European Sealing Association e.V.

ESA Position Statement on the EU Pressure Equipment Directive (97/23/EC)

1999 August

Introduction

The European Sealing Association e.V. (ESA) is a pan-European organisation, established in 1992 and representing a strong majority of the fluid sealing industry in Europe. Member Companies are involved in the manufacture and supply of sealing materials, crucial components in the safe containment of fluids during processing and use. This statement has been prepared by the Mechanical Seals Division of the ESA.

The Directive ("PED") was formally adopted by the European Parliament and the Council on 1997 May 29, the essentials of which are outlined in Annex I of this document. For full details, please refer to the *Official Journal of the European Communities* N$^{o.}$ L181 of 1997 July 9 (ISBN 011 916 0927). The Directive will enter into force on 1999 November 29, but compliance with its requirements will be optional until 2002 May 29.

Implications for mechanical seals

In order to clarify the legal and technical requirements of the **Pressure Equipment Directive**, the ESA has sought advice from sources across Europe, including the Verein Deutscher Maschinenbau-Anstalten e.V. (**VDMA**, Germany) and the Department of Trade and Industry (**dti**, United Kingdom).

Although in the majority of cases seal manufacturers may not be advised of the ultimate destination of the product, the **Pressure Equipment Directive** applies to equipment destined for use only in EU Member States.

It is accepted that pumps and the majority of equipment with rotating shaft seals are exempt from the **Pressure Equipment Directive**.

Further to earlier statements on the **EU Machinery Directive (98/37/EC)**, it is apparent that mechanical seals do not fall within the definition of *machinery*, but optionally, ESA Members may comply within the scope of the **Machinery Directive** by:

- *issuing a Declaration of Incorporation*
- *supplying the mechanical seal without a CE mark*
- *supplying appropriate Instruction Manuals*
- *maintaining systems for the compilation of Technical Files as appropriate*

Consequent course of action by Members of the ESA

1. Unless advised to the contrary by the purchaser, it is assumed that European Directives are not appropriate to mechanical seals and systems.

2. Pump gland plates, sleeves and seal chambers are assumed to be part of the pump casing and will comply with the requirements of the **Pump Safety Standard**, EN 809.

3. Single mechanical seals **may** comply optionally with the **Machinery Directive** (as indicated above).

4. In multiple seal arrangements, with a risk assessment based upon failure of the primary (inboard) seal, both the primary and secondary (outboard) seals will comply with the **Machinery Directive** (as indicated above).

5. The equipment which will fall within the scope of the **Pressure Equipment Directive** is indicated in Annex II of this document. In general, this will commence at the point of attachment (normally threaded union) of the system pipework to the gland or seal plate. When supplied as fully assembled devices by Member Companies of the Mechanical Seals Division of the ESA, and **where appropriate** (based upon the group category, pressure and volume classifications of the Directive):

- *a Declaration of Conformity will be issued*
- *the CE mark will be applied*
- *systems will be maintained for the compilation of Technical Files as appropriate*

6. When Member Companies supply components or sub-assemblies which will eventually be incorporated into a system within the scope of the **Pressure Equipment Directive**, the above procedure 5. will be followed **where appropriate** for those components or sub-assemblies, based upon the group category, pressure and volume classifications of the Directive.

7. In all cases when Member Companies supply components or sub-assemblies which will eventually be incorporated into a system within the scope of the **Pressure Equipment Directive**, the organisation responsible for final assembly of the complete system will be responsible for meeting the requirements of the Directive for that complete system.

8. Risk assessment will be based upon failure of the primary (inboard) seal, as follows:

(i) ***Seal buffer liquid (unpressurised) systems***; presumes the buffer liquid may be contaminated with process fluid, and the outboard seal and seal system are containing the buffer / process fluid under the conditions normally applied to the primary seal. Hence, the criteria used for establishing the category within the Pressure Equipment Directive will be based upon the most arduous fluid (buffer or process fluid) at the process operating pressure.

(ii) ***Seal buffer gas or non-buffer containment (unpressurised) systems****;* presumes the containment space may be contaminated with process fluid, and the outboard seal and seal condition monitoring system are containing the buffer / process fluid under the conditions normally applied to the primary seal. Hence the criteria used for establishing the category within the Pressure Equipment Directive will be based upon the process fluid at the process operating pressure. In general, however, the seal condition monitoring system will have a system pressure/volume multiple below that covered by the Pressure Equipment Directive and is an assembly rarely supplied by the seal industry.

