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SAFETY VALVES

***SERIE
30000
TYPE 320***

***USE AND
MAINTENANCE
MANUAL***

SAFETY VALVE FOR GASES, VAPOURS AND LIQUIDS

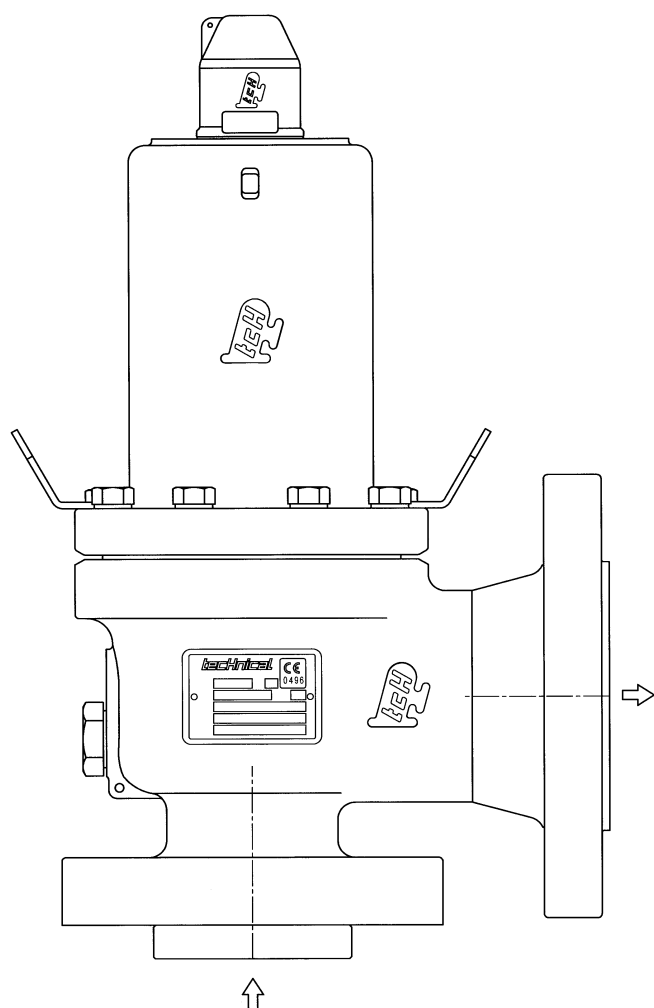
Characteristics

Homologation ASME / PED:

- overpressure 10%;
- blowdown 5 - 10%;
- spring range $\pm 5\%$ of set pressure ;
- gases and vapours discharge coefficient
K = 0,94 PED
K = 0,951 ASME
- liquids discharge coefficient
K = 0,6 PED
K = 0,720 ASME
- connections: ANSI, UNI, DIN, AFNOR etc

Accessories

- Test gag;
- soft seat;
- balancing bellows
- lifting lever;
- heating jacket



CHARACTERISTICS AND PRESSURE LIMITS

Type	ORIFICE		Lift mm	Max. set pressure bar	Max. backpressure	
	\varnothing mm	Area cm ² Sq. in			without bellows bar	with bellows bar
D	10	0.785 0.121	2.5	413	19 ÷ 41	10
E	13.3	1.389 0.215	3.1	413	19 ÷ 41	10
F	16.6	2.164 0.335	4.2	344	19 ÷ 51	15 ÷ 34
G	21.2	3.53 0.547	6.2	255	19 ÷ 51	15 ÷ 32
H	26.5	5.515 0.854	9.8	189	15 ÷ 28	19 ÷ 51
H1	30	7.068 1.095	10	189	15 ÷ 28	19 ÷ 51
J	34	9.079 1.407	11	186	19 ÷ 41	15
K	40.6	12.94 2.006	13	153	19 ÷ 41	10 ÷ 13
K1	45	15.9 2.465	14	153	19 ÷ 41	10 ÷ 13
L	50.6	20.1 3.116	16	103	19	7 ÷ 11
M	56.8	25.33 3.927	19	75	19	5 ÷ 11
N	62.4	30.58 4.74	20	68	19	5 ÷ 11
P	75.7	45 6.976	24	68	19	5 ÷ 10
P1	84.5	56.07 8.692	25	56	19	5 ÷ 10
Q	99.6	77.91 12.07	30	41	8	4 ÷ 8
R	119.8	112.7 17.47	36	20	4 ÷ 7	4 ÷ 7
T	152.8	183.3 28.42	46	20	2 ÷ 7	2 ÷ 7

