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1 Subject of specification

This specification used in conjunction with other technical specifications of the LOTOS Group establishes the minimum requirements for the design and making of gas blow down systems.

2 Scope of validity

This specification applies to the preparation of tender documents, inquiries and contracts concerning new investments and modernisation projects planned by LOTOS Group.

It shall also be a basis for preparing both detailed specifications and inquiries for individual or package supplies.

2.1 Deviations

Any deviation from this specification and the relevant specifications, standards and related documents including proposals, which the bidder claims to be economically and / or technically superior solutions must be submitted in writing for review and approval by Grupa LOTOS SA. Non-approved exceptions are not acceptable by Grupa Lotos S.A.

The supplier must report in writing any ambiguity in this or any other specifications of Grupa LOTOS SA or non-compliance with the referred documents / standards and obtain a written explanation from Grupa Lotos SA

3 Definitions and identifications

- **Blow down system –** a piping installation with a set of equipment, whose purpose is to remove gaseous waste generated in the production process.
- **DN –** nominal diameter of a pipeline
- **FP –** fixed point
- **Shall –** means mandatory requirements.

3.1 Hierarchy of documents.

In case of conflicts existing between this specification and other documents, the following order of precedence shall govern:

- The current Polish legislation\
- Terms of purchase order / contract and other requirements agreed in writing with GL S.A.
- Data Sheets approved by GL S.A.
- This specification
- Other Specifications
- Drawings and other documents
- Standards,

4 Blow down systems

4.1 General

Hydrocarbon gas slops shall be discharged to a closed system whose purpose is oxidation of the discharged gases.

Hydrocarbon gas slops containing acid gases (hydrogen sulphide) shall be sent to a separated system of collectors.

The design data of the existing discharge systems in the LOTOS Group refinery in Gdansk:

	Design temperature	Working temperature	Design pressure	Working pressure (back-pressure)
Installation 3500				
Low-sulphur slop system (350-BD1M)	350 ^{O}C	50°C	0.25 MPa	0.1 MPa
High-sulphur slop system (350-P1M)	220 ^{O}C	50°C	0.25 MPa	0.1 MPa
Installation 3550				
Low-sulphur slop system (355-BD4)	350 ^{O}C	40°C-350°C	0.3 MPa	0.15 MPa
High-sulphur slop system (355-BD11)	200°C	40°C-110°C	0.3 MPa	0.08 MPa

An inherent part of discharge systems are safety valves, which shall be located in a way allowing for easy access from the ground level or from a service platform.

Safety valves shall be installed so that the valve spindle is in a vertical position.

The nominal diameters of the inlet and outlet pipelines shall not be less than the valve inlet and outlet diameters.
Reducers necessary to change pipeline diameters shall be installed directly at the safety valve inlet and outlet.

4.2 Piping – technical requirements

4.2.1 Closed blow down systems

Safety valves discharging gas slops to the closed system shall be located at a level higher than the collector.

Due to the generation of condensate, outlet pipelines shall be routed with a constant slope to the separator and further on to the flare. In the case of a complex network it may be necessary to use several separators. The pipeline that evacuates slops to the separator shall be considered to be an outlet pipeline.

Spindele (stem) of gate valve located on inlet piping before safety valve shall be horizontally oriented (acc. to API 520 p 6.3.1)

Branches shall be connected to collecting pipelines at an angle of 45° to the axis of the collector. .

4.2.1.1 Inlet pipeline

Pressure drop at inlet to a safety valve shall not exceed 3% of the valve opening pressure. Therefore the inlet pipeline to the safety valve shall be as short as possible, with few bends. At the same time, due to the temperature of the discharged gases the pipeline shall have a flexible route.

4.2.1.2 Outlet pipeline

Dimension of outlet pipeline shall be adjusted for medium speed not to exceed 0.5 mach, and for allowable back pressure in slope system (see table from point 4.1). Nonetheless for agreed gas discharge scenarios (eg: decompression of reactor high pressure system) back pressure could be higher than show in table from point 4.1.

