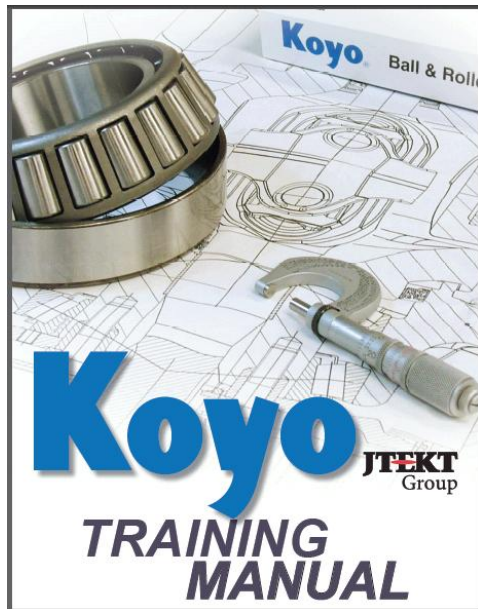
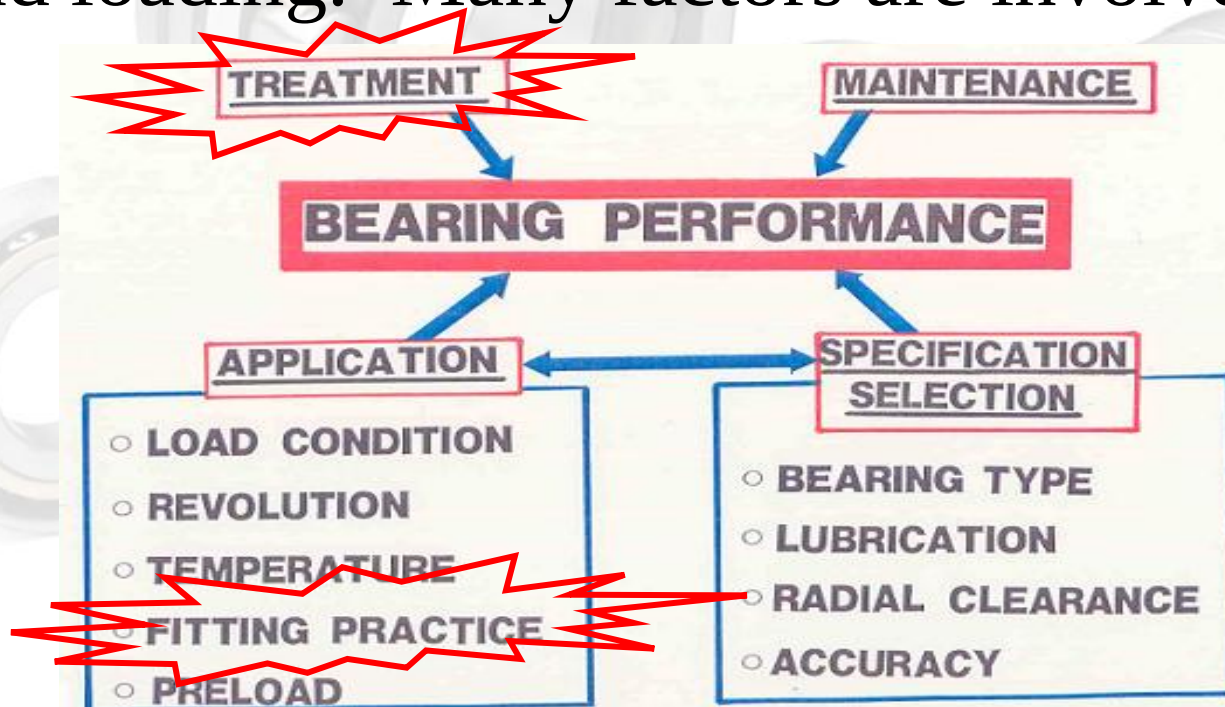


# Mounting & Removal

(Section 6)



Many Factors help determine real world life.  
A bearings **TRUE** life is **NOT** only speed and loading. Many factors are involved.



## Mounting Procedures Depend on the Type and Fitting Conditions of the Bearing

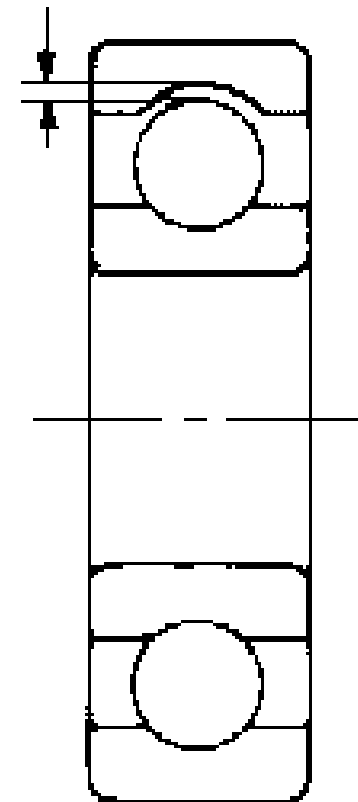
- In which the shaft rotates, the inner ring is press fit
- In which the housing rotates, the outer ring is press fit.

