WHEEL END PRODUCTS

BEARING FAILURE ANALYSIS CHART

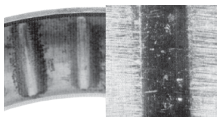
BEARING FAILURE DESCRIPTIONS

CAGE DAMAGE

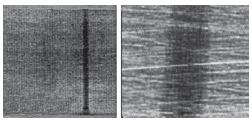
Improperly installed or dropped bearing.

BRINELLING

False Brinelling
Wear caused by vibration or relative axial movement between rollers and races.



True Brinelling
Damage from shock or impact.



INADEQUATE LUBRICATION

Cone Large Rib Face Scoring
"Welding" and heat damage from metal to metal contact.

Roller End Scoring
Metal to metal contact from breakdown of lubricant.

Cone Large Rib Face Deformation
Metal flow from excessive heat generation.

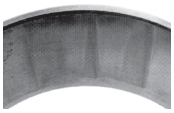
EXCESSIVE PRELOAD OR OVERLOAD

Rapid And Deep Spalling
Caused by unusually high stresses. Full race width fatigue spalling is caused by heavy loads creating a thin lubricant film and possible elevated temperatures.

EXCESSIVE END PLAY

Cage Pocket Wear
Heavy contact between the rollers and cage pocket surface due to operating under excessive end play.

Scalloping
Uneven localized wear resulting from excessive end play.



PEELING

Micro-spalling due to thin lubricant film from high loads/low RPM or elevated temperatures.

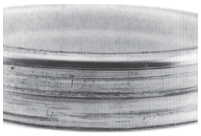
CORROSION/ETCHING

Line Spalling
Roller spaced spalling from bearings operating after etching damage.

Etching
Rusting and pitting caused by moisture or water exposure.

IMPROPER FIT

Cup Spinning
Loose cup fit in a rotating wheel hub.



Cone Bore Damage
Fractured cone due to out of round or oversized shaft.

FATIGUE SPALLING

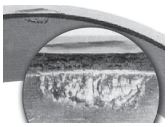
Geometric Stress
Spalling from misalignment, deflection or heavy loading.

Inclusion Origin
Spalling from oxides or other hard inclusions in bearing steel

Point Surface Origin
Spalling from contamination or raised metal exceeding the lubricant film thickness.

HANDLING DAMAGE

Cup Face Denting
Indentations from hardened driver.



Roller Nicking/ Denting
Rough handling or installation damage.

MISALIGNMENT

Irregular roller path from deflection, inaccurate machining or wear of bearing seats.

FOREIGN MATERIAL

Grooving
Large particle contamination embedding into soft cage material.

Abrasive Wear
Fine abrasive particle contamination.

Bruising
Contamination from other fatigued parts, inadequate sealing or poor maintenance.