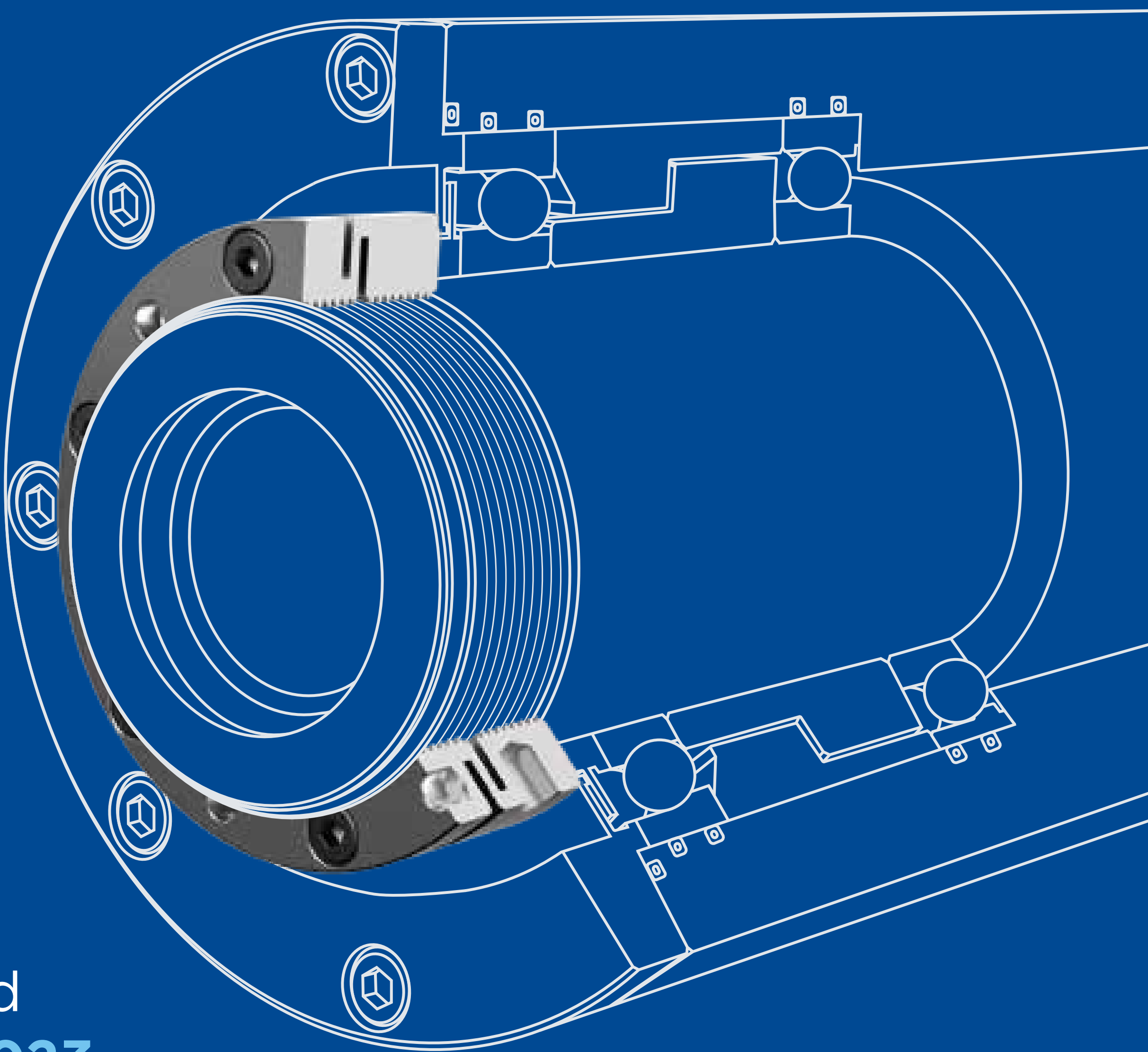
SPIETH

Products **that make yours run smoothly.**



NEW

Greatly improved values **2023**

Product Portfolio

GREATER PRECISION BY DESIGN

Spieth company headquarters and production department in Esslingen, Germany.

In-house production guarantees utmost precision.
When it comes to precision, Spieth sets the benchmark - and this certainly pays dividends in practice. Across the globe. For over 50 years. We are a leading technical innovator and provider of solutions in the area of mechanical and systems engineering. When it comes to ensuring the absolute quality of mechanical connecting, bearing and locking solutions for drive and guide components, leading manufacturers rely on us. Not least because we control the entire manufacturing process from start to finish.

Precision is a fundamental principle here at Spieth.
The unique Spieth principle embodied by all our products ensures that everything runs smoothly in practice. With our precision mechanical elements such as clamping sets, guide bushings, precision self-locking nuts and clamping nuts, we are continuously setting new standards in terms of precision, function, durability, ease of installation and cost-effectiveness. And being the kind people we are, we always try to improve on what we have achieved. Cooperating closely with our customers, we continuously develop our products – with a high degree of flexibility to meet ever-changing requirements and rising demands.

Guide bushings

Clamping sets
New: Concentricity better than 8 µm

Locknuts

Expert on-site advice.
As experts in the area of connections, we can offer specific advice from our technical service department and sales engineers. For complex assignments, we work closely with the customer to come up with the perfect solution, if necessary, on-site.

Radial plain bearings

Guide gibs
New: Tungsten-carbide coating

Clamping nuts

ENGINEERING EXPERTISE FOR OUR CUSTOMERS – DOWN TO THE FINEST DETAIL, EVEN WITH OUR SPECIAL SOLUTIONS

Spieth Elements – Precision-made in Germany.

When it comes to precision, durability, availability and minimum input of resources during installation and production at our customers, Spieth offers a range of services and expertise like no other. Which also explains why we maintain control over the production of our products. We continue to manufacture all precision parts ourselves here in Germany – using the very latest manufacturing, test and inspection processes. Only in this way can we be certain that they fully satisfy our exacting quality standards and those of our customers. A comprehensive works-standard portfolio of products available directly from stock guarantees you precision down to the finest detail.

Customer support by Spieth experts.

In addition to the exception al functionality and quality of our products, we offer comprehensive support from our experienced sales engineers – from concept phase all the way to practical implementation. This allows us to provide you with solutions that meet your current requirements while at the same time giving you the option to plan for the next stage of development.

Flexibility based on experience – in dialogue with customers.

By engaging in a continuous dialogue with customers from the most diverse industries and applying our accumulated expertise, we are in a position to provide products and services offering a high degree of added value. This experience pays dividends for you in practice.

Our service.

We can advise on how to optimise the integration of connecting elements into your system and how to ensure reliable functionality in the connection environment.

The difference between the original and plagiarism: Special solutions.

As the original manufacturer of Spieth products, we can apply the expertise and experience of our specialists to create bespoke solutions based on the renowned Spieth diaphragm system. The development process involves the use of modern simulation technologies and practically-oriented testing methods. By combining theoretical scientific findings with practical experience of numerous industries, our processes and developments are trailblazing. Numerous national and international patents bear witness to Spieth engineering expertise.

THE SPIETH PRINCIPLE: THE UNIFORM DISTRIBUTION OF FORCE ALL-ROUND

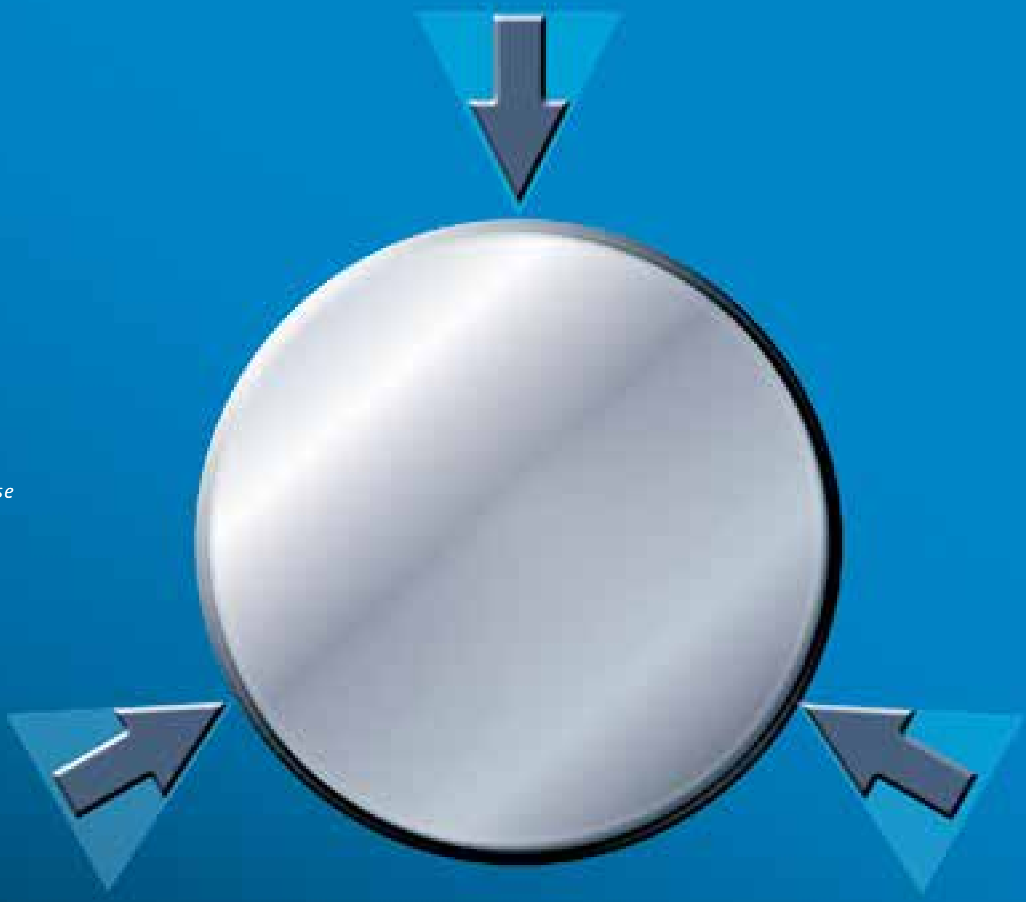
Everything runs smoothly – with the power of the Spieth principle. Developed by company founder Rudolf Spieth and further refined down to the smallest detail over a period of 50 years, this intelligent functional principle forms the basis for perfect and efficient solutions for mechanical connecting, clamping, guiding, bearing and locking in the mechanical and systems engineering fields. Guaranteeing ultimate precision and economical results.

Uniform distribution of clamping forces all-round.

The Spieth principle simply involves the uniform application of force – frictional force to be precise: Rather than being concentrated at a few single points, the clamping forces of our mechanical connecting elements engage all round and are thus uniformly distributed.

With unique benefits in practical applications:

- High concentricity with no balance problems thanks to the dynamically balanced and self-centring structure – without grooves and slots.
- A secure shaft-hub connection that can be released and re-used an unlimited number of times.
- Time-saving assembly and dismantling.
- Secure bearing function of locknuts: Uniform all-round clamping of thread flanks ensures high dynamic locking properties and exceptional axial rigidity. Thread flank play can be reduced to zero, resulting in absolutely level contact surfaces and run-out accuracy even in the assembled state.



Conventional solutions: Application of force at single points – less efficient, less precise and less safe.

- Secure, convenient application of high axial forces with clamping nuts. Can be used on rotating spindles.
- Perfect adjustment of play to suit radial plain bearings and guide gibs and, with additional clamping function, to suit guide bushings.

Our customers can rely 100 percent on the Spieth principle – for optimum mechanical and systems engineering performance.

The Spieth principle: uniform all-round friction locking – efficient, highly precise and secure.

THERE IS A SOLUTION TO EVERY CHALLENGE – WITH THE SPIETH CONNECTION EXPERTS

Spieth – exactly the right solution for challenging applications in mechanical and systems engineering.

For economical, safe operation.
Our products may seem inconspicuous, but they deliver powerful performances: In a wide range of applications. they are the key that enables the smooth, economical and safe operation of highly complex systems and machinery. And in situations where conventional products have reached their limits, solutions by Spieth that can meet the most stringent demands of modern machinery frequently come into play.

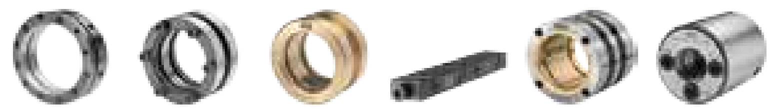
Thanks to their special characteristics and the unique Spieth principle, our products perform a wide range of duties with extreme precision, reduce failure rates and extend machinery run times.

Expertise in efficient connections.
Spieth is your solution partner offering comprehensive expertise when it comes to:

- transmitting torque, radial forces and axial forces or generating axial clamping forces,
- realising cylindrical or even sliding surfaces,
- bedding of linear, rotating or screwing movements,
- meeting high accuracy specifications and realising particular installation and dismantling benefits,
- locking threads,
- creating connections, which can be quickly and easily released and simply adjusted and readjusted.

Special versions available on request.
Special solutions are our speciality. To do this, we bring the experience acquired in numerous industries to bear along with the necessary technological expertise and understanding to meet your individual requirements.

Regardless of the challenges you need to overcome: With Spieth at your side, you will find the optimum, safe and therefore economical solution.



PROPERTIES	Lock-nuts	Clamping sets	Guide bushings	Guide gibs	Radial plain bearings	Clamping nuts
Transmission of torque		●	○			
Transmission of radial forces		●	●	●	●	
Transmission of axial forces	●	●	○			●
Generation of axial clamping forces	●					●
Sliding surface cylindrical			●		●	
Sliding surface even				●		
Bedding of linear movements			●	●		
Bedding of rotating movements					●	
Bedding of screwing movements			●			
Fulfils high accuracy requirements	●	●	●	●	●	●
Exceptional assembly and dismantling benefits	●	●	●	●	●	●
Locking thread	●					●
Connection quickly and easily released	●	●	○			●
Simple to adjust and readjust	●	●	●	●	●	●

PRODUCT RANGES

● Function provided ○ Function optional

AT SPIETH, PRECISION STANDS FOR SCOPE. AND VARIETY

When it comes to the precision of our products, we are extremely meticulous. That's because at the end of the day, our manufacturing tolerances are in the micron range. The entire Spieth product range – from clamping sets to guide gibs – can be measured against our own high standards and those of our customers.

For this reason, we constantly use modern testing stations to ensure the premium quality of our products even during production. The extensive range of precision products by Spieth includes several thousand variants for a broad spectrum of applications and is available worldwide through our partners and from the company headquarters in Germany. A permanent inventory of all standard parts ensures prompt and flexible delivery at an attractive price. And virtually all components we have ever manufactured are still available today as special elements.

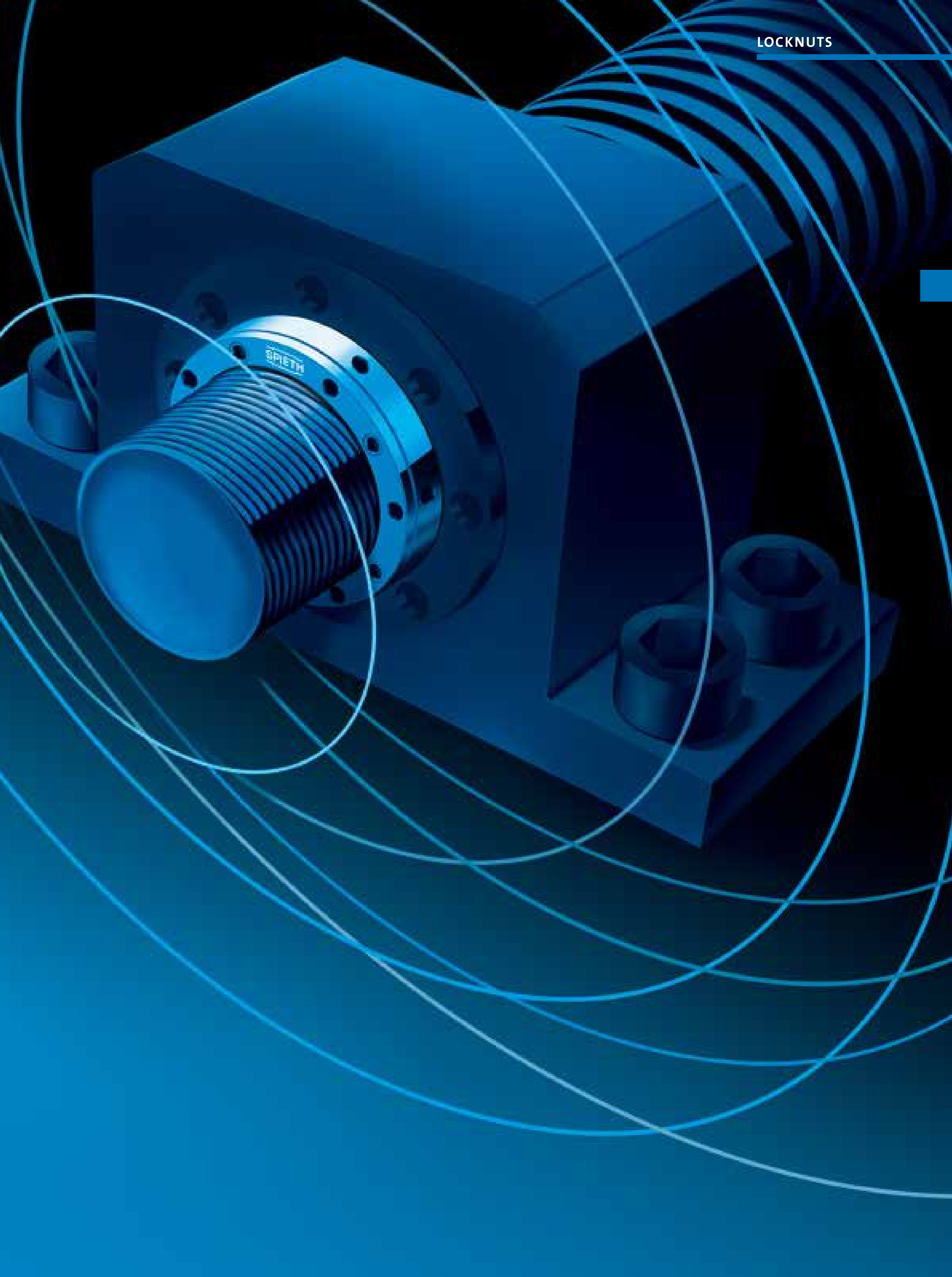
[1] Increased Axial Loads & Display of Breakaway Torques

[2] Increased Transmissible Torques

HOLDING PRECISLY IN POSITION WHEN THINGS GET GOING

Spieth locknuts – precision nuts by design.
With exceptional precision and uniform clamping forces at the thread flanks, Spieth locknuts can be exactly adjusted to perform demanding duties in mechanical engineering. Thanks to perfect functionality, they cope without difficulty with the increasing levels of dynamic stress and power densities inherent in modern machinery designs – and are therefore designed to deliver maximum economy.

Locknuts demonstrate their strength when things really get going: They ensure optimum concentricity of spindles. The locknut owes its unique capability to a combination of manufacturing precision and the diaphragm locking system developed by Spieth. The relevant functional components such as the load thread, locking thread and end face are inseparable components of the nut body and are manufactured to a high degree of precision as a clamping device. The diaphragm lock ensures that this precision is preserved when assembled in your application result and that it is also retained throughout its operation.


SPIETH

4 UNIQUE FEATURES – NUMEROUS BENEFITS

Secure
The locking system enables the application of high clamping forces to ensure that the nut is friction-locked onto the spindle thread. The load is applied to the thread across 360° symmetrically and evenly. The locking force and working load act in the same direction and cannot cancel each other out. This is the requirement for the highest locking effect while at the same time preserving the connecting components.

Self-centering
The locking procedure is designed to exert a self-centring effect for the nut on the spindle thread. This is the prerequisite for ensuring a coaxial end position of the nut relative to the spindle and for a vertical orientation of the end face with respect to the connection assembly. For demanding applications, this effect can be used in a separate installation step specifically to minimise thread join play.

Precise
All functional surfaces that determine precision are manufactured in a single set-up. And in contrast to other locking concepts, the precision is retained by design once it has been created, even during installation and operation.

Consistent rigidity
Irrespective of the degree of pretension in the nut, the closed distribution of locking force ensures an intensive application of the thread flanks in the direction of the working load. The assembly process creates an elastic pretension in the join of the thread pairing, as a result of which the bearing area of the thread flanks and the rigidity of the join are significantly increased. Damaging micro-movements, caused by strong impulses or abrupt changes in the direction of force, are drastically reduced.

BENEFITS TO YOU

Competitiveness through technological leadership – a strategy that calls for an economical increase in power density, efficiency and accuracy. Locknuts create the foundation for this.

Lower resource input
- No additional grooves or locking plates required.
- Free, infinitely variable and exact positioning.
- Fast, precise installation results.
- Simple to dismantle thanks to back-sprung diaphragm.

More success
- Optimum locking effect.
- High degree of run-out accuracy, even in the assembled state.
- High dynamic loading capacity.
- High dynamic rigidity.
- Dynamically balanced structure.
- Suitable for high speeds.

Series MSR large

Series MSR standard

Series MSR from size M10

FIELDS OF APPLICATION

Spieth locknuts are precision nuts fitted with an integrated premium thread lock.
They are used in all areas of mechanical engineering. Precision, safety, rigidity and ease of use are key aspects in the design of a threaded connection. Spieth nuts are the first choice whenever at least one of these aspects is required.

APPLICATION EXAMPLES

- In machining, forming and cutting machine tools.
- In handling and automation equipment.
- In materials handling.
- In general drive engineering and transmissions.
- In fixture construction.
- In packaging machinery.
- In compressors and pumps.
- In printing presses and paper-making technology.
- In textile machines.
- In woodworking machines.
- In press manufacturing.
- In process engineering applications for mixing, crushing and centrifuging.
- For metrology, control and test engineering.

Series MSA

Series MSF

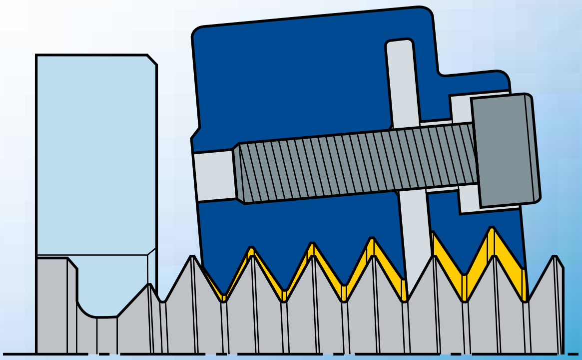
Series MSW

Series MSW > M70

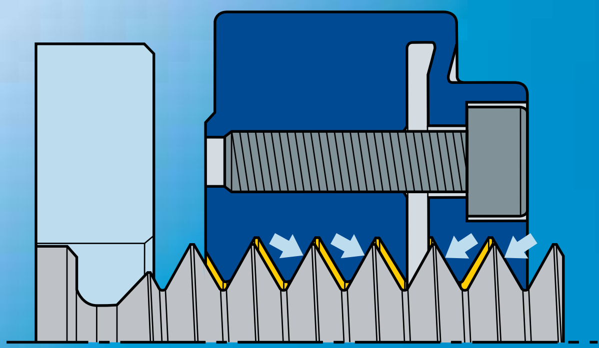
FUNCTIONAL PRINCIPLE

In this example, based on a type MSF locknut.

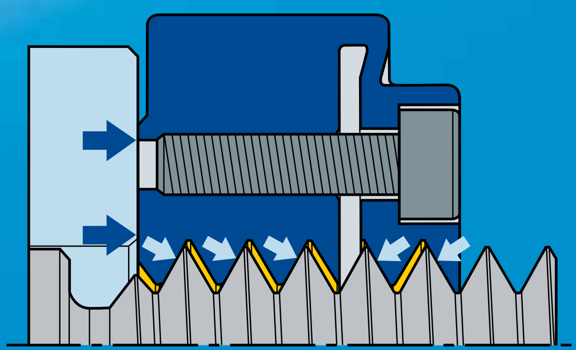
The principle is illustrated in a simplified diagram with enlarged thread flank play.



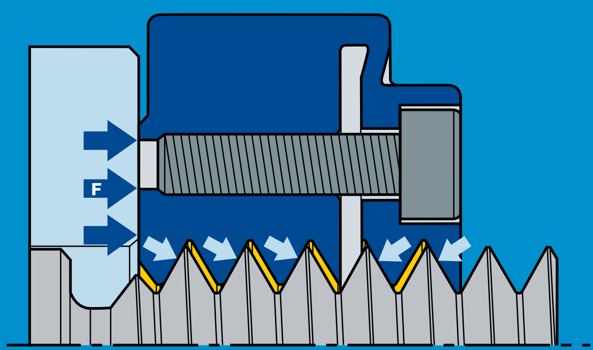
1. Screwing on the locknut
As with every threaded connection, there is a degree of mating play when the nuts are screwed on. As a result, the nut may be aligned with a parallel and/or angled axial offset relative to the spindle axis; in other words, the contact surface of the nut may be at an incline.



2. Spieth locknuts: Self-centring and self-aligning thanks to play restriction
Unique: Spieth locknuts are automatically self-centring and eliminate mating play (thread flank play) as far as possible. Thanks to play restriction, the locknut centres itself and the contact surface of the engages at right angles to the spindle axis.

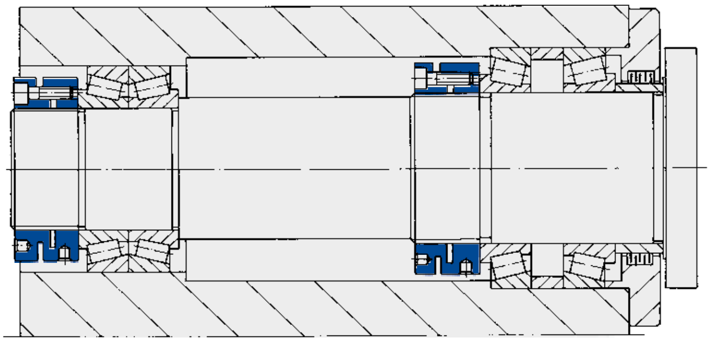


3. Tightening and locking
The locknut is tightened with the required level of preliminary torque. The lock screws are then locked with the specified level of locking torque. This ensures optimum contact at the thread flanks and maximum concentricity.



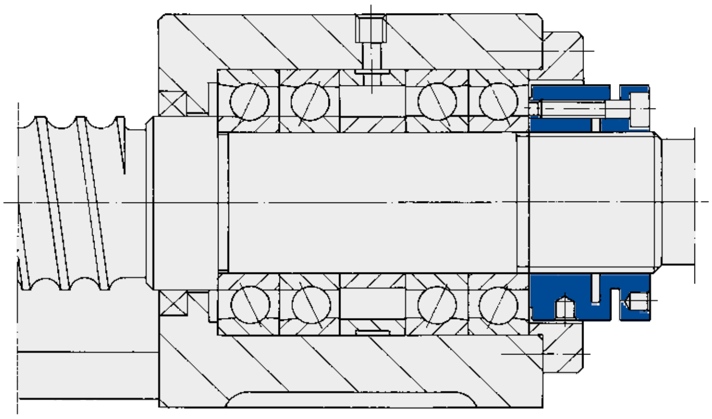
4. Higher levels of operational safety
Spieth benefit: The previously set locking forces are not cancelled by the working load, but are superimposed and therefore reinforced. Put simply: the forces act in the same direction and are therefore added to each other. The optimum solution that delivers improved safety.

