Specification for Automotive Weld Quality—Arc Welding of Steel
Specification for
Automotive Weld Quality—
Arc Welding of Steel

Supersedes AWS D8.8M:2007

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 specification provides the minimum quality requirements for arc welding of various types of automotive and light truck components. This specification covers the arc and hybrid arc welding of coated and uncoated steels.
Statement on the Use of American Welding Society Standards

All standards (codes, specifications, recommended practices, methods, classifications, and guides) of the American Welding Society (AWS) are voluntary consensus standards that have been developed in accordance with the rules of the American National Standards Institute (ANSI). When AWS American National Standards are either incorporated into, or made part of, documents that are included in federal or state laws and regulations, or the regulations of other governmental bodies, their provisions carry the full legal authority of the statute. In such cases, any changes in those AWS standards must be approved by the governmental body having statutory jurisdiction before they can become a part of those laws and regulations. In all cases, these standards carry the full legal authority of the contract or other document that invokes the AWS standards. Where this contractual relationship exists, changes in or deviations from requirements of an AWS standard must be by agreement between the contracting parties.

AWS American National Standards are developed through a consensus standards development process that brings together volunteers representing varied viewpoints and interests to achieve consensus. While AWS administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in its standards. AWS disclaims liability for any injury to persons or to property, or other damages of any nature whatsoever, whether special, indirect, consequential, or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this standard. AWS also makes no guarantee or warranty as to the accuracy or completeness of any information published herein.

In issuing and making this standard available, AWS is neither undertaking to render professional or other services for or on behalf of any person or entity, nor is AWS undertaking to perform any duty owed by any person or entity to someone else. Anyone using these documents should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances. It is assumed that the use of this standard and its provisions is entrusted to appropriately qualified and competent personnel.

This standard may be superseded by new editions. This standard may also be corrected through publication of amendments or errata, or supplemented by publication of addenda. Information on the latest editions of AWS standards including amendments, errata, and addenda is posted on the AWS web page (www.aws.org). Users should ensure that they have the latest edition, amendments, errata, and addenda.

Publication of this standard does not authorize infringement of any patent or trade name. Users of this standard accept any and all liabilities for infringement of any patent or trade name items. AWS disclaims liability for the infringement of any patent or product trade name resulting from the use of this standard.

AWS does not monitor, police, or enforce compliance with this standard, nor does it have the power to do so.

Official interpretations of any of the technical requirements of this standard may only be obtained by sending a request, in writing, to the appropriate technical committee. Such requests should be addressed to the American Welding Society, Attention: Managing Director, Technical Services Division, 8669 NW 36 St, # 130, Miami, FL 33166 (see Annex A). With regard to technical inquiries made concerning AWS standards, oral opinions on AWS standards may be rendered. These opinions are offered solely as a convenience to users of this standard, and they do not constitute professional advice. Such opinions represent only the personal opinions of the particular individuals giving them. These individuals do not speak on behalf of AWS, nor do these oral opinions constitute official or unofficial opinions or interpretations of AWS. In addition, oral opinions are informal and should not be used as a substitute for an official interpretation.

This standard is subject to revision at any time by the AWS D8 Committee on Automotive Welding. It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn. Comments (recommendations, additions, or deletions) and any pertinent data that may be of use in improving this standard are required and should be addressed to AWS Headquarters. Such comments will receive careful consideration by the AWS D8 Committee on Automotive Welding and the author of the comments will be informed of the Committee’s response to the comments. Guests are invited to attend all meetings of the AWS D8 Committee on Automotive Welding to express their comments verbally. Procedures for appeal of an adverse decision concerning all such comments are provided in the Rules of Operation of the Technical Activities Committee. A copy of these Rules can be obtained from the American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166.
Personnel

AWS D8 Committee on Automotive Welding

D. L. Galiher, Chair
T. Coon, 1st Vice Chair
M. D. Tumuluru, 2nd Vice Chair
E. H. Abrams, Secretary
G. Armstrong
J. E. Beckham
J. C. Bohr
W. H. Braddock
J. W. Dolfi
F. H. Hunt
J. G. Hunt
C. Jiang
S. C. Kelley
D. P. Kelly
D. R. Kolodziej
D. F. Maatz, Jr.
T. W. Morrissett
J. S. Noruk
W. F. Qualls

