

# TRAINING

*Lip Seals*

*Metal Case  
Lipseal*

**AST Seals**



# Lip Seals



# Content

- Introduction
- Competition
- Lip seals
- Lip Seal configuration
- Life time
- Installation
- Overview
- Markets

# Competition

- Elastomer-Lip Seals( NBR-FKM-SIL.....)
- Mechanical Face Seals
- Braided packing

# Competition

## Elastomer Seals ( NBR-FKM-SIL....)

- Limited Chemical resistance
- Temperature max. 150°C
- Low Pressure (No pressure)
- Limited speed
- Bad dry running
- High wear
- limited storage (aging)
- Easy installation
- Low cost
- Easy to get
- Resists vibrations

# Competition

## Mechanical Face Seals

- Chemical resistance secondary seal
- Temperature max. 150°
- Bad dry running
- High cost
- Installation very critical
- Much space
- Good in High Pressure applications
- Hardly any wear
- Long life time

# Competition

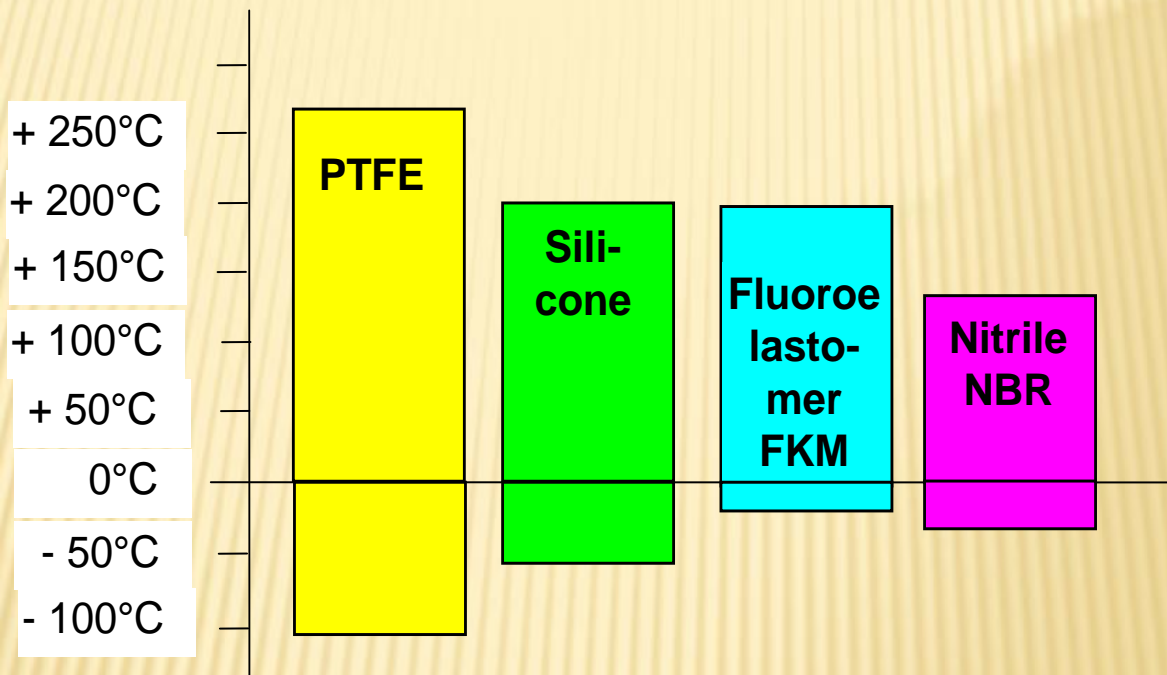
## Braided Packing

- Low speed
- Intensive Maintenance
- High friction
- Easy installation
- Low Cost
- Easy to buy

# Lipseals

- Chemically inert
- Temperature range - 50°C bis + 200°C
- Low friction
- High pressures
- Long life time
- Competitive pricing
- Easy Installation
- Less space

# Temperature - Table



# LipSeal Materials

Standard materials for Lip seals are:

- AF-2417 PTFE + 15% Carbon + 5% Graphite
- AF-4005 PTFE 5% Glass 5% MoS<sub>2</sub>
- AF-2413 PTFE 10% Carbon fiber
- AF-1111 PTFE + 10% Ekonol
- AF-4020 PTFE/glass(20%)/graphite(5%)