ASSEMBLY EXAMPLES



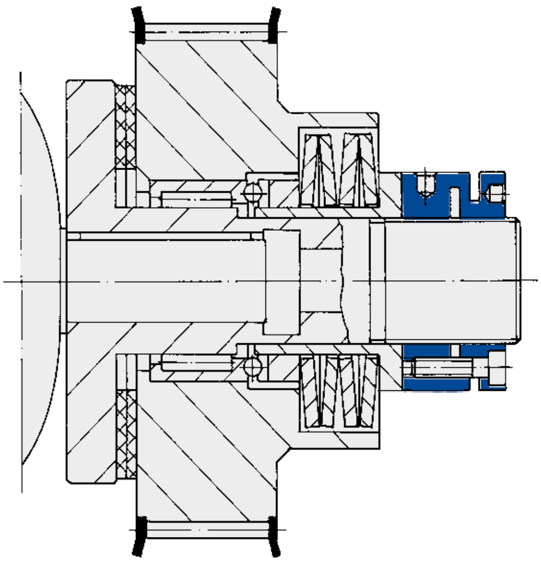
Example 1: Tapered roller bearing

In tapered roller bearings, run-out accuracy, a high level of axial rigidity and dynamic safety create a major contribution to perfect bearing operation: Radial stress applied to the tapered roller bearing generates axial forces (axial rigidity). Due to a lack of axial pretension (no axial friction), the intrinsic safety of the locknut is extremely important.



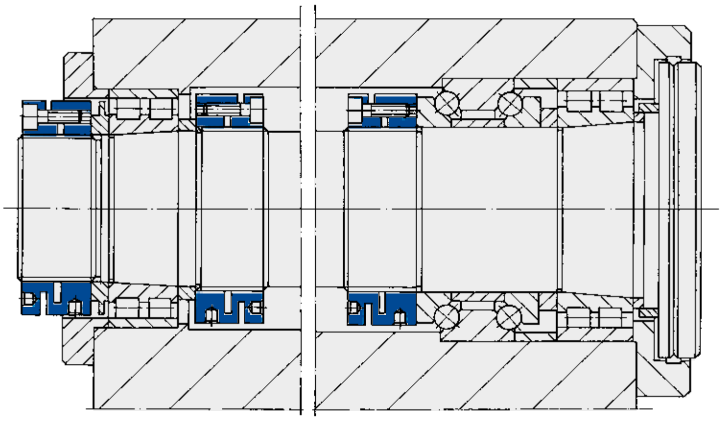
Example 2: Ball roller spindle

The use of a locknut gives the bearing of the ball roller spindle a high degree of axial rigidity. Under highly dynamic operating conditions, the high degree of dynamic safety of the locknut represents a major advantage.

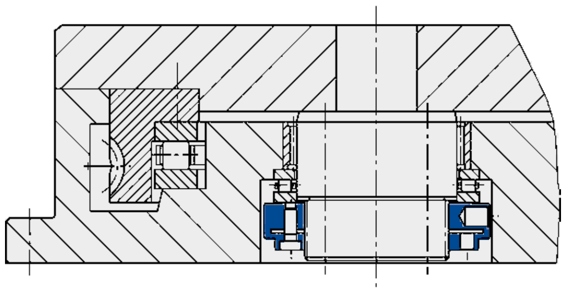


Example 3: Friction clutch

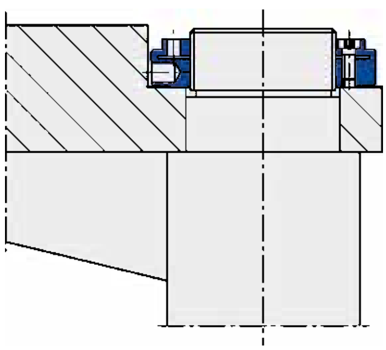
A locknut is used here to provide precise and infinitely variable adjustment of the pretension of the spring on a friction clutch. The reliable locking function is of particular importance here.



Example 4: Main spindle bearing
The locknut ensures a high level of axial rigidity and excellent concentricity on the main spindle bearing in a turning lathe.

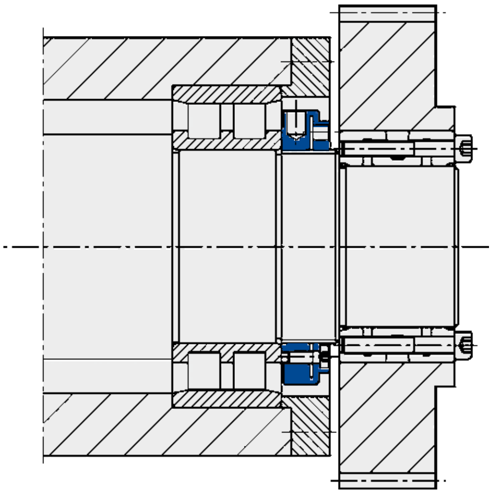


Example 5: Round axis
Not a millimetre is lost in the axial direction and, despite this, there is no need to sacrifice run-out accuracy, axial rigidity or a high degree of dynamic safety.

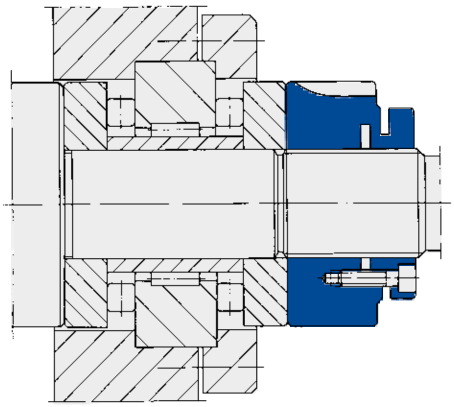


Example 6: Table structure
Due to the flat design, countersunk installation is possible without causing any interfering contours in the table surface. Straining of the structure due to a tilting locknut caused by thread flank play, or even opening under dynamic load are not possible due to the characteristic properties of the locknut.

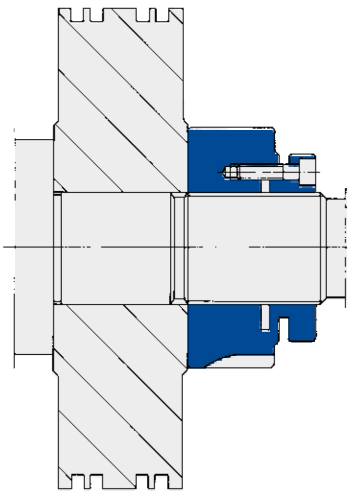
ASSEMBLY EXAMPLES



Example 7: Tooling spindle
The low installation height of the MSF locknut makes it possible to create a compact drive side of the spindle. This configuration saves valuable installation space and minimises destructive rotating bending stress. At the same time, the benefits of a Spieth high-precision locknut are fully exploited.



Example 8: Feed drive system
The installation using a locknut reliably transmits the high load-bearing capacity and axial rigidity of the needle axial cylindrical bearing to the feed drive system. The excellent locking properties provided by the locknut are of major importance under dynamic stress.



Example 9: Piston fixture
The piston fixture utilizes all the technical benefits of locknuts: Load-bearing capacity, axial rigidity and excellent locking properties.

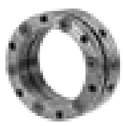
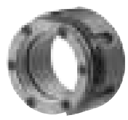
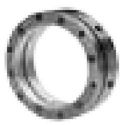
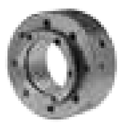
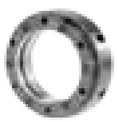
SPIETH **LOCKNUTS: THE RIGHT CHOICE**

We'll provide you with the perfect locknuts for your application. We'll also help you choose the right one – with expert advice from our specialists.

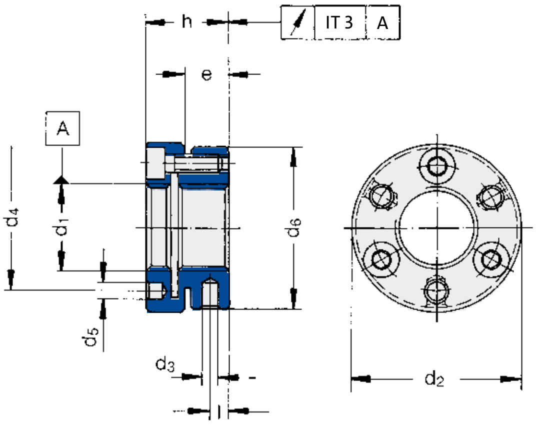
Series MSR – MSA, MSF and MSW
- Excellent axial rigidity and loading capacity under high levels of dynamic stress.
- Simple connecting components, no grooves, locking plates etc.
- Axial position of the contact surface can be easily and precisely adjusted.
- Even in the installed state, exact run-out accuracy, which can be further improved with adjustment.

LOCKNUTS
Precision nuts with high-performance locking system

Working load and rigidity requirements

Design	Normal	High	Design
Standard	 **Series MSR**	 **Series MSW**	Heavy-duty
Reduced contact surface and in some cases with reduced outer diameter	 **Series MSA**	 **Series MSW**	Heavy-duty > M70
Low installation height	 **Series MSF**		

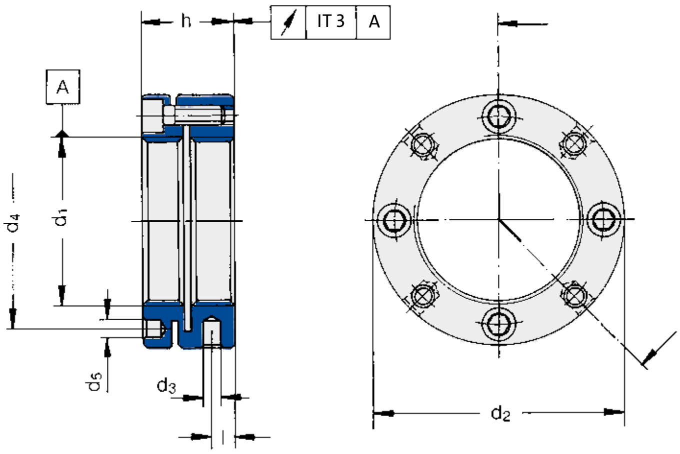
SPIETH LOCKNUTS SERIES **MSR**



NEW

Increased Axial Loads &
Display of Breakaway Torques

Name	Dimensions in mm									Clamping screws			Calcu-lation factor A	Calcu-lation factor B	Performance Data		Moment of inertia J
	d_1	d_2	d_3 1)	d_4	d_5 1)	d_6	h	l	e	ISO 4762	M_A	No.l			Breaking Load	Breakaway Torque	
	ISO-5H	h11	H11		H11	h11					Nm		mm	N	kN	Nm	kg cm²
MSR 10x0.75	M10x0.75	24	2.5	17	3.2	22	14	3	6.5	M3	2	3	0.672	2457	28	22	0.025
MSR 10x1	M10x1	24	2.5	17	3.2	22	15	3	6.5	M3	2	3	0.703	2457	27	22	0.027
MSR 12x1	M12x1	26	3	19	3.2	25	14	3	6.5	M3	2	3	0.819	2438	34	27	0.037
MSR 12x1.5	M12x1.5	26	3	19	3.2	25	15	3	6.5	M3	2	3	0.881	2438	32	24	0.04
MSR 14x1.5	M14x1.5	32	4	22.5	4.3	30	16	3	7	M4	2.9	3	0.997	2995	42	31	0.096
MSR 15x1	M15x1	33	4	23.5	4.3	31	16	3	7	M4	2.9	3	0.992	2984	46	37	0.108



NEW

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Name	Dimensions in mm							Clamping screws			Calcu-lation factor A	Calcu-lation factor B	Performance Data		Moment of inertia J
	d_1	d_2	d_3 1)	d_4	d_5 1)	h	l	ISO 4762	M_A	No.			Breaking Load	Breakaway Torque	
	ISO-5H	h11	H11		H11				Nm		mm	N	kN	Nm	kg cm²
MSR 16x1.5	M16x1.5	34	4	24.5	4.3	18	5	M4	2.9	4	1.112	3962	43	42	0.147
MSR 17x1	M17x1	35	4	25.5	4.3	18	5	M4	2.9	4	1.108	3947	48	54	0.164
MSR 18x1.5	M18x1.5	36	4	26.5	4.3	18	5	M4	2.9	4	1.228	3931	50	49	0.183
MSR 20x1	M20x1	40	4	30.5	4.3	18	5	M4	2.9	4	1.281	3900	50	63	0.283
MSR 20x1.5	M20x1.5	40	4	30.5	4.3	18	5	M4	2.9	4	1.344	3900	48	57	0.283
MSR 22x1.5	M22x1.5	40	4	30.5	4.3	18	5	M4	2.9	4	1.459	3869	54	64	0.27
MSR 24x1.5	M24x1.5	42	4	32.5	4.3	18	5	M4	2.9	4	1.575	3838	60	72	0.323
MSR 25x1.5	M25x1.5	45	5	36.5	4.3	20	6.5	M4	2.9	4	1.633	3822	81	80	0.488
MSR 26x1.5	M26x1.5	45	5	36.5	4.3	20	6.5	M4	2.9	4	1.69	3806	85	82	0.479
MSR 28x1.5	M28x1.5	46	5	38.5	4.3	20	6.5	M4	2.9	4	1.805	3775	92	85	0.504

Name	Dimensions in mm							Clamping screws			Calculation factor A	Calculation factor B	Performance Data		Moment of inertia J
	d_1	d_2	d_3 [1]	d_4	d_5 [1]	h	l	ISO 4762	M_A	No.			Breaking Load	Breakaway Torque	
	ISO-5H	h11	H11		H11				Nm		mm	N	kN	Nm	kg cm^2
MSR 30x1.5	M30x1.5	48	5	40.5	4.3	20	6.5	M4	2.9	4	1.921	3744	99	92	0.588
MSR 32x1.5	M32x1.5	50	5	42.5	4.3	22	7	M4	2.9	4	2.037	3713	114	99	0.743
MSR 35x1.5	M35x1.5	53	5	45.5	4.3	22	7	M4	2.9	4	2.21	3666	117	111	0.914
MSR 38x1.5	M38x1.5	58	5	48.5	4.3	22	7	M4	2.9	4	2.449	3619	138	125	1.34
MSR 40x1.5	M40x1.5	58	5	50.5	4.3	22	7	M4	2.9	4	2.5	3588	122	131	1.25
MSR 42x1.5	M42x1.5	60	5	52.5	4.3	22	7	M4	2.9	4	2.617	3557	123	138	1.41
MSR 45x1.5	M45x1.5	68	6	58	4.3	22	6.5	M4	2.9	6	2.789	5265	145	221	2.49
MSR 48x1.5	M48x1.5	68	6	59.5	4.3	25	9	M4	2.9	6	2.962	5195	163	225	2.63
MSR 50x1.5	M50x1.5	70	6	61.5	4.3	25	9	M4	2.9	6	3.079	5148	165	233	2.91
MSR 52x1.5	M52x1.5	72	6	63.5	4.3	25	9	M4	2.9	6	3.196	5101	167	242	3.21
MSR 55x1.5	M55x1.5	75	6	66.5	4.3	25	9	M4	2.9	6	3.369	5031	169	256	3.69
MSR 55x2	M55x2	75	6	66.5	4.3	25	9	M4	2.9	6	3.43	5031	166	273	3.69
MSR 58x1.5	M58x1.5	82	6	72.5	5.3	26	9	M5	6	6	3.541	8077	353	420	5.81
MSR 60x1.5	M60x1.5	84	6	74.5	5.3	26	9	M5	6	6	3.655	8001	356	448	6.32
MSR 60x2	M60x2	84	6	74.5	5.3	26	9	M5	6	6	3.718	8001	350	465	6.32
MSR 62x1.5	M62x15	86	6	76.5	5.3	28	10.5	M5	6	6	3.774	7925	404	474	7.33
MSR 65x1.5	M65x1.5	88	6	78.5	5.3	28	10.5	M5	6	6	3.948	7811	386	471	7.71
MSR 65x2	M65x2	88	6	78.5	5.3	28	10.5	M5	6	6	4.007	7811	380	489	7.71
MSR 68x1.5	M68x1.5	95	8	83	5.3	28	9.5	M5	6	6	4.121	7696	481	525	11
MSR 70x1.5	M70x1.5	95	8	85	5.3	28	9.5	M5	6	6	4.238	7620	439	554	10.5
MSR 70x2	M70x2	95	8	85	5.3	28	9.5	M5	6	6	4.297	7620	432	515	10.5
MSR 72x1.5	M72x1.5	98	8	86	6.4	28	8.5	M6	10	6	4.354	10692	374	731	11.8
MSR 75x1.5	M75x1.5	100	8	88	6.4	28	8.5	M6	10	6	4.525	10530	354	758	12.3
MSR 75x2	M75x2	100	8	88	6.4	28	8.5	M6	10	6	4.583	10530	348	720	12.3
MSR 80x2	M80x2	110	8	95	6.4	32	11	M6	10	6	4.873	10260	559	798	22
MSR 85x2	M85x2	115	8	100	6.4	32	11	M6	10	6	5.168	9990	569	830	25.7
MSR 90x2	M90x2	120	8	108	6.4	32	11	M6	10	6	5.453	9720	578	909	29.6
MSR 95x2	M95x2	125	8	113	6.4	32	11	M6	10	6	5.744	9450	584	955	34
MSR 100x2	M100x2	130	8	118	6.4	32	11	M6	10	6	6.033	9180	592	1019	38.8
MSR 105x2	M105x2	135	8	123	6.4	32	11	M6	10	6	6.321	8910	598	1069	44.1
MSR 110x2	M110x2	140	8	128	6.4	32	11	M6	10	6	6.616	8640	605	1098	49.8
MSR 115x2	M115x2	145	8	133	6.4	36	13	M6	10	6	6.9	8370	713	1181	64.2
MSR 120x2	M120x2	155	8	140	6.4	36	13	M6	10	6	7.193	8100	885	1300	89.7
MSR 125x2	M125x2	160	8	148	6.4	36	13	M6	10	6	7.474	7830	892	1331	99.7
MSR 130x3	M130x3	165	8	153	6.4	36	13	M6	10	6	7.895	7560	834	1491	111
MSR 140x3	M140x3	180	10	165	6.4	36	12	M6	10	8	8.475	9360	984	1856	161
MSR 150x3	M150x3	190	10	175	6.4	36	12	M6	10	8	9.05	8640	1001	1983	193
MSR 160x3	M160x3	205	10	185	8.4	40	14	M8	25	8	9.633	14520	1142	3929	301
MSR 170x3	M170x3	215	10	195	8.4	40	14	M8	25	8	10.213	13200	1156	4077	353
MSR 180x3	M180x3	230	10	210	8.4	40	14	M8	25	8	10.789	11880	1334	4360	478
MSR 190x3	M190x3	240	10	224	8.4	40	14	M8	25	8	11.362	10560	1158	4529	550
MSR 200x3	M200x3	245	10	229	8.4	40	14	M8	25	8	11.948	9240	1021	4604	545

[1] The number of holes corresponds to the number of clamping screws.

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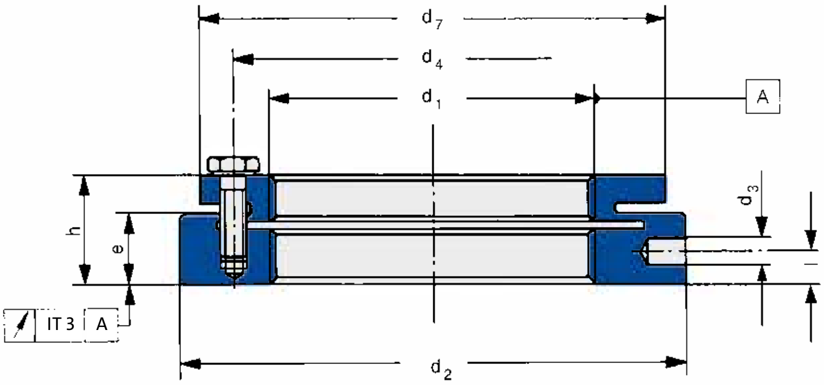

NEW

Increased Axial Loads

Name	Dimensions in mm								Clamping screws				Calcu-lation factor A	Calcu-lation factor B	Performance Data Breaking Load	Moment of inertia J
	d_1	d_2	d_3[1]	d_4	d_7	h	l	e	ISO 4017	ISO 4014	M_A	No.				
	ISO-5H	h11			h11						Nm		mm	N	kN	kg cm²
MSR 210x3	M210x3	270	12	232	250	44	13	27	M8	-	25	8	12.515	5280	1038	926
MSR 220x3	M220x3	282	12	242	260	44	13	27	M8	-	25	8	13.097	5148	1086	1090
MSR 230x3	M230x3	295	12	252	270	44	13	27	M8	-	25	8	13.677	5016	1153	1280
MSR 240x3	M240x3	308	12	262	280	44	13	27	M8	-	25	8	14.256	4884	1220	1510
MSR 250x3	M250x3	322	12	272	290	44	13	27	M8	-	25	8	14.833	4752	1305	1790
MSR 260x3	M260x3	336	12	282	300	44	13	27	M8	-	25	10	15.408	5775	1388	2100
MSR 270x3	M270x3	350	12	292	310	44	13	27	M8	-	25	10	15.982	5610	1473	2460
MSR 280x3	M280x3	364	12	302	320	44	13	27	M8	-	25	10	16.578	5445	1557	2870
MSR 290x3	M290x3	376	12	312	330	44	13	27	M8	-	25	10	17.149	5280	1605	3230
MSR 300x3	M300x3	390	12	322	340	44	13	27	M8	-	25	10	17.717	5115	1689	3730
MSR 310x4	M310x4	400	14	337	360	54	16	32	-	M10	49	10	18.437	7860	1910	5290
MSR 320x4	M320x4	412	14	347	370	54	16	32	-	M10	49	10	19.008	7598	1967	5900
MSR 330x4	M330x4	424	14	357	380	54	16	32	-	M10	49	10	19.578	7336	2023	9560
MSR 340x4	M340x4	436	14	367	390	54	16	32	-	M10	49	10	20.176	7074	2080	7270
MSR 350x4	M350x4	450	14	377	400	54	16	32	-	M10	49	10	20.743	6812	2180	8220
MSR 360x4	M360x4	466	14	387	410	54	16	32	-	M10	49	12	21.309	7860	2319	9460
MSR 370x4	M370x4	478	14	397	420	54	16	32	-	M10	49	12	21.905	7546	2377	10400
MSR 380x4	M380x4	490	14	407	430	54	16	32	-	M10	49	12	22.468	7231	2434	11400

[1] The number of holes corresponds to the number of clamping screws.

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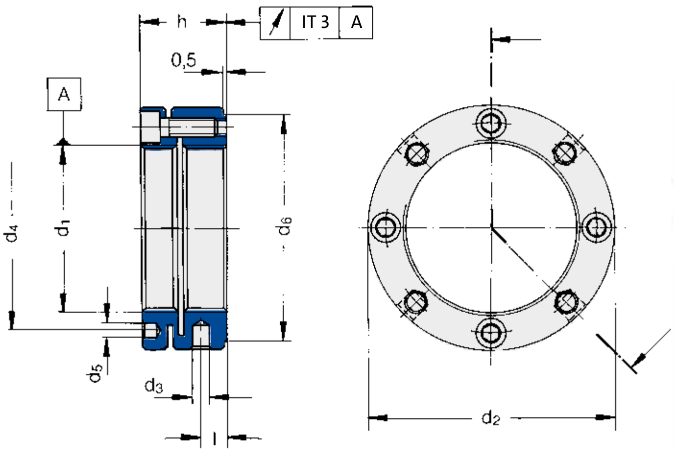
SPIETH LOCKNUTS SERIES **MSA**



NEW

Increased Axial Loads & Display of Breakaway Torques

Name	Dimensions in mm								Clamping screws			Calculation factor A	Calculation factor B	Performance Data		Moment of inertia J
	d_1	d_2	d_3 [1]	d_4	d_5	d_6	h	l	ISO 4762	M_A	No.			Breaking Load	Breakaway Torque	
	ISO-5H	h11	H11		H11	h11				Nm		mm	N	kN	Nm	kg cm²
MSA 20x1	M20x1	35	4	27.5	3.2	31	17	5	M3	2	5	1.281	3938	60	44	0.142
MSA 25x1.5	M25x1.5	40	4	32.5	3.2	36	19	6.5	M3	2	5	1.633	3859	83	46	0.265
MSA 30x1.5	M30x1.5	45	5	37.5	3.2	41	19	6.5	M3	2	5	1.921	3780	100	59	0.4
MSA 35x1.5	M35x1.5	53	5	45.5	4.3	48	22	7	M4	2.9	4	2.21	3666	118	82	0.904
MSA 40x1.5	M40x1.5	58	5	50.5	4.3	54	22	7	M4	2.9	4	2.5	3588	123	95	1.24
MSA 45x1.5	M45x1.5	64	6	54	4.3	59	23	7	M4	2.9	5	2.789	4388	134	133	1.89
MSA 50x1.5	M50x1.5	69	6	59	4.3	64	24	8	M4	2.9	6	3.079	5148	149	172	2.56
MSA 55x1.5	M55x1.5	73	6	64	4.3	69	24	8	M4	2.9	6	3.369	5031	141	188	3
MSA 60x1.5	M60x1.5	78	6	69	4.3	74	24	8	M4	2.9	6	3.655	4914	143	203	3.76
MSA 65x1.5	M65x1.5	83	6	74	4.3	79	24	8	M4	2.9	7	3.948	5597	273	248	4.61
MSA 70x1.5	M70x1.5	93	8	83	5.3	88	27	9	M5	6	6	4.238	7620	396	395	9.09
MSA 75x1.5	M75x1.5	98	8	88	5.3	93	27	9	M5	6	6	4.525	7430	401	422	10.9
MSA 80x2	M80x2	103	8	93	5.3	98	28	10	M5	6	6	4.873	7239	430	385	13.4
MSA 85x2	M85x2	112	8	100	6.4	106	30	10	M6	10	6	5.168	9990	496	554	21.3
MSA 90x2	M90x2	117	8	105	6.4	111	30	10	M6	10	6	5.453	9720	501	596	24.7
MSA 95x2	M95x2	122	8	110	6.4	116	30	10	M6	10	6	5.744	9450	508	605	28.4
MSA 100x2	M100x2	130	8	118	6.4	123	32	11	M6	10	6	6.033	9180	594	728	38.6
MSA 105x2	M105x2	135	8	123	6.4	128	32	11	M6	10	6	6.321	8910	599	753	43.9
MSA 110x2	M110x2	140	8	128	6.4	133	32	11	M6	10	6	6.616	8640	606	773	49.5
MSA 120x2	M120x2	155	8	140	6.4	145	36	13	M6	10	6	7.193	8100	886	928	89.1
MSA 130x3	M130x3	165	8	153	6.4	155	36	13	M6	10	6	7.895	7560	875	1049	110
MSA 140x3	M140x3	180	10	165	6.4	170	36	12	M6	10	8	9.05	9360	1032	1357	160
MSA 150x3	M150x3	190	10	175	6.4	180	36	12	M6	10	8	45.055	8640	1050	1468	192
MSA 160x3	M160x3	205	10	185	8.4	195	40	14	M8	25	8	9.633	14520	1199	3136	300
MSA 170x3	M170x3	215	10	195	8.4	205	40	14	M8	25	8	10.213	13200	1213	3241	352
MSA 180x3	M180x3	230	10	210	8.4	220	40	14	M8	25	8	10.789	11880	1399	3598	476
MSA 190x3	M190x3	240	10	224	8.4	230	40	14	M8	25	8	11.362	10560	1158	3803	548
MSA 200x3	M200x3	245	10	229	8.4	235	40	14	M8	25	8	11.948	9240	1021	3810	543

[1] The number of holes corresponds to the number of clamping screws.

