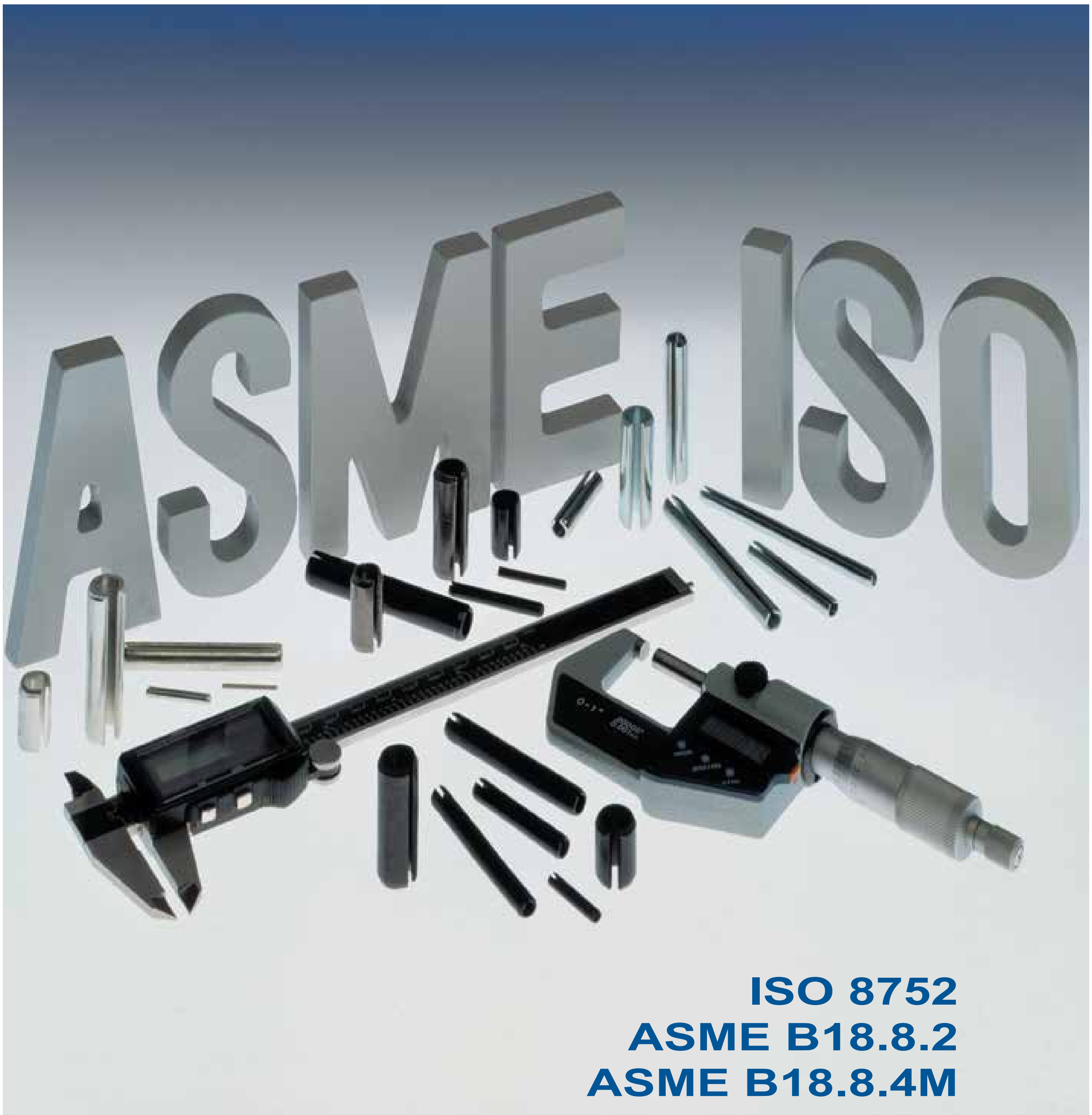
SPIROL®

SLOTTED SPRING PINS



ISO 8752
ASME B18.8.2
ASME B18.8.4M

SPIROL® SLOTTED SPRING PINS

SPIROL® Slotted Spring Pins manufactured to ISO 8752 (EN 28752), ASME 18.8.4M Type B (Metric), and ASME B18.8.2 (Inch) are available from stock.