30000 SERIES SAFETY VALVES

Safety valves **30000 Series**, designed and manufactured by **Technical s.r.l.** in accordance with **API 526**, are full nozzle and total lift type. They possess a high discharge coefficient ($k=0.94$), certified by **I.S.P.E.S.L.** and ($K=0.951$) certified by ASME/NATIONAL BOARD on the basis of experimental tests performed by authorized laboratories; are suitable for gaseous and liquid fluids.

The body and the bonnet are made from casting. The bonnet contains the spiral spring that, depending on the use and type of fluid, can be assembled with closed cap or with open bonnet (vapour).

The seat is plane and "metal on metal" type; it is possible to add valves with a soft sealing ring (FPM rubber). Upon request, the valve is also available with accessories such as the packed or open lifting lever, test gag, balancing-isolation bellows and heating jacket.

1. INSTALLING

Before installing the valve on the plant make sure that:

- the line fluid is indicated on the construction declaration or is compatible with the construction materials;
- the inlet piping in the valve are clean, impurities less, slag less etc. and eventually remove them.
- the inlet and discharge piping are dimensioned in such a way that they generate the minimum possible loss of pressure.

The mounting of the valve on the plant has to be carried out tightening the lock nuts in a crossed and uniform way.

Once the valve has been installed on the plant make sure that:

- the discharge is not positioned in such a way to result dangerous for people or for instruments;
- the discharge is properly conveyed .

1.1 SETTING UP

Before shipment all the safety valves are hydrostatically tested and set at the setting pressure required by the Client. Therefore regulation in loco should not be necessary.

The maximum setting error is less than 3% for pressure up to 21 bar, with a minimum of 0,2 bar; it is less than 0,7 bar up to 70 bar; it is less than 1% for pressure over 70 bar.

In case it should be necessary to modify the set pressure or the re-closure pressure of the valve (blowdown) , it should be necessary proceed as follows:

1.1.1 setting regulation (referring to drawing)

In order to carry out setting regulation of the valve it is necessary:

- remove the cap (11) and loosen the lock nut (16);
- turn the adjusting screw (10) clockwise in case the set pressure should be increased;
- turn the adjusting screw (10) counter clockwise in case the pressure should be decreased.

The adjustment range of the spring setting is $\pm 5\%$ of the set pressure indicated on the label of the valve.

Once the valve setting is regulated tighten the lock out (16) and re-screw the bonnet cap (11).

1.1.2 blowdown ring regulation (table 1)

In order to carry out the regulation of the blowdown ring execute the following operations:

- loosen the screw (8);
- raise the blowdown ring (5) by turning it counter-clockwise until touch the disc holder (3);
- withdraw the blowdown ring (5) by turning it clockwise, as indicated in **table 1**;
- tighten the screw (8) making sure it does not block the blowdown ring (5) but only that it prevents the blowdown ring rotation.

If is required a more precise blowdown regulation, should be necessary carry out it with the valve installed on the plant at full flow, taking into consideration that:

- reducing the number of withdrawing notches it is favoured the opening and it is delayed the re-closure;
- increasing the number of withdrawing notches it is delayed the full opening and it is favoured the re-closure.

