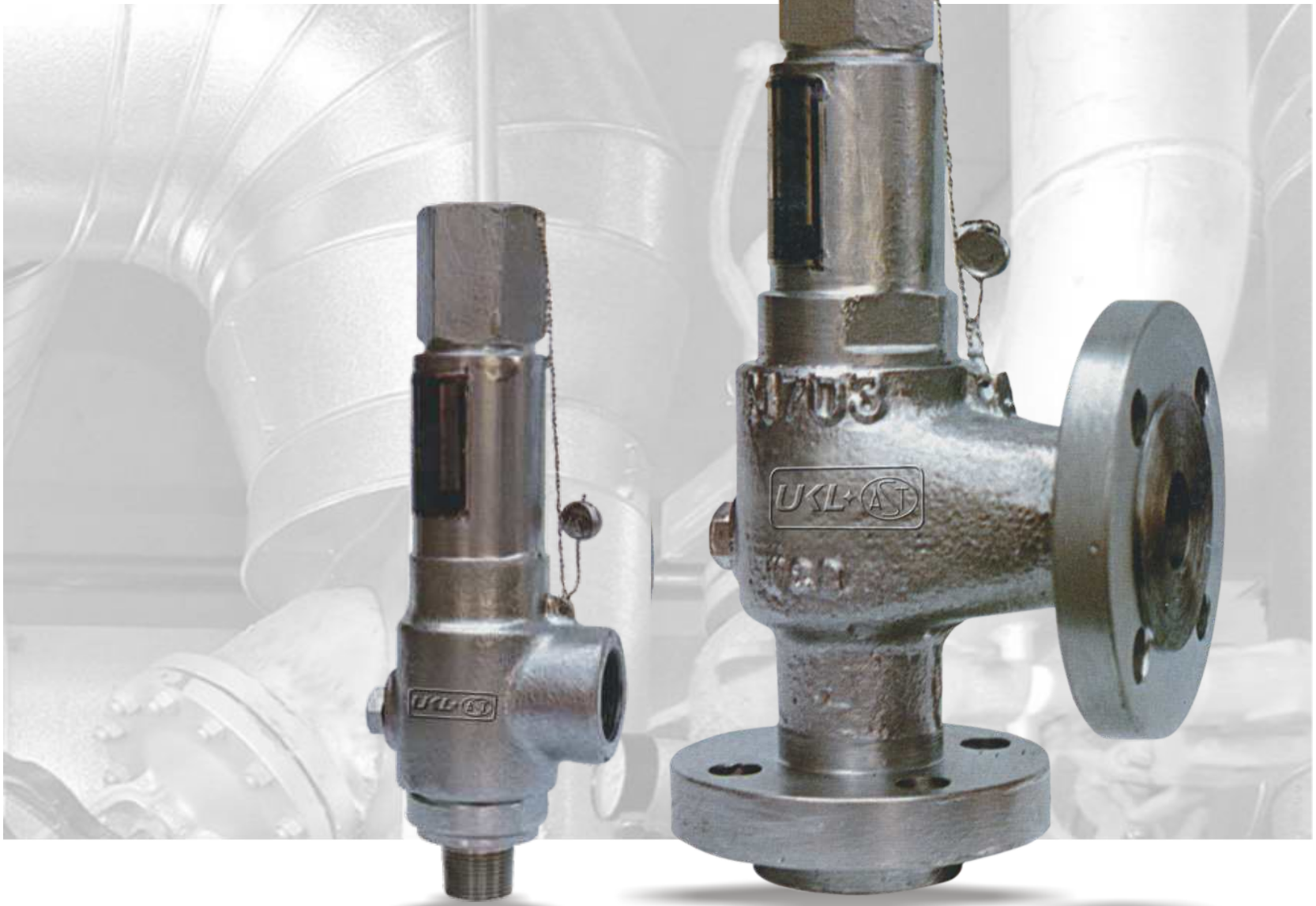




PRESSURE-RELIEF VALVES

SMFN-7000 | SMF-7000 | SMF*-7000





PRESSURE-RELIEF VALVES

SMFN-7000

SMF-7000

SMF*-7000

SU-7000

PRESSURE RELIEF Valve Type–SMFN-7000, SMF-7000, SMF*-7000 & SU-7000

This product range is mainly used for Thermal Relief application but thanks to the certified coefficient of discharge for gas and liquid it can be used also for pressure relieving application. Types SMF-7000 covers the application where users have preference for screwed connection.

These valves are available with inlet sizes from 1/2" to 1" and pressure from 0.8 Bar to 400 Bar for Gas & up to 1500 Bar for Liquid in various material combinations.

Type SU-7000 has flanged end connections with an integral cast body.





MAIN FEATURES

Screwed and Flanged, Spring Loaded, Direct Acting, Full Nozzle pressure relief valves.

