

**P.A. – S.p.A. – EQUIPAGGIAMENTI TECNICI DEL LAVAGGIO**

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**VS 80A/150-280 INOX 316 ATEX**

Technical Manual: E 228

Relief valve

- **60.0590.00** TYPE B
- **60.0590.60** TYPE A

- Body and internal parts made of stainless steel Aisi316.

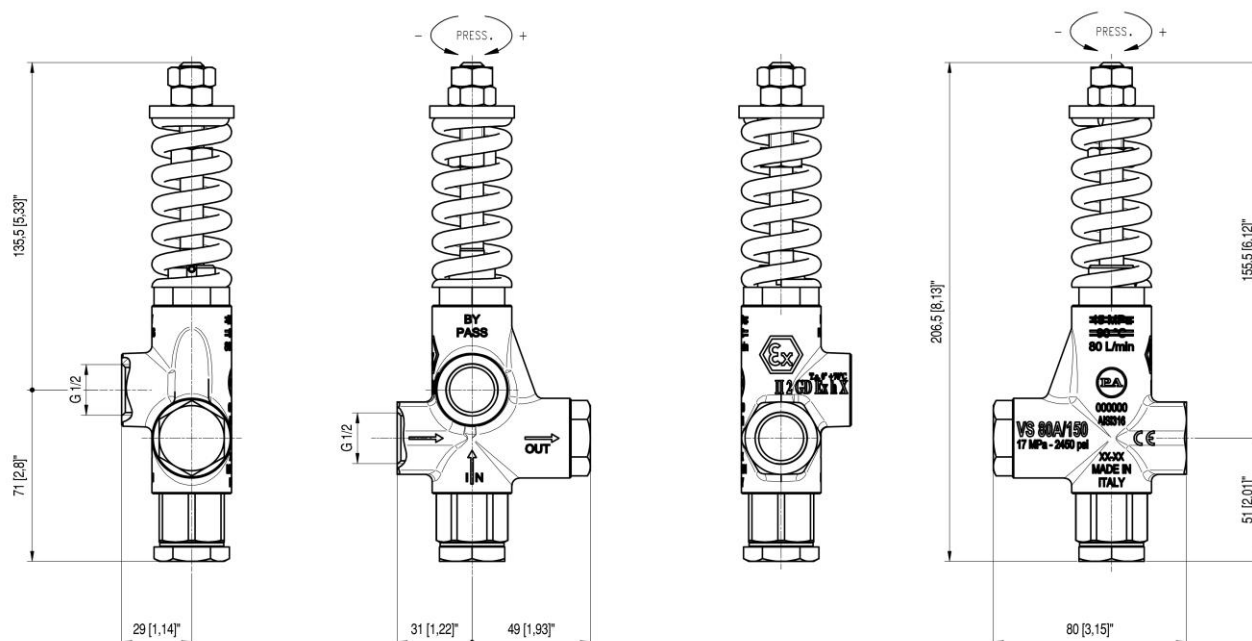
CERTIFICATIONS AND STANDARDS

- Atex Directive 2104\34\EU
- **CE** compliant

TECHNICAL SPECIFICATIONS

Construction material		Body and internal parts made of stainless steel Aisi316.								
Rated temperature		70°C – 158°F								
Nominal Diameter		DN15								
PN	RATED PRESSURE		PERMISSIBLE PRESSURE		PRE-SET PRESSURE		MAXIMUM FLOW		WEIGHT	INLET OUTLET BYPASS
	bar	psi	bar	psi	bar	psi	l/min	USGpm	g	
60.0590.00	150	2200	170	2450	-	-	80	21	1180	1/2" Bsp F
60.0590.60	280	4050	310	4500	-	-	80	21	1210	1/2" Bsp F

DIMENSIONAL DRAWING



SELECTION

This product is to be utilized with clean fresh water, even slightly additivated with normal detergents. For use involving different or corrosive liquids, contact the PA Technical department. Appropriate filtration should be installed when using impure liquids. Choose the valve in line with the working data of the machine where to be installed (permissible pressure, maximum flow rate and rated temperature of the system). In any case, any over-pressure of the machine must not exceed the permissible pressure marked on the valve.

