AWS D17.3/D17.3M:2016
An American National Standard

Specification for Friction Stir Welding of Aluminum Alloys for Aerospace Applications

American Welding Society®

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Approved by the
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Specification for Friction Stir Welding of Aluminum Alloys for Aerospace Applications

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Prepared by the
American Welding Society (AWS) D17 Committee on Welding in the Aircraft and Aerospace Industries

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

This specification covers the general requirements for the friction stir welding of aluminum alloys for aerospace applications. It includes the requirements for weldment design, qualification of personnel and procedures, fabrication, and inspection.

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Foreword

This foreword is not part of AWS D17.3/D17.3M:2016, *Specification for Friction Stir Welding of Aluminum Alloys for Aerospace Applications,* but is included for informational purposes only.

In the fall of 1993, aerospace welding personnel gathered together under the auspices of the American Welding Society (AWS) to develop an aerospace fusion welding specification to replace MIL-STD-1595A, *Qualification of Aircraft, Missile, and Aerospace Fusion Welders,* and MIL-STD-2219, *Fusion Welding for Aerospace Applications*. The result of this initial meeting was the formation of the AWS D17 Committee on Welding in the Aircraft and Aerospace Industries. The overriding theme voiced by the committee members was that the aviation industry had changed and a new specification was needed. In 2001, after years of hard work by the committee members, the American Welding Society issued AWS D17.1:2001, *Specification for Fusion Welding for Aerospace Applications*.

Specifications used for aerospace welding deal primarily with fusion welding, except for the relatively few that deal with friction welding. Fusion welding is used to produce the vast majority of large, structural, welded components, as opposed to friction welding, which usually is used to join smaller, circular cross-section detail parts. In 1991, The Welding Institute, in the United Kingdom, patented a new welding process called Friction Stir Welding (FSW). The question soon arose as to which requirements were necessary to specify and control this new welding process. Fusion welding specifications could not adequately address FSW because it is a solid-state welding process. Friction welding specifications also could not adequately address FSW process because unlike friction welding, FSW process uses a third body, the welding tool.

The AWS D17 Committee on Welding in the Aircraft and Aerospace Industries determined that it was necessary to form a subcommittee to write a specification for friction stir welding. It was appropriate that the setting for the subcommittee's kickoff meeting was at the Kennedy Space Center in Florida. Kennedy Space Center is where the first friction stir welded commercial aerospace component, the fuel tank for the Delta launch vehicle, went into service. Representatives from industry, welding institutes, government agencies, and universities met to dedicate themselves to form a specification for the friction stir welding of aluminum for aerospace applications. AWS D17. 1:2001, served as the model for this specification.

This is the second edition of AWS D17.3/D17.3M: 2016, *Specification for Friction Stir Welding of Aluminum Alloys for Aerospace Applications*. A vertical line in the margin or underlined text in clauses, tables, or figures indicates an editorial or technical change from the 2010 edition.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS D17 Committee on Welding in the Aircraft and Aerospace Industries, American Welding Society, 8669 NW 36 St, #130, Miami, FL 33166.

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