

# Tubing Tools and Accessories



## Products

- Electric, bench top, and hand tube benders
- Tube preparation tools

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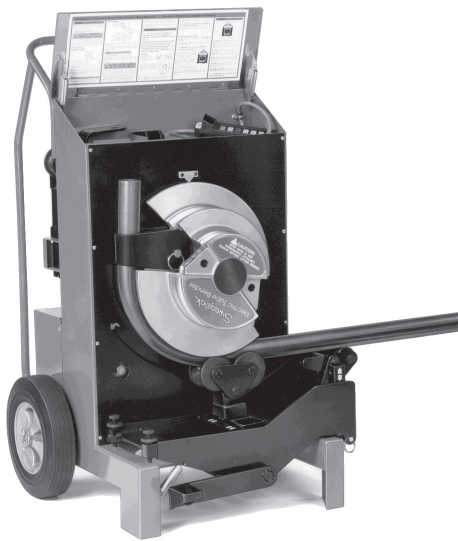
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## Tube Benders

Swagelok® benders provide high-quality bends on fractional and metric tubing made from materials that can be used with Swagelok tube fittings. These easy-to-use tube benders reduce installation time and effort as well as the potential for wrinkling or other damage to the tubing during bending.

### Electric Tube Benders



See the Swagelok *Electric Tube Bender User's Manual*, MS-13-138, for complete setup and operating instructions.

#### Features

- Electronic control
- 1 to 110° bending range
- 1 to 2 in. outside diameter (0.049 to 0.220 in. wall thickness) and 25 to 50 mm outside diameter (1.2 to 5.0 mm wall thickness) tubing range
- One bend shoe for 1, 1 1/4, 1 1/2, and 2 in. sizes
- One bend shoe for 25, 32, 38, and 50 mm sizes

#### Technical Data

- Dimensions—vertical position:  
44 in. (112 cm) high, 29 in. (74 cm) wide, 30 in. (76 cm) deep
- Weight—420 lb (191 kg)
- Power requirements  
MS-TBE-1—115 V (ac), 50/60 Hz;  
maximum current—13 A  
MS-TBE-2—230 V (ac), 50/60 Hz;  
maximum current—7 A

See **Ordering Information**, page 4.

### Tubing Data

Minimum tube length, bend radius, and wall thickness limits required to make a 90° bend in annealed tubing are listed below. Some applications require specific bend radii; consult applicable codes for bend radius requirements. See Swagelok *Tubing Data* (MS-01-107) for suggested tubing wall thickness for use with Swagelok tube fittings.

#### Fractional Tubing

Tube OD	Min Tube Length	Approx Bend Radius	Wall Thickness, Min/Max	
			Carbon Steel	Stainless Steel
Dimensions, in.				
1	20.5	4	0.049/0.120	0.065/0.120
1 1/4	22.8	5	0.065/0.180	0.083/0.156
1 1/2	25.5	6	0.083/0.220	0.095/0.188
2	32.0	8	0.095/0.220	0.109/0.188

#### Metric Tubing

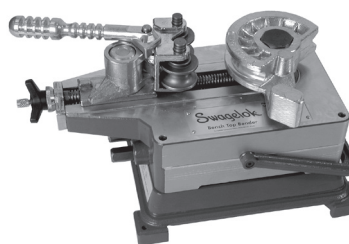
Tube OD	Min Tube Length	Approx Bend Radius	Wall Thickness, Min/Max	
			Carbon Steel	Stainless Steel
Dimensions, mm				
25	520	103	1.2/3.0	1.8/3.0
32	582	126	2.0/4.0	2.0/4.0
38	648	152	2.2/4.5	2.2/4.5
50	810	203	—	3.0/5.0