• DIN 1481 is interchangeable with ISO 8752 (EN 28752) except for a variation in length tolerance.

• The ASME B18.8.2 range meets the requirements of most pins per NASM 10971 (formerly MIL-P-10971), NASM 16562 (formerly 16562), NAS 561, SAE J496, and SAE AS7207 (Superseded AMS 7207 and MS171401-MS171900).

• ISO 13337 (DIN 7346), lightweight Slotted Pins, are available made-to-order for volume applications.

ISO/TS 16949:2009 and ISO 9001:2008 certifications are your guarantee for consistent quality.

- **Contract Review / Quality Planning.** A formal procedure exists for the specification and acceptance of new orders by sales, manufacturing and quality.
- **Document / Drawing Control.** All drawings, standards and specifications are controlled through engineering.
- **SQA Approval of Suppliers and Subcontractors** is maintained by supplier system audits and monitoring of supplier quality performance.
- **System Audits** are carried out regularly by independent auditors with written reports submitted for management action.
- **Calibration and Gauge Control.** All gauges are calibrated on a regular basis, traceable back to national standards. The control records are computerized.
- **All parts are traceable** through each manufacturing process and heat treatment back to the original raw material test certificate. Each lot has a unique identification number on the packaging which should be retained by the customer and quoted in the event of any inquiry.
- **Manufacturing Controls.** There is clear identification of job and quality status with controlled routings. Capability studies are used to verify machine and process capability; statistical process control is used for all processes, using variable and attribute data; and there are final audit checks of completed parts and stock.
- **Non-Conforming Parts.** These are segregated with a "hold" label and quarantined pending a decision on disposal. An automated corrective action system ensures management control for quick and accurate responses to customer inquiries.

PART DESCRIPTION

SLTP 4 X 10 BK ISO 8752

- SLTP — Pin Type (Slotted)
- 4 — Diameter
- 10 — Length
- B — Material
- K — Finish
- ISO 8752 — Standard

MATERIALS*

High Carbon Steel AISI 1070, ISO C67S
Martensitic (Chrome) Stainless Steel AISI 420, ISO X30Cr13 (1.4028)
Austenitic (Nickel) Stainless Steel AISI 302, ISO X10CrNi18-8 (1.4310)

* All standard materials conform to that as specified in ISO 8752, ASME B18.8.2 and ASME B18.8.4M Type B.

SPIROL® THE CHOICE – ASME OR ISO

SPIROL produces Slotted Pins to both the American National Standard, ASME B18.8.4M, and the International Standard, ISO 8752 (EN 28752). It is our recommendation that you consider ASME pins for all new applications and for your current applications if you are experiencing insertion problems or performance failures. Our recommendation is based on these important advantages of ASME pins:

- **LOWER INSERTION FORCE** as a result of the smaller free diameter of the pin in relation to the nominal hole. The pin is securely retained in the hole based on increased wall thickness, higher minimum hardness, and the minimal slot after insertion.
- **NO INTERLOCKING** because the maximum gap in the free diameter state is always less than the wall thickness of the pin.
- **HIGHER SHEAR STRENGTH** based on increased wall thickness, a higher minimum hardness, and narrower slots which close under load to ensure that the pins fail instantaneously rather than progressively in shear.

SHEAR STRENGTH COMPARISON

Nom. Dia.	ISO kN	ASME kN	Increase %
1.5	1.58	1.8	+11.4
2	2.82	3.5	+12.4
2.5	4.38	5.5	+12.6
3	6.32	7.8	+12.4
4	11.24	12.3	+9.4
5	17.54	19.6	+11.2
6	26.04	28.5	+9.4
8	42.76	48.8	+11.4
10	70.16	79.1	+12.6
12	104.1	111.6*	+7.2
14	144.7	170.0	+17.5
16	171.0	190.0	+11.1
18	222.5	250.0	+12.4
20	280.6	320.0	+11.4

* **SPIROL** standard.

