
14									
16									
18									
20									
22									
24									
26									
28									
30									
35									
40									
45									
50									
55									
60									
65									
70									
Length Tolerance	± 0.15mm								



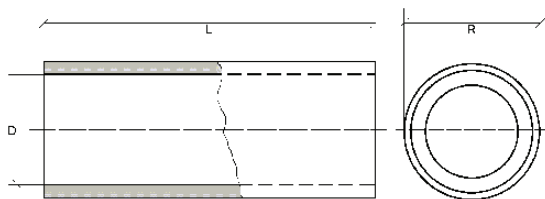
TURNED SPACERS, SERIES PTS AND MOULDED NYLON SPACERS, SERIES NS



We offer precision turned spacers in various materials, as well as moulded spacers in nylon.

We have a standard range, but can also manufacture parts to order.

SIZE RANGE – TURNED AND MOULDED SPACERS



Nominal Diameter	2	2.5	3	4	5	6	8	10	12	16	20
Materials											
Brass, Nickel Plated	*	*	*	*	*						
Steel, Zinc Plated				*	*	*	*	*	*	*	*
Stainless 303			*	*	*	*	*	*	*	*	*
Nylon			*	*	*	*	*				
Inside Diameter 'D'	2.2	2.5	3.2	4.3	5.3	6.3	8.3	10.3	12.5	16.3	20.7
Outside Diameter 'R' h9 tolerance	4	5	6	8	10	10	12	14	19	20	25
Lengths*											
1											
2											
3											
4											
5											
6											
8											
10											
12											
15											
18											
20											
25											
30											
Up to 190mm long											
Brass Spacers	Available from 1mm to 30mm long										
Steel Spacers	Available from 4 mm to 190mm long										
Stainless Spacers	Available from 4mm to 190mm long										
Nylon Spacers	Available from 1mm to 30mm long										
	Length tolerances to js 13										
	Outside Diameter tolerances to h9 (except Nylon)										

THREADED SPACERS AND STUDDING CONNECTORS



Hexagonal spacers are available in nickel plated brass, stainless steel grade AISI 303 and steel with a bright zinc and clear passivate finish. Round spacers are available in mild steel, bright zinc plated and stainless steel grade A2.

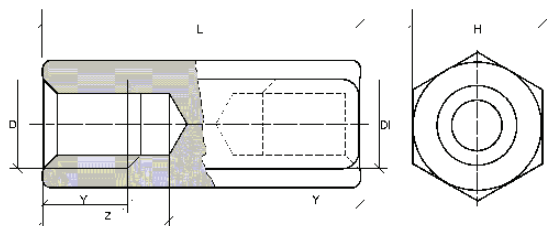
Lengths up to 20mm are usually tapped the full length, but over 20mm they are tapped each end to the depths specified in the table under the 'Y' dimension. We can manufacture any non-standard sizes to your specific requirements.

PRODUCT IDENTIFICATION

FA	Hexagonal zinc plated mild steel threaded spacer
FL	Hexagonal nickel plated brass threaded spacer
FI	Hexagonal stainless steel threaded spacer
FAR	Round zinc plated mild steel threaded spacer
FIR	Round stainless A2 threaded spacer

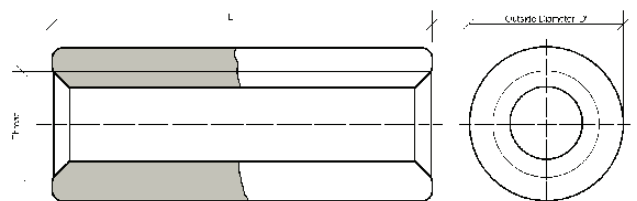
SIZE RANGE – HEXAGONAL THREADED SPACERS

Nominal Thread Size	M2	M2.5	M3	M4	M5	M6
Available Materials	Brass	Brass, Steel	Brass, Steel, Stainless		Brass, Steel	Steel
Dimension 'H'	4.0	5.0	5.0*	7.0	8.0	10.0
Thread Size 'D' & 'DI'	M2	M2.5	M3	M4	M5	M6
Dimension 'Y' & 'Y1'	Through tapped					
Where 'L' is 20 or less						
Where 'L' is over 20	10.0	10.0	10.0	10.0	10.0	10.0
Dimension 'Z'	'Y' Dimension + minimum of 1 mm					
Lengths in mm						
5						
8						
10						
12						
15						
18						
20						
25						
30						
35						
40						
45						
50						
55						
60						
70						
80						
Length tolerances to js 13						
* In stainless steel the 'H' dimension is 5.5 mm. Steel and brass M3 are also available with 5.5mm 'H' dimension						



SIZE RANGE – ROUND THREADED SPACER (FULL LENGTH THREAD)

Thread Size	M4	M5	M6	M8	M10	M12
Material	Steel, BZP	Steel, BZP and Stainless A2				
Dimension 'D', mm	7	8	10	11	13	15
Lengths	Made to Customer Requirement					



THREADED PILLARS



Hexagonal pillars are available in nickel plated brass, stainless steel grade AISI 303 and steel with a bright zinc finish. In addition to the standard range shown in the table, there are many intermediate body lengths and shorter or longer stud lengths.

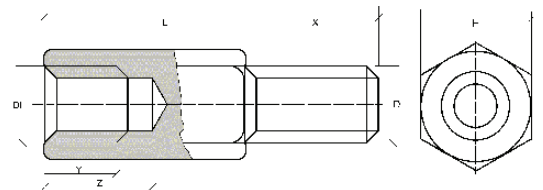
Also stocked are computer connectors with 4.40 UNC threads. These have a range of male thread lengths.

