

Aerospace - Visual Inspection Standard for Elastomeric Sealing Elements Other than O-Rings

RATIONALE

As there are many elastomeric sealing elements for fluid power applications other than O-rings, there is a need to create a standard that specifies the visual inspection criteria for these sealing elements.

1. SCOPE

This standard provides the following:

- a. The required surface finish criteria for the designed function of the parts
- b. The definition of surface imperfections and defects that affect surface quality
- c. The categories by location for each geometry for the permissible type, size and quantity of defects

It also establishes the quantitative levels of acceptance by providing defined limits and inspection guidance for the acceptance or rejection of production parts

This specification is applicable but not limited to, the surface quality of:

T-Seals

L-Rings

Capped T Rings

Capped L Rings

Cammed Type Seals

Cruciform Shaped Elastomers

Pyramid (Dyna-Bak) Seals

Square Ring Seals

Quadruple Lobed Seals

U-Cups

Spring Energized U-Cups

Molded in Place Metal Gasket Seals

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2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 ISO Documents

International Standards Organization Standards: Available from American National Standards Institute 25 west 43rd Street, New York, NY 10036-8002. Tel: 212-642-4900, www.ansi.org.

ISO 3601-3 Fluid Power Systems – O-Rings, Part 3 Quality Acceptance Criteria.

3. SEAL ELEMENT/PRODUCT

NOTE: Graphical depictions of individual seal geometries with their corresponding classification of imperfections by location are shown in Appendix A.

With the exception of molded-in-place gasket type seals, each type of seal cross section may have as many as 4 configurations as identified below:

- a. Radial Piston Type Seal
- b. Radial Rod Type Seal
- c. Internal Pressure Face Type Seal
- d. External Pressure Face Type Seal

In addition, some seals may be molded for custom applications, such as mounting on a ball swivel, in which case the cross-section would be rotated through an angle.




4. CLASSIFICATIONS OF IMPERFECTIONS

4.1 The classification of imperfections is broken down into three parts

- a. Geometric location (Area) for Major, Significant and Minor requirements as defined in Table 1 and as depicted in each cross section sketch per Appendix A
- b. Type of imperfection as described in ISO 3601-3
- c. Magnitude of each imperfection and acceptance level per Table 1

4.1.1 Type. Where critical criteria are deemed necessary, per Table 1, Type 1 to this specification shall be specified. Type 2 criteria shall be used for normal applications. If the Type is not specified, Type 2 criteria shall apply.

TABLE 1. - DEFINITIONS OF MAJOR, SIGNIFICANT AND MINOR AREAS

Symbol	Class	Definition, Type 1	Definition, Type 2
	MAJOR (1)	This area is the direct sealing surface in contact with mating metal or other parts (such as PTFE caps) to be sealed and should be of high quality.	
	Area 1	Area/s of the seal/ring that require no visible defects greater than the size or quantity stated in ISO 3601-3 Grade CS.	Area/s of the seal/ring that require no visible defects greater than the size or quantity stated in ISO 3601-3 Grade S.
	SIGNIFICANT (2)	This area is a functional part of the seal in that it is directly related to proper functioning of the elastomer part and other associated components such as backup ring(s). As such, the surface should be free of large "void type" defects that would allow the elastomer to flow from the sealing surface areas (Area 1) during pressurized service, thereby decreasing the effectiveness of the seal assembly.	
	Area 2	Area/s of the seal/ring that require no visible defects greater than the size or quantity stated in ISO 3601-3 Grade N.	
	MINOR (3)	This area is not a functional part of the sealing element in that it is not a sealing surface, nor is it under high stress during operation.	
	Area 3	Area/s of the seal/ring that require no visible defects greater than the size or quantity stated in ISO 3601-3 Grade N, except there are no limitations on the number of allowable imperfections.	

4.2 PARTING LINE CRITERIA

4.2.1 Position of parting line(s) varies by manufacturers and product depending on molding methodologies used. It is the responsibility of the inspecting agency to establish parting line position by product in order to perform appropriate inspections.

4.2.2 Where the parting line is in the sealing area, allowable imperfections shall be per ISO3601-3 Grade S for Type 2 parts and Grade CS for Type 1 parts.

4.2.3 Where the parting line is not in the sealing area, allowable imperfections shall be per ISO3601-3 Grade N.

4.2.4 Imperfections concerning parting line(s) include:

- a. Flash
- b. Parting Line Projection
- c. Parting Line Indentation
- d. Mismatch
- e. Off Register
- f. Offset
- g. Backrind
- h. Excessive Trimming

The above does not relieve the requirements at the parting line area for inclusions, non-fills, foreign materials or flow lines per Table 1.