CHAMPION AEROSPACE™

# TECHNICAL SPOTLIGHT

**Subject:** **Igniter Competitive Evaluation (Champion CH31900-6, GE P/N 1374M13P11 and Unison 9072215-1, GE P/N 1374M12P10)**

**Purpose:** To conduct a side-by-side "on engine" performance evaluation of CH31900-6 and 9072215-1 igniters installed in a Malaysian Airlines B737-400. The goal was to demonstrate Champion's advanced firing end design will deliver longer life capability due to its desired electrical erosion characteristics.

**Scope:** This test was performed on a Malaysian Airlines B737-400 aircraft fitted with CFM53-3C1 engines. A CH31900-6 and Unison 9072215-1 Igniter were installed in the same engine- one in position A and one in position B. The evaluation was conducted for 900 flight cycles (990 hours). Parts were returned to Champion for physical and functional evaluation.

**Conclusions:** The CH31900-6 igniter outperformed the 9072215-1 competitive equivalent in an "on engine" evaluation. The Champion design demonstrated desirable electrical erosion characteristics and passed the functional test requirements per the GE Specification Requirements after 900 cycles of operation. The 9072215-1 competitive part exhibited less desirable erosion patterns and did not pass the functional test requirements which would permit continued in service use. The Champion design's ability to extend installed life in the engine provides the lowest total cost of ownership opportunity.

**Results:**

After 900 cycles the Champion CH31900-6 igniter erosion was well short of the 50% remaining life shell wall and center electrode wear limits established by the CMM, met new part gas leakage requirements at 500 psig and passed the 14kV Wet Spark Test (Fuel) required by the GE Igniter Specification. The Unison design only conformed to the gas leakage and center electrode recession requirement. Failure of the 14kV Wet Spark Test would prevent further use as the functional Service Limit was achieved. After functional test the igniter firing ends were sectioned to review the erosion patterns. See **Figures 1** and **2** below:

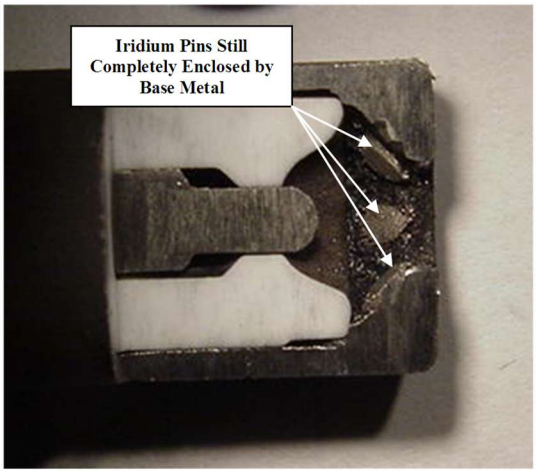


**Figure 1: Champion Sectioned Tip**

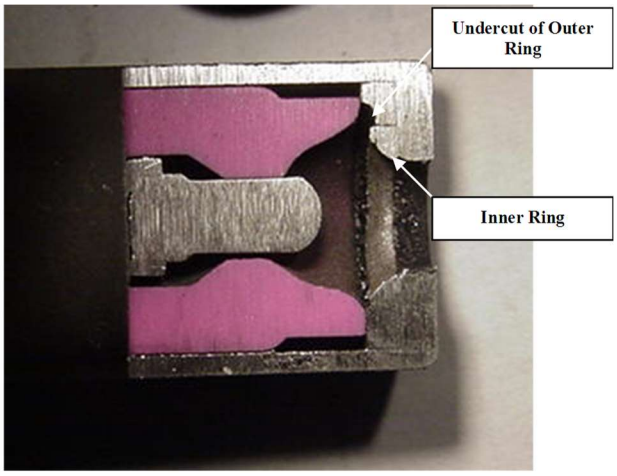


**Figure 2: Unison Sectioned Tip**

ECCN 9E991.

