

SPIETH



**HYDRODYNAMIC
EXPANSION GIBS**

FOR MACHINE SLIDES

DESCRIPTION

The Patented SPIETH HYDRODYNAMIC EXPANSION GIB (Fig. 1) offers a revolutionary way to guide machine slides. The parallel gib is designed with a series of grooves so that when it is compressed axially it expands to the desired preload. Hand scraping and fitting are eliminated. The Spieth Gib provides a positive guide with continuous preload and wear compensation capability. When used with a mechanical or hydraulic actuator, it also can be applied to clamp slides—an important feature in automatic or CNC machines. The SPIETH EXPANSION GIB is available for rectangular or dovetail guide surfaces.

FUNCTION

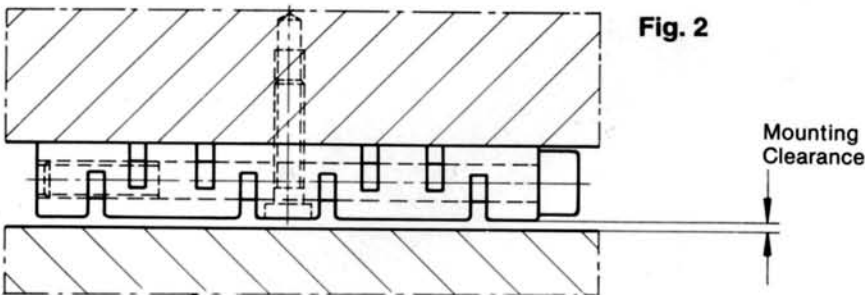


Fig. 2

Fig. 2 shows a typical SPIETH type BFS gib bolted to the slide.

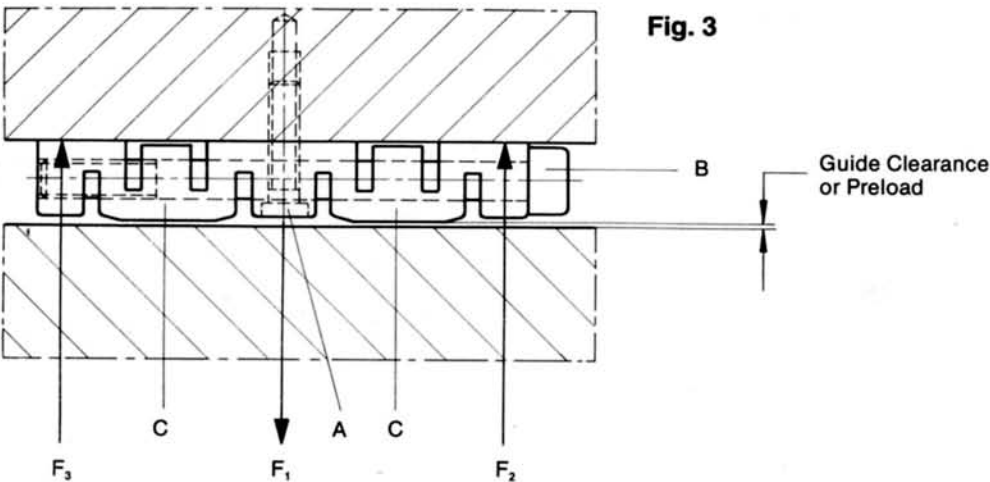


Fig. 3

When the adjustment screw (B) is tightened, internal forces F_1 , F_2 , and F_3 are created (Fig. 3). The mounting screws (A) resist force F_1 which try to pull away the gib in the direction of F_1 . The resulting forces F_2 and F_3 press the gib solidly on each end against the mounting surface.

The thinner sections "t" of the gib deflect under forces "Fc", causing a toggle effect (Fig. 4). Depending on the amount of torque applied to the adjustment screw, the toggle action initially reduces the guide clearance. Further tightening causes a guide preload condition or eventual locking action. During the adjustment process, the edges of the bearing lands are pulled inward, forming a lead angle. This important feature results in a hydrodynamic lubrication effect when the gib is in motion, thus reducing friction and wear. The ratio of axial compression to radial expansion of the bearing lands is about 10 to 1.

