

# Potlife Testing of High Performance Aerospace Coating Systems (HPACS)

## ***Background:***

Air Force Research Laboratory conducted a study in 1994-1996 to determine if the commercial paint industry had indeed developed better coating systems as they had stated several times to Air Force personnel. The results were the selection of High Performance Aerospace Coating Systems (HPACS) tested and selected as coatings having the best potential for near term integration into the USAF aircraft refinishing operations, but requiring further testing. The Coatings Technology Integration Office (CTIO) conducted studies to further test these coating systems.

**Project Sponsor/Customer:** Air Force wide

**Period of Performance:** 1995 -1996

## ***Objective:***

The objective of this project was to investigate the potlife of the eight selected HPACS. The coating systems range from conventional epoxy primers with solvent-based urethane topcoats to non-chromated epoxy primers and waterborne urethane topcoats. Several of the coating systems were developmental products and not currently used on either commercial or military aircraft. The results of this project were included in the full assessment report of the HPACS.

## ***Status:***

One of the coating properties evaluated in the HPACS down-select process is the measurement of viscosity as a function of time. This data can be used to determine a coating's "potlife". In this study, the viscosity of the coatings, as a function of time and temperature for a range of temperatures normally encountered at USAF aircraft painting sites, was measured using a Ford #4 Cup. Statistical and graphical methods were then used to determine an estimated time-to-failure for each system.

In general each coating system exhibited unique mixing and curing characteristics:

- Systems 3,14,15 and 17 meet the 4 hour/50 second viscosity criteria
- System 23 would probably pass if the initial viscosity of the topcoat was lowered by solvent dilution

- Although System 6 did not pass, it is designed to have a 2 hour potlife and has been accepted for use at several commercial and military sites
- Systems 4 and 20 failed. These systems are water based and tend to foam during cure.

Note: Errors with measurement of viscosity using the Ford Cup can be significant and thus be taken in to account when interpreting results.

**Final Report:** Titled: "Potlife Testing of High Performance Aerospace Coating Systems"

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