## Tube Benders

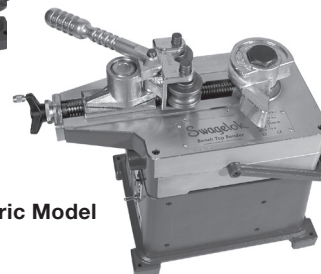
### Bench Top Tube Benders

#### Features

- Rugged, lightweight aluminum construction
- 1 to 180° bending range
- 1/4 to 1 1/4 in. outside diameter (0.028 to 0.120 in. wall thickness) and 6 to 30 mm outside diameter (0.8 to 3.0 mm wall thickness) tubing range
- Steel bend shoes required for:
  - 1 in. outside diameter tubing with greater than 0.095 in. wall thickness
  - 25 mm tubing with greater than 2.4 mm wall thickness
  - all sizes of Alloy 2507 tubing
  - all sizes of heavy-wall annealed stainless steel tubing
  - all sizes of cold-drawn 1/8-hard stainless steel seamless tubing.
  - all sizes of IPT medium and high pressure tubing.
- Includes grease gun and metal carrying case for storage
- Manual model can be operated with a 1/2 in. drill motor using optional torque clutch and support arm.
- CE compliant



Manual Model



Electric Model

#### Technical Data

- Dimensions—tube bender in case:
  - 14 1/2 in. (37 cm) high, 21 in. (53 cm) wide, 11 in. (28 cm) deep
- Weight—tube bender in case, excluding tools:
  - Manual model—75 lb (34 kg)
  - Electric model—79 lb (36 kg)
- Power requirements (electric model)
  - MS-BTB-1—110 V (ac), 50/60 Hz; maximum current—10 A
  - MS-BTB-2—230 V (ac), 50/60 Hz; maximum current—5 A

**See Ordering Information, page 4, and Options and Accessories, page 4.**

### Tubing Data

The bend radius and wall thickness limits for making a bend in annealed tubing are listed below. Some applications require specific bend radii; consult applicable codes for bend radius requirements. See *Swagelok Tubing Data* (MS-01-107) for suggested tubing wall thickness for use with Swagelok tube fittings.

#### Fractional Tubing

Tube OD	Approx Bend Radius	Wall Thickness, Min/Max				IPT Series Tubing	
		Carbon Steel	Stainless Steel	Heavy-Wall Annealed SS	Cold Drawn 1/8 Hard SS	Medium Pressure SS	High Pressure SS
Dimensions, in.							
1/4	1.42	0.028/0.065		0.065/0.095	0.028/0.065	0.071	0.084
3/8		0.035/0.065	0.035/0.083	0.083/0.134	0.035/0.083	—	—
1/2		0.035/0.083		0.083/0.188	0.049/0.109	—	—
5/8	1.81	0.035/0.095	0.049/0.095	—	—	—	—
1/2	2.20	0.035/0.065		—	—	—	—
3/8		0.035/0.065	0.035/0.083	0.083/0.134	0.035/0.083	0.086	0.125
3/4		0.049/0.109		—	—	—	—
7/8	2.64	0.049/0.109		—	—	—	—
9/16	3.23	—	—	—	—	0.125	0.187
1		0.049/0.120	0.065/0.120	—	—	—	—
1 1/4	4.41	0.065/0.120	0.083/0.120	—	—	—	—

#### Metric Tubing

Tube OD	Approx Bend Radius	Wall Thickness, Min/ Max	
		Carbon Steel	Stainless Steel
Dimensions, mm			
6	36	0.8/1.2	
10		1.0/1.5	
12		1.0/2.2	1.0/2.0
15	46	1.0/2.2	
16		1.0/2.5	1.0/2.2
18	55	1.2/2.5	
20	67	1.2/2.8	
22	67	1.2/2.8	
25	82	1.2/3.0	1.8/3.0
28	112	1.8/3.0	
30		2.0/3.0	

See the *Swagelok Bench Top Tube Bender User's Manual*, MS-13-145, for complete setup and operating instructions.

## Tube Benders

### Ordering Information, Electric and Bench Top Tube Benders









1. Select a basic ordering number.

Bender Type	Basic Ordering Number
<b>Electric<sup>①</sup></b>	
115 V (ac)	MS-TBE-1-
230 V (ac)	MS-TBE-2-
<b>Bench Top</b>	
Manual	MS-BTB-M-
Electric—110 V (ac)	MS-BTB-1-
Electric—230 V (ac)	MS-BTB-2-

<sup>①</sup> Not available in European Union or China.