The outlet pipeline shall be possibly short, straight and with a reinforced (thick-walled), adjusted to high loads, welding-in to the slop collector. If this is not possible, an fixed point shall be installed near the valve outlet. The pipeline support design shall prevent its vibrations during a discharge and the supports must transmit all the loads both from the valve and from the pipeline (weight, thermal expansion etc.).

4.2.1.3 The piping of a safety valve that discharges slops to the closed system

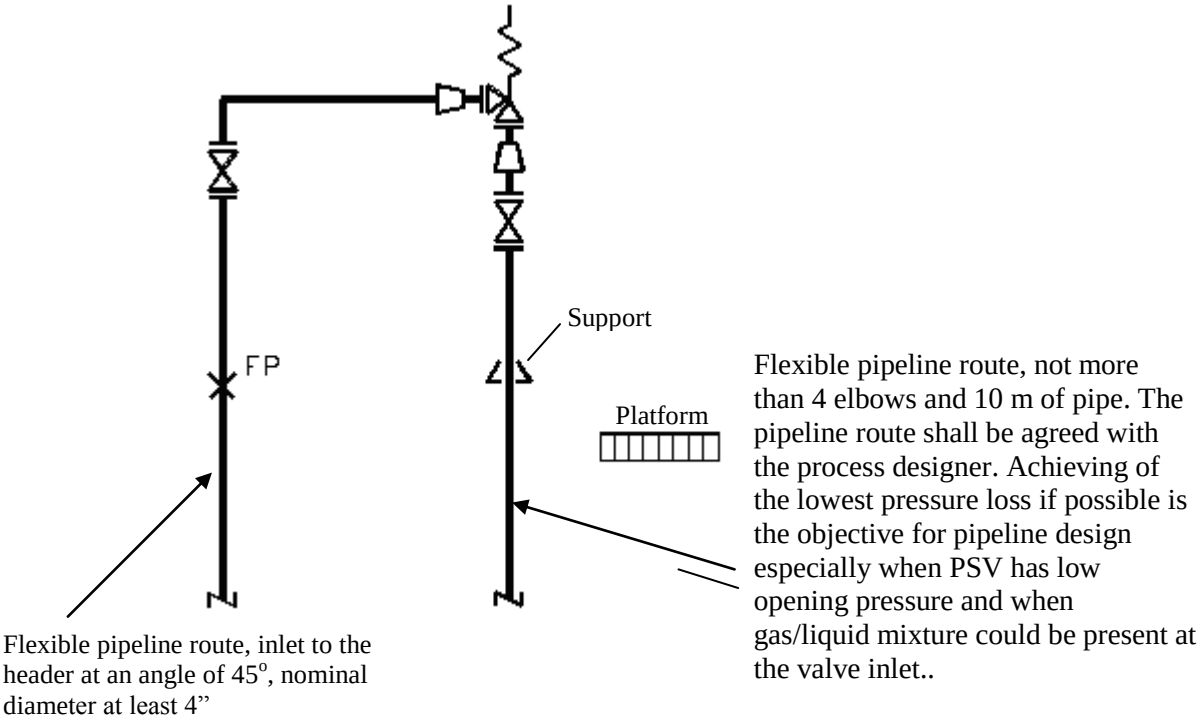


Fig. 1. Fixed point located at a vertical section of the outlet pipeline

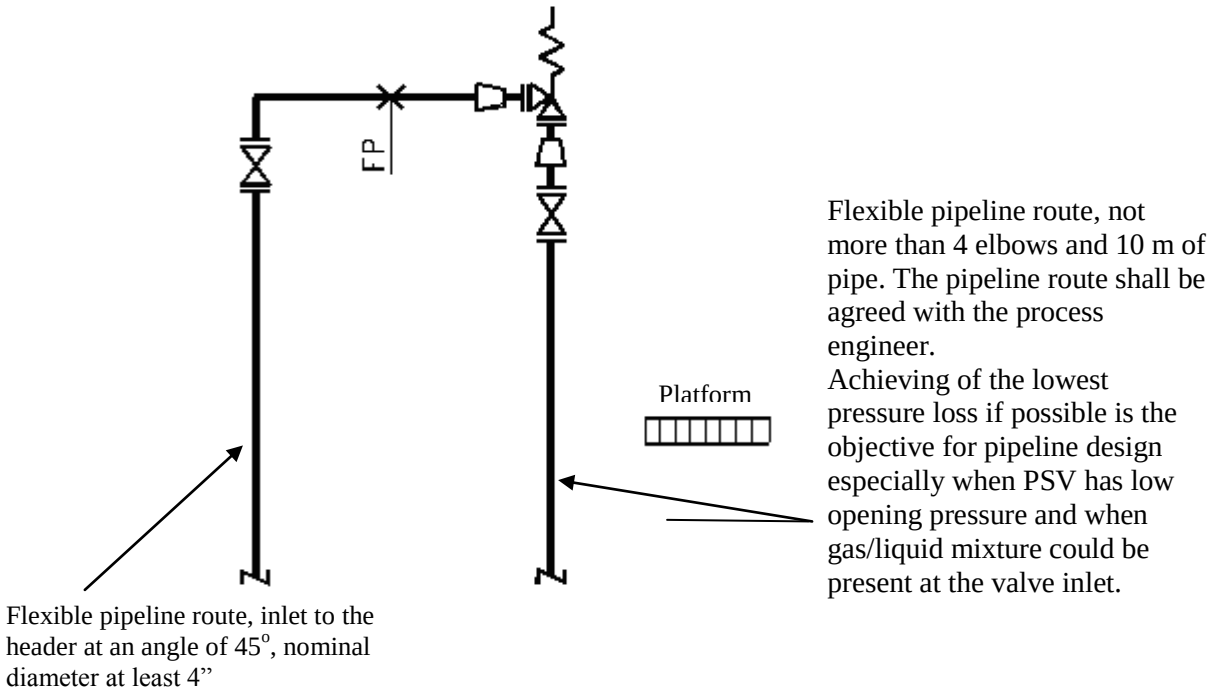


Fig. 2. Fixed point located at the horizontal section of the outlet pipeline