Media : Gas, Steam and Liquid.

Overpressure : Gas, Steam and Liquid 10%.

Blowdown : Gas and Steam -5% to 7%.

Orifices : From "b" to "f".

Set pressure range : From 0.8 bar to 400 bar (for Gas), up to 1500 bar for Liquid.

Temperature range : From -200°C to 400°C

Materials : Carbon Steel, Alloy Steel, Hastelloy, Monel and other materials upon request.

Options : Bellows, Flushing, Nozzle, Lifting lever, Test gag, Resilient or Hardened Seat.

Sizes/Pressure Classes

Size inlet & outlet: from NPS 1/2 to NPS 1 & from NPS 1 to NPS 1 1/2.

Rating: up to API 6000 or ASME 2500#.

Design Codes & Product Standards

EN ISO 4126-1, EN 764-7, EN 12516, EN 1092, API 520, API 521, API 527, ASME B16.34, ASME B16.5, ASME Sect.VIII

Homologations & Approvals

CE marking (97/23/CE PED and 94/9/CE ATEX), AQSIQ (China), Gost (Russia), SVTI ASIT (Switzerland).

BASIC SPECIFICATIONS HIGHLIGHTS

- Full nozzle and full lift safety relief valves.
- Body valve thicknesses to ASME B16.34.
- Threaded to ASME B1.20.1 or ISO 7/1.
- CE marking according to PED (Pressure Equipment Directive).
- Calculation and performance are in accordance to the most important European and international standards such as PED 97/23/CE, ASME VIII, EN ISO 4126, API 520, etc.
- Flanges comply to ASME B16.5.
- All pressurized components are hydraulically tested.

- Seat tightness test is performed at 95% of the set pressure allowing operating pressure very close to the set-pressure of the safety valve.
- The valves are designed to allow maximum interchangeability of components and thus reduce the number of spares required.
- The high discharge coefficient of safety relief valves permits economical sizing.
- Can satisfy special requests of the clients.

INTRODUCTORY NOTES

CONNECTIONS

Flanged or threaded connections indicated for each orifice are furnished according to ASME B16.5. They are also furnished in accordance to UNI, DIN, BS, etc.

DISCHARGE COEFFICIENTS

*Valves series SMFN 7000 / SMF 7000 / SMF*7000 have been tested and certified with GAS in accordance with EN ISO 4126-1, and the results are the following:*

- $K_d = 0.972$ with 10% overpressure.

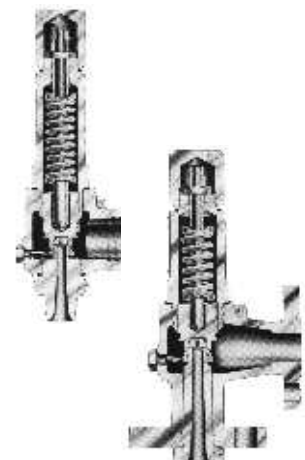
*Valves with trim for LIQUID series SMFN 7000/SMF7000/ SMF*7000 Liq. have been homologated, and the results are the following:*

- Liquid, $K_d=0.645$ with 10% overpressure
- Liquid, $K_d=0.712$ with 25% overpressure

*Discharge coefficient value in accordance with ASME VIII and with EN ISO 4126-1 shall be reduced by 10% ($K_{dr}=K_d*0.9$).*

BLOWDOWN

UKL AST declares a blowdown value between 5% and 7% of the set pressure. This value shall anyway not be lower than 0,25 bar and depends on the operating conditions, the type of fluid and the position of the blowdown ring which is positioned in the shop in order to obtain good performance.





BELLOWS TYPE SAFETY VALVES

Series SMF*7000; SU-7000 valves with Orifice “f” may be supplied with balancing and separation bellows Valves of this type are used to:

- Prevent set pressure variations in case of variable back pressure;
- Separate the disc guide and all components inside the bonnet from the process fluid when the latter is corrosive, viscous or likely to leave deposits, incrustations or to crystallize.

The bellows are designed to afford the greatest possible flexibility, greatest mechanical strength and the best possible balancing.

