Base Load Power Hub (BLPH)

INSTALLATION, OPERATION AND MAINTENANCE MANUAL PSV

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SAFETY VALVE
30000 SERIES
PED & ASME

INSTALLATION & OPERATION MANUAL

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THIS PRODUCT IS A SAFETY RELIEF DEVICE, INTENDED TO USE IN CRITICAL APPLICATIONS. IMPROPER APPLICATION, INSTALLATION OR MAINTENANCE OF THESE SAFETY VALVES OR THE USE OF COMPONENTS OR PARTS NOT MANUFACTURED OR AUTHORIZED BY MANUFACTURER MAY RESULT IN A FAILURE OF THE DEVICE.

SAFETY VALVES IN INAPPROPRIATE OPERATING CONDITIONS COULD EXPOSE THE PLANT TO EXPLOSIVE RISK WITH INJURIES TO PEOPLE AND DAMAGES TO THINGS.

PLEASE PAY ATTENTION TO THE INSTRUCTIONS OF THIS MANUAL AND FOLLOW THEM WITH CONSCIENTIOUSNESS.

PROCESS INFO USED FOR MATERIAL SELECTION AND VALVE SELECTION ARE UNDER CUSTOMER RESPONSIBILITY AND VALVE SELECTION IS BASED ON THE USER / CUSTOMER INFORMATION.

SAFETY VALVE MAINTENANCE SHALL BE CARRIED OUT BY TECHNICAL PERSONNEL OR BY PERSONS WHO HAVE SUITABLE TECHNICAL TRAINING AND THE NECESSARY EXPERIENCE OR WHO HAVE BEEN INSTRUCTED BY THE END-USER OF THE PRODUCT.

ANY INSTALLATION, MAINTENANCE, ADJUSTMENT, REPAIR OR TEST PERFORMED ON TECHNICAL SAFETY VALVE SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THIS DOCUMENT AS WELL AS APPLICABLE NATIONAL AND INTERNATIONAL CODES AND STANDARDS.

1 SAFETY INFORMATION

The following chapters report advices regarding the security and shall be read carefully to reduce the risk of serious consequences to the health of workers and to ensure the plant integrity. Recommendations and precautions mentioned can't be exhaustive of all the possible consequences of incorrectly performed actions. The following instruction shall be always respected.

- **Observe all safety regulations in force in the operation area.**
- **Take into account process data before operating on device. Take into account that metal surface of safety valves could be at high or low temperatures.**
- **Carefully consider the consequences of any action.**
- **Always use individual protection device.**
- **Never stand in front of safety valve outlet. Never be close to a valve in an attempt to hear or identify the source of a leakage/ discharge. Remember that hot gases and vapors are not always visible.**
- **Decrease the operative pressure before every work on the safety valve.**
- **Never hit a safety valve under pressure as this may cause unexpected opening at a pressure lower than set pressure.**
- **Disassembly shall be achieved only after the depressurization and drainage of the device.**
- **Be especially careful and protect yourselves from discharges of hazardous substances that may be trapped inside the safety valve.**



BEFORE ANY OPERATION ON VALVES, INDIVIDUAL PROTECTION DEVICES SHALL BE USED.

2 APPLICABILITY

This manual is applicable to Technical safety valves series 30000 for CE and ASME certification.

3 REFERENCE STANDARDS

The following codes and standards are applied:

ASME VIII Div.1	General manufacturing requirements
ASME B16.34	Valve body thickness
ASME B16.5 / UNI / DIN	Flange sizes
ASME B1.1	Body/bonnet threads
ASME B1.20.1	NPT threads
ASME II D	Maximum allowed stress for materials
UNI 4535	ISO threads
API 520	Valve sizing and installation for gas, steam and liquid service.
ISO EN 4126-7	Operative characteristics and sizing
API 527	Tightness test
ASTM	Material properties
ASME II A-B-D	Material properties

4 EXCEPTIONS and RESIDUAL RISK

Manufacturer analysis doesn't take into account the effects of the following factor on the device.

a) Wind loads.
b) Earthquakes
c) Fatigue stress.

Please contact the manufacturer for info about the effects of the above mentioned factors on device performance.
In addition take into account that:

- Fire: safety valves could operate in fire conditions only if they are not directly wrapped by flames and if the temperature limits are respected. Otherwise it is necessary the use of protection and cooling application equipment.
- Solidification/Polymerization: phenomena as polymerization, solidification, sedimentation or fluid freezing can compromise the normal safety performance of the valve.

Take into account that other possible remaining risks during the operating of the valves are:

a) Metal surface temperature of safety valve.
b) Discharge safety valve due to an unexpected pressure increase of the protected system. **NEVER BE IN FRONT OF VALVE OUTLET.**

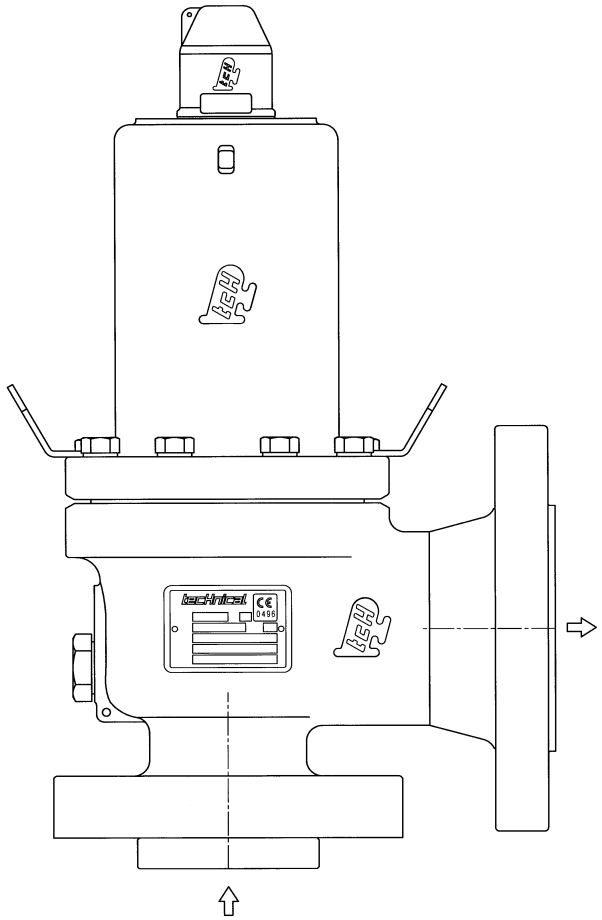
5 DEFINITIONS

In this manual following definitions are used:

BLOW-DOWN: Blowdown is considered as the difference between the set pressure of a pressure relief valve and actual reseating pressure expressed as a percentage of set pressure or in pressure units.
BUILT-UP BACKPRESSURE: static pressure generated by the discharge flow at the safety valve outlet.
CERTIFICATED CAPACITY: it is calculated multiplying the theoretic capacity by the discharge coefficient K_d and by the reducing coefficient 0,9, or multiplying the theoretic capacity by the certificated discharge coefficient K_{dr}.
COLD DIFFERENTIAL TEST PRESSURE: it is the set pressure on factory bench and could be different from set pressure for effects due to operating temperature or operating back pressure.
DERATED DISCHARGE COEFFICIENT K_{dr}: equal to the discharge coefficient K_d multiplied by the safety factor 0.9.
DISCHARGE AREA A: area used to calculate the theoretical capacity, without any deduction for possible obstructions. In case of a full lift valve, this area is equal to the minimum diameter of the valve nozzle (orifice).
DISCHARGE COEFFICIENT K_d: it is the ratio between valve measured capacity and valve theoretic capacity.
LIFT: lift of the valve disc.
RE-CLOSING PRESSURE: input pressure value necessary to the safety valve disk to re-establish the contact with the seat and to stop the continuous discharge as determined by seeing or hearing.
RELIEVING PRESSURE P_0: set pressure plus allowable overpressure.

ALLOWABLE OVERPRESSURE: allowable overpressure over the set pressure at which the valve attains the lift specified by the manufacturer. Usually overpressure is expressed as a percentage of the set pressure.
SET PRESSURE: it is defined by manufacturer. Technical defines the set pressure as the value of increasing inlet static pressure at which there is the first audible/visible discharge for gas and steam service and at which there is the first steady flow for liquid service.
SUPER IMPOSED BACKPRESSURE: static pressure that is found at the exit of the safety valve when it starts to open.
TOTAL BACKPRESSURE P_B: it is the combination of built-up and super imposed backpressure.

6 DESIGN



SAFETY VALVE FOR GASES, VAPOURS AND LIQUIDS

MAIN FEATURES

Spring loaded safety valve with:

- Conventional and balanced type.
- Full nozzle.
- Full lift type.
- Liquid, gas and vapour service.
- Orifice and overall dimensions according to API 526.
- Approval: CE, UV Stamp, EAC.
- Metal-to-Metal Seat

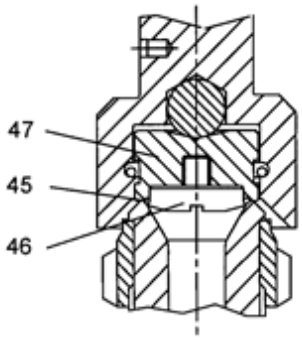
ACCESSORIES

- Soft
- Balancing Piston.
- Balancing Bellows.
- Test Gag.
- Jacket.
- Trevi Test Configuration.
- Packed Lever.
- Plain Lever.
- Limit Switch.

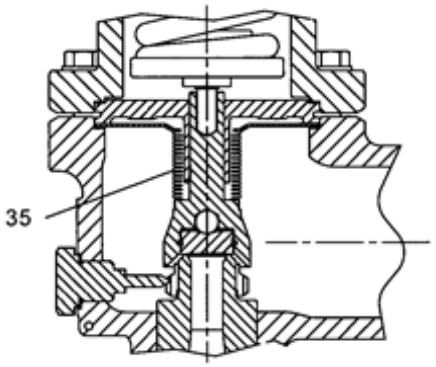
Safety valve **30000 Series,** designed and manufactured by **Technical s.r.l**. in accordance with **API 526** (overall dimensions)**,** are full nozzle and total lift type.
Safety valve 30000 series is suitable for liquid, gas and vapour services.
The bonnet contains the spiral spring that, depending on the use and type of fluid, can be assembled with closed cap or with open bonnet (vapour service).
The seat is plane and “metal to metal” type; soft sealing ring can be supplied on demand. Upon request, the valve is also available with accessories such as the packed or open lifting lever, test gag, balancing-isolation bellows, balancing piston, heating jacket, test gag, limit switch or/and Trevi test configuration.

CHARACTERISTICS AND PRESSURE LIMITS							
Type	ORIFICE ø mm	Area cm²	Area Sq. in	Lift mm	Max. set pressure bar	Max. backpressure without bellows bar	Max. backpressure 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