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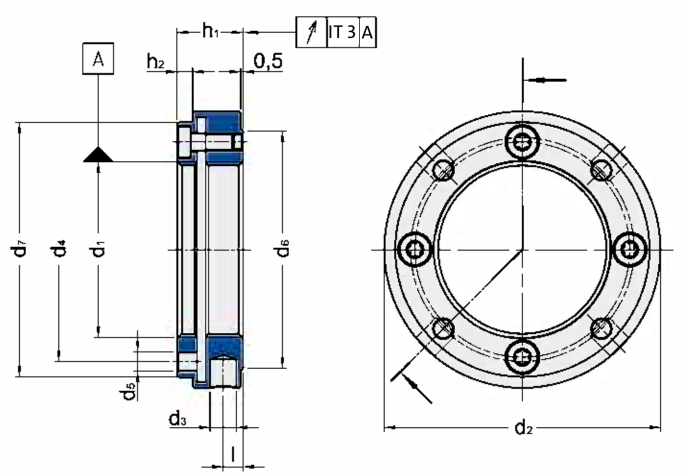
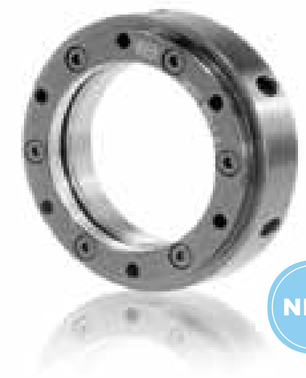
SPIETH LOCKNUTS SERIES **MSF**

For applications with limited installation space.





NEW
Increased Axial Loads &
Display of Breakaway Torques

Name	Dimensions in mm										Clamping screws			Calcu-lation factor A	Performance Data		Moment of inertia J
	d_1	d_2	d_3 [1]	d_4	d_5 [1]	d_6	d_7	h_1	h_2	l	ISR	M_A	No.		Breaking Load	Breakaway Torque	
	ISO-5H	h11	H11		H11	h11					Size	Nm		mm	kN	Nm	kg cm²
MSF 25x1.5	M25x1.5	48	5	36	4.3	39	43	14	3.5	4	20	2.9	4	1.633	56	30	0.338
MSF 30x1.5	M30x1.5	53	5	41	4.3	44	48	15	3.5	4.5	20	2.9	4	1.921	79	38	0.624
MSF 35x1.5	M35x1.5	58	5	46	4.3	49	53	15	3.5	4.5	20	2.9	4	2.21	93	46	0.876
MSF 40x1.5	M40x1.5	63	6	51	4.3	54	58	15	3.5	4.5	20	2.9	4	2.5	96	52	1.19
MSF 45x1.5	M45x1.5	70	6	56	4.3	59	63	15	3.5	4.5	20	2.9	6	2.789	122	89	1.7
MSF 50x1.5	M50x1.5	75	6	61	4.3	64	68	16	3.5	5	20	2.9	6	3.079	136	99	2.39
MSF 55x1.5	M55x1.5	80	6	66	4.3	69	73	16	3.5	5	20	2.9	6	3.369	279	110	3.02
MSF 55x2	M55x2	80	6	66	4.3	69	73	16	3.5	5	20	2.9	6	3.43	271	116	3.02
MSF 60x1.5	M60x1.5	89	6	74	5.3	77	82	18	5	5.25	25	6	6	3.655	327	188	5.34
MSF 60x2	M60x2	89	6	74	5.3	77	82	18	5	5.25	25	6	6	3.719	317	192	5.34
MSF 65x1.5	M65x1.5	94	8	79	5.3	82	87	18	5	5.25	25	6	6	3.948	334	205	6.51
MSF 65x2	M65x2	94	8	79	5.3	82	87	18	5	5.25	25	6	6	4.008	325	208	6.51
MSF 70x1.5	M70x1.5	99	8	84	5.3	87	92	18	5	5.25	25	6	6	4.238	338	221	7.55
MSF 70x2	M70x2	99	8	84	5.3	87	92	18	5	5.25	25	6	6	4.297	328	224	7.55
MSF 75x1.5	M75x1.5	106	8	89	6.4	94	99	20	5	5.75	30	10	6	4.525	382	321	11.2
MSF 75x2	M75x2	106	8	89	6.4	94	99	20	5	5.75	30	10	6	4.587	372	318	11.2
MSF 80x2	M80x2	111	8	94	6.4	99	104	20	5	5.75	30	10	6	4.873	378	343	13.4
MSF 90x2	M90x2	121	8	104	6.4	109	114	20	5	5.75	30	10	6	5.453	388	384	18.1
MSF 100x2	M100x2	131	8	114	6.4	119	124	20	5	5.75	30	10	6	6.033	396	433	24

[1] The number of holes corresponds to the number of clamping screws.

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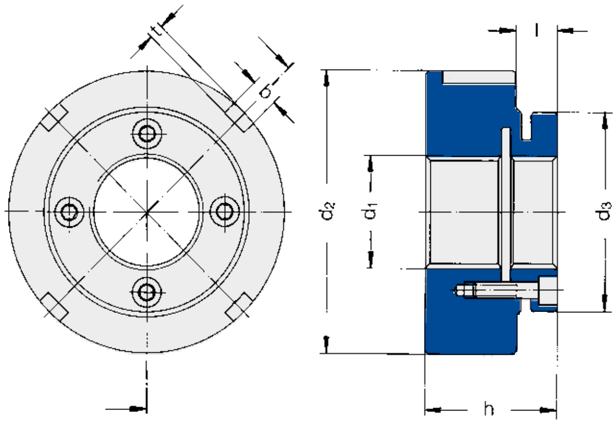
SPIETH LOCKNUTS SERIES **MSW**



NEW

Increased Axial Loads &
Display of Breakaway Torques

Name	Dimensions in mm							Clamping screws			Calcu-lation factor A	Calcu-lation factor B	Performance Data		Moment of inertia J
	d_1	d_2	d_3	h	l	b [1]	t	ISO 4762	M_A	No.			Breaking Load	Breakaway Torque	
	ISO-5H	c11							Nm		mm	N	kN	Nm	kg cm²
MSW 20.28	M20x1.5	42	38	28	11	6	2.5	M4	2.9	4	1.344	1560	194	40	0.486
MSW 20.40	M20x1.5	52	42	40	11	7	3	M4	2.9	4	1.344	936	375	42	1.74
MSW 25.28	M25x1.5	47	43	28	11	7	3	M4	2.9	4	1.633	1560	245	54	0.742
MSW 25.40	M25x1.5	62	47	40	11	8	3.5	M4	2.9	4	1.633	936	470	59	3.41
MSW 30.28	M30x1.5	52	48	28	11	7	3	M4	2.9	4	1.921	1560	295	68	1.09
MSW 30.44	M30x1.5	68	52	44	11	8	3.5	M4	2.9	4	1.921	936	655	83	5.54
MSW 35.28	M35x1.5	60	53	28	11	8	3.5	M4	2.9	4	2.21	1560	346	83	1.8
MSW 35.44	M35x1.5	73	60	44	11	8	3.5	M4	2.9	4	2.21	936	767	97	7.41
MSW 40.28	M40x1.5	65	58	28	11	8	3.5	M4	2.9	6	2.5	1560	398	134	2.43
MSW 40.44	M40x1.5	75	62	44	11	8	3.5	M4	2.9	6	2.5	936	878	139	7.98
MSW 45.28	M45x1.5	70	63	28	11	8	3.5	M4	2.9	6	2.789	2340	443	149	3.14
MSW 45.44	M45x1.5	90	70	44	11	10	4	M4	2.9	6	2.789	1404	982	171	16.4
MSW 50.32	M50x1.5	75	68	32	11	8	3.5	M4	2.9	6	3.079	2340	642	167	4.78
MSW 50.46	M50x1.5	95	75	46	11	10	4	M4	2.9	6	3.079	1404	1168	204	21.3
MSW 55.46	M55x1.5	100	80	46	12	10	4	M5	6	6	3.369	2286	1208	326	23.6
MSW 60.46	M60x1.5	100	85	46	12	10	4	M5	6	6	3.655	2286	1321	438	24.8
MSW 65.46	M65x1.5	110	90	46	12	10	4	M5	6	6	3.948	2286	1433	386	35.9
MSW 70.46	M70x1.5	115	95	46	12	10	4	M5	6	6	4.238	2286	1551	390	42.2

[1] The number of grooves for hook spanner DIN 1810-A corresponds to the number of clamping screws.

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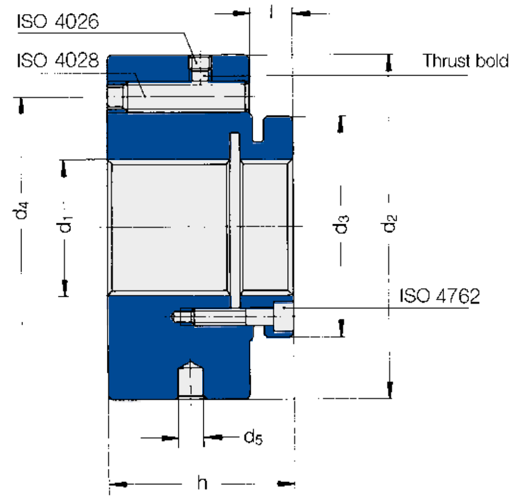


NEU Increased Axial Loads

Name	Dimensions in mm								Clamping screws			Performance Data
	d_1	d_2	d_3	h	l	d_4	d_5		ISO 4762	M_A	No.	Breaking Load
	ISO-5H	c11					øH11	No.		Nm		kN
MSW 72.60	M72x1.5	135	95	60	14	105	8	4	M5	6	6	2390
MSW 85.60	M85x2	160	110	60	14	124	8	4	M6	10	6	2600
MSW 105.66	M105x2	190	136	66	15	150	10	4	M6	10	6	3670
MSW 125.72	M125x2	215	154	72	16	172	10	4	M6	10	6	4830
MSW 140.78	M140x3	240	176	78	17	196	10	4	M6	10	8	5810

Name	Set screws					Lock screws		Alu thrust bolt		
	ISO 4028-45H	d_6	M_D [2)]	No.	Calculation factor A	ISO 4026	No.	ø	Length	No.
		mm	Nm		mm			mm	mm	
MSW 72.60	M10x45	7	34	8	0.92064	M6x8	8	4.5	3	8
MSW 85.60	M12x45	8.5	60	8	1.09913	M8x8	8	6	3	8
MSW 105.66	M12X50	8.5	60	9	1.09913	M8x8	9	6	4	9
MSW 125.72	M16x55	12	140	9	1.42613	M8x8	9	6	4	9
MSW 140.78	M16x60	12	140	9	1.42613	M8x8	9	6	4	9

[2)] Manufacturer's max. permissible tightening torque.

All information is supplied without liability and subject to technical changes. Please observe the operating instructions at https://www.spieth-maschinenelemente.de/en/download-faqs/catalogueinstructions/

The locknut is deformable in the axial direction and must therefore be handled with care. The clamping screws should only be tightened when the locknut has been screwed completely onto the spindle thread. If these instructions are ignored, inadmissible plastic deformation could render the locknut unusable.

Assembly

1. Carefully clean the locknut and connecting components and wet slightly with low-viscosity machine oil that does not contain friction-reducing additives.
2. Screw the locknut onto the spindle thread, but without making contact with the end face (Fig. 1).
3. Tighten the clamping screws evenly in diagonal sequence while turning the locknut forwards and backwards. Stop tightening when flank play is almost eliminated (Fig. 2).
4. Now tighten the locknut against the end contact surface initially by exerting a higher level of preliminary torque. Then release again and finally tighten using the prescribed degree of torque (Fig. 3). This sequence prevents subsequent seizure at the contact surfaces (thread flanks, end contact surfaces).
5. Then secure the locknut by evenly tightening the clamping screws. In applications that impose strict requirements in terms of spindle concentricity, it is possible to adjust the concentricity after testing by tightening the clamping screws individually. This eliminates any unilateral tensions caused by minimal axial run-out errors in the connecting components.

Dismantling

First slightly relieve the tension of the clamping screws in diagonal sequence. Only then should the clamping screws be fully released. This prevents all of the tension of the diaphragm from acting on the last clamping screw to be released and causing it to jam.

Once a locknut has been secured on a spindle thread, after removal it may only be used again on the same spindle. Adjustments carried out between the spindle and locknut can otherwise lead to problems if the locknut is used on a different spindle.

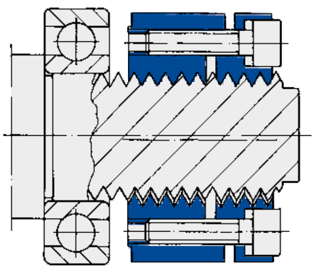


Fig. 1

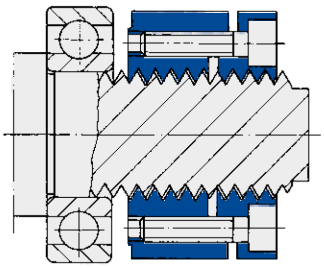


Fig. 2

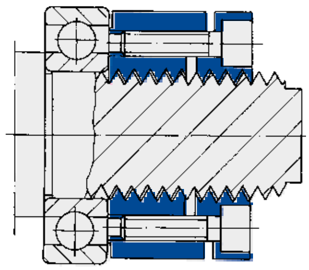


Fig. 3

Assembly

1. Carefully clean the locknut and connecting components and wet slightly with low-viscosity machine oil that does not contain friction-reducing additives.
2. Screw the locknut onto the spindle thread, but without making contact with the end face. The set screws should not protrude from the end face. (Fig. 4).
3. Tighten the clamping screws evenly in diagonal sequence while turning the locknut forwards and backwards. Stop tightening when flank play is almost eliminated (Fig. 5).
4. Now screw the locknut until it makes contact with the end face. Then tighten the clamping screws evenly to fix the lock.
5. Then tighten the set screws against the contact surface step by step in the sequence shown at a higher level of preliminary torque. Loosen them again and finally tighten them using the prescribed preliminary torque (Fig. 6). This sequence prevents subsequent seizure at the contact surfaces (thread flanks, end contact surfaces).
6. Finally tighten the lock screws and check the clamping screws again for the prescribed preliminary torque and adjust if necessary.

Dismantling

1. Release the lock screws, then slightly loosen the set screws in the sequence shown before fully releasing them.
2. First slightly relieve the tension of the clamping screws in diagonal sequence. Only then should the clamping screws be fully released. This prevents all of the tension of the diaphragm from acting on the last clamping screw to be released and causing it to jam.

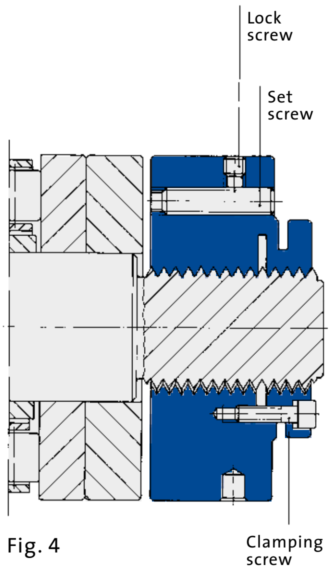


Fig. 4

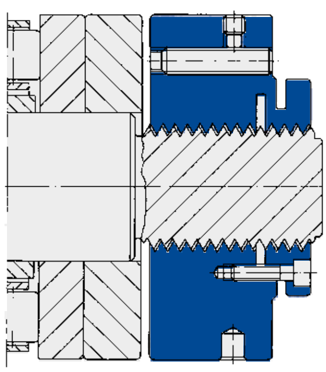


Fig. 5

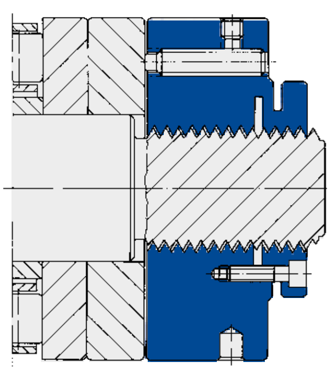


Fig. 6

GENERAL DESIGN

The specified performance data are subject to the dispersion of the friction values of the different contact partners. The components are designed to be reusable, with frequent assembly and disassembly we recommend reducing the tightening torque. Please note that this can also reduce the transmissible torque.

The locknuts are made of burnished steel. The metric ISO thread is manufactured to tolerance class "fine" (tolerance zone 5H, DIN 13 parts 21 ... 25) in a single work process with the end face of the locknut. All locknuts are fitted with integrated clamping screws to lock the thread. Radial installation is carried out with the aid of a hook spanner DIN 1810 shape A or shape B.

MSW DESIGN

These locknuts are generally required to withstand high pretension forces. In the upper dimension range, these pretension forces can no longer be achieved in practice using the locknut's own pretension moment due to the size of the friction radii. For this reason, the MSW locknut series is divided into 2 different versions: Up to locknut size MSW 70.46, axial pretension is set by using the preliminary torque of the locknut. From size MSW 72.60 upwards, this is done using the tightening torque of the integrated set screws.

CLAMPING SCREWS

Cheese-head screws with a hexagon socket ISO 4762 (DIN 912) or hexalobular socket cheese head screws (similar to TORX) with strength class 12.9, as well as hexagon bolts ISO 4014 and ISO 4017 with strength class 10.9 are used.

M_A: Tightening torque per clamping screw
The tightening torque is based on a friction coefficient of $\mu = 0.14$. As the effective friction coefficients depend on a range of factors which are often beyond the control of the manufacturer, the values specified here should only be regarded as non-binding recommendations.

CONNECTING COMPONENTS

The metric bolt thread must normally be manufactured to tolerance class "medium" (tolerance zone 6g, DIN 13 parts 21 ... 25), for higher precision requirements, to tolerance class "fine" (tolerance zone 4h, DIN 13 parts 21 ... 25).

The contact surfaces of the connecting components are essential to optimum functioning and must be manufactured with particular care and precision. To avoid surface seizure, all contact surfaces should be finished with a low level of surface roughness.

CONNECTING COMPONENTS MSW > M70

For this locknut size, the axial pretension applied by the hardened threaded pins requires a specially configured thrust collar to absorb the extremely high local pressure loads. This thrust ring must be hardened. The reason for the prescribed minimum height is to ensure distribution of locally occurring pressure forces to the following end contact surface. In certain cases, an already existing machine component, such as a gear, may be able to assume the function of the thrust collar (Fig. 1+2).

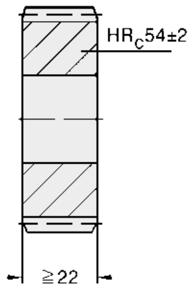


Fig. 1

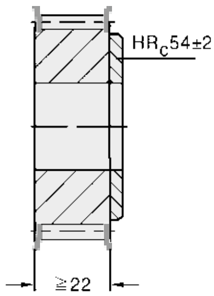


Fig. 2

SETTING THE AXIAL PRETENSIONING FORCES

The axial pretension of a screw connection often plays a decisive role for successful function, and must therefore be set with particular accuracy. However, in most assembly workshops, direct measurement of this variable is not possible, raising the need for indirect methods of setting. For this purpose, the locknut preliminary torque corresponding to the required pre-tensioning force is calculated. This factor can be determined using the following equation:

The locking process places the spindle thread under stress and in this case brings about intensive surface contact (= high axial rigidity). At the same time, this serves to relieve tension on the end contact surface of the locknut. This effect can easily be compensated by increasing preliminary torque accordingly during installation. This higher preliminary torque is ascertained using the allowance B relative to the required pre-tensioning force F_V.

General

$$M_V = \frac{(F_V + B) \cdot (A + \mu_A \cdot r_A)}{1000} \text{ [Nm]}$$

M_V = Pre-tensioning torque of the locknut [Nm]

F_V = Required axial pretension force of the threaded connection [N]

B = Locknut-specific allowance [N], compensates face end relief due to the locking process

A = Constant [mm], includes the calculation factors for the respective thread width (catalogue value)

μ_A = Frictional coefficient for the end contact surface of the locknut Approximate value μ_A = 0.1 steel/steel

r_A = Effective friction radius for the end contact face of the locknut [mm]

From locknut size MSW > M70

The tightening torque for the set screw is determined according to the following formula:

$$M_D = \frac{F_V \cdot (4 \cdot A + \mu_D \cdot d_6)}{n \cdot 4000} \text{ [Nm]}$$

M_D = Tightening torque per set screw [Nm]

F_V = Required axial pretension force of the threaded connection [N]

A = Constant [mm], includes the Calculation factors for the respective thread width (catalogue value)

μ_D = Frictional coefficient for the end contact face of the set screw Approximate value = 0.13

d_6 = Dog point dia. of the set screw [mm] (catalogue value)

n = number of set screws

APPLYING ALL-ROUND PRESSURE WITH PRECISION

Spieth clamping sets – friction-locked shaft-hub connections.
Rising power densities. Increasing levels of dynamic stress. And the required function must be realised within increasingly restrictive cost parameters. The stringent demands of modern mechanical engineering can only be satisfied with high-quality shaft-hub connecting elements.

Spieth clamping sets apply uniform pressure. Without compromise. The are designed to be more accurate, precise, efficient, simpler to install and easier to service. The economical solution for modern machinery designs. Offering outstanding performance.

4 UNIQUE FEATURES – NUMEROUS BENEFITS

Precise
All functional surfaces that determine precision are machined to the finest geometrical and positional tolerances.

Single-piece design
Unlike tapered clamping sets, the single-piece steel body does not have any joints that could compromise tolerances. This ensures that the high degree of precision achieved in the manufacturing process can also be brought to bear in the relevant application.

Self-centering
When subjected to axial compression, the unique geometry of the absolutely symmetrical base body ensures uniform transverse contraction in the direction of the shaft and hub. The resulting centring effect is equivalent to that of the hydro-expansion principle, only much simpler, safer and stiffer.

Intelligent
Cylindrical clamping sets exert very low levels of wear on their connecting components. Significantly better clamping homogeneity at the contact surfaces eliminates any possibility of peak clamping force acting at specific points, which frequently lead to damage and installation problems. At the same time, the Spieth design in the tensioned state is equivalent to the combination of a knee lever and a spring compressed against a block, thus guaranteeing an extremely rigid connection. And when released, the cylindrical clamping set easily returns to its original shape.

BENEFITS TO YOU

Competitiveness through technological leadership – a strategy that calls for an economical increase in power density, efficiency and accuracy. Cylindrical clamping sets create the foundation for this.

Lower Resource Input
- Simple configuration of connecting components.
- Simple installation and dismantling of all components thanks to mating play.
- Minimum axial drag during clamping process.
- Clamping force initiation can be freely configured.
- Quick-release connection.

More Success
- High level of concentricity.
- Minimised vibrational excitation.
- High torque levels and axial forces.
- Suitable for alternating torsion.
- Axial and angular position freely adjustable.
- Preserves connecting components.
- Connection can be automated/switched.
- Re-usable.

Series DSM .. 1, DSM .. 2

Series DSM

Series DSL

Series DSK

FIELDS OF APPLICATION

Spieth clamping sets are friction-locked shaft-hub connections for all areas of mechanical engineering. They are used wherever high-quality and reliable connections perform key functional roles. At the same time, they are the ideal solution for applications with high levels of replacement and adjustment as well as for manual or automated clamping of sleeves, skids, pivoting heads or rotary tables.

APPLICATION EXAMPLES

- In machining, forming and cutting machine tools.
- In handling and automation equipment.
- In materials handling.
- In general drive engineering and transmissions.
- In packaging machinery.
- In fixture construction.
- In compressors and pumps.
- In printing presses and paper-making technology.
- In textile machines.
- In woodworking machines.
- In process engineering applications for mixing, crushing and centrifuging.
- For metrology, control and test engineering.
- In precision engineering and optical technology.

Series AK

Series IK

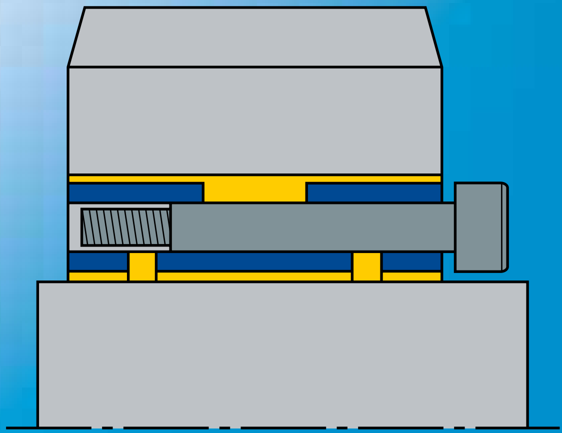
Series AL

Series IL

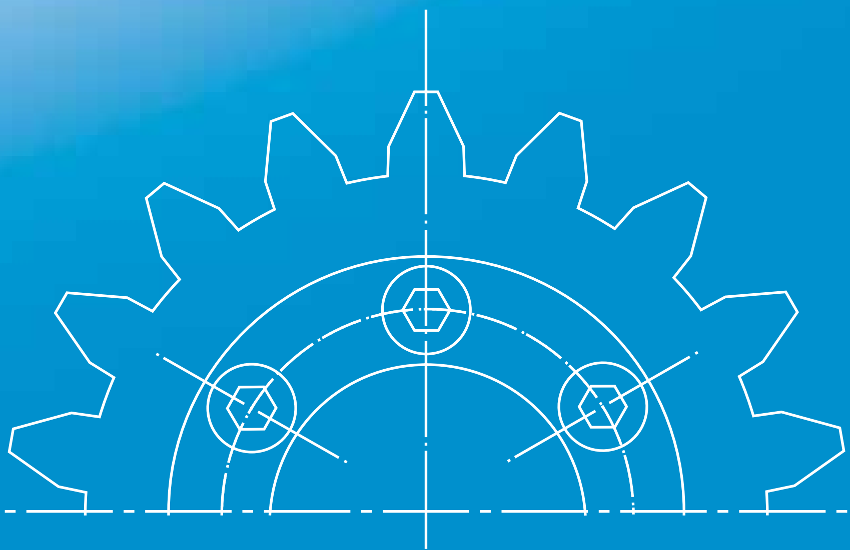
FUNCTIONAL PRINCIPLE

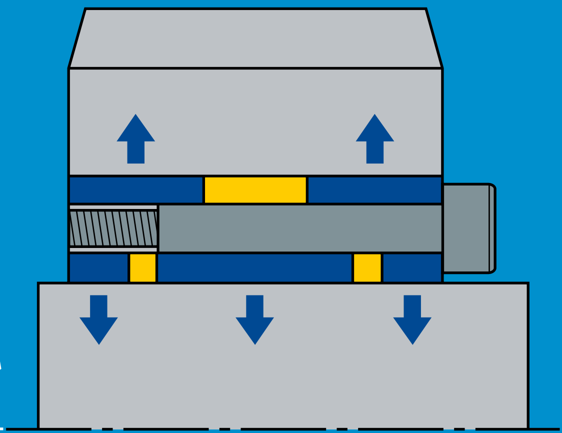
Shown here using a clamping set from series DSK with an integrated clamping screw.

The principle is illustrated in a simplified diagram with enlarged play.



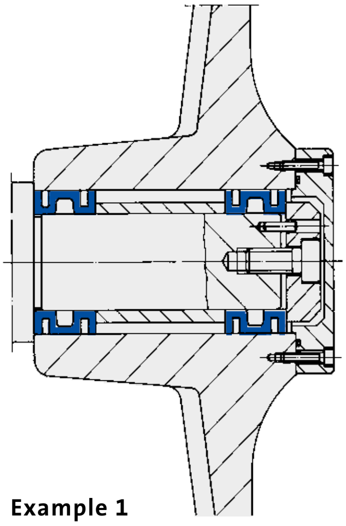
Clamping set released, easy installation or dismantling with mating play.