CLASSIFICATION

The selection UKL-AST of safety relief valves is simplified by an alphanumeric coding system by which each kind of valve materials and accessories is exactly identified:

- SMFN -7000/SMF 7000/SMF*7000/SU-7000 standard models
- W materials to table refer to last page
- (S4) materials to table refer to last page
- (LCB) materials to table refer to last page

ACCESSORIES

- /B bellows
- /La plain lever (no stuffing box)
- /L packed lever (stuffing box)
- /T test gag
- /R heating jacket
- /O O-ring (soft seated disc)

Example:SMF 7000-W/LT

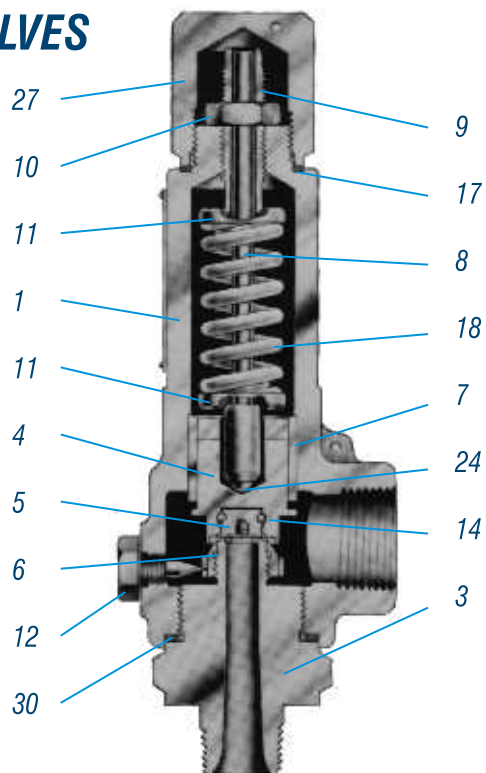
- valve construction of materials as per list, refer to last page
- for use in the temperature range 200,5 - 400°C
- alloy steel spring
- packed lever and test gag supplied.

1	BODY
2	BONNET
* 3	NOZZLE
4	DISC HOLDER
* 5	DISC
6	BLOWDOWN RING
7	GUIDE
8	STEM
9	SPRING ADJ. SCREW
10	LOCKNUT
* 11	SPRING WASHERS
12	ADJ. RING SCREW
* 14	DISC RETAINER
15	STEM RETAINER
* 16	BODY GASKETS
* 17	CAP GASKET
18	SPRING
19	DRAIN PLUG
24	BALL
* 25	BELLOWS
26	EXTENSION
27	CAP
29	BELLOWS PROTECTION
* 30	NOZZLE GASKET
* 31	'O' RING (SOFT SEATED DISC)
32	SPECIAL NUTS
33	GASKET
34	PACKING RING
35	NUT
36	LEVER SHAFT
37	GLAND HOUSING
38	LEVER CAP
39	LEVER

* Recommended spare parts



SERIES SMFN -7000 VALVES



ORIFICE <i>cm² sq.in</i>	Size IN/OUT (inches)	PRESSURE AND TEMP. LIMITS				
		INLET			OUTLET	
		Max Set Pressure		Max Back Press. bar		
		TEMPERATURE °C				
		-200 -29,5	-29 -200	200,5 400		
b 0,284 0,044	1/2 x 1 (1)	50	110	50	10	
c 0,426 0,066	1/2 x 1 (1)	50	110	50	10	
d 0,785 0,121	3/4 x 1 (1)	30	70	15	10	
e 1,389 0,215	1 x 1	15	40	15	10	

On request: (1) For liquids OUT. 1/2"-3/4"



COLD DIFFERENTIAL TEST PRESSURE TOLERANCE

The tolerances on the cold differential test pressure are the following:

- Up to 3,7 bar ±4% or ±0,04 bar whichever is greater
- 3,7 to 21 bar ±3% or ±0,15 bar whichever is greater
- over 21 bar ±1% or 0,7 bar whichever is greater

MINIMUM COLD DIFFERENTIAL TEST PRESSURE (SPRING SETTING)

The minimum setting pressure are the following:

ORIFICE	b	c	d	e	f
	bar				
Conventional valves	1	1	1	0,9	0,8
Bellows valves	-	-	-	-	1,5

SEAT TIGHTNESS

(Nozzle - Disc)

Seat tightness at ambient temperature is performed according to API-527 by raising the pressure to 90% of the set pressure (for tight seals to 95%) and checking that the number of bubbles per minute released into the tank does not exceed the values in the table below:

RELIEVING TEMPERATURE	MAXIMUM LEAKAGE (Bubbles per minute)
up to 200°C (392° F)	12 (for cold differential test pressures between 0,8 & 172 bar) 25 (for cold differential test pressures over 172 bar)
over 200°C (392° F)	5

COLD DIFFERENTIAL TEST PRESSURE (SPRING SETTING) RANGE

Cold differential test pressure may be changed from what is set at factory without changing the spring according to the following:

Up to 17,9 bar ±10% of cold differential test pressure.
Over 17,9 bar ±5% of cold differential test pressure or ±1,8 bar whichever is greater.

VALVE SEAT

If requested by customer or recommended by **UKL AST** valve seat may be stellite hard faced or soft seated.

These applications are recommended for the following conditions:

- 1) Stellite - where contaminated fluid is likely to crystallise or contain solids
- 2) Stellite - with high and medium-high pressures depending on temperature and orifice size
- 3) Soft seated - in case of low pressure to improve the valve tightness.