The following parameter are taken into consideration at an Application

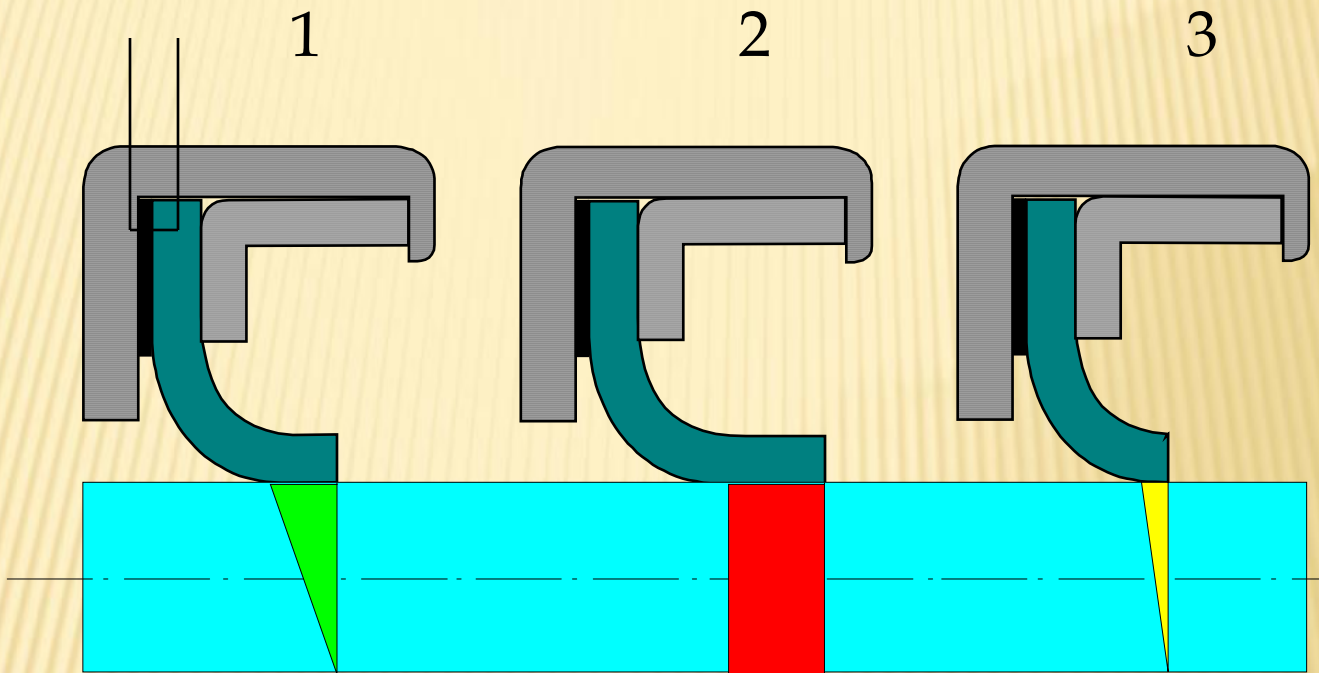
- Elongation , 150 to 300%
- Low elasticity, 3%
- Deformation under load
- Lowest Friction
- Thermo elastic memory
- Mechanical properties change at elevated temperatures

# LipSeal Materials

## Most used compounds

- |                |   |
|----------------|---|
| <b>AF-4005</b> | Filled PTFE, color Gray<br>Excellent wear resistance . Requires a shaft hardness of 55 HRc minimum. Can be abrasive.                      |
| <b>AF-1111</b> | Filled PTFE.- color Tan<br>Very good at soft shafts (<40HRC), Not recommended for use in water  |
| <b>AF-2417</b> | Filled PTFE.- Color Black<br>Good wear resistance. particularly suited for water and steam applications.<br>Also suitable for soft shafts |
| <b>AF-2413</b> | Filled PTFE.- Color black<br>, good wear resistance. Very good in water and steam applications. Needs a minimum shaft hardness of HRC55.  |
| <b>AF-4020</b> | Filled PTFE- Color Gray<br>Excellent wear resistance . Requires a shaft hardness of minimum 55 HRC minimum. Can be abrasive.              |

