

AWS D8.1M:2007
An American National Standard



**Specification for
Automotive
Weld Quality—
Resistance Spot
Welding of Steel**



American Welding Society



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An American National Standard

Approved by the
American National Standards Institute
January 12, 2007

Specification for
Automotive Weld Quality—
Resistance Spot Welding of Steel

1st Edition

Prepared by the
American Welding Society (AWS) D8 Committee on Automotive Welding

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

This document contains both visual and measurable acceptance criteria for resistance spot welds in steels. The information contained herein may be used as an aid by designers, resistance welding equipment manufacturers, welded product producers, and others involved in the automotive industry and resistance spot welding of steels.



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Specification for Automotive Weld Quality— Resistance Spot Welding of Steel

1. Scope

This specification expresses an industry consensus of quality characteristics and metrics pertinent to resistance spot welds on automotive steels. The evaluation methods and inspection criteria specified herein can be used to evaluate the effectiveness of particular welding equipment and procedures used to weld a particular base material combination. The subject matter is considered to be realistic and tempered with the knowledge of what a resistance spot welding process is capable of accomplishing in a high volume production environment. The criteria and metrics are the same for all welds regardless of the service load and are intended to be applied in conditions typically encountered during manufacturing. Welds at variance from the stated weld quality criteria in this document can still have mechanical properties that satisfy product and design requirements. Any attempted application of this document, or the evaluation criteria contained herein, to other uses, such as post-crash weld quality assessment, may lead to an erroneous result.

This standard makes sole use of the International System of Units (SI).

Safety and health issues and concerns are beyond the scope of this standard, and therefore are not fully addressed herein. Safety and health information is available from other sources, including but not limited to, ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*, and applicable federal and state regulations.

2. Normative References

The following standards contain provisions which, through reference in this text, constitute mandatory provisions of this AWS standard. For undated references, the latest edition of the referenced standard shall apply. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply.

American Welding Society (AWS) standards:¹

(1) AWS A3.0, *Standard Welding Terms and Definitions Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying*; and

(2) AWS D8.9M, *Recommended Practices for Test Methods for Evaluating the Resistance Spot Welding Behavior of Automotive Sheet Steel Materials*.

3. Terms and Definitions

The terms listed in AWS A3.0, *Standard Welding Terms and Definitions Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying*, shall apply to this document, except for those listed below. The terms listed below as used in various sections of this document require definition for correct interpretation. Most of these terms are not contained in AWS A3.0, or if they are listed, their definitions have been enhanced to clarify their use in this document.

For the purposes of this document, the following definitions apply:

aspect ratio. The ratio of the maximum dimension to the minimum dimension of the fused area.

button. The part of a spot weld which tears out during destructive testing of welded steel. It may include all or part of the nugget, the heat-affected zone (HAZ) and base metal. A hole is left in the mating sheet(s).

button pull. A fracture mode of a spot weld where separation occurs through the heat-affected zone (HAZ) of the weld, resulting in a button (see example in Figure 10).

button size. The average of the maximum and minimum dimensions of the button.

¹ AWS standards are published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.