Sample Non-Contacting Face Seal Application: Gear Box

- Background
  - Gear Box in a commercial aircraft engine had multiple locations with carbon face seals experiencing high leakage and seal failures
- Operating Conditions
  - High speed (up to 27,000 rpm)
  - Gear box oil (MIL-R-23699)
  - 5 psid
- Determining Cause and Failure Modes
  - High heat generation of seals caused oil to coke
  - Abrasive coke particles became embedded in sealing faces causing excessive leakage and wear
  - Seals had to be replaced on wing before scheduled maintenance of gear box due to excessive leakage
- QT Solution
  - Designed a new non-contacting carbon face seal with hydrodynamic features on mating ring to reduce heat generation
  - New design allows for maintenance-free seals before gear box is pulled for scheduled maintenance
  - Final design solution required NO COST INCREASE over original product

Mating Ring with Coke from High Heat Generation

Mating Rings with Hydrodynamic Features