# LipSeal Configuration

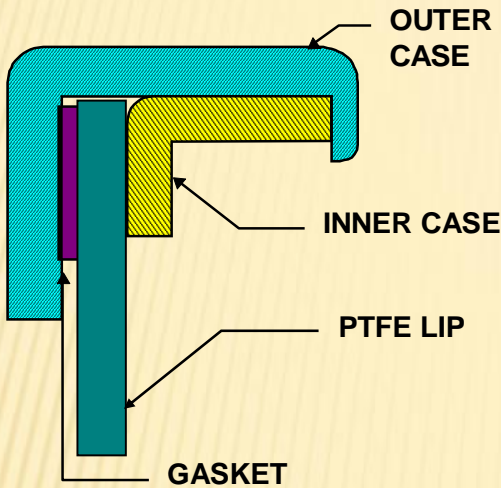


The PTFE lip is machined flat and after that stretched over the shaft. During installation the PTFE is stretched and a little elasticity remains. This causes the initial interference of the lip. The Lip ID and thickness is very important because this controls the sealing ability of the Lip seal.

The ID too large (3) causes a small contact area with a higher wear of lip and eventually the shaft.

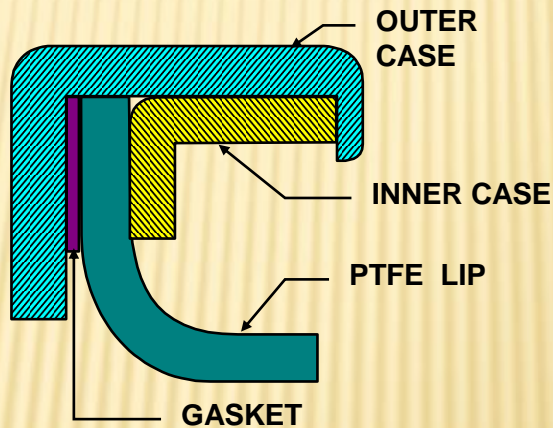
An ID too small (2) gives a wide contact area, which could cause a higher friction and fast leakage.