PRODUCT IDENTIFICATION

MA	Mild steel, grade S300Pb, zinc and clear chromate finish
ML	Brass, nickel plated
MI	Stainless steel (stocked in M3 and M4 only)

SIZE RANGE – THREADED PILLARS

Nominal Thread Size	M2	M2.5	M3	M4	M5	M6	4.40 UNC
Available Materials	Brass	Brass, Steel	Brass, Steel, Stainless		Brass, Steel	Steel	Brass, Steel
Dimension 'H'	4.0	5.0	5.0*	7.0	8.0	10.0	5.0
Thread Size 'D' & 'DI'	M2	M2.5	M3	M4	M5	M6	4.40 UNC
Dimension 'Y'							3.0
Where 'L' = 5	2.5	2.5	3.0	3.0	3.0	3.0	
Where 'L' = 8– 10	5.0	5.0	5.0	5.0	5.0	5.0	
Where 'L' = 12– 20	6.0	6.0	8.0	8.0	8.0	8.0	
Where 'L' = over 25	6.0	6.0	10.0	10.0	10.0	10.0	
Dimension 'Z'	'Y' Dimension + minimum of 1 mm						
Dimension 'X'							4, 5, 6, 8, 12
Where 'L' = 5– 20	6.0	6.0	8.0	8.0	8.0	8.0	
Where 'L' = over 25	6.0	6.0	10.0	10.0	10.0	10.0	
Body Lengths in mm							
5							
8							
10							
12							
15							
18							
20							
25							
30							
35							
40							
45							
50							
55							
60							
70							
80							
Length Tolerances to js 13							
* In stainless steel the 'H' dimension is 5.5 mm. Steel and brass M3 are also available with 5.5 mm 'H' dimension							



STUDDING CONNECTORS TO DIN 6334



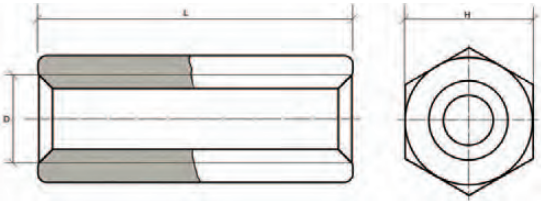
We stock hexagonal studding connectors in thread sizes M5 to M36, threaded full length. The standard length is three times the nominal thread size, however we are happy to quote for other sizes and specifications.

MATERIALS

MILD STEEL, ZINC PLATED

STAINLESS A2

SIZE RANGE – STUDDING CONNECTORS



Thread Size (full length)Dimension 'D'	Dimension 'H' (mm)	Standard Length 'L' (mm)	Available Material
M5	8	15	Mild Steel, Zinc Plated Stainless A2
M6	10	18	Mild Steel, Zinc Plated Stainless A2
M8	13	24	Mild Steel, Zinc Plated Stainless A2
M10	17	30	Mild Steel, Zinc Plated Stainless A2
M12	19	36	Mild Steel, Zinc Plated Stainless A2
M14	22	42	Mild Steel, Zinc Plated Stainless A2
M16	24	48	Mild Steel, Zinc Plated Stainless A2
M18	27	54	Mild Steel
M20	30	60	Mild Steel, Zinc Plated Stainless A2
M24	36	72	Mild Steel, Zinc Plated Stainless A2
M30	46	90	Mild Steel
M36	55	60	Mild Steel

See page 38 for more information on materials.

COMPRESSION LIMITERS



Compression limiters are produced by different roll-forming processes from cold-rolled strip material. Compression limiters are used wherever plastic components are bolted to another part of the assembly, to control compression of the plastic.

SPECIAL SOLUTIONS

- Longitudinal straight slot for subsequent pressing into plastic
- Longitudinal straight slot, butt seamed
- Longitudinal slot according to customer's requirements
- Chamfering or radii are possible
- According to the technical requirements, compression limiters can be supplied with stamped cut-outs

MATERIALS

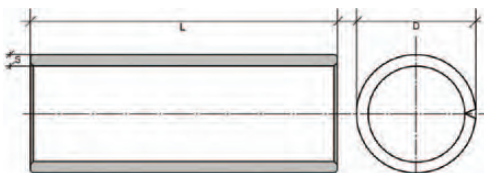
Cold rolled strip	DIN EN 10139
Spring steel	DIN EN 10132-4
Spring stainless steel	DIN EN 10151

See page 36 for more information on materials

MATERIALS

On customer's request, compression limiters in spring steel according to DIN EN 10132-4 can be hardened and quenched to HV 420 – 520. Other hardnesses on request.

DIMENSIONS – COMPRESSION LIMITERS



D	D – Tolerance	S – Tolerance	S
6.0 – 10.0mm	$\leq 0.15\text{mm}$	$\leq 0.2\text{mm}$	0.6 – 1.5mm
>10.0 – 16.0mm			0.8 – 2.5mm

THREADED INSERTS



Threaded inserts are used in plastics, wood and non-ferrous metals to provide a stronger thread than would be possible by using a self-tapping screw directly into the material.

They provide higher pull-out strength as the outside diameter of the insert has a much larger contact area with the material than the equivalent self-tapping screw. In addition to strength, inserts provide a durable thread, which is important if the product has to be disassembled regularly for maintenance or adjustment.

TYPES OF INSERT

Inserts in our range are frequently categorised by the method of insertion.

SELF-TAPPING

A universal type used in plastics, wood and non-ferrous metals.

Self-tapping inserts are available in brass, steel and stainless steel.

HEAT OR ULTRASONIC

Ideal for high volume applications in thermoplastics. Available in brass.

EXPANSION

Mainly used in plastics and rely on the radial pressure exerted by the screw to lock the insert into position.

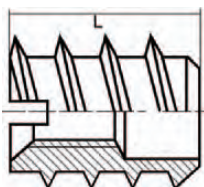
SELF TAPPING INSERTS

Self-tapping inserts can be used with drilled or moulded holes manually using a threaded mandrel, by the use of a tapping head mounted on a pillar drill, or by using automatic tapping machines.