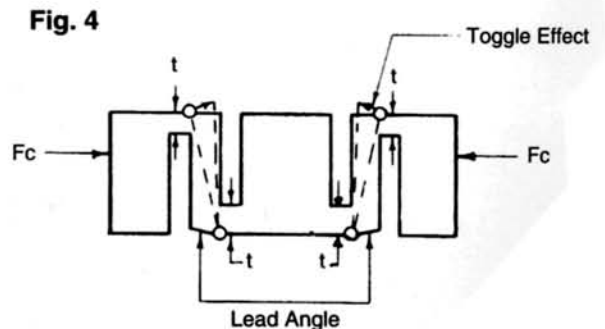
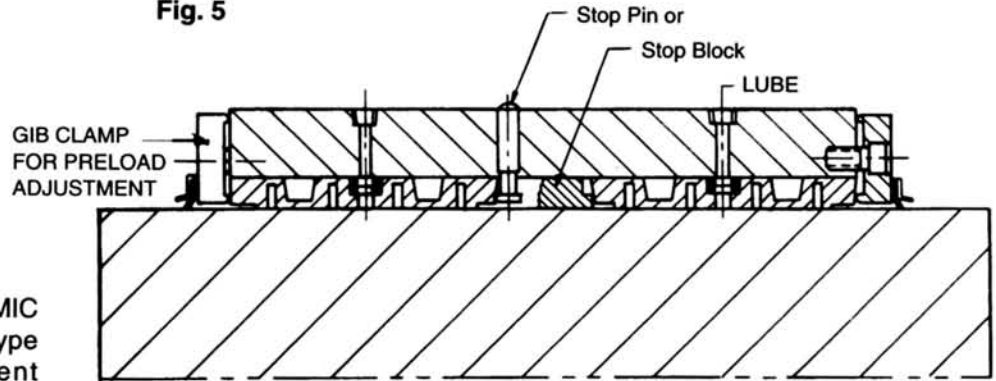


Fig. 4

Fig. 5

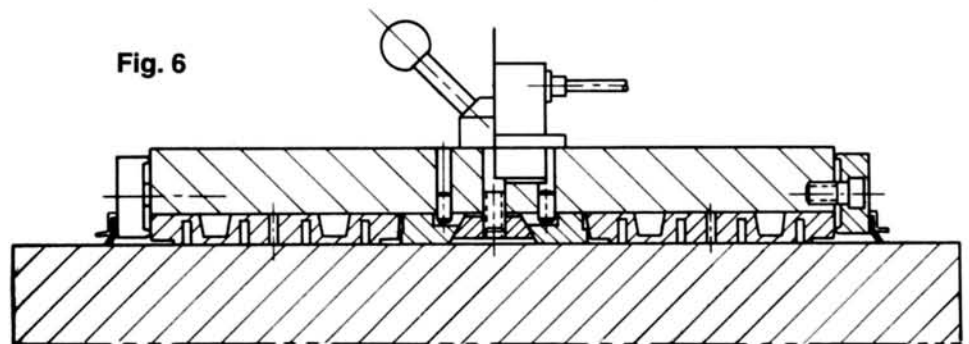


Typical BF Gib arrangement for guiding only.

DESIGN

Two types of SPIETH HYDRODYNAMIC EXPANSION GIBS are available: Type BFS Gibs have built-in adjustment screws and must be bolted to the slide before they can be adjusted (Fig. 1). BF Gibs are generally used on larger slides (Fig. 5) or when both guiding and clamping are required (Fig. 6). BF and BFS Gibs have low friction coating on the surface and .015" fitting stock.

Fig. 6



Typical gib arrangement for guiding and clamping manually or hydraulically.