# LipSeal Configuration



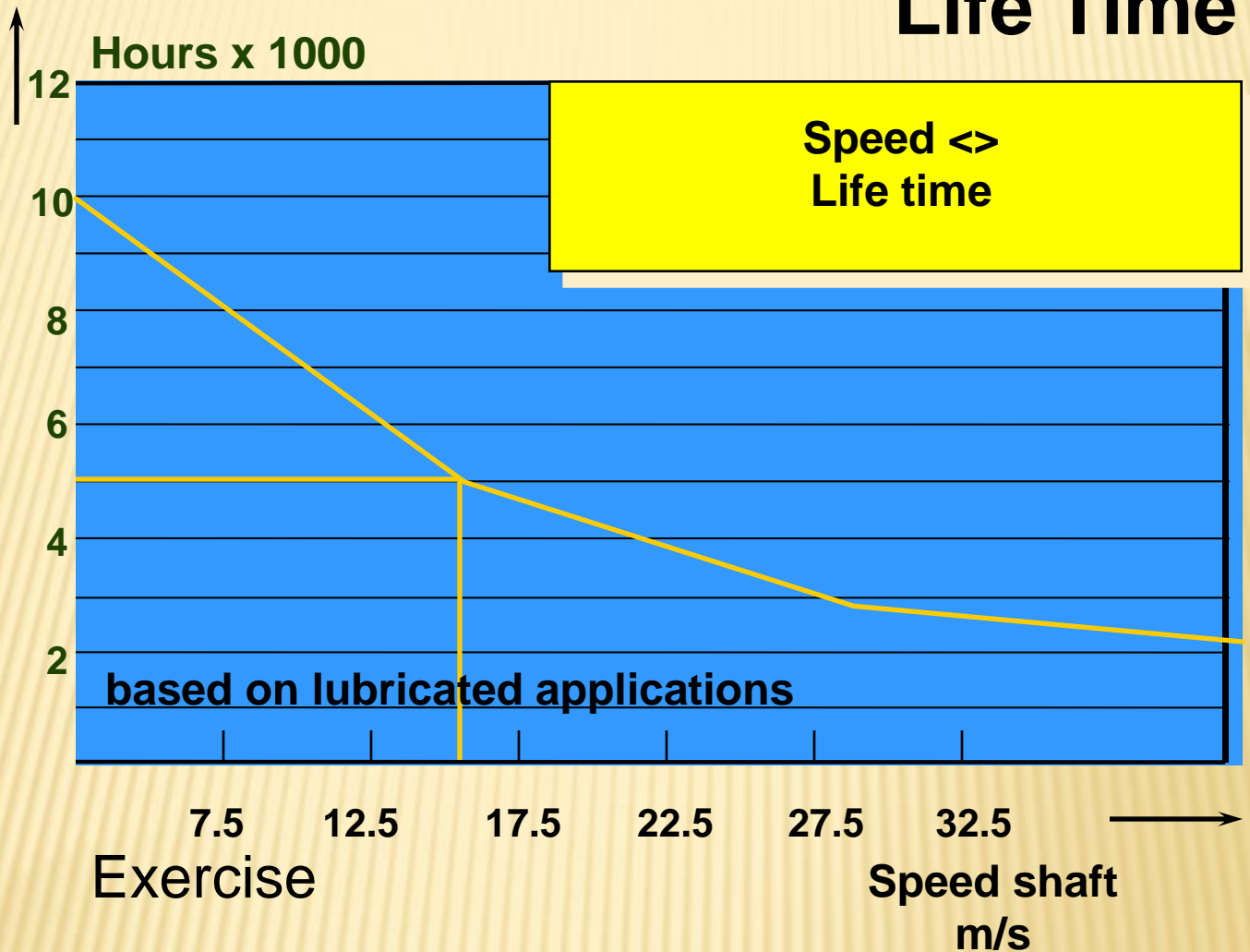
Seallip as produced

The metal case is normally made of Stainless Steel. Between the case and lip, a viton gaskets takes care of internal sealing .



