

COIL SPRING

Production of the Coil spring to wire diameter 65 mm

Types of coil spring are:

* Compression coil springs, designed to resist being compressed. A typical use for compression coil springs is in spring support, safety valve and control valve.

* Extension coil springs, designed to resist stretching. They usually have a hook or eye form at each end for attachment.

* Torsion springs, designed to resist twisting actions.



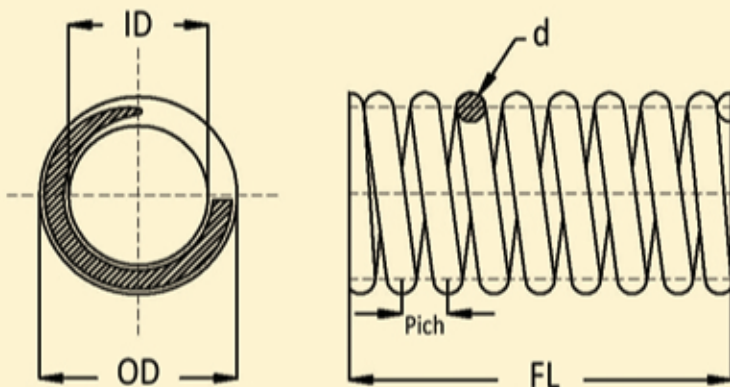
■ Compression coil spring



■ Extension coil spring



■ Torsion coil spring



■ Compression coil spring map



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شرکت صنعتی و تولیدی
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RIGID STRUTS

Tasks

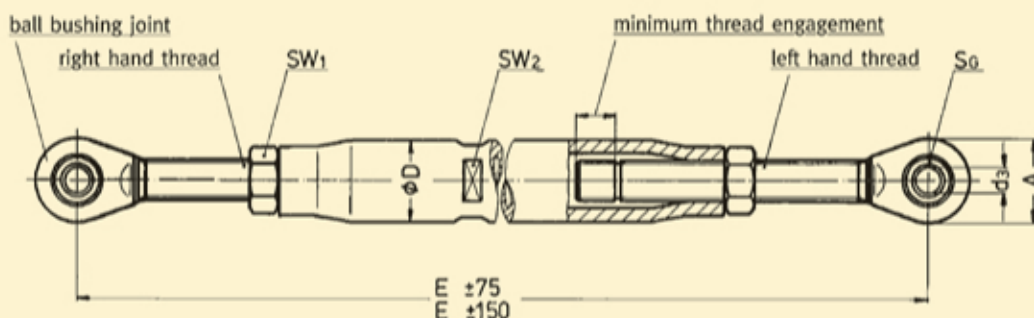
HACO. rigid struts type 39 have a number of important functions for the operational safety of piping systems:

- * Absorption of shocks from unexpected load events.
- * Guidance of pipe systems to control direction of calculated thermal displacement direction.
- * Stabilization of flexible pipe systems by fixing the so-called "zero" positions.
- * Design of axial stops ("movable" fixed points).

Mode of operation

Rigid struts form rigid connections with ball bushings between the piping and structure. No restriction is placed on the limited movement of the pipe within the angular displacement of the strut. Any movement in the axial direction of the strut is suppressed

In modern support concepts, rigid struts play an important role in the optimum support system under all operating conditions. Secure and reliable positioning is a key element in its operational safety and long life.



Assembly

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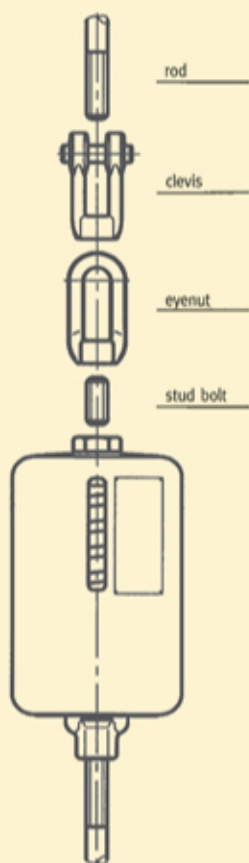
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SPRING HANGERS, SPRING SUPPORTS

To prevent constraints in the system, thermal expansion in the piping and other piping components must not be hindered. The piping must therefore be supported in a correspondingly elastic manner.