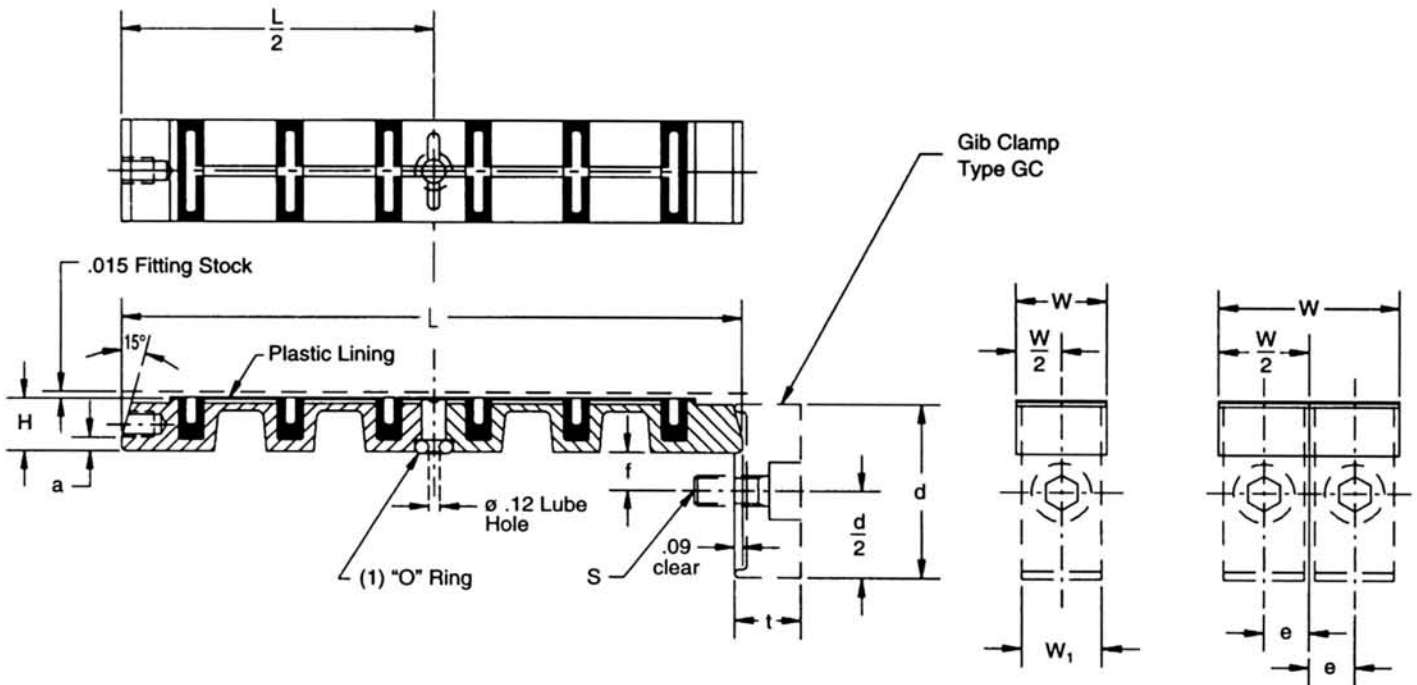
The gibs are made of heat treated alloy steel. Because of their hydrodynamic feature, the gibs' coefficient of friction is low when sliding on lubricated, hardened, ground surfaces. Even in poorly lubricated environments, the surface-coated gibs BF and BFS will perform satisfactorily. Hydrodynamic Expansion Gibs can be furnished precision-ground to close tolerances or with .015" fitting stock to eliminate tight tolerances on the mating parts.

BF Gibs are held in position by a stop block or a stop pin inside the slide (Fig. 5). Outer clamps provide the force for guide-preload adjustment. Locking can be achieved by means of a mechanically or hydraulically operated wedge mechanism. BF Gibs usually will slide out when removing the gib clamp, moving the slide in the opposite direction. A threaded hole in the end of the gib is also provided for easy removal. **SPIETH Gibs compensate for minor inaccuracy in parallelism of connecting surfaces.** Preformed wipers with metal casing can also be furnished for maximum protection.

