

Severe scuffing and cold flow

Wear

Polishing

Pitchline

Wear



Tooth Wear Modes

- Scuffing
 - rough torn furrows in the direction of sliding
 - adhesion is due to micro-welding and tearing of asperities under high loads.
 - affects addendum or dedendum of the tooth or both.
 - not present at pitchline (no relative sliding)
 - not a fatigue phenomenon
- Plastic deformation/cold flow
 - through hardened gears
 - insufficient hardness
 - high sliding and high loads (under adequate lubrication) - material yields
 - tooth profile is destroyed
- Polishing
 - fine scale abrasion promoted by lubricants with aggressive anti-scuffing additives
 - it degrades gear tooth profile.
 - wear steps at ends of contact and along the tip.

Prevent Scuffing, Polishing and Wear

- Clean, dry lube
- For low speed applications use nitride or carburized gears and high viscosity lube
- Optimize gear geometry and accuracy
- Grind gear teeth
- Use phosphate coating
- Use high-viscosity lube with borate anti-scuff additives
- Adequate tooth mesh lubrication – calculate specific film thickness
- Remove abrasive from lube.
- If through-hardened, use material of higher hardness