(iii) ***Seal barrier (pressure higher than process fluid) systems***; two possible levels of assessment -

(a) fast shut-off in the event of primary seal deterioration or failure. In this case, the outboard seal and seal system are containing the barrier fluid under conditions identical to normal operation. Hence, the criteria used for establishing the category within the Pressure Equipment Directive will be based upon the barrier fluid at the barrier system pressure.

(b) slow shut-off in the event of primary seal deterioration or failure. In this instance, the outboard seal and seal system are containing the process fluid under the conditions normally applied to the primary seal. Hence, the criteria used for establishing the category within the Pressure Equipment Directive will be based upon the most arduous fluid (barrier or process fluid) at the barrier system pressure.

9. Connecting pipework which is within the scope of the **Pressure Equipment Directive** (as indicated in Annex II of this document), will be normally the responsibility of the purchaser. All system volume assumptions made by the Members of the Mechanical Seals Division of the ESA will generally exclude connecting pipework, unless supplied as part of an assembled system.

10. Products supplied by Member Companies of the Mechanical Seals Division of the ESA prior to 2002 May 29 will continue to comply with existing national legislation. Products supplied from that date will comply with the Community regime of the Pressure Equipment Directive.

11. In order that Member Companies may comply with existing national legislation and the requirements of the Pressure Equipment Directive, information required from the purchaser is indicated in Annex III of this document.

12. A Member Company will be responsible for providing its own operating instructions for its own specific equipment, and will be responsible for maintaining technical files as appropriate.

13. Individual Member Companies may modify all or part of the above procedures as appropriate for specific local conditions.

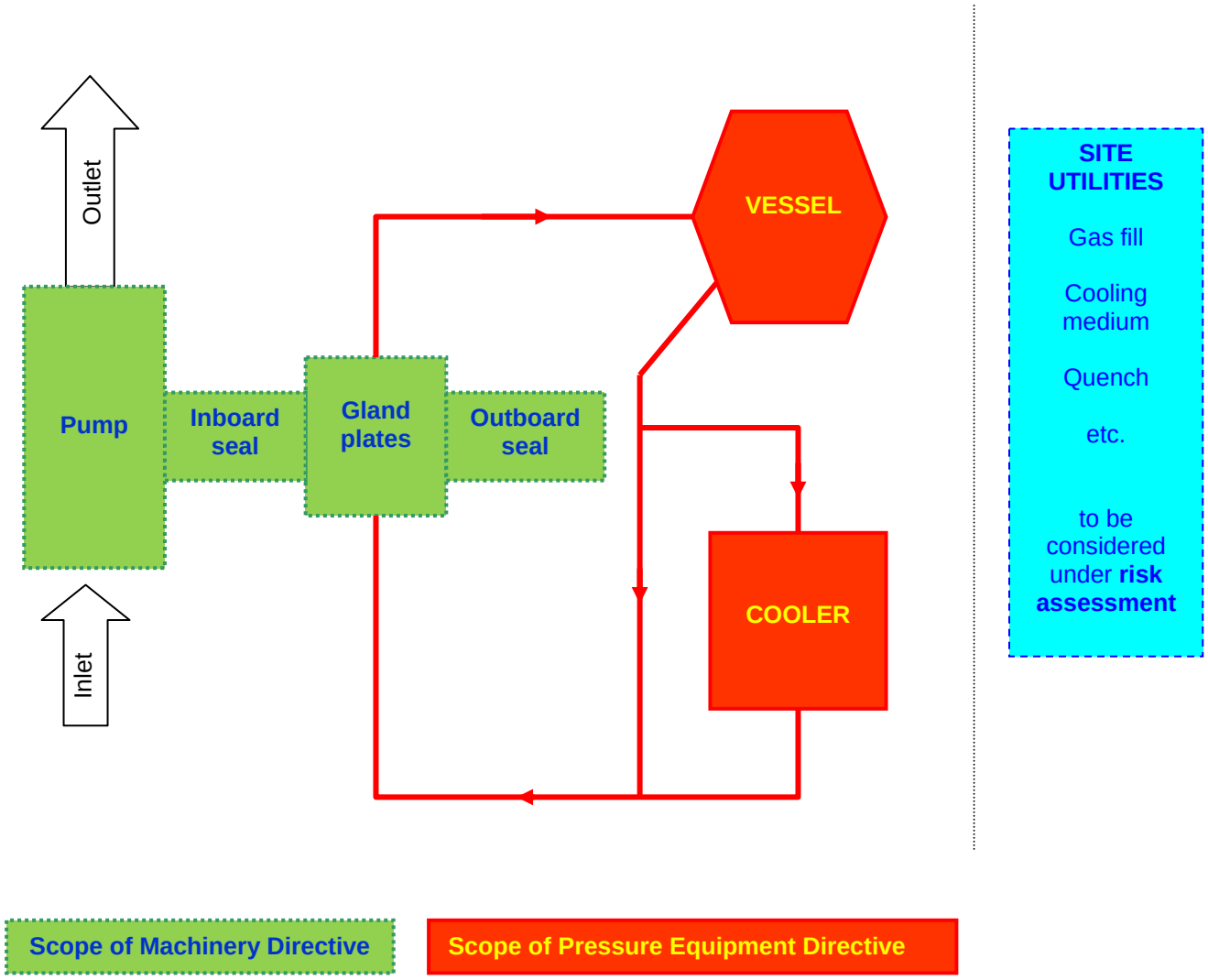
Annex I - ***Essentials of the Pressure Equipment Directive relating to sealing systems***