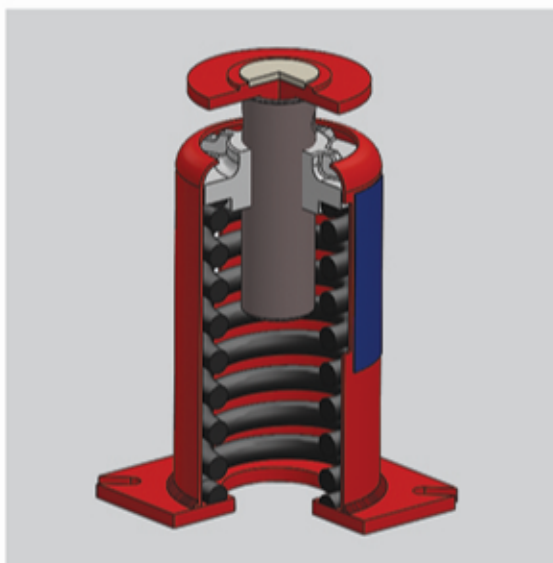


Serial connection types

Spring elements

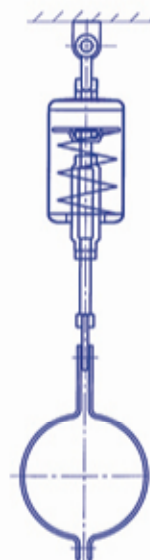
To compensate for slight vertical displacements in the piping, spring components are used as supports. The functioning of these components is based on preset helical coil springs which exert a variable supporting load over the whole range of movement corresponding to the given spring characteristics.

Load variations resulting from this are limited through corresponding specifications based on stress calculations for the piping - this depends on the sensitivity of the system.

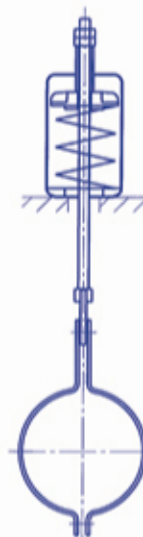


HACO. spring hangers

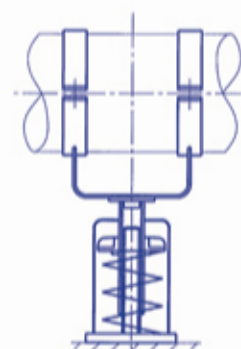
Various versions of spring elements, ideally suited to whatever structural requirements exist, are available. The optimum choice depends on the installation situation.



Spring hanger



Spring hanger



Spring support

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SPRING HANGERS, SPRING SUPPORTS



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Load setting and blocking

Spring hangers and supports are preset at the works to the installation load and blocked in both directions of movement. Blocking is necessary to take up additional loads during pickling, flushing, or hydrostatic tests. The factory settings are carried out on electronically controlled test benches:

- * with spring hangers, values set at the factory are stamped onto a riveted name plate.
- * the installation position is marked on the travel scale.
- * cold and hot settings are marked on the travel scale with a white and red sticker respectively.
- * the blocking device can be blocked in any position. The blocking pieces can be reinserted in any required position.

Generally, the max. permissible load deviation amounts to 25% of the operating load.

Above and beyond that, constant hangers exerting a **constant supporting** load over the whole travel range are to be used.

Design related advantages

- * no welding (Hanger Types)
- * fully galvanized surfaces
- * specially prerelaxed springs
- * integrated tightening devices
- * adjustable blocking system
- * variable connection possibilities
- * Suitability test



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CONSTANT HANGERS, CONSTANT SUPPORTS

To avoid detrimental constraints in the system, thermal expansion in piping and other plant components must not be prevented.