The hole size is critical to the successful use of inserts. For each type of insert a specified hole size is given, the lower end of the tolerance range is only applicable when the insert is to be installed in softer materials. For hardwood, hard plastics or aluminium, the top end of the range should be used.

SERIES 121

Steel self-tapping insert are for use in wood, plywood, chipboard and MDF The Series 121 has a deep coarse-pitched outside thread to provide maximum pull-out strength. There is an internal cut-out to prevent wood particles impeding the screw. Lengths other than standard can be manufactured to your specific requirements.



Nominal Thread Size	M3	M4	M5	M6	M8	M10	M12	M16
Outside Diameter	6.0	8.0	10.0	12.0	16.0	18.5	22.0	25.0
Length in mm	8.0	10.0	12.0	15.0	18.0	20.0	22.0	25.0
Recommended Min	4.6	5.7	7.6	9.4	12.6	15.1	18.3	21.3
Hole Size Max	5.2	6.6	8.5	10.4	14.0	16.5	19.8	22.8

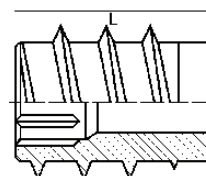
THREADED INSERTS

SERIES 125

Steel hex-drive self-tapping inserts can be used in wood, plywood, chipboard and MDF. The Series 125 are designed for insertion with an allen key and do not have a thread cut-out.



Nominal Thread Size	M4	M5	M6	M8	M10
Outside Diameter	8.0	10.0	12.0	16.0	18.5
Length in mm	10.0	12.0	15.0	18.0	20.0
Hex Socket	SW4	SW5	SW6	SW8	SW10
Recommended Min	6.6	8.4	10.0	14.0	16.2
Hole Size Max	7.2	9.2	10.8	14.8	17.2

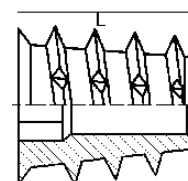


SERIES 127

The Series 127 is a zinc alloy insert for soft woods and chipboard. It's a more economical alternative to Series 121 and 125, but does not provide the same pull-out strengths. It has a hex recess for easy assembly.



Nominal Thread Size	M5	M6	M8	M10
Length in mm	13.0	13.0	13.0	13.0
Recommended Min	7.7	8.7	10.7	12.2
Hole Size Max	8.0	9.0	11.0	12.5



SERIES 300

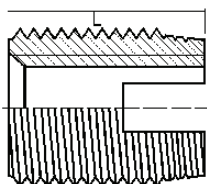
These self-tapping inserts have a fine external thread for use in harder materials. The Series 300 are available in case hardened steel (plated zinc and yellow passivate), brass and stainless steel grade 303 or chrome stainless 1.4104.



These inserts are designed for used in aluminium and other non-ferrous metals, plastics and thermosetting resins.

The insert should always be inserted slotted end first as the slot provides the cutting action to tap into the material.

Nominal Thread Size	M3	M4	M5	M6	M8	M10	M12	M14	M16
External Thread Size	M5 x 0.5	M6.5 x 0.75	M8 x 1	M10 x 1.5	M12 x 1.5	M14 x 1.5	M16 x 1.5	M18 x 1.5	M20 x 1.5
Length in mm	6	8	10	14	15	18	22	24	25
Recommended Min	4.6	5.8	7.1	8.6	10.6	12.6	14.6	16.6	18.6
Hole Size Max	4.8	6.2	7.6	9.4	11.4	13.4	15.4	17.4	19.4



HEAT AND ULTRASONIC INSERTS

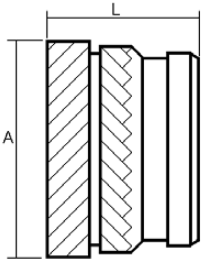


Heat and ultrasonic inserts are designed for use in thermoplastic materials. The insert is either pre-heated or uses heat generated by ultrasonic vibration to soften the walls of the hole as it is pressed into position. The softened plastic flows into the knurls and undercuts to lock the insert into place.

This method of insertion is ideal for high volume applications where suitable insertion equipment is available.

SERIES 01

The Series 01 brass inserts are designed for heat or ultrasonic insertion into parallel holes. This series, which is available in two standard lengths, combine diagonal knurls and undercuts to achieve the optimum balance of resistance to pull-out and torque loads.

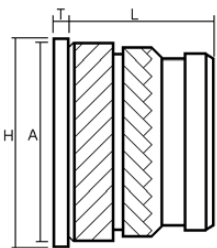


Nominal Thread Size	M2	M2.5	M3	M3.5	M4	M5	M6	M8
External Thread Size	3.6	4.6	4.6	5.43	6.3	7.06	8.66	10.23
Length in mm								
Short		4.00	4.00	4.00	4.80	5.80	7.00	
Long	4	5.74	5.74	7.14	8.15	9.53	12.70	12.70
Recommended Min	3.20	4.00	4.00	4.80	5.60	6.40	8.06	9.60
Hole Size Max	3.30	4.10	4.10	4.90	5.70	6.50	8.10	9.70

SERIES 02

These are headed inserts in brass, for heat or ultrasonic insertion into parallel holes. They are the headed version of Series 01. They can be used in two ways:

- To provide an electrical contact face (in which case a countersink will normally be needed)
- To be inserted from the back of the moulding to achieve a much higher pull-out strength.