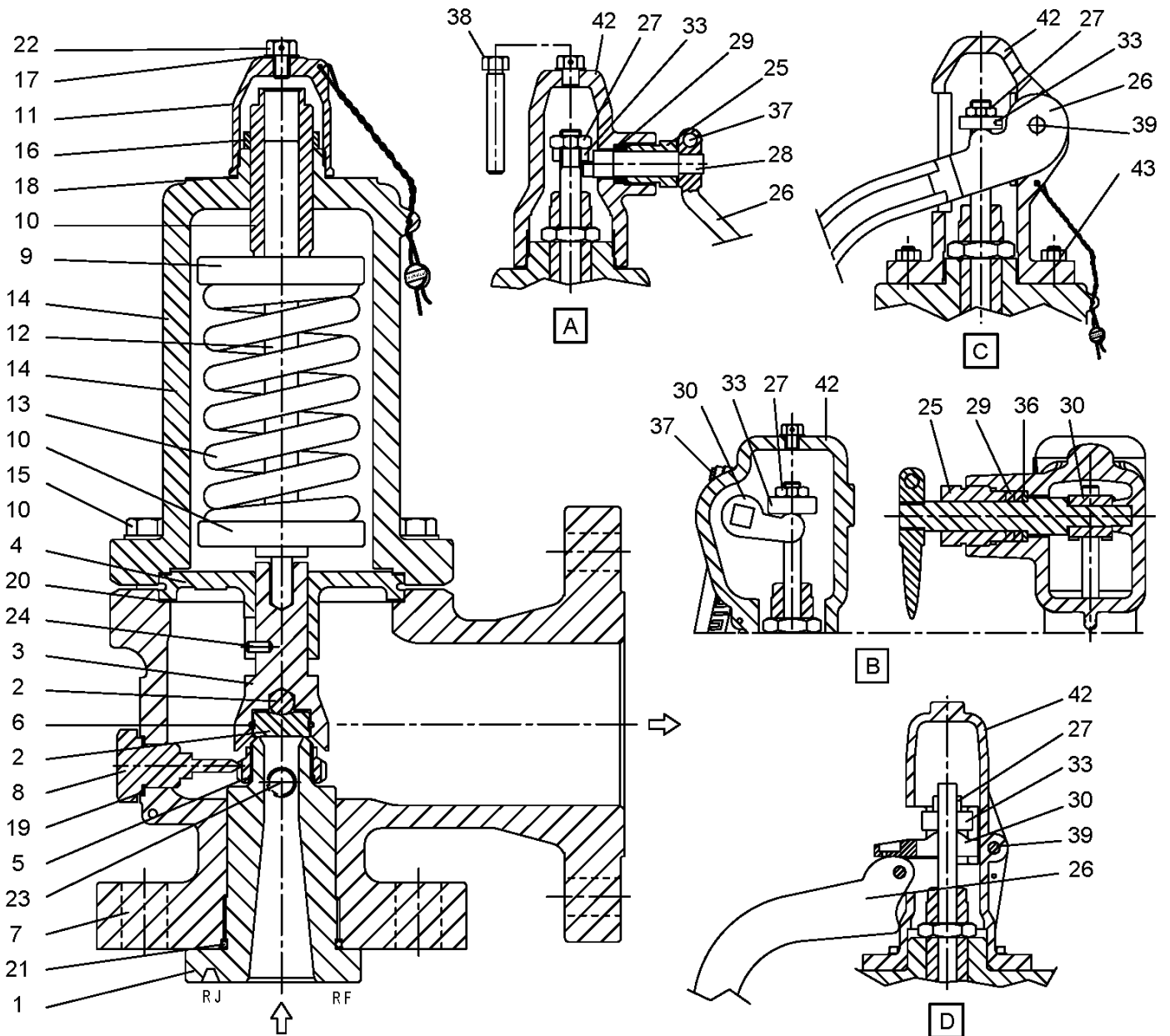
2. DISASSEMBLING

In order to execute disassembling carry out progressively the following operations:

CAUTION : before disassembling the valve make sure that the plant on which it is mounted is not "under pressure" and that no pressure inside the valve itself has remained.

before disassembling the bonnet of the valve body make sure that the spring (13) is totally released using the adjusting screw (10).