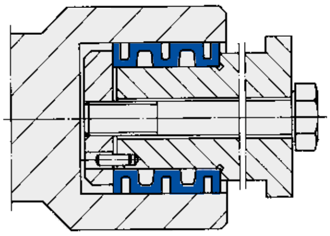
Clamping set clamped, connection is centred with a high load capacity. No lateral displacement during tightening. This ensures ultra-high precision centring and optimum concentricity.

ASSEMBLY EXAMPLES

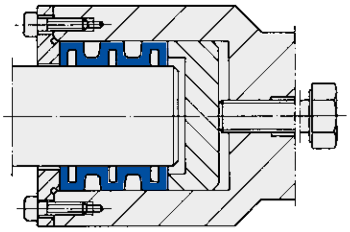


Example 1

Example 1: Blade wheel fixture
The clamping sleeves arranged over a wide basis exert a positive influence on run-out accuracy and rotating flexural stress of the shaft-hub fit. The degree of torque which can be transferred with two consecutively arranged clamping sleeves is approx. 30 % higher than when using a single clamping sleeve.

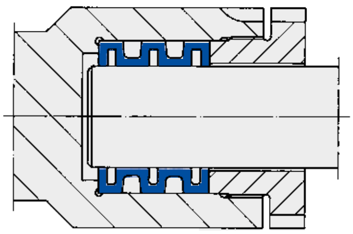


Example 2
Clamping force initiated by tension screw.

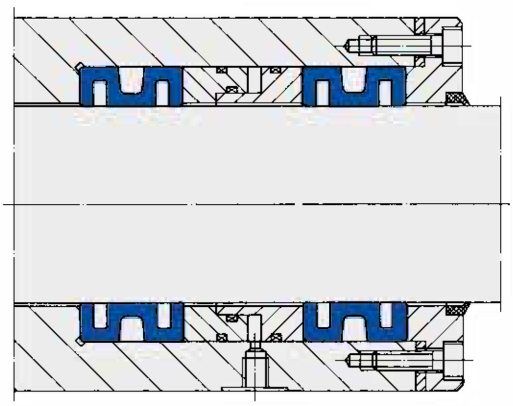


Example 3
Clamping force initiated by set screw.

Example 2–4: Plug-in connections
This shaft-hub connection is completely free of play and can be released an unlimited number of times. The tightening torque levels for clamping force initiating screws depend on the required clamping force for each individual clamping sleeve.

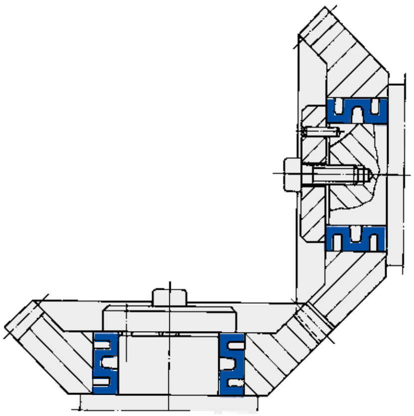


Example 4
Clamping force initiated by hollow screw.

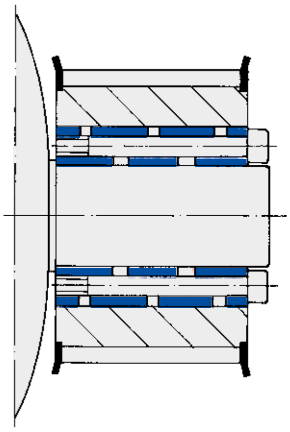


Example 5

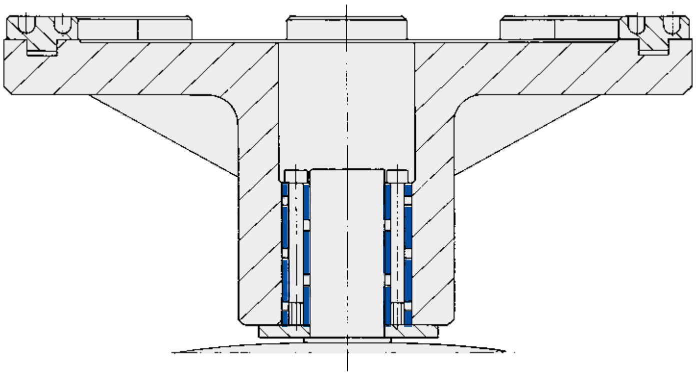
Example 5: Sleeve clamping
The sleeve is hydraulically tensioned and precisely centred. Free movement is immediately possible in the un-tensioned state. The axial thrust created during the clamping process with single arrangement of a clamping sleeve is theoretically balanced out in this case by forces working in opposition. In practice, however, in case of a freely located sleeve, allowance must be made for a slight residual thrust as it is not possible to create identical clamping conditions at the clamping sleeves.



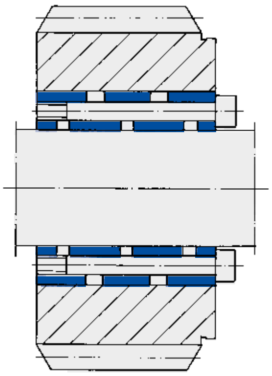
Example 6: Bevel wheel fixture
This connection is characterized by simple connecting components, a high degree of concentricity and absolute freedom from play.



Example 7: Pulley fixture
The hub can be made of an aluminium alloy. Observe the minimum strength specification. High temperatures can impair retention force.

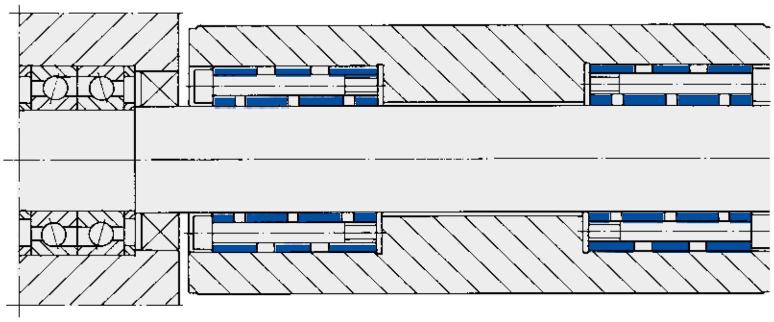


Example 8: Indexing plate
Indexing plate in alloy material at the shaft end of an indexing gear. Here, precise concentricity and run-out are vital.

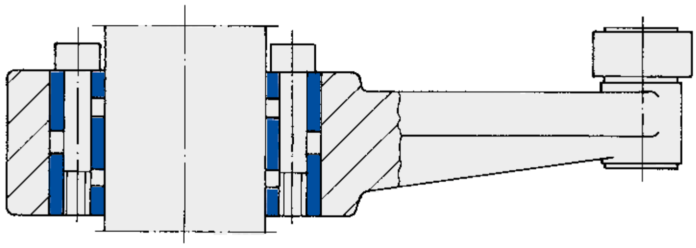


Example 9: Gear fixture
To satisfy the highest concentricity requirements, we recommend mounting a control facility on the gear to allow the concentricity to be checked and adjusted if necessary.

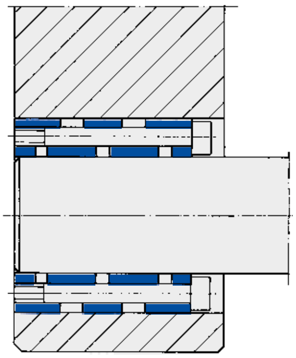
ASSEMBLY EXAMPLES



Example 10: Pressure roller fixture
Here, 2 long clamping sets are used to achieve high overall radial rigidity due to intensive tensioning of the shaft and hub. The pressure roller is exchanged by pulling the shaft out of the bearings.



Example 11: Rocker arm fixture
The peripheral and axial position can be ideally adjusted during assembly.



Example 12: Guide column
Fixture of a guide column in the machine body.

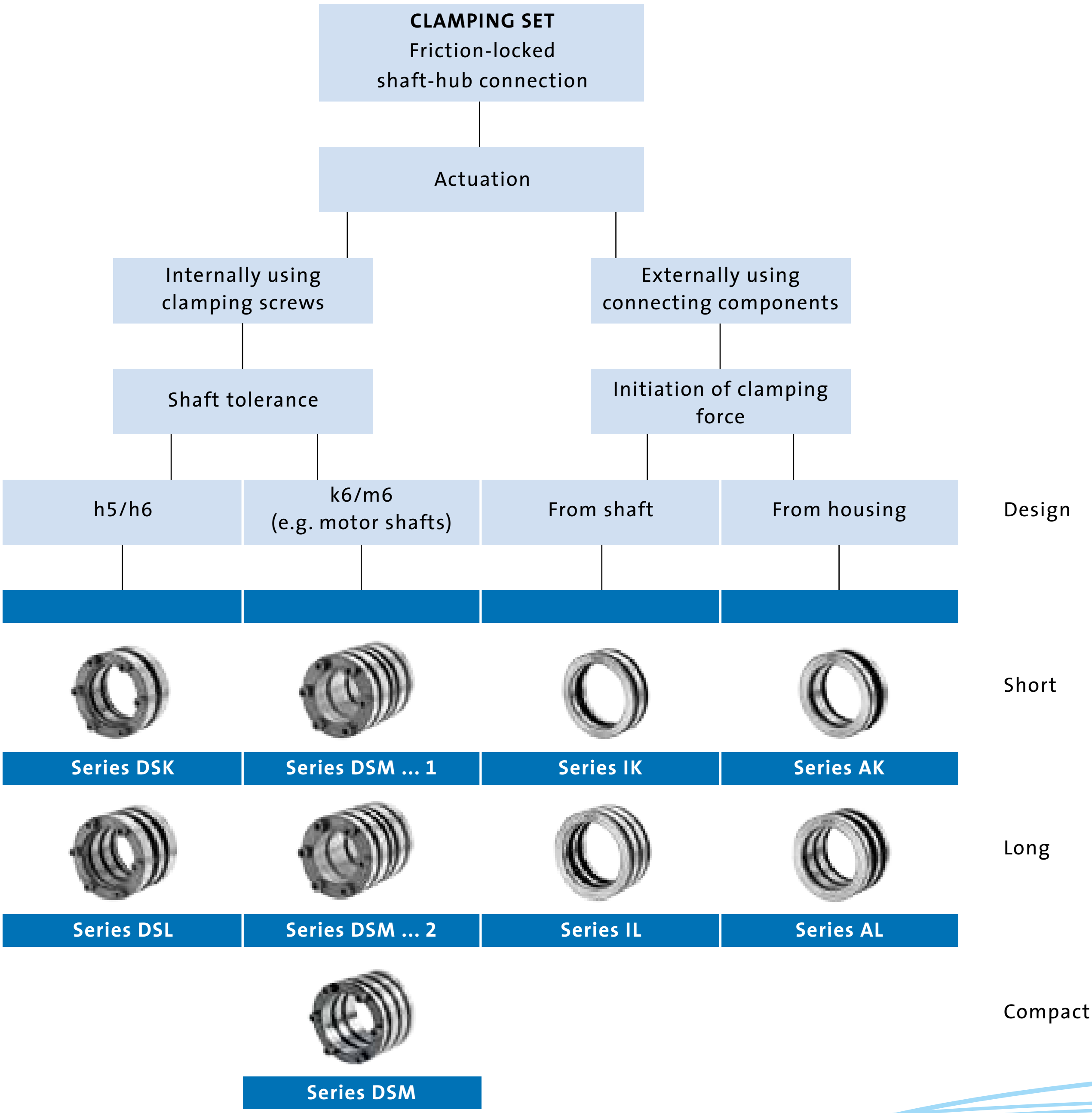
SPIETH **CLAMPING SETS: THE RIGHT CHOICE**

We'll provide you with the perfect clamping sets for your application. We'll also help you choose the right one – with expert advice from our specialists.

Series DSK, DSL
Ready-to-use friction-locked shaft-hub connection for quick and easy installation.

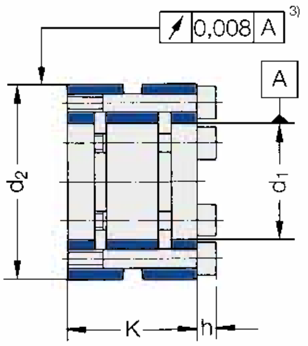
Series DSM
Ready-to-use friction-locked shaft-hub connection for use on motor shafts to DIN 748.

Series AK/IK and AL/IL
Friction-locked shaft-hub connection that can be automated. Clamping force initiation can be freely configured.



SPIETH CLAMPING SETS SERIES **DSK**

For shafts with h tolerance zone



NEW

Increased Transmissible Torques

Name	Dimensions in mm			Clamping screws				Transmittable forces		Moment of inertia J
	d_1	d_2	K	ISO 4762	h	M_A	No.	M	F_a	
	H6	h5			mm	Nm		Nm	N	kg cm^2
DSK 14.26	14	26	21	M3	3	2	6	40	5700	0.045
DSK 15.28	15	28	21	M3	3	2	6	44	5900	0.059
DSK 16.28	16	28	21	M3	3	2	6	45	5600	0.058
DSK 16.32	16	32	31	M4	4	5	6	100	12500	0.161
DSK 18.30	18	30	21	M3	3	2	6	53	5900	0.074
DSK 18.35	18	35	31	M4	4	5	6	110	12200	0.227
DSK 20.32	20	32	21	M3	3	2	6	64	6400	0.093
DSK 20.37	20	37	31	M4	4	5	6	130	13000	0.278
DSK 20.40	20	40	36	M5	5	7	6	180	18000	0.434
DSK 22.35	22	35	21	M3	3	2	6	76	6900	0.131
DSK 22.38	22	38	31	M4	4	5	6	160	14500	0.302
DSK 22.42	22	42	36	M5	5	10	6	330	30000	0.519
DSK 25.37	25	37	21	M3	3	2	6	94	7500	0.155
DSK 25.42	25	42	31	M4	4	5	6	220	17600	0.439
DSK 25.45	25	45	36	M5	5	10	6	388	31000	0.666
DSK 28.40	28	40	21	M3	3	2	6	113	8100	0.203
DSK 28.45	28	45	31	M4	4	5	6	280	20000	0.562
DSK 28.48	28	48	36	M5	5	10	6	450	32100	0.84
DSK 30.42	30	42	21	M3	3	2	6	126	8400	0.24
DSK 30.47	30	47	31	M4	4	5	6	321	21400	0.655
DSK 30.50	30	50	36	M5	5	10	6	510	34000	0.973
DSK 30.55	30	55	41	M6	6	13	6	588	39200	1.59
DSK 32.48	32	48	31	M4	4	5	6	360	22500	0.69
DSK 32.52	32	52	36	M5	5	10	6	585	36600	1.12
DSK 32.56	32	56	41	M6	6	13	6	634	39600	1.69
DSK 35.52	35	52	31	M4	4	5	6	390	22300	0.936
DSK 35.55	35	55	36	M5	5	10	6	679	38800	1.36
DSK 35.60	35	60	41	M6	6	17	6	935	53400	2.18
DSK 40.56	40	56	31	M4	4	5	6	430	21500	1.17
DSK 40.62	40	62	36	M5	5	10	6	835	41800	2.14
DSK 40.65	40	65	41	M6	6	17	6	1118	55900	2.9
DSK 40.70	40	70	52	M8	8	25	6	1270	63500	5.3
DSK 45.68	45	68	36	M5	5	10	6	987	43900	3.01
DSK 45.70	45	70	41	M6	6	17	6	1307	58100	3.76
DSK 45.75	45	75	52	M8	8	25	6	1485	66000	6.78
DSK 50.72	50	72	36	M5	5	10	6	1115	44600	3.6

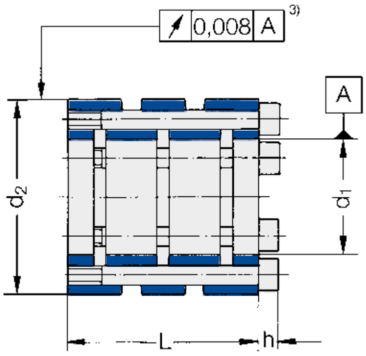
Name	Dimensions in mm			Clamping screws				Transmittable forces		Moment of inertia J
	d_1	d_2	K	ISO 4762	h	M_A	No.	M	F_a	
	H6	h5			mm	Nm		Nm	N	kg cm²
DSK 50.75	50	75	41	M6	6	17	6	1500	60000	4.78
DSK 50.80	50	80	52	M8	8	35	6	1850	74000	8.52
DSK 55.80	55	80	41	M6	6	17	6	1693	61600	5.98
DSK 55.85	55	85	52	M8	8	35	6	2120	77100	10.5
DSK 60.85	60	85	41	M6	6	17	6	1885	62800	7.36
DSK 60.90	60	90	52	M8	8	35	6	2370	79000	12.9
DSK 65.90	65	90	41	M6	6	17	6	2072	63800	8.95
DSK 65.95	65	95	52	M8	8	35	6	2650	81500	15.5
DSK 70.100	70	100	52	M8	8	35	6	2990	85400	18.5
DSK 75.105	75	105	52	M8	8	35	6	3250	86700	21.9
DSK 80.110	80	110	52	M8	8	35	6	3520	88000	25.6
DSK 85.120	85	120	57	M8	8	35	6	3560	83800	40.3
DSK 90.120	90	120	52	M8	8	35	7	4300	95600	35.2
DSK 95.125	95	125	52	M8	8	35	8	4800	101100	40.7
DSK 100.130	100	130	52	M8	8	35	8	5050	101000	46.3
DSK 110.140	110	140	52	M8	8	32	10	6570	119500	60.2
DSK 120.150	120	150	52	M8	8	32	10	7170	119500	75.2
DSK 130.160	130	160	52	M8	8	32	10	7760	119400	92.5
DSK 140.170	140	170	52	M8	8	32	10	8360	119400	112
DSK 150.180	150	180	52	M8	8	32	10	8960	119500	134
DSK 160.190	160	190	52	M8	8	32	12	11470	143400	162
DSK 170.200	170	200	52	M8	8	32	12	12180	143300	190
DSK 180.210	180	210	52	M8	8	32	12	12900	143300	221
DSK 190.230	190	230	62	M10	10	60	12	18400	193700	487
DSK 200.240	200	240	62	M10	10	60	12	19300	193000	588
DSK 210.250	210	250	62	M10	10	60	12	20400	194300	614
DSK 220.260	220	260	62	M10	10	60	12	21600	196400	639
DSK 230.270	230	270	62	M10	10	60	12	22500	195700	812
DSK 240.280	240	280	62	M10	10	60	12	23600	196700	984
DSK 250.300	250	300	72	M10	10	60	15	32000	256000	1580
DSK 260.310	260	310	72	M10	10	60	15	33300	256200	1760
DSK 270.320	270	320	72	M10	10	60	15	34600	256300	1950
DSK 280.330	280	330	72	M10	10	60	15	36000	257100	2150
DSK 290.340	290	340	72	M10	10	60	15	36800	253800	2360
DSK 300.350	300	350	72	M10	10	60	15	38500	256700	2590

[3] d2 > 80 mm = Concentricity to IT4

All information is supplied without liability and subject to technical changes. Please observe the operating instructions at https://www.spieth-maschinenelemente.de/en/download-faqs/catalogueinstructions/

SPIETH CLAMPING SETS SERIES **DSL**

For shafts with h tolerance zone



NEW

Increased Transmissible Torques

Name	Dimensions in mm			Clamping screws				Transmittable forces		Moment of inertia J
	d_1	d_2	L	ISO 4762	h	M_A	No.	M	F_a	
	H6	h5			mm	Nm		Nm	N	kg cm²
DSL 14.26	14	26	31	M3	3	2	6	60	8600	0.059
DSL 15.28	15	28	31	M3	3	2	6	66	8800	0.078
DSL 16.28	16	28	31	M3	3	2	6	73	9100	0.077
DSL 16.32	16	32	41	M4	4	5	6	187	23400	0.179
DSL 18.30	18	30	31	M3	3	2	6	87	9700	0.099
DSL 18.35	18	35	41	M4	4	5	6	205	22800	0.25
DSL 20.32	20	32	31	M3	3	2	6	100	10000	0.124
DSL 20.37	20	37	41	M4	4	5	6	230	23000	0.307
DSL 20.40	20	40	52	M5	5	7	6	250	25000	0.547
DSL 22.35	22	35	31	M3	3	2	6	110	10000	0.173
DSL 22.38	22	38	41	M4	4	5	6	275	25000	0.334
DSL 22.42	22	42	52	M5	5	10	6	485	44100	0.653
DSL 25.37	25	37	31	M3	3	2	6	140	11200	0.206
DSL 25.42	25	42	41	M4	4	5	6	348	27800	0.484
DSL 25.45	25	45	52	M5	5	10	6	566	45300	0.839
DSL 28.40	28	40	31	M3	3	2	6	160	11400	0.269
DSL 28.45	28	45	41	M4	4	5	6	420	30000	0.619
DSL 28.48	28	48	52	M5	5	10	6	653	46600	1.06
DSL 30.42	30	42	31	M3	3	2	6	180	12000	0.318
DSL 30.47	30	47	41	M4	4	5	6	470	31300	0.722
DSL 30.50	30	50	52	M5	5	10	6	705	47000	1.23
DSL 30.55	30	55	62	M6	6	13	6	717	47800	2.13
DSL 32.48	32	48	41	M4	4	5	6	520	32500	0.764
DSL 32.52	32	52	52	M5	5	10	6	760	47500	1.41
DSL 32.56	32	56	62	M6	6	13	6	770	48100	2.26
DSL 35.52	35	52	41	M4	4	5	6	600	34300	1.03
DSL 35.55	35	55	52	M5	5	10	6	871	49800	1.72
DSL 35.60	35	60	62	M6	6	17	6	1149	65700	2.91
DSL 40.62	40	62	52	M5	5	10	6	1040	52000	1.3
DSL 40.56	40	56	41	M4	4	5	6	690	34500	2.69
DSL 40.65	40	65	62	M6	6	17	6	1372	68600	3.87
DSL 40.70	40	70	77	M8	8	25	6	1420	71000	6.89
DSL 45.68	45	68	52	M5	5	10	6	1232	54800	3.77
DSL 45.70	45	70	62	M6	6	17	6	1607	71400	5.03
DSL 45.75	45	75	77	M8	8	25	6	1666	74000	8.81
DSL 50.72	50	72	52	M5	5	10	6	1412	56500	4.52

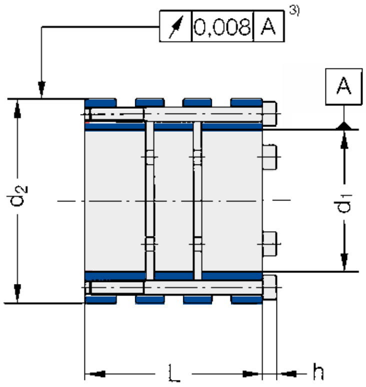
Name	Dimensions in mm			Clamping screws				Transmittable forces		Moment of inertia J
	d_1	d_2	L	ISO 4762	h	M_A	No.	M	F_a	
	H6	h5			mm	Nm		Nm	N	kg cm²
DSL 50.75	50	75	62	M6	6	17	6	1851	74000	6.4
DSL 50.80	50	80	77	M8	8	35	6	2043	81700	11.1
DSL 55.80	55	80	62	M6	6	17	6	2103	76500	8
DSL 55.85	55	85	77	M8	8	35	6	2344	85200	13.7
DSL 60.85	60	85	62	M6	6	17	6	2359	78600	9.85
DSL 60.90	60	90	77	M8	8	35	6	2650	88300	16.7
DSL 65.90	65	90	62	M6	6	17	6	2617	80500	12
DSL 65.95	65	95	77	M8	8	35	6	2970	91400	20.1
DSL 70.100	70	100	77	M8	8	35	6	3288	93900	24
DSL 75.105	75	105	77	M8	8	35	6	3605	96100	28.4
DSL 80.110	80	110	77	M8	8	35	6	3919	98000	33.2
DSL 85.120	85	120	92	M8	8	35	6	3950	92900	60.2
DSL 90.120	90	120	77	M8	8	35	7	6850	152200	48.1
DSL 95.125	95	125	77	M8	8	35	8	7390	155600	55.7
DSL 100.130	100	130	77	M8	8	35	8	7780	155600	63.3
DSL 110.140	110	140	77	M8	8	32	10	10690	194400	82.3
DSL 120.150	120	150	77	M8	8	32	10	11670	194500	103
DSL 130.160	130	160	77	M8	8	32	10	12640	194500	126
DSL 140.170	140	170	77	M8	8	32	10	13610	194400	153
DSL 150.180	150	180	77	M8	8	32	10	14580	194400	184
DSL 160.190	160	190	77	M8	8	32	12	18670	233400	221
DSL 170.200	170	200	77	M8	8	32	12	19830	233300	260
DSL 180.210	180	210	77	M8	8	32	12	21000	233300	302
DSL 190.230	190	230	92	M10	10	60	12	27200	286300	678
DSL 200.240	200	240	92	M10	10	60	12	28540	285400	777
DSL 210.250	210	250	92	M10	10	60	12	29960	285300	885
DSL 220.260	220	260	92	M10	10	60	12	31390	285400	1000
DSL 230.270	230	270	92	M10	10	60	12	33000	287000	1130
DSL 240.280	240	280	92	M10	10	60	12	34250	285400	1270
DSL 250.300	250	300	102	M10	10	60	15	46300	370400	2050
DSL 260.310	260	310	102	M10	10	60	15	48000	369200	2280
DSL 270.320	270	320	102	M10	10	60	15	50200	371900	2520
DSL 280.330	280	330	102	M10	10	60	15	52800	377100	2780
DSL 290.340	290	340	102	M10	10	60	15	54200	373800	3060
DSL 300.350	300	350	102	M10	10	60	15	55800	372000	3360

[3] d2 > 80 mm = Concentricity to IT4

All information is supplied without liability and subject to technical changes. Please observe the operating instructions at https://www.spieth-maschinenelemente.de/en/download-faqs/catalogueinstructions/

SPIETH CLAMPING SETS SERIES **DSM**

For motor shafts to DIN 748 with k6/m6 tolerance zone



NEW

Increased Transmissible Torques

Name	Dimensions in mm			Clamping screws				Transmittable forces		Moment of inertia J
	d_1	d_2	L	ISO 4762	h	M_A	No.	M	F_a	
		h5			mm	Nm		Nm	N	kg cm²
DSM 14.2	14	26	26	M3	3	2	4	50	7100	0.055
DSM 16.28	16	28	26	M3	3	2	6	70	8800	0.071
DSM 16.1	16	32	26	M4	4	5	6	100	12500	0.138
DSM 16.2	16	32	36	M4	4	5	6	195	24400	0.178
DSM 18.30	18	30	26	M3	3	2	6	92	10200	0.091
DSM 18.2	18	34	36	M4	4	5	6	224	24900	0.222
DSM 19.32	19	32	26	M3	3	2	6	100	10500	0.118
DSM 19.1	19	35	26	M4	4	5	6	135	14200	0.192
DSM 19.2	19	35	36	M4	4	5	6	243	25600	0.247
DSM 20.32	20	32	26	M3	3	2	6	109	10900	0.115
DSM 20.1	20	40	36	M5	5	10	5	215	21500	0.437
DSM 20.2	20	40	46	M5	5	10	5	386	38600	0.534
DSM 22.35	22	35	26	M3	3	2	6	123	11200	0.162
DSM 22.1	22	42	36	M5	5	10	5	256	23300	0.524
DSM 22.2	22	42	46	M5	5	10	5	445	40500	0.639
DSM 24.36	24	36	26	M3	3	2	6	153	12800	0.174
DSM 24.1	24	44	36	M5	5	10	5	299	24900	0.621
DSM 24.2	24	44	46	M5	5	10	5	505	42100	0.757
DSM 25.37	25	37	26	M3	3	2	6	184	14700	0.191
DSM 25.1	25	45	41	M5	5	10	6	390	31200	0.755
DSM 25.2	25	45	52	M5	5	10	6	622	49800	0.925
DSM 28.40	28	40	26	M3	3	2	6	205	14600	0.251
DSM 28.1	28	48	41	M5	5	10	6	455	32500	0.954
DSM 28.2	28	48	52	M5	5	10	6	724	51700	1.17
DSM 30.42	30	42	26	M3	3	2	6	223	14900	0.297
DSM 30.1	30	52	57	M6	6	17	5	900	60000	1.85
DSM 30.2	30	52	62	M6	6	17	5	950	63300	1.92
DSM 32.48	32	48	36	M4	4	5	6	570	35600	0.754
DSM 32.1	32	55	57	M6	6	17	5	1000	62500	2.29
DSM 32.2	32	55	62	M6	6	17	5	1050	65600	2.37
DSM 35.52	35	52	36	M4	4	5	6	670	38300	1.02
DSM 35.1	35	58	57	M6	6	17	6	1300	74300	2.79
DSM 35.2	35	58	62	M6	6	17	6	1320	75400	2.88
DSM 38.55	38	55	36	M4	4	5	6	750	39500	1.24
DSM 38.1	38	60	57	M6	6	17	6	1480	77900	3.08
DSM 38.2	38	60	62	M6	6	17	6	1510	79500	3.18