Tower International
Ford Motor Company
U. S. Steel
American Welding Society
Yachiyo of Ontario Mfg. Inc.
Chrysler Group LLC
General Motors
Tuffaloy Products, Incorporated
Consultant
Hitachi America, Limited
AET Integration, Incorporated
AET Integration, Incorporated
Arcelor Mittal
Fusion Welding Solutions
Ford Motor Company (Retired)
R & E Automated Systems LLC
SDK Engineering, LLC
Servo Robot Corporation
Consultant

Advisors to the AWS D8 Committee on Automotive Welding

E. Cross-Smith
W. Doneth

Meggitt Aircraft Braking Systems
Fronius USA LLC

AWS D8C Subcommittee on Automotive Arc Welding of Steel

J. S. Noruk, Chair
E. H. Abrams, Secretary
B. Allen
G. Armstrong
E. Biro
J. C. Bohr
R. Carlson
E. Cross-Smith
R. M. Dull
B. J. Farkas
M. D. Gartner
K. W. Gerhart
M. Herbert
I. G. Hunt
R. A. Krause
T. Lowe
W. A. Marttila
H. R. Mistry
M. D. Tumuluru
A. Anderson

Servo Robot Corporation
American Welding Society
BMW Manufacturing Corporation
Yachiyo of Ontario Mfg. Inc.
Arcelor Mittal
General Motors North America
NAO/CRW
Meggitt Aircraft Braking Systems
Edison Welding Institute
Maxal Inc.
Midway Products Group
Edison Welding Institute
Retired
AET Integration
AlcoTec Wire Corporation
Spec-Weld Technologies, Incorporated
WAMcom Consulting LLC
Cosma International
The Lincoln Electric Company
U.S. Steel
ITW Welding North America’s Company

Advisors to the AWS D8C Subcommittee on Automotive Arc Welding of Steel

D. L. Galiher
E. T. Hetrick

Tower International
Ford Motor Company

Special Contributor

E. Boan

John Deere Seeding
Foreword

This foreword is not part of AWS D8.8M:2014, Specification for Automotive Weld Quality—Arc Welding of Steel, but is included for informational purposes only.

This specification was developed by the AWS D8C Subcommittee on Automotive Arc Welding of Steel of the AWS D8 Committee on Automotive Welding.

Arc welding of truck and car frame structures with relatively thick metal parts and using the gas metal arc welding (GMAW) process is covered in AWS D8.8-97/SAE HS J1196, Specification for Automotive and Light Truck Components Weld Quality—Arc Welding and D8.8M: 2007 Specification for Automotive Weld Quality-Arc Welding of Steel. Recent changes in automotive design, caused by the desire to reduce fuel consumption and improve crash performance, have resulted in automotive structures being made of thinner and higher strength metal parts. This fact combined with the increased use of Zinc Coated Steels to reduce corrosion has made successful arc welding more difficult. This specification addresses joint geometry and workmanship requirements essential to automotive component arc welding quality. As the automotive industry is continually adopting new designs and materials, this standard is not intended to limit the user or prevent adoption of technology advancements. One objective was to prepare a specification that would be useful for the original equipment manufacturers (OEMs) and Tier suppliers of automotive components who may not have quality standards of their own. Another objective is to have the OEMs and Tier suppliers use and specify this document in order to establish common industry standards.

This fifth edition, D8.8M:2014, Specification for Automotive Weld Quality—Arc Welding of Steel, includes the following changes, notated with a vertical line along the side of the page:

1. Improvement of several figures and related text to depict discontinuities more realistically, make them easier to read and where possible, utilize ones already spelled out in A2.4 Standard Symbols for Welding, Brazing, and Nondestructive Examination.