Nominal Thread Size	M2	M2.5	M3	M3.5	M4	M5	M6	M8
External Diameter 'A'	3.6	4.6	4.6	5.43	6.3	7.06	8.66	10.23
Head Diameter 'H'	4.75	5.54	5.54	6.35	7.14	7.92	9.52	11.10
Head Thickness 'T'	0.53	0.61	0.61	0.76	0.91	1.10	1.35	1.35
Length in mm								
Short		4.00	3.50	4.00	6.00	6.00	7.00	
Long	4	5.74	5.75	7.14	8.11	9.52	12.70	12.70
Recommended Min	3.20	4.00	4.00	4.80	5.60	6.40	8.00	9.60
Hole Size Max	3.30	4.10	4.10	4.90	5.70	6.50	8.10	9.70

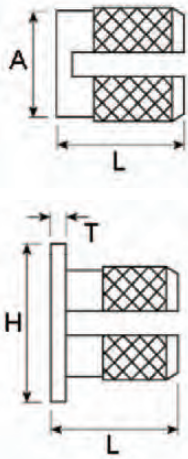
EXPANSION INSERTS



Expansion inserts are used where a durable thread is required but the high pull-out resistance of self-tapping or heat / ultrasonic inserts is not essential. They are hand-placed into a hole of specified size and the action of the screw on final assembly locks the insert into place.

They are ideally suited for use in plastics which are strong enough to resist the expansion of the insert yet flexible enough to allow the knurls to anchor into the material.

Series 81 parallel and Series 82 headed inserts are available in brass. We can also supply Series 32 inserts for tapered holes and Series 11 symmetrical ultrasonic inserts.



Nominal Thread Size	M3	M3.5	M4	M5	M6	M8
Diameter 'A'	3.96	4.72	5.50	6.32	7.90	9.50
Head Diameter 'H'	5.53	6.35	7.13	7.92	9.52	11.10
Head Thickness 'T'	0.50	0.65	0.81	1.00	1.24	1.24
Length 'L' (mm)	4.72	6.32	7.92	9.42	12.70	12.60
Recommended Hole Size						
Min	4.00	4.80	5.60	6.40	8.00	9.60
Max	4.10	4.90	5.70	6.50	8.10	9.70

PARALLEL KEYS



Parallel keys are stocked in C45k key steel having a minimum tensile strength of 60Kg/mm² and stainless steel grade A4.

Our stock range is to DIN 6885A (2 round ends) and is made to minus tolerances (h9 on width and h11 on height). See page 35 for tolerance tables. Inch sizes are stocked in BS 46 Type A (2 round ends) and are made to tolerances of +0.002" on both width and height.

Square ended keys or keys with one round end and one square end are also available and are identified as follows:-

- | | |
|---|-----------------------------|
| DIN 6885A / ISO 2491A / BS 46 Type A | Round Ended |
| DIN 6885B / ISO 2491B / BS 46 Type B | Square Ended |
| DIN 6885AB / ISO 2491AB / BS 46 Type C | One Round, One Square Ended |

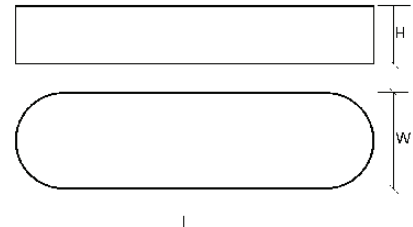
TO SPECIFY

State the standard and type, width, height, length and material

Eg DIN 6885A 10 x 8 x 30 C45k

SIZE RANGE – PARALLEL KEYS *

Parallel Keys, Width 'W' DIN 6885 (Metric)	2	3	4	5	6	8	10	12	14	16	18	20	22	25	28	32	36	40	45
Height 'H'	2	3	4	5	6	7	8	8	9	10	11	12	14	14	16	18	20	22	25
Length	6																		
8	10																		
12	14																		
15	16																		
18	20																		
22	25																		
28	30																		
32	35																		
40	45																		
50	55																		
60	65																		
70	75																		
80	85																		
90	95																		
100	110																		
120	130																		
140	150																		
160	170																		
180																			



Parallel Keys, Width 'W' BS 46 (Imperial)	1/8	5/32	3/16	1/4	5/16	3/8	7/16	1/2
Height 'H'	1/8	5/32	3/16	1/4	5/16	3/8	7/16	1/2
Length	1/4							
5/16	3/8							
1/2	9/16							
5/8	3/4							
7/8	1							
1 1/8	1 1/4							
1 3/8	1 1/2							
1 3/4	2							
2 1/4	2 1/2							
3	3 1/4							
3 1/2	3 3/4							
4								

*** WE MAY BE ABLE TO QUOTE FOR OTHER SIZES NOT SHOWN ABOVE**

WOODRUFF KEYS

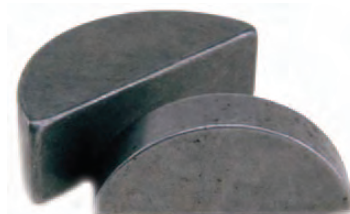


Woodruff Keys are supplied to DIN 6888 / ISO 3912 in C45k key steel and are made to minus tolerances (h9 on width and h12 on height). See page 35 for tolerance tables.

Inch sizes are supplied to BS 46 Part 1 and are made to plus tolerances of nominal +0.001" on the width and +0.005" on the height.

TO SPECIFY

State the standard, width and height Eg DIN 6888
3 x 5 Inch sizes can be specified in the same way,
but it is usual practice to give the width and full
diameter, rather than the width and height. There is also a 'Key Number' system
that is mentioned in the table below as an alternative way of specification.