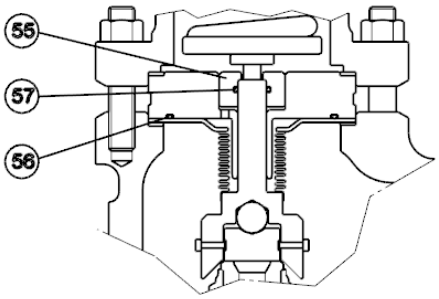
ACCESSORIES



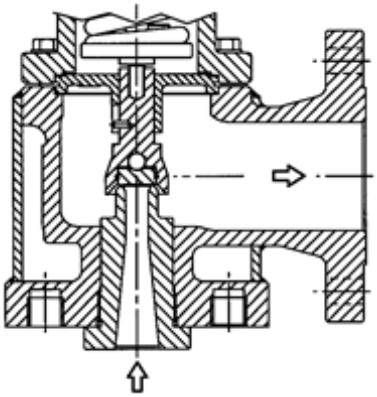
SOFT SEAT



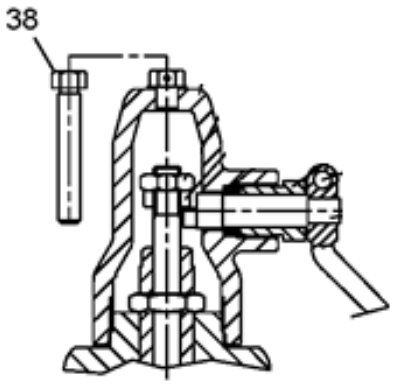
BELLOWS



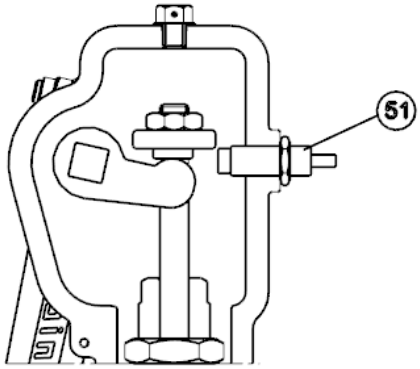
BALANCING PISTON



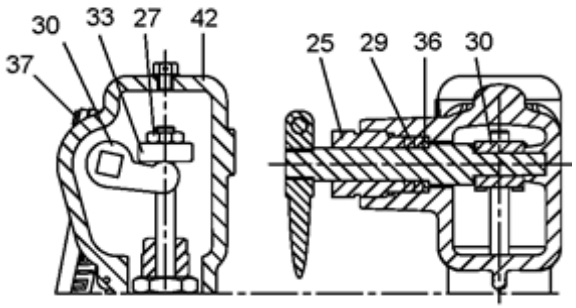
JACKET



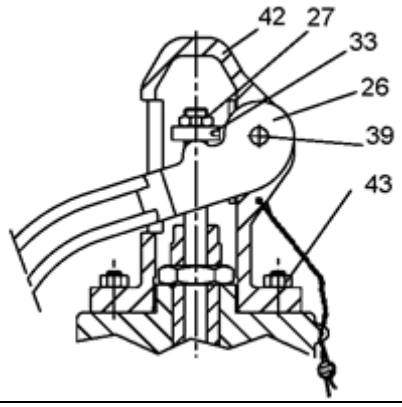
TEST GAG



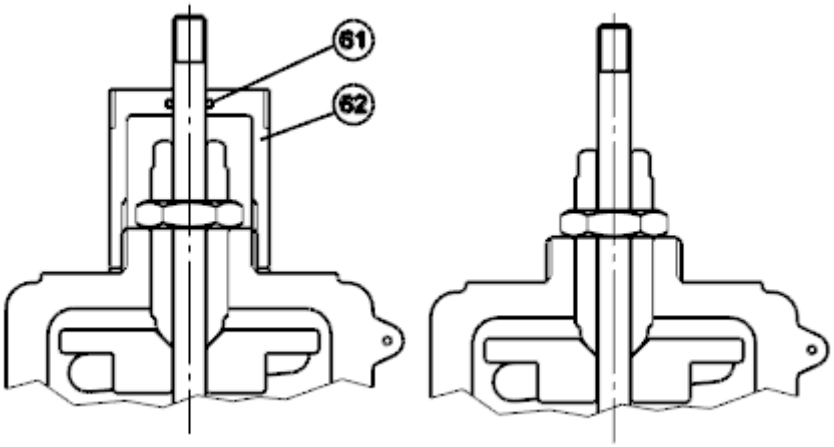
LIMIT SWITCH



PACKED LEVER



PLAIN LEVER



TREVI TEST CONFIGURATION

6.1 SOFT SEAT

Soft seat is design with an o-ring (45) fixed on the disc (47) screwing the seat screw (46).

O.ring material selection is in accordance with process data communicated by customer. Soft seat is particularly required when zero leakage tightness on seat is required.

6.2 BELLOWS

Balancing bellows (35) is applied to minimize the effect of back pressure on valve performance.

6.3 BALANCING PISTON

Balancing piston (55) is required when additional tool is required for minimize the effects of backpressure in case of bellows rupture. Balancing Piston slides inside a guide and requires 2 additional seal (56-57).

6.4 JACKET

Jacket (7a) is required for applications with high viscosity or crystallizing fluid.

6.5 TEST GAG

Test gag (38) is required to not damage the valve seat during transportation.

ATTENTION: REMOVE ALWAYS TEST GAG BEFORE INSTALLATION ON PLANT.

6.6 LIMIT SWITCH

Limit switch (51) is required to transmit a signal when valve is open.

6.7 PACKED LEVER

Packed lever (37) is required to test valve opening. Packed lever guarantees the tightness of the cap and could be supplied with threaded and flanged cap.

6.8 PLAIN LEVER

Plain lever (26) is required to test valve opening. Plain lever not guarantees the tightness of the cap and could be supplied with threaded and flanged cap.

6.9 TREVI TEST CONFIGURATION

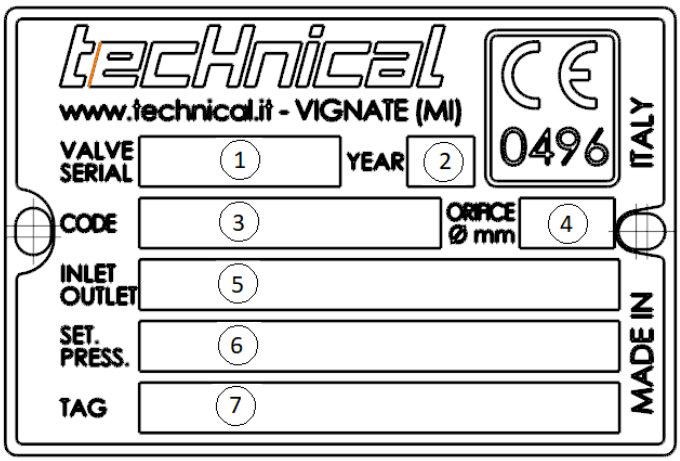
Trevi test configuration is required to verify on field the valve test pressure hooking the valve stem. In case of conventional valve, where the process fluid could damage the operator, an additional tool is required (62) with its seal (61) to perform the test.

7 NAMEPLATE

Nameplate is the first source of information about the device.

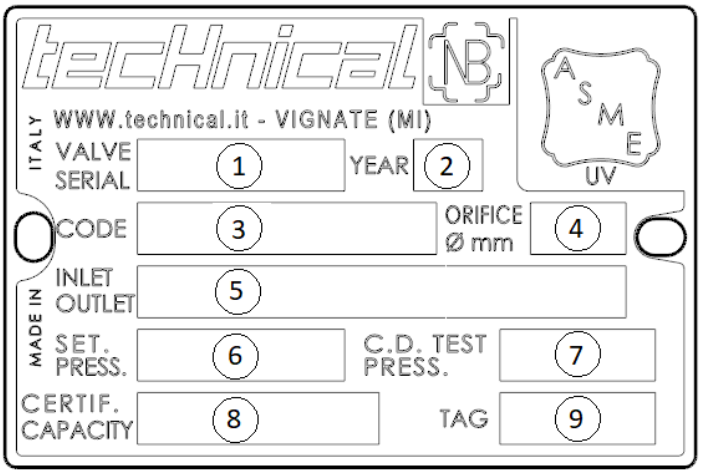
Any use not covered by this manual or outside the parameters as specified on the nameplate and on certificates provided together with the safety valve is not permitted and may compromise the health and safety of people as well as the integrity of the equipment.