BLOWDOWN RING REGULATION													
SET PRESSURE	NUMBER OF NOTCHES FROM CONTACT POSITION												
bar	ORIFICE												
	D	E	F - G	H-H1	J	K-K1	L	M	N	P-P1	Q	R	T
0.5 - 7	1 - 2	1 - 2	2 - 3	2 - 3	2 - 3	2 - 5	3 - 6	3 - 6	3 - 9	3 - 10	3 - 10	4 - 12	4 - 22
8 - 15	4 - 5	5 - 6	4 - 8	4 - 8	4 - 9	5 - 8	6 - 9	6 - 12	9 - 13	10 - 15	10 - 18	12 - 22	22 - 30
16 - 25	5 - 6	6 - 7	8 - 10	9 - 11	9 - 11	8 - 12	9 - 12	12 - 15	13 - 18	15 - 22	18 - 22	22 - 32	30 - 45
26 - 40	6 - 9	7 - 10	10 - 13	10 - 13	11 - 14	12 - 16	12 - 16	15 - 18	18 - 25	22 - 28	22 - 32		
41 - 60	9 - 12	10 - 13	13 - 16	14 - 17	14 - 18	16 - 20	16 - 22	18 - 25	25 - 32	28 - 35	32 - 40		
61 - 90	12 - 15	13 - 17	16 - 19	17 - 20	18 - 22	20 - 25	22 - 28	25 - 32	32 - 40	35 - 45			
91 - 125	15 - 18	17 - 20	19 - 22	20 - 25	22 - 26	25 - 30	28 - 32						
126 - 190	18 - 21	20 - 23	22 - 25	25 - 28	26 - 30								
191 - 280	21 - 24	23 - 26	25 - 28										
281 - 360	24 - 27	26 - 29	28 - 31										



2.1 VALVE WITHOUT ACCESSORIES

- remove the valve from the plant;
- remove the cap (11) and unloosen the lock nut (16) and the adjusting screw (10);
- remove the screws (15), the bonnet (14) and remove all the internal parts.

2.2 VALVE WITH PACKED LEVER

2.2.1 - Type "A"

- unloosen the screw (37) and remove the lever (26);
- remove the nut (25) and remove the packing rings (29) and camshaft (28);
- remove the lever cap (42) from the valve turning it counter clockwise;
- unloosen the lock nut (27) and remove it together with the disc (33);
- unloosen the lock nut (16) and the adjusting screw (10);
- remove the screws (15), the bonnet (14) and remove all the internal parts.

2.2.2 - Type "B"

- remove the nuts/screws (43) if any;
- turn the camshaft (28) counter clockwise, putting the fork (30) at the end of stroke, and remove the lever cap (42) from the valve
- unloosen the screw (37) and remove the lever (26);
- remove the nut (25) and remove the packing rings (29), the spacer, the camshaft (28) and the fork (30);
- unloosen the lock nut (27) and remove it together with the disc (33);
- unloosen the lock nut (16) and the adjusting screw (10);
- remove the screws (15), the bonnet (14) and remove all the internal parts.

2.3 VALVE WITH OPEN LEVER

2.3.1 - Type "C"

- remove the self-locking nuts with the screw (39) and remove the lever (26);
- remove the nuts/screws (43)
- remove the lever cap (42);
- unloosen the lock nut (27) and remove it together with the disc (33);
- unloosen the lock nut (16) and the adjusting screw (10);
- remove the screws (15), the bonnet (14) and remove all the internal parts.

2.3.2 - Type "D"

- remove the self-locking nuts with the screws (39) and remove the lever (26) and the fork (30);
- remove the nuts/screws (43)
- remove the lever cap (42);
- unloosen the lock nut (27) and remove it together with the disc (33);
- unloosen the lock nut (16) and the adjusting screw (10);
- remove the screws (15), the bonnet (14) and remove all the internal parts.

3. ASSEMBLING

3.1 VALVE WITHOUT ACCESSORIES

For assembling carry out the same operations of point **2.1**) but in reverse order, tightening first the nozzle (1) into the valve body (7). Before pushing the spring (13), make sure that the blowdown ring (5) is free and does not touch the disc holder (3).