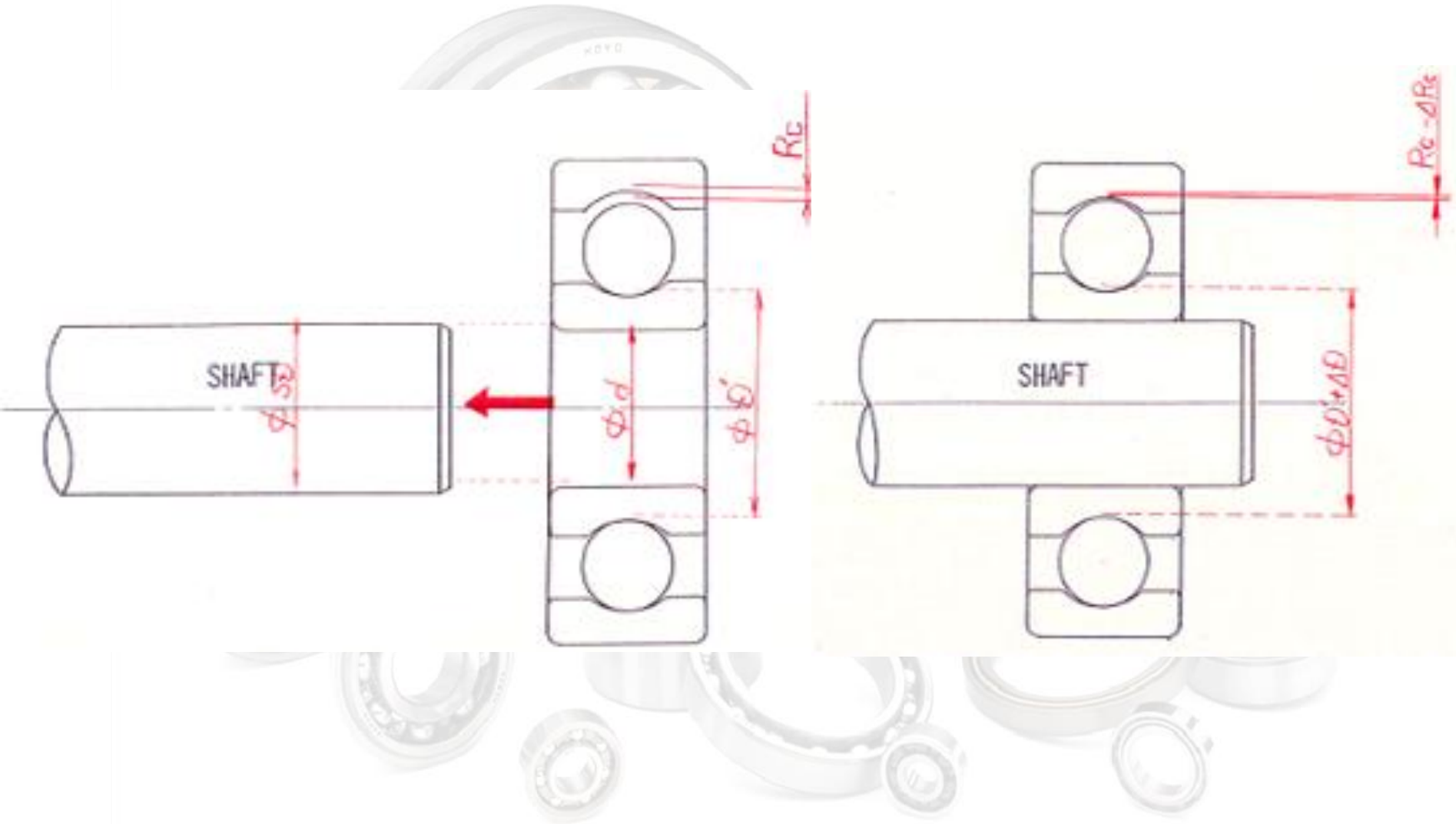
**Rule of Thumb:** Generally the part of the bearing that rotates, that is the part that needs to be press fit.

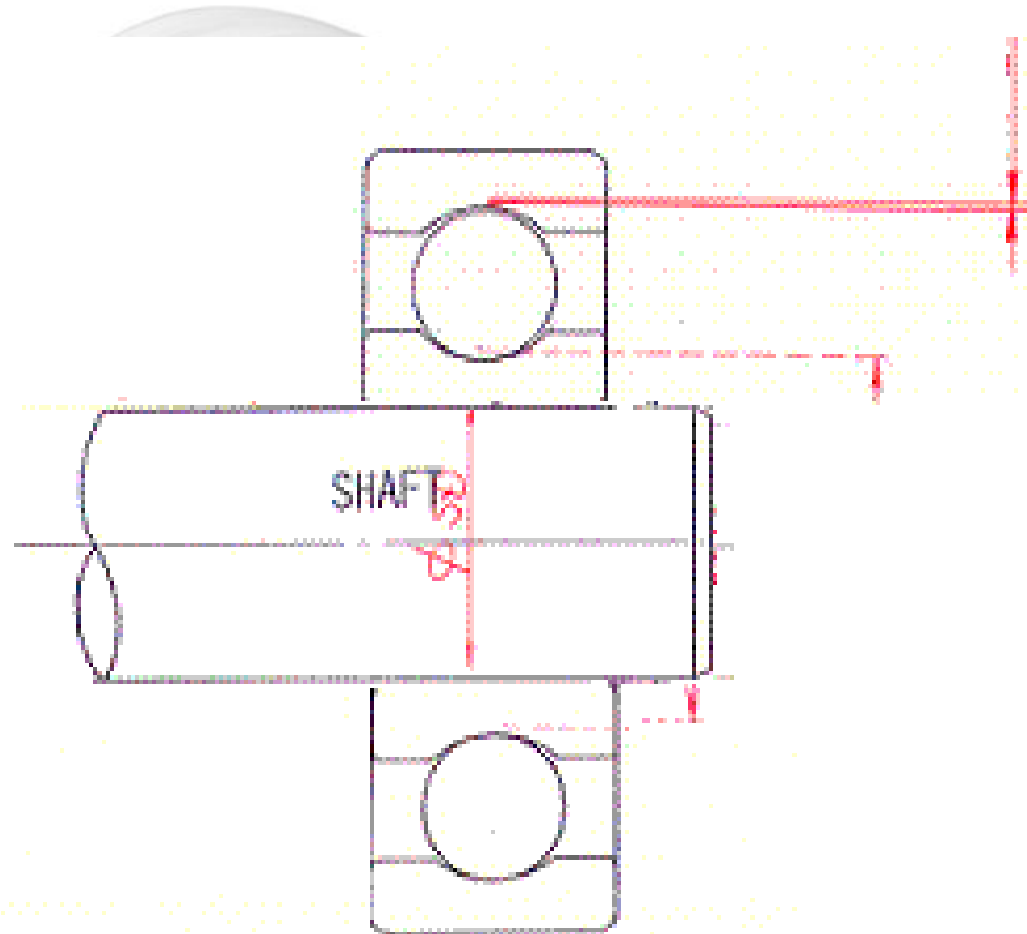
## Radial Internal Clearance

- Is defined as the total distance that either the inner or outer ring can be moved in the radial direction while the other ring is held stationary.

