



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Rotary shaft lip-type seals incorporating elastomeric sealing
elements - Part 1: Dimensions and tolerances**

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1 Scope

This document specifies the symbol, construction type, operating pressure, dimension series and tolerance, shaft requirements, cavity requirements and size identification codes of rotary shaft lip-type seals incorporating elastomeric sealing elements (hereinafter referred to as seals).

This document applies to seals used under low pressure conditions (see 6.1).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable to its application. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 1031-2009, Geometrical product specifications (GPS) - Surface texture:

Profile method - Surface roughness parameters and their values

GB/T 1800.2-2020, Geometrical product specifications (GPS) - ISO code system for

tolerances on linear sizes - Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts (GB/T 1800.2-2020, ISO 286-2:2010, MOD)

GB/T 13871.2, Rotary shaft lip-type seals incorporating elastomeric sealing elements - Part 2: Vocabulary (GB/T 13871.2-2015, ISO 6194-2:2009, MOD)

GB/T 17446, Fluid power systems and components - Vocabulary (GB/T 17446-2012, ISO 5598:2008, IDT)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in GB/T 13871.2 and GB/T 17446 apply.

4 Symbols

The following symbols apply to this document.

h housing-bore depth b axial width (of the seal)

l housing or shaft chamfer length d_1 shaft diameter or main lip diameter of the seal D housing-bore diameter or seal outer diameter r corner radius of the housing bore

5.1 Seal outside-diameter construction

Figure 1 shows four basic types of outside-diameter construction of the seal.

Figure 1 - Four basic types of outside-diameter construction

5.2 Seal construction without and with protection lip

See Figure 2 for two types of seal construction without and with protection lip.

See Figure 3 for the schematic diagram of the common construction of air-side surface of the sealing lip.

Figure 3 - Construction of air-side surface of the sealing lip

5.4 Construction of the rubber-covered metal-cased seal

See Figure 4 for the schematic diagram of the common construction of the rubber-covered metal-cased seal.

5.5 Construction code of the seal

The various constructions shown in Figure 1, Figure 2, and Figure 3 can be combined and applied with each other, and the construction codes could be as follows:

- Single letters W, Z and B (see Figure 1) indicate the seal construction without protection lip and without wave-profile;
- Two-letters FB, FW and FZ, starting with F, indicate the seal construction with protection lip and without wave-profile; F indicates the existing of a protection lip, and the second letter indicates the outside-diameter construction (see Figure 1);
- Two-letters WL, ZL, BL, WR, ZR and BR, not beginning with F, indicate the seal construction without protection lip and with wave-profile; the first letter indicates the outside-diameter construction (see Figure 1), and the second letter indicates the direction of the wave-profile (see Figure 3);
- Three-letters FBL, FWL, FZL, FBR, FWR and FZR indicate the seal construction with protection lip and with wave-profile; the first letter F indicates the existing of the protection lip, the second letter indicates the outside-diameter construction (see Figure 1), and the third letter indicates the direction of the wave-profile (see Figure 3).

The design of the sealing lip is mainly carried out by the manufacturer (to ensure sealing); it can also be agreed between the manufacturer and the buyer.

Note: The constructions shown are only representative examples of the basic types. For the specific design details, refer to GB/T 9877-2008.

6.1 Operating pressure

Seals are normally used with atmospheric pressure on the air side, and sealing fluids at pressures of 0 kPa ~ 50 kPa above atmospheric pressure. The user shall consult the seal manufacturer regarding use at other pressures.

6.2 Dimension series

The assembling diagram of the seal is shown in Figure 5 and the dimension series are given in Table 1.

7.2 Diametral tolerance

The shaft shall have a diametral tolerance not greater than h11 as specified in GB/T 1800.2-2020.

7.3.1 Surface roughness

The seal contact surface of a ground shaft shall be finished to a surface roughness, measured in the axial direction of Ra 0.2 μ m ~ Ra 0.8 μ m, or Rz 0.8 μ m ~ Rz 3.2 μ m, as specified in GB/T 1031-2009.

If the surface roughness value of the shaft does not fall within the limits given in this document, it shall be determined between the user and the seal manufacturer.

7.3.2 Surface hardness

The surface hardness of the shaft shall be a minimum of HRC30. If the surface hardness of the shaft is less than HRC30, it shall be subject to agreement between the user and the seal manufacturer.

8.1.1 Where the housing is a rigid fully machined ferrous part, the housing bore shall

conform to 8.2 and 8.3.

8.1.2 The housing bore shall be provided with a lead-in chamfer, free from burrs, as

shown in Figure 7 and specified in Table 6.