



Equipment



The Fitting Authority

 <p>Benders</p>	<p>Hand Tube Benders</p>  <p>S4 – S5</p>	<p>Adjustable Handle Hand Benders</p>  <p>S4</p>	<p>Ratchet Hand Tube Bender</p>  <p>S4</p>	<p>1" Hand Tube Bender</p>  <p>S5</p>	<p>BV06/12 Combined Tube Bending & Cutting Tool</p>  <p>S6</p>
<p>BV06/18, BV20/25 Tube Bending Tools</p>  <p>S6</p>	<p>BVP06/181 Tube Bending Tool</p>  <p>S6</p>	<p>Bender Capacity Guides</p>  <p>S7</p>	<p>Exactol Benders 412 & 424</p>  <p>S8 – S11</p>	<p>HB632 Hydraulic Bender</p>  <p>S12 – S16</p>	<p>Mandrel Bending Components</p>  <p>S16 – S18</p>
<p>CP432 Tube and Pipe Bender Kit</p>  <p>S19</p>	 <p>Brazing Equipment</p>	<p>Braze Flux</p>  <p>S21</p>	<p>Post Braze Cleaner</p>  <p>S21</p>	 <p>Cutting & Deburring Tools</p>	<p>Kloskut Medium (Sizes 2 to 18)</p>  <p>S22</p>
<p>Kloskut Large (Sizes 12 to 32)</p>  <p>S22</p>	<p>Tru-Kut Sawing Vise (Sizes 3-32)</p>  <p>S22</p>	<p>Cut-Off Saw 974250</p>  <p>S22</p>	<p>In-Ex Deburring Tool (Sizes 2-26)</p>  <p>S23</p>	<p>Power Deburr Tool</p>  <p>S23</p>	
 <p>Flanging Tools</p>	<p>Parflange 1050</p>  <p>S24</p>	<p>Parflange 1025</p>  <p>S25</p>	<p>Flanging Pin and Die Sets</p>  <p>S25</p>	 <p>Flaring Tools</p>	<p>210A Combination Tool (Sizes 2 to 10)</p>  <p>S28</p>
<p>Vise Block and Flaring Pin (Sizes 4 to 24 and 6-38mm)</p>  <p>S27-S28</p>	<p>Rolo-Flair Rotary, Manual (Sizes 2 to 12)</p>  <p>S28</p>	<p>Hydra-Tool Hydraulic Flaring & Pre-Setting Tool</p>  <p>S29 – S31</p>	<p>Karryflare</p>  <p>S32</p>	<p>Flaring Tooling for Parflange</p>  <p>S33</p>	
 <p>Porting Tools</p>	<p>Straight Thread Port Tap (Sizes 2 to 32)</p>  <p>S34</p>	<p>SAE Straight Thread Port Counterbore (Sizes 2 to 32)</p>  <p>S34</p>	<p>BSPP Counterbores</p>  <p>S35</p>	<p>BSPP/BSPT Taps</p>  <p>S35</p>	<p>NPTF Taps</p>  <p>S36</p>
<p>ISO 6149-1 Port Tap</p>  <p>S36</p>	<p>ISO 6149-1 Port Counterbore</p>  <p>S36</p>	<p>ISO 6149-1 Port Counterbore with ID Groove</p>  <p>S36</p>	 <p>Pre-Setting Tools</p>	<p>Ferulset Ferrule Pre-Setter (Sizes 2 to 32)</p>  <p>S38</p>	<p>VOMO Pre-Assembly Bodies</p>  <p>S39</p>

Hyferset Ferrule Pre-Setter (Sizes 4 to 32)  S40	Hydra-Tool  S43	Pre-Setting Tooling for Hydra-Tool  S43-S44	EO-Karrymat  S45	EOMAT III  S47	
O-Ring Assembly Tools	O-Ring Pick  S48	Captive O-Ring Installation Tool  S48	Sealants, Lubricants, & Cleaners	LB 2000 & MPG-2  S49	STP  S49
EO Lubricants  S49	Loctite Anti-Seize Lubricant  S49	Super-Lube PTFE Grease  S50	Loctite Penetrating Oil  S50	O-Lube  S50	Super O-Lube  S50
Threadmate  S51	Loctite Thread Sealant 567  S51	Loctite Thread Sealant 545  S51	Pipe Sealing Cord  S52	PTFE Tape  S52	Loctite 7649 Primer N  S52
Loctite Threadlocker 242  S52	Loctite Threadlocker 271  S53	Loctite Fast Orange Hand Cleaner  S53	Loctite Natural Blue Degreaser  S53	Loctite Parts Cleaner  S54	Loctite Rack  S54
Tube Preparation Centers	Modular Preparation Centers  S55	Thread Identification	Thread Identification Kit  S56	Portboards  S56	ITK International Thread Kit  S56
Wrenches	Par-Lok Wrenches  S57 – S58	Weights	Tube Fabricating Equipment Weight Chart S59 – S60		