7.1 PED NAMEPLATE



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Unique serial number	5	Inlet and outlet dimension and rating
2	Production year	6	Set pressure with consistent unit
3	Technical identification model code	7	Valve Tag
4	Orifice diameter with consistent unit		

7.2 UV STAMP NAMEPLATE



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Unique serial number	6	Set pressure with consistent unit
2	Production year	7	Cold differential test pressure
3	Technical identification model code	8	Certified capacity by National Board
4	Orifice diameter with consistent unit	9	Valve tag
5	Inlet and outlet dimension and rating		

7.3 ATEX NAMEPLATE

In case of application in explosive atmosphere an additional tag “Ex” is marked on nameplate in accordance with European Directive 2014/34/UE.



Equipment group: II
Equipment category: 2
Environment: Gas atmosphere [G]
Explosion protection: Intrinsic [c]
Gas group: IIC
Temperature Class: T6

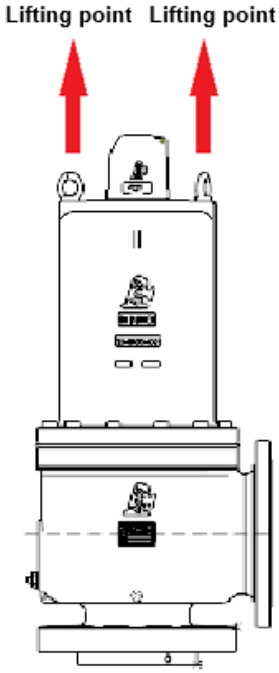
8 SETTING-UP

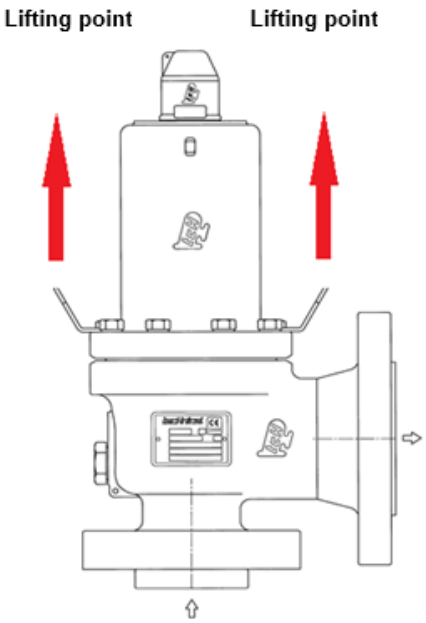
Before shipment all the safety valves are hydrostatically tested and set at the setting pressure required by the Client. The maximum setting deviation is less than 3% for pressure up to 2,1 MPa, with a minimum of 0,02 MPa; it is less than 0,07 MPa up to 7 MPa; it is less than 1% for pressure over 70 MPa.
If adjustment is required on field, please contact always the manufacturer.

9 STORAGE & HANDLING

We recommend to leave the valves in their original package till it is necessary to keep them operating.
Safety valves should be stored indoors, on pallets and away from dirt and other forms of contamination.
Safety valves should be handled with care and should not be subjected to shock. Some crashes or hard vibrations could create damages to seats endangering good valve operations.

Cleanness is determinant for a safety valve performance





10 INSTALLATION

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, for instruments or for things;
- the discharge is properly conveyed.

Before installation always verify that:

- **The maximum design pressure of the device protected by the safety valve should not be lower than the valve set pressure as reported on nameplate. For multiple installation, additional safety valves could have a set pressure above the design pressure.**

Proceed with installation only after verifying the integrity of manufacturer seals.
The original Technical guarantee is not valid if the seals are removed or damaged.

10.1 PIPING

Safety valve inlet piping shall have an internal diameter greater than or equal to the inner diameter of safety valve inlet flange. The connections between the valve and the vessel shall be as short as possible.
Inlet piping generates twisting moment and reaction forces during discharge. The inlet piping should be right sized and supported.

The downstream piping must be shortest and linear as possible. The exit connection of a safety valve must be connected to a pipe conveying in a safe area. The downstream piping shall have an internal diameter greater than or equal to the valve inner diameter outlet flange.
Actual backpressure on system/plant shall be consistent with data reported on sizing sheet.

A safety valve discharge must be conveyed in a safe and protected area, otherwise it could be dangerous for people and for the plant.

Using outlet piping with an inner diameter not consistent with the selected safety valve could generate hazardous situations and danger for people and things.

10.2 PRESSURE DROPS

Safety valve inlet piping (also curves and any isolating valves) shall be sized so that during fully open discharge the total pressure drop in the line does not exceed 3% of valve set pressure. Greater pressure drop could generate chattering and capacity reduction. Please contact manufacturer for additional info.

10.3 SUPPORTS

Inlet and outlet valve piping shall be sized and supported so that they can resist to reaction forces generated by the valve discharge.

Inlet and outlet piping shall be fixed in such a way to minimize/eliminate possible **vibrations**.

10.4 REACTION FORCES

Valve flow discharge generates stress due to the flow through the valve. If the downstream piping is not properly supported, the reactive loading due to valve operation will be transmitted to the valve and inlet piping.
Reference standard for reaction force calculation is usually API 520 Part II, for gas, vapors or mixture service.
For liquid service and additional information please contact the valve manufacturer.

10.5 ADDITIONAL FORCES

The safety valve outlet piping with conveyed discharge should be designed in order to prevent stresses which can be transferred to the valve or its inlet piping.
Such stresses can have thermal and/or mechanical nature.

- **Thermal stresses** are due to increase of temperature resulting from the flow of hot fluids during discharge, to prolonged sun exposure or to heat radiated from nearby equipment. These stresses should be minimized by means of flexible supports or anchorages, or providing expansion allowance.
- **Mechanical stresses** are mainly due to the weight of the discharge piping which could be not properly supported. Stresses caused by incorrect alignment of the valves piping must also be avoided.

10.6 DRAINAGES

30000 series are designed with drainage system on valve body. Please consider that during maintenance operations.

10.7 BELLOWS

In case of balanced safety valve, in presence on field of a very low ambient temperature during night and humidity in atmosphere during the day bellows could be damaged by the formation of ice during the nights. If this scenario is possible, please consider to keep in temperature the valve with electric tracking or something equal.

10.8 BLOWDOWN RING

Blowdown ring is fixed and sealed in factory by Technical. Any adjusting of blowdown ring shall be approved by Technical. Please contact us for info about blowdown ring adjustment.

10.9 PLANT HYDRAULIC TEST

If hydraulic test of the plant with mounted safety valve is required, take into account that valve could be damaged.

During the hydraulic test of the plant or of the device/vessel under pressure, the safety valves shall be disassembled or intercepted. The use of a blind flange is suggested.
For the use of test gag to block the valve lift please contact always the manufacturer.