3.2 VALVE WITH PACKING LEVER

3.2.1 - Type "A"

For assembling carry out the same operations of point **2.2.1**) but in reverse order, tightening first of all the nozzle (1) into the valve body (7). Before pushing the spring (13), make sure that the blowdown ring (5) is free and does not touch the disc holder (3).

Once assembled the valve and tightened the lock nut (16) it is necessary to put the disc (33) and the lock nut (27) at the end of the thread and tightening one against the other.

After assembling make sure that the lever can turn easily with no efforts and without interferences.

3.2.2 - Type "B"

For assembling carry out the same operations of point **2.2.2**) but in reverse order, tightening first of all the nozzle (1) into the valve body (7). Before pushing the spring (13), make sure that the blowdown ring (5) is free and does not touch the disc holder (3).

Once assembled the valve and tightened the lock nut (16) it is necessary to put the disc (33) and the lock nut (27) at the end of the thread and tightening one against the other.

After assembling make sure that the lever can turn easily with no efforts and without interferences.

3.3 VALVE WITH OPEN LEVER

3.3.1 - Type "B"

For assembling carry out the same operations of point 2.3.1) but in reverse order, tightening first of all the nozzle (1) into the valve body (7). Before pushing the spring (13), make sure that the blowdown ring (5) is free and does not touch the disc holder (3).

Once assembled the valve and tightened the lock nut (16) it is necessary to put the disc (33) and the lock nut (27) at the end of the thread and tightening one against the other.

After assembling make sure that the lever can turn easily with no efforts and without interferences

3.3.2 - Type "D"

For assembling carry out the same operations of point 2.3.2) but in reverse order, tightening first of all the nozzle (1) into the valve body (7). Before pushing the spring (13), make sure that the blowdown ring (5) is free and does not touch the disc holder (3).

Once assembled the valve and tightened the lock nut (16) it is necessary to put the disc (33) and the lock nut (27) at the end of the thread and tightening one against the other.

After assembling make sure that the lever can turn easily with no efforts and without interferences

4. MAINTENANCE

The safety valves requires an ordinary but careful maintenance (**SEE MAINTENANCE PLAN**) and in case it should be necessary , follow the operation stated in point 2) for disassembling and in point 3) for assembling.

In case of seat damaging it is necessary to carry out a new lapping: this operation has to be executed by skilled workers.

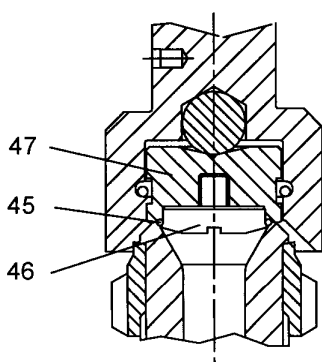
In case of inconveniences should occur to the valve, verify if in **DAMAGE TABLE** are contained some useful instructions for solving the problem.

If the damage is different from what stated in the table, contact our Service Department.

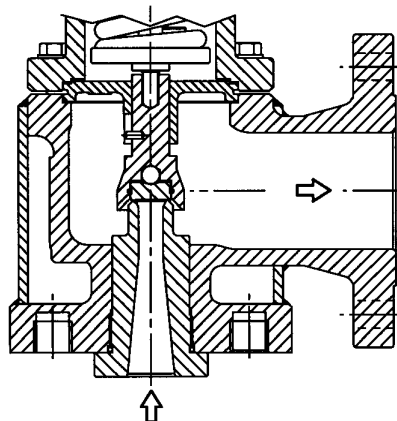
WARNING

- The safety valves should not be subjected to bumps or such stresses that could compromise the working.
- High loads on the spring can damage the valve.
- The safety valves must be used only exclusively for the use stated in the construction declaration.
- The safety valve must be revised within two years from installation for dangerous fluid (Group 1) and within three years for other fluids (Group 2) independently from the number of interventions executed by the valve.