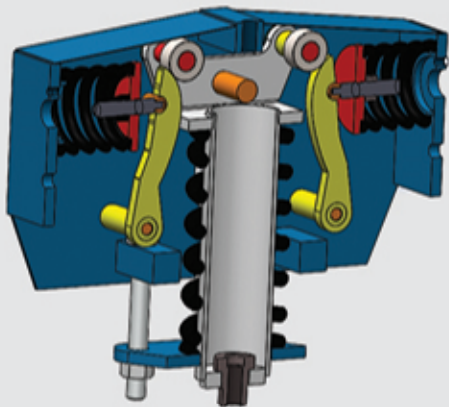
Constant hangers

Constant hangers compensate for vertical movement caused by thermal expansion. Via constant hangers, the respective piping loads are constantly absorbed and transferred with no significant deviation over the whole range of movement.

Significant deviations would act as harmful and uncontrolled extra loads in the system.

In this case, connection points are especially at risk because of unacceptable forces and moments.

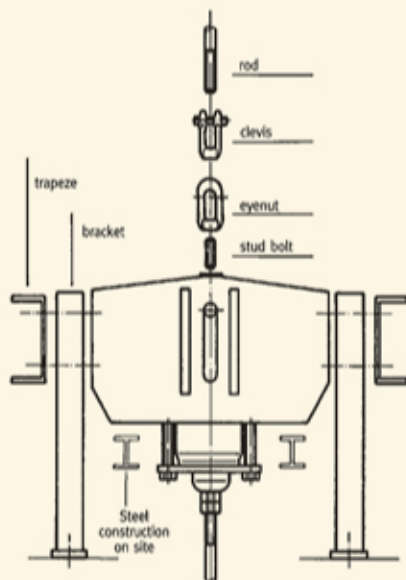
It is vital that the constant hangers work reliably and efficiently, as this is decisive for the operational safety and long life of the piping system



constant hangers provide special benefits:

1- Simple planning

- * standard cover for the respective load spectrum 0.05 - 500kN, travel range up to 900mm
- * easy selection via load groups and travel ranges
- * clearly arranged type identification system facilitates orientation
- * symmetric and particularly compact designs of low installed weight
- * user-friendly planning documentation, such as informative catalogs, technical manuals and special publications
- * efficient LICAD design software, the special planning system for HACO. standard supports
- * optimum fit within installation environment via standard variants and accessories (e.g. constant hangers suspended, seated, as supports or trapezes)
- * only one load connection point for the steel structure is needed



Serial connection types

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CONSTANT HANGERS, CONSTANT SUPPORTS



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2. Easy installation

- * compact, symmetric designs with only one suspension point and practical installation aids
- * favorable weight performance ratios of the units reduce skeleton weight
- * precision fit attachment devices by way of standardized elements
- * "intelligent" travel stop enables easy conformity checks of set load and operating load
- * extra wide load adjustment ranges (40 - 100% of nominal load) permit later adjustment in the event of deviation in piping weights

3. Reliable operational safety

- * due to the fundamental principle, absolute constancy over total set load range
- * reduced frictional forces through a minimum of bearing points - the load is transferred vertically via the main spring (no friction through high lever bearing loads)

* operational travel runs straight through the symmetrical axis of the hanger, no load variations from radial deflection of the load distribution point (lever arm hanger)

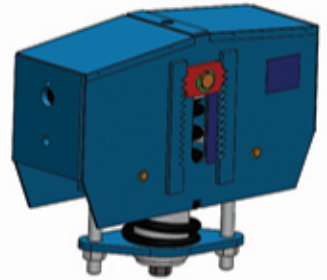
* attachment point and load point always lie in the symmetrical axis (no moment of force exertion on the connection structures through radial deflection)

* lasting loadbearing performance through the use of specially treated prerelaxed springs

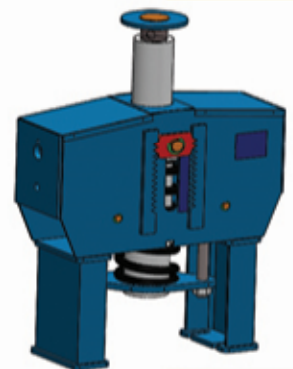
* lasting operating performance through corrosion protection and maintenancefree special steel bearings

