



# Guide for Multipass Orbital Machine Pipe Groove Welding



**American Welding Society**



**AWS D10.14M/D10.14:2010  
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# **Guide for Multipass Orbital Machine Pipe Groove Welding**

**1<sup>st</sup> Edition**

Prepared by the  
American Welding Society (AWS) D10 Committee on Piping and Tubing

Under the Direction of the  
AWS Technical Activities Committee

Approved by the  
AWS Board of Directors

## **Abstract**

The Standard *Guide for Multipass Orbital Machine Pipe Groove Welding*, AWS D10.14M/D10.14:2010, provides an overview of the subject. The guide presents several aspects of multipass orbital machine pipe groove welding. Among the aspects presented are: arc welding processes, pipe beveling, pipe line up and welding equipment, nondestructive examination, consumable estimation, maximum repair length, and preparation for welding. Multipass orbital machine pipe groove welding of both plant pipe welding and transmission pipe welding are discussed.



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## Foreword

This foreword is not part of AWS D10.14M/D10.14:2010, *Guide for Multipass Orbital Machine Pipe Groove Welding*, but is included for informational purposes only.

This document was created as a result of the recognized need to bring together a description of the various technologies combined in orbital multipass machine pipe groove welding. This document should be of benefit to readers wishing to familiarize themselves with the mechanized orbital pipe welding option to manual or semiautomatic pipe groove welding.

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# Guide for Multipass Orbital Machine Pipe Groove Welding

## 1. Scope

The scope of this document is multipass, orbital machine pipe groove welding of pipe by arc fusion processes with filler metal addition. The orbital machines described in this document are typically used to weld pipe in plants, such as power generation plants or chemical processing plants, and to weld transmission pipelines, both cross-country and offshore. Offshore pipeline construction includes “S-lay,” “J-lay,” and “Reel-lay.” Each of these will be described in further detail. This guide is organized into sections describing welding processes, pipe beveling, pipe line-up, weld heads, nondestructive examination, plant pipe welding, cross-country welding, “S-lay” welding, “J-lay” welding, and finally reel lay welding. The guide concludes with a brief description of methods used to estimate consumable usage, engineering critical assessments, methods to calculate maximum repair lengths, and safety.

This document excludes orbital tube welding, which is addressed by AWS D18.1, *Specification for Welding of Austenitic Stainless Steel Tube and Pipe Systems in Sanitary (Hygienic) Applications*.

This document presents an overview of multipass orbital machine pipe groove welding including the welding processes, pipe beveling equipment, pipe line-up equipment, welding equipment, and nondestructive examination equipment. This document includes the steps required to prepare for and use multipass, orbital machine pipe groove welding equipment.

The alternative to multipass orbital machine pipe groove welding is manual welding, which includes welding with a torch, gun, or electrode held and manipulated by hand. Orbital machine welding is a form of mechanized welding which offers an alternative to manual welding when the investment in mobilization and equipment costs can be offset by productivity gains. The goal of this guide is to familiarize the reader with the orbital machine alternative to manual welding.

This standard makes use of both the International System of Units and U.S. Customary Units. The latter are shown within brackets ( [ ] ) or in appropriate columns in tables and figures. The measurements may not be exact equivalents; therefore, each system must be used independently.

Safety and health issues and concerns are beyond the scope of this standard and therefore are not fully addressed herein. Safety and health information is available from other sources, including, but not limited to, ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*, AWS *Safety and Health Fact Sheets* (see Annex B) and applicable federal and state regulations.

## 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:**<sup>1</sup>

AWS A2.4, *Standard Symbols for Welding, Brazing and Nondestructive Examination*

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<sup>1</sup> AWS standards are published by the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.