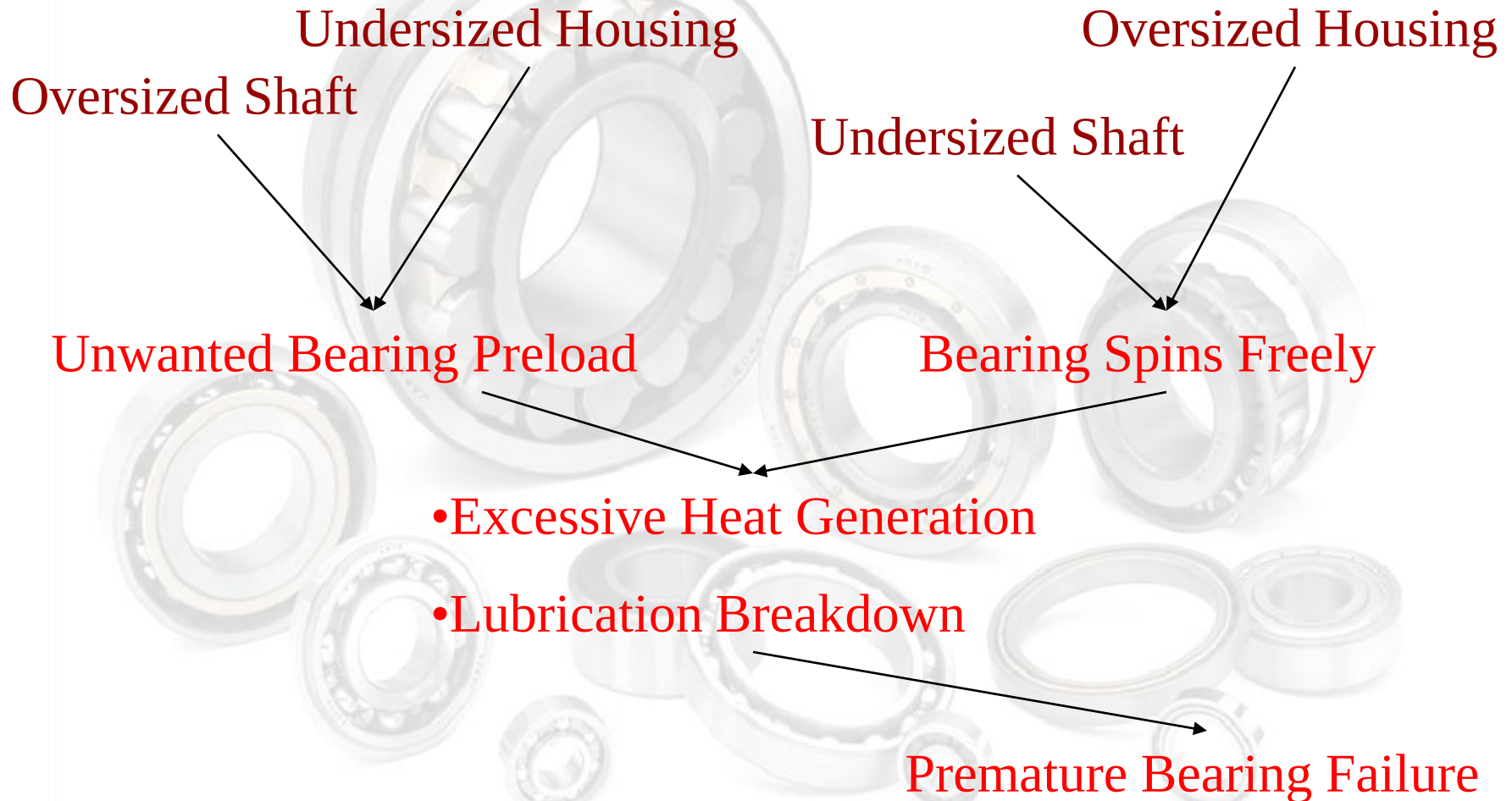
RADIAL INTERNAL CLEARANCE

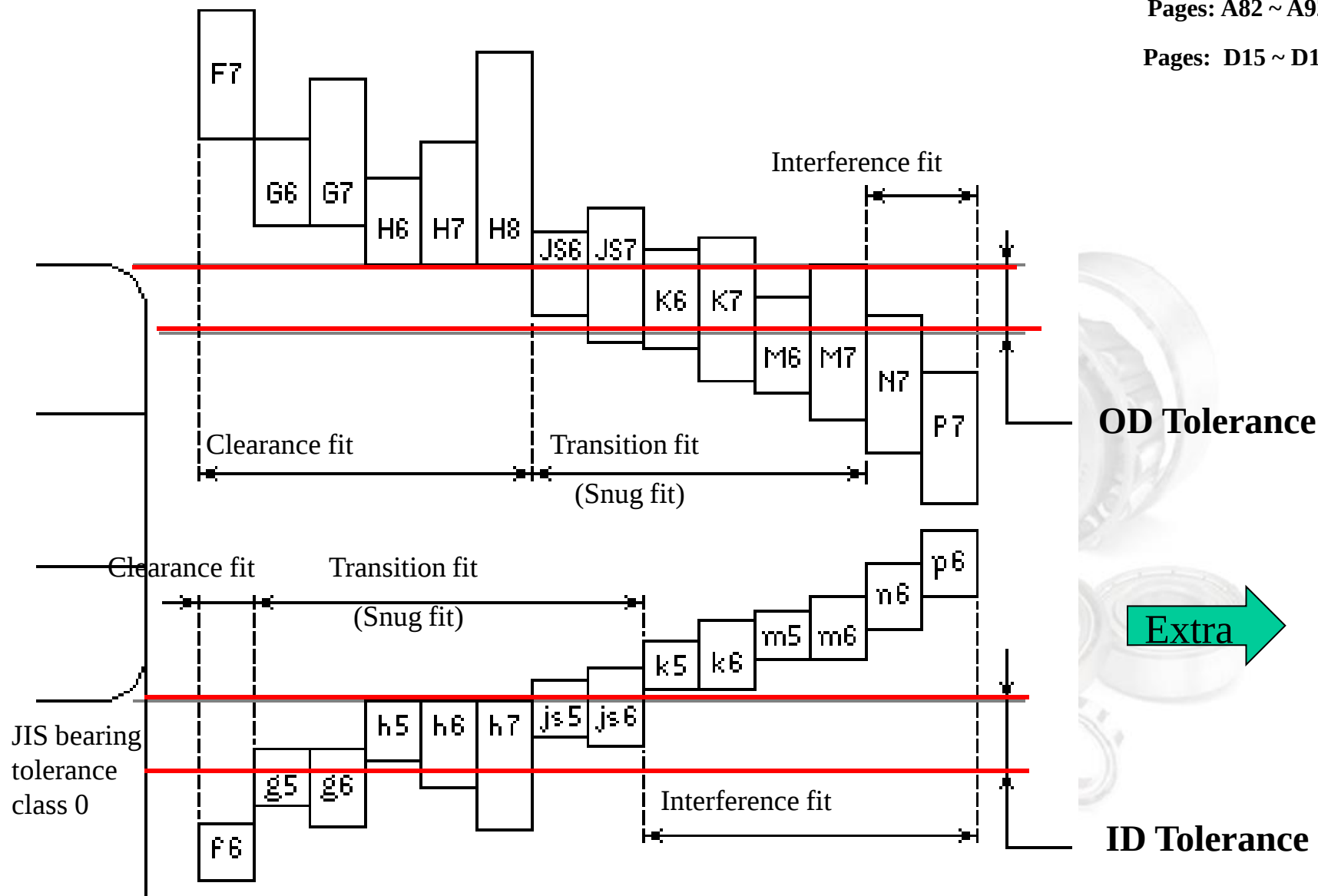




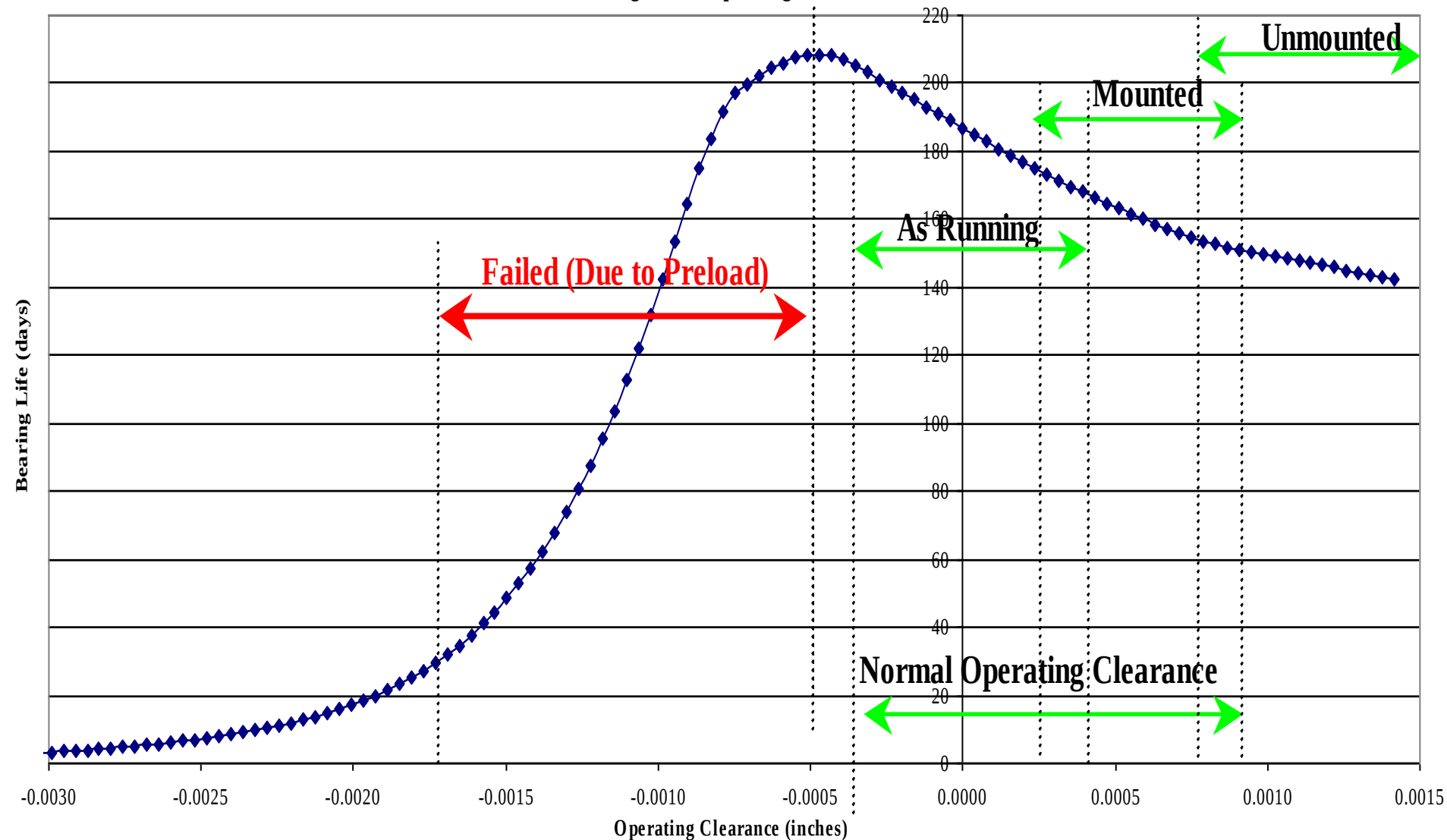


## Improper Mounting Issues



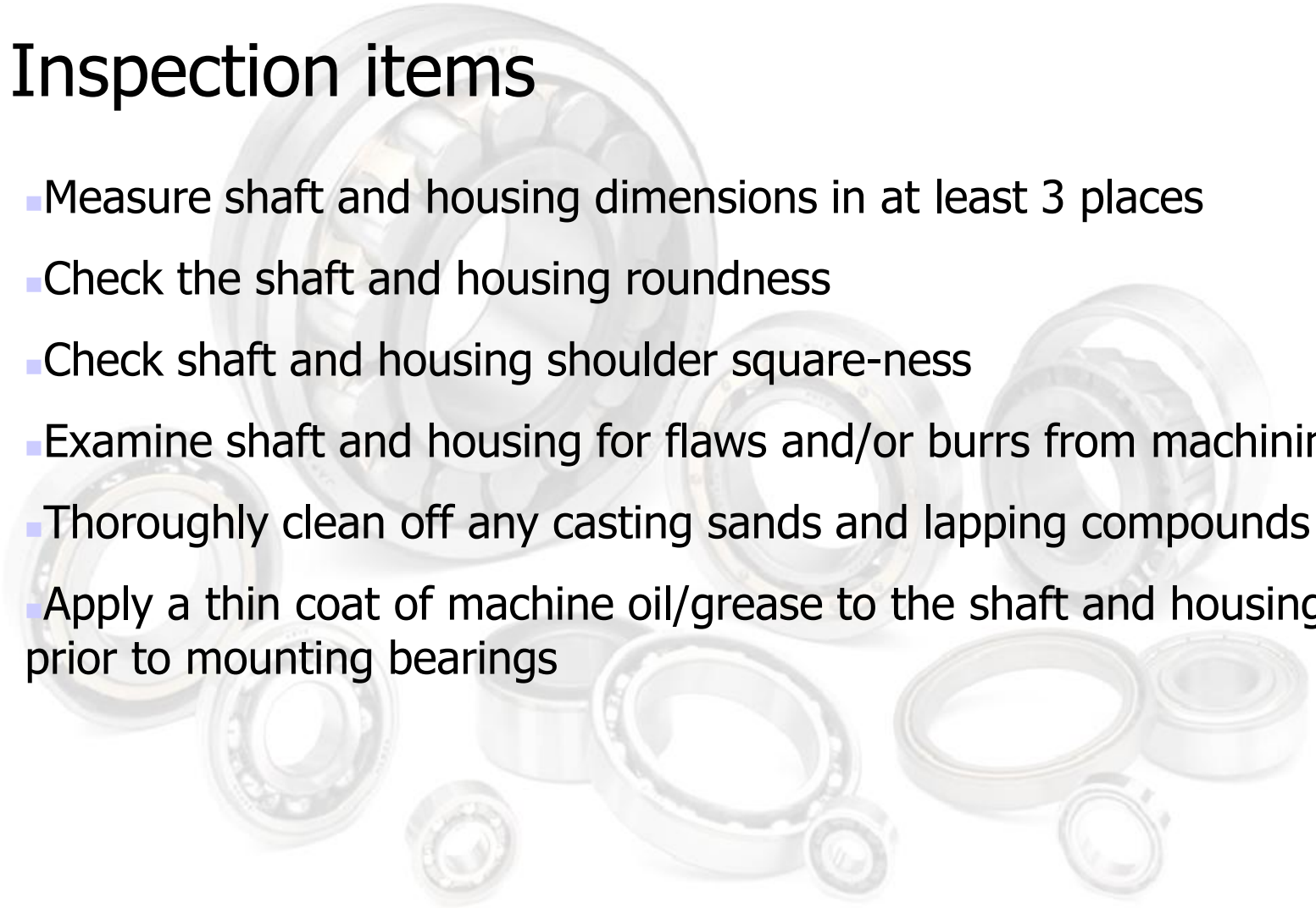


Bearing Life vs. Operating Clearance



## Inspection items

- Measure shaft and housing dimensions in at least 3 places