Example: **MS-BTB-1-**

2. Add a power cord designator (electric models).

Region	Voltage	Plug Type	Designator
Australia, China, New Zealand	230 V 50/60 Hz	AS 3112 	8
Continental Europe, Korea	230 V 50/60 Hz	CEE 7/7 	7
Japan, Taiwan	100/115 V 50/60 Hz	NEMA 5-15 	3
	200/230 V 50/60 Hz	NEMA L6-20 	4
North America	115 V 50/60 Hz	NEMA 5-15 	1
	230 V 50/60 Hz	NEMA 6-15 	2
United Kingdom	115 V 50/60 Hz	IEC 309 	5
	230 V 50/60 Hz	BS 1363 	6

Example: **MS-BTB-1-1**

3. Add a user's manual language designator.

Language	Designator
Chinese (simplified)	-C
English	-E
French	-F
German	-G
Japanese	-J
Spanish	-S

Example: **MS-BTB-1-1-E**

4. Add a tool kit designator.

Tool Kit	Designator
<b>Electric<sup>①</sup></b>	
Fractional bend shoe, roller towers, and tube clamps (1, 1 1/4, 1 1/2, and 2 in.)	-FKIT
Metric bend shoe, roller towers, and tube clamps (25, 32, 38, and 50 mm)	-MKIT
<b>Bench Top</b>	
Aluminum fractional bend shoes and steel rollers (1/2, 5/8, 3/4, 7/8, and 1 in.)	-FKIT
Aluminum metric bend shoes and steel rollers (12, 16, 18, 20, 22, and 25 mm)	-MKIT

<sup>①</sup> Not available in European Union or China.

Example: **MS-BTB-1-1-E-FKIT**

### Bench Top Tube Bender Kits

To substitute a steel bend shoe for a 1 in. or 25 mm aluminum bend shoe, add **-S16** to the fractional kit ordering number or **-S25M** to the metric kit ordering number.

Example: **MS-BTB-1-1-E-FKIT-S16**

Kits contain tooling for the tubing sizes listed in the table above *only*. Individual tool kits with aluminum or steel bend shoes for 1/4 in., 6 mm, and 10 mm tubing must be ordered separately; see **Options and Accessories, Bench Top Tube Benders**, below.

### Options and Accessories, Bench Top Tube Benders

- Individual tool kits with aluminum or steel bend shoes are available for all tubing sizes listed in the tables below and must be ordered to obtain tooling for 1/4 in., 6 mm, and 10 mm tubing. Steel bend shoes are required for select tubing, as listed on page 3.

Kits contain bend shoe, guide, and roller.

To order, replace **XX** with a size designator from the tables below.

Fractional Size, in.	Size Designator
1/4	4
3/8	6
1/2	8
9/16	9
5/8	10
3/4	12
7/8	14
1	16
1 1/4	20

Individual Tool Kit	Basic Ordering Number
Aluminum	MS-BTT-K-XX <sup>①</sup>
Steel	MS-BTT-K-SXX

<sup>①</sup> Not available in 1 1/4 in., 28 mm, and 30 mm sizes.

Metric Size, mm	Size Designator
6	6M
10	10M
12	12M
14	14M
15	15M
16	16M
18	18M
20	20M
22	22M
25	25M
28	28M
30	30M

## Tube Benders

Example: MS-BTT-K-4

- The tripod provides portable support for the tube bender.  
Ordering number: **MS-BTB-A-TP**
- The torque clutch and support arm kit allows the manual model to be operated with a 1/2 in. drill motor.  
Ordering number: **MS-BTB-A-TCSA**
- The foot pedal can be used in place of the toggle switch to operate the electric model.  
Ordering number: **MS-BTB-A-FS**

See the Swagelok *Bench Top Tube Bender User's Manual*, MS-13-145, for additional accessories.

### Heavy-Duty Shipping Case

The upgraded, rugged plastic custom shipping case provides maximum protection of the manual or electric bench top tube bender during transport and enhances portability with an extendable handle and wheels. The case can also accommodate an aluminum fractional or metric tool kit.