COMPARISON OF RECOMMENDED HOLES

ASME recommends tolerance class H10 for holes up to 2.5 mm and H12 for diameters 3 mm and larger. ISO recommends H12 for all diameters.

Nom. Dia.	ISO	ASME
1.5	1.5 / 1.6	1.5 / 1.56
2	2 / 2.1	2 / 2.07
2.5	2.5 / 2.65	2.5 / 2.58
3 and up	No difference	No difference

ASME pins 3 mm and larger can be substituted for ISO pins without any review or change. 1.5 to 2.5 mm pins require a change in the maximum specified hole.

COMPARISON OF TECHNICAL SPECIFICATIONS

EXPANDED DIAMETER – ASME pins have a smaller expanded or free diameter relative to the nominal hole.

CHAMFER SPECIFICATION – ASME specifies a maximum chamfer diameter from 0.1 to 0.5 mm smaller than the nominal hole diameter whereas ISO only specifies a chamfer diameter less than the nominal hole diameter.

STRAIGHTNESS – ASME specifies a straightness requirement. ISO does not address it at all.

SHEAR STRENGTH – ASME specifies a minimum double shear strength for austenitic stainless steel. ISO does not.

MATERIAL – ASME includes Beryllium Copper. ISO does not.

LENGTH TOLERANCE – The differences are minimal:

Pin Length	ISO	ASME
4 - 10 mm	± 0.25 mm	± 0.40 mm
12 - 24 mm	± 0.50 mm	± 0.40 mm
26 - 50 mm	± 0.50 mm	± 0.50 mm
55 -75 mm	± 0.75 mm	± 0.60 mm
80 - 100 mm	± 0.75 mm	± 0.75 mm

WALL THICKNESS – ASME pins have a wall thickness equal to or greater than ISO pins and a greater cross sectional area based on both thickness and strip width.

HARDNESS – The ASME specification for carbon steel is higher (HV 458-560 vs HV 420-520) to maximize the tensile strength and for chrome stainless it is slightly lower (HV 423-544 vs HV 440-560) to avoid the risk of brittleness.

ISO 8752
EN 28752

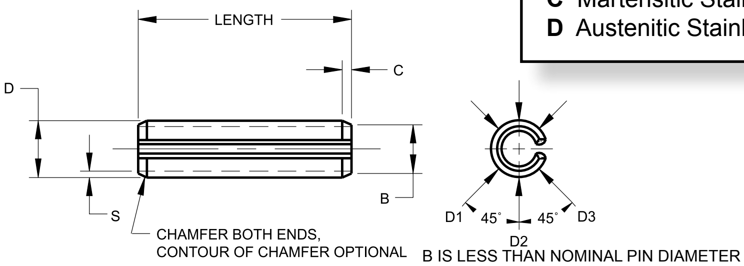
PIN MATERIALS AND HARDNESS

B	Carbon Steel	HV 420-520
C	Martensitic Stainless Steel	HV 440-560
D	Austenitic Stainless Steel	Work Hardened

PIN FINISHES

K	Plain*
P	Passivated

*** Plain carbon steel pins have a protective oil finish.**



SPECIFICATIONS in mm

Nominal Pin Diameter	Pin Diameter D		Chamfer Length C	Wall Thickness S	Recommended Hole Size		Double Shear Strength Carbon & Martensitic S.S.
	Min.[1]	Max.[2]	Nominal	Nominal	Min.	Max.	Minimum kN
1.5	1.7	1.8	0.25	0.3	1.5	1.60	1.58
2	2.3	2.4	0.35	0.4	2.0	2.10	2.82
2.5	2.8	2.9	0.40	0.5	2.5	2.60	4.38
3	3.3	3.5	0.50	0.6	3.0	3.10	6.32
3.5	3.8	4.0	0.60	0.75	3.5	3.62	9.09
4	4.4	4.6	0.65	0.8	4.0	4.12	11.24
4.5*	4.9	5.1	0.80	1.0	4.5	4.62	15.36
5	5.4	5.6	0.90	1.0	5.0	5.12	17.54
6	6.4	6.7	1.20	1.2	6.0	6.12	26.04
8	8.5	8.8	2.00	1.5	8.0	8.15	42.76
10	10.5	10.8	2.00	2.0	10.0	10.15	70.16
12	12.5	12.8	2.00	2.5	12.0	12.18	104.1
14*	14.5	14.8	2.00	3.0	14.0	14.18	144.7 [3]
16	16.5	16.8	2.00	3.0	16.0	16.18	171.0 [3]
18*	18.5	18.9	2.00	3.5	18.0	18.18	222.5 [3]
20	20.5	20.9	3.00	4.0	20.0	20.21	280.6 [3]

