High-Performance Rotary Shaft Oil Seals are a must in this industry, due to the aggressive chemicals used in the cooling baths, and the high working speeds reached by the equipment. F.LLI PARIS S.r.l. and ATS S.r.l. propose a wide selection of Oil Seals to guarantee a solution for all the possible working conditions in this industry.

Stand for hot and cold rolling mills
STEEL MILL APPLICATION

L2M®
Oil seal with a flexible reinforced textile-rubber back, and a rubber sealing lip with a garter spring combined with axial (A) and radial (R) lubrication grooves.

L1M
Oil seals produced with various elastomers. Vulcanized is one single piece to the strong outer metal casing, and reinforced with a stiffening ring. Developed for small diameter cylinders.

BBS® DF
Primary Seal for oil film bearing applications with two built-in garter springs, and “duck foot” outside lips.

BBS® MX
Primary Seal for oil film bearing applications with two built-in garter springs, and straight outside lips.

WATER SEAL
Secondary seal for oil film bearings, installed as a protection from the cooling media.

VA
V-Ring with standard cross section proportional to the diameter of the shaft. On demand, fastening metal band with clips.

VE
V-Ring with special lip profile for higher elasticity. Cross section with fixed dimensions.

VAX
V-Ring with longer lip and Cross section with fixed dimensions. Suggested for heavy duty applications. On demand, fastening metal band with clips.

TGA
Oil seal with a flexible reinforced textile-rubber back, and a rubber sealing lip with a garter spring combined with axial (A) and radial (R) lubrication grooves.

TGU
Oil seal with a flexible reinforced textile-rubber back, and a rubber sealing lip with a garter spring.

TGF
Profile with flexible metal band which enables the assembly without clamping plate.

GM-L2
Self-retaining oil seal with an external ground finished metal case. Lip with a vulcanized finger spring, and a reinforcing metal insert.

For further information on all our seals, please check our web page or contact our offices.
STEEL MILL APPLICATION

Work roll and back up roll bearing

**Oil seal type L2M®**

- L2M® stands for a 2 springs system. One finger spring holding a garter spring. Due to this double spring system, the working conditions are guaranteed even with high speeds and large misalignments.
- The L2M® part number follows the US standards (e.g., L2M4012). The Shaft Oil Seals produced by any manufacturer under US standards directives, are interchangeable.
- The L2M® outer metal cases are manufactured in one single piece without welding points.
- The sealing lip is vulcanized onto the metal case. This avoids internal leakages.

**Oil seal type L1M**

- Oil seals similar to the L2M® type, and developed for small diameter cylinders, starting from 100 mm.
- Strong external ground metal casing onto which is vulcanized the sealing element.
- A forged steel stiffening ring bound to the external metal casing provides the required strength and rigidity of the seal.
- A finger spring in stainless steel vulcanized with the sealing lip ensure the correct sealing performance, even when shock loads arise.

**VA**

- All rubber seal for rotary shaft.
- Perfect solution to prevent the inclusion of dirt, dust or water.
- Secondary seal, in order to protect the primary seal.

**VE**

**VAX**

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STEEL MILL APPLICATION

Work roll and back up roll bearing

TGA and TGU

- Equipped with a strong flexible textile rubber back.
- It can be made in endless and in “split” form; please note that in the “split” version no pressure can be applied.
- The seal must be installed with a retaining plate in order to secure it into the housing and to avoid the rotation of the seal with the shaft.
- Garter spring also available encapsulated in resin or other materials, for protection from chemicals and dirt.

GMA

- Oil seal with rubber covered metal insert.
- Garter spring moulded-in the sealing lip.
- Built-in spacers for twin mounting systems.

GM-L2

- Self-retaining oil seal for severe working conditions, with an external ground finished metal case.
- Lip with a vulcanized stainless steel finger spring.
- Recommended for working conditions with grease in low-speed applications.

Oil seal type TGF

- Self-retaining all-rubber oil seal with a vulcanized flexible metal band to be mounted without clamping plate.
- Available also in “split” (open) form. Mainly used for maintenance in applications without any pressure. In this case the clamping plate is recommended.
- Garter spring available also encapsulated in resin or other materials for protection from chemical aggressions and dirt.

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STEEL MILL APPLICATION

Working roll and back-up roll oil seals
Rotary shaft oil seals for oil lubricated bearings - Hot and Cold mills - examples of main seal arrangements.

L1M Application design with back-to-back L1M oil seals.

L2M® Application design with back-to-back L2M® oil seals.

TGF Application design with back-to-back TGF oil seals.

A Water Protection V-Ring type VA or VE
B Oil seals
C Oil
D Lubrification
E Water

For further information on all our seals, please check our web page or contact our offices.
STEEL MILL APPLICATION

NOTICE

There are different designs for the stand mills that require various seals and mounting combinations.

For further information on all our seals, please check our web page or contact our offices.
STEELE MILL APPLICATION

Work roll and back up roll bearing

BBS®DF and BBS®MX

• Primary shaft oil seals for oil film bearings.
• The BBS® oil seals are available in both DF and MX style to fit every customers’ requirement.
• Used in steel mill: back-up rolls (hot and cold rolling mills).
• The BBS® oil seals can be supplied together with the corresponding Water Seal, or with specific V-Rings (secondary seal).

WATER SEAL

• Secondary seal for oil film bearings installed as a protection from the cooling media. Available also with a finger spring Vulcanized in the sealing lip.
• The finger spring has the function to constantly maintain the preloaded lip, even after the rubber loses its flexibility with time. The finger spring also enables the sealing lip to better copy the axial movement of the shaft.
• The Water Seal is available also without finger spring.
• Also available with its corresponding BBS® seal type (primary seal).
BBS® for oil film bearings applications.  
Back-up rolls for Hot and Cold rolling mills

Primary shaft oil seal for oil film bearing.

All the BBS® seals are available both in NBR or HNBR compound.

The BBS® oil seals can be supplied together with the corresponding Water Seal, or with specific V-Rings (secondary seal).

A Seal-end plate  
B Coolant seal  
C Seal inner ring  
D BBS® SEALS (neck seal)
**STEEL MILL APPLICATION**

**BBS® for oil film bearings applications for back-up rolls**
**Hot and cold rolling mills**

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**BBS®-DF e BBS®-MX**

**APPLICATION:** Back-up rolls (hot and cold rolling mills).

**COMPOUND NBR:**
Special compound developed for this specific application.
Temperature range: \(-20°C / +120°C\)
Hardness: 70 +/- 5 Sh.A - 80 +/- 5 Sh.A

**COMPOUND HNBR:**
Special compound developed for this specific application.
Temperature range: \(-30°C / +160°C\)
Hardness: 70 +/- 5 Sh.A - 80 +/- 5 Sh.A

**ADVANTAGES:**
The design of the BBS® seals from FP and ATS differs from the competition by the way they are moulded. We have engineered a method to completely vulcanize the garter springs into the body and into the lip of the seal, avoiding any pasting resin. For these Big Bearing Seals we studied and developed a special HNBR compound, that has a better temperature resistance with reduced friction and abrasion features.

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**WATER SEALS**

**APPLICATION:** Back-up rolls (hot and cold rolling mills), water preventing.

**COMPOUND NBR:**
Special compound developed for this specific application.
Temperature range: \(-20°C / +120°C\).
Hardness: 75 +/- 5 Sh.A

**ADVANTAGES:**
The finger spring has the function to constantly maintain the preloaded lip, even after the rubber loses its flexibility with time. The finger spring also enables the sealing lip to better copy the axial movement of the shaft.