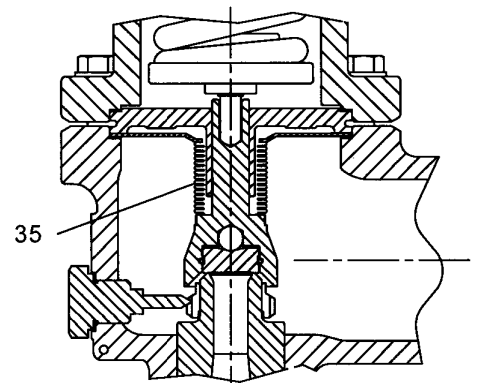
ACCESSORIES



SOFT SEAT



JACKET



BELLOWS

ORDINARY MAINTENANCE PLAN

Check of seat and disc tightness on the plant	Every valve opening or every 6-month working.
Check of outwards valve tightness in case of back pressure on the plant.	Every 30 days.
Check of the painting condition on the plant.	Every 6 months.
Ordinary maintenance of the valve installed on the plant, including the tightness check and the surface check of the movable components.	Every 12-month working.
General maintenance of the valve removed from the plant including the disassembling, the seat and the disc check, the incidental seat and disc lapping, gaskets substitution, painting restoration and test on the test bench.	Every opening with seats damaging or every 24-month working (Group 1) every 36-month working (Group 2)

DAMAGE TABLE

INCONVENIENT	POSSIBLE DAMAGE	ACTION TO BE CARRIED OUT
Fluid leakage in-line	Seat wear and tear	Nozzle substitution or revision
	Disc wear and tear	Disc substitution or revision
	Seat and disc damaging	Nozzle and disc revision
	Impurities presence between seat and disc	Nozzle and disc cleaning and revision
	Valve-use with fluid different from the one stated in the purchase order	Nozzle and disc revision
External back pressure fluid leakage.	Valve gaskets damaging	Gaskets substitution
	Valve body-bonnet damaging	Valve revision or substitution
	Cap or blowdown screw loosen	Check and setting-up of the cap and of the blowdown screw.
Opening at pressure value different from setting valve	Back pressure variable	Check of dimensioning and of the discharge piping working conditions and possible valve substitution with another type.
	Spring release	Spring substitution and check compatibility of the material with the fluid.
	Setting screw withdraw	Resetting the valve and tighten very well the lock nut
Valve intervention with quick opening and re-closures repeated in the time	Strong pressure loss in the inlet piping	Check the inlet piping length
	Not correct setting-up of the blowdown ring	Withdraw the blowdown ring until obtain a proper working, basing the first regulation one table 1; for liquid fluids withdraw the blowdown ring completely.
	Pulsating flow rate to be discharged	Check plant regulation.
	Over dimensioned valve	Substitute the valve with one correctly dimensioned.