ADVANTAGES

1. Hydrodynamic lubrication feature
2. Eliminates expensive machining of tapered surfaces
3. No hand scraping is necessary
4. A high degree of stiffness
5. Simple and accurate adjustment of guide clearance or preload
6. Compensates for minor inaccuracy in parallelism of the mating way and gib back-up surfaces
7. Reduces vibration and chatter due to preload condition
8. Economical

EXPANSION GIBS TYPE BF



ORDERING EXAMPLE:

To order BF Gib: 1.00" wide, .50" thick, 6.00" long

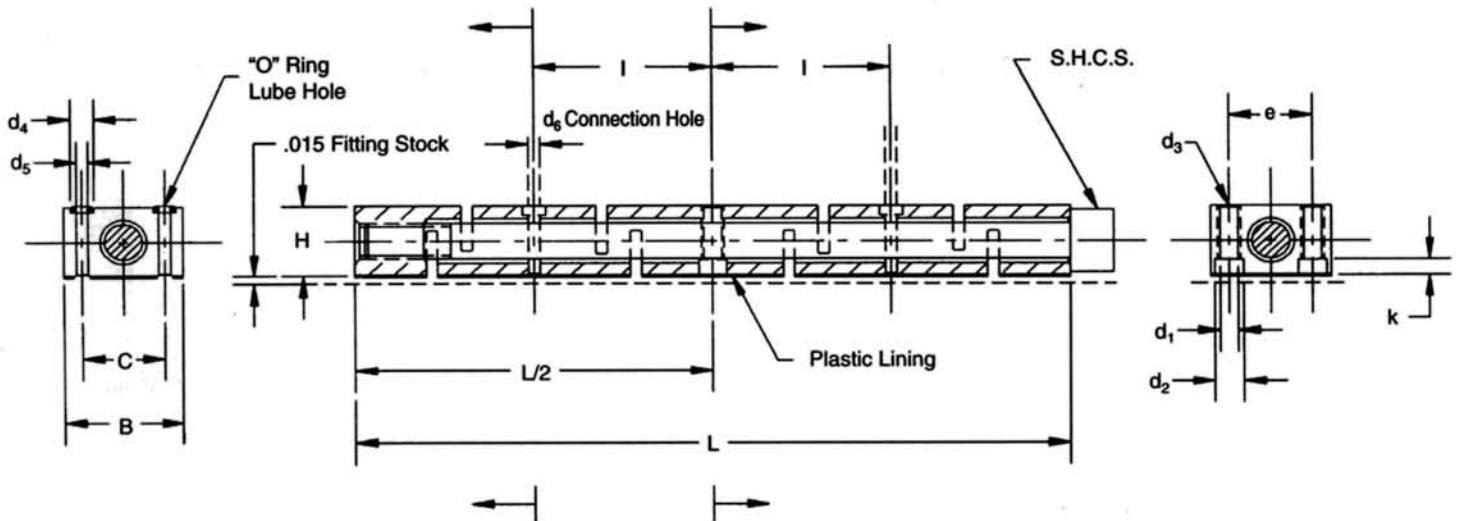
Order: SPIETH Gib BF - 1.00 x .50 x 6.00 With fitting stock .015"

BF CATALOG NUMBER	WIDTH W +.000 -.005	HEIGHT H	LENGTH L	"O" RING a	Permissible Load Lbs.	CAT. NO. GC	NO. OF CLAMPS REQD.	W ₁	d	e	f	s	t
.75 x .50 x 6.0	.745	.500	6.00	.13	900	.75	1	.69	1.38	.25	.25	1/4-20	.50
.88 x .50 x 6.0	.870				1,000								
1.00 x .50 x 6.0	.995				1,150								
1.12 x .50 x 9.0	1.120				2,000								
1.25 x .50 x 9.0	1.245				2,500								
1.37 x .50 x 9.0	1.370				3,000								
1.50 x .63 x 12.0	1.495	.625	12.00	.13	5,500	1.50	1.44	1.75	.31	.25	3/8-16	.62	
1.75 x .63 x 12.0	1.745				6,500								
2.00 x .63 x 12.0	1.995				8,000								
2.25 x .75 x 15.0	2.245				11,000								
2.50 x .75 x 15.0	2.495	.750	15.00	.19	11,500	1.25	2	.94	1.75	.31	.25	.62	
3.00 x .75 x 15.0	2.995				16,000								1.50

Special gibs can be made to suit requirements.

