

Tubing Tools and Accessories



Products

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

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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



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

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. Refer to *Tubing Data* catalog, 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

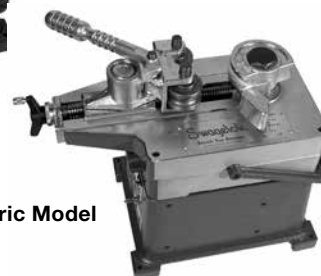
Bench Top Tube Benders

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. Refer to Swagelok *Tubing Data* catalog, 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 ^①	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	—	—	—	—

① 9/16 in. bend shoe is steel and for use with IPT tubing only.

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

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	

Tube Benders

Ordering Information, Electric and Bench Top Tube Benders









1. Select a basic ordering number.

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

^① 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
Electric^①	
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
Bench Top	
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

^① 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. These are the only sizes permitted to be changed to steel in these kits.

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

-FKIT and -MKIT kits contain tooling for the tubing sizes listed in the table above *only*. Tooling for 1 1/4 in., 28 mm, and 30 mm must be ordered separately and is only offered in steel. Individual tool kits with aluminum or steel bend shoes for 1/4 in., 3/8 in., 6 mm, and 10 mm tubing must be ordered separately; see **Options and Accessories, Bench Top Tube Benders**, page 5.

Tube Benders

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., 3/8 in., 6 mm, and 10 mm tubing. Steel bend shoes are required for select tubing, as listed on page 3.

Individual Tool Kit	Basic Ordering Number
Aluminum	MS-BTT-K-XX ^①
Steel	MS-BTT-K-SXX

^① Not available in 1 1/4 in., 28 mm, and 30 mm sizes.

Kits contain 1 bend shoe, 1 guide roller, and 1 deformation roller.

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

Example: MS-BTT-K-4

Fractional Size, in.	Size Designator
1/4	4
3/8	6
1/2	8
9/16 ^①	9
5/8	10
3/4	12
7/8	14
1	16
1 1/4	S20 ^②

^① 9/16 in. bend shoe is steel and for use with IPT tubing only.

^② Available only in steel.

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	S28M ^①
30	S30M ^①

^① Available only in steel.

To order a complete aluminum fractional kit (1/2 in., 5/8 in., 3/4 in., 7/8 in., and 1 in.) use ordering number MS-BTT-K-F-CASE. For a metric kit (12 mm, 16 mm, 18 mm, 20 mm, 22 mm, and 25 mm) use ordering number MS-BTT-K-M-CASE. These kits are only available in aluminum and contains the bend shoes, all rollers, and a carrying case. We do not offer kits in steel.

- 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**

Refer to *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.

Refer to *Hand Tube Bender Manual*, MS-13-43, for additional information.

Tubing Data

See **Ordering Information**, below, for bend radius data. Some applications require specific bend radii; consult applicable codes for bend radius requirements. Refer to *Tubing Data* catalog, 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:

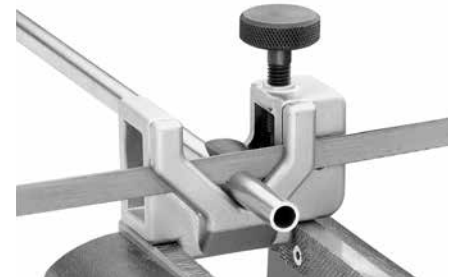
MS-TCW-308

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. Contact your authorized Swagelok sales and service representative for more information.



Introduction

Since 1947, Swagelok has designed, developed, and manufactured high-quality, general-purpose and specialty fluid system products to meet the evolving needs of global industries. Our focus is on understanding our customers' needs, finding timely solutions, and adding value with our products and services.

We are pleased to provide this global edition of the book-bound *Swagelok Product Catalog*, which compiles more than 100 separate product catalogs, technical bulletins, and reference documents into one convenient, easy-to-use volume. Each product catalog is up to date at the time of printing, with its revision number shown on the last page of the individual catalog. Subsequent revisions will supersede the printed version and will be posted on the Swagelok website and in the Swagelok electronic Desktop Technical Reference (eDTR) tool.

For more information, visit your Swagelok website or contact your authorized Swagelok sales and service representative.

Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit swagelok.com or contact your authorized Swagelok representative.

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.

WARNING

Do not mix/interchange Swagelok products or components not governed by industrial design standards, including Swagelok tube fitting end connections, with those of other manufacturers.

Not all trademarks listed below apply to this catalog.
Swagelok, Cajon, Ferrule-Pak, Goop, Hinging-Collecting, IGC, Kenmac, Micro-Fit, Nupro, Snoop, Sno-Trik, SWAK, VCO, VCR, Ultra-Torr, Whitey—TM Swagelok Company
15-7 PH—TM AK Steel Corp.
AccuTrak, Beacon, Westlock—TM Tyco International Services
Atlas—TM Asahi Glass Co., Ltd.
ASCO, El-O-Matic—TM Emerson
AutoCAD—TM Autodesk, Inc.
CSA—TM Canadian Standards Association
Crastin, DuPont, Kalrez, Krytox, Teflon, Viton—TM E.I. duPont Nemours and Company
DeviceNet—TM ODVA
Dyneon, Elgiloy, TFM—TM Dyneon
Elgiloy—TM Elgiloy Specialty Metals
FM—TM FM Global
Grafoil—TM GrafTech International Holdings, Inc.
Honeywell, MICRO SWITCH—TM Honeywell
MAC—TM MAC Valves
Microsoft, Windows—TM Microsoft Corp.
NACE—TM NACE International
PH 15-7 Mo, 17-7 PH—TM AK Steel Corp
picofast—Hans Turck KG
Pillar—TM Nippon Pillar Packing Company, Ltd.
Raychem—TM Tyco Electronics Corp.
Sandvik, SAF 2507—TM Sandvik AB
Simriz—TM Freudenberg-NOK
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