

# REPAIR 004: LOW PRESSURE ROTATING AIR SEAL WELD BUILD-UP REPAIR

*The MRO Lab*  
Adaptive Innovations



CRMA, an AFI KLM E&M Center of excellence for engines part and module repairs, has developed an innovative solution under which worn-or-damaged Low Pressure Turbine (LPT) Rotating Air Seals on CFM56 series engines are repaired instead of being replaced. Called Repair 004, it involves weld build-up of seal teeth using an automatic gas tungsten arc welding procedure.

## The issue

Time-to-market repair development is our priority. As such, CRMA was asked to develop this repair solution at a third-party customer's request, as they were seeing high scrap rates on CFM56-5 series engines, which meant they had to make an emergency purchase of entire batches of LPT rotating air seals, generating substantial costs and delays. CRMA was the first shop in the world to develop this repair for CFM56-5C engines, providing worthwhile experience not only on that engine type, but also on other CFM56 series engines.

## The adaptive solution developed by AFI KLM E&M

Cooperation with OEMs is a key strategic driver of CRMA's industrialization policy. CRMA worked closely with engine-maker CFMI to develop the process, especially for Waspaloy parts. During development, CRMA successfully overcame a number of technical issues resulting largely from the poor "weldability" of used nickel-base alloys (weldability, dimensional shrinkage, etc.). The solution was implemented on the ESM repair. Moreover, for the space of twelve months, CRMA retained exclusive use of a specific thermal treatment that cut treatment time by a factor of four. CRMA retained exclusive ownership of this special welding skill as a key asset to develop new repair types, and will shortly propose new developments to CFMI. Repair 004 calls for industrial resources such as automatic welding facilities, as well as machining, surface treatments, non-destructive testing and thermal spray facilities. It consists of removing the old seal teeth coating, machining them and welding them up using an automatic gas tungsten arc welding process (dabber GTAW). After the new seal teeth have been machined, they are inspected, cleaned and sprayed, returning the seal to as-new condition.

## Key benefits

- Repair rather than replace
- Up to 85% cost savings compared to part replacement
- Scrap rate cut from around 70% to 0% on this part
- Applicable to all CFM56 engines, including the 5B





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“The first shop in the world to develop this repair for CFM56-5C engines”

This adaptive solution was developed by the **CRMA Engineering team**.  
For further information please contact your Sales Manager.



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