UKL AST reserves the right to approve the exercise conditions.

COLD DIFFERENTIAL TEST PRESSURE FOR VALVES WORKING AT HIGH TEMPERATURE

Safety relief valves are bench set at ambient temperature and therefore the pressure setting can be modified when operating temperature is higher than 212°F.

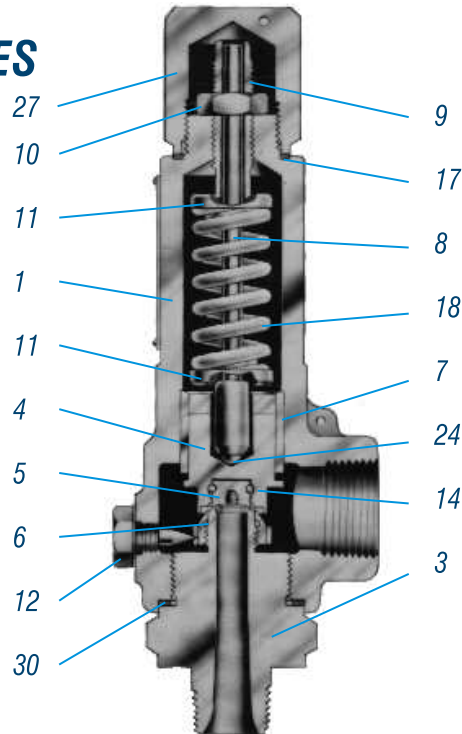
A high operating temperature will cause a reduction of spring rate and the body valve and bonnet to expand, as a result the thrust on the disc will decrease; therefore cold differential test pressure must be higher than set pressure.

Correction will be evaluated for every conditions, anyway approximate corrections are as follows:

RELIEVING TEMPERATURE		COLD DIFFERENTIAL TEST PRESSURE INCREASE %
°C	°F	
-200-100	-328-212	0%
100,5-200	213-392	1,5%
200,5-400	393-752	3,0%



SERIES SMF 7000 VALVES

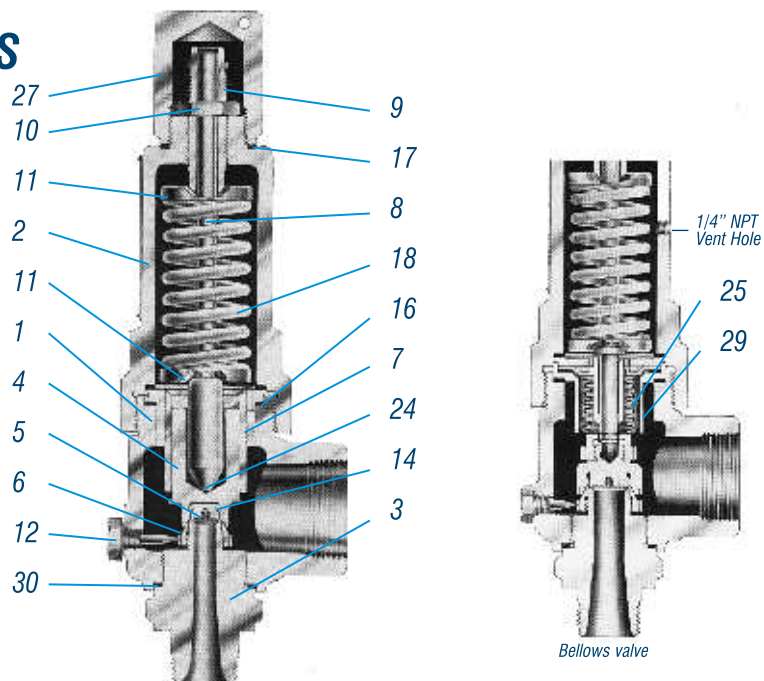


ORIFICE cm ² sq.in	Size IN/OUT (inches)	PRESSURE AND TEMP. LIMITS				
		INLET			OUTLET	
		Max Set Pressure bar				
		TEMPERATURE °C				
		-200 -29,5	-29 -200	200,5 400	Max Back Press. bar	
b 0,284 0,044	1/2 x 1	100	240	100	10	
c 0,426 0,066	1/2 x 1 1/2	100	240	100	10	
d 0,785 0,121	3/4 x 1 1/2	50	120	50	10	
e 1,389 0,215	1 x 1 1/2	35	80	35	10	
f 2,164 0,335	1 x 1 1/2	15	40	15	10	