[1] Minimum diameter is the average of D1, D2, and D3. [2] Maximum measured with go-ring gauge. [3] Carbon Steel only.

STANDARD LENGTHS

Length	Nominal Diameter															
	1.5	2	2.5	3	3.5	4	4.5*	5	6	8	10	12	14*	16	18*	20
4																
5																
6																
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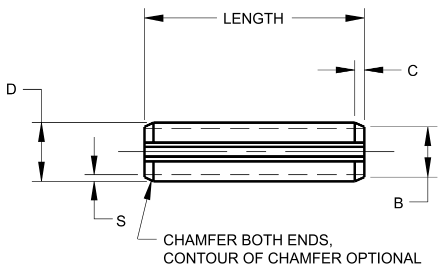
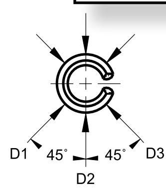
70																
75																
80																
85																
90																
95																
100																

Nominal Pin Length	Length Tolerance
Length Tolerance — ISO 8752	
4 to 10 mm	± 0.25 mm
12 to 50 mm	± 0.50 mm
55 to 100 mm	± 0.75 mm
Length Tolerance — DIN 1481 (Ref.)	
4 to 10 mm	+ 0.5 mm
12 to 50 mm	+ 1.0 mm
55 to 100 mm	+ 1.5 mm

* Not generally a stocked diameter.

ASME B18.8.4M
TYPE B





PIN MATERIALS AND HARDNESS

B	Carbon Steel	HV 458-560
C	Martensitic Stainless Steel	HV 423-544
D	Austenitic Stainless Steel	Work Hardened

PIN FINISHES

K	Plain*
P	Passivated
T	Mechanical Zinc Plated
R	Phosphated, Oiled

*** Plain carbon steel pins have a protective oil finish.**

SPECIFICATIONS in mm

Nominal Pin Diameter	Pin Diameter D		Chamfer Diameter B	Chamfer Length C		Wall Thickness S	Recommended Hole Size		Minimum Double Shear Strength	
									Carbon & Martensitic S.S.	Austenitic S.S.
	Min.[1]	Max.[2]	Max.	Min.	Max.	Nominal	Min.	Max.	kN	
1.5	1.58	1.66	1.4	0.15	0.7	0.35	1.5	1.56	1.8	1.0
2	2.10	2.19	1.9	0.2	0.8	0.45	2.0	2.07	3.5	2.0
2.5	2.62	2.72	2.4	0.2	0.9	0.55	2.5	2.58	5.5	3.2
3	3.14	3.25	2.9	0.2	1.0	0.65	3.0	3.10	7.8	4.5
4	4.16	4.30	3.9	0.3	1.2	0.8	4.0	4.12	12.3	7.2
5	5.17	5.33	4.8	0.3	1.4	1.0	5.0	5.12	19.6	11.4
6	6.18	6.36	5.8	0.4	1.6	1.2	6.0	6.12	28.5	16.6
8	8.22	8.45	7.8	0.4	2.0	1.6	8.0	8.15	48.8	28.4
10	10.25	10.51	9.7	0.5	2.4	2.0	10.0	10.15	79.1	46.1
12	12.28	12.55	11.7	0.6	2.8	2.5	12.0	12.18	111.6 [3]	60.7
14†*	14.30	14.60	13.7	0.8	2.8	3.0	14.0	14.18	170.0 [4]	—
16†	16.32	16.65	15.6	1.0	3.0	3.0	16.0	16.18	190.0 [4]	—
18†*	18.35	18.71	17.6	1.2	3.2	3.5	18.0	18.18	250.0 [4]	—
20†	20.40	20.80	19.5	1.4	3.4	4.0	20.0	20.21	320.0 [4]	—

[1] Minimum diameter is the average of D1, D2, and D3. [2] Maximum measured with go-ring gauge. [3] SPIROL standard. [4] Carbon Steel only.