Case dimensions, with handles folded and retracted:

30.5 H by 20.5 W by 15.5 D in.  
approx (77.5 by 52.1 by 39.4 cm approx)

Ordering number:  
**MS-BTB-CASE-SHIP**



## Hand Tube Benders

Swagelok hand tube benders provide consistent, high-quality bends in tubing made from materials that can be used with Swagelok tube fittings.



### Features

- The hand tube bender is available in 1/8, 1/4, 5/16, 3/8, and 1/2 in., as well as 3, 6, 8, 10, and 12 mm tubing sizes.
- Clevis handle design provides enhanced leverage for bends greater than 90°.
- Roll dies reduce bending force and tube ovality, as compared to conventional slide block design.
- 1 to 180° bending range.

**The hand tube bender cannot be used for Alloy 2507 tubing over 1/4 in. or for medium-pressure tubing.**

See the Swagelok *Hand Tube Bender Manual*, MS-13-43, for more information.

### Tubing Data

See **Ordering Information**, below, for bend radius data. Some applications require specific bend radii; consult applicable codes for bend radius requirements. See Swagelok *Tubing Data* (MS-01-107) for suggested tubing wall thickness for use with Swagelok tube fittings.

### Ordering Information

Tube OD	Bend Radius	Ordering Number
Dimensions, in.		
1/8	0.56	MS-HTB-2
1/4	0.56	MS-HTB-4T
1/4	0.75	MS-HTB-4
5/16	0.94	MS-HTB-5
3/8	0.94	MS-HTB-6T
1/2	1.50	MS-HTB-8
Dimensions, mm		
3	15	MS-HTB-3M
6	15	MS-HTB-6M
8	24	MS-HTB-8M
10	24	MS-HTB-10M
12	38	MS-HTB-12M

## Tube Preparation Tools

### Tube Cutter

The Swagelok tube cutter cuts stainless steel, soft copper, and aluminum tubing from 3/16 to 1 in. and 6 to 25 mm outside diameter.

#### Features

- Flare-out and work hardening of tube end is reduced.
- Knobs on handle are spaced in 1/8-turn increments to provide easy reference when advancing cutter wheel.



Ordering Number:

**MS-TC-308**

Replacement Cutting  
Wheel Ordering  
Number:

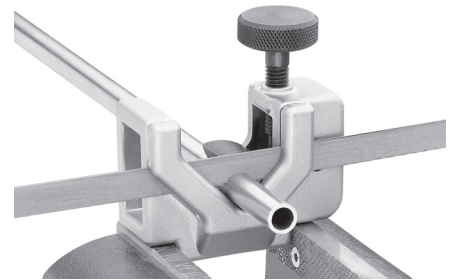
**MS-TCW-308**

### Tube Sawing Guide

The tube sawing guide holds tubing to enable fast, accurate cutting with a hacksaw. The guide helps reduce tubing preparation time, thereby speeding system assembly.

#### Features

- Specially designed clamp holds tubing accurately, without distorting or scratching the tube surface.
- Precision guides easily position blade for all cuts.
- Recess under guide plates provides blade clearance at end of stroke.
- Retractable spring-loaded clamp allows tubing to be inserted easily.
- Guide accepts tubing sizes from 3/16 to 1 in. and 4 to 25 mm outside diameter.
- Design permits easy mounting in vise.



Ordering Number:

**MS-TSG-16**

### Tube Deburring Tools

After use of the tube cutter or tube sawing guide, Swagelok deburring tools deburr stainless steel, steel, and hard alloy tube ends.

#### Features

- For deburring the inside and outside diameters of 3/16 to 1 1/2 in. and 4 to 38 mm tubing
- Steel blades for long life
- Rugged, heavy-duty die-cast housing



Ordering Number:

**MS-TDT-24**

For deburring the inside diameter of 1/4, 3/8, and 9/16 in. stainless steel tubing.



Ordering Number: **MS-44CT-27**

### Tube Gripper Pad

The Swagelok tube gripper pad allows users to hold tubing with a firm, secure grip while using the tube cutter or tube deburring tool.







## About this document

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### Safe Product Selection

**When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.**

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