Hand Tube Benders – Inch

These are sturdy, easy-to-use hand tools for fast and accurate bending without kinks or visible flattening. Twelve individual sizes from -2 (1/8" O.D.) to -16 (1" O.D.) are available.

Medium Duty Inch Hand Tube Benders

Designed and built for fast, accurate bends and long service life.

These are individual benders for eight inch tube sizes (1/8", 3/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4"). All of these benders will bend copper, aluminum, annealed steel and stainless steel. These can be used in hands or mounted in a bench vise.

HOW TO USE: Simply align marks of the pressure arm and radius block, then bend to the desired angle (up to 180°) by pulling steadily on the slide block handle. Bend angles are indicated on the radius block, both front and back. (Detailed instructions are included with each bender.) See the table below for technical data and part numbers.

Size	Tube O.D. (in.)	Radius to Tube Centerline (in.)	Min. Wall Without Flattening (in.)	Recommended Max. Wall Thickness		Part No.
				Copper, Aluminum (in.)	Steel, Stainless Steel (in.)	
2	1/8	7/16	0.012	Any	0.032.....	2-2829S
3	3/16	9/16	0.020	Any	0.032.....	3-2829S
4	1/4	9/16	0.028	Any	0.083.....	4-2829S
5	5/16	15/16	0.032	Any	0.083.....	5-2829S
6	3/8	15/16	0.032	Any	0.083.....	6-2829S
8	1/2	1 1/2	0.042	Any	0.083.....	8-2829S
10	5/8	3	0.042	Any	0.049.....	10-2829S
12	3/4	3 3/4	0.049	Any	0.065.....	12-2829S



Fig. S1 — Medium Duty Inch Hand Tube Bender

Ratchet Hand Tube Benders

These are individual benders for three tube sizes, 5/8", 3/4" and 7/8", in copper, aluminum, annealed steel and stainless steel. They can be used in hands or mounted in a bench vise.

HOW TO USE: Position the tube in the bender, close the latch and pull the ratchet handle away from radius block handle until the desired angle (up to 180°) is formed. Bend angles are indicated on the radius block. (Detailed instructions are included with each bender.) See the table below for technical data and part numbers.

Size	Tube O.D. (in.)	Radius to Tube Centerline (in.)	Min. Wall Without Flattening (in.)	Recommended Max. Wall Thickness		Part No.
				Copper, Aluminum (in.)	Steel, Stainless Steel (in.)	
10	5/8	3	0.042	Any	0.049.....	10-2829
12	3/4	3 3/4	0.049	Any	0.065.....	12-2829
14	7/8	3 3/4	0.049	Any	0.065.....	14-2829



Fig. S2 — Ratchet Hand Tube Bender

Adjustable Handle Hand Benders

These are individual benders for three tube sizes (1/4", 3/8", 1/2"). All of these benders can form accurate bends up to 180° in aluminum, copper, steel & stainless steel materials.* These benders include rollers in the bending handle to reduce effort required for bending and they can be mounted in a bench vice.

HOW TO USE: Simply align marks on the slide block end of the pressure arm and radius block, then bend to the desired angle. For angles greater than 90°, the adjust-



Fig. S3 — Adjustable Handle Hand Benders

Dimensions and pressures for reference only, subject to change.

able handle can be used for reduced hand interference that occurs at the end of the bending operation.

*Refer to max. wall/min. wall recommendations specified for medium duty inch benders.

Size	Tube O.D. (in.)	Radius to Tube Centerline (in.)	Min. Wall Without Flattening (in.)	Recommended Max. Wall Thickness		Part No.
				Copper, Aluminum (in.)	Steel, Stainless Steel (in.)	
4	1/4	9/16	0.028	Any	0.083	4-2829AH
6	3/8	5/16	0.032	Any	0.083	6-2829AH
8	1/2	1 1/2	0.042	Any	0.083	8-2829AH

1" Hand Tube Bender

Part No. 16-2829

For 1" O.D. tube in soft copper and aluminum materials. This bender can be used in hands, but mounting in a bench vise is suggested, especially for heavier wall thickness tube.