Dimensions subject to change without notice.

ADJUSTABLE GIBS TYPE BFS



ORDERING EXAMPLE

To order BFS Gib with plastic lining with .015" fitting stock:

H = 1", B = 2", L = 12.0"

Order: SPIETH Gib BFS 1.0

*NOTE:

The Spieth Gibs can be bolted to the slide by screws through the clearance holes d_1 or to the slide using the threaded holes d_3 .

INCH SERIES

CATALOG NO. BFS	DIMENSIONS IN INCHES															Permissible Load of Gib in Lbs.	ADJUSTMENT SCREW	"O" RING
	H	B	L	* d_1	d_2	* d_3	d_4 (mm)	d_5 (mm)	d_6	l ± 0.005	c	e ± 0.005	k	t				
.38	.38	.75	3.0	.093	.156	4-40	5.0	2.5	.10	.75	.500	.500	.086	.080	650	10-24	2.5-1.2	
.50	.50	.75	4.0	.113	.203	6-32	5.0	2.5	.10	1.00	.500	.500	.112	.080	800	1/4-20	2.5-1.2	
.62	.62	1.00	6.0	.152	.234	10-24	5.0	2.5	.10	1.50	.687	.687	.138	.080	1,350	3/8-16	2.5-1.2	
.75	.75	1.25	8.0	.261	.328	5/16-18	5.0	2.5	.10	1.75	.875	.875	.190	.080	4,100	3/8-16	2.5-1.2	
.88	.88	1.50	10.0	.261	.406	5/16-18	7.6	3	.12	2.12	1.062	1.062	.250	.118	6,300	1/2-13	3.9-1.8	
1.0	1.00	2.00	12.00	.316	.500	3/8-16	7.6	3	.12	2.5	1.312	1.312	.312	.118	10,100	5/8-11	3.9-1.8	

METRIC SERIES

CATALOG NO. BFS	DIMENSIONS IN MILLIMETERS															Permissible Load of Gib in Lbs.	ADJUSTMENT SCREW	"O" RING
	H	B	L	* d_1	d_2	* d_3	d_4	d_5	d_6	l ± 0.1	c ± 0.1	e	k	t				
6	6	12	41	2.5	4.8	M3	—	—	—	—	—	6.5	1.7	—	200	M3 x40	—	
8	8	14	56	2.5	4.8	M3	—	—	—	—	—	8	1.7	—	430	M4 x55	—	
10	10	18	66	3.3	5.9	M4	5.0	2.5	2.5	15	10	10	2.2	2	630	M5 x65	2.5-1.2	
12	12	20	76	3.3	5.9	M4	5.0	2.5	2.5	17.5	11	11	2.2	2	800	M6 x75	2.5-1.2	
12/1	12	20	110	3.3	5.9	M4	5.0	2.5	2.5	26.5	11	11	2.2	2	1,600	M6 x110	2.5-1.2	
15	15	25	100	4.3	7.4	M5	5.0	2.5	2.5	22.2	15	15	3	2	1,400	M8 x100	2.5-1.2	
15/1	15	30	150	6.8	10.4	M8	5.0	2.5	2.5	34	18	18	4.5	2	4,000	M8 x150	2.5-1.2	
20	20	35	200	6.8	10.4	M8	7.6	3	3	44	22	22	4.5	3	6,500	M12x200	3.9-1.8	
26	26	45	250	8.5	13.5	M10	7.6	3	3	54	28	28	6	3	10,100	M16x250	3.9-1.8	

Special and larger sizes available upon request.

Dimensions subject to change without notification.

LUBRICATION

The hydrodynamic feature of SPIETH ADJUSTABLE GIBS functions only if a lubricant is present. Good lubrication is mandatory. Gradually forced lubrication is applied on moving slides. Grease lubrication is sufficient for occasional, slow movement. Type BF Gibs have oil grooves and the expansion slots can be filled with rubber to maintain the oil on the guide surface when forced lubrication is applied. When using grease lubrication, the expansion slots are filled with a high-grade Moli-Grease. Type BFS Gibs have lube holes provided on each bearing land. Only the top holes need to be connected to the lube system (Fig.7) The lube holes have counter-bores on the back side to seat "O" rings.