Name	Dimensions in mm			Clamping screws				Transmittable forces		Moment of inertia J
	d_1	d_2	L	ISO 4762	h	M_A	No.	M	F_a	
		h5			mm	Nm		Nm	N	kg cm²
DSM 40.56	40	56	36	M4	4	5	6	805	40300	1.29
DSM 40.1	40	70	77	M8	8	40	5	1820	91000	7.8
DSM 40.2	40	70	92	M8	8	40	5	1854	92700	9.08
DSM 42.58	42	58	36	M4	4	5	6	850	40500	1.46
DSM 42.1	42	72	77	M8	8	40	5	1950	92900	8.63
DSM 42.2	42	72	92	M8	8	40	5	2000	95200	10
DSM 45.62	45	62	36	M4	4	5	6	920	40900	1.9
DSM 45.1	45	75	77	M8	8	40	5	2100	93300	10
DSM 45.2	45	75	92	M8	8	40	5	2250	100000	11.6
DSM 48.65	48	65	36	M4	4	5	6	980	40800	2.25
DSM 48.1	48	78	77	M8	8	40	5	2370	98800	11.5
DSM 48.2	48	78	92	M8	8	40	5	2600	108300	13.4
DSM 50.1	50	80	77	M8	8	40	6	2600	104000	12.6
DSM 50.2	50	80	92	M8	8	40	6	2700	108000	14.7
DSM 55.1	55	85	77	M8	8	40	6	3000	109100	15.6
DSM 55.2	55	85	92	M8	8	40	6	3100	112700	18.2
DSM 60.1	60	90	92	M8	8	40	6	3550	118300	22.3
DSM 60.2	60	90	122	M8	8	40	6	3550	118300	34.3
DSM 65.1	65	95	92	M8	8	40	6	4000	123100	26.9
DSM 65.2	65	95	122	M8	8	40	6	4000	123100	41.4
DSM 70.1	70	100	92	M8	8	40	6	4500	128600	30
DSM 70.2	70	100	122	M8	8	40	6	4500	128600	49.4
DSM 75.1	75	105	92	M8	8	40	7	5000	133300	38.1
DSM 75.2	75	105	122	M8	8	40	7	5000	133300	58.7
DSM 80.1	80	110	122	M8	8	40	8	6500	162500	69
DSM 85.1	85	115	122	M8	8	40	8	7150	168200	80

[3] d2 > 80 mm = Concentricity to IT4

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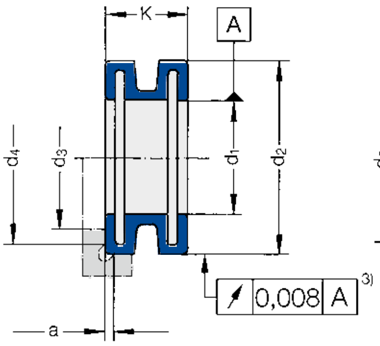
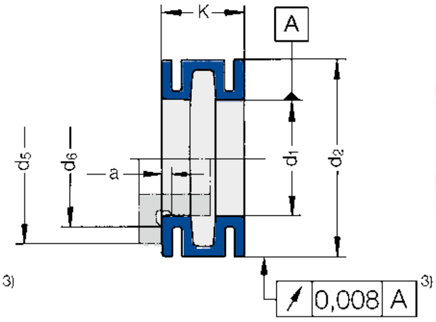
SPIETH CLAMPING SLEEVES SERIES **AK/IK**

For shafts with h tolerance zone



Series AK



Series IK

Designation of a clamping sleeve with initiation of clamping force from the shaft with d_1 = 28 mm, d_2 = 40 mm and K = 16 mm: **IK 28.40**.

Order No.	Dimensions in mm			Initiation of clamping force		Transmittable forces		Dimensions for connecting components in mm				
AK/IK	d_1 H6	d_2 h5	K	F_{max} 1) N	C_{min} 2) mm	M Nm	F_a N	d_3 max.	d_4 min.	d_5 min.	d_6 max.	a max.
8.12	8	12	12	10000	0.3	7	1750	9	10.8	11	9.2	1.5
10.15	10	15	12	11000	0.4	11	2200	11	13.8	14	11.2	1.5
12.18	12	18	12	11800	0.4	18	2950	13	16.8	17	13.2	1.5
14.20	14	20	12	13400	0.5	25	3620	15	18.8	19	15.2	1.5
15.22	15	22	12	13700	0.5	29	3840	16	20.8	21	16.2	1.5
16.22	16	22	12	14900	0.5	35	4320	17	20.8	21	17.2	1.5
18.25	18	25	12	15900	0.6	44	4930	19	23.8	24	19.2	1.5
20.32	20	32	16	20600	0.6	82	8240	24	30	28	22	1.7
22.35	22	35	16	21700	0.6	95	8680	27	33	30	24	1.7
25.37	25	37	16	24500	0.7	128	10290	29	35	33	27	1.7
28.40	28	40	16	26900	0.7	162	11570	32	38	36	30	1.7
30.42	30	42	16	28300	0.7	187	12450	34	40	38	32	1.7
32.48	32	48	21	32400	0.8	259	16200	40	46	40	34	2.2
35.52	35	52	21	34400	0.8	307	17540	43	50	44	37	2.2
40.56	40	56	21	38900	0.8	404	20230	48	54	49	42	2.2
45.68	45	68	26	44700	0.8	553	24590	58	65	55	48	3
50.72	50	72	26	49400	0.8	679	27170	62	69	60	53	3
55.80	55	80	31	59000	1.0	908	33040	70	77	65	58	3
60.85	60	85	31	63300	1.0	1082	36080	75	82	70	63	3
63.88	63	88	31	66000	1.0	1205	38280	78	85	73	66	3
65.90	65	90	31	67700	1.0	1298	39940	80	87	75	68	3
70.100	70	100	38	78800	1.0	1682	48070	88	96	82	74	4
75.105	75	105	38	83400	1.0	1907	50870	93	101	87	79	4
80.110	80	110	38	88100	1.1	2185	54620	98	106	92	84	4
85.115	85	115	38	92700	1.1	2442	57470	103	111	97	89	4
90.120	90	120	38	97200	1.1	2799	62200	108	116	102	94	4
95.125	95	125	38	101800	1.2	3139	66100	113	121	107	99	4
100.130	100	130	38	106500	1.3	3460	69200	118	126	112	104	4
110.140	110	140	38	115700	1.4	4136	75200	128	136	122	114	4
120.150	120	150	38	125000	1.4	4950	82500	138	146	132	124	4
125.155	125	155	38	129600	1.4	5343	85500	143	151	137	129	4
130.160	130	160	38	134300	1.5	5759	88 600	148	156	142	134	4
140.170	140	170	38	143500	1.5	6727	96100	158	166	152	144	4
150.180	150	180	38	152800	1.5	7672	102300	168	176	162	154	4

1) Max. perm. clamping force. For automated operation, the clamping sleeve should be clamped with max. 0.75xF.
2) Design specification, not to be confused with actuation travel. For explanations, see p. 55.
3) d_2 > 80 mm = Concentricity to IT4

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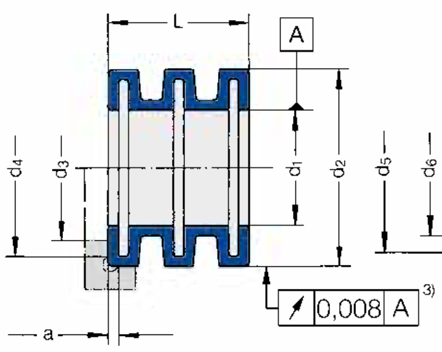
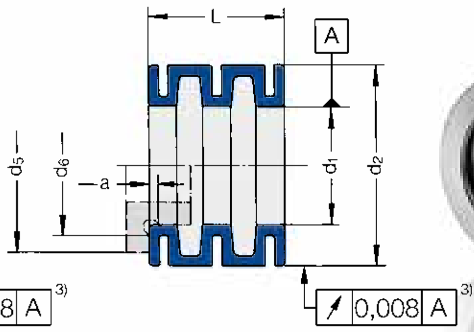
SPIETH CLAMPING SLEEVES SERIES **AL/IL**

For shafts with h tolerance zone



Series AL



Series IL

Designation of a clamping sleeve with initiation of clamping force from the housing with d_1 = 55 mm, d_2 = 80 mm and L = 52 mm: **AL 55.80**.

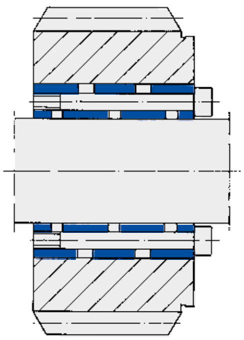
Order No.	Dimensions in mm			Initiation of clamping force		Transmittable forces		Dimensions for connecting components in mm				
AL/IL	d_1	d_2	L	F_{max} [1]	C_{min} [2]	M	F_a	d_3	d_4	d_5	d_6	a
	H6	h5		N	mm	Nm	N	max.	min.	min.	max.	max.
8.12	8	12	19	10000	0.5	12	3000	9	10.8	11	9.2	1.5
10.15	10	15	19	11000	0.6	21	4200	11	13.8	14	11.2	1.5
12.18	12	18	19	11800	0.7	35	5900	13	16.8	17	13.2	1.5
14.20	14	20	19	13400	0.8	49	6970	15	18.8	19	15.2	1.5
15.22	15	22	19	13700	0.8	54	7260	16	20.8	21	16.2	1.5
16.22	16	22	19	14900	0.8	64	8050	17	20.8	21	17.2	1.5
18.25	18	25	19	15900	0.9	80	8900	19	23.8	24	19.2	1.5
20.32	20	32	26	20600	0.9	124	12360	24	30	28	22	1.7
22.35	22	35	26	21700	0.9	143	13020	27	33	30	24	1.7
25.37	25	37	26	24500	1.1	190	15190	29	35	33	27	1.7
28.40	28	40	26	26900	1.1	237	16950	32	38	36	30	1.7
30.42	30	42	26	28300	1.1	272	18110	34	40	38	32	1.7
32.48	32	48	35	32400	1.2	389	24300	40	46	40	34	2.2
35.52	35	52	35	34400	1.2	457	26140	43	50	44	37	2.2
40.56	40	56	35	38900	1.2	599	29950	48	54	49	42	2.2
45.68	45	68	42	44700	1.2	804	35760	58	65	55	48	3
50.72	50	72	42	49400	1.2	988	39520	62	69	60	53	3
55.80	55	80	52	59000	1.5	1314	47790	70	77	65	58	3
60.85	60	85	52	63300	1.5	1557	51910	75	82	70	63	3
63.88	63	88	52	66000	1.5	1725	54780	78	85	73	66	3
65.90	65	90	52	67700	1.5	1848	56870	80	87	75	68	3
70.100	70	100	62	78800	1.5	2372	67770	88	96	82	74	4
75.105	75	105	62	83400	1.5	2690	71720	93	101	87	79	4
80.110	80	110	62	88100	1.6	3065	76650	98	106	92	84	4
85.115	85	115	62	92700	1.6	3427	80650	103	111	97	89	4
90.120	90	120	62	97200	1.6	3802	84500	108	116	102	94	4
95.125	95	125	62	101800	1.8	4251	89500	113	121	107	99	4
100.130	100	130	62	106500	2.0	4685	93700	118	126	112	104	4
110.140	110	140	62	115700	2.1	5599	101800	128	136	122	114	4
120.150	120	150	62	125000	2.1	6672	111200	138	146	132	124	4
125.155	125	155	62	129600	2.1	7206	115300	143	151	137	129	4
130.160	130	160	62	134300	2.2	7767	119500	148	156	142	134	4
140.170	140	170	62	143500	2.2	9037	129100	158	166	152	144	4
150.180	150	180	62	152800	2.2	10314	137520	168	176	162	154	4

[1] Max. perm. clamping force. For automated operation, the clamping sleeve should be clamped with max. 0.75xF.
[2] Design specification, not to be confused with actuation travel. For explanations, see p. 55.
[3] d_2 > 80 mm = Concentricity to IT4

GENERAL APPLICATION

The clamping sleeve may only be actuated when the bore and outside surface of the clamping sleeve are covered by the connecting components. Otherwise the clamping set could be destroyed as a result of plastic deformation.

APPLICATION USING SCREWS



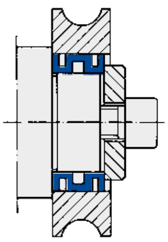
Assembly

1. Clean the clamping set, shaft and hub bore carefully and wet slightly with a low-viscosity machine oil.
2. Join the clamping set and connecting components without applying force.
3. Tighten the clamping screws evenly in diagonal order until the initial assembly play is eliminated. The play elimination phase is particularly important for ensuring good concentricity results.
4. Continue tightening evenly and gradually in diagonal sequence until you have applied full torque.
5. Finally, check the tightening torque all round.

Dismantling

1. Release the clamping screws gradually in diagonal sequence. Never completely unscrew one screw after the other. This would cause the last screw to be subjected to the total spring-back force exerted by the clamping sleeve and consequently to block. An attempt to release it can result in destruction of the hexagonal socket.
2. After releasing the clamp screws, all the components of the connection can be freely moved. After several assembly processes, an unfavourable alteration of the friction ratio between the head and contact surface of the clamping screws can take place. A stick-slip effect can occur during the tightening procedure, which results in jerky movement of the clamping screw. In this case, the contact surface of the screw head must be re-lubricated using a standard machine oil without additives.

APPLICATION WITHOUT SCREWS



Assembly

1. Clean the clamping sleeve, shaft and hub bore carefully and wet slightly with a low-viscosity machine oil.
2. Join the clamping sleeve and connecting components without applying force.
3. Initiate clamping force. The clamping sleeve deforms elastically and creates a friction-locked connection between the shaft and the housing bore.

Dismantling

1. Release the clamping force.
2. The clamping sleeve relaxes and resumes its original shape. All the parts are once again freely movable. Due to the many possible ways of initiating the clamping force, this description can only be formulated in general terms.

DESIGN

The clamping sets are manufactured from spring-hardened steel. The concentricity of the bore/outside diameter is accurate to 0.008 mm and from d_2 > 80 mm, concentricity to IT4.

The outside diameter is machined according to ISO tolerance h5. Depending on the design, the inside diameter is machined to ISO tolerance H6 or, for shaft ends, to DIN 748 (k6/m6).

Two different series (AK/AL and IK/IL) are offered to enable the different types of clamping force initiation. The AK/AL series sleeves are designed for use where the clamping force is initiated from the housing (Fig. 1). IK/IL series clamping sleeves are used in cases where clamping force is initiated from the shaft (Fig. 2).

However, of decisive importance is that the clamping force is applied to the end faces of the clamping sleeves in the area of diameter d_3 and d_4 or d_5 and d_6.

CONNECTING COMPONENTS

The cylindrical bore and outside surfaces of the clamping set must be completely covered by the connecting components. The shaft and bore must be machined cylindrically with a mean peak-to-valley height of Rz=2.5 ... 6.3 µm microns.

To ensure that the stress exerted on the hub or housing bore remains within the elastic range, we recommend the following minimum wall thickness:

Steel C 45	$= 0.6\ (d_2 - d_1)$
Aluminium alloys Minimum strength F 38	$= 1.0\ (d_2 - d_1)$
Grey cast iron GG 25 shrinkage-free casting	$= 1.0\ (d_2 - d_1)$

Hub bore

The following manufacturing tolerance applies for all series:
H7 (H6 for stringent concentricity requirements or a hydraulically operated clamp).

Shaft

Shafts must generally be manufactured to manufacturing tolerance h5 (max. perm. h6). As an exception when the DSM series is used, shafts must be manufactured to DIN 748 for motor shafts (up to dia.50 mm in k6 tolerance field, from dia.55 mm in m6 tolerance field).

Series AK/IK, AL/IL (without screws)

To permit simple configuration of the connecting components, however, projection of the clamping sleeve up to max. a (Fig. 1 and 2) can be tolerated.

Initiation of clamping force

The functional surfaces of the connecting components, which are used to initiate clamping force in the clamping sleeves, must be manufactured with a run-out accuracy of 0.01 mm or to IT4.

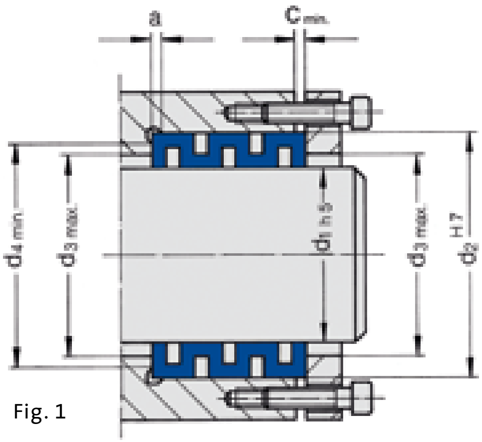


Fig. 1

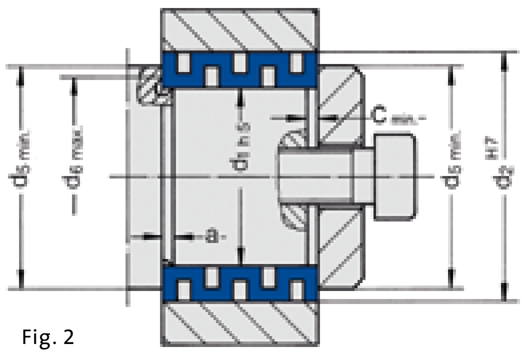


Fig. 2

CLAMPING SCREWS

Cheese-head screws with a hexagon socket ISO 4762 (DIN 912) with strength class 12.9 are used. As the power transmission of the clamping sleeves depends on the exerted clamping force, the clamping screws should be tightened using a torque wrench.

M_A: Tightening torque per clamping screw

TRANSMITTABLE FORCES

DSK/DSL/AK/IK/AL/IL

The specifications provided in the table apply to a bore tolerance of H7 and a shaft tolerance of h5 in the connecting components. For an h6 shaft, in the most unfavourable scenario, a reduction of transmittable forces of approx. 10 % may be expected.

DSM

The specifications provided in the table apply to a bore tolerance of H7 and a shaft tolerance to DIN 748 (k6/m6).

M: Transmittable torque at F_a = 0

The specified values were ascertained in a series of tests, in which the connecting components were made of C45steel, produced with the stipulated surface quality.

The specified performance data are subject to the variation of the friction values of the different contact partners. The components are designed to be reusable, with frequent assembly and disassembly we recommend reducing the tightening torque. Please note that this can also reduce the transmissible torque.

F_a: Transmittable axial force at M = 0

The F_a values are calculated according to

$$F_a = 2000 \cdot \frac{M}{d_1} \text{ [N]}$$

Subjection of the clamped connection to steady, pulsating, alternating or sudden stress has no impact provided that the occurring peak forces do not exceed the catalogue values. The risk of fretting corrosion is always a possibility in friction-locked connections subjected to alternating torsion or rotating bending stress. This phenomenon can complicate dismantling, and can be prevented by complying with the following instructions:

Perm. alternating torsion	$\tilde{T}_{perm.}$	$\leqq$ 0,6 M
Perm. rotating bending stress	$\tilde{M}_{b_{perm.}}$	$\leqq$ 0,3 M

M and F_a:

If both torque and axial forces act on a clamping set at the same time, check using the following formula whether the resulting torque Mr is transmittable.

$$M \geqq M_r = \sqrt{M_e^2 + \left(\frac{F_{ae} \cdot d_1}{2000}\right)^2} \text{ [Nm]}$$

M	=	Transmittable torque (catalogue value) [Nm]
M_e	=	Required torque [Nm]
M_r	=	Resulting torque [Nm]
F_{ae}	=	Required axial force [N]
d_1	=	Shaft diameter [mm]

TRANSMITTABLE FORCES

For series AK/IK, AL/IL only

F: Maximum permissible clamping force
To avoid the danger of fatigue failure and fretting corrosion, the clamping sleeves should be tensioned in case of high clamping/release cycle frequencies to a maximum of 0.75 F.

C: Required functional installation space
Spieth clamping sleeves must be clamped using the controlled application of force. The clamping force cannot be applied in relation to the clamping path. To prevent premature blocking, a "free" functional path "C" must be provided.

Automated operation
In the case of automated operation, for example, using hydraulic actuation, a variety of influencing variables can cause the actual values of the system to deviate from the catalogue values. For this application scenario, we strongly recommend that you verify the force or torque values required. In this application, care must be taken to ensure that the installation is completely free of axial play. To avoid fatigue failure and due to the danger of fretting corrosion, in case of high clamping/release cycle frequencies, the clamping sleeves should be tensioned at a maximum of 0.75xF.

General
If it is not possible to apply the clamping force F, the following formula is used for approximate determination of the torque M_{red} which can be transmitted with the given clamping force $F_{giv.}$ (<F).

$$M_{red} = \frac{M\ (F_{giv.} - 0.05\ F)}{0.95\ F}\ [Nm]$$

To ascertain the necessary clamping force for a transmittable torque $M_{red} < M$ an approximation is possible using the following formula:

$$F_{req.} = \frac{M_{red} \cdot 0.95\ F}{M} + 0.05\ F[N]$$

M = Transmittable torque (catalogue value) [Nm]
M_{red} = Reduced transmittable torque [Nm]
F = Max. perm. clamping force (catalogue value) [N]
F_{ae} = Required axial force [N]
$F_{req.}$ = Required clamping force [N]
$F_{giv.}$ = Given clamping force (<F) [N]

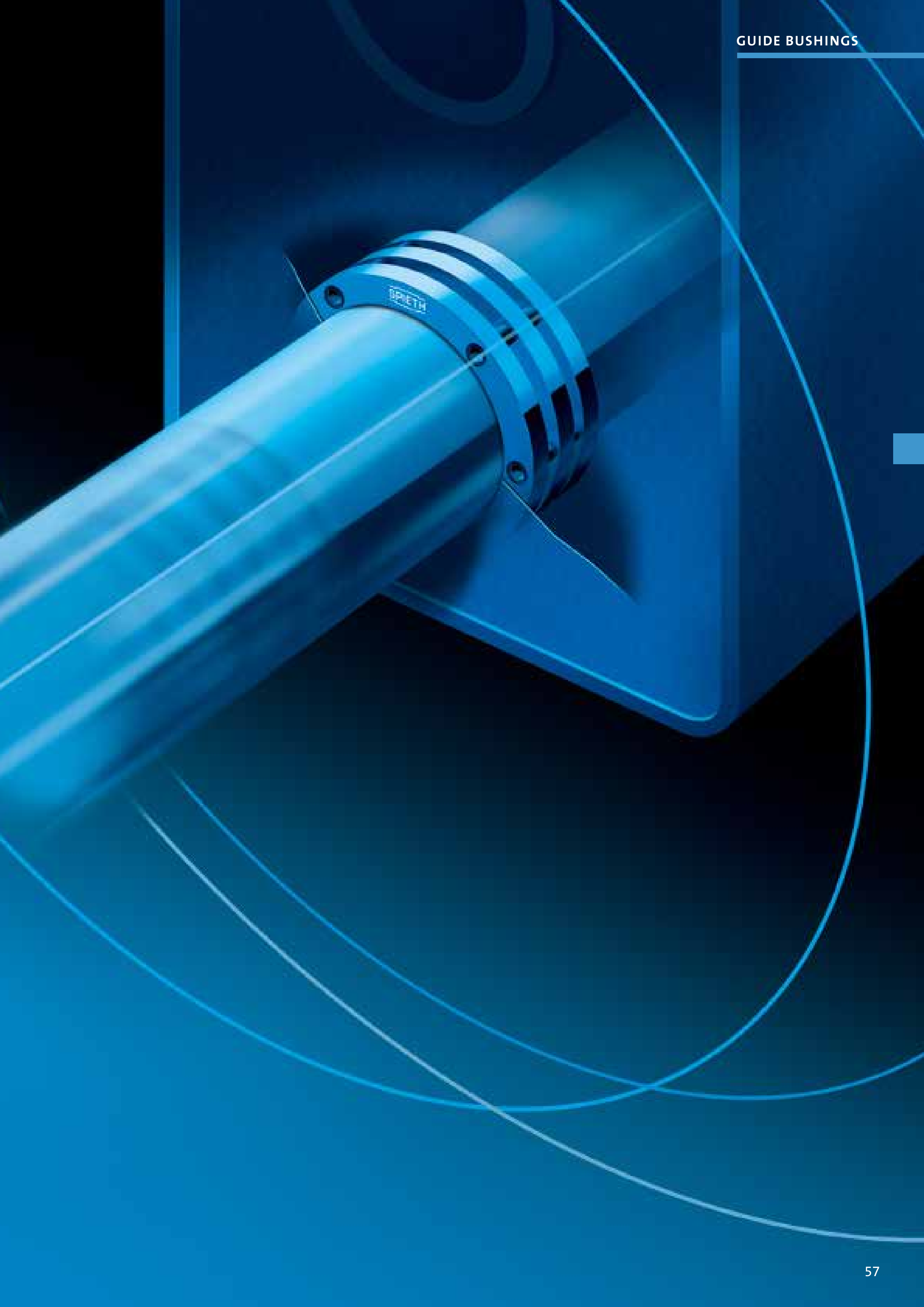
NOTE

During the clamping process, the clamping sleeve reduces in length by some tenths of a mm (depending on the size of the clamping sleeve, the clamping force and the real dimensions of the clamping sleeve and connected components), dragging the clamped part in the direction of clamping. The resulting axial displacement of the clamped part can be up to 0.5 times the clamping path. When positioned against a thrust collar or similar, the axial thrust produces an intensive face contact with the clamped part. AK and IK series clamping sleeves can be supplied in a low-thrust version. However, the retention force of these versions only achieves 0.5 times the values listed in the table.

For clamping sets with integrated clamping screws, this effect is theoretically cancelled as the actuating force is applied symmetrically. Due to the actual dimensions of all components, however, allowance must be made for a slight residual thrust in an undefined direction.

EXACT GUIDANCE –
IT'S ALL A MATTER OF ADJUSTMENT

Spieth guide bushings – round guiding and clamping elements with adjustable play.
Spieth guide bushings open up new dimensions for contemporary, efficient and economical machine designs incorporating high power densities and high levels of dynamic stress. That's because the simple to produce surrounding components can be manufactured to standard ISO tolerance levels. The required fine guidance play can be optimally adjusted during the mounting process. Minor geometrical errors in the surrounding components as well as operational influences such as increasing temperature can be taken into account – and play can easily be re-adjusted later on.


