

ERRATA SHEET
for
CERTIFICATION MANUAL FOR WELDING INSPECTORS
THIRD EDITION (Revised 4/94)

Since the printing of the *Certification Manual for Welding Inspectors*, Third Edition, 1993 and Revised 4/94, errant or missing data was noted as follows:

Review - Chapter 3: Note the following corrections or additions.

#1. Pages 3-8 Question 3-2 should appear as follows:

Q3-2 Of the following documents, which may be considered a “standard”?

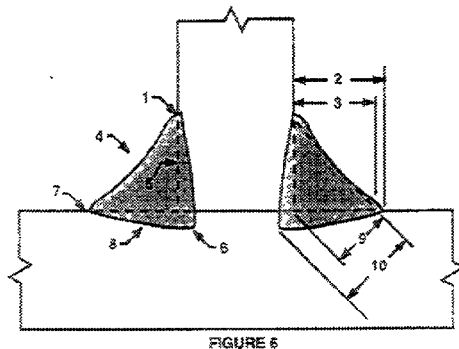
- a. codes
- b. specifications
- c. recommended practices
- d. a and b above
- e. all of the above

#2. Page C-1 - Q3-2 answer key should read:

Q3-2 e

Review - Chapter 4: Note the following corrections or additions.

#3. Pages 4-27 - 4-29 - Figure 6 should appear as follows:



#4. Page C-2 - Q5-36 answer key, should read:

Q5-36 c

Review - Chapter 7: Note the following corrections or additions.

#5. Page 7-29 - Q7-5 should read:

Q7-5 What is the percent elongation of a specimen whose original gage length was 2 inches and final gage length was 2.5 inches?

#6. Page C-2 - Q7-17 answer key should read:

Q7-17 b

#7. Page 7-34 - Q7-34 should read:

Q7-34 The head capacity of a furnace is listed as 120,000 Btu. Using the conversion factor 4.184, what is that in terms of Joules?

Review - Chapter 10: Note the following corrections or additions.

#8. Pages 10-10 and 10-11 Illustrated radiograph error:

Page 10-10 Radiograph should be for illustration page 10-11. (wagon tracks)

Page 10-11 Radiograph should be for illustration page 10-10. (tungsten inclusions)

CERTIFICATION MANUAL FOR WELDING INSPECTORS

THIRD EDITION

**Published By
American Welding Society
Education Department**



American Welding Society

CERTIFICATION MANUAL FOR WELDING INSPECTORS

THIRD EDITION

**Published By
American Welding Society
Education Department**



American Welding Society

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: 0-87171-421-3

Copyright © 1993 by American Welding Society, Miami, Florida.

Third Edition 1993

Revised 4/94

All rights reserved. No part of this book may be reproduced in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage or retrieval system, without permission in writing from the publisher.

Printed in the United States of America

PREFACE

CERTIFICATION MANUAL FOR WELDING INSPECTORS

In 1976, the American Welding Society introduced a much needed certification program specifically for those individuals who perform visual welding inspection. Shortly thereafter, the AWS Qualification and Certification Committee initiated the development of a single publication which could serve as a valid reference for those individuals interested in becoming qualified as a Certified Welding Inspector. Prior to the initial publication of *Certification Manual for Welding Inspectors* in 1977, relevant information on the subject could be found scattered among various documents such as *Welding Inspection* and *Guide to Nondestructive Testing of Welds*.

Dr. Hallock C. Campbell was selected to organize existing information on the topic in a manner that would be most helpful to those individuals who wished to become better prepared for both the certification examination as well as their jobs as welding inspectors. Dr. Campbell's ability to present this technical information in a form that inspectors of many different backgrounds could easily comprehend has made the *Certification Manual for Welding Inspectors* one of the most utilized documents on the subject. The initial printing was followed by a revised second printing in 1979, and finally a Second Edition, released in 1980. This is, I feel, adequate proof of the publication's value to the industry.

Since that time, numerous changes have occurred in both the AWS Certified Welding Inspector program and examination as well as the technology related to welding inspection. Consequently, the AWS Continuing Education Committee sought to update the information contained in the Certification Manual. Much of the information contained herein was drawn from other AWS publications, including: *Welding Inspection*, Second Edition, *Welding Inspection Technology*, AWS B1.11-88, *Guide for the Visual Inspection of Welds*, and AWS B1.10-86, *Guide for the Nondestructive Inspection of Welds*. The reader is encouraged to review these and other documents for even more detailed descriptions of much of the information contained in this new edition.

As Dr. Campbell pointed out in previous editions, welding inspectors are employed in a variety of industries. As a result, their duties will differ somewhat from one situation to the next. This Manual has been developed under the assumption that a welding inspector will be performing quality control duties of a general nature. Some inspectors, for example, may be working at a field construction site where he or she is in charge of overall welding quality. At the other extreme, in a large organization, a quality assurance department may make many of the decisions that the Manual assigns solely to the inspector. As noted by Dr. Campbell, in either case, the welding inspector will always perform a key role. The individual inspector's specific role in the quality control activity must therefore mesh with many other activities and personnel, as outlined in the pages which follow.

In this third edition, there has been an attempt to update the technical information, where appropriate. One of the areas where readers of previous editions will note changes is in the terminology used for describing various weld characteristics. There is an ongoing effort to use standard terminology when talking about welding operations and related weld characteristics. Other important changes include the addition of more illustrations and photographs to better describe much of the information. A final major change involves the questions appearing at the end of each chapter. The number of questions has been significantly increased to provide those individuals who are preparing for the CWI examination with numerous examples of the types of questions that appear on the test. To further enhance the value of the questions, they all appear in the same format (multiple choice with five options) as the questions on the CWI examination. While this is intended to specifically aid those studying for the test, it should also be beneficial to others from the standpoint of improving their comprehension of the information presented in the text.

The fourteen chapters included in previous editions have been rearranged and combined into twelve chapters, much like the AWS Course Welding Inspection Technology. It is hoped this change will result in better understanding by the reader. As with previous editions, the target audience remains the same: practical people in welding inspection, technicians, and the novice welding inspector who are not specifically interested in a highly technical and academic treatment of the topics presented. That does not mean, however, that technical topics have been omitted; only that they are presented in a manner and language that should allow for their comprehension by individuals having a moderate amount of education and experience.

I hope this presentation will prove helpful to those interested in becoming welding inspectors and eventually becoming qualified as an AWS Certified Welding Inspector. The job of welding inspector is a tremendously challenging and important one, and those seeking the CWI qualification should be commended and encouraged. My personal desire is that this Manual will assist you in reaching that goal. I wish you the best in that endeavor.

Richard L. Holdren, P.E.
July 1993

TABLE OF CONTENTS

Chapter	Title	Page
	Preface	iii
1	The Welding Inspector	1-1
2	Welding Inspector Responsibilities	2-1
3	Codes, Standards and Specifications	3-1
4	Weld Joint Geometry and Welding Terminology	4-1
5	Welding Symbols	5-1
6	Weldability, Welding Chemistry and Welding Metallurgy	6-1
7	Destructive Testing	7-1
8	Welding Procedure and Welder Qualification	8-1
9	Welding, Brazing and Cutting Processes	9-1
10	Weld and Base Metal Discontinuities	10-1
11	Nondestructive Examination Processes	11-1
12	Inspection Reports	12-1
	Appendix A - Additional Resources & References	A-1
	Appendix B - Sample Forms	B-1
	Appendix C - Answer Key	C-1
	Index	xi