

## Registration Form:

Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Company: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_  
State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Email: \_\_\_\_\_  
Fax: \_\_\_\_\_  
Date of Seminar: \_\_\_\_\_  
Visa/MasterCard: \_\_\_\_\_  
Card #: \_\_\_\_\_  
Expiration Date: \_\_\_\_\_ Code: \_\_\_\_\_  
Signature: \_\_\_\_\_  
Purchase Order #: \_\_\_\_\_  
Check #: \_\_\_\_\_  
Shirt Size:

**Dates:** August 7th, 8th, & 9th (Appleton, WI)  
October 30th, 31st, & Nov. 1st (Appleton, WI)

**Fee:** The fee for the entire seminar is \$495.00

**Cancellations:** Cancellations will be accepted and refunds made up to 14 days prior to the seminar date. Make non-refundable airline reservations at your own risk.

**Direct Payment to:**

Miller Training Systems  
Miller Electric Mfg. Co.  
P.O. Box 1079  
Appleton, WI 54912  
Fax 920-735-4101

**Email inquiries or Registration:**

peggy.moehn@MillerWelds.com

**Fee Covers:** Coffee and doughnuts available in the lecture room at 7:30 AM. Lunch all three days. Dinner the second day of the seminar.

**Materials:** MAXAL brochure for topic reference, safety glasses use of a welding helmet and personal safety equipment.

**Completion of Seminar:** 4:00 PM on the third day

**Accommodations:** Reserved by participant in a common location.

**Transportation:** Participants will make arrangements to be available for the first day of the seminar as scheduled.



As a leading manufacturer of arc welding and cutting equipment, Miller is continually introducing new products, technology, and innovations. Together with MAXAL, manufacturer and supplier of high quality aluminum welding products, we present a seminar that combines laboratory hands-on welding with, aluminum welding technology.

**23 Professional Development Hours (PDH's) can be used for AWS Re-certification.**

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# Advanced Aluminum Welding Technology Seminar

## Theory and Practical Application



## Course Overview:

To provide professionals, active in the design and fabrication of aluminum structures, educational support in the areas of welding technology associated with designing and welding of aluminum structures. This will include a detailed evaluation of the many aluminum alloys, their characteristics and applications, metallurgical considerations, welding procedure development, welding processes, weld design, weld discontinuities, trouble shooting welding problems and quality control.



## Course Outline - Theory

### Introduction:

Industry trends  
Characteristics of aluminum  
Applications  
MAXAL's guide for aluminum  
Welding brochure

### Codes and Standards:

Review of AA and AWS publications  
Alloy & temper designation system

### Metallurgy:

History of aluminum production  
Alloy system characteristics of element additions  
Effect of alloying elements on structure  
Weld bead, fusion zone and heat affected zone

### Weld Preparation:

Metal storage considerations  
Dew point calculations  
Cutting, thermal and mechanical  
Cleaning techniques

### Welding Processes and Procedures:

#### GMAW (MIG) Welding

Feedability  
Polarity/arc cleaning  
Metal transfer modes  
Power sources

#### GTAW (TIG) Welding

Polarity  
Wave formation square wave  
Tungsten electrode selection

Take away  
every usable  
**FACT**  
about  
welding  
aluminum

### Design and Performance:

Corrosion types and performance  
Elevated temperature performance  
Strength performance/tensile and shear  
Weld joint design  
Toughness/elasticity/ductility  
Fatigue performance  
Post anodize color matching

### Filler Metal Selection:

Weld metal properties  
How to use the MAXAL filler metal selection chart  
Case studies

### Weld Discontinuities - Cause and Correction:

Weld cracking  
Porosity  
Inadequate fusion and penetration

### AWS/D1.2

#### Structural Welding Code - Aluminum:

Structural design  
Procedure qualification  
Performance qualification  
Fabrication and inspection

## Course Outline - Practical

### Welding Procedures:

Safety procedures  
WPS preparation  
Sample preparation  
Pre-weld inspection  
Welding machine set up

### Fillet Welds & Groove Welds:

Select base and filler metal  
Prepare and clean base metal  
Review and select equipment settings

Experience  
the practical  
**FEEL**  
of a  
successful  
aluminum  
weld

### Welding, Testing and Inspection:

- Create weldments
- Record settings, practice and produce samples
- Visually inspect weldments
- Perform a fillet weld fracture test inspection
- Perform a fillet weld macroetch specimen inspection
- Perform a groove weld guided bend test (Root and face bends)
- Evaluation of radiographic (X-ray) inspection