SIZE RANGE – WOODRUFF KEYS

Woodruff Keys, DIN 6888 (Metric)				Woodruff Keys, BS 46 Part 1 (Imperial)			
Width 'W'	Height 'H'	Length 'L'	Diameter (d2 x 2)	Key No	Width 'W'	Height 'H'	Diameter (d2x2)
1.5	2.6	6.75	7	203	1/16	0.166 – 0.171	3/8
2	2.6	6.75	7	204	1/16	0.198 – 0.203	1/2
2	3.7	9.66	10	303	3/32	0.166 – 0.171	3/8
2	5	12.65	13	304	3/32	0.198 – 0.203	1/2
2.5	3.7	9.66	10	305	3/32	0.245 – 0.250	5/8
3	3.7	9.66	10	403	1/8	0.166 – 0.171	3/8
3	5	12.65	13	404	1/8	0.198 – 0.203	1/2
3	6.5	15.72	16	405	1/8	0.245 – 0.250	5/8
4	5	12.65	13	406	1/8	0.308 – 0.313	3/4
4	6.5	15.72	16	505	5/32	0.245 – 0.250	5/8
4	7.5	18.57	19	506	5/32	0.308 – 0.313	3/4
5	6.5	15.72	16	507	5/32	0.370 – 0.375	7/8
5	7.5	18.57	19	606	3/16	0.308 – 0.313	3/4
5	9	21.63	22	607	3/16	0.370 – 0.375	7/8
5	10	24.49	25	608	3/16	0.433 – 0.438	1
6	7.5	18.57	19	609	3/16	0.479 – 0.484	1 1/8
6	9	21.63	22	807	1/4	0.370 – 0.375	7/8
6	10	24.49	25	808	1/4	0.433 – 0.438	1
6	11	27.35	28	809	1/4	0.479 – 0.484	1 1/8
7	10	24.49	25	810	1/4	0.542 – 0.547	1 1/4
8	9	21.63	22	812	1/4	0.636 – 0.641	1 1/2
8	11	27.35	28	1008	5/16	0.433 – 0.438	1
8	13	31.43	32	1009	5/16	0.479 – 0.484	1 1/8
10	11	27.35	28	1010	5/16	0.542 – 0.547	1 1/4
10	13	31.43	32	1011	5/16	0.589 – 0.594	1 3/8
10	16	43.08	45	1012	5/16	0.636 – 0.641	1 1/2
				1210	3/8	0.542 – 0.547	1 1/4
				1211	3/8	0.589 – 0.594	1 3/8
				1212	3/8	0.636 – 0.641	1 1/2

GIB HEAD KEYS



Gib Head Keys are available in metric and inch sizes. Metric sizes are made to DIN 6887 / ISO 2492 and Inch sizes are made to BS 46 Part 1. They are made in key steel with a minimum tensile strength of 55KG/mm² or stainless (to order).

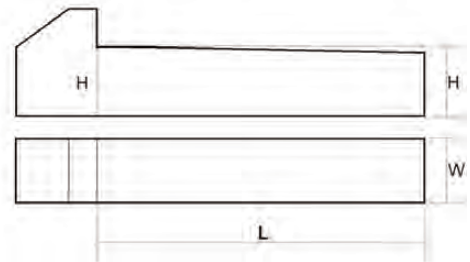
TO SPECIFY

State the standard, width, height and length

Eg DIN 6887 8 x 7 x 50

GIB HEAD KEYS TO DIN 6887 / ISO 2492 (METRIC)

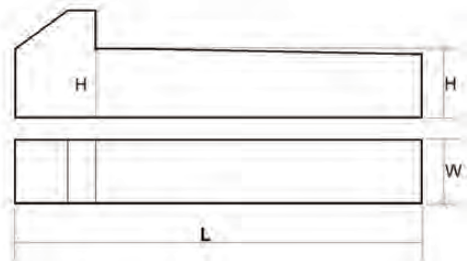
Taper	1 in 100
Width 'W'	Tolerance h9
Height 'H'	Measured at Top of Taper
Length 'L'	Measured from Tapered End to Under Head



Gib Head Keys, Width 'W' DIN 6887 (Metric)	4	5	6	8	10	12	14	16	18	20	22	25	28	32	36	40	45	50
Height 'H'	4	5	6	7	8	8	9	10	11	12	14	14	16	18	20	22	25	28
Length 'L' As Required																		

GIB HEAD KEYS TO BS 46 PART 1 (IMPERIAL)

Taper	1 in 100
Width 'W'	Tolerance up to 5/8" = +0.002" / -0.000" Tolerance 3/4" to 7/8" = +0.003" / -0.000" Tolerance 1" to 1 1/4" = +0.004" / -0.000" Tolerance over 1 3/8" = +0.005" / -0.000"
Height 'H'	Measured at Top of Taper
Length 'L'	Overall Length



Gib Head Keys, Width 'W' BS 46 Part 1 (Imperial)	1/8	3/16	1/4	1/4	5/16	5/16	3/8	3/8	3/8	7/16	7/16	1/2	1/2	5/8	3/4	7/8	1	1	1
Height 'H'	1/8	3/16	3/16	1/4	1/4	5/16	1/4	5/16	3/8	5/16	7/16	5/16	1/2	5/8	3/4	7/8	1	1	1
Length 'L' As Required																			