4. Easy monitoring

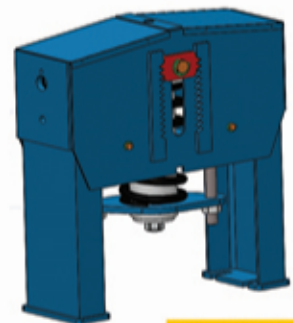
- * directly readable scales for travel position and operating load
- * permanent marking for cold/hot positions and set load
- * controlled subsequent load adjustment possible after installation
- * simple reinstallation of blocking devices for inspection work



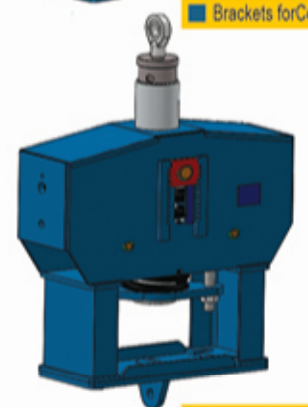
Constant hanger



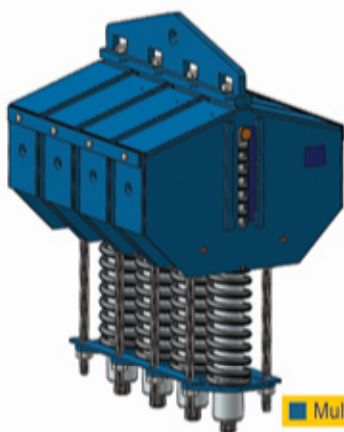
Constant support



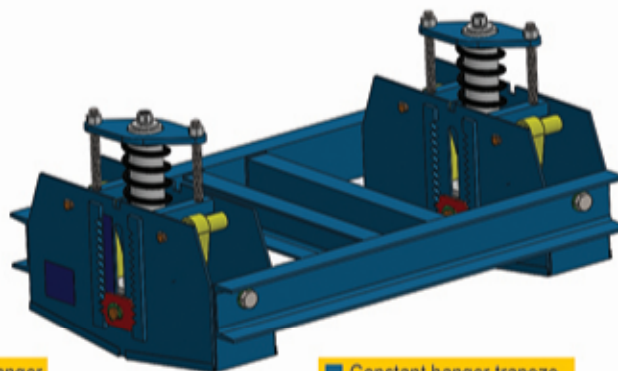
Brackets for Constant



Angulating constant supports



Multi-cell Constant hanger



Constant hanger trapeze

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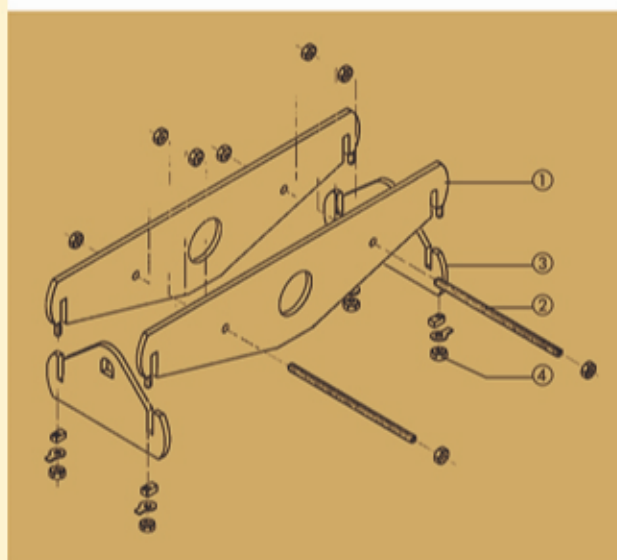
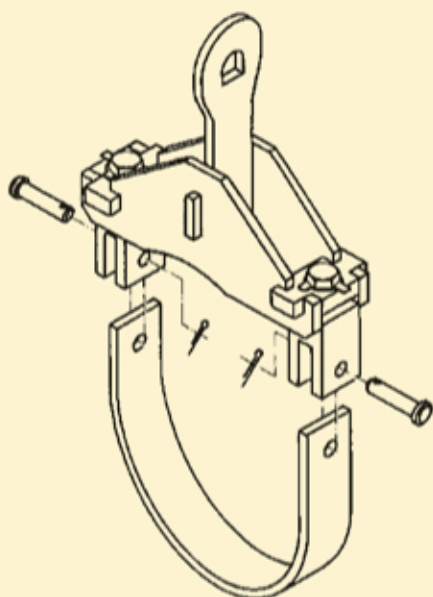
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In high temperature piping systems, pipe clamps and clamp bases are the most highly stressed and therefore most vulnerable components in the support system, owing to the additional effects of high temperatures. In spite of this, pipe clamps are seldom checked, as access is difficult after commissioning due to the surrounding insulation.



