ATEX Directive 2014/34/EU

Ignition Hazard Assessment

1 Purpose

This LID_DE describes:

- the contents and the scope of ATEX Directive 2014/34/EU
- the ignition hazard assessment procedure used by LESER

2 References

ATEX Directive 2014/34/EU
ATEX 2014/34/EU Guidelines – 3rd Edition – May 2020
DIN EN 1127-1:2019-10
DIN EN ISO 80079-36:2016
EN ISO 4126-7
LDeF_3002.48_ATEX_Ignition_hazard_assessment_report_SV
LDeF_3002.48_ATEX_Ignition_hazard_assessment_report_POSV
LDeF_3002.48_ATEX_Ignition_hazard_assessment_report_COV
LDeF_3002.48_ATEX_Ignition_hazard_assessment_report_SLS
Manufacturing Declaration according to EU-Directive 2014/34/EU on the harmonization of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)

3 Introduction

The ATEX Directive 2014/34/EU replaced the previous ATEX Directive 94/9/EC which was applicable between 1 July 2013 and 19 April 2016. As of 20 April 2016, Directive 2014/34/EU, as transposed into the national legislation of the EU Member States, is the sole legal instrument applicable.

This directive applies to equipment and protective systems intended for use in potentially explosive atmospheres as well as to safety devices, controlling devices and regulating devices intended for use outside potentially explosive atmospheres but required for or contributing to the safe functioning of equipment and protective systems with respect to the risks of explosion.

According to the directive 2014/34/EU a potentially explosive atmosphere is an "environ-mental atmosphere which could become explosive due to local and operational conditions". An explosive atmosphere is defined as a "mixture with air, under atmospheric conditions, of flammable substances in the form of gases, vapors, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture."

The term "product" as defined in the ATEX Directive 2014/34/EU covers equipment, protective systems, safety devices, controlling devices, regulating devices and components.

To be within the scope of Directive, a product has to be:

a) equipment or a protective system, as defined in Article 1(1)(a);
b) a safety device, a controlling device or a regulating device as defined in Article 1(1)(b); or
c) a component, as defined in Article 1(1)(c),

according to their intended use.

Safety valves and change-over valves are not used to protect atmosphere. They protect against overpressure and fulfil the requirements of the Pressure Equipment Directive 2014/68/EU. Nevertheless they may be used within a potentially explosive atmosphere.

If PED equipment shows hot surfaces occurring during operation caused by the temperature of its content solely, it is not applicable to consider this equipment under the ATEX Directive 2014/34/EU.

Risk assessment related to hot surfaces and electrostatic charges, among other possible risks, shall be undertaken by the end user to ensure that any explosive atmosphere is not ignited.

4 Ignition Hazard Assessment Report

4.1 Scope

LESER has carried out an ignition hazard assessment according to DIN EN ISO 80079-36 for safety valves (SV), pilot operated safety valves (POSV), change-over valves (CoV) and pneumatic supplementary loading system (SLS). According to DIN EN 1127-1 the following sources of ignition exists:

1 Hot surfaces
2 Flames and hot gases
3 Mechanically generated sparks
4 Electrical apparatus
5 Stray electric currents and cathodic corrosion protection
6 Static electricity
7 Lightning
8 Radio frequency (RF) electromagnetic waves from 104 Hz to 3x 1011 Hz
9 Electromagnetic waves from 3x 1011 Hz to 3x 1015 Hz
10 Ionizing radiation
11 Ultrasonics
12 Adiabatic compression and shock waves
13 Exothermic reactions, including self-ignition of dusts

4.2 Results

The safety valves (SV), pilot operated safety valves (POSV), change-over valves (CoV) and pneumatic supplementary loading system (SLS) have no potential sources of ignition and therefore cannot cause explosions (exclusions see below). The ATEX 2014/34/EU is not applicable to these LESER safety devices.

