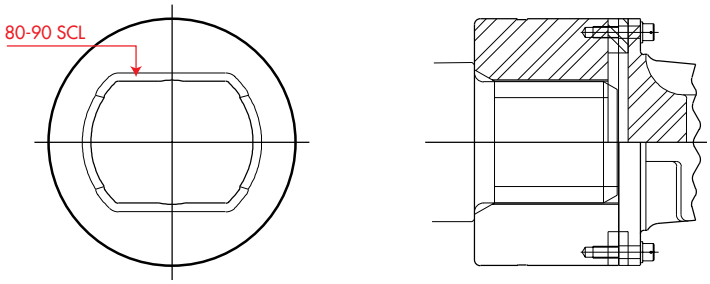
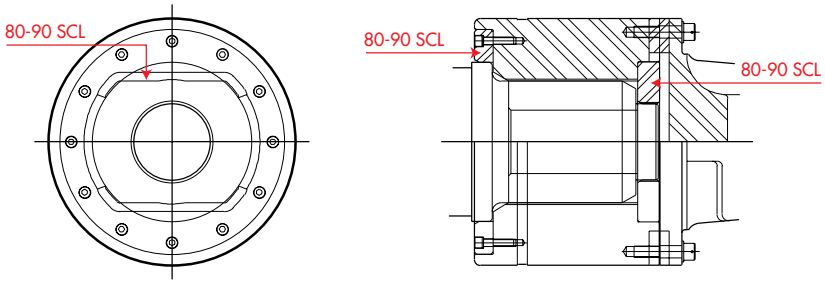
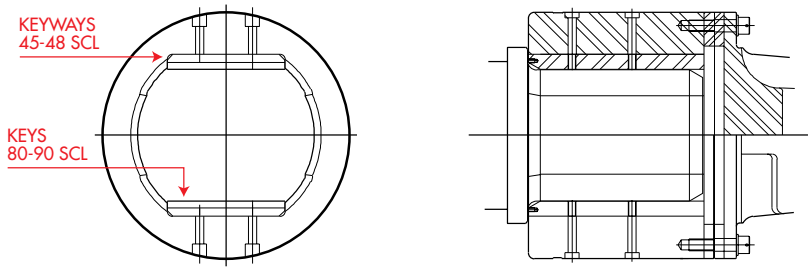
Roll End Casing Design



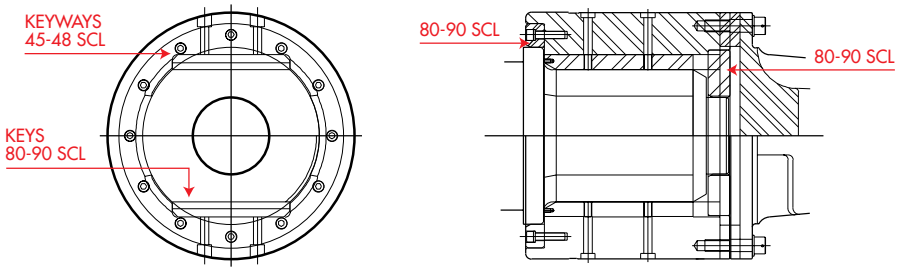
Integral Spade Bore Casing



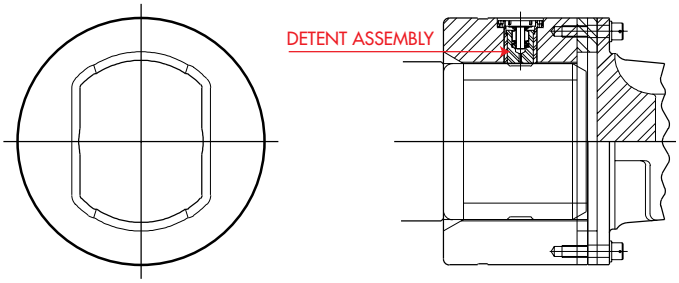
Integral Spade Bore Casing
with Replaceable Pilot Rings