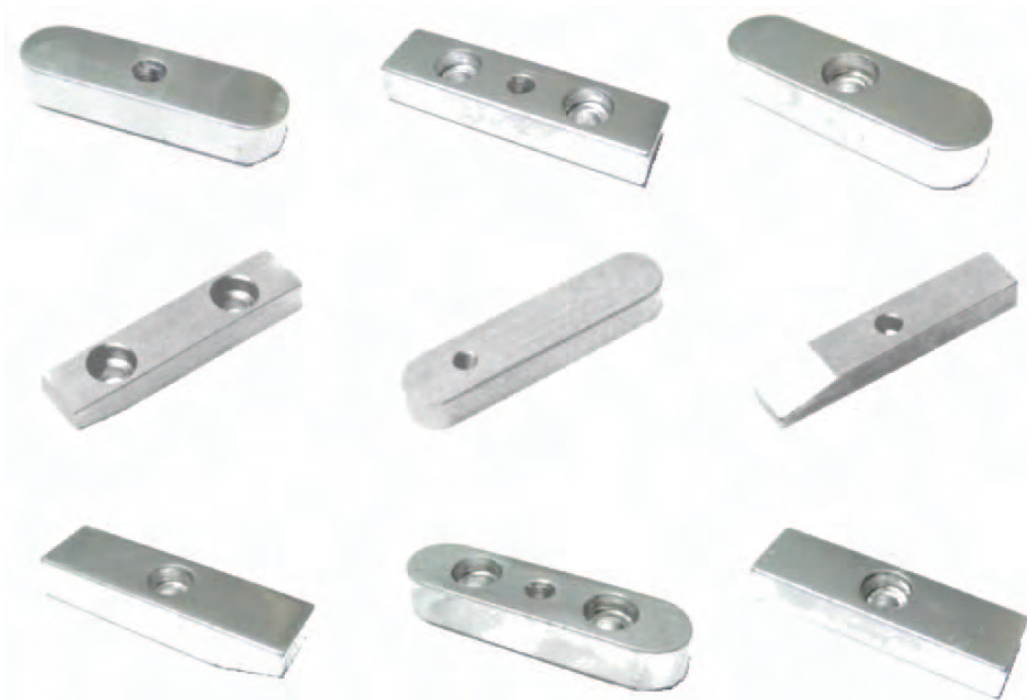
*** WE MAY BE ABLE TO QUOTE FOR OTHER SIZES NOT SHOWN ABOVE**

SPECIAL KEYS

In addition to the standard range, keys can be made to customer specifications.

TYPICAL SPECIAL KEYS ARE:-

- Standard designs with special dimensions on tolerances
- Standard designs with special materials or higher tensile strengths
- Keys with chamfered edges
- Keys with plain or tapped holes
- Keys with cut outs
- Keys with tapered end



SEMI-FINISHED PRODUCTS

KEY STEEL*

We supply 1000mm and 300mm lengths of key steel in C45k material, with most sizes also being available in stainless steel grade A4.

Width x Height	Width x Height	Width x Height	Width x Height	Width x Height	Width x Height
2 x 2	7 x 7	12 x 8	16 x 7	20 x 12	25 x 25
3 x 3	8 x 5	12 x 10	16 x 10	20 x 20	28 x 10
4 x 4	8 x 7	12 x 12	16 x 16	22 x 9	28 x 16
5 x 3	8 x 8	14 x 6	18 x 7	22 x 14	32 x 18
5 x 5	10 x 6	14 x 9	18 x 11	22 x 22	36 x 20
6 x 3	10 x 8	14 x 10	18 x 12	25 x 9	40 x 22
6 x 4	10 x 10	14 x 12	18 x 18	25 x 14	45 x 25
6 x 6	12 x 6	14 x 14	20 x 8	25 x 22	56 x 32

ROUND BAR*

We offer a range of bar stock either in 1 metre lengths or cut to the required length. Other diameters may be available to order.

Material	Silver Steel	Stainless 303S31 (A2)	Stainless 316S11)
Diameter Tolerance (mm)	± 0.015	h9 & m6	h9 & m6
Diameters (mm)			
4			
5			
6			
8			
10			
12			
16			
20			
24			
25			

THREADED ROD

We can offer threaded rod to DIN 975 in either 1 metre lengths or cut to the required length.

Material	Mild Steel, Zinc Plated Grade 4.8	Mild Steel Grade 8.8	Stainless A2
Thread Size			
M3			
M4			
M5			
M6			
M8			
M10			
M12			
M14			
M16			
M20			

Other materials including brass and stainless steel are available to order, as well as other threads, UNC and imperial sizes.

E: sales@technifast.co.uk **W:** www.technifast.co.uk

TECHNICAL DATA

ISO STANDARDS REFERRED TO IN THIS CATALOGUE

plus related standards which are available to special order (marked with *)

ISO STANDARD	DESCRIPTION	EQUIVALENT BRITISH STANDARD (BS)	EQUIVALENT DIN STANDARD
1234	Cotter Pins	1574	94
2338	Parallel Dowels	1804	7
2339	Taper Pins	46	1
2341	Clevis Pins		1444
2491	Keys, Parallel	4235	6885
2492	Keys, Gib-Head		6887
3912	Keys, Woodruff		6888
8734	Parallel Dowels	1804	6325
8735	Extractable Dowels	1804	7979
8736	Extractable Taper Pins	1804	978
8740	Grooved Pins, full length parallel groove	GP 3	1473
8741	Grooved Pins, half length reverse taper groove	GP 4	1474
8742	Grooved Pins, third length centre groove	GP 8	1475
8743*	Grooved Pins, half length centre groove	GP 5	1478
8744	Grooved Pins, full length taper groove	GP 1	1471
8745	Grooved Pins, half length taper groove	GP 2	1472
8746*	Grooved Pins, headed (round head)		1476
8747*	Grooved Pins, headed (countersunk)		1477
8748	Coiled Pins, heavy duty	7057	7344
8749	Standard specifying shear testing		
8750	Coiled Pins, standard duty	7058	7343
8751	Coiled Pins, light duty	7059	
8752	Slotted Pins, heavy duty	7060	1481
13337*	Slotted Pins, light duty		7346

It should be noted that the BS and DIN standards shown are rarely identical to each other or to the ISO standards but are considered as equivalent.