On request: (1) For liquids OUT. 1/2"-3/4"-1"
Other dimensions on request



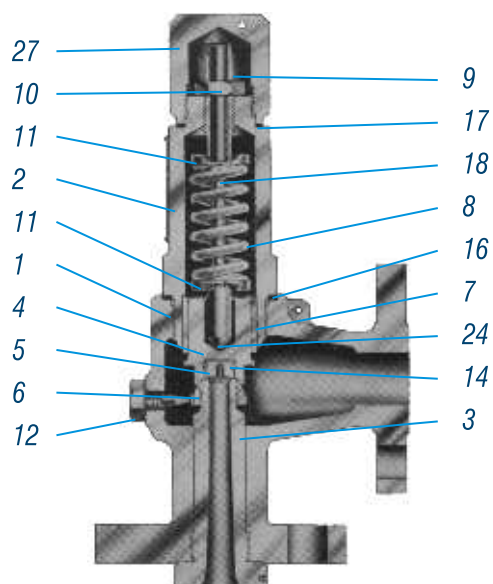
SERIES SMF*7000 VALVES



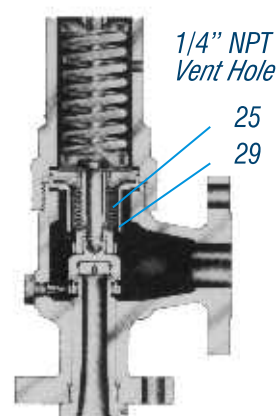
ORIFICE	Size IN/OUT (inches)	PRESSURE AND TEMP. LIMITS					
		INLET			OUTLET		
		Max Set Pressure bar			Max back press. bar		
		TEMPERATURE °C			Without Bellows	With Bellows	
cm ² sq.in		-200 -29,5	-29 -200	200,5 400			
b	0,284 0,044	1/2 x 1 1/2	200	400 ▲	350	10	-
c	0,426 0,066	1/2 x 1 1/2	200	400 ⊙	350	10	-
d	0,785 0,121	3/4 x 1 1/2	100	240	180	10	-
e	1,389 0,215	1 x 1 1/2	55	110	100	10	-
f	2164 0,335	1 x 1 1/2	28	55	50	10	10

On request: (1) For liquids OUT. 1/2"-3/4"-1"
Other dimensions on request

▲ For liquids max set pressure 1500 bar
⊙ For liquids max set pressure 800 bar



SERIES SU-7000 VALVES

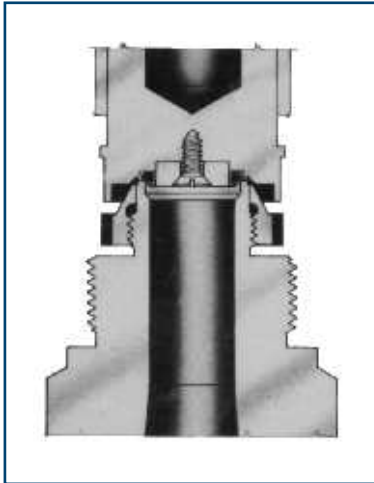


Bellows valve

ORIFICE	Size IN/OUT (inches)	Rating (API) IN/OUT	PRESSURE AND TEMP. LIMITS								
			INLET					OUTLET			
			Max Set Pressure					bar		Max Back Press. bar	
			TEMPERATURE °C							Without Bellows	With Bellows
-200 -45,5	-45 -29,5	-29 +38	38,5 200	200,5 400							
b 0,284 0,044	1/2x1	150 x 150	18,2	18,2	19,6	13,7	6,5	10	-		
	1/2x1 (1)	300 x 150	43	47,9	51	43,7	25,5	10	-		
	1/2x1 (2)	600 x 150	50	95,8	102	87,5	50	10	-		
	1/2x1 1/2	900 x 150	100	143,7	153	131	100	10	-		
	1/2x1 1/2 (2)	1500 x 150	100	240	240	218,5	100	10	-		
c 0,426 0,066	1/2x1	150 x 150	18,2	18,2	19,6	13,7	6,5	10	-		
	1/2x1 (1)	300 x 150	43	47,9	51	43,7	25,5	10	-		
	1/2x1 1/2 (1)	600 x 150	50	95,8	102	87,5	50	10	-		
	1/2x1 1/2 (2)	900 x 150	100	143,7	153	131	100	10	-		
	1/2x1 1/2 (2)	1500 x 150	100	240	240	218,5	100	10	-		
d 0,785 0,121	3/4x1	150 x 150	18,2	18,2	19,6	13,7	6,5	10	-		
	3/4x1 (1)	300 x 150	30	47,9	51	43,7	15	10	-		
	3/4x1 1/2 (2)	600 x 150	50	95,8	102	87,5	50	10	-		
	3/4x1 1/2 (2)	900 x 150	50	120	120	120	50	10	-		
e 1,389 0,215	1x1 1/2	150 x 150	18,2	18,2	19,6	13,7	6,5	10	-		
	1x1 1/2 (2)	300 x 150	35	47,9	51	43,7	25,5	10	-		
	1x1 1/2 (2)	600 x 150	35	80	80	80	35	10	-		
f 2164 0,335	1x1 1/2	150 x 150	15	18,2	19,6	13,7	6,5	10	10		
	1x1 1/2 (2)	300 x 150	15	40	40	40	15	10	10		

