

CHAPTER 1 INTRODUCTION

Section I. GENERAL

1-1. SCOPE

This training circular is published for use by personnel concerned with welding and other metal joining operations in the manufacture and maintenance of materiel.

1-2. DESCRIPTION

a. This circular contains information as outlined below:

- (1) Introduction
- (2) Safety precautions in welding operations
- (3) Print reading and welding symbols
- (4) Joint design and preparation of metals
- (5) Welding and cutting equipment
- (6) Welding techniques
- (7) Metals identification
- (8) Electrodes and filler metals
- (9) Maintenance welding operations for military equipment
- (10) Arc welding and cutting processes
- (11) Oxygen fuel gas welding processes
- (12) Special applications
- (13) Destructive and nondestructive testing

b. Appendix A contains a list of current references, including supply and technical manuals and other available publications relating to welding and cutting operations.

c. Appendix B contains procedure guides for welding.

d. Appendix C contains a troubleshooting chart.

e. Appendix D contains tables listing materials used for brazing, welding, soldering, arc cutting, and metallizing.

f. Appendix E contains miscellaneous data as to temperature ranges, melting points, and other information not contained in the narrative portion of this manual.

Section II. THEORY

1-3. GENERAL

Welding is any metal joining process wherein coalescence is produced by heating the metal to suitable temperatures, with or without the application of pressure and with or without the use of filler metals. Basic welding processes are described and illustrated in this manual. Brazing and soldering, procedures similar to welding, are also covered.

1-4. METALS

- a. Metals are divided into two classes, ferrous and nonferrous. Ferrous metals are those in the iron class and are magnetic in nature. These metals consist of iron, steel, and alloys related to them. Nonferrous metals are those that contain either no ferrous metals or very small amounts. These are generally divided into the aluminum, copper, magnesium, lead, and similar groups.
- b. Information contained in this circular covers theory and application of welding for all types of metals including recently developed alloys.