OPERATION

The valve limits the maximum pressure of the system. In the event of over-pressure, this relief valve will open to allow the liquid to by-pass. During normal system operation, a shutter driven by a spring will keep the bypass opening close. The set valve pressure can be regulated by adjusting the spring load by means of the dedicated adjusting screw.

INSTALLATION

This product is intended to be incorporated on a finished machine. On a machine that produces hot water, this valve must be fitted upstream the heat generator. In addition it is recommended to install devices that limit the fluid temperature accidental increase.

DISCHARGE SYSTEM AND WATER ADDUCTION

It is advisable to direct the bypass discharge liquid to a baffled tank that will reduce possible turbulence and air bubbles generated by the immission of the bypass flow, which could be harmful for the pump.

When large flow volumes, close to the max flow rate, are used, it is not advisable to return the bypass liquid to the pump as this may cause dangerous pressure spikes, dangerous for the pump.

PRESSURE ADJUSTMENT/SETTING

The valve is supplied without pressure setting. The setting is done with the system "on" and with pressure inside the circuit. The valve setting pressure is achieved by operating on the adjusting screw (pos.7): by screwing it, the set pressure will increase. Once the desired pressure is attained, block the screw by locking the counternut (pos.7)

TROUBLESHOOTING

PROBLEMS	PROBABLE CAUSES	SOLUTIONS
Leaking out the bypass port during normal system operation.	- Seat or shutter is worn. - Foreign material is jammed between seat and shutter.	- Replace. - Clean.
	- System working pressure is above the set pressure.	- Re-set the system pressure.

REGULATIONS

See **SAFETY NOTE SN03**.

The accessory hereby described bears the CE marking in accordance with the standards and directives published in the Declaration of conformity.

For a correct utilization, follow the directions described in this manual and re-print them on the Use and Maintenance manual of the machine. If needed, ask for the original Conformity Declaration for the chosen accessory.

The present manual is valid for all unloader valves named **VS 80/150 INOX 316 ATEX - VS 80/280 INOX 316 ATEX**.

T.a.0÷70° C

CE  **II 2 GD Ex h X**

ATEX marking (see ATEX SAFETY NOTE SN03, PN: 10.9408.06)

SERVICING

The relief valve useful life is 10 years with general inspection and service after 5 years.