11 START-UP

After following all the instructions reported on installation chapter, please proceed with start-up pressurizing the system protected by safety valve. Safety valve not required additional adjustment.
Manufacturer suggests to increase slowly the system pressure in order to evaluate eventual leakage from valve parts.

12 OPERATION

30000 safety valve is a spring loaded safety valve with full lift.
In case of overpressure scenario, 30000 safety valve fully opens relieving the flowrate necessary to restate the normal process condition.

13 MAINTENANCE

Maintenance and repair operations can be performed with a variable frequency based on operating conditions, process fluid and the frequency with which the valve discharges.
Normally, inspection frequency on the safety valves follows the same frequency of inspections on the protected pressure vessel or equipment.

Use always individual safe-protections tools, in particular hear protections and glasses.
Take care about the pressure system. Operate on the valve only with no pressure in the system.
Take care about the presence of toxic, noxious or dangerous fluids.
Take into account that severe service could be damaged the safety valve inner parts.
Maintenance and/or repair operations must be carried out by skilled personnel, which have received adequate training, according to the specifications and procedures of the manufacturer and also with respect to the laws in force in the country where the valve is installed.
Only use original spare parts supplied by manufacturer is permitted to guarantee PED conformity declaration, warranty and valve certificate void.

SUGGESTED ORDINARY MAINTENANCE PLAN	
Check of the seat and disc on the plant	Every valve opening / every 6-months of operation.
Check of the seal outwards 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 assembled on the plant, including the seal check and surface check of the movable components.	Every 12 months.
General maintenance of the valve removed from the plant including the disassembling, the seat and the disc check, the possible seat and disc lapping, gaskets substitution, painting restoration and inspection on the test bench.	Every 24 months of operation.

If no regulations exist, follow the guidance given in ORDINARY MAINTENANCE PLAN table reported above.

In case of valve leakage, inspection and maintenance shall be done as soon as possible.
For damage on seat, disc and nozzle could be repaired by skilled personnel.
For valve full repair, valve shall be removed by the plant and fixed on a test bench.
Some possible damage and relate solution are summarized on the table below.
For any other additional information or in case of no solution, please contact our Service Department.
The use of a "service manual" to archive all maintenance operations is strongly recommended.

14 DAMAGE TABLE

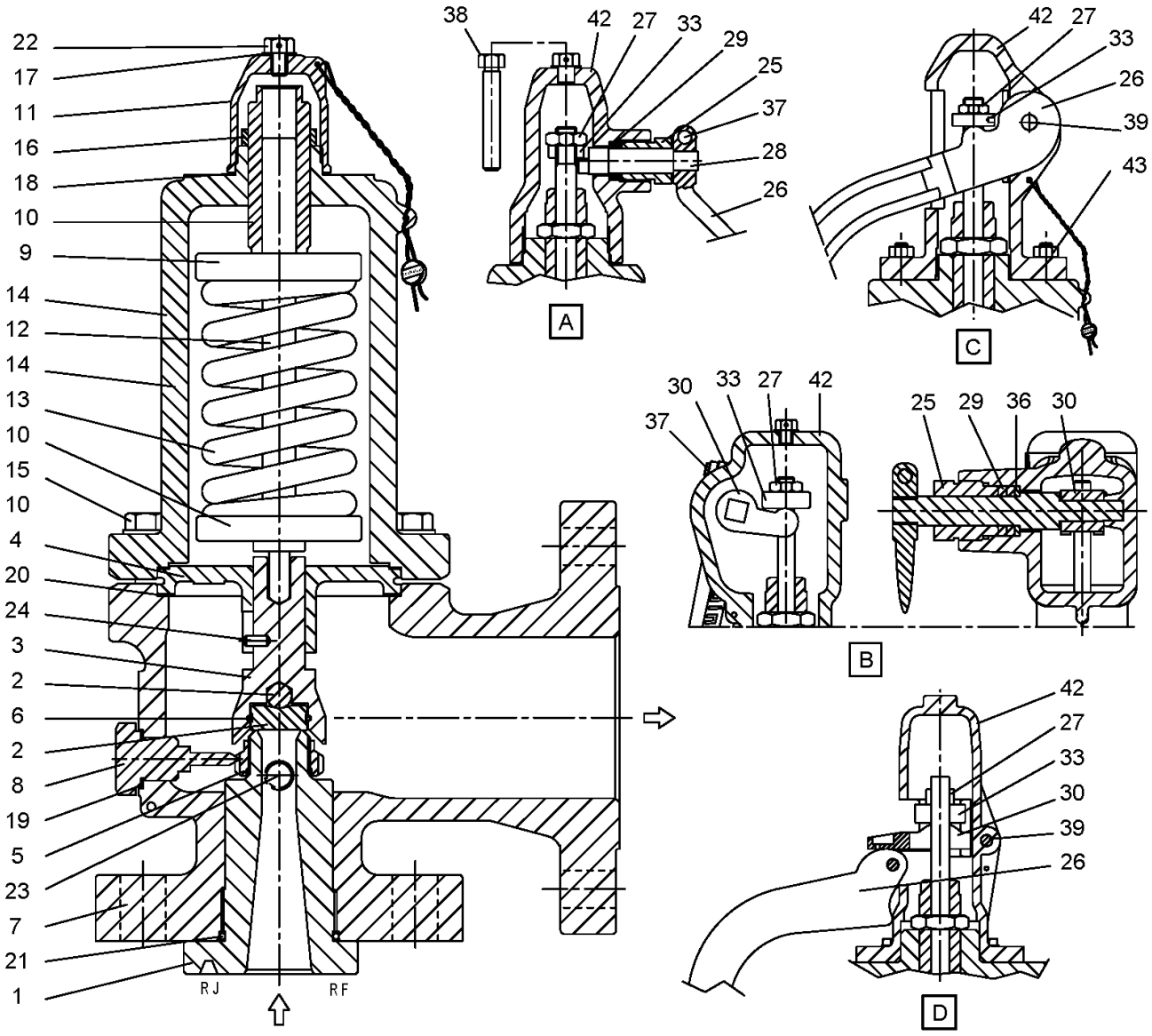
DAMAGE TABLE		
INCONVENIENT	***POSSIBLE DAMAGE***	***ACTION TO BE CARRIED OUT***
Fluid leakage in-line	*Seat wear and tear*	*Nozzle substitution or repair*
	Disc wear and tear	*Disc substitution or repair*
	Seat and disc damaging	*Nozzle and disc repair*
	Impurities presence between seat and disc	*Nozzle and disc cleaning and repair*
	Valve-use with fluid different from the one stated in the purchase order	*Nozzle and disc repair*
External back pressure fluid leakage.	*Valve gaskets damaging*	*Gaskets substitution*
	Valve body-bonnet damaging	*Valve repair or substitution*
	Cap or blowdown screw loosen	*Check and setting-up of the cap and of the blowdown screw.*
Opening at pressure value different form 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*
	Pulsating flow rate to be discharged	*Check plant regulation.*
	Over dimensioned valve	*Substitute the valve with one correctly dimensioned.*

15 VALVE DISASSEMBLY

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

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).



