



# Sealing solutions for hydro power plants

Customized machined seals and engineered plastic parts



The Power of Knowledge Engineering



# Sealing solutions

SKF is a supplier of top quality, highly reliable seals to the hydro power industry. Customers benefit from the comprehensive field experience and extensive knowledge in the large diameter sealing technology. Whenever reduced maintenance costs, increased productivity or process reliability are important – SKF is there with customized machined sealing solutions for the hydro power industry.

## Competences

SKF is a leading supplier for standard and custom engineered sealing solutions. Based on many years of experience, especially in hydro power applications, SKF is able to support the hydro power industry with

- on-site solution analysis,
- application engineering,
- material development for increased wear resistance, reduced friction, high speed solutions, etc.,
- just-in-time availability of standard seals and customized sealing solutions.

## Virtually no limits

The hydro power industry, in particular, has a high demand for special sealing solutions and large diameter seals produced in small to medium quantities. SKF can supply virtually any kind of seal for almost any conceivable application, in any dimension and design up to 4 000 mm in diameter as one piece. Larger seals with diameters up to 10 000 mm and above are assembled using a special welding technique.

## Manufacturing concept

With the SKF SEAL JET system, a CNC controlled production system with dedicated software and specially developed tools for different polymeric materials, SKF can quickly supply single seals or larger quantities without additional tooling costs. SKF machined seals are made from extensively tested high performance materials specially developed for the most demanding applications.

## From development to installation

SKF's assistance to the hydro power industry is not limited to developing a proper sealing solution for specific applications and a fast and cost effective production process for custom engineered sealing solutions. It also includes – if required – on-site assembly

and installation of seals through well trained and experienced service engineers.

The choice of material, G-ECOPUR, a special cast polyurethane recommended for hydro power applications, is one of the most suitable materials for welding, allowing on-site joints and achieving the performance and quality of an endless seal. When replacing large diameter seals for heavy equipment (e.g. rotor blade seals of Kaplan turbines, flange connection seals etc.), the customer benefits from tremendously reduced installation time, reduced fitting costs, reduced plant downtime and – most importantly – minimized maintenance costs.

*Step 1: Mounting of runner blade seals*



*Step 2: Cutting and aligning of cross-section*



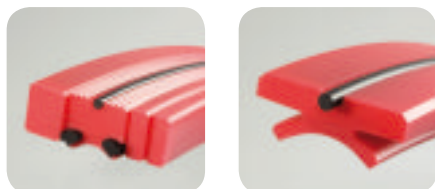
*Step 3: Welding of aligned cross sections*



# Application examples

## Rotor blades

- Compact seals
- Flexible lip seals
- Chevron sets
- Suitable for small housings
- Flexible sealing lip compensates for large misalignments
- Replacements for O-Ring, X-Ring or similar solutions



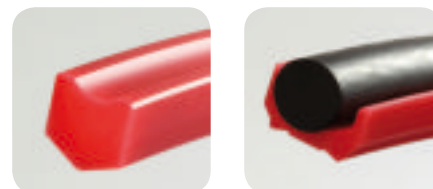
## Wicket gates

- Lip seals
- Compact seals
- Chevron sets
- Optimized for pivoting in low pressure range
- Flexible sealing lip compensates for large misalignments
- Low friction to avoid stick-slip tendency



## Spherical valves

- Compact seals
- O-ring loaded cap seals
- Space saving designs to fit small housings
- High dimensional stability under pressure
- No twisting during installation or operation
- Flexible sealing lip compensates for deformation and misalignment of mobile ring



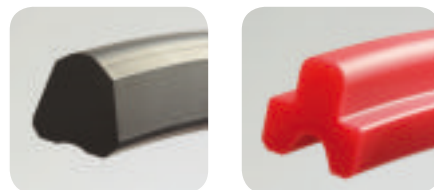
## Ring gates

- Flexible upper ring gate seals
- Compact lower ring gate seals
- Flexibility to adopt to different housing/clamping ring designs
- Flexible upper ring gate seal lip design
- Flexible sealing lip compensates for tolerances and misalignments



## Butterfly valves

- Large variety of compact seals
- Geometry adjustments to any housing/clamping ring design possible
- High dimensional stability under pressure