2. Harmonize requirements for fusion and penetration across all joint types.

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, 8669 NW 36 St, #130, Miami, FL 33166.
This page is intentionally blank
# Table of Contents

*Personnel* ................................................................. v
*Foreword* ................................................................... vii
*List of Figures* .............................................................. x

1. General Requirements ................................................................. 1

2. Normative References ................................................................. 1

3. Terms and Definitions ................................................................. 2

4. General Provisions ................................................................... 3
   4.1 Application ................................................................. 3
   4.2 Welding Processes ......................................................... 3
   4.3 Limitations ................................................................. 4
   4.4 Weld Identification and Inspection ........................................ 4
   4.5 Types of Weld Joints and Applicable Welds ............................... 4

5. Weld Quality Requirements ........................................................... 4
   5.1 Weld Discontinuities ....................................................... 4
   5.2 Dimensional Requirements ................................................ 6
   5.3 Weld Size .................................................................. 6

Annex A (Informative) — Guidelines for the Preparation of Technical Inquiries ........................................ 15

List of AWS Documents on Automotive Welding ........................................ 17
# List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Fillet Weld</td>
<td>2</td>
</tr>
<tr>
<td>2.</td>
<td>Examples of Discontinuities Found in Arc Welds</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>Example of Notching at End of Weld</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>Examples of Undercut, Melt-Through, Root Penetration, and Overlap</td>
<td>5</td>
</tr>
<tr>
<td>5.</td>
<td>Fillet Welded T-Joints</td>
<td>7</td>
</tr>
<tr>
<td>6.</td>
<td>Illustration of Fillet Welds—Concavity and Convexity</td>
<td>8</td>
</tr>
<tr>
<td>7.</td>
<td>Leg Length of a Lap Fillet Weld</td>
<td>8</td>
</tr>
<tr>
<td>8.</td>
<td>Effective Weld Size</td>
<td>9</td>
</tr>
<tr>
<td>9.</td>
<td>Partial Joint Penetration Groove Weld</td>
<td>9</td>
</tr>
<tr>
<td>10.</td>
<td>Flare-Bevel-Groove Weld</td>
<td>9</td>
</tr>
<tr>
<td>11.</td>
<td>Flare-V-Groove Weld</td>
<td>10</td>
</tr>
<tr>
<td>12.</td>
<td>Arc Spot Welds</td>
<td>11</td>
</tr>
<tr>
<td>13.</td>
<td>Plug Weld Profiles—A, B, and C</td>
<td>11</td>
</tr>
<tr>
<td>14.</td>
<td>Plug Weld</td>
<td>12</td>
</tr>
<tr>
<td>15.</td>
<td>Single Fillet Weld in a Slot</td>
<td>12</td>
</tr>
<tr>
<td>16.</td>
<td>Double Fillet Weld in a Slot</td>
<td>13</td>
</tr>
<tr>
<td>17.</td>
<td>Fillet Weld in Holes</td>
<td>13</td>
</tr>
</tbody>
</table>
Specification for Automotive Weld Quality—Arc Welding of Steel

1. General Requirements

1.1 Scope
This specification describes weld geometry and workmanship criteria essential to ensure the quality of automotive and light truck weldments. This specification covers the arc and hybrid arc welding of coated and uncoated steels.

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

1.3 Safety
Safety issues and concerns are addressed in this standard, although health issues and concerns are beyond the scope of this standard. Safety and health information is available from the following sources:

American Welding Society:
(1) ANSI Z49.1, Safety in Welding, Cutting, and Allied Processes
(2) AWS Safety and Health Fact Sheets
(3) Other safety and health information on the AWS website

Material or Equipment Manufacturers:
(1) Safety Data Sheets supplied by materials manufacturers
(2) Operating Manuals supplied by equipment manufacturers

Applicable Regulatory Agencies
Work performed in accordance with this standard may involve the use of materials that have been deemed hazardous, and may involve operations or equipment that may cause injury or death. This standard does not purport to address all safety and health risks that may be encountered. The user of this standard should establish an appropriate safety program to address such risks as well as to meet applicable regulatory requirements. ANSI Z49.1 should be considered when developing the safety program.

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.

AWS Documents:¹
(1) AWS A2.4, Standard Symbols for Welding, Brazing, and Nondestructive Examination.

¹AWS documents are published by the American Welding Society, 8669 NW 36 St, #130, Miami, FL 33166.