- Check the shaft and housing roundness
- Check shaft and housing shoulder square-ness
- Examine shaft and housing for flaws and/or burrs from machining
- Thoroughly clean off any casting sands and lapping compounds
- Apply a thin coat of machine oil/grease to the shaft and housing prior to mounting bearings

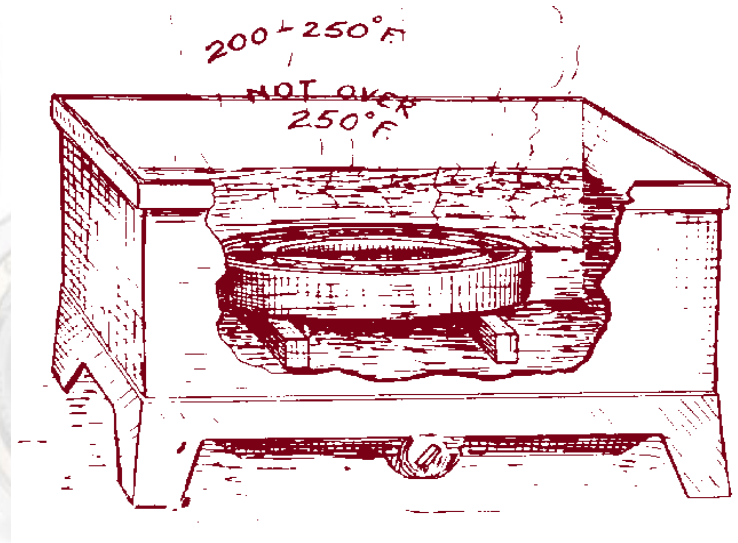


## How to Press Fit a Bearing

- Oil Bath (messy, wasteful)
- Induction Heating (safest, easiest)
- Impact (dangerous, but easy)
- Bolt & Nuts (compression method)
- Arbor/Hydraulic Press
- Cone Heaters w/ Temp Sticks
- Torch & Spit Method (Haha....)