ITEM	PARTS	ITEM	PARTS	ITEM	PARTS
1	NOZZLE	17	GASKET	37	LEVER SCREW
2	DISC	18	GASKET	38	TEST GAG
2	BALL	19	GASKET	39	SCREW
3	DISC HOLDER	20	GASKET	42	LEVER CAP
4	STEM GUIDE	21	GASKET	43	NUT / SCREW
5	BLOWDOWN RING	22	SCREW	45	GASKET
6	RING	23	PLUG	46	SOFT SEAT SCREW
7	BODY	24	PIN	47	SOFT SEAT DISC
8	BLOWDOWN SCREW	25	RING NUT	51	
9	SPRING GUIDE	26	LEVER	55	
10	ADJUSTING SCREW	27	LOCK NUT LEVER	56	
11	CAP	28	CAMSHAFT	57	
12	STEM	29	PACKING RING	61	
13	SPRING	30	FORK	62	
14	BONNET	33	SPACER		
15	SCREW /	35	BELLOWS		
16	LOCK NUT	36	SPACER		

15.1 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.*

15.2 VALVE WITH PACKED LEVER

15.2.1 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.*

15.2.2 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.*

15.3 VALVE WITH OPEN LEVER

15.3.1 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.*

15.3.2 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.*

16 VALVE ASSEMBLY

16.1 VALVE WITHOUT ACCESSORIES

*For assembling carry out the same operations of point **15.1)** 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).*

16.2 VALVE WITH PACKING LEVER

16.2.1 Type “A”

*For assembling carry out the same operations of point **15.2.1** 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.

16.2.2 Type “B”

*For assembling carry out the same operations of point **15.2.2** 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.

16.3 VALVE WITH OPEN LEVER

16.3.1 Type “C”

*For assembling carry out the same operations of point **15.3.1** 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

16.3.2 Type “D”

*For assembling carry out the same operations of point **15.3.2** 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.

17 VALVE TESTING

17.1 HYDROSTATIC TEST

Before shipment all the safety valves are hydrostatically tested and set at the setting pressure required by the Client.

17.2 SET PRESSURE

The maximum setting deviation is:

SET PRESSURE	MAXIMUM ACCEPTABLE DEVIATION
Set pressure <= 0,5 MPa	0,015 MPa
0,5 MPa < Set pressure <= 7 MPa	3%
Set pressure > 7 MPa	1%

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:

- remove the cap (15) and unloosen the lock nut (17);
- turn the adjusting screw (12) clockwise in case the set pressure should be increased;
- turn the adjusting screw (12) counter-clockwise in case the set pressure should be decreased.

The adjustment range of the spring setting is ± 5 % of the set pressure indicated on the label of the valve.
Once the valve setting is regulated tighten the lock nut (17) and re-screw the cap (15).
Set pressure calibration shall be performed on field by authorized and appropriately skilled people.
Set pressure calibration requires the seal removal and original warranty expire.

17.3 SEAT TIGHTNESS TEST

Using a leak detection system apply a blind flange for leak testing to the main valve outlet flange and slowly increase the supply inlet pressure until 90% of set pressure. For set pressure lower than 0,345 MPa g, the test pressure shall be equal to 0,0345 MPa less than set pressure. Check the seat tightness and verify the leakage in accordance with API 527.Minimum waiting times for leakage evaluation are:

SERVICE	MINIMUM WAITING TIME
GAS – STEAM – VAPOR	2 minutes
LIQUID	1 minute

18 SPARE PARTS

For spare parts for 2 years please refer always to the valve drawing supplied during order.

19 SERVICE LIFE

Technical provides full traceability of product documentation for a maximum of 30 years. Valve service life strictly depends on operating conditions and maintenance plan.Severe service could reduce the estimated period of life.
Warranty period is, in any case, defined in contractual documents.

20 SEALS & WARRANTY

Warranty period is always defined in contractual documents.
Seal removing from not authorized personnel declares the warranty expire.

21 DECOMMISSIONING & DISPOSAL

Safety valve is made by metal parts and plastic and rubber parts (gasket, o-ring, lip-seal) and in some cases from painting parts. Before operating with disposal, end-user shall deeply evaluate the history of the device and the process conditions at which the device operated during its service life.
Disposal of safety valve shall be always in accordance with local laws.



20060 Vignate (MI) - Italy

ADDENDUM AL MANUALE D'USO E MANUTENZIONE	ADDENDUM TO OPERATING AND MAINTENANCE MANUAL
ATEX	
DIRETTIVA EUROPEA	**EU DIRECTIVE**
2014/34/EU	
IN ACCORDO A / ACCORDING TO	
UNI CEI EN ISO 80079-36:2016 & UNI CEI EN ISO 80079-37:2016 [para.]	

1. Classe di temperatura [Part 36, par. 6.2]

La temperatura superficiale della valvola dipende delle condizioni operative e non dalla valvola in sé (vedi UNI CEI EN ISO 80079-36:2016, par. 6.2.5 e 6.2.7); le valvole assumono la temperatura del fluido che le attraversa o la temperatura ambientale o una temperatura intermedia tra le due pertanto la classe di temperatura applicabile è definita come:

Valvole con corpo e coperchio metallici
T6...T1
T85°C…T450

Valvole con corpo e/o coperchio in plastica
T6
T85°C

L'effettiva temperatura superficiale della valvola viene quindi determinata dall'applicazione (temperatura del fluido) e dall'installazione (temperatura ambiente). Inoltre a valvola chiusa, quindi con valvola non percorsa dal fluido, la temperatura superficiale si riduce notevolmente in base a fattori quali la lunghezza del tronchetto di installazione a monte della valvola e l'eventuale coibentazione.