HAZARDOUS FLUID *Group 1*		**NON-HAZARDOUS FLUID** *Group 2*			**CE CATEGORY**
Less than 25	Bar litres	Less than 50	Bar litres	=	N/A
25 to 50	-- " --	50 to 200	-- " –	=	Category **i**
50 to 200	-- " --	200 to 1000	-- " –	=	Category **ii**
200 to 1000	-- " --	1000 to 3000	-- " –	=	Category **iii**
Over 1000	-- " --	Over 3000	-- " –	=	Category **iv**

Actions required:

Below Category **i**	Risk Assessment to determine Category classification. Sound engineering practice. No CE mark may be applied
Category **i**	As above, plus: Technical documentation and conformity assessment covering design, manufacture and operation Affix CE mark with Notified Body identification number Declaration of conformity Retain records for 10 years
Category **ii**	As Category **i**, plus: Manufacture controlled within ISO 9002 or 9003 Quality system and final test monitored by a Notified Body
Category **iii**	As Category **ii**, plus: Design verified as conforming by a Notified Body, or Design type approval certificate is valid
Category **iv**	As per Category **iii**, plus: Notified Body verification of conformity and release

Annex II - *Basic Scope of the Pressure Equipment Directive, with respect to mechanical seal systems*



All devices shown within the PED circuit (such as valves, pressure relief devices, coolers etc.) will comply with the requirements of the Pressure Equipment Directive

Annex III - ***Information required from the purchaser***

	Notes (see explanations below)
1. Process fluid	N1, N2
2. Total seal chamber heat generation	N3
3. Shaft diameter	N4
4. Process temperature and pressure	N4
5. Electrical power supply	N5
6. Electrical hazard rating	N5
7. Is cooling water available, and at what temperature ?	
8. Local ambient temperature	
9. Customer name / end user	N6
10. Location	N7
11. Specifications	N8
12. Certification requirements	N9
13. Delivery / commercial requirements	N10

Notes

N1 Needed to allow selection of barrier fluid
If not available, discuss fluids which would be acceptable

N2 Ensure correct chemical name is obtained

N3 Includes all heat generated in seal chamber from mechanical seals and any internal pumping device but not heat soak

N4 Allows calculation of heat soak and barrier pressure

N5 May not be necessary if there are no electrics on system

N6 End user name may indicate type of system favoured or imply highly specified equipment

N7 Some locations (offshore, desert, tropical, arctic) imply special materials or considerations

N8 Specifications may be very complex, covering design, materials, build, testing, storage, etc.

N9 Certification levels may include NDE, PMI, QP, stage witness etc.

N10 Delivery dates, shipping, site storage, can all affect quotation