# TECHNICAL PUBLICATION

## The Impact of Bearing Corner Radii on Wheel End

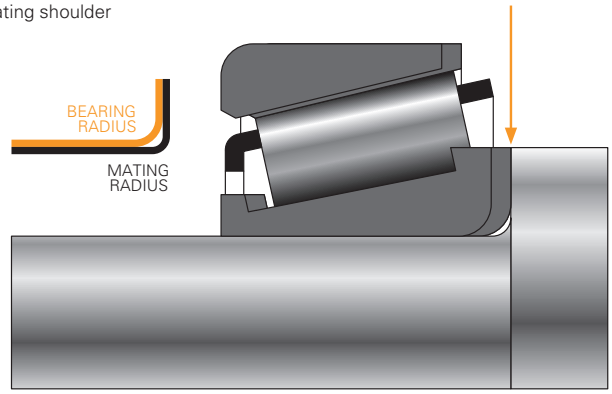
12th December 2025

Bearing corner radii may be small, but they play a critical role in wheel-end performance.

This detail directly affects the bearing race radius, shoulder radius, and shoulder seating - all of which influence bearing life and hub reliability.

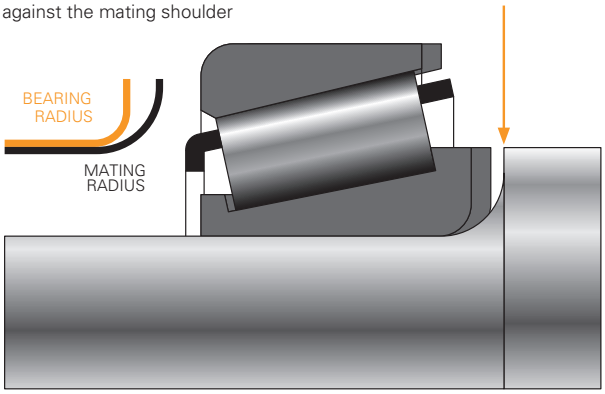
Incorrect radii can lead to improper seating, premature wear, and seal leakage. Identifying the correct corner radius is essential and can be determined by the suffix letter at the end of the bearing part number. For example,
HM516449**A** - Shaft Radius of 0.240" (SET421STM)
HM516449**C** - Shaft Radius of 0.140" (SET422STM)

**Fig.1:** Correct bearing radius – bearing inner ring seated fully against the mating shoulder




BEARING INNER RING CORNER RADIUS > MATING RADIUS

**Fig.2: Incorrect bearing radius** – bearing inner ring cannot seat fully against the mating shoulder




BEARING INNER RING CORNER RADIUS < MATING RADIUS

## Follow These Guidlelines to Ensure Proper Wheel-End Performance

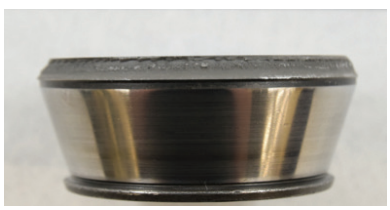
1. Always replace bearings as a complete SET. STEMCO bearings are engineered with matched cup and cone profiles to maximize performance and durability.
2. Buying as a SET reduces the risk of incorrect or mixed components. This ensures proper fit and prevents premature failures.
3. Verify bearing suffix letters on old and new bearings match. The suffix determines the corner radius, which is critical for correct seating.
4. Confirm the bearing race fully seats against the mating shoulder (see figure above). Improper seating can lead to serious performance issues.

## Potential Risk - Incorrect Bearing Radii

- Premature Seal Leakage - Incorrect bearing seating changes the installed seal position on the spindle. Over time, seals wear into a specific location for optimal oil retention and contamination exclusion. If the seal lip shifts, sealing effectiveness drops, resulting in premature leakage.
- Bearing Movement - When the inner bearing race does not seat correctly against the shoulder, it can move under heavy loads, even after initial setting. This movement compromises wheel-end stability and can accelerate wear.
- Bearing Damage - Incorrect corner radii prevent proper seating against the axle shaft shoulder. This misalignment can cause rib fracture, scoring, and overall poor wheel-end performance, ultimately reducing bearing life.

Fracturing the large rib

Scoring and/or Rib



Cone Spinning

## Common SET Part Numbers with Unique Radii

SET403STM - 594**A** and 592**A**
SET404STM - 598**A** and 592**A**
SET421STM - HM516449**A**
SET422STM - HM516449**C**
SET423STM - 6461**A**
SET424STM - 555**S** and 552**S**

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