

## ESA Position Statement on ATEX Directive 94/9/EC and its applicability to Mechanical Seals.

2005 December

The Directive ATEX 94/9/EC (ATEX 95) – ‘Equipment and Protective Systems intended for use in potentially explosive atmospheres’ has been mandatory since 2003 July 1. The interpretation of how this Directive applies to Mechanical seals is still largely misunderstood. On 2005 Feb 22, the EC ATEX Standing Committee provided a “*Consideration document*” § on mechanical seals defining when a mechanical seal is to be considered a machinery element or an ATEX Component.

§ <http://europa.eu.int/comm/enterprise/atex/rotating.htm>

The Members of the European Sealing Association (ESA) Mechanical Seals Division support this “*Consideration document*” and have developed the following “*Position Statement*” to summarise its content and to further clarify related issues.

### A. DEFINITION AND REQUIREMENTS FOR MECHANICAL SEALS CLASSIFIED AS MACHINERY ELEMENTS

Nearly exclusively, Mechanical Seals produced by Members of the ESA Mechanical Seals Division are “**Machinery elements**”, which do **not** fall within the Directive 94/9/EC. Machinery Elements are defined as:

- catalogue mechanical seals and their parts selected by the equipment manufacturer or equipment user alone or with assistance from the seal manufacturer
- mechanical seals stocked by the equipment manufacturer or end user for general applications
- mechanical seals used for applications where the service conditions are not closely specified
- non cartridge-seals and parts
- standard cartridge seals.

Mechanical seals will also be machinery elements if a risk assessment by the mechanical seal or equipment manufacturer shows that the seal is not expected to be an ignition source even in the event of fault conditions.

Because Machinery elements are not defined within ATEX Directive 94/9/EC they cannot be supplied with a Declaration of Conformity. However, Machinery elements are suitable for incorporation into rotating equipment that is classified as Groups 1 and 2, categories M2, 2 and 3 in potentially explosive gas or dust mixtures.

The Instruction Manual supplied by the seal manufacturer provides the necessary guidance for the safe incorporation of the mechanical seal into equipment and relevant safety aspects and limits of operation. This document assists both Rotating Equipment Manufacturer and user of the equipment when meeting the needs of the Machinery Directive 98/37/EC and the ATEX Directive 94/9/EC. Please consult your mechanical seal manufacturer for further information.

### B. DEFINITION AND REQUIREMENTS FOR MECHANICAL SEALS CLASSIFIED AS ATEX COMPONENTS

The EC ATEX Standing Committee’s “*Consideration document*” makes reference that some “Engineered mechanical seals” may be classified and sold as ATEX Components. The term “Engineered mechanical seal” however has no clear definition. Applying the EC Standing Committee’s intent to restrict the definition of ATEX Components to only those rare mechanical seals in high explosive risk environments, the ESA Mechanical Seals Division offers this clarification of the terminology. ***‘Mechanical seals which use standard parts or modifications thereof are considered machinery elements. Only in exceptional circumstances should a mechanical seal be classified as an ATEX component. An engineered mechanical seal, in the context of ATEX, should be when a specifically designed mechanical seal (which meets the criteria of an ATEX component) has its design features based on the ignition potential of a particular service.’***

The “*Consideration document*” also advises that mechanical seals applied in zone 0 / 20 environments require mechanical seals to be classified as ATEX components, category 1. These circumstances are rare and for zone 0, described as ‘highly likely to be potentially explosive’, are defined as an area in which ‘the explosive atmosphere typically exists for more than 1000 hours per year’ (reference; EC *ATEX Guidelines*). Classification of a rotating equipment item requiring a Category 1 ATEX Component should be judged in this context.

Where mechanical seals are used in agitators the guidelines from the “*Consideration document*” should be equally applied and the majority of seals should be classified as machine elements. The zone in which they are operating in the case of a top-entry design can be either inside and/or outside the vessel and in rare instances operators have had to classify the inside of the vessel as a zone 0 environment.

### B.1 Marking of ATEX Components

Unlike ATEX equipment, marking in the context of ATEX components refers to conformity marking only. CE marking should not be affixed to ATEX components. Although not required by the legislation, from 2006 the mechanical seal industry will apply the recommendations in the “*Consideration document*” and, in the rare circumstances of a mechanical seal being an ATEX component, will conformity mark according to the recommendations of the EC ATEX Guidelines (second Edition). When necessary, appropriate conformity marking will be provided on the seal, unless size is prohibitive, in which case conformity marking will be on the packaging and documentation. The information provided will be;

- The manufacturer’s name and type or code description of the product
- The symbol for explosion protection as laid down in Directive 84/47/EEC
- The symbol of the equipment group and the category. The source of the explosive atmosphere (gas or dust).
- The symbol for the type of explosivity protection employed.
- The use of the symbol ‘TX’ to indicate that the maximum surface temperature or Temperature Class is advised in supporting documentation.

### B.2 Maximum Surface Temperature

The primary ignition risk from a mechanical seal during normal operation results from the maximum surface temperature. Prediction of this temperature is based on a number of different criteria; for example the typical temperature rise expected at the seal faces is very much dependent on medium to be sealed, seal design and operating conditions. Please consult your mechanical seal manufacturer for estimations of maximum surface temperature for specific seal types.

## C. AUXILIARY SUPPORT SYSTEMS

The ATEX Standing Committee guidance note does not consider fluid support systems which help to lubricate the seal contact surfaces and assist in improving process fluid containment. However, their applicability is now clear when put in the context of the improved definition of an ATEX ‘component’. This definition now describes ATEX components as having two defining elements;

- Are essential to the safe functioning of equipment and protective systems **with respect to explosion protection**;
- With no autonomous function.

Auxiliary seal support systems do not fit the above definition and, in addition, generally do not have their own source of ignition. Thus they are assemblies which **are not considered ATEX components** but, when fitted with specific electrical switches/alarms and other parts which individually are required to be ATEX accredited, should have these items comply with the specified ATEX zone. Therefore, it is important that the purchaser **warns the system supplier of the local ATEX requirements** in purchase order documentation.

## REFERENCES

1. Considerations by the ATEX Standing Committee, 2005, "When a Mechanical Seal is a Machinery Element and when an ATEX Component", (<http://europa.eu.int/comm/enterprise/atex/rotating.htm>).
2. ATEX Guidelines (Second Edition), July 2005, Directorate General – Enterprise and Industry of the European Commission.
3. Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres.
4. VDMA-Leitfaden, 2005, "Mechanical Seal, 2<sup>nd</sup> Edition".