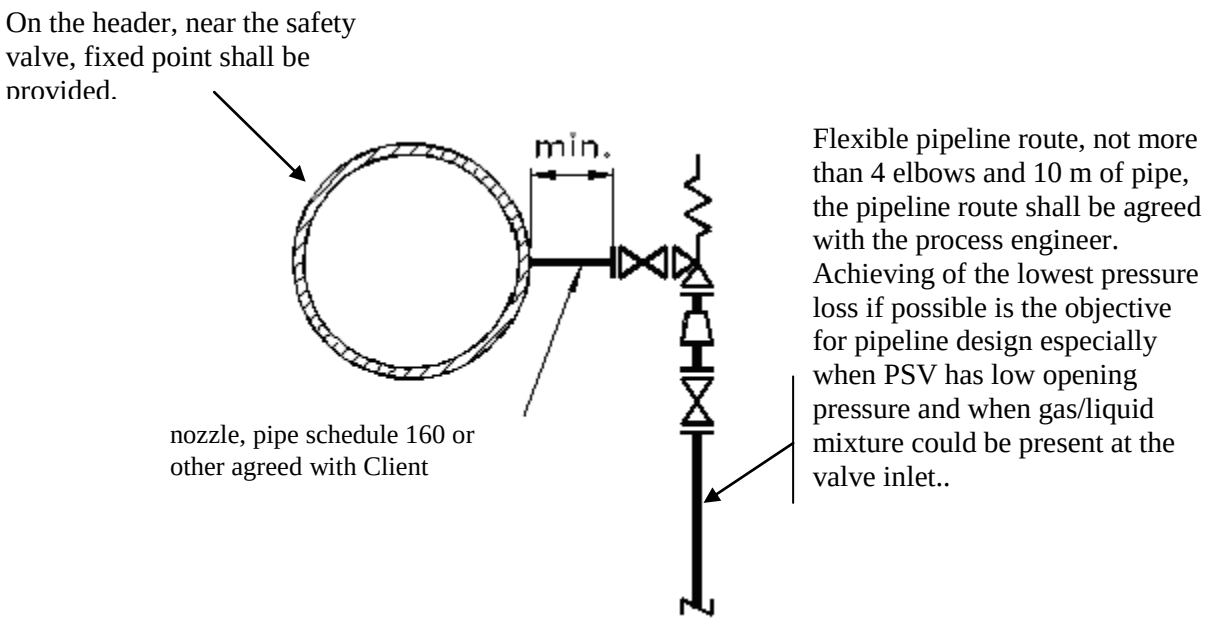


Fig. 3. Discharge of slops from the safety valve directly to the downstream header

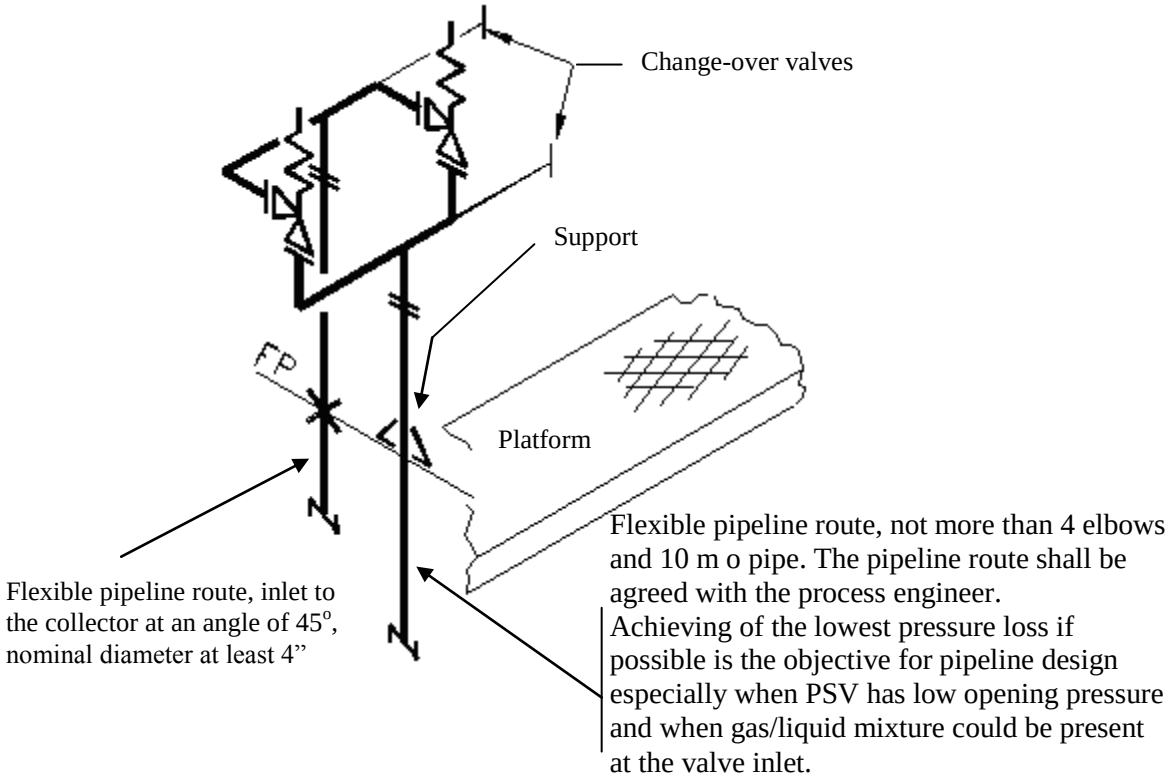


Fig. 4. The arrangement of safety valves with change-over valves

5 Relevant documents

"Technical Specification" issued by GRUPA LOTOS S.A. listed in Contract Files.

