

Training

# Advanced Tube Bending Training

2-3 Day Lecture-Lab | Hands-on Bending Exercises

## Learn From An Expert

Sound tube bends are hard to achieve in any condition or setting, no matter how simple it may appear. Attempts to do without proper training may cost you expensive downtime and money. This valuable three-day course will challenge attendees with a variety of exercises designed to improve their abilities with both basic and advanced bending techniques in any situation.

This training will provide you with:

- A detailed, mathematical approach that will improve accuracy, allowing for better quality prototypes and output
- Improved system performance and enhanced aesthetic qualities of your tubing system Reduced scrap and rework time caused by inaccurate or unqualified tube bending practices
- An emphasis on operational issues, overcome through unique, hands-on learning experiences

## How Can Swagelok Training Help?

The seminar is a hands-on, lecture-lab that provides a deep dive into tube bending. Students gain practical experience using tools-of-the-trade.

Primary topics will include:

- Using the Swagelok Hand Tube Bender
- The Measure-Bend Method of Tube Bending
- The Swagelok Method of Tube Bending
- How to make both simple and custom offset bends
- Making both segmented bends and rolling offsets
- Understanding constraints of tube bending, such as minimum distances between bends
- Hands-on experience constructing a peg board

### Day 3

- How to use the Swagelok bench top tube bender (BTTB) and Electric Tube Bender (ETB)
- Additional time to complete all the types of bends and finish constructing the peg board as well as bend larger tubing using the ETB and BTTB

## Who Should Take This Seminar?

*Hands-on personnel who need to learn the art of tube bending or upgrade their skills. Engineers who design systems that include bent tubing. Supervisors of operations personnel. Quality assurance and quality control personnel.*

**Where: Swagelok Northern California**  
**3393 West Warren Ave**  
**Fremont, CA 94538**

**When: May 20-22, Tuesday-Thursday, 8am-5pm**  
**Price: 2-day (Tues-Wed) - \$1,499 per attendee**  
**3-day (Tues-Thurs) - \$2,249 per attendee**

Register at [NorthernCal.Swagelok.com/events](https://NorthernCal.Swagelok.com/events) or Scan QR Code





Learn TWO proven and trusted Bending methods: Measure-Mark-Bend and The Swagelok Master Technique



Training that Meets Your Schedule: Select 2-day OR 3-day training



Train at our leading-edge Fremont Training Center

## BENDING METHODS

### The Measure-Bend



The traditional basic way you've employed or heard about.

### The Swagelok Master Technique

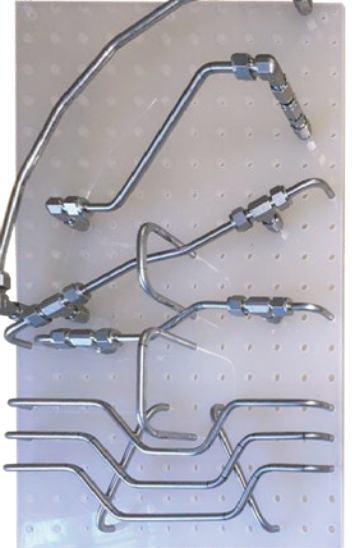
For superior accuracy and aesthetics. You'll learn how to precisely mark all the locations of all bends in a tubing run – to determine the overall length of tubing required – prior to actually making any bends.

**Best of all:** This process works for all bend angles.



## Types of bends we demonstrate, immediately followed by YOUR hands-on exercises:

- **Offsets** - Learn how to change the centerline of a tubing run.
- **Custom Offsets** - Figure out a bend angle less than 22.5° to enable you to make an offset bend.
- **Off-Plane** - For those times when bends must be rolled to a particular angle. See how to mark the tube before positioning it in the hand bender – to drastically reduce mistakes/waste.
- **Rolling Offset** - Know what to do if your tubing run is offset in the horizontal plane AND, at the same time, in the vertical plane? We can help you solve such a seemingly difficult challenge!
- **Segmented** - Have any idea how to bend a 1" tube around a 6' tank? See how to calculate equal leg lengths so you can ultimately make a 90° bend using four 22.5° bends. Yes, that certainly sounds complicated; we'll show you why it's not.



## SO, WHICH TIMEFRAME IS BEST FOR ME/MY CREW?

### 2-Day Course

Learn at an accelerated pace through challenging hands-on exercises and personal tutoring.

### 3-Day Course

Everything from our 2-Day course, learn at a comfortable pace with additional time to complete all the types of bends, finish constructing the peg board, and bend larger tubing using the bench top tube bender and electric tube bender

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# *We supply all training materials:*

*components, tube benders, tubing...*

*Students simply need to show up!*

## **all participants receive**

- Swagelok Advanced Tube Bending Workbook
- Tube Bending Fractional Data
- Measurement Worksheets
- Genuine Swagelok Certificate of Completion



### **Meet your instructor: MIKE GAGEL,**

*a 20-year Swagelok  
Company veteran and  
certified tube-bending  
master.*

## ***Graduate Testimonials:***

*"Even though I've been bending tubes for a long time, I learned plenty."*

*"I'll now be able to stop wasting time and material."*

*"I learned new – and better – ways to bend tubes."*

*"You can bet I'll make fewer mistakes when making complicated bends."*

*"Anyone who bends tubes needs to enroll in this class."*

*"I especially benefitted from the hands-on portion of this class."*

*"Highly informative and fun!"*

*"Came away feeling confident about making high-quality offset bends."*

*"Now feel I can master the rolling offsets and parallel runs that used to give me trouble."*

*"This course is ideal for Mechanics who have to make multiple tubing runs."*

*"I know now that my bending will certainly help improve the quality of our finished product."*

*"I can bend anything now."*

*"Learning the Swagelok Bending Method was the highlight for me."*

*"Being able to make more accurate measurements will mean far less wasted tubing."*

*"Any Engineer incorporating bends into a design would find this session worthwhile."*

*"Never knew the impact and importance of bend deduction and gain."*

*"Learning the calculations to bend tubing more precisely was my big takeaway."*

*"This class offers something for benders of all levels: beginners as well as experienced."*

*"I used to create so much scrap when bending...now I know I can make tubes that fit."*

*"Hearing bending theory...then putting it into practice...wonderful learning experience."*

*"Enables me to now make unassisted tubing repairs on our skids."*