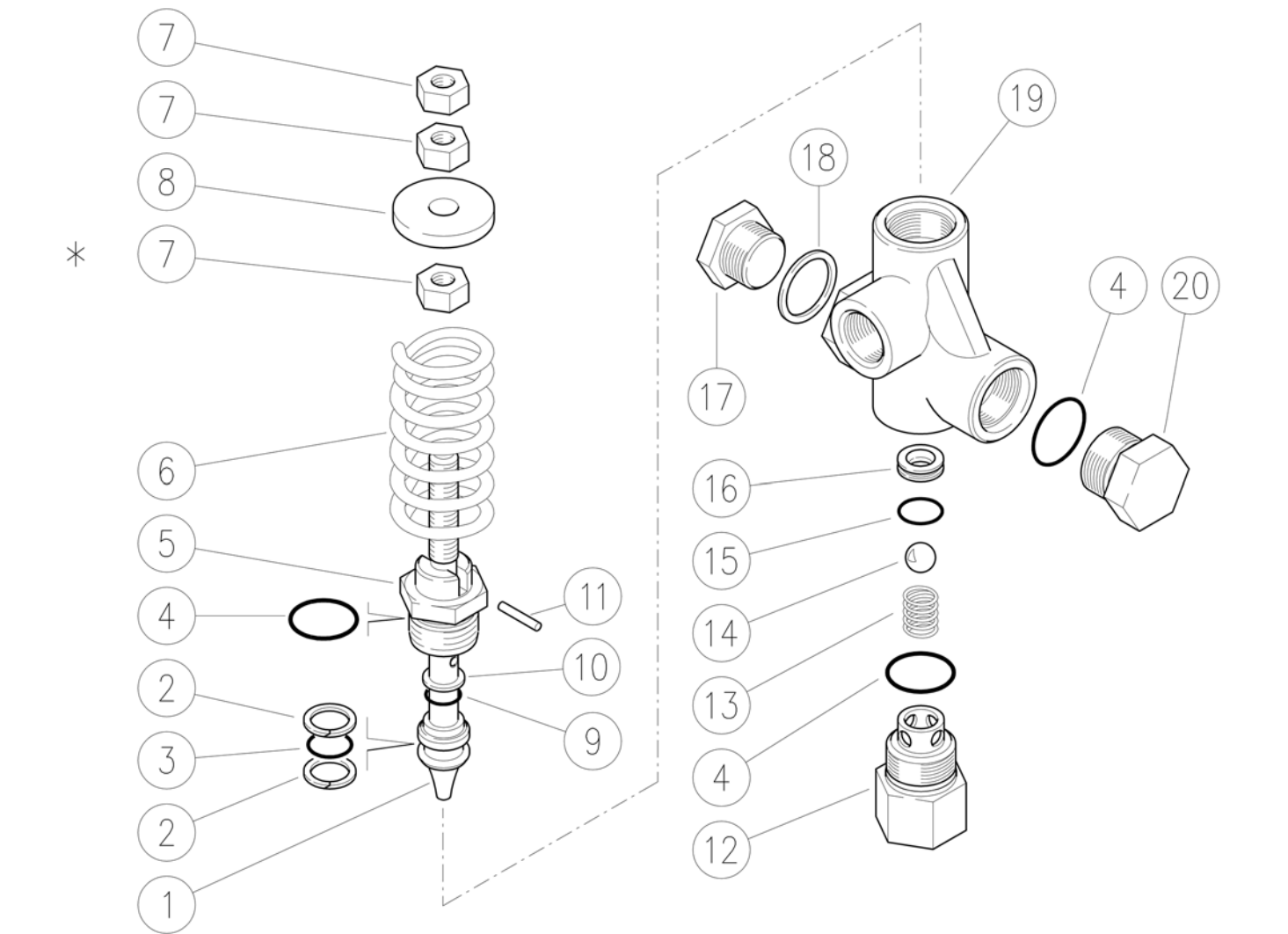
The life duration depends from the working conditions such as type of fluid, ambient and operating conditions (pressure and temperature).

PA recommends to regularly service the relief valves every two years.

Any unauthorized servicing operation will cause the interruption of any “PA” responsibility and warranty on the product.

Technical data, descriptions and illustrations are indicative and liable to modification without notice.

Instruction manual, maintenance, installation, spare parts. For a correct utilization, follow the directions of this manual. Re-print them on the use and maintenance booklet of the machine.	n. 12.9228.00



Pos.	P/N	Description	Q.ty	K1	K2	K3	K4
1	60.0432.60R	Piston, M10 aisi316 Sst.	1				3
2	10.4014.00R	Back-up ring, opn. 18x13,5x1,2 mm	2	•			10
3	10.3178.10R	O-ring, 2,62x13,1 mm Vi 70	1	•			10
4	10.3072.10R	O-ring, 1,78x20,35 mm Vi 70	3	•			10
5	60.0404.60R	Piston holder, aisi316 Sst.	1				3
6	60.0412.61R	Spring, 7,5x35x70 mm blue (1)	1				10
6	60.0411.61R	Spring, 6,5x33x70 mm white (2)	1				3
7	11.4627.50R	Hex. nut, M10, Sst.	3				10
8	60.0406.31R	Spring holding washer, brass	1				10
9	10.3174.10R	O-ring, 2,62x9,93 mm Vi 70	1	•			10
10	10.4015.00R	Back-up ring, 10x14,5x1,2 mm	1	•			10

