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An American National Standard

Recommended Practices for Automotive Weld Quality—Resistance Spot Welding

American Welding Society

Approved American National Standard
ANSI

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Recommended Practices for Automotive Weld Quality—Resistance Spot Welding

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Prepared by
AWS D8 Committee on Automotive Welding

Under the Direction of
AWS Technical Activities Committee

Approved by
AWS Board of Directors

Abstract

This document presents recommended practices and criteria for evaluating resistance spot welds typical of automotive sheet steel applications. The document contains weld characteristics, metrics and testing methods useful in evaluating spot welding quality on coated and uncoated automotive sheet steels of all strength levels and compositions. The test methods described are designed to assess both static and dynamic properties of automotive sheet steel welds.

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Foreword

(This Foreword is not a part of AWS D8.7M:2005, *Recommended Practices for Automotive Weld Quality—Resistance Spot Welding*, but is included for informational purposes only.)

This document has been prepared as an informative reference to recognize a consensus of practices that may assist automotive industry suppliers in their understanding of resistance spot weld criterion and the methods for assessment of weld quality. As a recommended practice the criteria and techniques contained are not obligatory until cited as a normative reference in a mandatory document.

This recommended practice was prepared by the AWS D8D Subcommittee on Automotive Resistance Spot Welding of the AWS D8 Committee on Automotive Welding. This publication is issued under the auspices of the AWS D8 Committee on Automotive Welding.

The present publication of *Recommended Practices for Automotive Weld Quality—Resistance Spot Welding* is an update of the original document published in 1978. This edition presents an extension of previous information along with an introduction of new data and test methodologies. These enhancements are based on research activities sponsored by resistance welding equipment manufacturers, steel companies, automotive manufacturers, universities and the United States Department of Commerce.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS D8 Committee on Automotive Welding, American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

Official interpretations of any of the technical requirements of this standard may only be obtained by sending a request, in writing, to the Managing Director, Technical Services Division, American Welding Society. A formal reply will be issued after it has been reviewed by the appropriate personnel following established procedures.

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Table of Contents

Page No.

Personnel iii
Foreword v
List of Tables viii
List of Figures viii

1. Scope 1

2. Normative Reference 1

3. Terms and Definition 1

4. General 2
   4.1 Weld Process Control 2
   4.2 Satisfactory Weld 2
   4.3 Material Limitations 2
   4.4 Surface Condition 2
   4.5 Weld Through Sealers and Adhesives 2
   4.6 Part Fit-Up 2
   4.7 Weld Identification 2

5. Weld Quality Evaluation Criteria 2
   5.1 Size 2
   5.2 Location 3
   5.3 Spacing 3
   5.4 Indentation 3
   5.5 Distortion 3
   5.6 Weld Appearance 3
   5.7 Quantity 3
   5.8 Penetration 3

6. Inspection Techniques 5
   6.1 Visual Evaluation 5
   6.2 Nondestructive Testing 5
   6.3 Destructive Testing 6

7. Test Methods 6
   7.1 Peel Test 6
   7.2 Chisel Test 6
   7.3 Metallographic Test 6
   7.4 Tensile-Shear Test 6
   7.5 Double Pendulum Impact Test 6
   7.6 Other Tests 9

8. Disposition of Substandard Products 9

Page No.

9. Safety 9

Nonmandatory Annexes 13
Annex A—Guidelines for Preparation of Technical Inquiries for AWS Technical Committees 13
Annex B—Reference Documents 15

List of AWS Documents on Automotive Welding 17

List of Tables

Table		Page No.
1	Weld Sizes for Automotive Resistance Spot Welding	2
2	Minimum Width for Tensile-Shear Testing Specimens	6
3	Minimum Width for Impact Testing Specimens	6

List of Figures

Figure		Page No.
1	Measurement of Weld Size	3
2	Attributes of a Spot Weld Measured from a Section Through the Center	3
3	An Edge Weld	4
4	A Mislocated Weld	4
5	Overlapped Welds	4
6	Potentially Insufficient Spaced Welds	4
7	Excessive Indentation	4
8	Weld Distortion	5
9	Holes and Whiskers on a Weld Surface	5
10	Surface Cracks	5
11	Impact Testing Specimen Dimensions	7
12	Peel Test	7
13	Chisel Test	8
14	Porosity in a Weld Revealed in a Cross Section	8
15	Tensile-Shear Test	8
16	Quantities to be Measured in a Tensile-Shear Test	9
17	Tensile-Shear Test Failure Mode	10
18	Double Pendulum Impact Test	11

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Recommended Practices for Automotive Weld Quality—Resistance Spot Welding

1. Scope

This recommended practice expresses an industry consensus of quality characteristics and metrics pertinent to resistance spot welds on automotive materials. 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 service load and intended to be applied in conditions typically encountered during manufacturing. Welds at variance from the stated criteria can have mechanical properties that satisfy product and design requirements. Any attempted application of this document or the evaluation criteria used herein to other uses, as for example post-crash weld quality assessment, may lead to an erroneous result.

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

2. Normative Reference

The following standard contains provisions which, through reference in this text, constitute 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 this publication do not apply.

AWS A3.0:2001, *Standard Welding Terms and Definitions*.

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3. Terms and Definitions

The terms listed are used in various sections of this document and require definition for correct interpretation. Most of these terms are not contained in AWS A3.0-2001, *Standard Welding Terms and Definitions,* or if they are listed in AWS A3.0, their definitions have been enhanced to clarify their use in this document.

adjacent welds. Welds located next to each other joining the same pieces of metal.

coupon. A single, small piece of test material with specified dimensions that is used to make up test samples.

edge weld. A weld located such that the electrode contact area as indicated by the weld indentation overlaps the edge of the sheet.

Governing Metal Thickness (GMT). The GMT for a two-sheet stackup is the metal thickness of the thinner of the two sheets. The GMT for a three-sheet stackup is the metal thickness of the second thickest sheet.

minimum weld size. The smallest allowable value for nugget width or the weld button.

minimum weld spacing. Minimum weld spacing is the shortest permissible distance or pitch from weld center to weld center of adjacent welds.

partial interfacial fracture. A fracture mode of a spot weld where a part of the weld nugget (fused area of a spot weld) separates through the plane of the weld and some portion of the weld pulls out as a partial button.

penetration. The height of the fusion zone expressed as a percent of the total material stack up welded.

set-up weld size. The set-up weld size is the weld size to be obtained during equipment set-up and when the electrodes are new.

weld aspect ratio. The weld aspect ratio is the ratio of the maximum diameter measurement to the minimum diameter measurement of the weld button.

weld group. A weld group is a row, string, pattern, or an array of spot welds joining one part to another. Weld groupings are identified on the product drawing.