**Figure 1** demonstrates the Champion tip design exhibited consistent sparking to the 6 Iridium Pins embedded in the firing end shell and considerably lower insulator erosion. This leads to lower spark path length and ultimately ensures effective Wet Spark performance at this level of wear. It also ensures continued consumption of the highly erosion resistant Iridium Pins to maximize spark life, and therefore, Igniter installed life. The Unison Igniter erosion of the insulator permitted undercutting of their erosion resistant inner ring and consistent sparking to the outer ring, which is a less erosion resistant feature as shown in **Figure 2**. This limits life in the engine and can even lead to tip liberation as shown in **Figure 3** and **4** below.

**Figure 3: Unison Side Wall Erosion**

**Figure 4: Unison Tip Loss from Sidewall Erosion**

Recent CFM56 operator field surveys of igniter replacement intervals fully support the on engine evaluation data and conclusions made above. See **Figures 5** and **6** for comparison data.

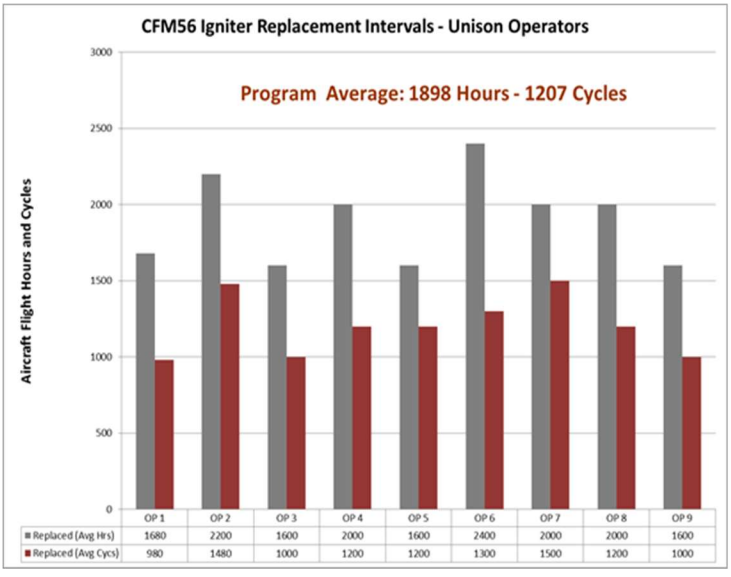


**Figure 5: Unison Operator Data**

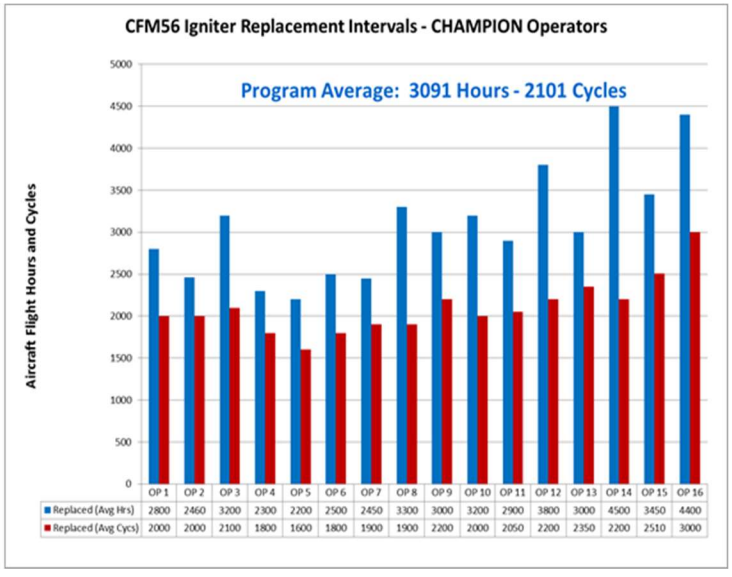


**Figure 6: Champion Operator Data**