Assembly method

PIPE CLAMPS AND CLAMP BASES

Standardization

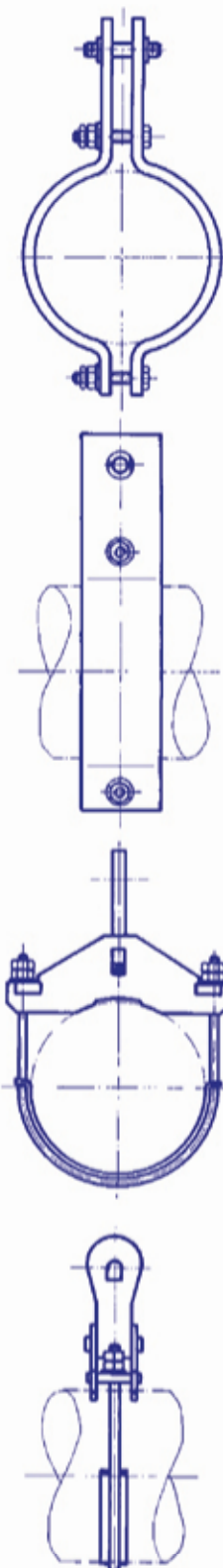
Pipe clamps, clamp bases, pipe weld-on lugs and U-bolts constitute the group of pipe connection

components. Regarding these products, the design criteria for piping systems lead to a wide variation and hence to a particularly large number of components.

- * diameters
- * loads
- * temperature of the medium

For appropriate coverage of the whole spectrum

with safe products, HACO. provides a complete program of standardized products for the whole field of application. In line with the special requirements of the field of application, the corresponding ideal design shape has been developed. Diameters range from OD 21.3 to OD 914.4, the temperature range extends to 650°C and the loads – divided into economical areas of operation –



PIPE CLAMPS AND CLAMP BASES

Quality

Because of their exposed field of application, the design and construction of the pipe connection components require particular attention. Just as much care should be spent on the pipe supports as on the piping itself, since:

Piping can never be better than its supports!

The most important prerequisite for dependable component quality is general standardization.

When purchasing pipe connection components, confidence should only be placed in products of proven suitability.

Through standardization of the entire application spectrum with sophisticated designs, plant designers, constructors and operators can draw equal profit:

* Comprehensive and clearly structured data tables simplify planning work

* all supplies from a single source through integration into a complete support program (LISEGA modular system)

* superior quality at competitive prices through rational series production and favorable designs

* consistent standardization enables instant availability

* favorable performance/weight ratios, easy to install designs and connection compatibility of LISEGA components allow rational installation

* the uniform design with guaranteed safety factors ensures maximum operational safety

* a correspondingly compact design prevents excessive heat loss

* certification from type tests by independent authorities is on hand



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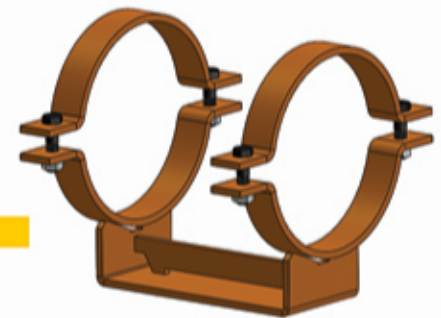
2-bolt clamp

