

## Swagelok® Orbital Welding + ASME Section IX Qualification

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This 5-day course is designed to familiarize each participant with orbital welding principles, design standards, equipment, and welding procedures. On Day 5, each student will complete multiple weld coupons and paperwork required for ASME Section IX weld qualification testing. All ASME Section IX weld qualification testing costs are included in the class registration fee.

### Course objectives:

- Understand basic metallurgy and industry standards, and specifications for welding
- Set up and operate orbital welding equipment
- Utilize borescope for weld inspection
- Learn how to select, use, and care for tungsten electrodes
- Learn how proper gas selection and purging techniques affect weld quality
- Troubleshoot common issues
- Practice orbital weld procedures up to 1.5" tubing diameter
- Develop weld procedures and adjust the variables of the GTAW process
- Learn about weld shrinkage and how to calculate cut lengths
- Create an assembly within allowable tolerances
- Create samples to be submitted for ASME Section IX qualification

### What's included in the registration fee?

- 5 days of training
- Use of orbital weld equipment and consumables to complete all practical projects
- Student course guide
- Weld reference cards
- Certificate of course completion
- ASME Section IX weld test/qualification fees
- Lunch and snacks each day

### Day 1:

- GTAW process, history, evolution, practical theory, and weld variables

### Day 2:

- Overview of Swagelok welding system functions, setup and operations
- Introduction to the 5H fixture block; side plates, plenums, collets, adjusting alignment, and using the arc gap gage
- Using the auto-generate function to create a welding program on 1/2" x .065" SS tubing
- Define what makes an acceptable weld, how to evaluate a weld and how to generate a weld coupon
- Using the level adjustment feature on the M200 power supply
- Developing weld parameters to meet specific weld size (root width)

### Day 3:

- How to weld differential wall
- Review of Standard Operating Procedures
- Introduction to the 20H fixture block

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- Additional weld coupon exercises, 1/4" and 1/2"
- Welding larger sizes, 1" or 1 1/2", and implementation of tacking

### Day 4:

- Introduction of Micro-Fit® fixture block
- Weld shrinkage calculations
- Facing tool setup and operation
- Weld assembly within allowable tolerances
- Prep spool pieces for ASME Section IX qualification

### Day 5

- Reserved for ASME Section IX welds and paperwork
- Each student must submit 4 samples of 1/4" and 4 samples of 1/2"

### Training locations:

Swagelok Southwest Phoenix Training Center  
4926 E. Beverly Road  
Phoenix, AZ 85044

Swagelok Southwest Albuquerque Training Center  
2732 Vassar Place NE, Suite A  
Albuquerque NM 87107

### Registration fee:

\$3000 per student

### Contact for more information or to register:

Karen Polen, Training Coordinator  
(602) 268-4848  
[karen.polen@swagelok.com](mailto:karen.polen@swagelok.com)



### Swagelok Southwest

#### Phoenix Office

4926 E. Beverly Rd.  
Phoenix, AZ 85044  
(602) 268-4848

#### Albuquerque Office

2732 Vassar Place NE, Suite A  
Albuquerque, NM 87107  
(505) 842-0213