

Swagelok MS-HTB-4

SWAGELOK MS-HTB-4 Hand Tube Bender

Instruction Manual

1. INTRODUCTION

The Swagelok MS-HTB-4 Hand Tube Bender is a precision tool designed for accurately bending 1/4 inch (6 mm) tubing. It is engineered to produce smooth, consistent bends with a 3/4 inch (19 mm) bend radius, minimizing tube distortion and ensuring system integrity. This manual provides essential information for the safe and effective use, setup, operation, and maintenance of your hand tube bender.

2. SAFETY INFORMATION

Always observe the following safety precautions when operating the hand tube bender:

- **Eye Protection:** Always wear appropriate eye protection (e.g., safety glasses) to guard against potential hazards from tube fragments or debris.
- **Hand Protection:** Use gloves to protect hands from sharp tube edges or pinch points during operation.
- **Secure Workpiece:** Ensure the tubing is properly secured and free from obstructions before bending.
- **Pinch Points:** Be aware of potential pinch points between the bending former, bending shoe, and handles during operation. Keep fingers clear.
- **Proper Use:** Use the tool only for its intended purpose of bending specified tubing sizes. Do not attempt to bend tubing larger than 1/4 inch OD.
- **Inspect Tool:** Before each use, inspect the bender for any signs of damage or wear. Do not use a damaged tool.

3. COMPONENTS

The Swagelok MS-HTB-4 Hand Tube Bender consists of the following key components:

- **Handles:** Ergonomically designed for comfortable grip and leverage during bending.
- **Bending Former:** The central component around which the tube is bent, defining the bend radius.
- **Bending Shoe:** Pivots to guide the tube around the bending former, preventing kinking.
- **Indexing Marks:** Markings on the bending former and shoe to assist in precise angle measurement and bend alignment.



Image: The Swagelok MS-HTB-4 Hand Tube Bender, showing its two handles, the bending former with angle markings, and the bending shoe. The handles have blue grips.

4. SETUP

Before beginning any bending operation, ensure the following:

1. **Clean Tubing:** Ensure the tubing to be bent is clean and free of burrs or debris.
2. **Verify Size:** Confirm that the tubing outer diameter (OD) is 1/4 inch (6 mm), matching the bender's specification.
3. **Inspect Bender:** Check the bender for any damage or excessive wear.

5. OPERATING INSTRUCTIONS

Follow these steps to perform a bend:

1. **Open Handles:** Fully open the bender handles to allow the bending shoe to retract.
2. **Insert Tubing:** Insert the 1/4 inch tubing into the bender, ensuring it rests firmly against the bending former and is aligned with the appropriate groove.
3. **Align Markings:** Align the desired bend location on the tubing with the '0' or starting mark on the bending former.
4. **Close Handles:** Slowly and steadily bring the handles together. The bending shoe will pivot and guide the tube around the bending former.
5. **Monitor Angle:** Observe the angle markings on the bending former as you bend. Continue bending until the desired angle is reached. For a 90-degree bend, align the bending shoe's mark with the 90-degree mark on the former.
6. **Release Bend:** Once the bend is complete, slowly open the handles to release the tension and remove the bent tubing.

Note: For accurate bends, apply steady, even pressure throughout the bending process. Avoid sudden jerks or excessive force, which can deform the tubing.

6. MAINTENANCE

Proper maintenance will extend the life and performance of your hand tube bender:

- **Cleaning:** After each use, wipe down the bender with a clean, dry cloth to remove any dirt, oil, or metal shavings.
- **Lubrication:** Periodically apply a light coat of machine oil to the pivot points and moving parts to ensure smooth operation.
- **Storage:** Store the bender in a clean, dry environment, away from corrosive materials and extreme temperatures.
- **Inspection:** Regularly inspect the bending former and shoe for wear, nicks, or damage that could affect bend quality. Replace if necessary.

7. TROUBLESHOOTING

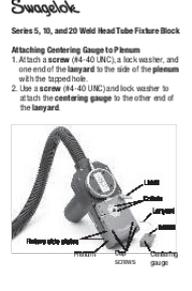
Problem	Possible Cause	Solution
Tube Kinking/Flattening	Incorrect tube size; Worn bending shoe/former; Bending too fast; Tubing material too soft.	Ensure 1/4 inch OD tubing; Inspect and replace worn parts; Bend slowly and steadily; Use appropriate tubing material for bending.
Inaccurate Bend Angle	Improper alignment of tube; Not bending to the correct mark; Spring-back of tubing material.	Ensure tube is fully seated and aligned; Bend slightly past the desired mark to compensate for spring-back; Practice on scrap tubing.
Difficulty Bending	Tubing material too hard; Lack of lubrication on bender; Damaged bender.	Verify tubing material is suitable for manual bending; Lubricate pivot points; Inspect bender for damage.

8. SPECIFICATIONS

- **Model:** MS-HTB-4
- **Manufacturer:** SWAGELOK
- **Compatible Tube OD:** 1/4 inch (6 mm)
- **Bend Radius:** 3/4 inch (19 mm)
- **Approximate Dimensions (L x W x H):** 12.09 x 4.17 x 3.07 inches (30.7 x 10.6 x 7.8 cm)
- **Approximate Weight:** 1.95 Pounds (0.88 kg)

9. WARRANTY AND SUPPORT

For information regarding product warranty, please refer to the documentation provided at the time of purchase or contact your authorized Swagelok distributor. For technical support or inquiries not covered in this manual, please reach out to Swagelok customer service or your local distributor.

	<p>Swagelok Tube Fitting Installation and Reassembly Instructions</p> <p>Comprehensive guide to installing and reassembling Swagelok tube fittings for 1 inch (25 mm) and smaller sizes, covering safe practices, gaugeability, and reassembly steps.</p>
	<p>Swagelok FK Series Medium-Pressure Tube Fittings Installation Guide</p> <p>This guide provides detailed installation instructions for Swagelok FK series medium-pressure tube fittings, covering materials such as 316 stainless steel, alloy 2507, and alloy 625. It outlines required tools, step-by-step assembly procedures, torque specifications for various sizes and materials, and gaugeability checks for proper tightening. Instructions for reassembly, cap installation, plug installation, port connectors, and tube adapters/reducers are also included.</p>
	<p>Swagelok Gaugeable Tube Fittings & Adapter Fittings Catalog Reliable Fluid System Connections</p> <p>Discover the comprehensive Swagelok catalog detailing gaugeable tube fittings and adapter fittings. Learn about advanced designs, material options, pressure ratings, and installation tools for reliable fluid system connections across diverse industries.</p>
	<p>Swagelok Tube Fittings: An Installer's Pocket Guide</p> <p>An Installer's Pocket Guide for Swagelok Tube Fittings. This comprehensive manual provides essential installation instructions, product specifications, and ordering information for Swagelok's extensive range of fluid system components, including NPT, ISO/BSP, SAE/MS, and specialized fittings. Essential for professionals in industrial fluid systems.</p>
	<p>Swagelok Tube Fittings: An Installer's Pocket Guide</p> <p>Comprehensive guide for Swagelok tube fittings, covering installation, selection, ordering, and replacement parts. Essential resource for installers and engineers.</p>
	<p>Swagelok Series 5, 10, and 20 Weld Head Tube Fixture Block Instructions</p> <p>Instructions for attaching the centering gauge to the plenum and performing alignment adjustments for Swagelok Series 5, 10, and 20 Weld Head Tube Fixture Blocks.</p>