Nel caso di Gas, le Classi di temperatura applicabili secondo UNI CEI EN ISO 80079-36:2016 sono le seguenti (par. 6.2.5 Table 2):

Classe	Temperature del fluido = Temperatura della valvola °C
T1	≤ 450
T2	≤ 300
T3	≤ 200
T4	≤ 135
T5	≤ 100
T6	≤ 85

1. Temperature class [Part 36, par. 6.2]

The surface temperature of the valve depends on the operating conditions and not on the valve itself (see UNI CEI EN ISO 80079-36:2016, par. 6.2.5 and 6.2.7); the valves reach the temperature of the fluid passing through them or the ambient temperature or an intermediate temperature between the two. Therefore, the applicable temperature class is defined as follow:

Valves with metal body and bonnet
T6... T1
T85°C...T450

Valves with plastic body and/or bonnet
T6
T85°C

The actual surface temperature of the valve is therefore determined by the application (fluid temperature) and installation (ambient temperature). In addition, when the valve is closed and therefore not crossed by fluid, the surface temperature is greatly reduced according to factors such as the length of upstream piping of the valve and the possible insulation.

In the case of Gas, the temperature classes applicable according to UNI CEI EN ISO 80079-36:2016 are as follows (par. 6.2.5 Table 2):

Class	Fluid Temperature = Valve Temperature °C
T1	≤ 450
T2	≤ 300
T3	≤ 200
T4	≤ 135
T5	≤ 100
T6	≤ 85

2. Scintilla da singolo urto e per frizione [Part 36, par. 6.4.2 - 6.4.3] Il rischio di innesco per scintilla da singolo urto è considerato non applicabile perché le parti in movimento hanno velocità inferiore a 1 m/s, i materiali utilizzati non sono alluminio, titanio, magnesio; i materiali contengono magnesio, titanio e zinco per un totale inferiore al 7.5%; i componenti mobili in contatto tra loro (guide, boccagli otturatori) hanno durezza differenziate.	**2. Single impact spark and friction [Part 36, par. 6.4.2 - 6.4.3]** The risk of single impact spark ignition is considered not applicable because moving parts have speeds less than 1 m/s, the materials used are not aluminium, titanium, magnesium; materials contain magnesium, titanium and zinc for a total of less than 7.5%; the mobile components in contact with each other (guides, nozzle, disc) have different hardness.
3. Guarnizioni per parti mobili [Part 37 par 5.3 - 5.5 - 5.6 - 5.7] Sulla valvola possono essere presenti guarnizioni sulle parti in movimento. Le guarnizioni sono realizzate in materiali autoestinguenti. La velocità reciproca tra i componenti è inferiore a 1 m/s. Non è possibile l'innesco per temperature elevate. Inoltre non sono presenti guarnizioni lubrificate e parti lubrificanti, le valvole non sono soggette a vibrazioni e non ci sono cuscinetti e sistemi di trasmissione di potenza.	**3. Gaskets for moving parts [Part 37 par 5.3 - 5.5 - 5.6 - 5.7]** There may be gaskets on the moving parts of the valve. The seals are made of self-extinguishing materials. The reciprocal velocity between components is less than 1 m/s. The ignition is not possible due to high temperatures. In addition, there are no lubricated gaskets, lubricating parts and the valves are not subject to vibration and there are no bearings and power transmission systems.
4. Molle [Part 37 par 5.12] Le molle sono tutte calcolate secondo un foglio di calcolo realizzato da TECHNCIAL che poi viene verificato dal fornitore delle molle. In caso di rottura della molla non si creano scintille e/o sovratemperature che innescano l'atmosfera.	**4. Springs [Part 37 par 5.12]** All the springs are calculated according to a spreadsheet made by TECHNCIAL and verified by the supplier of the springs afterwards. In the event of spring failure, no sparks and/or over-temperature are created that could trigger the atmosphere.
5. Componenti elettrici montati come accessori [Part 36, par. 6.5] Normalmente le valvole non sono equipaggiate con componenti elettrici. Qualora il cliente richieda accessori elettrici particolari, quali ad esempio fine corsa di prossimità e relative cassette di derivazione, le stesse saranno acquistate con il grado di protezione e la certificazione richieste dal cliente per la zona di applicazione.	**5. Electrical components mounted as accessories [Part 36, par. 6.5]** Valves are not normally equipped with electrical components. If the customer requests special electrical accessories, such as proximity sensors and related junction boxes, they will be purchased with the protection degree and certification required by the customer for the application area.
6. Fulmini [Part 36, par. 6.6] Eventuale protezione dai fulmini è demandata alle installazioni circostanti alla valvola. La valvola in sé, laddove installata in posizioni più alte rispetto alle strutture circostanti, non ha una protezione dai fulmini.	**6. Lighting [Part 36, par. 6.6]**: Possible protection from lightning is left to the installations surrounding the valve. The valve itself, when installed in higher positions than the surrounding structures, does not have lightning protection.

7. Elettricità statica e correnti parassite [Part 36, par. 6.6 - 6.7] Dopo l'installazione va verificata la **continuità elettrica** tra le flange di accoppiamento valvola e tubazione al fine di evitare differenze di potenziale che possano provocare scintille. Inoltre va verificata la necessità di **messa a terra**, in funzione dell'impianto dove la valvola è installata. Queste verifiche sono ad opera e responsabilità dell'istallatore.	**7. Static electricity and eddy current [Part 36, par. 6.6 - 6.7]** After installation, **electrical continuity** between the valve and pipe coupling flanges must be checked in order to avoid potential differences that may cause sparks. In addition, the need for grounding should be checked, depending on the system where the valve is installed. These checks must be carried out by the installer and are under his responsibility.
8. Cariche elettrostatiche, verniciatura e gruppi di fluido ISO 800079 [Part 36, par. 6.7.5] - Le valvole sono idonee per l'uso con gas del **gruppo IIC** (idrogeno e acetilene) purché la verniciatura delle valvole sia inferiore a 200 micron oppure venga fatta con vernici conduttive. Una vernice spessa oltre i 200 micron e non conduttiva potrebbe generare una differenza di potenziale tale da rendere la valvola non idonea ai fluidi del gruppo IIC (NOTA: Una valvola idonea per il gruppo IIC è idonea anche per i gruppi IIA e IIB). - Verniciature fino a 2 mm (2000 micron) rendono la valvola idonea ai gas dei **gruppi IIB e IIA**. - Per verniciature oltre i 2 mm necessita fare un'analisi specifica per determinare il gruppo dei fluidi applicabile. - Non è ammessa la **riverniciatura** delle valvole dopo la consegna a meno che non si garantisca che lo spessore totale non aumenti.	**8. Electrostatic charges, painting and fluid groups ISO 800079 [Part 36, par. 6.7.5]** - The valves are suitable for use with gas of **group IIC** (hydrogen and acetylene) if the paint of the valves is less than 200 microns or made with conductive paints. A paint that is over 200 microns thick and non-conductive could generate a potential difference such as to make the valve unsuitable for IIC group fluids. (NOTE: a valve suitable for the IIC group is also suitable for groups IIA and IIB.) - Paintings up to 2 mm (2000 micron) make the valve suitable for gases of **groups IIB and IIA.** - For paintings over 2 mm, it is necessary to make a specific analysis to determine the applicable fluid group. - Valve **repainting** after delivery is not allowed unless it is ensured that the total thickness does not increase.
9. Gruppo III Polveri - Scariche elettrostatiche [Part 36, par. 6.7.6] Le valvole vanno tenute pulite evitando l'accumulo di polvere; per la **pulizia** usare strumenti che non generino scintille quali ad esempio stracci umidi.	**9. Group III Powders - Electrostatic discharges [Part 36, par. 6.7.6]** The valves must be kept clean while avoiding the accumulation of dust; for cleaning use tools that do not generate sparks such as damp rags.