Fig. 7

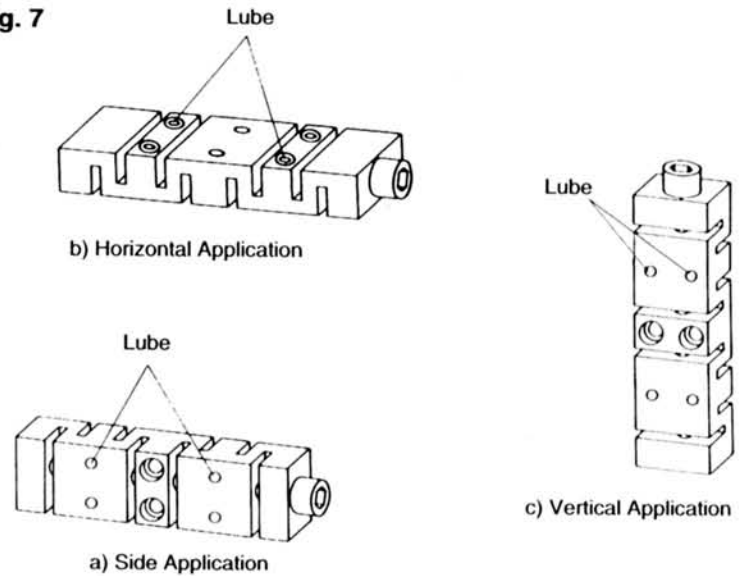
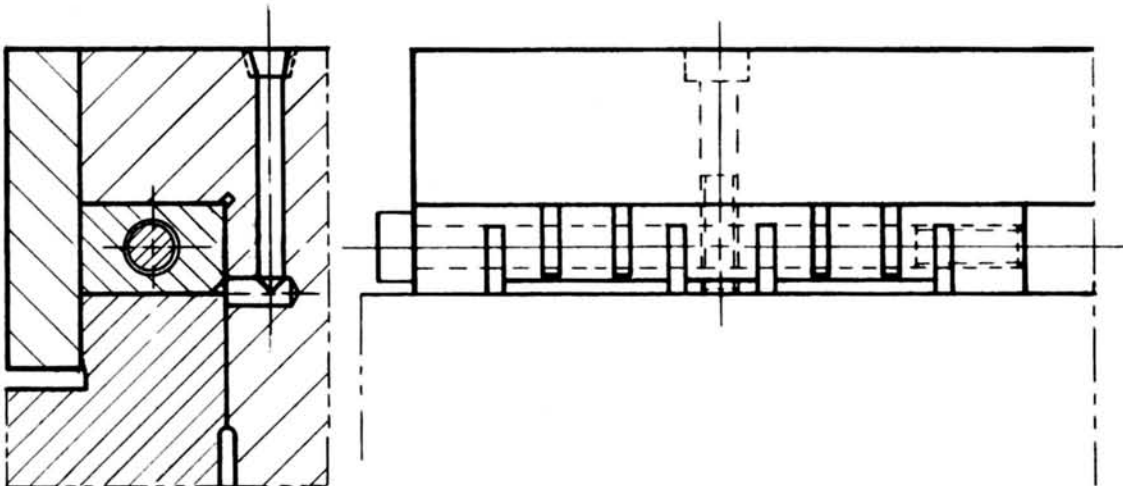


Fig. 8



A chamfer can be provided on one edge of the gib bearing lands between the outer slots to distribute grease between the expansion slots (Fig. 8).

INSTALLATION

The guide surface and gib back-up surface are to be parallel and the dimension between the surfaces must be held to within .001" over the length of the gib.

For gibs with fitting stock, measure the clearance between the slide and way surfaces with gauge blocks. Grind the gib on the plastic surface, allowing for about .0005 to .001" clearance, depending on size.

