

# DRDO DEVELOPS CRITICAL NEAR ISOTHERMAL FORGING TECHNOLOGY FOR AEROENGINES

Relevant for: Science & Technology | Topic: Science and Technology- developments and their applications and effects in everyday life

Defence Research and Development Organisation (DRDO) has established the near isothermal forging technology to produce all the five stages of high-pressure compressors (HPC) discs out of difficult-to-deform titanium alloy using its unique 2000 MT isothermal forge press. The technology has been developed by Defence Metallurgical Research Laboratory (DMRL), a premier metallurgical laboratory of DRDO at Hyderabad. This is a crucial technology for establishing self-reliance in aeroengine technology. With this development, India has joined the league of limited global engine developers to have the manufacturing capabilities of such critical aero engine components.

To meet the bulk production requirements, DMRL technology was transferred to M/s MIDHANI through a licensing agreement for technology transfer (LAToT). Using the isothermal forge press facility available at DMRL, Hyderabad, bulk quantity (200 numbers) of HPC disc forgings pertaining to various compressor stages have been jointly (DMRL & MIDHANI) produced and successfully supplied to HAL (E), Bengaluru for fitment in to Adour Engine that powers the Jaguar/Hawk Aircrafts.

In India, the Adour engine is overhauled by HAL (E), Bengaluru under a licensed manufacturing agreement with OEM. Like in any aeroengine, the HPC Drum assembly has to be replaced after a specified number of operations or in case of damage. The annual requirements of these high value HPC discs are quite large, warranting indigenisation. HPC drum is a highly stressed sub-assembly and is also subjected to low cycle fatigue and creep at elevated temperature. The raw materials and forgings for HPC drum are required to be of the highest quality which can meet the specified combination of static and dynamic mechanical properties.

DMRL developed this forging technology by integrating various science and knowledge-based tools. The methodology adopted by DMRL is generic in nature and can be tuned to develop other similar aeroengine components. The compressor discs produced using this methodology met all the requirements stipulated by the airworthiness agencies for the desired application. Accordingly, the technology was type certified and letter of technical approval (LoTA) was accorded. Based on the exhaustive component level and performance evaluation test results, HAL (E) and Indian Air Force cleared the components for engine fitment. Apart from DMRL and HAL (E), various agencies such as MIDHANI, CEMILAC and DGAQA worked in unison to establish this crucial technology.

Raksha Mantri Shri Rajnath Singh has congratulated the scientists of DRDO, Industry and all other agencies involved in the development of this critical Aero Engine related technology.

Secretary Department of Defence R&D and Chairman DRDO Dr G Satheesh Reddy expressed his satisfaction on achieving this crucial milestone and congratulated the teams involved.



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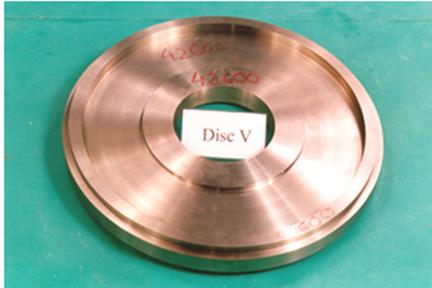
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