Seallip preformed for easy assembly

# Life Time



Shaft = 100 mm

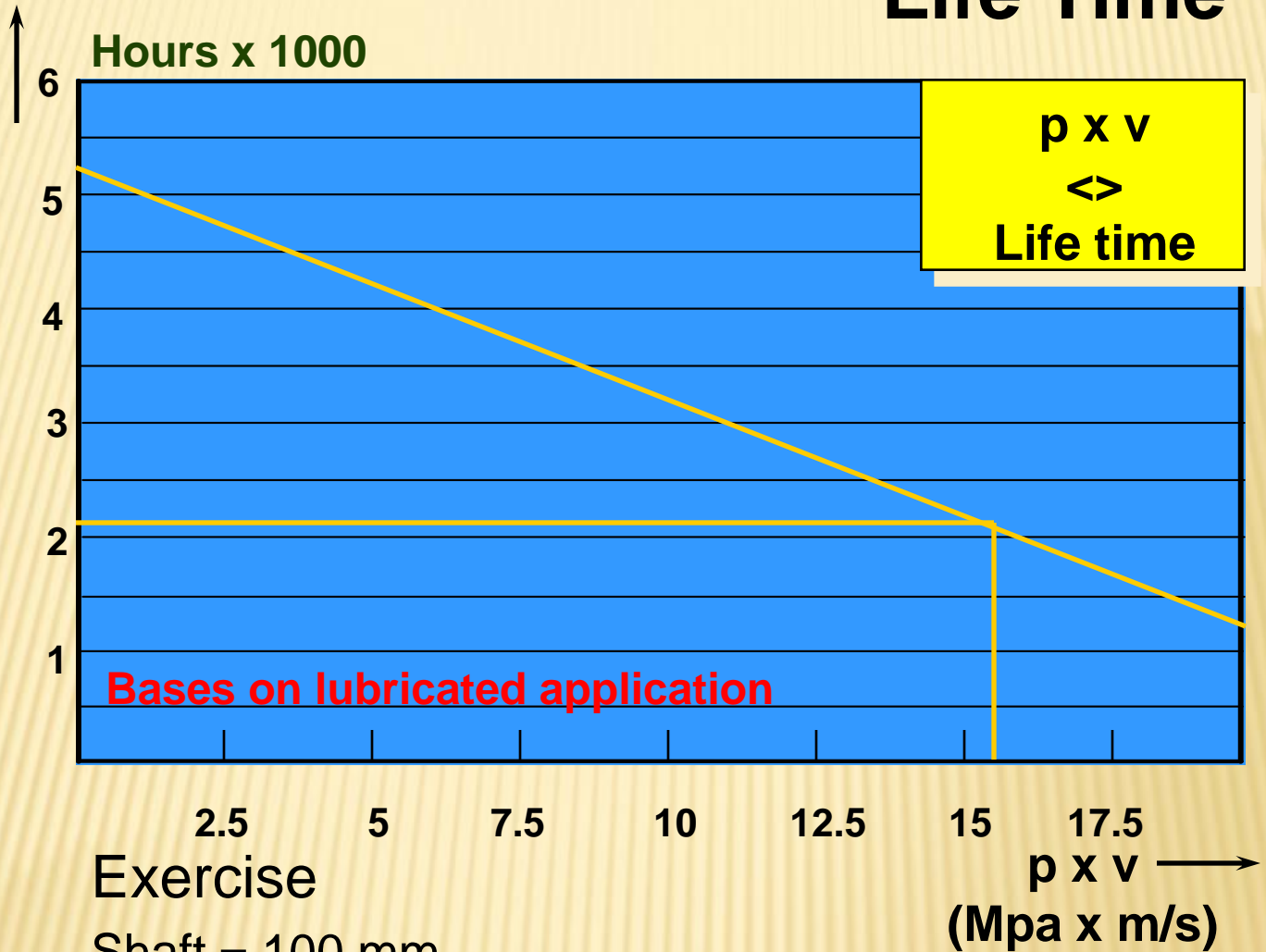
RPM = 3000

$v = 100 \times 3000 \times 3,14 / (1000 \times 60) = 15,70 \text{ m/s}$

Life = 5100 Hours

This calculation is informative and can change depending on the application.