6 Standards and regulations

- API Recommended Practice 520 (Part I-Sizing and Selection Eight Edition, December 2008; Part II – Installation Fifth Edition, August 2003, Reafirmed, February 2011)
- ASME B31.3 (Process Piping, ASME Code for Pressure Piping, B31)

7 Enclosures

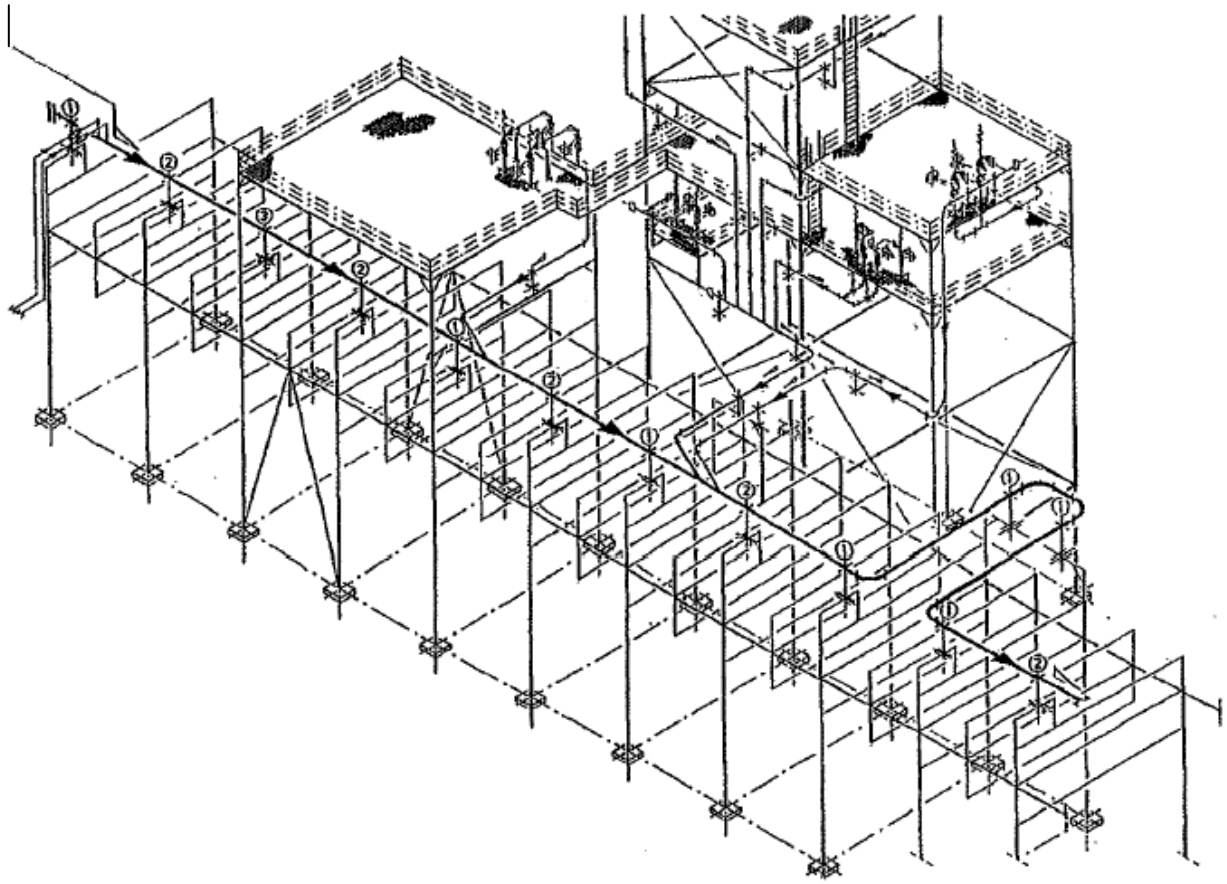
- Enclosure No.1, Demonstrative presentation of a closed slop system
- Enclosure No.2, Examples of slop discharge from safety valves to the collector