HOW TO USE: Align marks and bend the tube to the desired angle (up to 180°) by pulling steadily on the operating handle. The handle may be re-positioned for maximum leverage. Bend angles are indicated on the radius block. (Detailed instructions are included with the bender.) See the table below for technical data and part numbers.

Size	Tube O.D. (in.)	Radius to Tube Centerline (in.)	Min. Wall Without Flattening (in.)	Recommended Max. Wall Thickness		Part No.
				Copper, Aluminum (in.)	Steel, Stainless Steel (in.)	
16	1	3 1/2	0.065	Any	Not Recommended	16-2829



Fig. S4 — 1" Hand Tube Bender

Hand Tube Benders – Metric

These are sturdy, easy-to-use hand tools for fast and accurate bending without kinks or visible flattening. Individual sizes in ten models from size 5mm to 25mm are available.

Medium Duty Metric Hand Tube Benders

Designed and built for fast, accurate bends and long service life.

These are individual benders for six metric tube sizes (5mm, 6mm, 8mm, 10mm, 12mm and 14mm). All of these benders will bend copper, aluminum, annealed steel and stainless steel. These can be used in hands or mounted in a bench vise.

HOW TO USE: Simply align the marks on the slide block and radius block, then bend to the desired angle (up to 180°) by pulling steadily on the slide block handle. Bend angles are indicated on the radius block, both front and back. (Detailed instructions are included with each bender.) See the table below for technical data and part numbers.

Tube O.D. (mm)	Radius to Tube Centerline (mm)	Min. Tube Wall Thickness (mm)	Recommended Max. Wall Thickness		Part No.
			Copper, Aluminum (mm)	Steel, Stainless Steel (mm)	
5	14.3	0.5	Any	1.0.....	2829-5mm
6	14.3	1.0	Any	1.5.....	2829-6mm
8	23.8	1.0	Any	1.5.....	2829-8mm
10	23.8	1.0	Any	2.0.....	2829-10mm
12	38.1	1.0	Any	2.0.....	2829-12mm
14	38.1	1.0	Any	2.0.....	2829-14mm

Dimensions and pressures for reference only, subject to change.



Fig. S5 — Medium Duty Metric Hand Tube Bender

Bench Mount Metric Hand Bender and Cutting Guide

This bender combines a tube cutting guide with the bender for sizes 6mm, 8mm, 10mm, and 12mm. There are three bender rollers that cover all sizes. The bender mounts easily to a work bench or table.

Part Description

Bench Mount Tube Bender (6mm, 8mm, 10mm, 12mm).....

Part No.

BAV06/12KPLX

Vise Mount Metric Hand Benders

Vise Mount Metric Bender – 6/18mm

This bender has six interchangeable rollers to cover tube sizes 6mm, 8mm, 10mm, 12mm, 14mm, 15mm, 16mm, and 18mm.

Part Description

Vise Mount Tube Bender

(6mm, 8mm, 10mm, 12mm, 14mm, 15mm, 16mm, 18mm) **BV06/18KPLX**

Part No.

Tube O.D. (mm)	Bend Radius (mm)	Max. Wall Thickness (mm)
6	33	2.5
8	34	2.5
10	36	2.5
12	37	2.5
14	37	2.0
15	44	2.0
16	44	2.0
18	52	2.0

Vise Mount Metric Bender – 20/25mm

This bender has three interchangeable rollers to cover tube sizes 20mm, 22mm, and 25mm. All bend radii are 86.5mm. Pressure arm is not included with the BV20/25KPLX, however it can be manufactured on site with a piece of tube, or it can be ordered separately with part number BV20/2510X. Maximum wall thickness for all sizes is 2.0mm.

Part Description

Vise Mount Tube Bender (20mm, 22mm, 25mm)

Part No.

BV20/25KPLX

Pressure Arm

BV20/2510X

Programmable Vise Mount Metric Bender – 6/18mm

This bender has 6 interchangeable rollers which cover tube sizes 6mm, 8mm, 10mm, 12mm, 14mm, 15mm, 16mm, and 18mm. Also standard with the bender is the program rail, guide rail and dimension rail in either one or two meter lengths. The BVP can be manually programmed to offer repeatability of bends. For bend radii and maximum wall thickness, see [BV06/18KPLX](#) above.