Kit	P/N	Description	Q.ty
K1	60.0596.24	Spares kit -VB80, aisi316 Sst. 8x1pcs.	1

(1) 60.0590.60 (2) 60.0590.00

Pos.	P/N	Description	Q.ty	K1	K2	K3	K4
11	15.1032.00R	Roll pin, 3x18 mm Sst.	1				10
12	60.0405.60R	Suction coupl., 1/2F Bsp aisi316 Sst.	1				3
13	60.0410.60R	Spring, 1,6x11,5x20 mm aisi316 Sst.	1				5
14	14.7462.00R	Ball, 13/32" ceramics	1	•			10
15	10.3060.10R	O-ring, 1,78x12,42 mm Vi 70	1	•			10
16	60.0408.60R	Seat, 8,5x15,9x4,5 mm aisi316 Sst.	1	•			3
17	60.0413.51R	Plug,sst. 1/2 Bsp, hex.27	1				3
18	14.4101.00R	Sealing washer, 1/2 Bsp	1				10
19	60.0431.60R	Housing -VB80, 1/2F Bsp ai.316	1				1
20	60.0552.51R	Plug, sst. M24x1,5, hex.27	1				5



ATEX UNLOADER AND RELIEF VALVES SAFETY NOTE

SN03

Rev. 00

Date 27/10/2020

Pag. 2 of 10

INDEX

1.	INTRODUCTION.....	3
2.	DESCRIPTION OF THE PRODUCT	3
2.1	CLASSIFICATION & MARKING	3
2.2	FIELD OF APPLICATION	4
2.3	TERMS USED	4
3.	INSTRUCTIONS FOR USE	5
3.1	STORING, SHIPPING AND MOVING	5
3.2	INSTALLATION	5
3.2.1	WARNING.....	5
3.3	FILTERING OF LIQUID	5
3.3.1	CONNECTION & SETTING	6
3.4	USE & WORKING	6
3.4.1	WORKING & ADJUSTMENT	6
3.4.2	SUITABLE & NON-SUITABLE USE.....	6
3.4.3	DANGEROUS AREAS.....	7
3.4.4	DANGER & POSSIBLE RISKS	7
3.4.5	PPE (PERSONAL PROTECTIVE EQUIPMENT) & PROCEDURES TRAINING	8
3.5	SYSTEM PROCEDURES	8
3.5.1	TOOLS & MACHINERY	8
3.5.2	LOAD & UNLOAD.....	8
3.5.3	START & STOP	8
3.6	INSPECTION, ORDINARY & EXTRAORDINARY MAINTENANCE, SERVICE & CLEANING	8
3.6.1	PRECAUTIONS	8
3.6.2	ORDINARY MAINTENANCE AND CLEANING	9
3.6.3	EXTRAORDINARY MAINTENANCE AND REPAIR.....	9
3.6.4	INHIBITION AND RE-INSTALLATION OF THE VALVE	10
3.6.5	REPLACEMENT OF PARTS & SPARES	10
3.7	PREVENTION & REPRESSIVE ACTIONS (PRECAUTIONS)	10



ATEX UNLOADER AND RELIEF VALVES SAFETY NOTE

SN03

Rev. 00

Date 27/10/2020

Pag. 3 of 10

1. INTRODUCTION

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY BEFORE INSTALLING ANY EC-MARKED PART (UNLOADER OR RELIEF VALVE), ACCORDING TO THE ATEX PARTS DIRECTIVE 2014/34/EU IN A POTENTIALLY EXPLOSIVE ATMOSPHERE AS DEFINED IN THE ATEX WORK ENVIRONMENT DIRECTIVE 99/92/EC. This manual must be brought to the attention of the personnel working with the valve, and must be illustrated to the personnel qualified for maintenance and repair of the valve. Any substantial modification to the valve will not be allowed.

Any substantial modification must be authorized by P.A. S.p.A. (for a broader definition of substantial modification, please see maintenance manual).



2. DESCRIPTION OF THE PRODUCT

2.1 CLASSIFICATION & MARKING

The unequivocal identification of the equipment is to be verified by the data imprinted on the body and by the declaration of conformity attesting that the valve has been produced using an evaluation, design and manufacturing process which complies the essential safety requirements of Directive 2014/34/EU.

The assembler has the responsibility to verify the compliance with other EU directives.