SPIETH

SPIETH **GUIDE BUSHINGS**

BENEFITS

- Low-cost, ready-to-mount guide and clamping bushing.
- Existing mating play ensures simple mounting even with large dimensions.
- Optimum guide play adjustment for any operating status.
- Metallic support between clamped sleeve and housing affords high radial rigidity.
- Provides typical high damping performance characteristics for slideways.
- Precise central play restriction and clamping of the sleeve or column.

Series FSL

Series FSK

Series FDL

Series FDK

FIELDS OF APPLICATION

Spieth guide bushings are round linear guiding elements for use in construction and mechanical engineering. The use of guiding bushes is called for wherever the benefits of slideways, such as high levels of damping combined with minimal guide play are required. As a result, guide bushings are successfully used on guide frames, cylindrical carriage guides, on tailstock sleeves, press rams etc. In addition to linear movement, simultaneous rotary movements are possible. However, due to the constraints imposed by lubrication technology, pure rotation such as that used for sliding bearings is not permitted. High acceleration values are possible, as long as an adequate supply of lubrication is ensured.

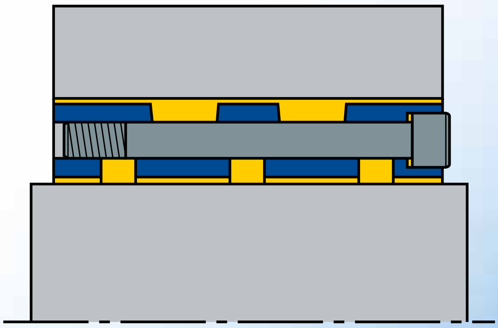
Series FAK/FAL guiding bushes are round linear guiding and clamping elements for precise sleeve or column guidance in applications where the sleeve/column also has to be clamped precisely and centrally in any position. This is required, for example, for sleeves on machine tools in which absolute freedom from play at standstill is called after positioning. The sequence of clamping and release can be repeated as often as required.

Series FAL

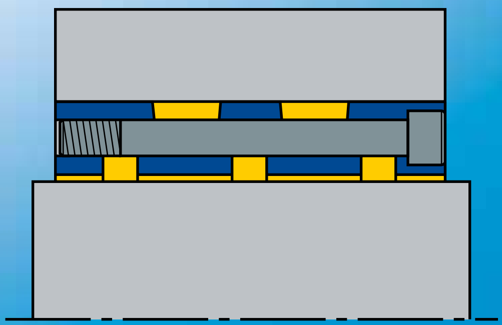
Series FAK

FUNCTIONAL PRINCIPLE

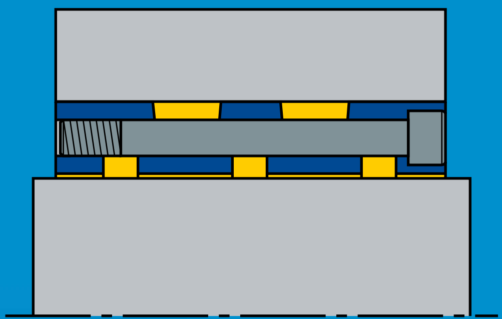
FDK/FDL, FSK/FSL



Connection with assembly play between the housing, guide bushing and centre sleeve.

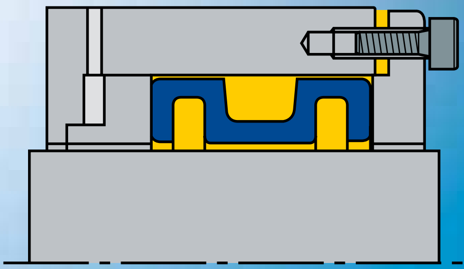


First phase of axial pre-stress: Mating play between housing and guide bushing eliminated, firm fit realized.

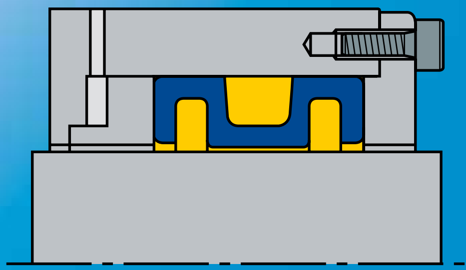


After further axial pre-stressing, the guide play between the guide bushing and sleeve is optimally adjusted.

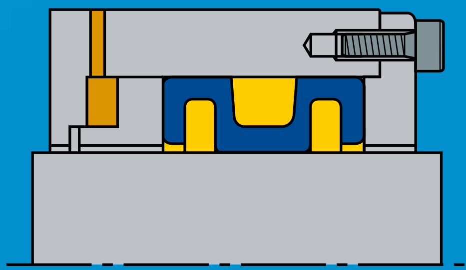
FAK/FAL



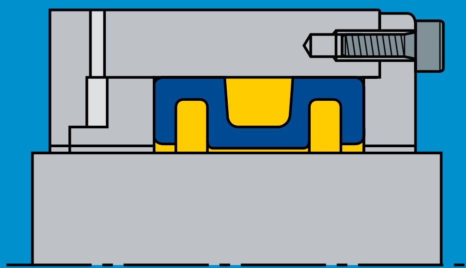
Mounting situation: Connection with assembly play between the housing, guide bushing and centre sleeve.



Guide play adjusted: The guide bushing fits firmly in the housing; guide play between guide bushing and sleeve is optimally adjusted.

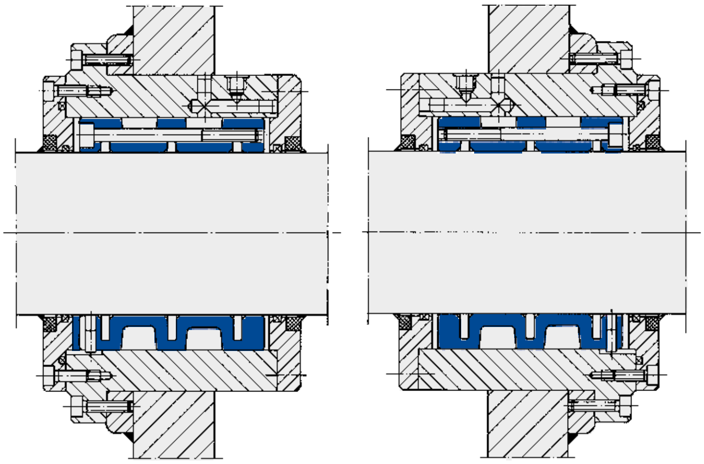


Sleeve clamped: Absolute freedom from play between the sleeve and housing due to tensioned guide bushing.

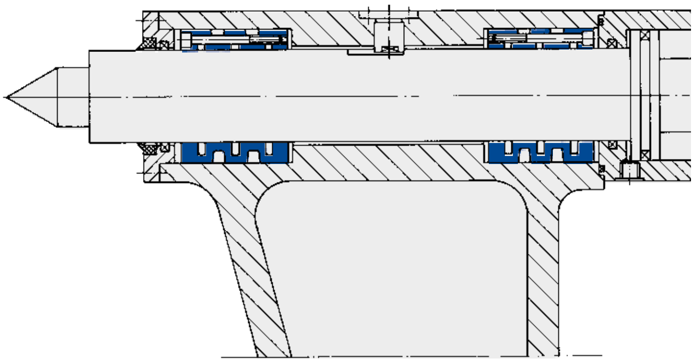


Sleeve released for free movement: The guide bushing has released the sleeve with the previously set degree of guide play.

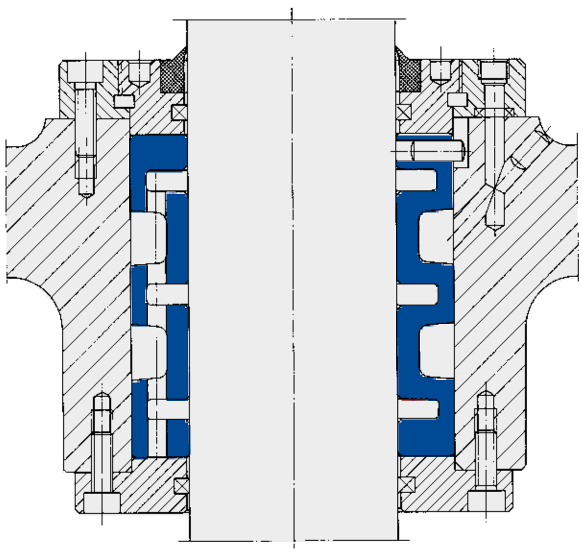
ASSEMBLY EXAMPLES



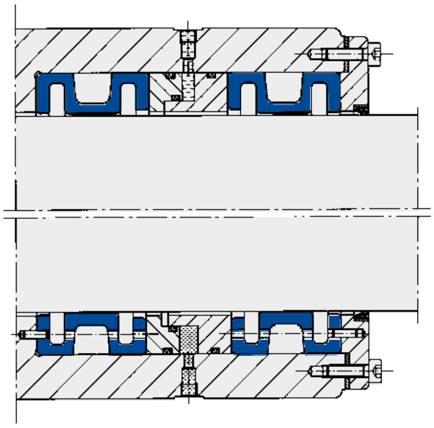
Example 1: Round guide
Due to the long guidance basis of the guide bushings on a welded machine column, particular attention must be paid to ensuring a precisely flush housing borehole.



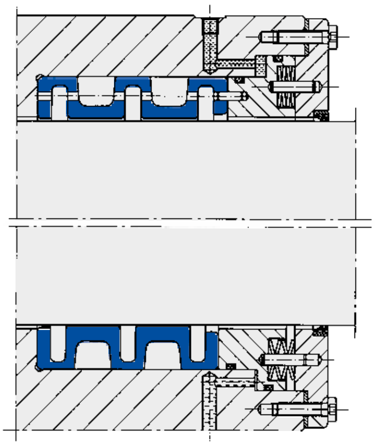
Example 2: Sleeve guide
In a tailstock, minimal guide play can be achieved here during the installation process. Guide play readjustment is possible at any time. Grease lubrication with facility for occasional re-lubrication is sufficient here.



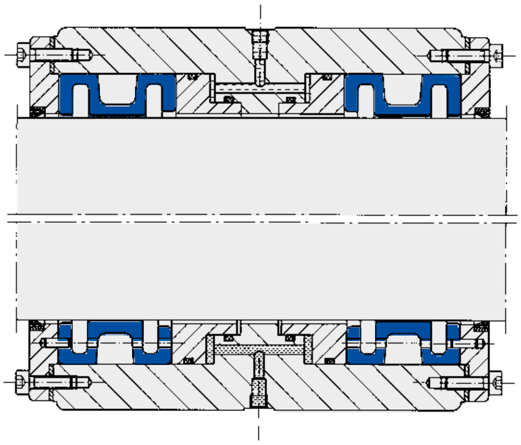
Example 3: Column guide
Guide play adjustment using threaded ring. A locating fit at the threaded ring ensures the necessary rectangular face contact at the guide bushing. The required feed path can be specified when the flange cover has not yet been tightened by turning the threaded ring. The guide bushing is then pre-stressed by tightening the screws at the flange cover.



Example 4: Sleeve guidance and clamping
In this example, the working sleeve of a machine tool is precisely guided by two FAK series guide bushings. In the stationary working position of the sleeve or column, clamping using the spring-hardened guide bushing guarantees absolute freedom from play as well as a high degree of radial rigidity in the guide system.



Example 5: Safety clamping
Safety requirements (power failures, oil pressure drop) or economic considerations (long clamping and short release times) often call for a mechanically acting clamp. In this case, the FAL series guide bushing is clamped using banks of cup springs (lower half of the picture) and hydraulically released (upper half of the picture).



Example 6: Guide play compensation
In the arrangement shown here, an independent guide play setting is possible for each guide bushing. This allows the ever-present minimal influence of the different actual guide bushing dimensions and housing boreholes to be compensated. Where expedient for certain requirements, differing degrees of guide play can be set at the two guide bushings.

SPIETH **GUIDE BUSHINGS: THE RIGHT CHOICE**

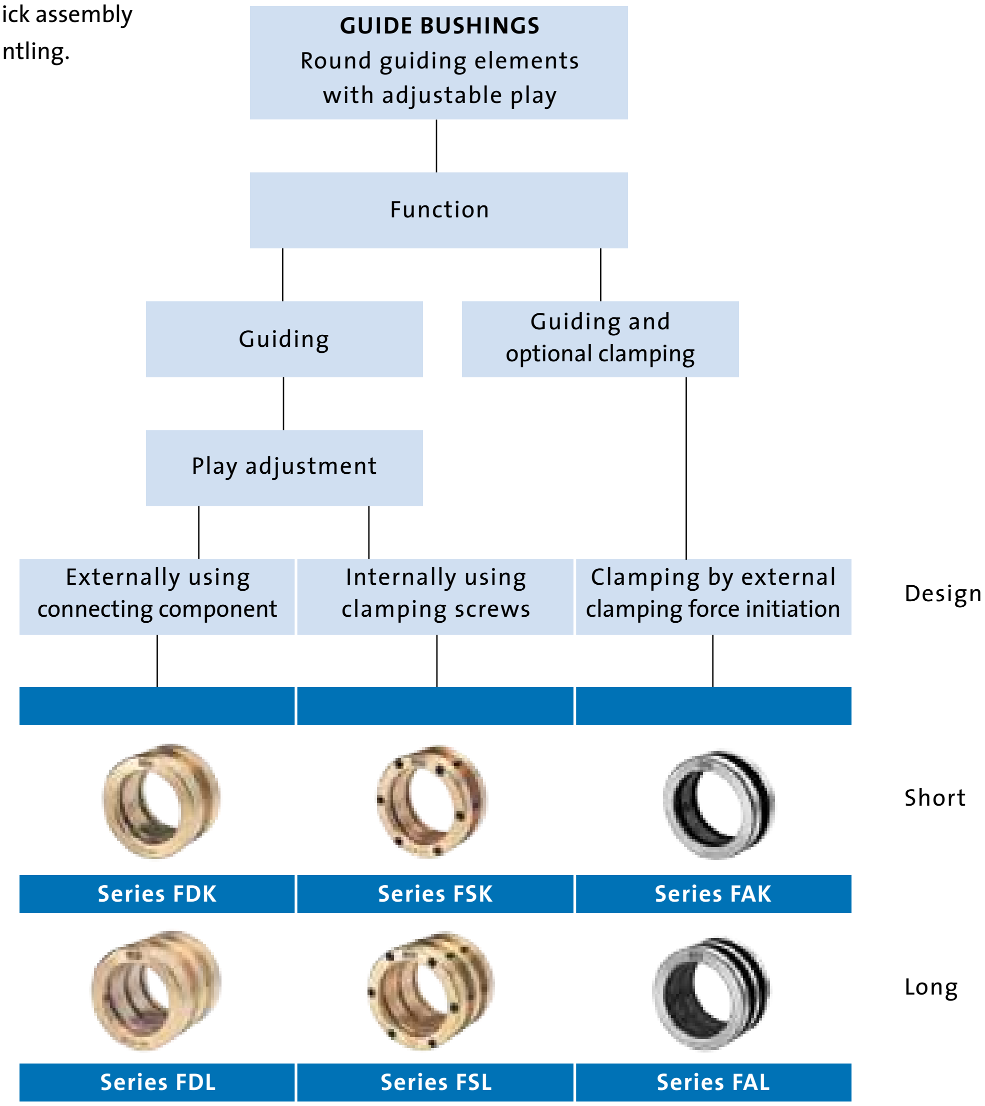
We'll provide you with the perfect guide bushings for your application. We'll also help you choose the right one – with expert advice from our specialists.

Series FDK/FDL and FSK/FSL

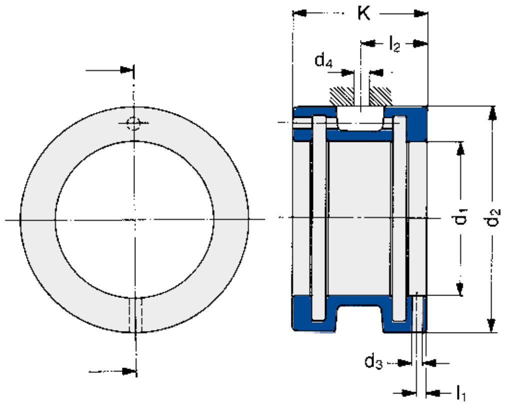
- Precision round guiding elements with adjustable play.
- Low-cost, ready-to-mount.
- Sliding friction in combination with minimum guide play possible.
- Adjustable during installation.
- Connecting components simple to manufacture.
- High degree of damping.
- Simple, quick assembly and dismantling.

Series FAK/FAL

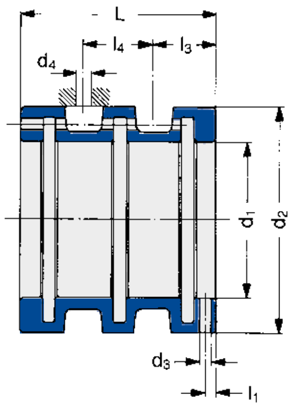
- Round guiding and clamping elements with precisely adjustable play.
- Low-cost, ready-to-mount.
- High degree of radial rigidity.
- High degree of damping.
- Simple, quick assembly and dismantling, even with large dimensions.



SPIETH GUIDE BUSHINGS SERIES **FDK/FDL**



Series FDK



Series FDL

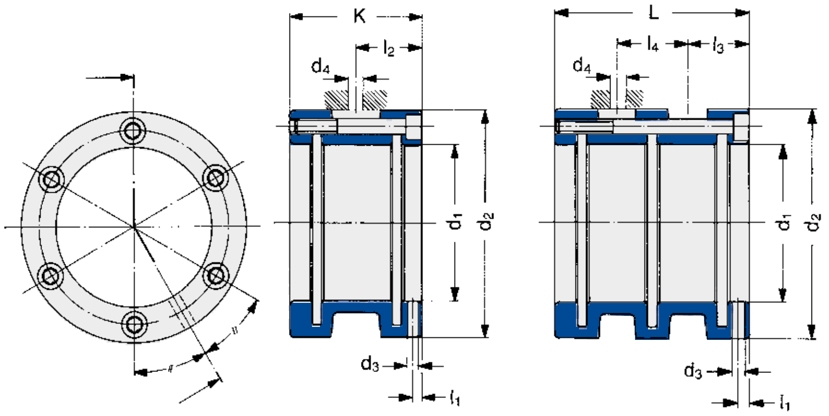
Order No.	Dimensions in mm										Perm. radial stress (Guideline values)	
FDK/FDL	d_1 H6 [1]	d_2 h5	K	L	d_3 H7	l_1	l_2	l_3	l_4	d_4 max.	FDK N	FDL N
20.37	20	37	30	46	3	2.5	15	15	16	6	1800	3600
25.42	25	42	30	46	3	2.5	15	15	16	6	2260	4500
30.47	30	47	30	46	3	2.5	15	15	16	6	2810	5720
35.55	35	55	42	62	4	3.5	21	20	22	10	5290	9070
40.62	40	62	42	62	4	3.5	21	20	22	10	6050	10370
45.68	45	68	42	62	4	3.5	21	20	22	10	6800	11660
50.72	50	72	42	62	4	3.5	21	20	22	10	7560	12960
55.80	55	80	42	68	4	3.5	21	21.5	25	12	8320	16630
60.85	60	85	42	68	4	3.5	21	21.5	25	12	9070	18140
65.90	65	90	42	68	4	3.5	21	21.5	25	12	9830	19660
70.100	70	100	48	78	4	3.5	24	24	30	14	12100	25200
75.105	75	105	48	78	4	3.5	24	24	30	14	12960	27000
80.110	80	110	48	78	4	3.5	24	24	30	14	13820	28800
85.120	85	120	60	92	5	4.5	30	28.5	35	16	20810	36110
90.125	90	125	60	92	5	4.5	30	28.5	35	16	22030	38230
95.130	95	130	60	92	5	4.5	30	28.5	35	16	23260	40360
100.140	100	140	66	102	5	5.5	33	31.5	39	16	25920	47520
110.150	110	150	66	102	5	5.5	33	31.5	39	16	28510	52270
120.165	120	165	72	114	6	6	36	36	42	16	34560	58750
130.180	130	180	78	124	6	6	39	39	46	16	41180	71140
140.190	140	190	78	124	6	6	39	39	46	16	44350	80640
150.200	150	200	78	124	6	6	39	39	46	16	47520	86400

[1] As the guide borehole is machined while the guide bushing is in a preloaded condition, control measurement of the guide bushing is not possible in its delivered, non-loaded state.

All information is supplied without liability and subject to technical changes. Please observe the operating instructions at https://www.spieth-maschinenelemente.de/en/download-faqs/catalogueinstructions/

Designation of a guide bushing with d_1 = 40 mm, d_2 = 62 mm and K = 42 mm: Guide bushing **FDK 40.62**.

SPIETH GUIDE BUSHINGS SERIES **FSK/FSL**



Series FSK

Series FSL

Order No. FSK/FSL	Dimensions in mm: d_1 H6 [1]	d_2 h5	K	L	d_3 H7	l_1	l_2	l_3	l_4	d_4	Clamping screws: ISO 4762	No.	Perm. radial stress (Guideline values) FSK N	FSL N
20.37	20	37	30	46	3	2.5	15	15	16	6	M4	4	1800	3600
25.42	25	42	30	46	3	2.5	15	15	16	6	M4	4	2260	4500
30.47	30	47	30	46	3	2.5	15	15	16	6	M4	6	2810	5720
35.55	35	55	42	62	4	3.5	21	20	22	10	M4	6	5290	9070
40.62	40	62	42	62	4	3.5	21	20	22	10	M4	6	6050	10370
45.68	45	68	42	62	4	3.5	21	20	22	10	M5	6	6800	11660
50.72	50	72	42	62	4	3.5	21	20	22	10	M5	6	7560	12960
55.80	55	80	42	68	4	3.5	21	21.5	25	12	M5	6	8320	16630
60.85	60	85	42	68	4	3.5	21	21.5	25	12	M5	6	9070	18140
65.90	65	90	42	68	4	3.5	21	21.5	25	12	M5	6	9830	19660
70.100	70	100	48	78	4	3.5	24	24	30	14	M5	6	12100	25200
75.105	75	105	48	78	4	3.5	24	24	30	14	M5	6	12960	27000
80.110	80	110	48	78	4	3.5	24	24	30	14	M5	6	13820	28800
85.120	85	120	60	92	5	4.5	30	28.5	35	16	M6	6	20810	36110
90.125	90	125	60	92	5	4.5	30	28.5	35	16	M6	6	22030	38230
95.130	95	130	60	92	5	4.5	30	28.5	35	16	M6	6	23260	40360
100.140	100	140	66	102	5	5.5	33	31.5	39	16	M6	6	25920	47520
110.150	110	150	66	102	5	5.5	33	31.5	39	16	M6	6	28510	52270
120.165	120	165	72	114	6	6	36	36	42	16	M6	8	34560	58750
130.180	130	180	78	124	6	6	39	39	46	16	M8	8	41180	71140
140.190	140	190	78	124	6	6	39	39	46	16	M8	8	44350	80640
150.200	150	200	78	124	6	6	39	39	46	16	M8	8	47520	86400

[1] As the guide borehole is machined while the guide bushing is in a preloaded condition, control measurement of the guide bushing is not possible in its delivered, non-loaded state.

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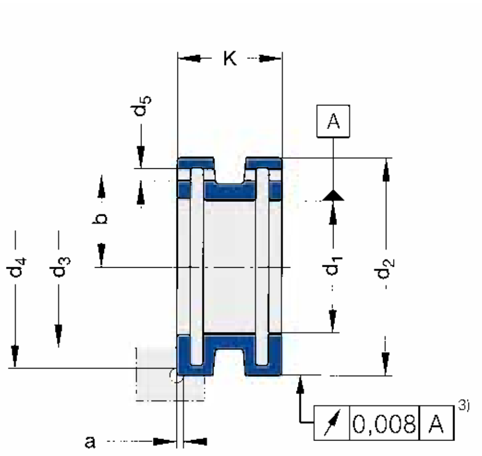
Designation of a guide bushing with integrate clamping screws, d_1 = 60 mm, d_2 = 85 mm and K = 42 mm: Guide bushing **FSK 60.85**.

SPIETH GUIDE BUSHINGS SERIES **FAK**



Order No.	Dimensions in mm					Clamping initiation		Transmittable forces		Dim. connect. comp. in mm		
	d_1	d_2	K	Fixing hole		F_{max}	C_{min} [2]	M	Fa	d_3	d_4	a
	G6	h5		d_5	b	N	mm	Nm	N	max.	min.	max.
FAK 35.52	35	52	21	3.8	22	22900	0.4	100	5710	43	50	2.2
FAK 40.56	40	56	21	3.8	24	25900	0.4	131	6550	48	54	2.2
FAK 45.68	45	68	26	3.8	28	29800	0.4	180	8000	58	65	3
FAK 50.72	50	72	26	3.8	30	32900	0.4	221	8840	62	69	3
FAK 55.80	55	80	31	3.8	33	39300	0.5	295	10730	70	77	3
FAK 60.85	60	85	31	4.8	36	42200	0.5	352	11730	75	82	3
FAK 65.90	65	90	31	4.8	38	45100	0.5	421	12950	80	87	3
FAK 70.100	70	100	38	4.8	42	52500	0.5	546	15600	88	96	4
FAK 75.105	75	105	38	4.8	44	55600	0.5	619	16510	93	101	4
FAK 80.110	80	110	38	4.8	46	58700	0.5	709	17730	98	106	4
FAK 85.115	85	115	38	4.8	50	61800	0.6	793	18660	103	111	4
FAK 90.120	90	120	38	4.8	53	64800	0.6	909	20200	108	116	4
FAK 100.130	100	130	38	5.8	58	71000	0.6	1123	22460	118	126	4
FAK 110.140	110	140	38	5.8	63	77100	0.6	1342	24400	128	136	4
FAK 120.150	120	150	38	5.8	68	83300	0.6	1606	26770	138	146	4
FAK 130.160	130	160	38	5.8	73	89500	0.6	1869	30290	148	156	4
FAK 140.170	140	170	38	5.8	78	95700	0.6	2185	31210	158	166	4
FAK 150.180	150	180	38	5.8	83	101900	0.6	2491	33210	168	176	4

[2] Design specification, not to be confused with actuation travel. For explanations, see p. 71.
[3] d_2 > 80 mm = Concentricity to IT4

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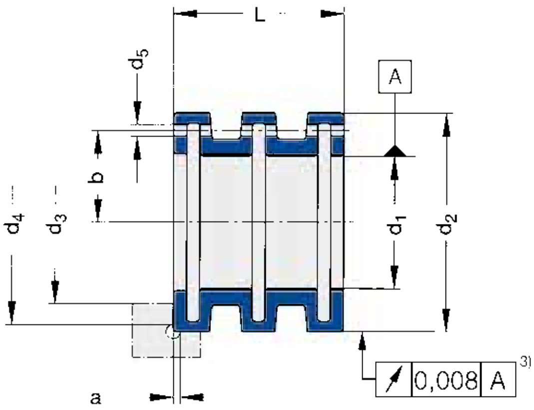
SPIETH GUIDE BUSHINGS SERIES **FAL**



Order No.	Dimensions in mm					Clamping initiation		Transmittable forces		Dim. connect. comp. in mm		
	d_1	d_2	L	Fixing hole		F_{max}	C_{min} [2)]	M	Fa	d_3	d_4	a
	G6	h5		d_5	b	N	mm	Nm	N	max.	min.	max.
FAL 35.52	35	52	35	3.8	22	22900	0.6	149	8510	43	50	2.2
FAL 40.56	40	56	35	3.8	24	25900	0.6	195	9750	48	54	2.2
FAL 45.68	45	68	42	3.8	28	29800	0.6	261	11600	58	65	3
FAL 50.72	50	72	42	3.8	30	32900	0.6	321	12840	62	69	3
FAL 55.80	55	80	52	3.8	33	39300	0.8	427	15530	70	77	3
FAL 60.85	60	85	52	4.8	36	42200	0.8	506	16870	75	82	3
FAL 65.90	65	90	52	4.8	38	45100	0.8	600	18460	80	87	3
FAL 70.100	70	100	62	4.8	42	52500	0.8	770	22000	88	96	4
FAL 75.105	75	105	62	4.8	44	55600	0.8	874	23310	93	101	4
FAL 80.110	80	110	62	4.8	46	58700	0.8	995	24880	98	106	4
FAL 85.115	85	115	62	4.8	50	61800	0.9	1113	26190	103	111	4
FAL 90.120	90	120	62	4.8	53	64800	0.9	1234	27420	108	116	4
FAL 100.130	100	130	62	5.8	58	71000	0.9	1521	30420	118	126	4
FAL 110.140	110	140	62	5.8	63	77100	0.9	1817	33040	128	136	4
FAL 120.150	120	150	62	5.8	68	83300	0.9	2165	36080	138	146	4
FAL 130.160	130	160	62	5.8	73	89500	0.9	2520	38770	148	156	4
FAL 140.170	140	170	62	5.8	78	95700	0.9	2935	41930	158	166	4
FAL 150.180	150	180	62	5.8	83	101900	0.9	3349	44650	168	176	4

[2)] Design specification, not to be confused with actuation travel. For explanations, see p. 71.
[3)] d_2 > 80 mm = Concentricity to IT4

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Application

Before mounting, all parts belonging to the round guide must be carefully cleaned and wet slightly using low viscosity machine oil.