STANDARD METRIC SIZES

Length	Nominal Diameter 1.5	2	2.5	3	4	5	6	8	10	12	14†*	16†	18†*	20†
4														
5														
6														
8														
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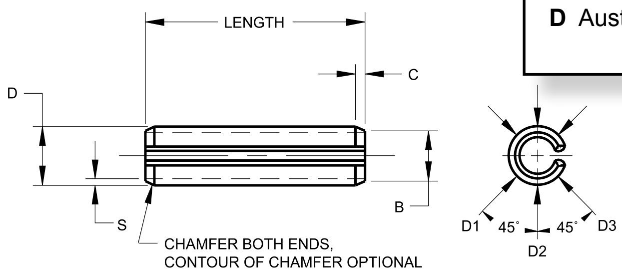
70														
75														
80														
85														
90														
95														
100														

Nominal Pin Length	Length Tolerance
Up to 24 mm, incl.	±0.40 mm
Over 24 to 50 mm	±0.50 mm
Over 50 to 75 mm	±0.60 mm
Over 75 mm	±0.75 mm

† In conformance with but not part of ASME 18.18.4M.
* Not generally a stocked diameter.

ASME B18.8.2



PIN MATERIALS AND HARDNESS

B	Carbon Steel	HV 458-560
C	Martensitic Stainless Steel	HV 423-544
D	Austenitic Stainless Steel	Work Hardened

PIN FINISHES

K	Plain*
P	Passivated
T	Mechanical Zinc Plated
R	Phosphated, Oiled

*** Plain carbon steel pins have a protective oil finish.**

SPECIFICATIONS in inches

Nominal Pin Diameter		Pin Diameter D		Chamfer Diameter B	Chamfer Length C		Wall Thickness S	Recommended Hole Size		Minimum Double Shear Strength			
										Carbon & Martensitic S.S.		Austenitic S.S.	
		Min. [1]	Max. [2]	Max.	Min.	Max.	Nom.	Min.	Max.	Lbs.	kN	Lbs.	kN
1/16	.062	.066	.069	.059	.007	.028	.012	.062	.065	430	2.00	250	1.10
5/64	.078	.083	.086	.075	.008	.032	.018	.078	.081	800	3.56	460	2.05
3/32	.094	.099	.103	.091	.008	.038	.022	.094	.097	1150	5.12	670	2.98
1/8	.125	.131	.135	.122	.008	.044	.028	.125	.129	1875	8.34	1090	4.85
5/32	.156	.162	.167	.151	.010	.048	.032	.156	.160	2750	12.23	1600	7.12
3/16	.187	.194	.199	.182	.011	.055	.040	.187	.192	4150	18.46	2425	10.79
7/32	.219	.226	.232	.214	.011	.065	.048	.219	.224	5850	26.02	3400	15.12
1/4	.250	.258	.264	.245	.012	.065	.048	.250	.256	7050	31.36	4100	18.24
5/16	.312	.321	.330	.306	.014	.080	.062	.312	.318	10800	48.04	6300	28.02
3/8	.375	.385	.395	.368	.016	.095	.077	.375	.382	16300	72.50	9500	42.25
7/16	.437	.448	.459	.430	.017	.095	.077	.437	.445	19800	88.08	11500	51.16
1/2	.500	.513	.524	.485	.025	.110	.094	.500	.510	27100	120.55	15800	70.28
5/8 [3]	.625	.640	.653	.608	.030	.125	.118	.625	.637	42500	189.06	—	—
3/4 [3]	.750	.768	.784	.730	.045	.150	.145	.750	.764	62500	278.02	—	—

[1] Minimum diameter is average of D1, D2 and D3. [2] Maximum diameter measured with go-ring gauge. [3] **SPIROL** standards, Carbon Steel only.