3-bolt clamp



Clamp with inlay plate

Clamp bases



Riser clamp

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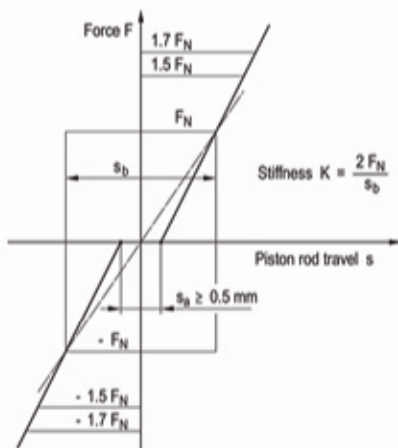


شرکت صنعتی و تولیدی
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Hydraulic Snubber / Shock Absorber

HACO. Hydraulic Snubber have a number of important functions for the operational safety of piping systems:

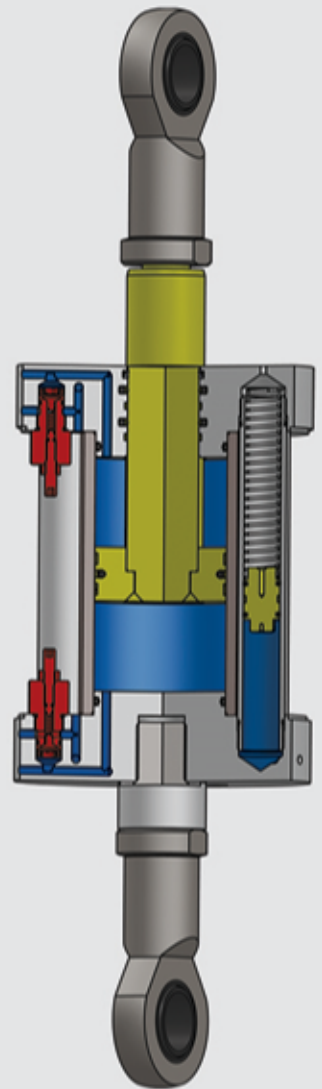
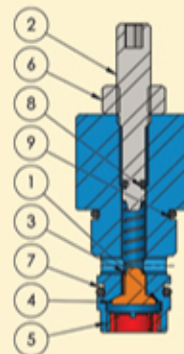
Hydraulic Snubber / Shock Absorber restraining devices used to control the movement of pipe and equipment during abnormal dynamic conditions such as earthquakes, turbine trips, safety/relief valve discharge and rapid valve closure.



■ Force / travel diagram

- corrosion-resistant materials
- special sealing systems
- vibration-resistant special guides
- pressurized hydraulic systems
- dynamic functional behavior
- exchangeable valves