The marking of the valve is:

 
II 2 G Ex h IIC T6 Gb
II 2 D Ex h IIIC T85°C Db
Ta: 0°C / +70°C

where:

-) Symbol CE Ex: in accordance with directive 2014/34/EU
-) Group II: suitable on surface
-) Category 2: suitable in zones 1 – 2 for gas and in zone 21 -22 for dust
-) Substance type: G (gas) and D (dust)
-) Specific type of protection: “Ex h” (construction safety)
-) Group of gas/dust: IIC (gas) and IIIC (dust)
-) Temperature Class/Max surface temperature: T6 (gas) and T85°C (dust) (see note 1)
-) EPL: Gb (gas) and Db (dust)
-) Ambient Temperature: 0 ÷ +70 °C
-) Acknowledgement of receipt - EU: XXXXXXXXX (the number will be communicated after the receipt)
-) Additional marking on equipment: material of the Seals: E – N – K – V (see note 2)

The measures of prevention and protection described in this manual do not determine the level of safety required if the valves will not be used according to the provisional use, nor if they were not installed and subjected to maintenance according to the terms of use or appropriate requirements.



ATEX UNLOADER AND RELIEF VALVES SAFETY NOTE

SN03

Rev. 00

Date 27/10/2020

Pag. 4 of 10

2.2 FIELD OF APPLICATION

The valve is designed to be used with water up to 70 °C, with addition of mild detergents or disinfectants. In case of use with special or even flammable liquids (different viscosity, chemical harshness or other), please contact our technical department. The valve shall be used within pressure and temperature reported in the official documents, such as declaration of conformity, certificate of assembly and technical data reported on the instruction manual.

The fluid shall have an ignition temperature of minimum 50 K over the maximum exterior temperature of the appliance's surface where the cleaning liquid is utilized.

The ambient temperature when the appliance is working shall range between 0 ÷ +70 °C. For a different use, please contact the manufacturer for a customized study.

Only when it's used according to the prescriptions included in this manual and in correctly tackling residual risks raising from its use, does this valve assure a level of protection high enough as to not generate potential sources of priming, when installed in a potentially explosive environment.

The appliance in question grants that potential sources of priming are not activated in normal functioning and even in case of foreseeable and rare failure or malfunction.

Breakage or failure to the appliance can happen. In that case, it is necessary to check the causes of failure. When these are traced down to the appliance, they must be removed.

Note 1: the appliance reaches a maximum surface temperature according to the temperature of the fluid pumped in. The temperature class must take into account the safety factor 0,8 aimed for appliances of class 1, see table below.

FLUID TEMPERATURE °C	TEMPERATURE CLASS (GAS)	MAX EXTERIOR SURFACE TEMPERATURE (DUSTS)
0 to ≤ 70	T6	T85 °C

Note 2: the cleaning liquid is to be chemically compatible with the seals that have been assembled by the manufacturer of the appliance. The marking will identify the material of the seals, as per the following chart:

MARKING ON THE EQUIPMENT	MATERIAL OF THE SEALS
E	EPDM
N	HNBR
K	FFKM
V	FKM

Compatibility (category - zoning) between the valve and the environment must be established by the user according to exact and specific considerations Directive 99/92/EC.

It is not allowed to use the valves in potentially explosive atmospheres in underground and mining areas, EPL Ma and Mb (group I category M1 and M2).

2.3 TERMS USED



ATEX UNLOADER AND RELIEF VALVES SAFETY NOTE

SN03

Rev. 00

Date 27/10/2020

Pag. 5 of 10

Qualified/Specialized Technician: personnel who was trained for installation, adjustment, maintenance, repair. It is required that the technician shall be trained and allowed to perform such tasks, and to have specific knowledge not only of the tool and the risks stemming from its use, but also the possible risks of the appliance in question.

Temperature Class (T): it is the maximum superficial temperature of the appliance (taking into account also the safety coefficient as reported in UNI CEI EN ISO 80079-36:2016. It also corresponds to the max. surface temperature of the valve.

3. INSTRUCTIONS FOR USE

3.1 STORING, SHIPPING AND MOVING

The valves are supplied with adequate packaging. The unloading and moving of the tools shall be carried out by trained personnel, who is also responsible for checking that the order and the freight match.

It is necessary to carefully move the valve to avoid shock impacts, and therefore, possible deformations and cracks which could successively determine leaking of the product contained through the attachment points of the valve a/w possible trigger source (sparks, adiabatic compression, etc.).