STANDARD SIZES

Length	Nominal Diameter													
	1/16	5/64	3/32	1/8	5/32	3/16	7/32	1/4	5/16	3/8	7/16	1/2	5/8*	3/4*
3/16	■	■	■											
1/4	■	■	■											
5/16	■	■	■	■										
3/8	■	■	■	■										
7/16	■	■	■	■	■									
1/2	■	■	■	■	■	■	■	■						
9/16	■	■	■	■	■	■	■	■						
5/8	■	■	■	■	■	■	■	■						
11/16	■	■	■	■	■	■	■	■						
3/4	■	■	■	■	■	■	■	■	■	■				
13/16	■	■	■	■	■	■	■	■	■					
7/8	■	■	■	■	■	■	■	■	■	■				
15/16	■	■	■	■	■	■	■	■	■					
1	■	■	■	■	■	■	■	■	■	■	■			
1-1/8		■	■	■	■	■	■	■	■					
1-1/4		■	■	■	■	■	■	■	■	■	■	■		
1-3/8		■	■	■	■	■	■	■	■					
1-1/2		■	■	■	■	■	■	■	■	■	■	■		
1-5/8				■	■	■	■	■	■					
1-3/4				■	■	■	■	■	■	■	■	■		
1-7/8				■	■	■	■	■	■					
2				■	■	■	■	■	■	■	■	■	■	■
2-1/4					■	■	■	■	■	■	■	■	■	■
2-1/2					■	■	■	■	■	■	■	■	■	■
2-3/4							■	■	■	■	■	■	■	■
3							■	■	■	■	■	■	■	■
3-1/4								■	■	■	■	■	■	■
3-1/2								■	■	■	■	■	■	■
3-3/4									■	■	■	■	■	■
4									■	■	■	■	■	■

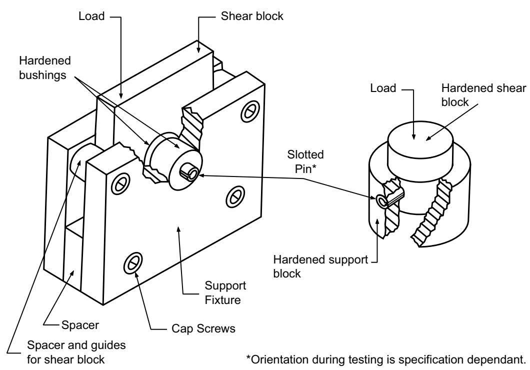
Nominal Pin Length	Length Tolerance
Up to 1”, incl.	±0.015
Over 1” to 2”, incl.	±0.020
Over 2” to 3”, incl.	±0.025
Over 3” to 4”, incl.	±0.030
Over 4”	±0.035

* **SPIROL** standards.

SPIROL® TECHNICAL INFORMATION

SHEAR STRENGTH

The shear test procedure is set forth in ISO 8749, ASME B18.8.2, ASME B18.8.4M, SAE J496, and NASM 10971, which are identical in substance.



Typical pin shear test fixture

Shear values specified will only be obtained under the conditions noted in the referenced standards. Of special note:

- The clearance at the shear plane cannot exceed 0.15 mm or .005”.
- The hole has to be the nominal pin diameter (tolerance H6) with a hardness of not less than HV 700.
- The shear planes have to be at least one pin diameter from each end, and at least two diameters apart.
- ISO 8752 pins are shear tested with the slot up, aligned with the shear load.
- ASME B18.8.2, ASME B18.8.4M, NASM 10971, and SAE J496 pins are shear tested with the slot rotated 90˚ to the shear load.

STRAIGHTNESS SPECIFICATION

(ASME PINS ONLY) The straightness over the length of the pins shall be such that the pin will pass freely through a ring gauge of the length and diameter as specified below.

