Chapter A5

Quality management system

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Individual chapters of the Kalsi Seals Handbook™ are periodically updated. To determine if a newer revision of this chapter exists, please visit https://www.kalsi.com/seal-handbook/.

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1. Certified ISO Quality Management System

The order fulfillment, inspection, testing, and sale of Kalsi-brand rotary seals is conducted under our registered ISO 9001:2015 Quality Management System (QMS). Our Quality Manual provides specific details on the policies and procedures used by Kalsi Engineering to meet ISO 9001:2015 requirements.

Our Quality Management System covers various topics, such as organizational roles, document control, control of records, training, understanding the needs and expectations of interested parties, order fulfillment, quality objectives, operational planning and control, control of externally provided processes, products, and services, performance evaluation, addressing risks and opportunities, purchasing, internal audits, inspection and testing, control of non-conformances, corrective action, identification and traceability, and product preservation. Although these topics are all important to our quality mission, this chapter focuses on the quality-related subject that, in our opinion, is of the greatest interest to the engineers who are charged with implementing our seals in critical service applications: Our requirements for quality-related inspection and testing.

2. Elastomer batch testing

Our quality management system requires that approved elastomer compounds have written specifications for physical testing that establish batch acceptance criterion. Batch qualification testing of approved elastomers is performed to evaluate the following material properties:

- Hardness, in accordance with ASTM D 1415 or D 2240.
- Tensile strength, in accordance with ASTM D 1414 or D 412.
- Elongation, in accordance with ASTM D 1414 or D 412.
- Modulus, in accordance with ASTM D 1414 or D 412.

If needed to for special requirements, such as API 16RCD, additional testing such as compression set and immersion testing can be performed for batch acceptance, at the customer's expense. In view of the added expense of such testing, the customer may wish to consider imposing such testing on a periodic basis, rather than as a requirement for every material batch.

3. Testing of manufacturing lots

Seals with all-elastomeric construction

Each manufacturing lot of Kalsi-brand rotary seals that have all-elastomeric construction are subjected to the following in-house tests by trained inspectors:

- Statistical sampling of hardness using manufactured seals, or using test buttons that accompany the manufacturing lot.
- Complete visual inspection of every rotary seal.
- Statistical sampling of overall cross-sectional dimensions.
- Sampling of diameter dimensions.

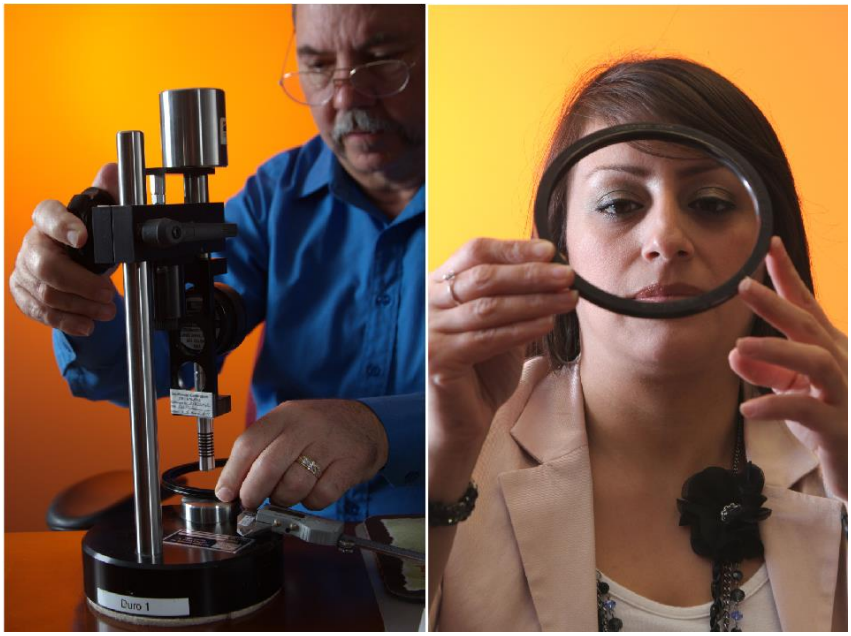

Figure 1

Hardness testing and visual inspection

Manufacturing lots of Kalsi Seals® are tested for hardness (left) and inspected visually (right).

Figure 2

Dimensional inspection

Manufacturing lots of Kalsi Seals are dimensionally inspected on a statistical basis.

Seals with plastic-lined construction

Each manufacturing lot of Kalsi-brand rotary seals that have plastic-lined construction are subjected to the following in-house tests by trained inspectors:

- Complete visual inspection of every rotary seal.
- Statistical sampling of overall cross-sectional dimensions.
- Diameter measurement on a sampling basis.

Routine inspection by outside inspectors

All though not specifically required by our Quality Management System, manufacturing lots of Kalsi Seals are inspected by trained outside inspectors, using criterion established by Kalsi Engineering, in advance of being inspected by Kalsi Engineering employees.

4. Packaging promotes identification, traceability, preservation, etc.

Kalsi-brand rotary seals are shipped in packaging (Figure 3) that provides product identification and traceability, facilitates product preservation, and supports age control practices.

Identification

Kalsi-brand rotary seals are identified by the Kalsi Engineering part number that is printed on the package. Basic dimensional information is provided as supplemental identifying information. As an additional identification aide, Kalsi Seals are typically shipped in clear ultra-violet resistant packaging, so the content is readily visible without opening the package.

Traceability

Kalsi-brand rotary seals are traceable to inspection records and material batch information via the inspection code that is printed on the seal package.

Product preservation

Kalsi-brand rotary seals are sold in plastic packaging that provides protection from ultra-violet light, oxygen, ozone, dust and other contaminants.

Although some ultra-violet light resistant packaging is colored black or amber, for identification purposes, we prefer clear packaging that allows the content to be visible. The color of a bag does not contribute to its resistance to ultra-violet light. The ingredient in a shipping bag that protects the contents from ultra-violet light is a clear, cloudy additive. The clear bags that we use have the same resistance to ultra-violet light as the color coded black and amber bags (300 to 380 nanometers).

Kalsi Seals are stored in an air-conditioned environment until shipped.

Age control

The seal package provides the cure date of the seal manufacturing batch, and the recommended shelf life of the seal material.

Figure 3

Packaging promotes identification, traceability, product preservation, age control

Kalsi-brand rotary seals are shipped in packaging that identifies the product, provides traceability to inspection and material batch records, and provides the information necessary for age control. The packaging also provides protection from ultra-violet light, ozone, oxygen, dust, and other contaminants.

5. Risk management

Kalsi Engineering has established robust risk management practices. Contact us for additional details.