

Oil Coking

Part Two: Engine Influences

Introduction

All coking events occur because the temperature and the oil residue time are both higher than the stability limitations of the oil in use. Coke formation events increase dramatically as local metal contact temperatures exceed 225°C.

Positive washing of system surfaces by high liquid oil flow reduces residence time. Obstructions to flow or directional change causes a reduced oil flow rate and increased oil residence time. Increased air flow in high temperature metal contact zones reduces the amount of coke deposit formed by promoting oil volatilisation. High post-shutdown temperatures due to conducted or convected heat increases deposition in low drainage areas.

Thermal Insulation

Thermal insulation of supply, scavenge or vent lines in the gas path can significantly reduce deposits. Low clearance scavenge ports increase the likelihood of blockage due to shedded incidences.

Unprotected Reactive Metals

Unprotected reactive metals in the oil system, such as lead, cadmium or magnesium, can cause an increase in deposits due to reaction between the oil and the metals. Other metals, such as low alloy iron or copper, can stimulate coke formation by catalysis.

- Operational factors also influence coke formation.
- Hot shutdowns promote coke build-up, de-rated operation reduces coking.
- Prolonged aircraft inactivity allows moisture absorption by coke deposits which promote coke shedding after start-up.

