

# FRICION CRUSH WELDING: AN INNOVATIVE AND CUTTING EDGE FABRICATING TECHNOLOGY

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## ABSTRACT

Over the decade, the world has witnessed progressive, innovative, and cutting edge technologies in engineering stream. Researchers and technologists have been working in collaboration to construct a better tomorrow. Numerous advancements have taken place in this journey. Critical and industrially significant components have seen limelight owing to the relentless efforts put forth by scientists and technologists. Most of these advancements have been occupied with manufacturing sector. Welding has always been one of the sought after technologies while fabricating components for any sector. The advents of welding have taken equal pace and proportion with the advancements in manufacturing. Friction welding has emerged out to be the reliable process as it accounts for less distortion and minimal defect association. Friction stir welding is a class of friction welding process, which has revolutionized the manufacturing sector and is being made use of while fabricating critical components for strategic applications. This method has paved way to join similar or dissimilar metals with minimal variation in their parent structural constituents. Nevertheless, some limitations do associate with this process not facilitating its employment at some instances. The thickness of the sheets being joined during friction stir welding poses critical consideration and has to be counted before hand. These constraints have lead to originate a newer friction welding technology that has similar pathway as friction stir welding. This process, Friction crush welding (FCW) offers a high speed process which requires a simple edge preparation and can be applied to out-of-plane geometries.

The current paper critically discusses the mechanism, process description and equipment requirements during friction crush welding. The interdependence of microstructure and mechanical properties is dealt in detail. Some of the case studies are drawn from real-time applications of FCW. Emphasis is given to understand and analyze the microstructure at different zones during FCW. Mention has also been made of appropriate criteria to optimize the process parameters.

**Key words:** Friction welding, Friction stir welding, Friction crush welding, strategic applications