# Life Time



Shaft = 100 mm

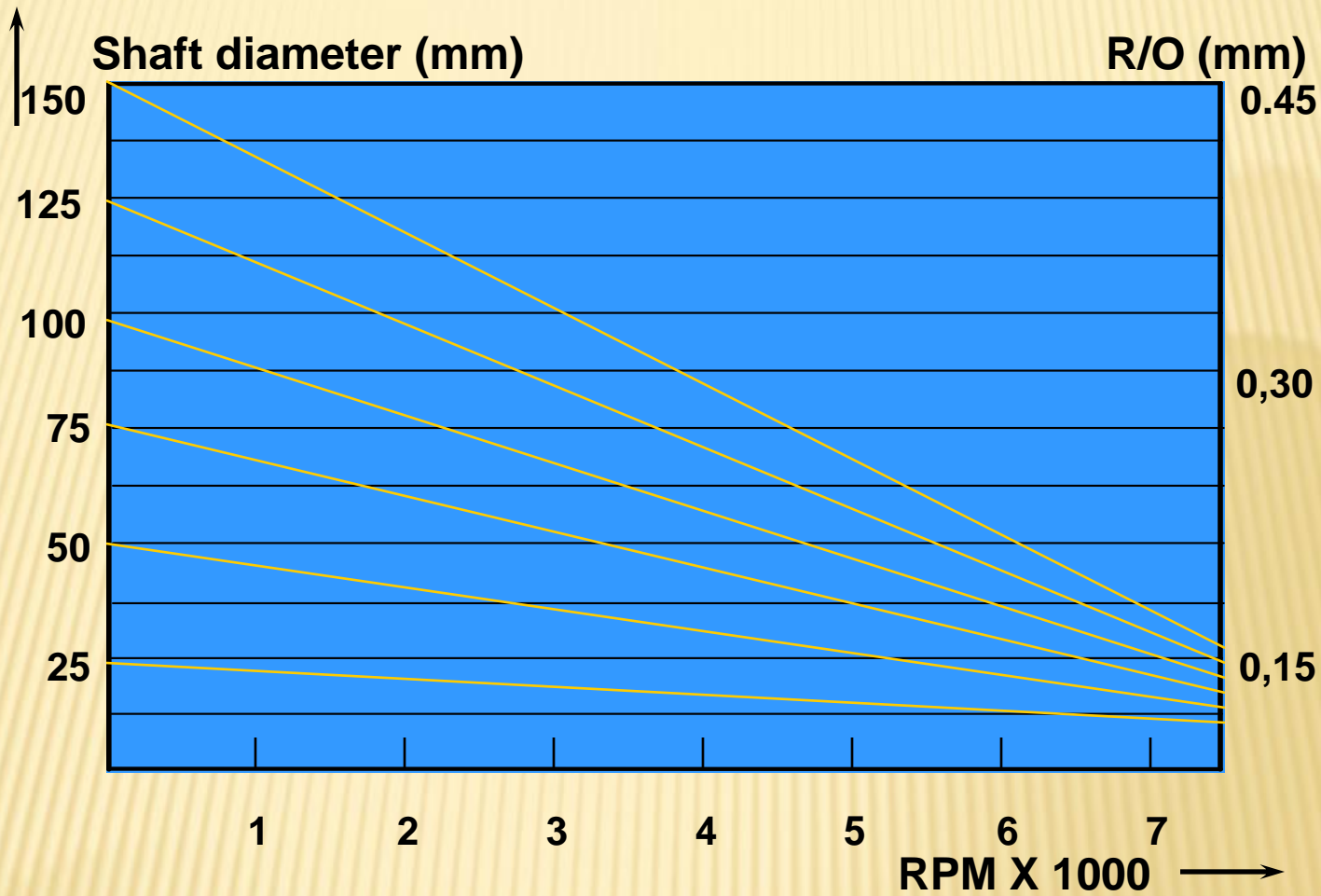
Pressure = 1MPa = 10 bar = p

RPM = 3000

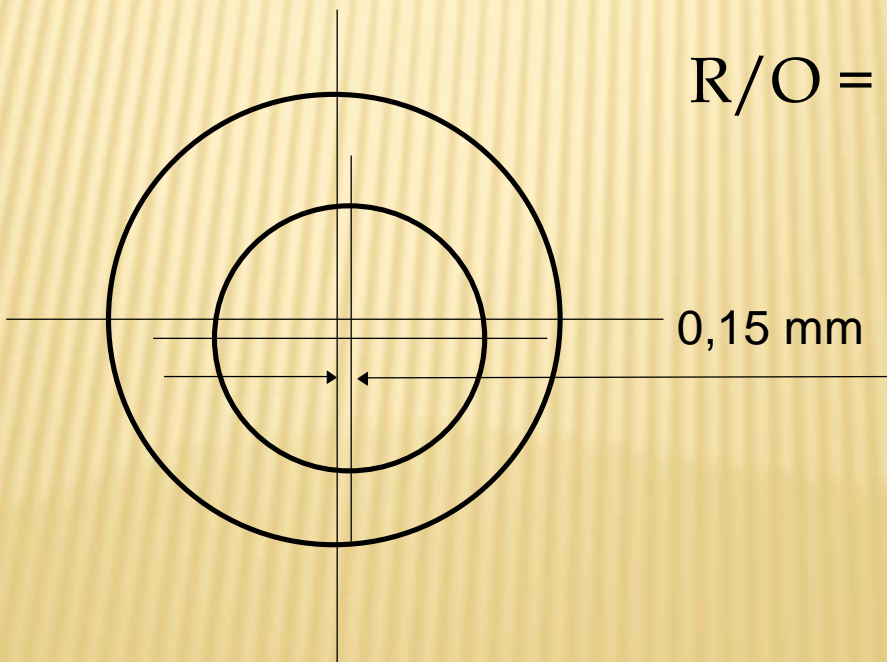
$v = 100 \times 3000 \times 3,14 / (1000 \times 60) = 15,70 \text{ m/s}$

$p \times v = 1\text{MPa} \times 15,7 \text{ m/s} = 15,7 \text{ Mpa} \times \text{m/s}$

Life time = 2100 Hours



R/O = Run out



# Installation

## Shaft material and Hardness

- Cast iron or hardenable steel is preferable
  - Shaft hardness :
    - 40 to 65 HRc in Hydraulic oil, 15 bar
    - 58 to 65 HRc at pressures > 15 bar,
- Non lubricating of abrasive media.

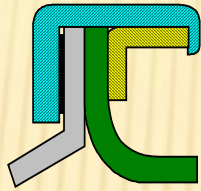
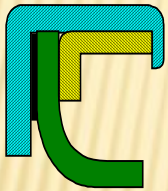
## Surface finish

$R_a = 0,3 - 0,5$  at lubricated media

$R_a = 0,2 - 0,4$  at non lubricated media

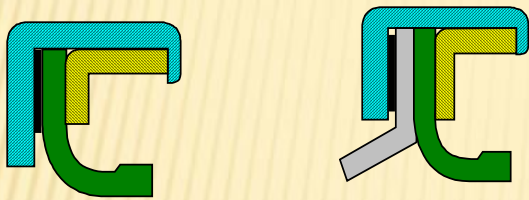
Preferred method of finish is Plunge grinding without machine lead.