STRAIGHTNESS GAUGE SPECIFICATIONS

Pin Length	Gauge Length	Maximum Pin Diameter Plus
Up to 24 mm	25 ± 0.15	0.20 – 0.22
Up to 1”	1” ± .005”	.007”
24 mm – 50 mm	50 ± 0.15	0.40 – 0.43
1” – 2”	2” ± .005”	.010”
Over 50 mm	75 ± 0.15	0.60 - 0.64
Over 2”	3” ± .005”	.013”

RECOMMENDED PIN/SHAFT RATIO

The recommended maximum ratio is 1 to 3; that is the pin diameter should never exceed 33.3% of the shaft diameter. If this limit is exceeded, the remaining material in the shaft is inadequate and the shaft will fail before the pin.

DOUBLE PINNING

In situations requiring exceptionally high shear strength, it is possible to use pins in combination by driving an inner pin into an already inserted outer pin. The gaps should be 180° opposed. The recommended hole needs to be increased. It is suggested you consult **SPIROL** Application Specialists in these situations.

WHICH STAINLESS?

Martensitic chrome stainless steel is hardened and has strength comparable to carbon steel. It also provides satisfactory corrosion resistance in most cases. Austenitic nickel stainless steel has better corrosion resistance in some environments but since it is not hardened, it has lower strength and requires more care in the insertion process.

HOLE PREPARATION

Holes can be drilled, punched or cast with no need for additional reaming or sizing. Care should be taken to avoid undersize holes to eliminate potential pin damage during insertion. The following points are suggested for your consideration:

- Break or debur the edges, particularly in case of hardened holes.
- Countersinking is not recommended if it increases the clearance at the shear plane.
- In case of cast or sintered metal holes, provide a lead-in radius.
- Whenever possible, punched holes should be punched in the same direction as the direction of pin insertion.
- Eliminate hole misalignment problems by drilling holes together.
- In case of hardened collars or similar components, flatten the component at the entry of the hole to avoid two-point contact as the pin starts into the hole.

SPECIALS

ISO 13337 (DIN 7346) SPECIFICATIONS

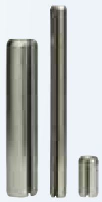
Nom. Pin Diameter	Expanded Diameter		Chamfer Length		Wall Thickness	Double Shear Strength Carbon & Martensitic S.S. Min. kN
	Min.	Max.	Min.	Max.	Nominal	
2	2.3	2.4	0.20	0.40	0.20	1.50
2.5	2.8	2.9	0.25	0.45	0.25	2.40
3	3.3	3.5	0.25	0.45	0.30	3.50
4	4.4	4.6	0.50	0.70	0.50	8.00
5	5.4	5.6	0.50	0.70	0.50	10.40
6	6.4	6.7	0.70	0.90	0.75	18.00
8	8.5	8.8	0.70	0.90	0.75	24.00
10	10.5	10.8	0.90	1.10	1.00	40.00

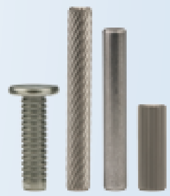
OTHER COMMON SPECIALS:

- **Special Lengths**
- **Special Materials**
- **Special Tolerances**
- **Special Finishes**
- **Special Packaging**

SPIROL® Innovative fastening solutions. Lower assembly costs.

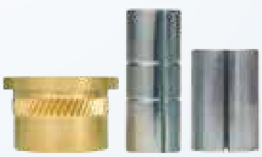

Coiled Spring Pins


Slotted Spring Pins


Solid Pins


Ground Hollow Dowels


Dowel Bushings / Spring Dowels


Compression Limiters


Rolled Tubular Components


Inserts for Plastics


Spacers


Precision Washers


Precision Shims & Thin Metal Stampings


Disc Springs

Installation Technology


Parts Feeding Technology

*Please refer to **www.SPIROL.com** for current specifications and standard product offerings.*

SPIROL Application Engineers will review your application needs and work with you to recommend the optimum solution. One way to start the process is to visit our **Optimal Application Engineering** portal at **SPIROL.com**.

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