Localities of Warehouse storage, conservation, transport and movement of the valves must guarantee that they are not subject to shock impacts, tumbles, deterioration and other damaging which could compromise the function of the valve.

Any eventual damage must be immediately communicated to P.A. S.p.A. for assessment.

3.2 INSTALLATION

3.2.1 WARNING

Each installation or reinstallation must be performed by qualified personnel, duly trained and informed on the related risks, even concerning the instructions of this document.

When using the utensils do not apply excessive force rotation on the connections in the presence of a potential explosive atmosphere.

The use of utensils in zone 1/21 and 2/22 is allowed with particular instructions under the directive UNI CEI EN ISO 80079-36:2016 which has to be known by the operator.

Installation errors can provoke deformation or structural collapse of the pipe connection, also a loss of fluid in the ambient.

Installation errors can compromise the regular movement with effective possibility of sparking.

During installation, keep to the direction of flow indicated by the arrows on the valve body and on the construction drawings.

3.3 FILTERING OF LIQUID

The fluid sent from the system to the valve has to be filtered in order to prevent particles to slip through causing malfunction and therefore frequent maintenance interventions. The recommended sealed filter has to be at least 300 microns. We recommend to clean it every 100/300 hours and, in case of filter breakage, replace it.



ATEX UNLOADER AND RELIEF VALVES SAFETY NOTE

SN03

Rev. 00

Date 27/10/2020

Pag. 6 of 10

3.3.1 CONNECTION & SETTING

The valve must be connected to a pressure application, usually fed by piston pumps, pressure washers and similar; in order to prevent possible damage to persons and things, where such an application must be equipped with all safety parts and control (like safety valves, regulating etc.) foreseen by the directives in force. Use a resistant and adequate sized tube for the connection, possibly avoiding narrow necks and abrupt direction variations to restrain the pressure loss.

The valve must be anchored firmly by an appropriate support. This type of valve must be held and fed by a fixed pipe that prevents any swinging.

The connecting tube to the valve must be of such to help the fluid flow without any excessive pressure drop.

The assembler is compelled also to carry out the inspection of all the connection links.

The apparatus must be installed by the following procedure:

-) Assure that there is no obstacle placed between valve and attachment; place a suitable gasket that assures a seal age conform and a protection grade minimum IP54 for Gas and IP6X for powders.
-) Insert the connection tubes (entry and exit) following a good technique and using acknowledged components, adopting the foreseen clamping instructions.
-) During the connection of the tubes, make an electrical earth link-up with a minimum cable size 4mm observing the prescribed terms for equipotential connections.
-) Inspection after installation, to be carried out by the assembler or end user, in particular the perfect coupling of usage at the various openings (keep to the limit levels of emission rated in the zoning phase).

3.4 USE & WORKING

3.4.1 WORKING & ADJUSTMENT

The function of the unloader valve is to prevent the risk of overpressure by automatically releasing the overpressure towards the by-pass line when the pressure exceeds the set value.

The function of the relief valve is to discharge excess fluid to the inlet system when the pressure of the protected equipment exceeds the maximum allowable pressure values for expressly non-ordinary reasons of operation (incorrect maneuver with excess pressure and excess temperature, also caused by external fire).

This function takes place with the direct discharge into the atmosphere without the need for drainage with the direct discharge pipe into the atmosphere, or with recycling in the collection and replenishment system water tank.

The valves intent is to be assembled into a set whose destination has industrial, technological and production purposes.

The procedures to observe during function concern the process levels and correct running.

3.4.2 SUITABLE & NON-SUITABLE USE

The cleaning liquid should have an ignition temperature of minimum 50K over the maximum exterior temperature of the appliance's surface where the cleaning liquid is utilized. (T=70 °C).

It is forbidden to make substantial modifications to the valve (replacement of parts not recognized by P.A. S.p.A. or assembly variations). In the other cases of ordinary & extraordinary maintenance and repairs, refer to the maintenance manual.