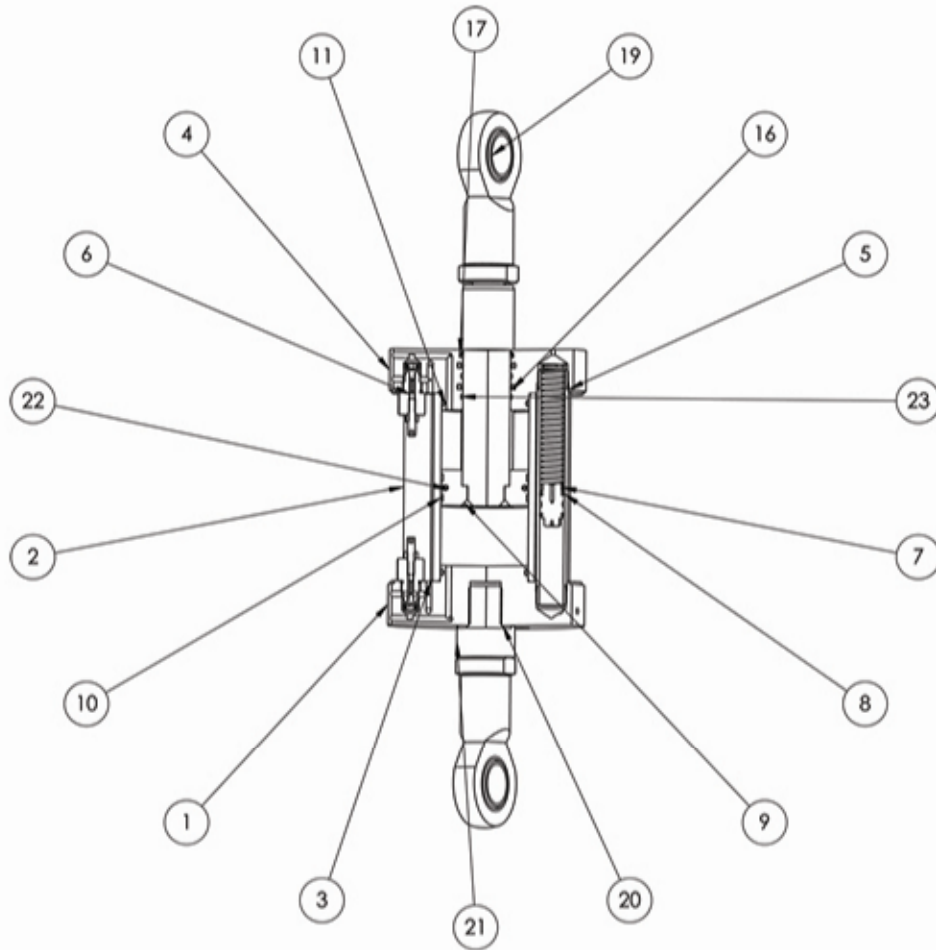
ITEM NO.	DESCRIPTION	PartNo	Material	Weight	QTY.
1	Valve Body	9 307299 11 1	AISI 304	270.86	1
2	Valve Adjusting Spindle	9 307299 11 2	AISI 304	23.87	1
3	Valve Spring	9 307299 11 3	AISI 302	0.30	1
4	Valve Disk	9 307299 11 4	AISI 304	4.28	1
5	Valve Disk Retainer	9 307299 11 5	AISI 304	4.15	1
6	Heavy Hex Nut	M10	A2-70	10.920	1
7	Valve Oring	O-ID17-d2.5	VITON	0.58	1
8	Valve Spindle Oring	O-ID4-d1.5	VITON	0.10	1
9	Valve Oring	O-ID20-d2.5	VITON	0.67	1



■ Snubber valve detail

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ITEM NO.	DESCRIPTION	Material	Weight	QTY.
1	Snubber Bottom Plate	ST 52-3	19640.08	1
2	Snubber Lateral Cylinder	ST 52-3	1410.29	4
3	Snubber Main Cylinder	ST 52-3	7554.81	1
4	Snubber Upper Plate	ST 52-3	18015.40	1
5	Oring	PTFE (general)	1.52	8
6	Snubber Valve	Acc. to Part List	315.72	2
7	Main Spring	50CrV4	117.33	3
8	Snubber Lateral Piston	Acc. to Part List	300.22	3
9	Snubber Main Piston & Rod	Ck 45	10465.42	1
10	Ribbon Guide	PTFE (general)	20.23	3
11	Bottom & Upper Plate Oring	VITON	13.70	2
12	Snubber Oil Plug	AISI 304	9.63	2
13	Snubber Bottom Cover	ST 37-2	3466.24	1
14	Snubber Top Cover	ST 37-2	6066.84	1
15	Snubber Cover Connection Plate	ST 37-2	340.53	1
16	Main Rod Seal	Acc. to Part List	13.08	2
17	Wiper	acc to Part List	5.05	1
18	O-Ring 8X2	NBR 70 SHORE A	0.19	2
19	Female Rod End-RH	ASTM A36 Steel	3336.22	2
20	Snubber Bottom Threaded Rod	1.7225 (42CrMo4)	1993.67	1
21	Snubber Bottom Extension	ST 37-2	709.19	1
22	Piston Packing	NBR + PTFE	20.16	1
23	Main Piston Ribbon Guide	PTFE (general)	6.52	2