On request: (1) For liquids OUT. 3/4" ANSI 150/300 (2) For liquids OUT. 1" ANSI 150/300 Other dimensions on request

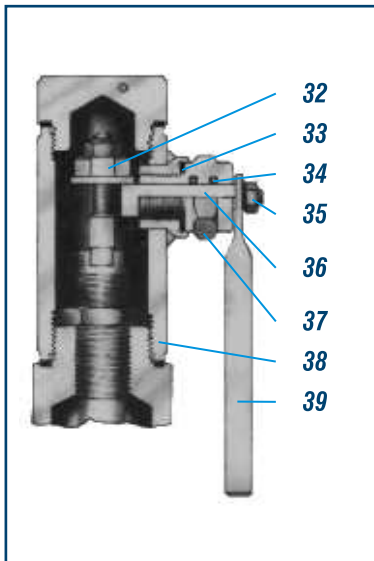
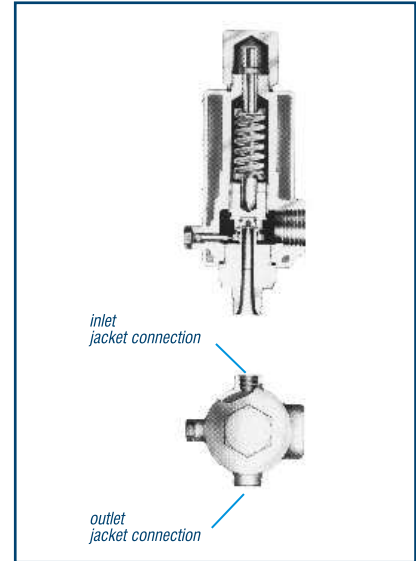
ACCESSORIES



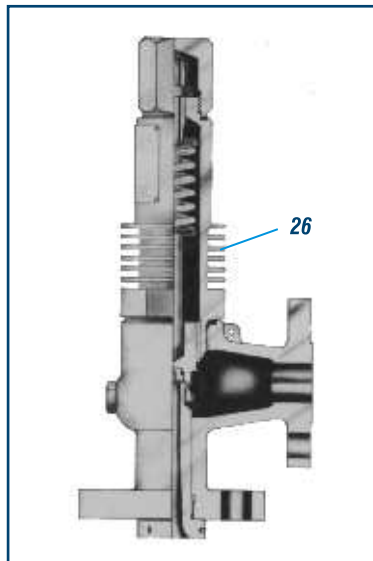
Soft seated disc (viton; Kalrez)
for low pressures and
temperatures (ORIFICE "d" - "e" - "f")



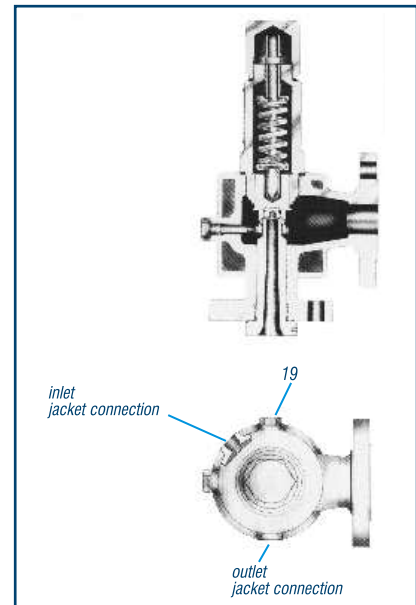
Cap with test gag



Cap with packed or plain lever



Closed Bonnet Valve with Extension



For All Orifieces Jacket Connction Will Be 1/3"
NPT-F jacket Limiting Pressure: 10 Bar Limiting
Temperature 185°C

