International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI)

Balapur P.O., Hyderabad – 500005, Telangana, India

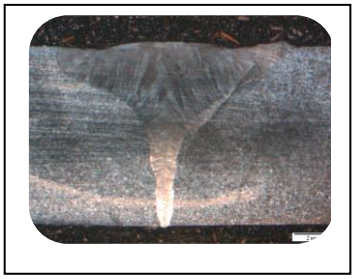
Laser Hybrid Welding of Nickel based super alloys

Overview

Research to increase the efficiency of conventional fossil power plants by increasing the steam temperature and pressure has been pursued worldwide. The need to reduce CO_2 emission has recently provided an additional incentive to increase efficiency. The main enabling technology in achieving the above goals has been the development of stronger high temperature materials. Solid solution and carbide strengthened Nickel based super alloys have been identified as candidate materials for Advanced ultra-supercritical (AUSC) boilers capable of operating with 760^{o}C, 35Mpa steam. Laser hybrid welding is one of the potential fusion joining techniques developed for these alloys. Deep penetration capability of laser and edge bridgability of arc process enables processing of defect free joints at higher speed with acceptable mechanical properties. Laser hybrid welding process is AMSE coded and validated process.

Key Features

- Demonstrated laser hybrid weldability of 10mm thick Plates and Tubes at coupon level.
- Defect free hybrid welds with minimal HAZ liquation.
- 100% joint efficiency.



Single Pass Laser Hybrid weld cross-section

Potential Applications

- Power sector
- Aerospace
- Nuclear

Set up of Laser Hybrid welding of Tubes

Intellectual Property Development Indices (IPDI)

- Performance and stability are validated at coupon level

Status	1	2	3	4	5	6	7	8	9	10

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