



Tech topic

# Oil lifetime

Oil consumption insights and issues in commercial jet engines

## Key insight

Lubricant choice must suit the engine situation, particularly with high cycles and very low consumption.

## Introduction

Oil systems for commercial jet engines are rarely drained. There is no oil change as long as the engine stays on wing. The oil is only renewed by top-up, typically accomplished every day to compensate for normal engine oil consumption.



## Oil ages and deterioration

Consequently, the oil contained in the tank is a mixture of different aged oils, some old and some new. Parts of the oil can stay in the engine for a long period of time, depending on the engine cycles and engine oil consumption. If the residence time exceeds the oil lifetime, which is an intrinsic property of the oil (such as viscosity), these parts of oil lose some of their initial qualities. For a certain fraction of the volume, this leads to a deterioration of some of the capability of the lubricating quality of the oil and may result in the formation of varnish, sludge and carbon deposits.

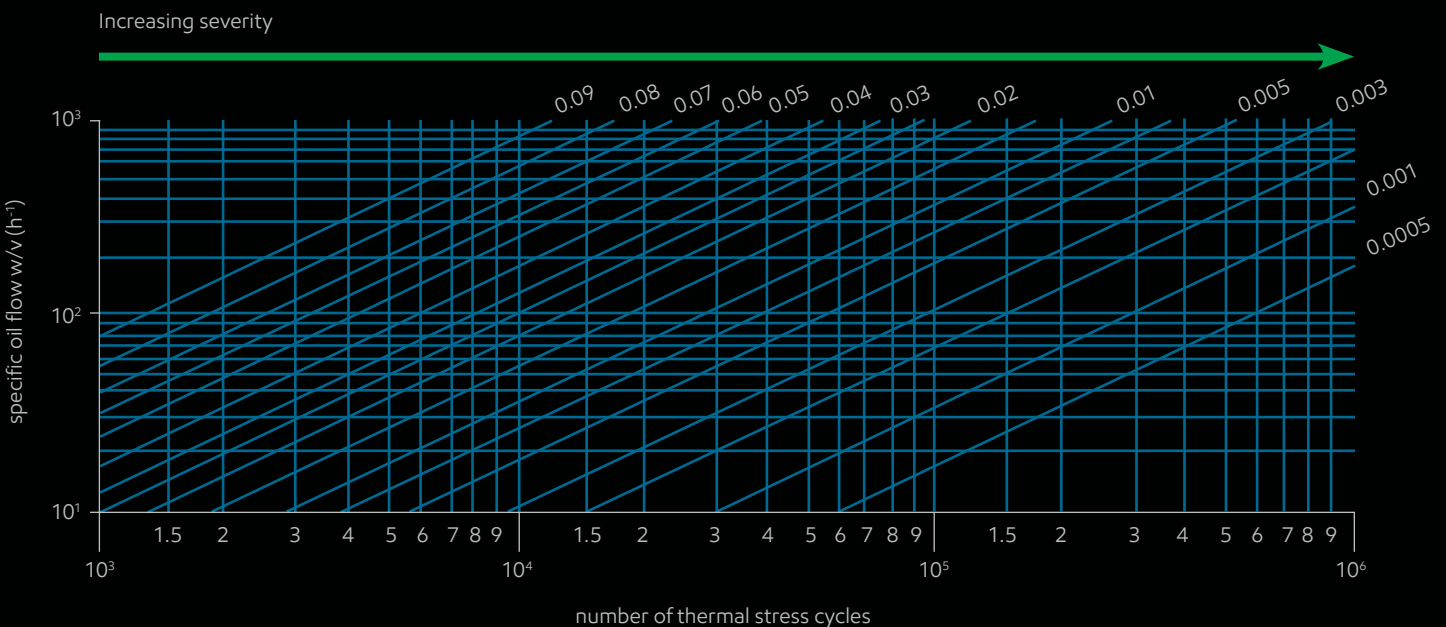
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## Minimizing problems

To minimize these potential problems, the choice of the lubricant must be suitable to the engine situation, particularly when high cycles and very low consumption prevail. Knowing the oil tank capacity, the engine oil consumption and the oil flow delivered to the engine, we can determine the severity from the diagram pictured below.

- The lower the oil consumption and the higher the number of thermal stress cycles (NTSC), the more severe it is for the engine lubricant.
- The choice of the lubricant must be suitable to the engine temperatures and the number of thermal stress cycles.
- High performance capability (HPC) lubricants, such as Mobil Jet™ Oil 387, are recommended for severe operating conditions.



### Specific oil consumption $c/v$ ( $h^{-1}$ )

The lower the oil consumption and the higher the number of thermal stress cycles (NTSC), the more severe it is for the engine lubricant.

W = Oil flow to the engine

V = Oil volume

C = Oil consumption

Units: liters, gallons or pints; time in hours

## For more information

Please contact your ExxonMobil aviation sales representative.