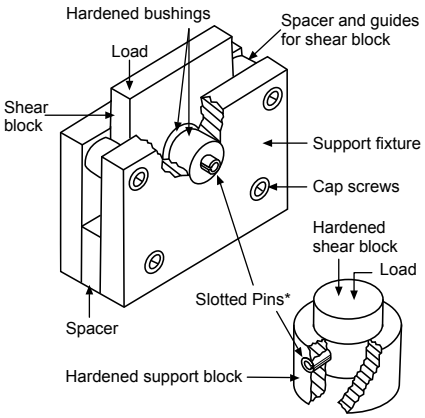
SPIROL® TECHNICAL INFORMATION

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.



*Orientation during testing is specification dependent

Typical pin shear test fixtures

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

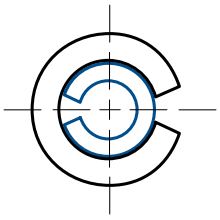
- The clearance at the shear plane cannot exceed 0.15mm or .005".
- The hole has to be the nominal pin diameter (tolerance H6) with a hardness of not less than HV 700.
- The shear planes have to be at least one pin diameter from each end, and at least two diameters apart.
- ISO 8752 pins are shear tested 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.

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 Engineers in these situations.



Which Stainless?

Martensitic chrome stainless steel is hardened and has strength comparable to high carbon steel. It also withstands most common atmospheric and environmental conditions in the presence of free oxygen. Austenitic nickel stainless steel provides the best corrosion protection against normal environmental conditions in both oxygenating and non-oxygenating atmospheres. However, this material is not heat treated and therefore it is not as strong and does not have the fatigue resistance of chrome stainless steel. Austenitic stainless steel Slotted Pins are not recommended for high shock and vibration applications, and should never be installed into hardened holes.

Why Mechanical vs. Electroplated Zinc?

Slotted Spring Pins are particularly susceptible to hydrogen embrittlement due to the high stress area directly opposite the slot. Mechanical zinc plate eliminates the risk associated with hydrogen embrittlement often caused by the electroplating process.

Hole Preparation

Holes can be drilled, punched or cast with no need for additional reaming or sizing. Care should be taken to avoid undersized 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 as it increases the clearance at the shear plane.
- In the case of cast or sintered metal holes, a lead-in radius should be specified.
- 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 the 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.
- *Note: The recommended hole sizes in this catalog may not be true for all applications. Components may require a different hole size to ensure the proper function of the assembly. For this reason, it is recommended that SPIROL be consulted on new designs.*

SPECIALS*

ISO 13337 (DIN 7346) Specifications

NOM PIN DIAMETER	EXPANDED DIAMETER		CHAMFER LENGTH		WALL THICKNESS	RECOMMENDED HOLE SIZE		MINIMUM DOUBLE SHEAR STRENGTH HIGH CARBON & MARTENSITIC SST
	MIN.	MAX.	MIN.	MAX.	NOMINAL	MIN.	MAX.	kN
2	2.3	2.4	0.2	0.4	0.2	2.00	2.10	1.5
2.5	2.8	2.9	0.25	0.45	0.25	2.50	2.60	2.4
3	3.3	3.5	0.25	0.45	0.3	3.00	3.10	3.5
4	4.4	4.6	0.5	0.7	0.5	4.00	4.12	8
5	5.4	5.6	0.5	0.7	0.5	5.00	5.12	10.4
6	6.4	6.7	0.7	0.9	0.75	6.00	6.12	18
8	8.5	8.8	1.5	1.8	0.75	8.00	8.15	24
10	10.5	10.8	2.0	2.4	1	10.00	10.15	40

***All special parts are subject to minimum order quantities.**

Other Specials: Lengths Materials Tolerances Finishes Packaging

SPIROL® Innovative fastening solutions. Lower assembly costs.

*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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