## Oil Bath Heating

- Submerge the entire bearing (can't use this for sealed or shielded bearings)
- Make sure you don't exceeded 250F (or you will anneal the steel)



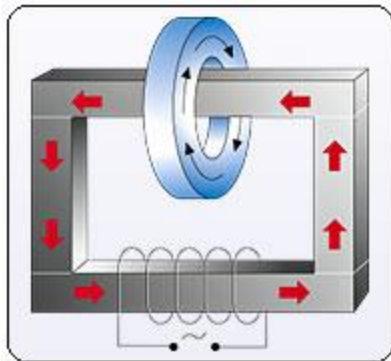
**Rule of Thumb:** Don't Heat a Bearing Over 250F in any method

## How to Press Fit a Bearing

- Oil Bath (messy, wasteful)
- Induction Heating (safest, easiest)
- Impact (dangerous, but easy)
- Bolt & Nuts (compression method)
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## Induction Heating

- Safest method
- Most modern units come with automatic shut offs and temp sensors
- Accommodate wide range of bearing sizes (universal)

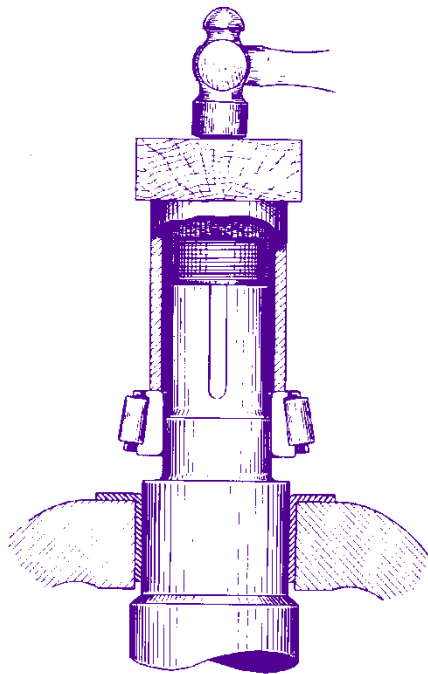
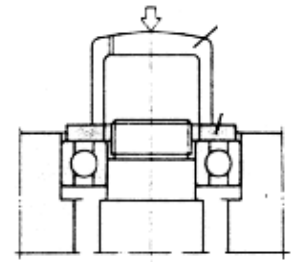


## How to Press Fit a Bearing

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- Arbor/Hydraulic Press
- Cone Heaters w/ Temp Sticks
- Torch & Spit Method (Haha....)

## Impact Mounting

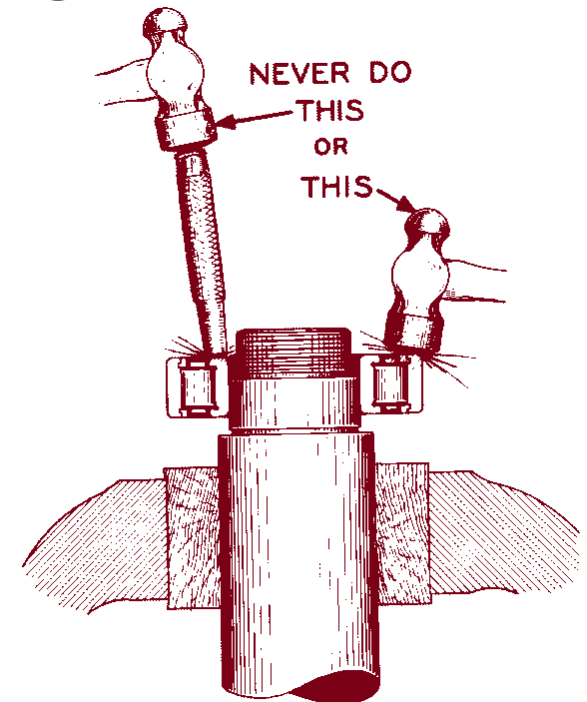
- Easiest Method
- Easiest Method to Cause Damage



Correct Method



Wrong Method

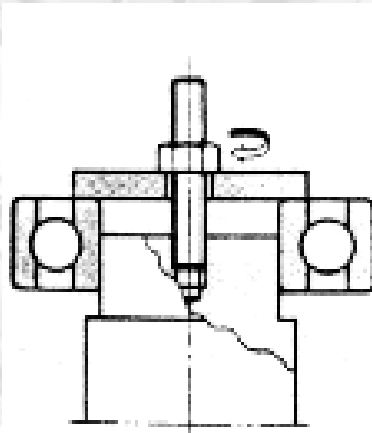


## How to Press Fit a Bearing

- Oil Bath (messy, wasteful)
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- Impact (dangerous, but easy)
- Bolt & Nuts (compression method)
- Arbor/Hydraulic Press
- Cone Heaters w/ Temp Sticks
- Torch & Spit Method (Haha....)

## Rest of the Methods

- Bolt and Nut Method
  - Works good for small bearings
  - Can compress the bearing and Brinell it
  - Needs lots of space



## How to Press Fit a Bearing

- Oil Bath (messy, wasteful)
- Induction Heating (safest, easiest)
- Impact (dangerous, but easy)
- Bolt & Nuts (compression method)
- **Arbor/Hydraulic Press**
- Cone Heaters w/ Temp Sticks
- Torch & Spit Method (Haha....)

- Easy to perform when a fixture is used
- Frequently used in mass production



## How to Press Fit a Bearing

- Oil Bath (messy, wasteful)
- Induction Heating (safest, easiest)
- Impact (dangerous, but easy)
- Bolt & Nuts (compression method)
- Arbor/Hydraulic Press
- **Cone Heaters w/ Temp Sticks**
- Torch & Spit Method (Haha....)

- Cone Heater w/ Temp Sticks
  - Heat can be uncontrollable (causes hot spots)
  - Most temp sticks are NOT a calibrated tool
  - If you MUST use a temp stick use 180°F
  - The cone stays HOT