MATERIAL TABLE SAFETY VALVE 30000 SERIES

TEMPERATURE LIMITS °C		- 29° ÷ 232°	- 29° ÷ 232°	- 101° ÷ 232°	- 29° ÷ 538°	- 196° ÷ 350°	
ITEM	PARTS	16 (1)	1L (2)	L3 (3)	W0 (4)	50 (8) (9)	60 (5) (6) (7)
1	NOZZLE	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L
2	DISC	17-4PH	AISI 316L	AISI 316L	AISI 316L	17-4PH	17-4PH
2	BALL	AISI 420	AISI 420	AISI 420	AISI 420	AISI 316	AISI 316
3	DISC HOLDER	17-4PH	17-4PH	17-4PH	AISI 316L	17-4PH	17-4PH
4	STEM GUIDE	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L
5	BLOWDOWN RING	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L
6	RING	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316	AISI 316
7	BODY	A 216WCB	A 216WCB	A 352LC3	A 217WC6	A 351CF8M	A 351CF3M
8	BLOWDOWN SCREW	AISI 303	AISI 303	AISI 303	AISI 303	AISI 303	AISI 316L
9	SPRING GUIDE	CARBON STEEL / ST. STEEL					
10	ADJUSTING SCREW	AISI 431	AISI 431	AISI 431	AISI 431	AISI 431	AISI 431
11	CAP	CARB.STEEL	CARB.STEEL	CARB.STEEL	CARB.STEEL	AISI 316L	AISI 316L
12	STEM	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L
13	SPRING	CARBON STEEL / ST. STEEL / TUNGSTEN					
14	BONNET	A 216WCB	A 216WCB	A 352LC3	A 217WC6	A 351CF8M	A 351CF3M
15	SCREW /	AISI 304	AISI 304	AISI 304	AISI 304	AISI 304	AISI 316
16	LOCK NUT	AISI 303	AISI 303	AISI 303	AISI 303	AISI 303	AISI 303
17	GASKET	ALUMINIUM	ALUMINIUM	ALUMINIUM	AISI 316	AISI 316	AISI 316
18	GASKET	ARAM. FIBER	ARAM. FIBER	ARAM. FIBER	ARAM. FIBER	ARAM. FIBER	ARAM. FIBER
19	GASKET	ALUMINIUM	ALUMINIUM	ALUMINIUM	AISI 316	AISI 316	AISI 316
20	GASKET	ARAM. FIBER	ARAM. FIBER	ARAM. FIBER	ARAM. FIBER	ARAM. FIBER	ARAM. FIBER
21	GASKET	FPM RUBBER	FPM RUBBER	FPM RUBBER	FPM RUBBER	FPM RUBBER	FPM RUBBER
22	SCREW	AISI 304	AISI 304	AISI 304	AISI 304	AISI 304	AISI 304
23	PLUG	AISI 304	AISI 304	AISI 304	AISI 304	AISI 304	AISI 304
24	PIN	AISI 304	AISI 304	AISI 304	AISI 304	AISI 304	AISI 304
25	RING NUT	AISI 431	AISI 431	AISI 431	AISI 431	AISI 431	AISI 431
26	LEVER	CARB.ST./ST.ST	CARB.ST./ST.ST	CARB.ST./ST.ST	CARB.ST./ST.ST	ST. STEEL	ST. STEEL
27	LOCK NUT LEVER	AISI 303	AISI 303	AISI 303	AISI 303	AISI 303	AISI 303
28	CAMSHAFT	17-4PH	17-4PH	17-4PH	17-4PH	17-4PH	17-4PH
29	PACKING RING	TEFLON	TEFLON	TEFLON	TEFLON	TEFLON	TEFLON
30	FORK	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L
33	SPACER	AISI 431	AISI 431	AISI 431	AISI 431	AISI 431	AISI 431
35	BELLOWS	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L
36	SPACER	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L	AISI 316L
37	LEVER SCREW	AISI 304	AISI 304	AISI 304	AISI 304	AISI 304	AISI 304
38	TEST GAG	AISI 304	AISI 304	AISI 304	AISI 304	AISI 304	AISI 304
39	SCREW	ST. STEEL	ST. STEEL	ST. STEEL	ST. STEEL	ST. STEEL	ST. STEEL
42	LEVER CAP	CARB.STEEL	CARB.STEEL	CARB.STEEL	CARB.STEEL	AISI 316L	AISI 316L
43	NUT / SCREW	ST. STEEL	ST. STEEL	ST. STEEL	ST. STEEL	ST. STEEL	ST. STEEL
45	GASKET	/	FPM RUBBER	FPM RUBBER	FPM RUBBER	/	FPM RUBBER
46	SOFT SEAT SCREW	/	AISI 316L	AISI 316L	AISI 316L	/	AISI 316L
47	SOFT SEAT DISC	/	AISI 316L	AISI 316L	AISI 316L	/	AISI 316L

1. Available with stellited nozzle
2. Available with stellited nozzle & disc
3. Available with stellited nozzle & disc
4. Available with stellited nozzle & disc
5. Available with stellited nozzle

- code **H6**
- code **K6**
- code **L6**
- code **W1**
- code **6H**

6. Available with trim in AISI 316L
7. Available with stellited nozzle & disc
8. Available with stellited nozzle & disc
9. Available with stellited nozzle

- code **6L**
- code **6K**
- code **5H**
- code **5K**