

EDWIN LOWE LTD, BIRMINGHAM, UK

PREFABRICATED BEARING HOUSING ASSEMBLIES (CARTRIDGES)

**SOME WORKING NOTES ON SHAFT DIAMETER & SHAFT SURFACE CONDITION
RE - BEARING SEAT AND THREE LIP SEALING ARRANGEMENT**

These are a few comments concerning the questions of nett shaft diameters and of shaft surface condition, for rollers incorporating Edwin Lowe Ltd prefabricated bearing housing assemblies (or cartridges). The main points for consideration here are:

- **Shaft diameter – bearing seat**
- **Shaft diameter – lip seal contact**
- **Shaft surface condition – lip seal contact**

NETT SHAFT DIAMETER - BEARING FIT AND 3 LIP SEAL CONTACT

- When we worked with one of the major ball bearing manufacturers in the UK, to design the original cartridge during the early 1980s - they recommended a shaft diameter tolerance, at the bearing seating area, of:

+ NIL -0.013 mm (*+ NIL -0.0005"*)

- In our experience, many roller manufacturers extend this tolerance range, for ease of assembly. In practise, many manufacturers may use a wider tolerance band of:

-0.013 mm to -0.025 mm (*-0.0005" to -0.0010"*)

- Occasionally we have seen an even more extended (but not recommended!) wider tolerance range of:

-0.013 mm to -0.038 mm (*0.0005" to -0.0015"*)

3 LIP POLYURETHANE SHAFT CONTACT SEAL

- All our seals incorporate three individual flexing lips, each of which is designed to locate precisely upon the shaft surface - to provide an effective seal against both liquid and solid contaminants.
- All of our range of three lip shaft seals are manufactured in polyurethane - an extremely tough polymer, highly resistant to abrasion and general wear.
- In addition all of the cavities between the three individual sealing lips are packed with grease - in essence providing a secondary sealing element within the three lip seal itself.

(Historically some leading bearing manufacturers have actually recommended grease as a sealing medium for precision deep groove ball bearings).

PREFABRICATED BEARING HOUSING ASSEMBLY CARTRIDGES - SOME WORKING
NOTES ON SHAFT DIAMETER & BEARING SEAT AND 3 LIP SEALING ARRANGEMENT
AND SHAFT DIAMETER AND SURFACE CONDITION (Page 2.....)

- Our range of three lip shaft seals will effectively seal the bearings, even at the extended shaft diameter tolerance range outlined above.
- The three lips of the polyurethane shaft seal will tend to wear (microscopically speaking) the shaft surface, as they "bed in".
- As the seals "bed in" during the early working life of the roller, there will be a corresponding reduction in the amount of roll resistance, when the three lips of the shaft seal achieve optimum position upon the shaft surface.

ADDITIONAL COMMENTS - SHAFT SURFACE CONDITION

- The surface of the shaft, at the point upon which the three sealing lips of the polyurethane seal locate, should be as smooth as possible - i.e. the smoother the shaft surface at this point, then the longer the working life of the seal will be.
- Some roller manufacturers grind their shaft ends at the bearing seat / seal seat location – whilst others machine shaft diameters at this point on a CNC machine centre or equivalent.
- Ideally a ground surface is preferable to provide the optimum surface for our 3 lip shaft seals – however, an acceptable machined surface condition is 32 RMS – or better.

A V Cook
Edwin Lowe Ltd
Birmingham, England
05.03.14