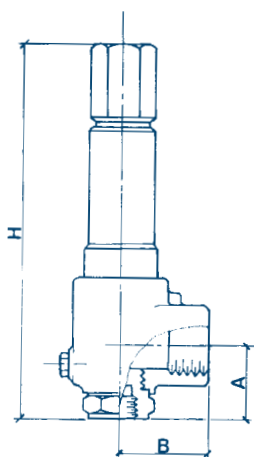


SERIES VALVES

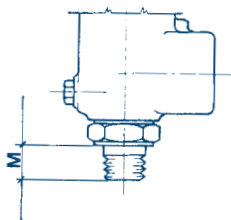
SMFN-7000

SMF-7000

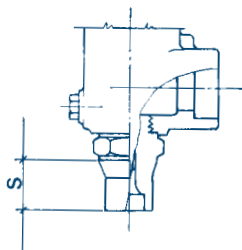
SMF*-7000



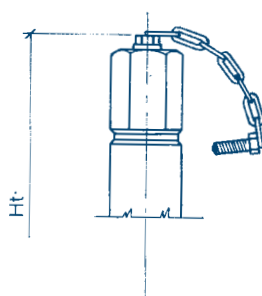
FEMALE SCREWED



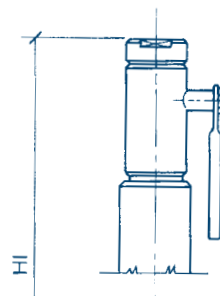
MALE SCREWED



WELDING CONNECTION



TEST GAG



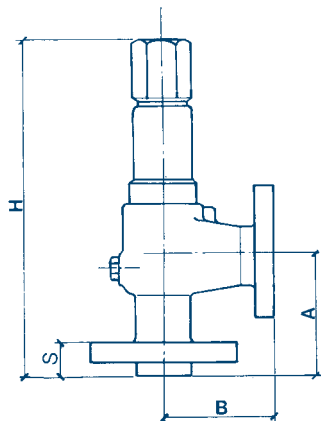
LIFTING LEVER

SIZE IN/OUT (inches)	DIMENSIONS AND WEIGHTS							Weight Kg
	mm							
	A	B	H	Ht	HI	M	S	
1/2 x 1	54	50	226	234	271	20	36	3
3/4 x 1	54	50	226	234	271	23	41	3
1 x 1	63	50	235	243	280	18	37	3
1/2 x 1 1/2	60	70	303	314	344	20	36	7
3/4 x 1 1/2	60	70	303	314	344	23	41	7
1 x 1 1/2	69	70	312	323	353	18	37	7

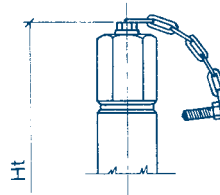
The dimensions and weights are approximate. **UKL-AST** will not assume any liability for discrepancies between actual dimensions and weights and those shown in this table.



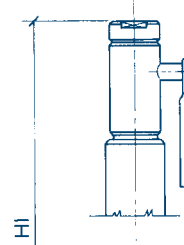
SERIES SU-7000 VALVES



FLANGED CONNECTIONS



TEST GAG



LIFTING LEVER

Size IN/OUT (inches)	Rating (ANSI) IN/OUT	DIMENSIONS AND WEIGHTS						Weight Kg
		mm						
		A	B	H	Ht	HI	S	
1/2 x 1	150 x 150	100	90	272	280	317	29	6
1/2 x 1	300 x 150	100	90	272	280	317	29	6
1/2 x 1 1/2	600 x 150	106	100	349	360	390	31	9
1/2 x 1 1/2	900 x 150	106	100	349	360	390	36	10
1/2 x 1 1/2	1500 x 150	106	100	349	360	390	36	10
3/4 x 1	150 x 150	100	90	272	280	317	31	6,5
3/4 x 1	300 x 150	100	90	272	280	317	31	6,5
3/4 x 1 1/2	600 x 150	106	100	349	360	390	31	9,5
3/4 x 1 1/2	900 x 150	106	100	349	360	390	39	10,5
1 x 1 1/2	150 x 150	106	100	349	360	390	31	9
1 x 1 1/2	300 x 150	106	100	349	360	390	31	10
1 x 1 1/2	600 x 150	106	100	349	360	390	31	10



STANDARD MATERIALS

VALVES STANDARD MATERIALS										
PART NAME	SMFN 7000 / SMF 7000 / SMF*7000					SU 7000				
	TEMPERATURE °C					TEMPERATURE °C				
	S4	SS4	LF2	STD	W	S4	LCB	LCC	STD	W
BODY	A479 304	A479 316	A350 LF2	A105	A105	A351 CF8	A352 LCB	A352 LCC	A216 WCB	A 216 WCB
BONNET	A479 304	A479 316	A350 LF2	A105	A105	AISI 304	A350 LF2	A350 LF2	A 105	A105
NOZZLE	A479 316	A479 316	A479 316	A479 316	A479 316	A479 316	A479 316	A479 316	A479 316	A479 316
DISC HOLDER	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600
DISC	A479 316	A479 316	A479 316	A479 316	A479 316	A479 316	A479 316	A479 316	A479 316	A479 316
ADJUSTING RING	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600
GUIDE	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600	UNS S31600
GASKET	GRAFITE	GRAFITE	GRAFITE	GRAFITE	GRAFITE	GRAFITE	GRAFITE	GRAFITE	GRAFITE	GRAFITE
SPRING	UNS S31600	UNS S31600	ALLOY STEEL	TUNGSTEN STEEL (b)	TUNGSTEN STEEL (b)	UNS S31600	TUNGSTEN STEEL (b)	TUNGSTEN STEEL (b)	ALLOY STEEL	TUNGSTEN STEEL (b)
STUD	A193 B8 (cl. 1)	A193 B8M (cl. 1)	A320 L7	A193 B7	A193 B7	A193 B8M (cl. 1)	A320 L7	A320 L7	A193 B7	A193 B7
NUT	A194 8	A194 8M	A194 4	A194 2H	A194 2H	A194 8M	A194 4	A194 4	A 194 2H	A 194 2H