10. Onde d'urto [Part 36, par. 6.8] La valvola mette in comunicazione due zone con differenza di pressione che può essere elevata. Il funzionamento stesso della valvola prevede che alla bocca di uscita si generino onde di pressione, delle quali va tenuto conto convogliando opportunamente il fluido in uscita dalla valvola.	**Shock waves**: The valve connects two zones with a pressure difference that can be high. The operation of the valve requires pressure waves to be generate at the outlet, which must be taken into account by appropriately conveying the fluid downstream of the valve.
11. Gruppo III Polveri - Deposito di polveri nelle parti in movimento [Part 36, par. 7.1] È possibile l'ingresso di polvere nella guida con rischio di blocco della valvola o apertura ritardata, per questo motivo sono previsti l'installazione di soffietti di protezione e/o il convogliamento dello scarico in zona protetta dalla polvere. Nel caso di installazione di soffietto viene installato un filtro antipolvere sulla connessione di sfiato del coperchio.	**11. Group III Dust - Dust deposit in moving parts [Part 36, par. 7.1]** It could happen that dust settles in the guide with the risk of valve blocking or delayed opening, for this reason protective bellows are provided and/or the drain is conveyed to a dust-protected area. In the case of bellows installation, a dust filter is installed on the vent connection of the bonnet.
12. Uso Improprio [Part 36, par. 10] La valvola viene fornita con il manuale d'uso e manutenzione, corredato del presente "Addendum ATEX" che è redatto in base all'analisi dei rischi (IHA Ignition Hazard Assessment) depositato presso l'Ente Notificato.	**12. Improper use [Part 36, par. 10]** The valve is supplied with the user and maintenance manual, accompanied by this "Addendum ATEX" which is drawn up based on the risk analysis (IHA Ignition Hazard Assessment) deposited with the Notified Body.
13. ESCLUSIONI Il malfunzionamento che provoca l'apertura e chiusura della valvola ad alta frequenza, con contatto (urto) tra boccaglio ed otturatore (in inglese "chatter") è considerato raro e quindi escluso dal Livello di Protezione dell'Apparecchiatura **(EPL) Gb**. Inoltre il "chatter" è una condizione fortemente condizionata dall'installazione e quindi fuori dalla diretta responsabilità del costruttore della valvola.	**13. EXCLUSIONS** The malfunction that causes the valve to open and close at high frequency, with contact (impact) between the disc and the nozzle seat (the so called chatter phenomenon), is considered rare and therefore excluded from the Equipment Protection Level **(EPL) Gb**. In addition, the chatter is mainly conditioned by the installation and therefore out of the direct responsibility of the valve manufacturer.

14. AVVERTIMENTI [Part 36, par. 11.3] Il rischio di Elettricità statica è presente per le VALVOLE IN MATERIALI PLASTICI (per esempio ma non solo, PVC, PVC-C, PVC-U, PP, PVDF, PTFE) qualora vengano strofinate (ad esempio con l'intento di pulirle). È un rischio legato all'utilizzatore e non alla valvola in sé. Sono presenti una "X" in marcatura ed una targa aggiuntiva di avvertimento sul prodotto: **ATTENZIONE - POTENZIALE RISCHIO PER CARICHE ELETTROSTATICHE**	**14. WARNINGS [Part 36, par. 11.3]** The risk of Static Electricity is present for PLASTIC VALVES (e.g. but not only, PVC, PVC-C, PVC-U, PP, PVDF, PTFE) when they are rubbed (e.g. with the intention of cleaning them). It is a risk related to the user and not to the valve itself. There is an "X" in the marking and an additional warning plate on the product: **WARNING - POTENTIAL ELECTROSTATIC CHARGING HAZARD**
15. MARCATURA [Part 36, par. 11] La targhetta con la marcatura viene fissata saldamente alla valvola con filo metallico o tramite rivetti (in funzione dello spazio disponibile). **La marcatura sarà come segue:**	**MARKING** The marking plate is securely attached to the valve with wire or rivets (depending on the available space). **Marking will be as follow:**
Valvole con corpo e coperchio metallici, non verniciate o con spessore di vernice (DFT) fino a 0,2 mm (200 micron):	Valves with metal body and bonnet, unpainted or with paint thickness (DFT) up to 0.2 mm (200 microns):
II 2G Ex h IIC T6...T1 Gb **II 2D Ex h IIIC T85°C…T450°C Db** **Tech. file at DNV 10000455040-PA-NA-ITA**	
Valvole con corpo e coperchio metallici e con spessore di vernice (DFT) fino a 2 mm (2000 micron):	Valves with metal body and bonnet and with paint thickness (DFT) up to 2 mm (2000 micron):
II 2G Ex h IIB T6...T1 Gb **II 2D Ex h IIIC T85°C…T450°C Db** **Tech. file at DNV 10000455040-PA-NA-ITA**	
Valvole con corpo e/o coperchio in plastica (per esempio ma non solo, PVC, PVC-C, PVC-U, PP, PVDF, PTFE):	Valves with plastic body and/or bonnet (e.g. but not only, PVC, PVC-C, PVC-U, PP, PVDF, PTFE):
II 2G Ex h IIB T6 Gb X **II 2D Ex IIIC T85°C Db X** **Tech. file at DNV 10000455040-PA-NA-ITA** *In aggiunta, targhetta di avvertimento con la dicitura* *In addition, a warning plate with the following wording:* **ATTENZIONE - POTENZIALE RISCHIO PER CARICHE ELETTROSTATICHE** **WARNING - POTENTIAL ELECTROSTATIC CHARGING HAZARD**	