Assembly of series FDK – FDL:

1. Insert the guide bushing in the housing borehole. If an orientation pin is fitted, this must not come to rest axially against the groove in the housing.
2. Mount the flange cover loosely without the shim ring and insert the sleeve.
3. Tighten the clamping screws in the flange cover evenly crosswise until loss of play in the centre sleeve is indicated by stiffer sliding action of the sleeve. Check the parallelism of the mounting gap for the shim ring and correct if necessary.
4. Gauge the mounting gap for the shim ring, remove the flange cover.
5. Adjust the height of the shim ring. Recommendation: measured mounting gap + approx. 0.02 mm for contact surface compression.
6. Mount the flange cover and the underneath shim ring, tighten the screws crosswise.
7. Check the guide play. If necessary, correct by reworking the shim ring (reducing guide play) or the flange cover (increasing guide play). Guideline value: 0.1 mm alteration of the height corresponds to ~ 0.01 mm alteration in diameter.

Assembly of series FSK – FSL:

1. Insert the guide bushing in the housing borehole. If an orientation pin is fitted, this must not come to rest axially against the groove in the housing.
2. Tighten the clamping screws in the flange cover evenly crosswise until the guide bushing is seated firmly in the housing. Even actuation of the clamping screws can be achieved by tightening in each case by a certain angular amount (e.g. 30°). Specifying a certain degree of torque for the clamping screws is a less suitable method of ensuring uniform guide play adjustment.
3. Insert the sleeve and continue tightening the clamping screws – as described above – until the desired loss of play is indicated by stiffer sliding action of the sleeve.
4. Remove the sleeve, apply a thin coating of inking paste and re-insert in the guide bushing to check the contact pattern.
5. Move the sleeve backwards and forwards with an oscillating motion, remove and inspect the ink impression left on the guide bushing.
6. Should the surface impression be incomplete, insert the sleeve again and tighten the screws in the sector, which is not making correct contact. Stop tightening when you notice the sleeve running more stiffly in the bushing.
7. After optimising the contact pattern, clean the sleeve and guide bushing borehole, oil and re-insert the sleeve.

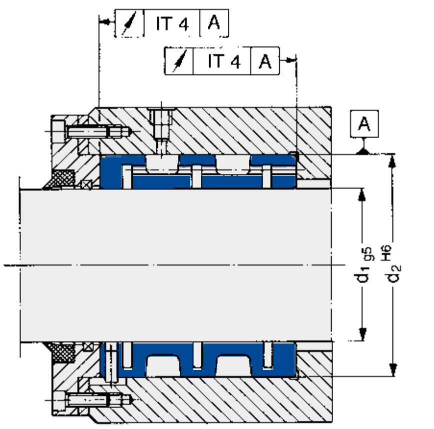


Fig. 1

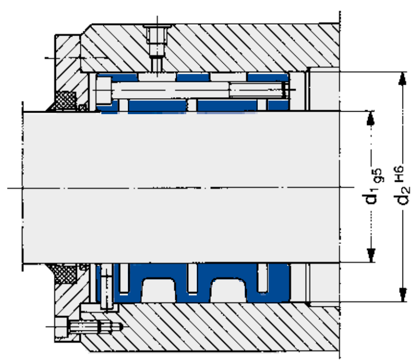


Fig. 2

APPLICATION

Assembly of series FAK – FAL:
The guide bushing may only be clamped if its borehole and outer surfaces are covered by the connecting components. Otherwise the guide bushing could be destroyed as a result of plastic deformation.

1. Insert the guide bushing and ring piston into the housing borehole without exerting force.
2. Mount the flange cover loosely without the shim ring and insert the sleeve.
3. Tighten the clamping screws in the flange cover evenly crosswise until loss of play in the centre sleeve is indicated by stiffer sliding action of the sleeve. Check the parallelism of the mounting gap for the shim ring and correct if necessary.
4. Gauge the mounting gap for the shim ring, remove the flange cover.
5. Adjust the height of the shim ring. Recommendation: Measure mounting gap + approx. 0.02 mm for contact surface compression.
6. Mount the flange cover and the underneath shim ring, tighten the screws crosswise.
7. Check the guide play. If necessary, correct by reworking the shim ring (reducing guide play) or the flange cover (increasing guide play).

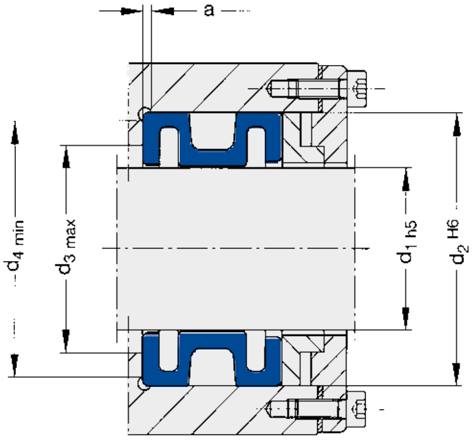


Fig. 3: Mounting assembly showing design of connecting components

Clamping
To obtain complete freedom from play between the sleeve and housing, the guide bushing is hydraulically clamped by the ring piston once it has been adjusted for optimum guide play. For further arrangements with mechanical or hydraulic clamping, see the assembly examples.

NOTE

The length of the guide bushing is reduced during the clamping process by a few tenths of a mm (depending on the size of the guide bushing, the clamping force and the actual dimensions of the connecting components) and in the process, it drags the part to be clamped in the clamping direction. If the guide bushings are arranged in pairs (e.g. Example 4, p. 62) with opposing clamping direction, this thrust effect is theoretically cancelled. However, due to minimal geometrical differences and changing coefficients of friction, even in this case a residual thrust in the range of hundredths of a mm can occur in an undetermined direction. As it is caused by the actual circumstances, this phenomenon is reproducible. FAK series guide bushings can be supplied as a special non-standard low-thrust version on request; but the retention force in this version only reaches 0.5 times that of the table values.

DESIGN

Series FDK/FDL, FSK/FSL

The guide bushings are made of high-grade bearing bronze. The guide borehole is precision turned to ISO tolerance H6, the outside diameter to ISO tolerance h5. As the guide borehole is machined while the guide bushing is in a pre-stressed condition, control measurement of the guide bushing is not possible in its delivered, non-stressed state. The radial borehole for fitting the cylindrical pin is machined to ISO tolerance H7. In the FDK/FDL series, lubricant is distributed to the various chambers by means of an additional borehole. In the FSK/FSL series, the space between the clamping screws and the through holes is used for this purpose. The lubricants used are predominantly mineral oils, whose viscosity is adjusted to the respective operating conditions.

For orientation, the guide bushings are equipped with a hole for a fixing pin (d_3). The necessary supply of lubrication is implemented by means of another borehole (d_4). The design of the housing must be adapted accordingly.

Series FAK/FAL

The guide bushings are manufactured from spring-hardened steel. The borehole has a plastic slide coating. The outside diameter is machined to ISO tolerance h5, the borehole to ISO tolerance G6. The maximum run-out of the borehole – outside diameter – end faces is 0.01 mm.

CLAMPING SCREWS

Clamping screws in series FSK/FSL are cheese-head screws with a hexagon socket ISO 4762 (DIN 912), which are tightened with an ISO 2936 (DIN 911) screwdriver.

CONNECTING COMPONENTS

The connecting components (housing borehole, shaft/sleeve) must be configured in such a way that the entire inside and outside surfaces of the guide bushing are covered at all times.

When series FDK/FDL and FAK/FAL guide bushings are used, all contact end faces of the connecting components, which represent functional surfaces, must be configured precisely at right angles to the axis.

Housing borehole

Manufacturing tolerance H6, concentricity and cylindricity within IT 3, surface roughness Rz max. 6.3 µm.

Sleeve on bronze bushes of series FDK/FDL, FSK/FSL

Manufacturing tolerance of the sleeve: g5, surface roughness R_z = 1µm. The quality of the round guide depends to a large degree on the cylindricity and the concentricity of the sleeve. Therefore, the minimum degree of geometrical error must be aimed for in this case. We recommend adhering to tolerance level IT 2 (ISO).

Shaft in steel bushings of series FAK/FAL

Manufacturing tolerance of the shaft: h5, concentricity and cylindricity within IT 3, surface roughness R_z max. 6.3 µm. We recommend the following experience value for the minimum housing wall thickness:

C 45 = 0.4 (D – d)

GG 25 = 0.7 (D – d)

Series FAK/FAL

In conjunction with the lubrication, the plastic coating of the guide bushings ensures smooth-running, low-wear guidance. However, the good sliding properties of the bushing have a detrimental effect on the transmittable forces. Therefore the table values "transmittable forces" should only be regarded as non-binding guideline values.

F: Maximum permissible clamping force.

C: Required functional installation space

Spieth clamping sleeves must be clamped using the controlled application of force. The clamping force cannot be applied in relation to the clamping path. To prevent premature blocking, a "free" functional path "C" must be provided.

M: Transmittable torque at $F_a = 0$.

F_a: Transmittable axial force at M = 0.

The F_a values are calculated according to

$$F_a = 2000 \cdot \frac{M}{d_1} \text{ [N]}$$

M and F_a: If both torque and axial forces act on a guide bushing at the same time, check using the following formula whether the resulting torque Mr is transmittable:

$$M \geqq M_r = \sqrt{M_e^2 + \left(\frac{F_{ae} \cdot d_1}{2000}\right)^2} \text{ [Nm]}$$

If it is not possible to apply the clamping force F, the following formula is used for the approximate determination of the torque M_{red} which can be transmitted with the given clamping force $F_{giv.}$ (<F).

$$M_{red} = \frac{M\ (F_{giv.} - 0.05\ F)}{0.95\ F} \text{ [Nm]}$$

To ascertain the necessary clamping force for a transmittable torque $M_{red} < M$, an approximation is possible using the following formula:

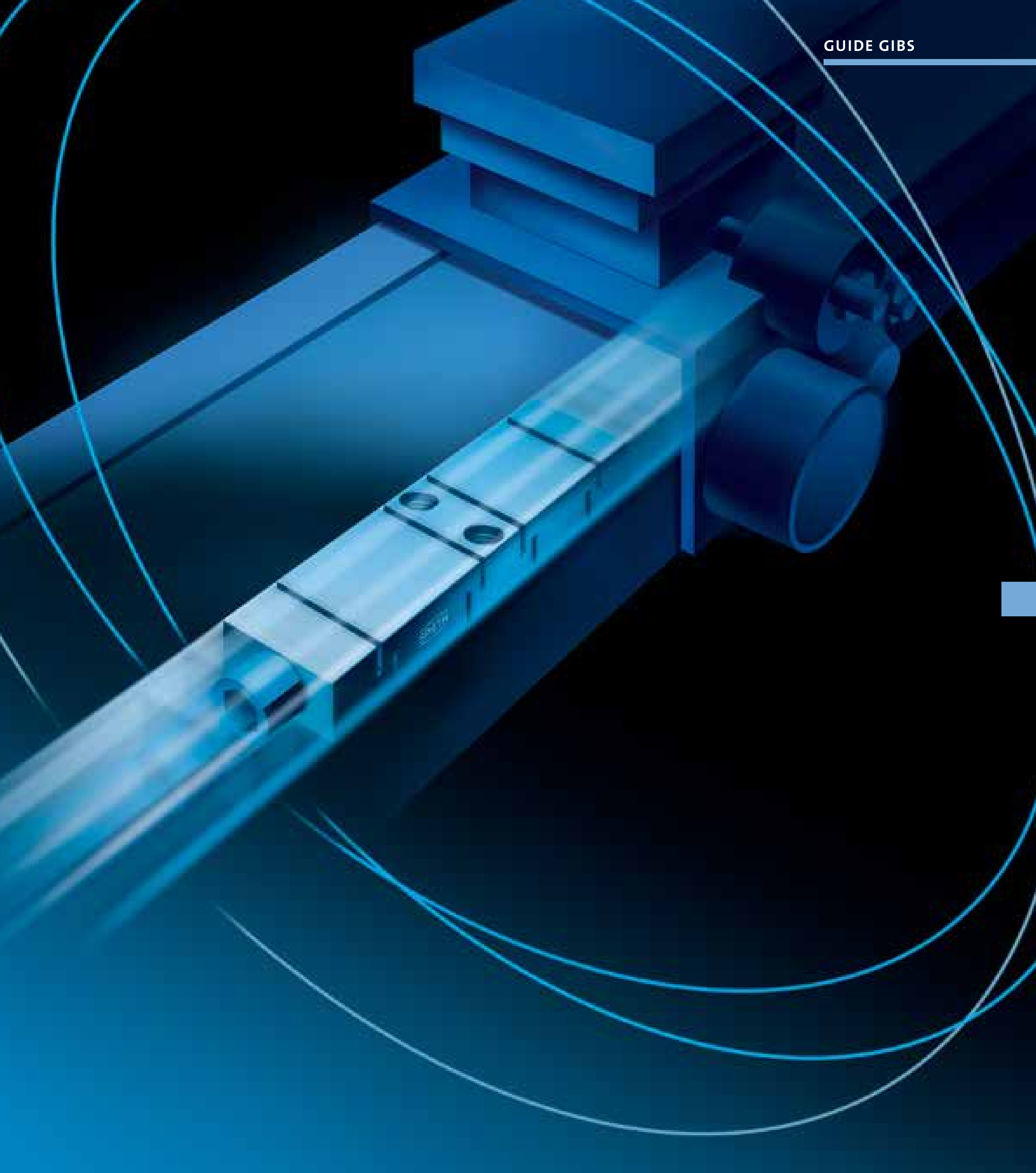
$$F_{req.} = \frac{M_{red} \cdot 0.95\ F}{M} + 0.05\ F[N]$$

M = Transmittable torque (catalogue value) [Nm]
M_e = Required torque [Nm]
M_r = Resulting torque [Nm]
M_{red} = Reduced transmittable torque [Nm]
F = Max. perm. clamping force (catalogue value) [N]
F_{ae} = Required axial force [N]
$F_{req.}$ = Required clamping force [N]
$F_{giv.}$ = Given clamping force (<F) [N]
d_1 = Shaft diameter [mm]

THE REQUIRED GUIDANCE QUALITY: PRECISION

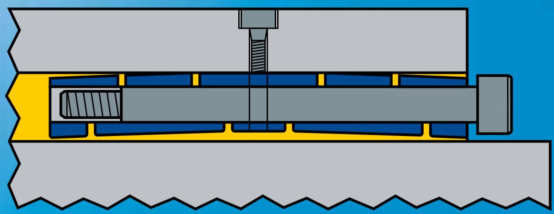
Spieth guide gibs – flat guides with adjustable play.
Wherever precision guides are configured without the occurrence of high forces in the fields of precision construction and mechanical engineering, guide gibs designed by Spieth are there to lend a guiding hand: They outperform the taper and pressure gibs used elsewhere.

That's because the flat linear guiding elements by Spieth combined the benefits of slideways, e.g. high damping, with minimal guide play that can be optimally adjusted during assembly.

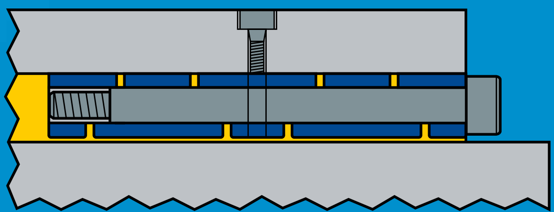


FUNCTIONAL PRINCIPLE

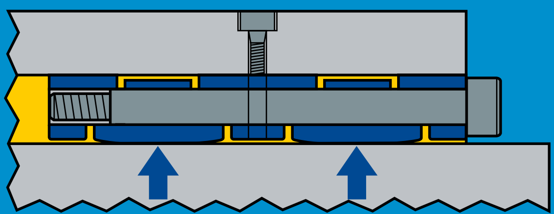
The principle is illustrated in a simplified diagram with enlarged play.



The guide gib is fastened to the machine body with the screws. In this phase, the "flying" ends of the guide gib are still not flush with the machine body.



The first pre-tensioning phase causes the ends of the guide gib to press flat against the machine body.



After further axial tensioning, the movement play between the guide block and the slideway is ideally adjusted.

SPIETH **GUIDE GIBS FLW**

At Spieth, you'll find the perfect guide gibs for your application. And you can rely on the expert advice of our specialists. The enhanced characteristics of the FLW series open up new possibilities for challenging linear guides.

FLW flat guides are ready-to-install machine elements that allow you to realise minimal guide play on your machines without the use of significant manual force. The process of designing and machining the contact surfaces on the surrounding components is straightforward, i.e. they are geometrically rectangular and parallel. Play is adjusted using a simple clamping screw, which is fitted on end face where it is easily accessible. This ensures that guide play can be corrected at any time if necessary.

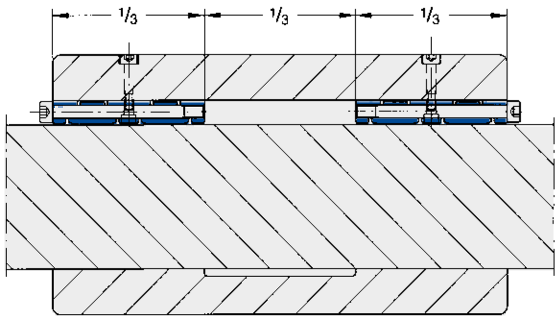
BENEFITS

- Low-cost precision that's ready to install.
- High degree of damping.
- Minimum stick-slip effect.
- Cost-effective installation conditions.
- Guide play can be ideally adjusted and re-adjusted.
- Outstanding tribological characteristics.

FIELDS OF APPLICATION

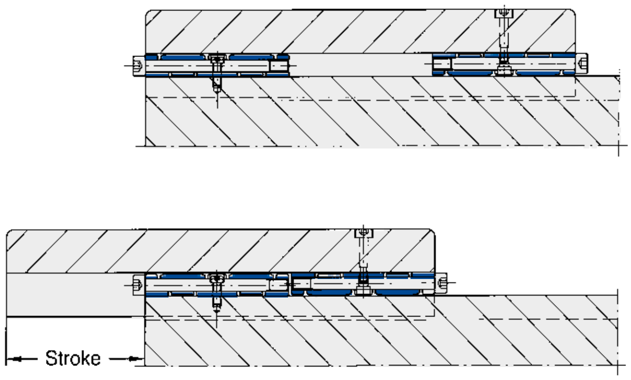
FLW guide gibs are flat linear guiding elements for all areas of precision mechanical and construction engineering. By using guide gibs, you can avoid the expense of producing your own flat guides or taper and pressure gibs and the painstaking process of integrating them into the required guiding area. On-site assembly or modifications are straightforward and adjustments can be made using a central screw. Based on their design, these guide gibs ideally suited for creating precision guides where the occurrence of high force must be avoided.

FLW guide gib, unhardened steel, with a tungsten carbide coating



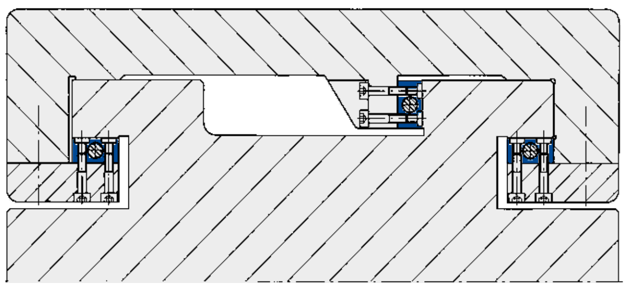
Example 1: Guide block

Standard arrangement of the guide gibs. In the case of a precisely executed guide, no stress occurs in the centre area of the guide block. This zone only exercises any effect when play exists (drawer effect).



Example 2: Guide block with restricted length

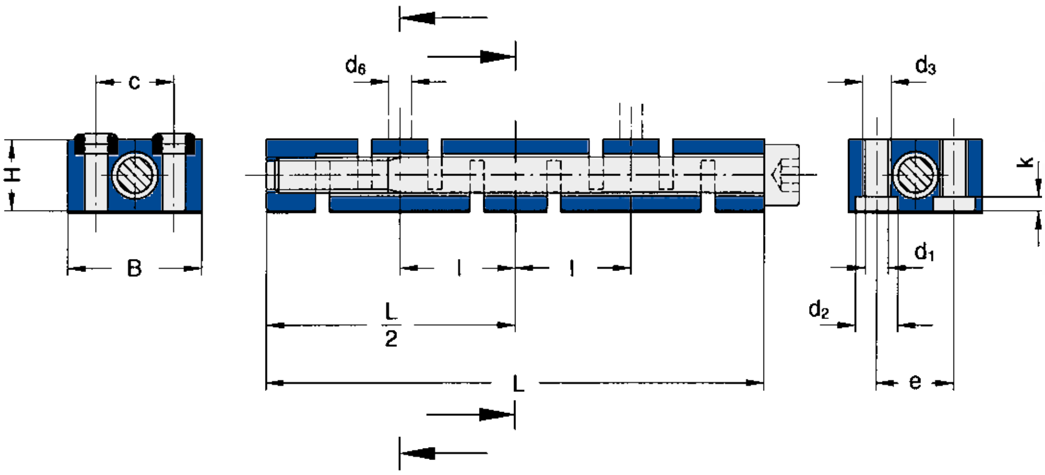
If the length of the slideway is limited, it is possible to achieve an optimum guide basis in any guide block position by arranging one guide gib at the slideway and one guide gib at the guide block.



Example 3: Narrow bed guide

The ratio between the length and width of the guide (guide basis) should be as high as possible. To achieve this, the guide must be configured as a narrow bed guide in special cases.

SPIETH GUIDE GIBS SERIES **FLW**



Order No.	Dimensions in mm								Clamping screws	Perm. load (Guideline values)	Lubricant supply in mm		
	H f6	B h11	L	d_1	d_2	d_3	e	k	ISO 4762	N	d_6	l +/−0.1	c +/−0.1
FLW 6[1)]	6	12	41	2.5	4.8	M 3	6.5	1.7	M3x40	900	-	-	-
FLW 8[1)]	8	14	56	2.5	4.8	M 3	8	1.7	M4x55	1900	-	-	-
FLW 10	10	18	66	3.3	5.9	M 4	10	2.2	M5x65	2800	2.5	15	10
FLW 12	12	20	76	3.3	5.9	M 4	11	2.2	M6x75	3600	2.5	17.5	11
FLW 12/1	12	20	110	3.3	5.9	M 4	11	2.2	M6x110	7000	2.5	26.5	11
FLW 15	15	25	100	4.3	7.4	M 5	15	3	M8x100	6000	2.5	22.2	15
FLW 15/1	15	30	150	6.8	10.4	M 8	18	4.5	M8x150	18000	2.5	34	18
FLW 20	20	35	200	6.8	10.4	M 8	22	4.5	M12x200	28000	3	44	22
FLW 26	26	45	250	8.4	13.5	M10	28	6	M16x250	45000	3	54	28

[1)] FLW 6 and FLW 8 without lubrication boreholes.

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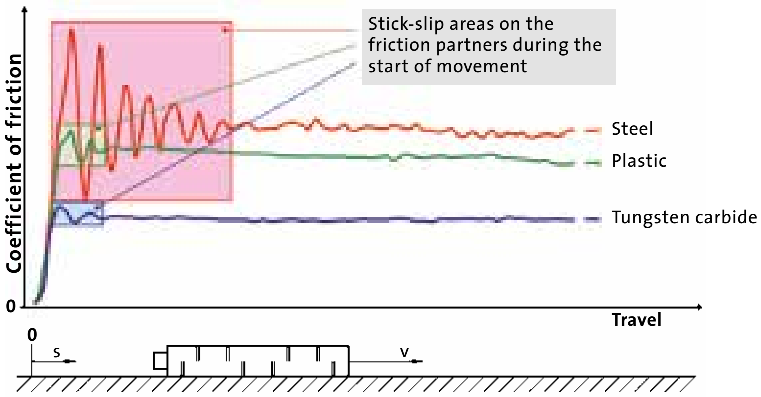
DESIGN

The guide gibs are made of steel (unhardened), ground parallel on all sides and coated with tungsten carbide. The integrated clamping screws are cheese-head screws to ISO 4762 (DIN 912), which are tightened with an ISO 2936 (DIN 911) screwdriver. The boreholes used to fasten the guide gibs are fitted with a thread and a recess for the screw head. This arrangement provides 2 different fixing options. The guide gibs are provided with lubricating boreholes and are characterised by a high level of wear resistance and favourable emergency running characteristics. Depending on the system, transverse grooves are provided to remove dirt.

Sliding properties of tungsten carbide compared

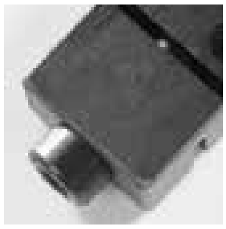


DETAILS

Fastening concept can be selected

Central adjustment of play

Lubrication boreholes incl. sealing rings



Coating for min. friction/wear

CONNECTING COMPONENTS

The mounting space for the guide gib between the slideway and the guide block must be designed to ISO tolerance H8. The recommended surface roughness for the contact surfaces Rz = 6.3 µm, for the sliding surfaces Rz = 2.5 µm. All functional surfaces must be rectangular or parallel.

The lubrication boreholes provided can be used to provide an optimum lubrication supply. Not all 4 boreholes must be used; depending on the mounting location, it is sufficient to supply the uppermost boreholes.