## Capabilities

- High abrasion resistant materials
- Special self-lubricated polyurethanes
- Excellent resistance against sediments
- Endless, split and welded designs
- Easy installation depending on design
- Extremely large diameter capacity (10 000 mm and above)

## Overall benefits

- Increased seal service life
- Reduced downtime
- Easy and fast installation
- On-site welding and installation service

Step 4: Visual inspection of weld



Step 5: Post-processing with special milling tool



Step 6: Installed seals for runner blades



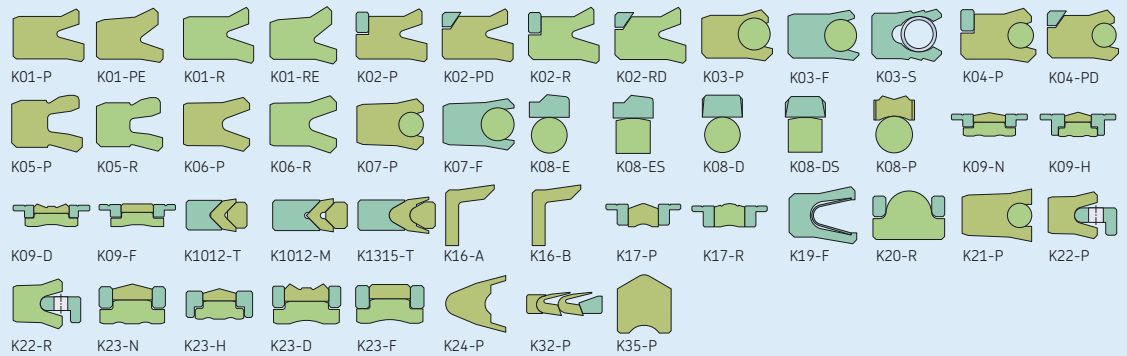


# Standard machined seal profiles

## Wipers



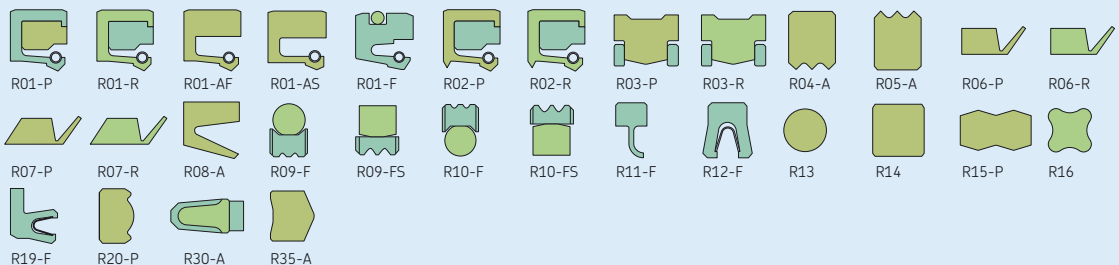
## Piston seals



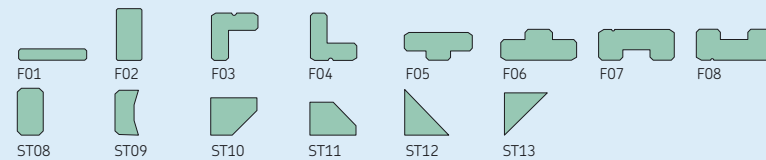
## Rod seals



## Rotary seals



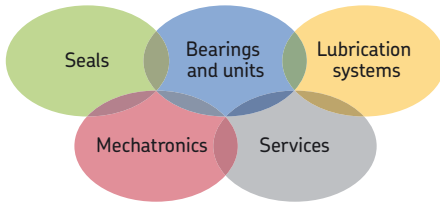
## Guide and backup rings



## O-rings and static seals







### The Power of Knowledge Engineering

Drawing on five areas of competence and application-specific expertise amassed over more than 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry world-wide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management systems. A global presence provides SKF customers uniform quality standards and worldwide product availability.

This brochure was presented by:

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PUB SE/S2 13064 EN · August 2012

Printed in Sweden on environmentally friendly paper.