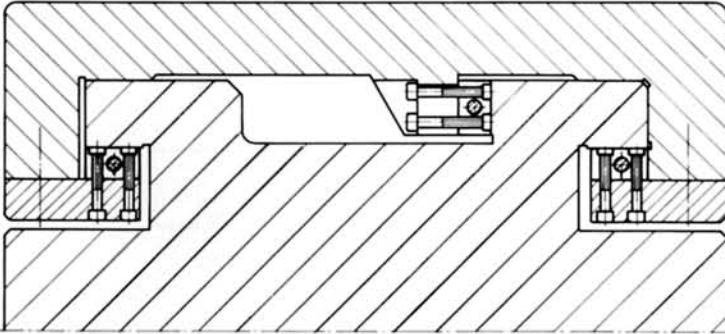
To avoid damaging a BFS Gib, the gib must be bolted to the slide before tightening the built-in adjustment screw.

BF Gibs usually will slide out when removing the gib clamp, moving the slide in the opposite direction. A threaded hole in the end of the gib is also provided for easy removal. SPIETH Gibs compensate for minor inaccuracy in parallelism of connecting surfaces. Preformed wipers with metal casing can also be furnished for maximum protection.

APPLICATIONS

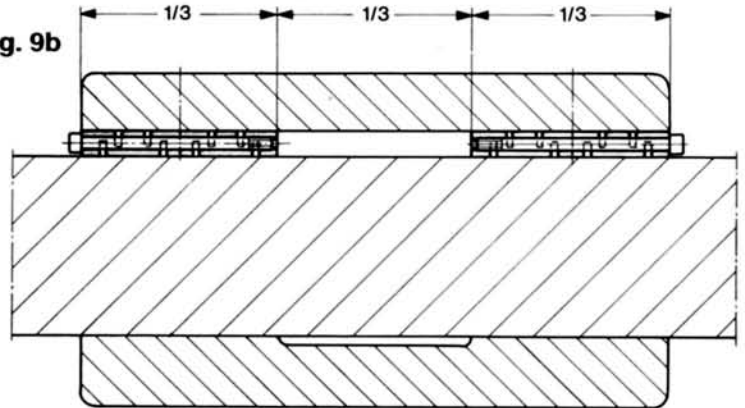
STANDARD ARRANGEMENT OF GIBS

Fig. 9a



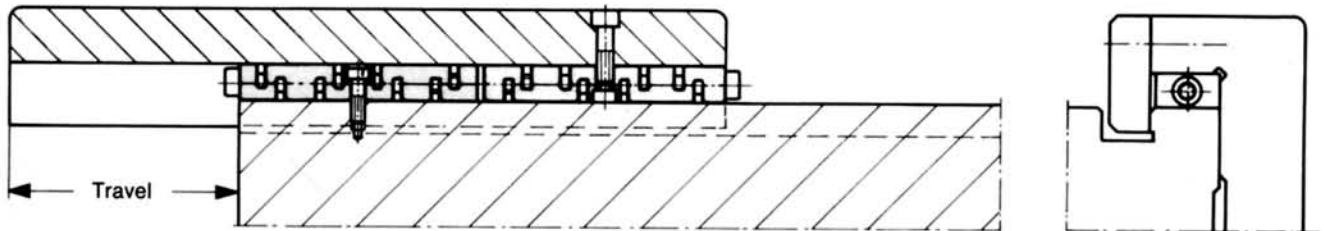
The ratio of guide length to guide width should be at least 1.5 to 1. If necessary, the side gib could be arranged on the inner or outer side of a single way.

Fig. 9b



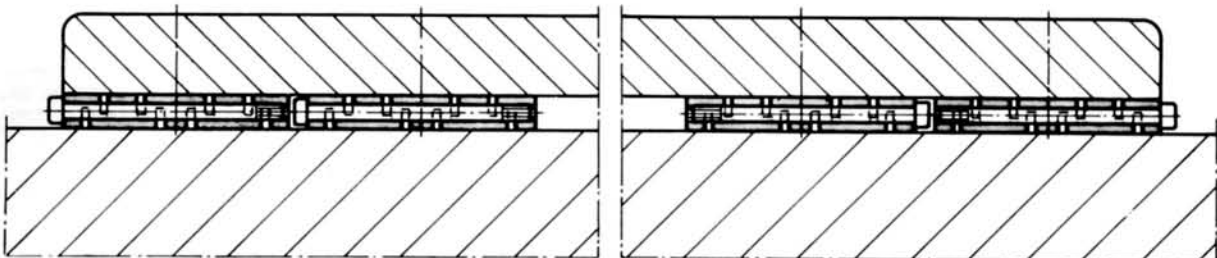
1/3 of the total slide length in the center should be relieved for better guide action.