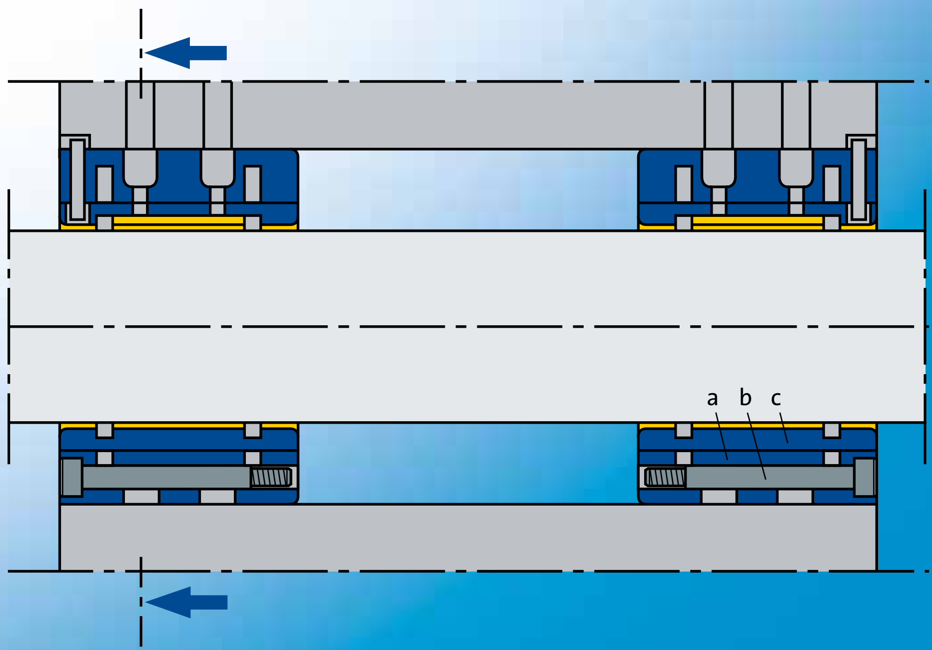
SAFELY SLIDING AND LIFTING

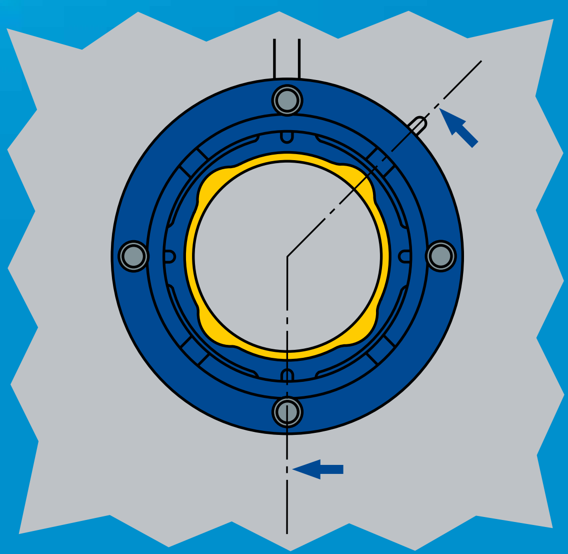
Spieth radial plain bearings – Hydrodynamic multilobe bearings with adjustable play.
When it comes to the implementation of spindle bearings in modern, powerful machines, roller bearings are increasingly being pushed to their limits and are being replaced by sliding bearings. Hydro-dynamically lubricated, adjustable multilobe radial plain bearings manufactured by Spieth play to their strengths in the field of mechanical engineering and in machine tool engineering in particular: They allow heavily loaded spindles to lift away from the bearing surface and float on the lubricant layer. This allows the increasing requirements in terms of surface quality, dimensional accuracy, manufacturing tolerance of the work piece as well as tool service life to be fulfilled. With the high level of damping achieved by the lubricant film along with their concentricity, they combine smooth running with shock resistance and long service life.


SPIETH

LAYOUT

a Meander-shaped profiled steel sleeve
b Clamping screw
c Bearing bush made of high-quality bearing bronze





SPIETH **RADIAL PLAIN BEARINGS**

We'll provide you with the perfect radial plain bearings for your application. We'll also make choosing easy – with expert advice from our specialists.

BENEFITS

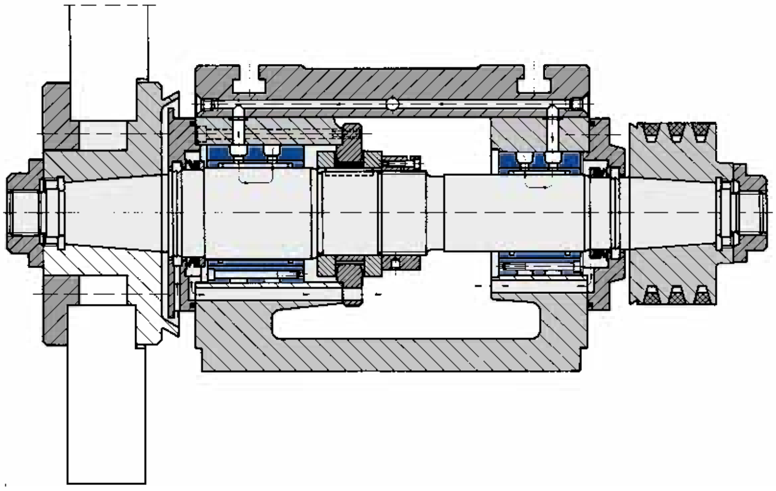
- Simple and precise adjustment of play.
- High degree of damping.
- High level of concentricity.
- Smooth running and shock resistant.
- Excellent emergency running properties.
- Suitable for low and high speeds.
- Independent of running direction.
- Connecting components simple to manufacture.
- Simple, quick assembly and dismantling.

FIELDS OF APPLICATION

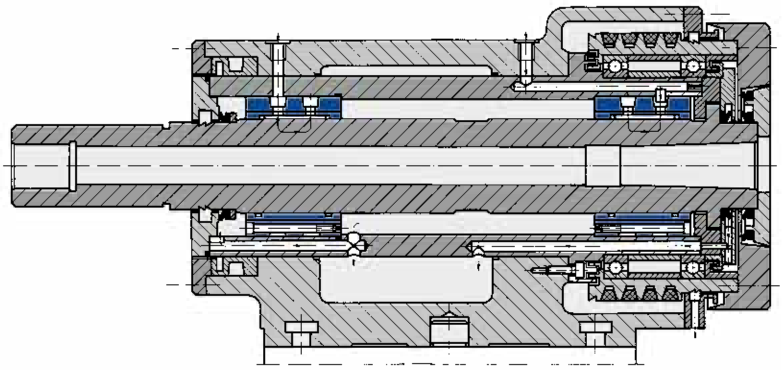
The hydro-dynamically lubricated, adjustable multilobe radial plain bearings are used primarily in the field of mechanical engineering. Thanks to their outstanding damping, concentricity and smooth running characteristics along with their long service life, multilobe slide bearings are an excellent choice for modern powerful machines with their ever-increasing requirements in terms of surface quality, dimensional accuracy and manufacturing tolerances of work pieces. One of the most important areas of application is in cylindrical grinding machines.

GLM hydro-dynamic radial plain bearing

ASSEMBLY EXAMPLES



Example 1: Headstock with open housing
The adjustable GLM radial plain bearings are mounted directly in the bores of the head-stock. The axial guiding is placed between the GLM, adjusted for correct play and tightened with a Spieth-Locknut against the spindle end. V-rings are used for sealing against oil loss.



Example 2: Work piece spindle head with bearing flange sleeve and closed housing
In this stable spindle head design, radial guidance is achieved using two GLM bearings mounted in the bearing flange sleeve.

Axial guidance is provided by a spindle collar, which is located on the working side outside the GLM bearing.

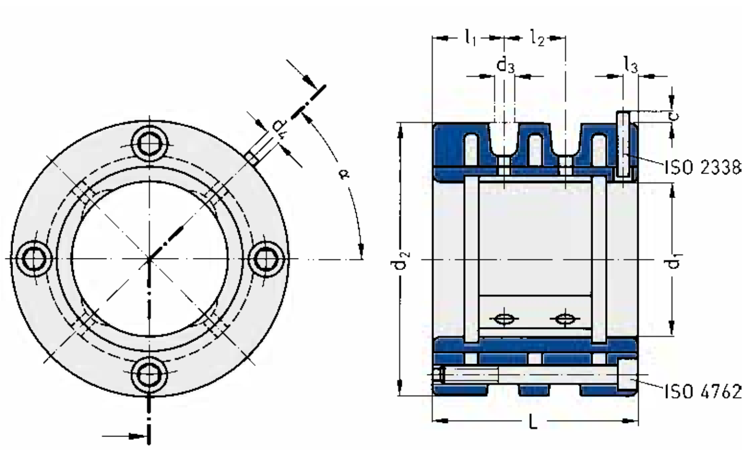
A Spieth clamping set is used to eliminate the assembly play between the housing borehole and bearing flange sleeve on the spindle drive side.

V-rings are provided to prevent oil loss.

NOTE

Detailed documents are available for download at: **www.spieth-me.de**

SPIETH RADIAL PLAIN BEARINGS SERIES **GLM**



Order No.	Dimensions in mm						Cylindrical pin ISO 2338 – m6				Clamping screws	
	d_1 F6	d_2 h5	L	l_1	l_2	d_3 max	d_4 mm	c mm	l_3 mm	α °	Dimensions ISO 4762	No.
GLM 30.55	30	55	40	13.8	12.5	4	2	2	3	45	M4x35	4
GLM 35.60	35	60	40	13.8	12.5	4	2	2	3	45	M4x35	4
GLM 40.65	40	65	45	15	15	6	2	2	3	45	M4x40	4
GLM 45.70	45	70	45	15	15	6	2	2	3	45	M4x40	4
GLM 50.80	50	80	52	17.8	16.5	6	3	2	4	45	M5x45	4
GLM 55.85	55	85	56	18.8	18.5	8	3	2	4	45	M5x50	4
GLM 60.90	60	90	62	20.3	21.5	10	3	2	4	45	M5x55	4
GLM 65.100	65	100	68	23.5	21	10	4	3	6	45	M6x60	4
GLM 70.105	70	105	72	24.5	23	10	4	3	6	45	M6x65	4
GLM 75.110	75	110	78	26	26	15	4	3	6	45	M6x70	4
GLM 80.115	80	115	82	27	28	15	4	3	6	45	M6x75	4
GLM 85.120	85	120	85	27.8	29.5	15	4	3	6	45	M6x75	4
GLM 90.125	90	125	90	29.8	30.5	15	4	3	6	45	M6x80	4
GLM 95.130	95	130	95	31	33	20	4	3	6	45	M6x85	4
GLM 100.135	100	135	100	32.3	35.5	20	4	3	6	45	M6x90	4
GLM 110.160	110	160	110	34.8	40.5	20	4	3	6	45	M8x100	4
GLM 120.170	120	170	120	38.5	43	25	4	3	7	30	M8x110	6
GLM 130.180	130	180	130	41	48	25	4	3	7	30	M8x120	6
GLM 140.190	140	190	140	43.5	53	25	4	3	7	30	M8x130	6

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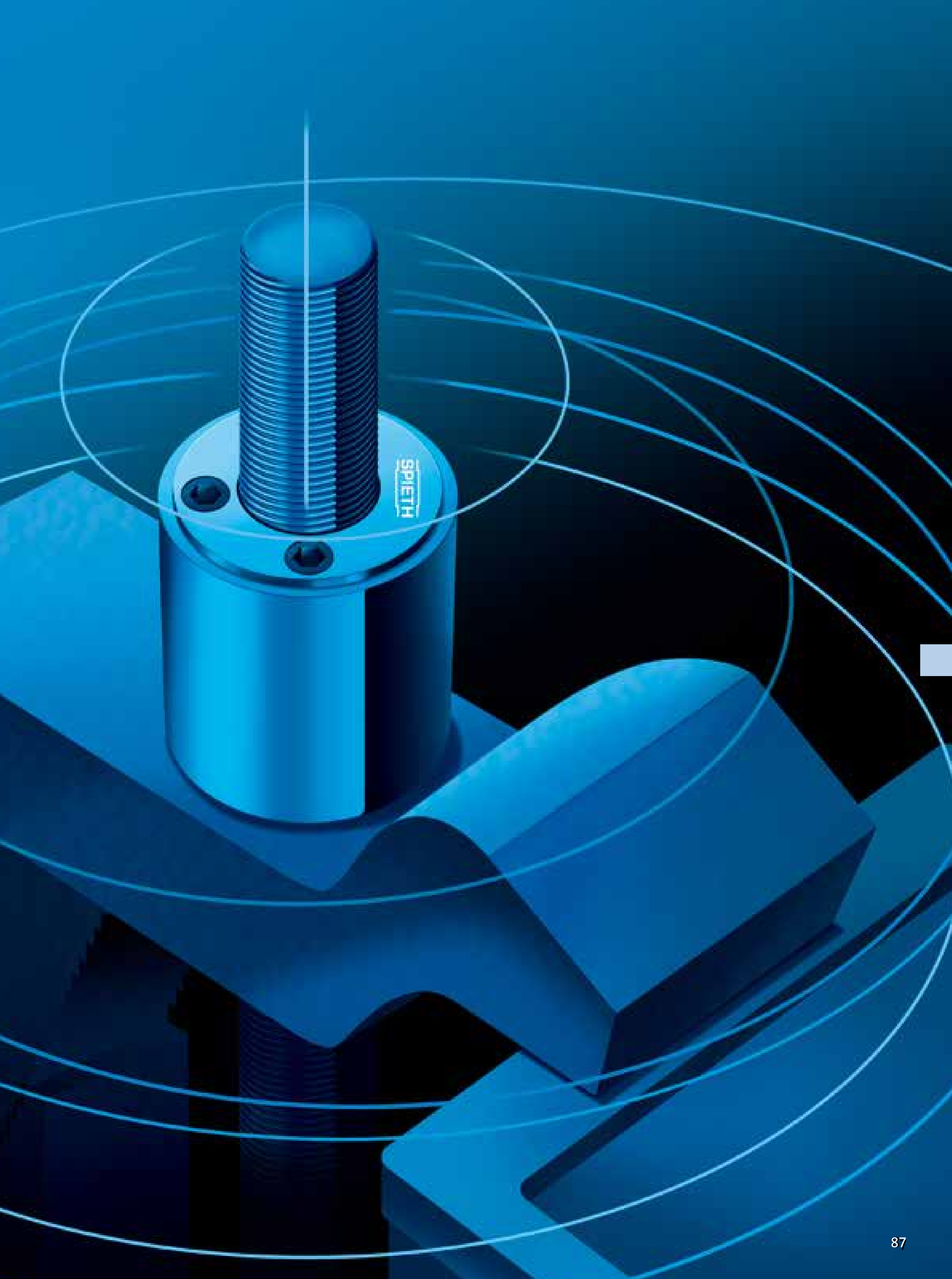
SECURE ALL-ROUND CLAMPING FORCE

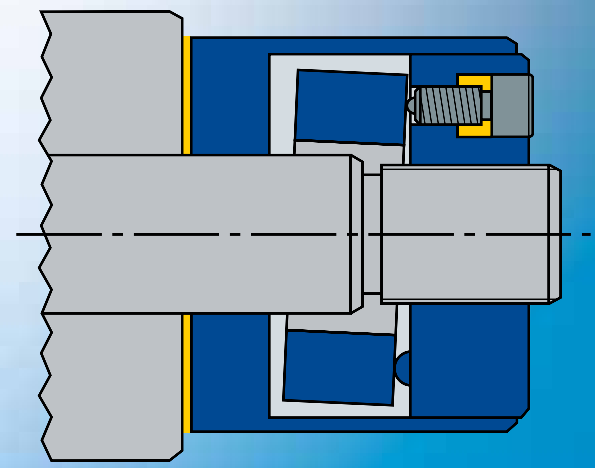
Spieth clamping nuts – an efficient principle.
Clamping nuts are widely used in general mechanical and construction engineering applications as mechanical force-transmitting elements for executing reliable connections involving high axial forces with a low level of manual force. Clamping nuts are suitable for use on rotating spindles and can be clamped and released in rapid succession without difficulty.

Since no movement takes place at the end face and at the main thread of the clamping nut during the clamping process, this precludes the possibility of friction loss. Thanks to the Spieth design, these clamping nuts offer much greater efficiency than conventional nuts – along with an extended service life and resistance to temperature influences.

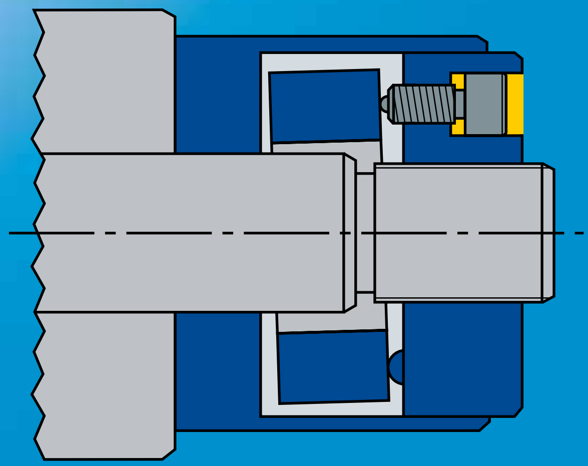

SPIETH

FUNCTIONAL PRINCIPLE

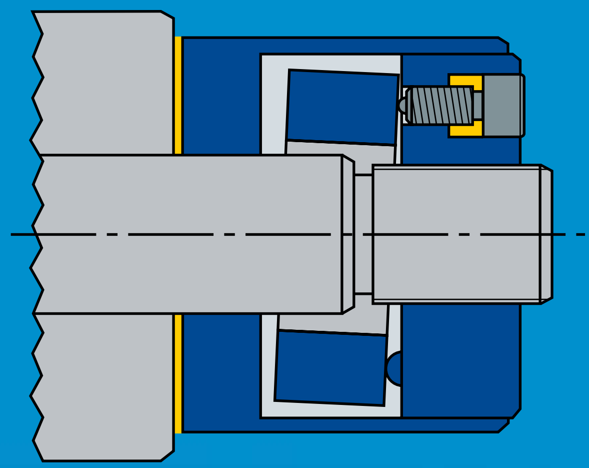
The principle is shown in a simplified diagram with enlarged clamping path.



Clamping nut screwed into place, light contact with end face is sufficient.



Clamping screw actuated: High axial forces have built up at the point of end face contact.



Clamping screw released: Original, light end-face contact is restored.

SPIETH **CLAMPING NUTS AM-GS**

BENEFITS

During the clamping process (tightening the clamping screw), no movement takes place at the end face and at the main thread of the clamping nut. This precludes the possibility of friction loss, thus eliminating the cause of the poor efficiency of conventional nuts. Only the clamping screw with its relatively small movement thread and the ball-bearing supports make some sliding movements. This results in high system efficiency. Combined with the double clamping force ratio, this enables reliable and user-friendly application of the clamping force.

The entirely mechanical structure of the clamping nut guarantees long durability and makes it virtually impervious to the influence of temperature.

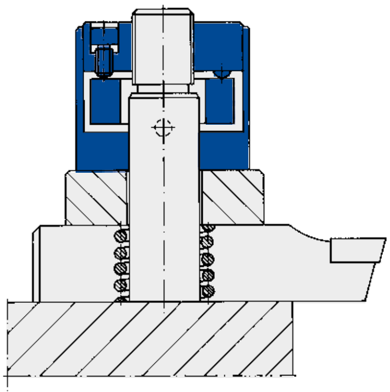
FIELDS OF APPLICATION

Series AM-GS clamping nuts are mechanical force-transmitting elements for use in general mechanical and construction engineering. They are of particular benefit for the execution of reliable connections involving high axial forces with a low level of manual force. They are designed to permit clamping and release in quick succession without difficulty. The clamping nut is suitable for use on rotating spindles.

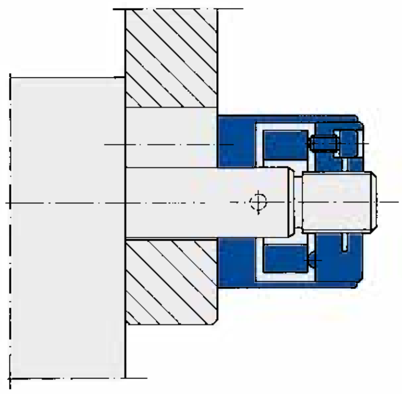
Series AM-GS

- High degree of efficiency, minimal tightening torque.
- Simple actuation.
- Can be used on rotating spindles.
- Capable of withstanding dynamic loads.
- High degree of axial pretension safely achievable.
- Designed with purely mechanical components.
- No hydraulics used, which means no leaks or sudden failures are possible.
- Excellent durability.

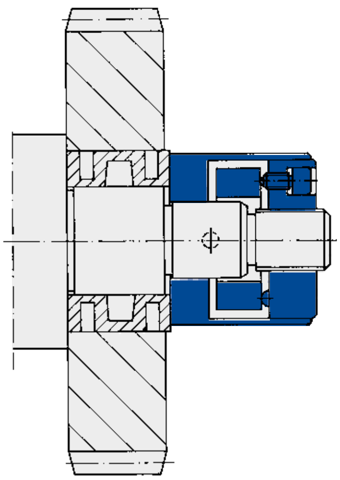
Clamping Nuts Series AM-GS



Example 1: Tool fixture
Typical arrangement of the clamping nut on a tool fixture.

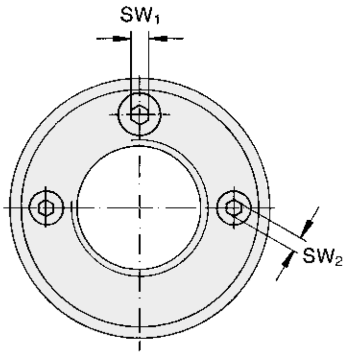


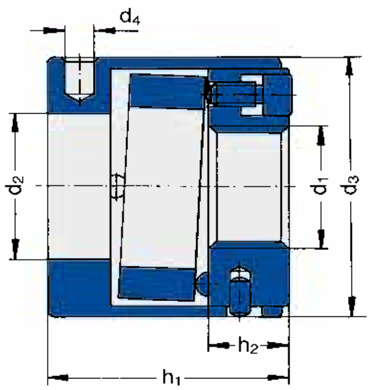
Example 2: Work piece fixture
The machine component must be reliably clamped here during the operational status, but must permit traversing for periodic set-up work. The clamping nut with thread fixation used here offers the advantage that its position remains fixed even when the nut is released.



Example 3: Gear fixture
Realised using a clamping set, tensioned by a clamping nut. The gear has to be changed or its peripheral position altered periodically. This can be conveniently and safely achieved using the clamping nut.

SPIETH CLAMPING NUTS SERIES **AM-GS**





Order No.	Dimensions in mm						Effective clamping force	Clamping screw		Lock screws	
	d_1	d_2	d_3	d_4	h_1	h_2	F	Width across flats SW_1	M_A	Width across flats SW_2	M_S
	ISO - 5H	H7					kN	mm	Nm	mm	Nm
AM 20.1,5 - GS	M20x1.5	22	52	6.9	56	26	30	6	20	5	8
AM 24.1,5 - GS	M24x1.5	27	55	6.9	56	26	30	6	20	5	8
AM 30.1,5 - GS	M30x1.5	32	69	9.2	78	31	50	8	35	6	15
AM 36.2 - GS	M36x2	40	78	9.2	82	31	50	8	35	6	15
AM 42.2 - GS	M42x2	50	88	11.5	88	36	75	10	55	6	15
AM 52.2 - GS	M52x2	60	100	11.5	92	36	75	10	55	6	15
AM 60.3 - GS	M60x3	70	118	14	102	40	85	12	70	8	20
AM 68.3 - GS	M68x3	80	130	16.2	112	46	100	14	80	10	30
AM 80.4 - GS	M80x4	100	152	16.2	122	46	100	14	80	10	30

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Ensure that the clamping screw is in the correct starting position. Under no circumstances may the clamping screw be screwed in below the surface of the housing before the clamping sequence begins. Otherwise it is not possible to utilise the full clamping path of 2 mm.

Clamping

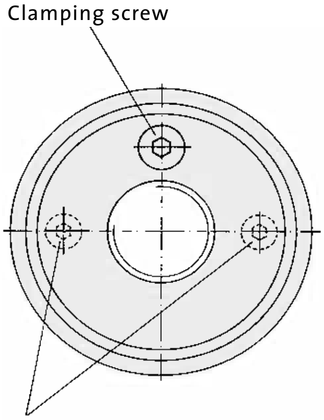
1. Screw the clamping nut manually until it makes contact with the end face (Fig. 1), Tighten the fixing screws and lock the clamping nut to the thread.
2. Tighten the clamping screw, observing the max. tightening torque. If a torque wrench is not available, the clamping screw may also be tightened using a screwdriver ISO 2936 (DIN 911) using normal manual force. If the clamping screw is tightened without a torque wrench, there is a tendency for the clamping force of the clamping nuts larger than M42 not to be fully utilised.

The clamping force of the nut is now fully effective. (Fig. 2)

Releasing

1. Turn the clamping screw back to the starting position. The clamped component is now released.
2. If the clamping nut is to be completely removed from the spindle, the thread lock screws must now be released. Then unscrew the clamping nut manually.

In exceptional circumstances, for example due to heavy soiling, it may be difficult to unscrew the clamping nut. In this case, utilize the radial boreholes around the outside diameter to insert a guide pin.



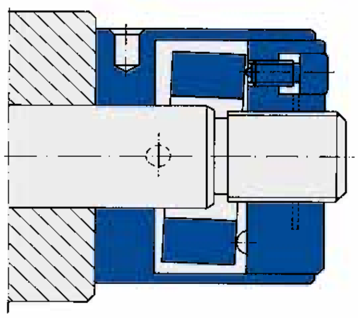


Fig. 1

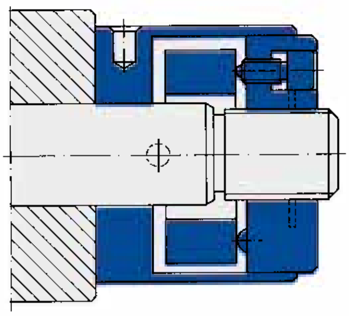


Fig. 2

DESIGN

All parts are made of steel. The thread ring, the tilting ring and the pressure ring are hardened and tempered.

The outside diameter, the borehole and the end face of the clamping nut are ground.

The modified clamping screw and the fixing screws are all cheese-head screws with a hexagon socket to ISO 4762 (DIN 912).

The metric thread d_1 is manufactured to tolerance class "fine" (tolerance zone 5H, DIN 13 parts 21 ... 25).

The locating bore d_2 of the pressure ring is manufactured to tolerance zone H7.

CONNECTING COMPONENTS

The metric bolt thread must normally be manufactured to tolerance class "medium" (tolerance zone 6g, DIN 13 parts 21 ... 25), for higher precision requirements (e.g. for arrangement on revolving spindles) to tolerance class "fine" (tolerance zone 4h, DIN 13 parts 21 ... 25).

If high accuracy of centring the clamping nut is required, the shank diameter for d_2 must be manufactured to tolerance zone h6.

EXPLANATIONS

For all clamping nuts, the maximum **clamping path of 2 mm** must be observed.

F: Max. effective clamping force with specified M_A.

M_A: Max. permissible torque for clamping screw.

If a torque wrench is not available, the clamping screw may also be tightened using a screwdriver ISO 2936 (DIN 911) using normal manual force. In this case, however, there is a tendency for the clamping nuts in sizes ≥ AM 42x2 not to be fully utilised.

M_S: Tightening torque for fixing the thread (guideline value).

OUR SERVICE: THERE BY DESIGN, WHEREVER YOU NEED IT

Our concept of precision also means that we are there wherever you need us – to provide the optimum service for all your requirements. Since time is money, Spieth guarantees prompt service, a high level of delivery availability backed up by technical expertise on the ground.

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Use our expertise to expand your catalogue of design solutions. Our dedicated sales engineers will be only too delighted to draw on their up-to-date product and industry knowledge in advising you on all aspects of efficient and economical mechanical components. Just give us a call.

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