8 Record of changes

No.	Date	Description	Introduced by
0		This specification entirely replaces the former LOTOS Group S.A. standard No. PR 07 123 with the same title.	B. Kowalewski
1	30-11-2013	Review, update, standardize and changes to the Standard in scope of order No. OK/990/2012	Editorial board coordinated by T.Wróbel
-	31-08-2015	Page layout corrections, no contents changes.	T. Wróbel

Grupa LOTOS S.A.	**ENCLOSURE No. 1**	Spec. No. 1160
	Demonstrative presentation of a closed slop system	

Sloping pipeline



Identification of header supports:

① free support

② guide

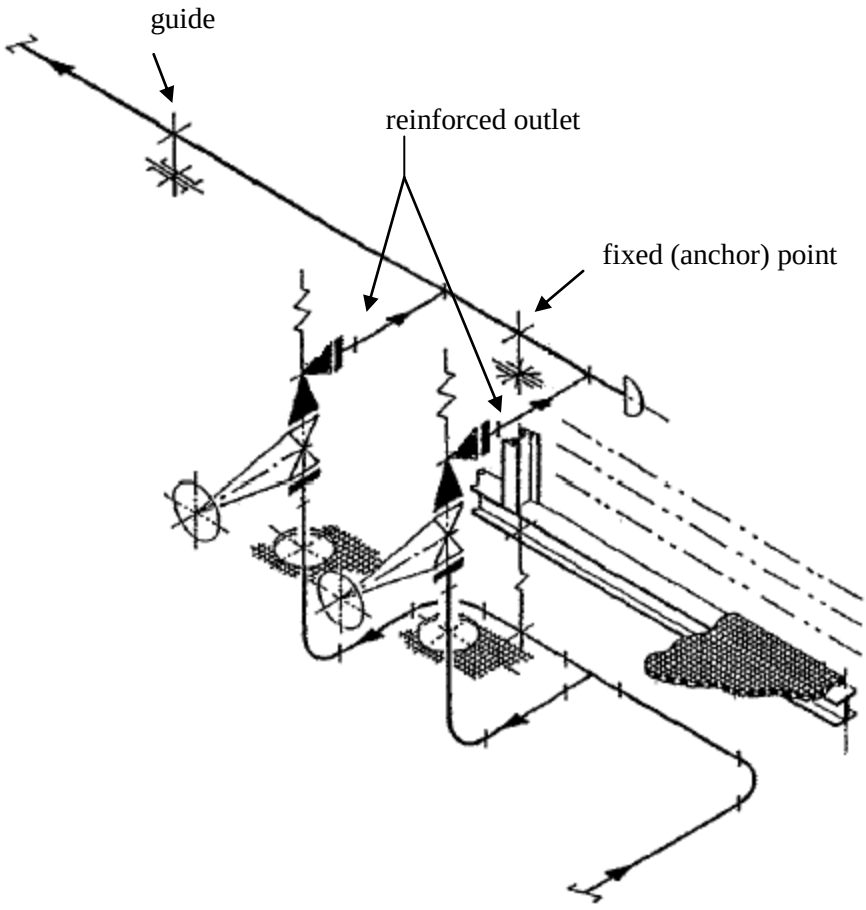
③ fixed (anchor) point

Attachments shall have adjustable height due to the necessity to route the pipeline at a slope

Branches shall be introduced to the header:

- for branch diameters less than DN100mm – at an angle of 90° to the header axis
- for branch diameters at least equal to DN100mm – at an angle of 45°

Grupa LOTOS S.A.	**ENCLOSURE No. 2**	Spec. No. 1160
	Examples of slop discharge from safety valves to the collector	



Grupa LOTOS S.A.	**ENCLOSURE No. 2**	Spec. No. 1160
	Examples of slop discharge from safety valves to the collector	