## How to Press Fit a Bearing

- Oil Bath (messy, wasteful)
- Induction Heating (safest, easiest)
- Impact (dangerous, but easy)
- Bolt & Nuts (compression method)
- Arbor/Hydraulic Press
- Cone Heaters w/ Temp Sticks
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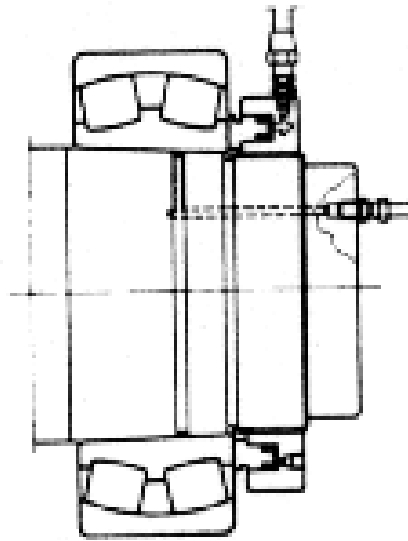
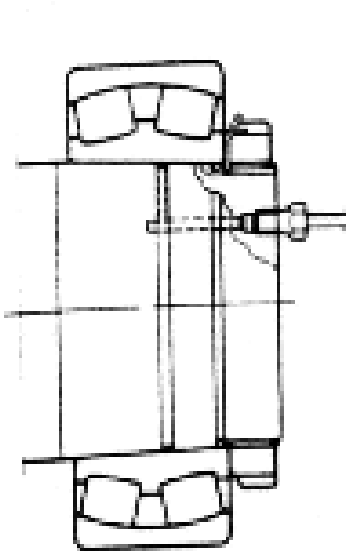
## Rest of the Methods



- Can Cause Hot Spots
- Uneven Heating
- Softening of the Steel

## Failures Caused By Improper Mounting

- Fretting Corrosion (insufficient interference)
- Creep (insufficient interference – CRB's)
- Scuffing (excessive interference)
- Smearing on Raceway ( too much preload)
- Symmetrical Fretting (misalignment)
- Flaking 180 Degrees a part (oval housing)



1. Locknut

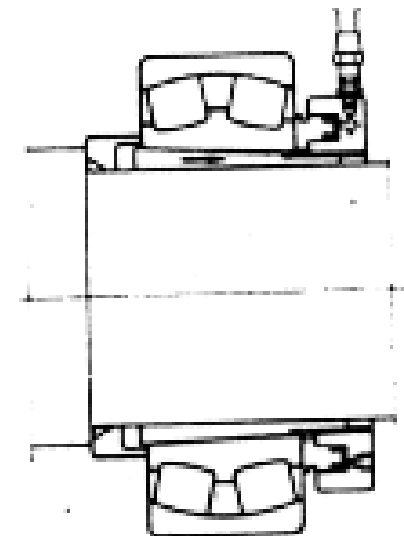
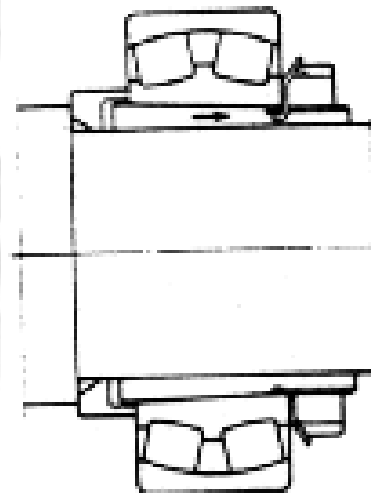
2. Hydraulic nut

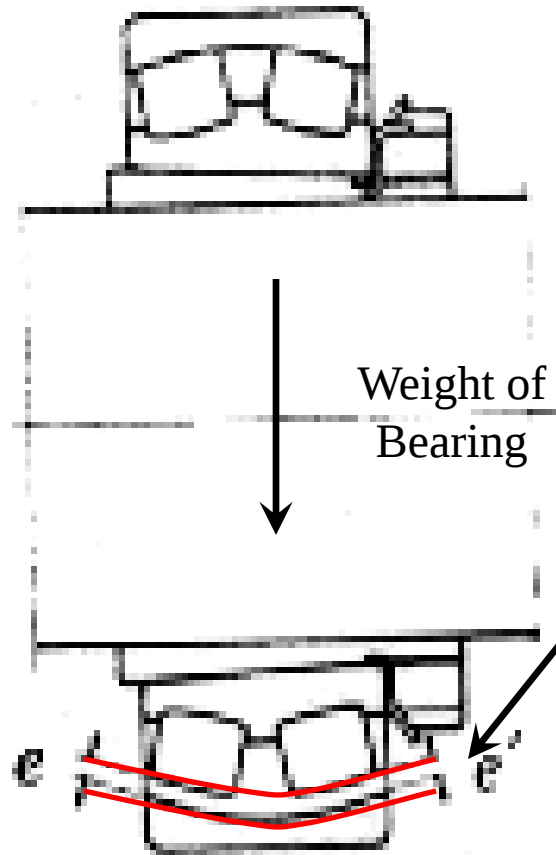
(b) Mounting by use of an **Adapter Sleeve**

1. Locknut

2. Hydraulic nut

(a) Mounting on **Tapered Shafts**



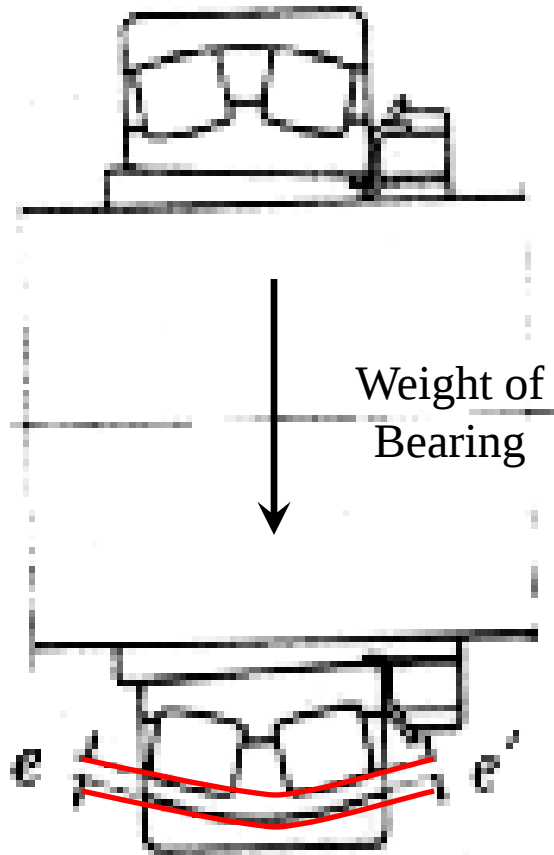


Measuring clearances

Insert Feeler  
Gauge Into Gap  
“e”

