

Garlock Technical Statement

ATEX for PS-SEAL®



General Statement

Directive 2014/34/EU applies to equipment and protective systems for use in potentially explosive atmospheres and is mandatory as from 20 April 2016. It replaces Directive 94/9/EC.

With this revised Directive, the essential health and safety requirements have not changed.

Regarding to Chapter A, it is evident that PS-SEAL® by Garlock are no longer named a „component“; they are classified as **“Machinery elements“**. The policy document of the ESA (European Sealing Association e.V.) of April 2016 clearly states that **“Machinery elements“** cannot be certified independently.

The third paragraph in Chapter A states: „Because machinery elements are not defined within ATEX Directive 2014/34/EU **they cannot be supplied with a Declaration of Conformity“**.

In Chapter B there is a new designation for mechanical seals: “Engineered mechanical seals” can now be labeled and sold with the designation “ATEX Components.” It applies when a special seal considers the ignition potential.

Details about this change and marking can be found under the following link (section B/B1):

[ESA-Position-Statement-ATEX-Directive-2016.pdf](#)

For mechanical seals, the ATEX Directive is linked to the following three ignition sources:

- A) an ignition spark arising from the discharge spark after prior electrostatic charging,
- B) an ignition spark arising from mechanical contact,
- C) an ignition arising from overheating occurring as the result of exposure to excess temperature, caused by friction between the seal and the sealing surface.

Assessment of Ignition Sources

In the following section, Garlock will assess the ignition sources A - C.

A) Ignition sparks arising from the discharge spark after prior electrostatic charging

At the request of Garlock GmbH (in September 2001), BBG Prüf- und Zertifizier GmbH EXAM compiled an „Expert Opinion on the electrostatic ignition hazards of PS-SEAL® sealing systems when used in devices subject to Directive 2014/34/EU (ATEX).“ The seal lip materials GYLON® Black, GYLON® White, GYLON® Blue, as well as lips made of KF material and F material were examined.

The expert opinion found that **„there were no objections against the use of PS-SEAL® with a width of up to 12mm and the use of chrome oxide or chrome carbide coatings on the counter surface in potentially explosive atmospheres.“**

Summary of the details:

Although - with the exception of the KF material - all materials showed a resistance value of more than 109 Ohm, and are thus deemed to be chargeable in an electrostatic sense, the maximum transferred charge of less than 10 nC (nano Coulomb) was less than the material-specific minimum ignition charge (MZQ). According to information provided by the National Metrology Institute of Germany (PTB) this value is (for example) 12 nC (nano Coulomb) in the case of hydrogen in its most ignitable mixture. A table with the MZQ values of the most frequently used ignitable gases and mixtures is available on the website of the National Metrology Institute of Germany (PTB).

B) Ignition sparks arising from mechanical contact

This ignition source can be ruled out if the system has been correctly installed and is used in accordance with the Garlock data sheet and the Garlock operation and assembly instructions, since the metal case is not in contact with the rotating parts.

C) Ignition arising from overheating occurring as the result of exposure to excess temperature, caused by friction between the seal and the sealing surface

No general statements can be made regarding to the surface temperature. The development of the temperature under the seal lip depends on a great number of external influences and process parameters. An theoretical assessment - by means of calculations - may possibly be made based on certain assumptions and parameters, or empirically through testing. This assessment must be made separately for each application by customer.

The ESA policy document mentioned above further recommends in Chapter B.2, „Please consult your mechanical seal manufacturer for estimations of maximum surface temperature for specific seal types“.

We also wish to draw your attention to the fact that a final assessment of the ignition sources, in particular in regard to the maximum temperature according to EN ISO 80079-36:2016 (harmonized standard pursuant to Directive 2014/34/EU (ATEX)), must be carried out for the complete equipment or protective system, or for the complete safety devices, controlling devices and regulating devices, for which measurements in the installed state on the end product are or may be necessary.

Note:
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