ATEX UNLOADER AND RELIEF VALVES SAFETY NOTE

SN03

Rev. 00

Date 27/10/2020

Pag. 7 of 10

The Company P.A. S.p.A. declines all responsibility for damage to persons, animals or things derived by an improper use of the apparatus a/o the non-observance of the dispositions contained in the present manual.

3.4.3 DANGEROUS AREAS

Particular attention has to be reserved to any area potentially explosive around the valve and also from the inside. Do not open the valve in areas potentially explosive and during working. Before opening the valve, disconnect it from the machine and bring it to a safe area.

It is severely forbidden to operate on the tightening components and on the apparatus connections whilst running and in any case each time it is predictable that the area may contain a potentially explosive ambient.

3.4.4 DANGER & POSSIBLE RISKS

Hot surfaces

The valves always present the danger of hot surfaces due to the maximum temperature of 90°C: always check that the internal fluids and external areas cannot trigger off at such a temperature. The surface temperature must not be higher than 80% of the minimum temperature ignition of the Gas measured in ° C.

Naked flames and hot gas

Naked flames and hot gas are forbidden around the valve.

Mechanical sparks

Sparks have to be excluded during a normal function even if they can occur in case of foreseen and rare dysfunctions; they can be caused by friction, knocks or abrasion, hammering.

Ultrasounds (acoustic danger)

Tank measurement is forbidden when the valve is in function.

Electric currents and protection against cathode corrosion. Static electricity

Earth connect all the wires which could dangerously charge through certain connection points.
The installer is responsible for checking that there are no insulated metal parts.

The User must regularly check the effectiveness of the ground connection.

Adiabatic compression and shock waves

The process that can cause adiabatic compression or shock waves are not tolerated. Verify the normal function of the wash fluid in the adduction systems.

Exothermic/Endothermic reactions, including self-ignition of powders

Wash fluids with endothermic characteristics or reactive with water and impurities are forbidden.

Excessive vibrations and stress

Stress derived from vibrations, especially transmitted by the tube connections and other connected apparatus are forbidden; where such conditions cannot be guaranteed, appropriate measures must be taken to reduce to the minimum such phenomena.

Back pressure

An elevated back pressure to the nozzles acts negatively on the valve compromising the set calibration. The nozzles must be exempt from back pressure: They must not be blocked and no flow from the nozzles towards the inside of the valve is permitted.



ATEX UNLOADER AND RELIEF VALVES SAFETY NOTE

SN03

Rev. 00

Date 27/10/2020

Pag. 8 of 10

Ambient risks

Ambient conditions different than those specified can cause a danger source.

They can cause dangerous service conditions (with relation to the processed fluids) an abrupt movement, humidity effects, ambient temperatures and pressure changes, chemical agents, corrosion.

The working process in the installations must be carried out in such a manner to be not determined by a dangerous influence.

Refrain from the functioning of the valve in case of evident irregularities. The rupture of some components provokes a non-hydrokinetic function of the valve.

3.4.5 PPE (PERSONAL PROTECTIVE EQUIPMENT) & PROCEDURES TRAINING

The choice of PPE (Personal protective equipment) is user's responsibility according to the local safety regulation, predicting the following residuary risks:

-) Hot surface temperatures
-) Electrostatic charges
-) Inflammable liquids, noxious substances, etc
-) Others in relation to type of use

The use of the valve must foresee a precise training formation.

It is necessary to pertain to the application of the local safety regulation.

3.5 SYSTEM PROCEDURES

3.5.1 TOOLS & MACHINERY

The safety of the system is also in function with control devices (conform with Directive 2014/34/EU) which must be absolutely independent from the valve.

3.5.2 LOAD & UNLOAD

Adequate means are foreseen for the draining and leakage in order to consent the cleaning operations, inspection and maintenance in absolute safety conditions.

3.5.3 START & STOP

In case of doubt and an irregular function, stop the productive process, do not make brief repairs and ask qualified personnel.

3.6 INSPECTION, ORDINARY & EXTRAORDINARY MAINTENANCE, SERVICE & CLEANING

3.6.1 PRECAUTIONS

Before proceeding to the periodic procedures of inspection, maintenance, repairs & cleaning it is necessary to discharge the internal pressure, through a duct converged in a safe area, to avoid damage to persons or things and to verify the occurred discharge phase by means of control devices (pressure gauges).