TOLERANCES REFERRED TO IN THIS CATALOGUE

SIZE	MAXIMUM AND MINIMUM VALUES									
	m6	h6	h7	h8	h9	h11	h12	js 13	js 14	js 15
0 to 3 mm	+ 0.002	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0.070	+ 0.125	+ 0.200
	+ 0.008	- 0.006	- 0.010	- 0.014	- 0.025	- 0.060	- 0.100	- 0.070	- 0.125	- 0.200
3 to 6 mm	+ 0.004	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0.090	+ 0.150	+ 0.240
	+ 0.012	- 0.008	- 0.012	- 0.018	- 0.030	- 0.075	- 0.120	- 0.090	- 0.150	- 0.240
6 to 10 mm	+ 0.006	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0.110	+ 0.180	+ 0.290
	+ 0.015	- 0.009	- 0.015	- 0.022	- 0.036	- 0.090	- 0.150	- 0.110	- 0.180	- 0.290
10 to 18 mm	+ 0.007	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0.130	+ 0.215	+ 0.350
	+ 0.018	- 0.011	- 0.018	- 0.027	- 0.043	- 0.110	- 0.180	- 0.130	- 0.215	- 0.350
18 to 30 mm	+ 0.008	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0	+ 0.160	+ 0.260	+ 0.420
	+ 0.021	- 0.013	- 0.021	- 0.033	- 0.052	- 0.130	- 0.210	- 0.160	- 0.260	- 0.420
30 to 50 mm					+ 0	+ 0	+ 0	+ 0.190	+ 0.310	+ 0.500
					- 0.062	- 0.160	- 0.250	- 0.190	- 0.310	- 0.500

CHEMICAL COMPOSITIONS OF STEELS REFERRED TO IN THIS CATALOGUE

CS 70 and C67	Carbon steel which, after hardening and tempering, has excellent strength and fatigue resistance which makes them ideal for spring pins, both coiled and slotted.
AISI 304 and WS 1.4310	Austenitic stainless steel, unhardenable and with low magnetic permeability, used for both coiled and slotted spring pins where corrosion resistance is needed.
WS 1.3505	Hardenable high carbon steel with chrome content used for through-hardened dowels in the metric range.
WS 1.4305 and 303S31 (A2)	Unhardenable austenitic stainless steel with low magnetic permeability used for dowels, grooved pins, taper pins and threaded spacers where corrosion resistant properties are required.
WS 1.4571 and 316S11 (A4)	Unhardenable austenitic stainless steel with low magnetic permeability, but with very high corrosion resistance used for dowels.
431S29 (C1)	A hardenable martensitic stainless steel used for dowels requiring the maximum shear strength, combined with corrosion resistance.
WS 1.0718 (9SMnPb28)	Leaded mild steel used for dowels, taper pins and grooved pins.
S300 Pb	Leaded mild steel used for threaded spacers.
AISI 1010	Low carbon steel used for roll-formed clearance spacers.
WS 1.0503 (C45k)	Standard Key steel with a minimum tensile strength of 60 Kg/mm ² .
Silver Steel to BS 1407	A through-hardenable high carbon steel used for dowels and small turned parts.

Type of Steel	Carbon C	Manganese Mn	Phosphorous P	Sulphur S	Silicon Si	Chrome Cr	Vanadium V	Lead Pb	Nickel Ni	Molybdenum Mo	Titanium Ti
CS 70	0.65-0.75	0.5-0.9	0.045 Max	0.045 Max	0.35-0.50						
AISI 304	0.08 Max	2.0 Max	0.045 Max	0.030 Max	1.00 Max	18.0-20.0			8.0-10.5		
WS 1.4301	0.07 Max	2.0 Max	0.045 Max	0.030 Max	1.0 Max	17.0-19.0			8.5-10.5		
303S31	0.12 Max	2.0 Max	0.060 Max	0.15-0.35	1.0 Max	17.0-19.0			8.0-10.0	1.0 Max	
WS 1.3505	0.90-1.05	0.25-0.45	0.030 Max	0.025 Max	0.15-0.35	1.35-1.65			0.30 Max		
WS 1.4305	0.12 Max	2.0 Max	0.060 Max	0.15-0.35	1.00 Max	17.0-19.0			8.0-10.0		
WS 1.4571	0.08 Max	2.0 Max	0.045 Max	0.030 Max	1.00 Max	16.5-18.5			10.5-13.5	2.0-2.5	5xC Min 0.8 Max
316S11	0.03 Max	2.0 Max	0.045 Max	0.030 Max	1.0 Max	16.5-18.5			11.0-14.0	2.0-2.5	
431S29	0.12-0.20	1.0 Max	0.040 Max	0.030 Max	1.0 Max	15.0-18.0			2.0-3.0		
WS 1.0718	0.14 Max	0.90-1.30	0.100 Max	0.27-0.33	0.05 Max			0.15-0.35			
S300 Pb	0.14 Max	1.00-1.50	0.100	0.32-0.40	0.05 Max			0.20-0.30			
AISI 1010	0.06-0.13	0.30-0.60	0.040 Max	0.05 Max	0.4 Max						
Silver Steel	0.95-1.25	0.25-0.45	0.045 Max	0.045 Max	0.4 Max	0.5 Max					
WS 1.0503	0.42-0.50	0.50-0.80	0.045 Max	0.045 Max	0.4 Max	0.4 Max			0.40 Max	0.10 Max	

NB All values are as a percentage %

DOUBLE SHEAR STRENGTHS FOR PINS AND DOWELS

Double shear figures serve mainly to compare the relative strengths of different types of pin, or different diameters of the same type of pin. The conditions prevailing in a given application usually differ from test conditions. The test itself is carried out according to ISO 8749 and records the maximum load the pin will withstand before fracture. In practise, manufacturers' figures provide the minimum load without any safety margin.