Fig. 10



In order to obtain an optimum guide base in each position of the slide when the length of the guideway is limited, one adjustable gib can be mounted on the way surface.

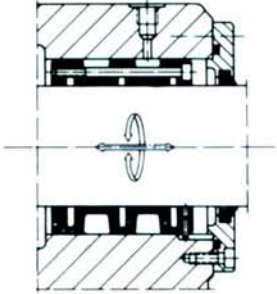
Fig. 11



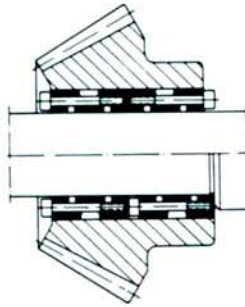
For heavy-duty or larger slides, two or more gibs can be mounted in tandem or side by side. To preload, start with the inside gib and finish with the outside gib.

MORE "ADVANCED" COMPONENTS

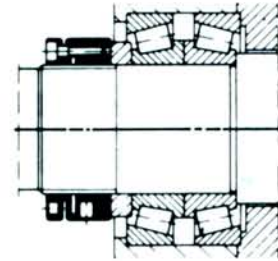
SPIETH Hydrodynamic Guide Bushings



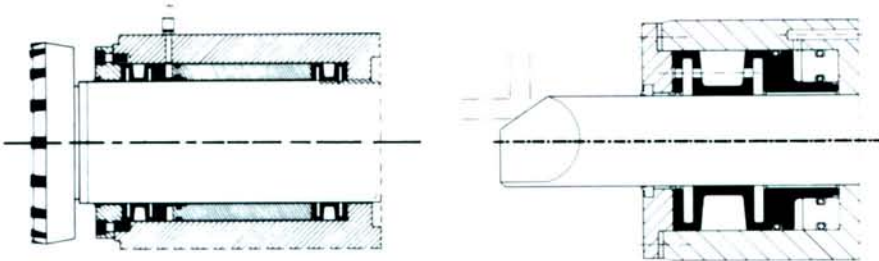
SPIETH Removable Keyless Shrink Fit Connectors



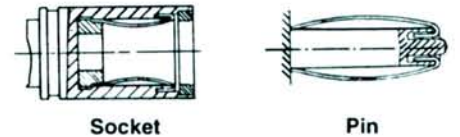
SPIETH Adjustable Locknuts



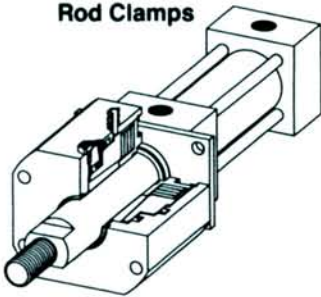
SPIETH Hydraulically Operated Guide and Clamping Sleeves



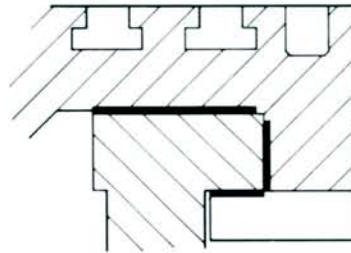
Spring Wire Contacts



Rod Clamps



SKC Antifriction Coating



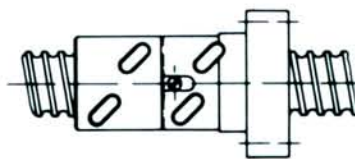
Cable and Hose Carriers



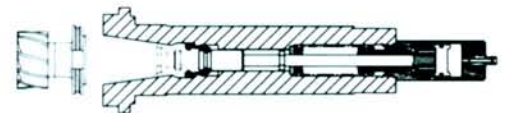
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