## Over view Lip Seals



- up to 25 m/s
- up to 0.7 Mpa
- up to 180°C

## Overview Lip Seals



- up to 15 m/s
- up to 0.7 Mpa
- up to 180°C
- **Wiper for severe applications**

# Over view Lip Seals & Dynalips Serie



- Threaded sealing lip
- Low friction
- Only one direction
- Speed 30 m/s
- Pressure up to 0.1 Mpa
- Temperature 180°C (> 180°C after consulting)
- Optional wiper

# Over view Lip Seals

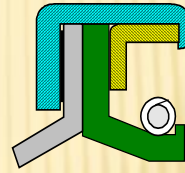
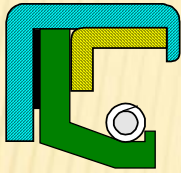
## Serie



- Threaded sealing lip
- Low friction
- One direction
- Speed up to bis 30 m/s
- Pressure 0.1 Mpa
- Temperature 180°C (> 180°C after consulting)
- Wiper optional

# Overview Lip Seals

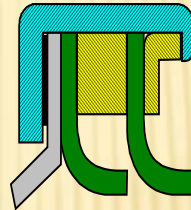
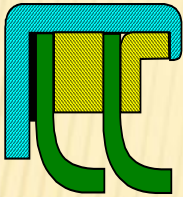
## Serie



- **Spring energized Lip (High tip load)**
- **higher run out or misalignment**
- **applicable for abrasive media**
- **speed 8 m/s**
- **Pressure 0.4 Mpa e**
- **Temp. 180°C (> 180°C after consulting)**
- **optional Wiper**

# Over view Lip Seals

## Serie



- Double lips
- Speed 25 m/s
- Pressure 3.0 Mpa
- Max. PV 10 Mpa x m/s
- Double lips seals better
- for Hydro-pumps
- Temp. 180°C (> 180°C after consulting)
- Wiper optional

# Over view Lip Seals

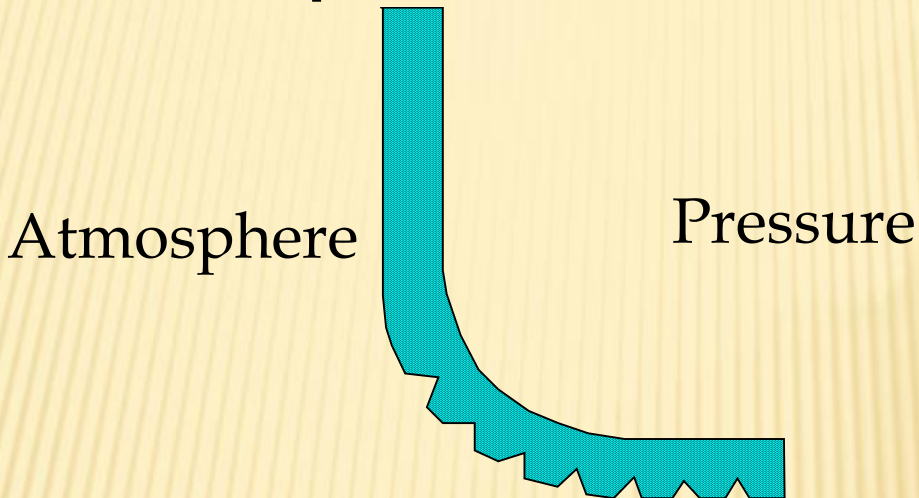
## Serie



- Double lip, first lip threaded
- Speed 30 m/s
- Pressure 0.1 Mpa (dynamic)
- Pressure 1.5 Mpa (static)
- Only one direction
- Classic screw compressor seal (air end)
- Temp. 180°C (> 180°C after consulting)
- Wiper optional

# Over view Lip Seals

## Threaded Lip



- Normally used in combination with a normal lip to seal statically.
- Applicable up to 30 m/s
- Always advise **CW** or **CCW** (seen from the atmosphere side)

**CW = Clock wise**

**CCW = Counter Clock Wise**

# Over view Lip Seals

## Dimensions

Metal cased Lip Seals are available in dimensions from 8 mm up to 500 mm diameter.

Metal cased lip seals are manufactured according to DIN 3760. Please keep a minimal Cross section of the seal of 7 mm. DIN 3760 goes to 5 mm. This standard is applicable for Elastomer lip seals

## When do I choose for a Lipseals

High quantity

Large diameter > Lipseals

# Over view Lip Seals

## Markets

- Petrochemical Industry
- Food industry
- Aircraft
- Medical
- Transportation
- Special Tools
- Compressors
- Robots
- Hydraulics
- Pumps
- Gear Boxes
- Paper and Steel mills