Remark: On request the valves can be supplied partially or completely in AISI 316 - Monel - Hastelloy - Aluminum etc.

DEFINITIONS (abstract from EN ISO 4126-1)

Lift

The actual travel of the valve disc away from the closed position.

Flow area

The minimum cross-sectional flow area (but not the curtain area) between inlet and seat which is used to calculate the theoretical flow capacity, with no deduction for any obstruction.

Coefficient of discharge

The value of actual flowing capacity (from tests) divided by the theoretical flowing capacity (from calculation).

Built-up back pressure

The pressure existing at the outlet of a safety valve caused by flow through the valve and the discharge system.

Superimposed back pressure

The pressure existing at the outlet of a safety valve at the time when the device is required to operate. It is the result of pressure in the discharge system from other sources.

Certified (discharge) capacity

That portion of the measured capacity permitted to be used as a basis for the application of a safety valve. It may, for example, equal to the theoretical capacity times the coefficient of discharge times the derating factor.

Cold differential test pressure

The inlet static pressure at which a safety valve is set to commence to open on the test stand. This test pressure includes corrections for service conditions, for example, back pressure and/or temperature.



QUALIFICAZIONE  VALVOLE DI SICUREZZA

QUALIFICATION OF  SAFETY-RELIEF VALVES
ITALIAN STATE ORGANIZATION ANCC



A N C C

ASSOCIAZIONE NAZIONALE PER IL
CONTROLLO DELLA COMBUSTIONE

ENTE DI DIRITTO PUBBLICO - LEGGE 16 GIUGNO 1927 N. 1122

SEDE CENTRALE

Direzione Centrale Tecnica

ROMA, addì 10 MAG 1977

Ala AST

Via Merendi, 20
Cornaredo (Milano)

Risp. e del e p.c. Al Direttore della Sezione ANCC di
Prot. n. 21262 SP-V-A MILANO/UTENZA

OGGETTO: Qualificazione valvole di sicurezza AST per fluidi vari - Modelli SMFN -
7000, SMF - 7000, SU - 7000. -

Visti i risultati delle prove condotte presso l'Istituto di Macchine
del Politecnico di Milano,

si qualificano

le valvole di sicurezza di costruzioni AST con il coefficiente di efflusso:

- modelli SMFN - 7000, SMF-7000, SU-7000,

DN 1/2", 3/4", 1" : K = 0,972

per sovrappressione non inferiore al 10% della pressione di taratura e contro-
pressione non superiore a quella atmosferica.

00184 ROMA - VIA URBANA, 167 - TEL. 489844 - IND. TELEGR. ASSOCOMB ROMA

YR WE/sg

IL PRESIDENTE
(On. Dott. Alessandro Pavan)



Reseating pressure (of a safety valve)

The value of the inlet static pressure at which the disc re-establishes contact with the seat or at which the lift becomes zero.

Relieving pressure

The pressure used for the sizing of a safety valve which is \geq set pressure + overpressure.

Set pressure

The predetermined pressure at which a safety valve under operating conditions commences to open. It is the gauge pressure measured at the valve inlet at which the pressure forces tending to open the valve for the specific service conditions are in equilibrium with the forces retaining the valve disc on its seat.

Blowdown (of a safety valve)

The difference between set and re-seating pressures, normally stated as a percentage of set pressure except for pressures of less than 3 bar when the blowdown is expressed in bar.

Overpressure (of a safety valve)

A pressure increase over the set pressure, at which the safety valve attains the lift specified by the manufacturer, usually expressed as a percentage of the set pressure. This is the over-pressure used to certify the safety valve.

DISCHARGING COEFFICIENTS CERTIFIED SINCE 1977

reserves the right to alter the characteristics of here described products at any time and with out notice; all data contained in this catalogue are indicative and may be subject to change.



Safety & Control Valves

Manufactured under AST SpA licence - (SMU-7000, SMFN -7000, SU-7000).



AST SpA products distributed by

UNI KLINGER LIMITED Safety & Control Valves division - SMS-7100, Pilot operated valve, Control valve.

In view of technical progress designs and dimensions are subject to change without notice.

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