An ignition hazard assessment according to DIN EN ISO 80079-36 was carried out for the safety valves (SV), pilot operated safety valves (POSV), change-over valves (CoV) and pneumatic supplementary loading system (SLS) with the following main result:

- The maximum surface temperature of the SV, POSV and CoV valve is caused solely by the feed medium. It corresponds to the permissible operating temperature of the safety valve according to the name plate.
- With a suitable configuration, the SV, POSV, SLS and CoV do not have their own potential ignition source. The suitability of the configuration shall be ensured before installation and documented with the corresponding declaration from the manufacturer. This can be called up from LESER on request.
- Open bonnets and open lifting devices are not permitted.
- The SV, POSV, SLS and CoV do not fall within the scope of ATEX 2014/34/EU and were not marked.

The SV, POSV, SLS and CoV may be used in hazardous areas. For use in hazardous areas, the following individual points of intended use shall be observed:

- The outlet of the SV and POSV and, if present, the drain hole, the flushing connection or the bellows monitoring shall be connected pressure-tight and vented to a non-hazardous area (outside the hazardous area). The drainage and flushing connections can also be sealed pressure-tight with screw plugs.
- The POSV type 811 must not be used in explosive atmospheres with hot gases or flammable operating media because the pop action pilot vents into the environment and is therefore not gas-tight. Due to the principle, piping the pop action pilot is not permitted.
- The CoV shall be connected pressure-tight to the pipe-side and SV-side flange connections and, if present, to the pressure relief, drainage or flushing connections and vented to a non-hazardous area (outside the hazardous area). The drainage and flushing connections can also be sealed pressure-tight with screw plugs.
- Coatings must not exceed a thickness of 200 µm. Additional coatings that are applied to the safety valve shall be subjected to their own conformity assessment by the operator.
- Additional components (products conforming to 2014/34/EU or electrical and non-electrical components that are not subject to conformity assessment according to 2014/34/EU) shall be individually assessed as regards their safe use in the ATEX zones defined by the operator (zone plan) before they are installed. The assembled unit does not count as an installation, but as a provision and must be subjected to its own conformity and risk assessment by the operator with regard to assembly. LESER only provides Declarations of Conformity for individual components (and not for

assemblies in the sense of the ATEX regulations). The installation and operating instructions required for assembly are included.
- The SV, POSV, SLS and CoV shall be properly grounded and incorporated into the grounding concept of the plant. All applicable statutory regulations and technical rules shall be adhered to.
- It is the responsibility of the operator to ensure that all maintenance and repair work is performed in such a way that there is no risk of ignition sources.

4.3 FAQ

- Bursting of the spring

The preload energy of the compression spring, depending on the set pressure, is sometimes considerably more than 500J. Therefore open bonnets and lifting devices are not permitted for SV.

For POSV type 821 only corrosion-resistant compression springs made of stainless steel or highly corrosion-resistant material are permitted. Due to the toughness of the materials, spring breakage does not occur, but rather plastic deformation of the spring coils, as a result of which the POSV leaks.

The compression springs for SV and POSV are designed according to EN ISO 4126-7 and are only loaded with the permissible spring force or the permissible spring deflection. The compression springs in POSV are loaded quasi-statically, as the stroke of the modulating pilot is maximum 2.5 mm

- Impact (hammering) of the disk on the seat

The material selection of the metallic seats and discs is at least chrome steel, austenitic stainless steel, duplex steels or high alloys. Rust as a trigger can be excluded.

With the modulating POSV, velocities of well below 1 m/s and an impact energy of well below 500 J can be expected during closing operations due to the valve characteristics (EN ISO 80079-36 - 6.4.2.1).

Random evaluations of SV closing processes showed speeds well below 1 m/s (EN ISO 80079-36 - 6.4.2.1). The spring energy is not relevant during the closing process, as the pressure under the disc and the spring force during closing are almost identical.

The materials titanium or zirconium are not permitted.

- Friction of the spindle

The material selection of the metallic seats and discs is at least chrome steel, austenitic stainless steel, duplex steels or high alloys. Rust as a trigger can be excluded.

Due to the axial guidance, only low lateral forces occur when the SV operates, which means that no sparking is triggered.

The materials titanium or zirconium are not permitted.

5 Remarks

5.1 Use of electronic-pneumatic supplementary loading system Type 714

The supplementary loading system type 714 could only be used in potentially explosive atmospheres, if an analysis of sources of ignition sources and if applicable a respective conformity assessment procedure acc. to directive 2014/34/EU has been completed.