

# **WELDING INSPECTION TECHNOLOGY**

**FIFTH EDITION—2008**

**Published by  
American Welding Society  
Education Department**



**American Welding Society**

---

Education Services

## DISCLAIMER

**The American Welding Society, Inc. assumes no responsibility for the information contained in this publication. An independent, substantiating investigation should be made prior to reliance on or use of such information.**

International Standard Book Number: 978-0-87171-579-1

American Welding Society

550 N.W. LeJeune Road, Miami, FL 33126

© 2008 by American Welding Society

All rights reserved

Printed in the United States of America

**Photocopy Rights.** No portion of this standard may be reproduced, stored in a retrieval system, or transmitted in any form, including mechanical, photocopying, recording, or otherwise, without the prior written permission of the copyright owner.

Authorization to photocopy items for internal, personal, or educational classroom use only or the internal, personal, or educational classroom use only of specific clients is granted by the American Welding Society provided that the appropriate fee is paid to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, tel: (978) 750-8400; Internet: <[www.copyright.com](http://www.copyright.com)>.

# Table of Contents

<b>Chapter</b>	<b>Title</b>	<b>Page</b>
1	Welding Inspection and Certification	1-1
2	Safe Practices for Welding Inspectors	2-1
3	Metal Joining and Cutting Processes	3-1
4	Weld Joint Geometry and Welding Symbols	4-1
5	Documents Governing Welding Inspection and Qualification	5-1
6	Metal Properties and Destructive Testing	6-1
7	Metric Practice for Welding Inspection	7-1
8	Welding Metallurgy for the Welding Inspector	8-1
9	Weld and Base Metal Discontinuities	9-1
10	Visual Inspection and Other NDE Methods and Symbols	10-1



# CHAPTER 1

# Welding Inspection and Certification

## Contents

<b>Introduction .....</b>	<b>1-2</b>
<b>Who is the Welding Inspector? .....</b>	<b>1-3</b>
<b>Important Qualities of the Welding Inspector .....</b>	<b>1-3</b>
<b>Ethical Requirements for the Welding Inspector .....</b>	<b>1-6</b>
<b>The Welding Inspector as a Communicator .....</b>	<b>1-6</b>
<b>Personnel Certification Programs .....</b>	<b>1-8</b>
<b>Key Terms and Definitions .....</b>	<b>1-11</b>

## ***Chapter 1—Welding Inspection and Certification***

### **Introduction**

In today's world there is increasing emphasis placed on the need for quality, and weld quality is an important part of the overall quality effort. This concern for product quality is due to several factors, including economics, safety, government regulations, global competition, and the use of less conservative designs. While not singularly responsible for the attainment of weld quality, the welding inspector plays a large role in any successful welding quality control program. In reality, many people participate in the creation of a quality welded product. However, the welding inspector is one of the "front line" individuals who must check to see if all of the required manufacturing steps have been completed properly.

To do this job effectively, the welding inspector must have a wide range of knowledge and skills, because it involves more than simply looking at welds. Consequently, this course is specifically designed to provide both experienced and novice welding inspectors a basic background in the more critical job aspects. This does not imply, however, that each welding inspector will use all of this information while working for a particular company. Nor does it mean that the material presented will include all of the information for every welding inspector's situation. Selection of these various topics is based on the general knowledge desirable for an individual to do general welding inspection.

The important thing to realize is that effective welding inspection involves much more than just looking at finished welds. Section 4 of AWS QC1, *Standard for AWS Certification of Welding Inspectors*, outlines the various functions of the welding inspectors. You should become familiar with these various responsibilities because the welding inspector's job is an ongoing process. A successful quality control program begins well before the first arc is struck. Therefore, the welding inspector must be familiar with many facets of the fabrication process. Before welding, the inspector will check drawings and specifications to determine such information as the configuration of the component, its specific weld quality re-

quirements, and what degree of inspection is required. This review will also show the need for any special processing during manufacturing. Once welding begins, the welding inspector may observe various processing steps to assure that they are done properly. If all these subsequent steps have been completed satisfactorily, then final inspection should simply confirm the success of those operations.

Another benefit of this course is that it has been designed to provide the welding inspector with the necessary information for the successful completion of the American Welding Society's Certified Welding Inspector (CWI) examination. The ten chapters listed below are sources for examination information. The welding inspector must have at least some knowledge in each of these areas. Typically, the information presented will simply be a review, while sometimes it may represent an introduction to a new topic.

**Chapter 1: Welding Inspection and Certification**

**Chapter 2: Safe Practices for Welding Inspectors**

**Chapter 3: Metal Joining and Cutting Processes**

**Chapter 4: Weld Joint Geometry and Welding Symbols**

**Chapter 5: Documents Governing Welding Inspection and Qualification**

**Chapter 6: Metal Properties and Destructive Testing**

**Chapter 7: Metric Practice for Welding Inspection**

**Chapter 8: Welding Metallurgy for the Welding Inspector**

**Chapter 9: Weld and Base Metal Discontinuities**

**Chapter 10: Visual Inspection and Other NDE Methods and Symbols**