Casing with Replaceable Keys



Casing with Replaceable Keys
and Pilot Rings



Casing with a Detent Assembly

11451 Reading Road
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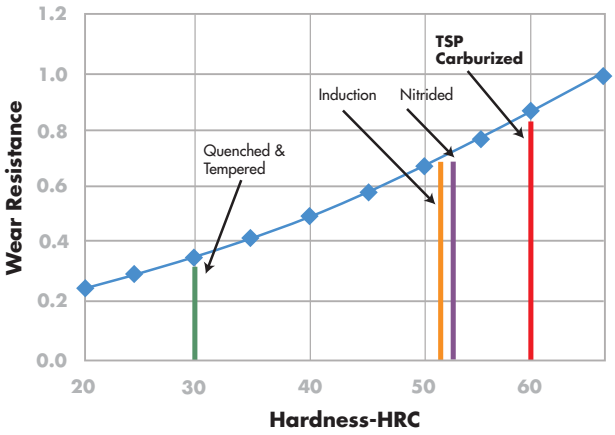
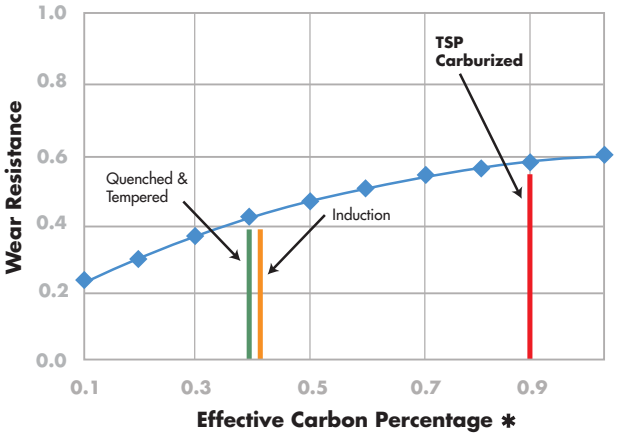
Roll End Casing Design

Roll end casings are a critical link in the power transmission of a rolling mill. The durability of the casing is a function of metallurgy, geometry and application. Casing wear rate is inversely proportional to hardness level and carbon percentage. The figures below show the hardness, effective carbon content, case depth and the overall durability of materials commonly used for casings. Note that 4140 steel hardened to BHN 300 (HRC 32) has a significantly lower wear resistance than the much harder TSP Carburized steels.

Wear Resistance vs. Hardness

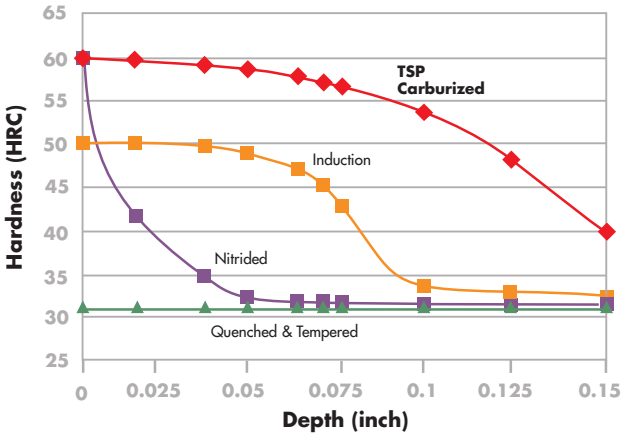


Wear Resistance vs. Effective Carbon Percentage

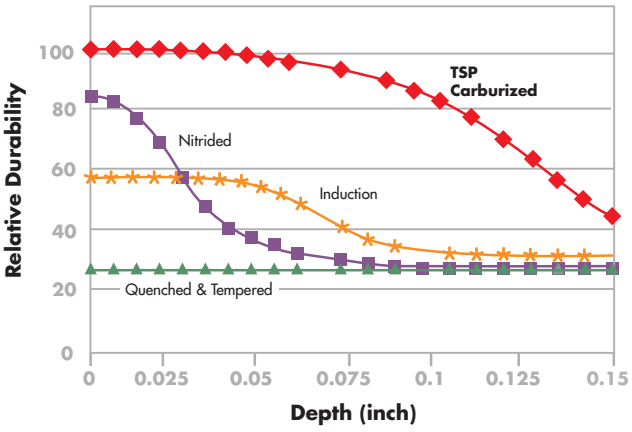


While induction hardened and nitrided steel have comparable hardness, the case depth of these treatments is relatively shallow and as the spade bore wears, the wear rate accelerates. The figure below at left shows typical case depths of various heat-treat methods. Note that carburizing leads to a dramatically greater case depth than other methods. In the figure below at right, durability with respect to wear depth of materials commonly used for spade bores is shown.

Case Depth of Various Heat Treatments



Durability vs. Wear Depth



✱ Not Applicable to Nitriding Process

TSP Carburizing supplies the best combination of surface hardness and case depth, thus providing the longest life for casing bores.

Roll End Casing Life Factors:

- **Hardness**
- **Case depth**
- **Carbon content**
- **Load–contact stress**
- **Surface finish**
- **Cycles**
- **Pilot stabilizing configuration**
- **Roll neck / casing bore configuration**
- **Operating environment**