ATEX UNLOADER AND RELIEF VALVES SAFETY NOTE

SN03

Rev. 00

Date 27/10/2020

Pag. 9 of 10

It is always necessary to verify the non-existence of potential explosive atmospheres and the impossibility to trigger off.

The user must certify that the operator is opportunely instructed to carry out all the safety procedures & hygiene in the work areas according to the protocol in order to avoid any eventual risks deriving from the operations mentioned above.

3.6.2 ORDINARY MAINTENANCE AND CLEANING

The cleaning stages are to be carried out regularly depending on the use and are obligatory in situations where foreign bodies and/or exploding powders are present on the valve and on the drains ((independently from the settled thickness).

Before carrying out periodic cleaning operations, it is absolutely essential to release the internal pressure on the protected equipment by means of the relevant pipe into a safe zone to avoid uncontrolled atmospheres being generated; verify that the unloading phase is complete by means of control devices. Then disconnect the service connections using the methods required for the use of tools and completely empty the valve of all the product inside it.

For internal and external cleaning, it is necessary to use non corrosive products or solutions, suitable to remove the work residue, and that do not damage the O-ring surfaces. For the cleaning operations do not use aggressive chemical detergents a/o mechanical systems that can cut or deform the valve.

The above operations must not jeopardize the alignment of the internal parts and the seal between seat and valve shutter/sphere.

For the cleaning operations, do not use aggressive chemicals and/or mechanical systems that can cut into or deform the valve.

Before reusing and/or reinstalling the VALVE, after washing or general maintenance or any other operation deemed necessary, carry out the procedure provided in point 3.2.

3.6.3 EXTRAORDINARY MAINTENANCE AND REPAIR

Please check the internal parts every 300 / 400 hours of work in order to verify any premature wear of the parts. Replacement of the dynamic seals is recommended:

-) VB23A-280: pos. 9-10 and 21
-) VB26A-280: pos. 6-7 and 19
-) VB33A-280: pos. 5-6 and 19-20
-) VB43A: pos. 6-7 and 18
-) VB80A: pos. various, identified with letter A
-) VS26A: pos.5 and 9-10
-) VS43A: pos. 7 and 16
-) VS80A: pos. various, identified with letter A

Verify that the slide surfaces of the seals are in good conditions: replace the parts if worn out or if damaged.

Use only original "PA" spare parts.

Lubricate only with silicone grease (14.6552.00) and do not use mineral grease or oil otherwise internal parts will be subject to rupture.



ATEX UNLOADER AND RELIEF VALVES SAFETY NOTE

SN03

Rev. 00

Date 27/10/2020

Pag. 10 of 10

If exposed to freezing temperatures, make sure that the valve is completely emptied after use in order to prevent the freeze.

For all details regarding assembly and disassembly of the valve, please see the Maintenance Manual.

3.6.4 INHIBITION AND RE-INSTALLATION OF THE VALVE

For a working order inspection of the apparatus or for maintenance/replacement, the removal of the valve from the application is permitted only when the apparatus is not under pressure and in the absence of a potential explosive atmosphere.

Before reusing or reutilizing the valve after washes, general maintenance or any other necessary operation, follow the warnings as seen on paragraph 3.2.1. of this safety note

After reinstalling the device, and before placing the equipment under pressure, verify the correct tightness between the connections and apparatus and its efficiency.

3.6.5 REPLACEMENT OF PARTS & SPARES

It is necessary to replace the valve and/or its components when, upon the user's discretion, the safety functions are not guaranteed during working. The replacement of valve parts with others not identical to those original cannot guarantee the design conditions established by P.A. S.p.A.

3.7 PREVENTION & REPRESSIVE ACTIONS (PRECAUTIONS)

The user must use suitable measures to eliminate a/o reduce potential explosive atmospheres externally to the valve applying the Directive 99/92/EC.

The user must pertain to what established in order to:

-) Avoid, however possible, the formation of explosive atmospheres (concentration-classification limits of the areas);
-) Choose qualified control systems;
-) Avoid the creation of lively trigger sources (prevention).