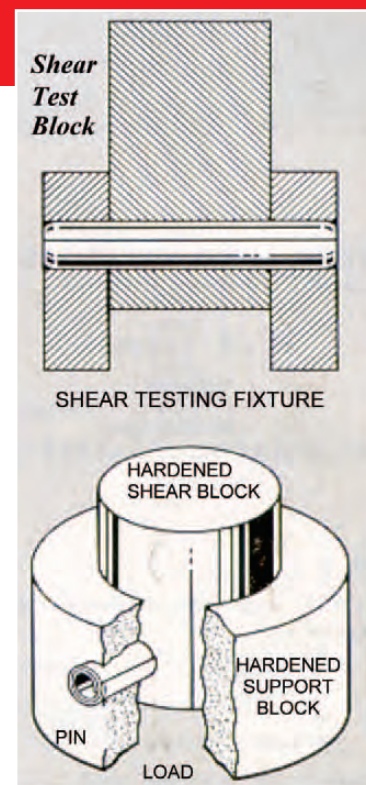
It is important to note that figures given based on testing to ISO 8749 do not allow for the effect of dynamic (shock) loads or bending moments. Specifically the test stipulates the following restrictions: -

- **The clearance between the two pieces of the test block must not exceed 0.15 mm in order to maintain a straight line of shear. This is important in that in an assembly where the holes in the mating components are deeply countersunk, (even if the components themselves are flush) there will not be a straight line of shear and the resulting bending moment will reduce the shear strength.**
- **The shear planes must be at least one pin diameter from the end of the pin, and at least two diameters apart.**
- **The load must not be applied at a rate in excess of 13mm/min. In other words this is a test for static shear loads, not dynamic.**

Consequently shear figures are a design guideline and not a guarantee of performance. The figures given elsewhere in this catalogue are for double shear applications. Where a pin is used in single shear, the values should be halved.

Where an engineering application includes conditions that are not covered by the ISO 8749 test, the following guidelines may be used.

- **Where there are dynamic loads, a coiled pin will perform better due to its shock-absorbing features.**
- **Where there is a bending moment of some significance a hardened solid pin is preferable, either through hardened for maximum shear strength or case hardened where less shear strength but more resistance to bending moments is required.**
- **Where there is a high level of vibration, a grooved pin will have the maximum retention provided it is of the full-length parallel grooved type (DIN 1473).**



PIN ECONOMICS

Every application is individual, but we offer the following information as a guide to how to choose the most suitable pin.

TECHNICAL REQUIREMENTS

The pin must perform its required function. Economic factors only come into play in choosing between one or another type of pin that meets the technical needs of the application. Typical considerations are: -

- Where the maximum possible resistance to static shear loads is required a through hardened solid steel dowel has the most strength, but if space permits a larger diameter of other types of pin can be considered. A small increase in the diameter of the pin makes a large difference to the strength.
- Where the maximum possible resistance to vibration is needed, avoid spring pins and use either grooved pins to DIN 1473 (full length parallel grooves) or a hardened dowel fitted to the tightest possible tolerances.
- For resistance to corrosion, stainless is preferred to zinc or other plated finishes, except where the problem is galvanic corrosion between the pin and the components into which the pin is to be inserted. Plated finishes offer limited resistance to atmospheric, marine or chemical corrosion as the plated surface is liable to damage during insertion and in the case of spring pins and cotter pins the inside surfaces are not fully protected.
- For most commercial purposes, A2 grades of austenitic stainless (303, 304, etc) are sufficient to give good protection and are commercially available in most types of pin. For marine or chemical resistance, A4 grades such as 316 are essential, but this limits the choice of pin as A4 is not readily available in all types of pin.
- The shear strength of austenitic stainless is lower than that of hardened steel so if the application requires both corrosion resistance and high strength a larger diameter may be needed.
- For hinge applications where the pin will be subject to friction from rotation avoid slotted spring pins as the open slot can cause wear.
- For applications where the pin will require regular removal for purposes of repair or adjustment, consider extractable dowels (DIN 7979) or extractable taper pins (DIN 7977 or 7978).
- For safety-critical applications, avoid any form of electrolytic plating as the process to remove hydrogen embrittlement resulting from such plating is not fully reliable.
- Where considerations of hygiene are important, such as with food processing equipment, solid pins (dowels, grooved or taper) are preferred as dirt retention is avoided.

THE COST OF THE PIN

The cost of the pin itself is a small part of the total installed cost (pin + hole preparation + insertion). Nonetheless, the following general information is offered: -

- Slotted spring pins and cotter pins are the lowest in cost, size for size.
- In small diameters, A2 stainless may cost no more than zinc plated steel, except in high volumes. In large diameters, the difference is considerable.
- Pins from 8mm diameter and above increase in cost considerably compared to smaller sizes.

THE COMMERCIAL AVAILABILITY OF THE PIN

- Before specifying a pin, check that it is commercially available in the quantities and delivery times you require – some types of pin are available in a wider size range than others.
- Avoid inch sizes where possible.
- Avoid non-standard parts if possible. Where no standard part is suitable, choose a type of pin that can be made without special tooling or material. Slotted and coiled spring pins as well as most cotter pins and grooved pins need tooling and sometimes specially made lots of material when they differ to any great extent from the standard. Solid dowels and taper pins do not present this problem.

THE COST OF HOLE PREPARATION

Cost differences are considerable between the types of pin: -

- Some pins need only a plain drilled hole with fairly wide tolerances. These are slotted and coiled spring pins, grooved pins, cotter pins and R-pins.
- Some pins require a drilled and reamed hole where an interference fit is needed. This applies to all types of dowel.
- Taper pins need a drilled and taper-reamed hole.
- On hinged applications, there should be a slight difference in the hole size between the fixed and rotating part of the assembly. This can often be avoided by the use of grooved pins such as DIN 1475 where the pin diameter itself allows for this.

THE COST OF ASSEMBLY

- Very short pins are difficult to manipulate except where the insertion equipment is available.
- Very long pins when engaged the full length require a high insertion force.
- Slotted spring pins to ISO 8752 require a higher insertion force than coiled spring pins.
- Where bowl-fed automated assembly machines are used, avoid pins which are not symmetrical. Avoid standard slotted spring pins as the open slot can cause interlocking of the pins in the feeder.

TECHNIFAST

North Folds Road
Oakley Hay Industrial Estate
CORBY
Northamptonshire
NN18 9QD

T: +44 (0) 1536 461140
F: +44 (0) 1536 461622
E: sales@technifast.co.uk
W: www.technifast.co.uk