**Remember:**

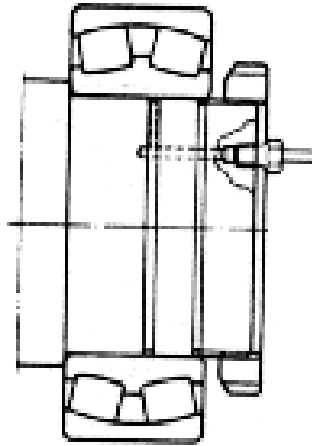
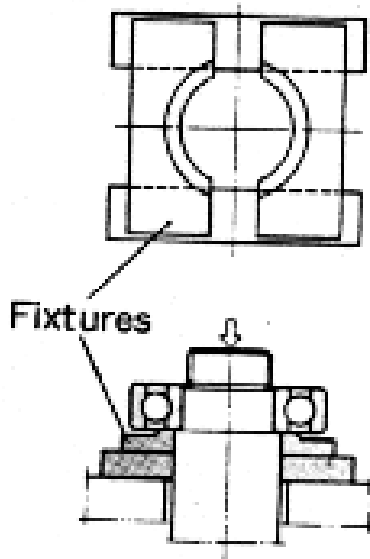
- Don't FORCE the the gauge in
- Don't ROTATE the brg during measurement
- The gauge that fits snugly, is the initial clearance



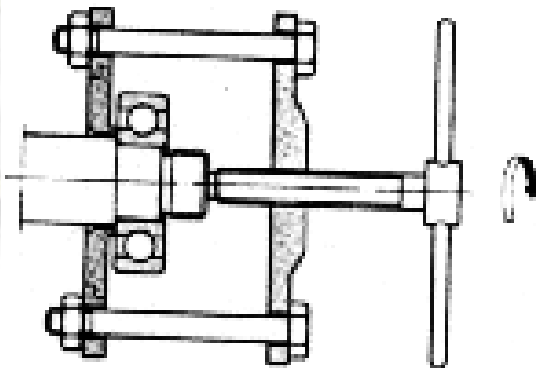
Measuring clearances

1. Take that size feeler gauge, and match it up on the side **Unmounted** chart.
2. Now you can get your **Recommended Clearance Reduction**.
3. Turn that lock nut until you achieve it!

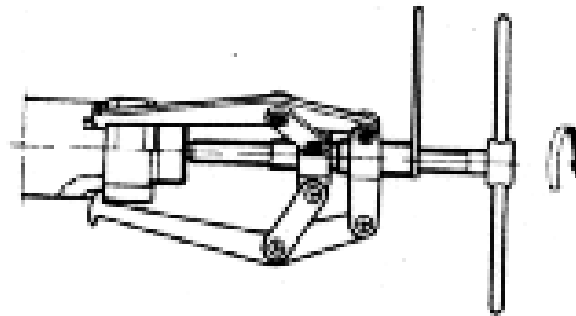
**Rule of Thumb: ½ Turn Intervals –  
You can't go BACK!**



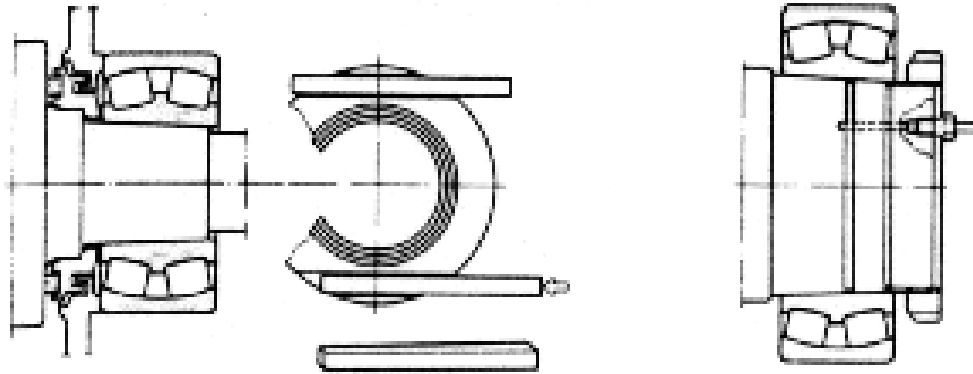
- (a) Dismounting by Arbor Press
- (b) Dismounting by use of oil pressure



(c) Dismounting by use of special tools

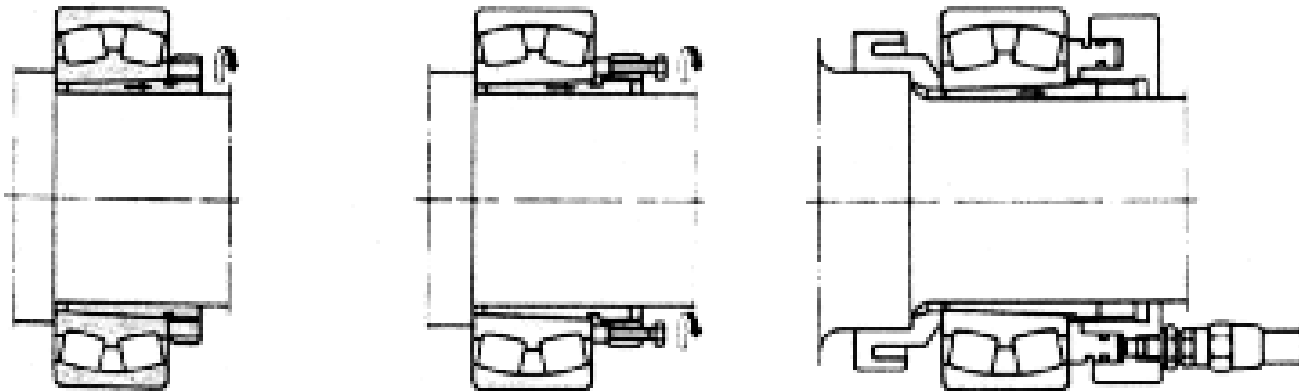


(d) Dismounting by use of special tools



(a) Dismounting by use of a wedge

(b) Dismounting by use of oil pressure



Dismounting

(e) by use of  
locknuts

(f) by use of  
bolts

(g) by use of  
hydraulic nuts

# What are your Questions or Concerns?