Part Description

Programmable Vise Mount Tube Bender

(6mm, 8mm, 10mm, 12mm, 14mm, 15mm, 16mm, 18mm) **BVP06/181**

Part No.



Fig. S6 — BAV06/12KPLX



Fig. S7 — BV06/18KPLX



Fig. S8 — BV20/25KPLX



Fig. S9 — BVP 06/181

Dimensions and pressures for reference only, subject to change.

Hand Crank & Hydraulic Tube Bender Capacity Guides

All benders listed in Tables S1 through S3 are capable of bending 1/2" O.D. and under fully annealed steel and stainless steel tube with no limit on wall thickness. For HARD copper and HIGH STRENGTH aluminum, use the wall thickness shown for stainless steel. Observe that VERY HARD materials may not be ductile enough to bend without fracture.

Inch Tube Sizes

Tube O.D.	Material	Tube Wall Thickness (in.)											
		0.035	0.049	0.058	0.065	0.072	0.083	0.095	0.109	0.120	0.134	0.156	0.188
		Bender Code*											
3/4"	S	ABCD	ABCD	ABCD	ABCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD
	SS	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD
1"	S	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD
	SS	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	BCD	CD	CD
1 1/4"	S	BCD	BCD	BCD	BCD	BCD	BCD	CD	CD	CD	CD	CD	CD
	SS	BCD	BCD	BCD	BCD	BCD	CD	CD	CD	CD	CD	C	C
1 1/2"	S	BCD	BCD	BCD	BCD	BCD	CD	CD	CD	CD	CD	CD	CD
	SS	BCD	BCD	CD	CD	CD	CD	CD	CD	CD	CD	C	C
2"	S	CD	CD	CD	CD	CD	CD	CD	CD	CD	CD	CD	CD
	SS	CD	CD	CD	CD	CD	CD	CD	CD	CD	CD	—	—

Table S1 — Hand Crank and Hydraulic Tube Benders Maximum Capacity Guide – Inch Sizes

Inch Pipe Sizes

Pipe Size	Material	Inch Pipe Schedule (IPS)	
		40	80
		Bender Code*	
1/2"	S	CD	CD
	SS	CD	CD
3/4"	S	CD	CD
	SS	CD	CD
1"	S	CD	CD
	SS	CD	CD
1 1/4"	S	CD	CD
	SS	CD	CD
1 1/2"	S	CD	CD
	SS	CD	CD
2"	S	D	D
	SS	D	—

Table S2 — Hand Crank and Hydraulic Benders Maximum Capacity Guide – Inch Pipe Sizes

Metric Tube Sizes

Tube O.D. (mm)	Material	Tube Wall Thickness (mm)							
		1.5	2	2.5	3	3.5	4	5	
		Bender Code*							
18	S	ABCD	ABCD	ABCD	ABCD	BCD	BCD	CD	
	SS	BCD	BCD	BCD	BCD	BCD	BCD	CD	
20	S	ABCD	ABCD	ABCD	BCD	BCD	BCD	CD	
	SS	BCD	BCD	BCD	BCD	BCD	BCD	CD	
22	S	BCD	BCD	BCD	BCD	BCD	BCD	CD	
	SS	BCD	BCD	BCD	BCD	BCD	BCD	CD	
25	S	BCD	BCD	BCD	BCD	BCD	CD	CD	
	SS	BCD	BCD	BCD	BCD	CD	CD	CD	
28	S	BCD	BCD	BCD	BCD	CD	CD	CD	
	SS	BCD	BCD	CD	CD	CD	CD	CD	
30	S	BCD	BCD	BCD	BCD	CD	CD	CD	
	SS	BCD	BCD	CD	CD	CD	CD	CD	
32	S	BCD	BCD	CD	CD	CD	CD	CD	
	SS	BCD	BCD	CD	CD	CD	CD	CD	
35	S	BCD	CD	CD	CD	CD	CD	CD	
	SS	BCD	CD	CD	CD	CD	CD	CD	
38	S	BCD	CD	CD	CD	CD	CD	CD	
	SS	CD	CD	CD	CD	CD	CD	CD	
42	S	CD	CD	CD	CD	CD	CD	CD	
	SS	CD	CD	CD	CD	CD	CD	—	
50	S	CD	CD	CD	CD	CD	CD	—	
	SS	CD	CD	CD	CD	CD	—	—	

Table S3 — Hand Crank and Hydraulic Tube Benders Maximum Capacity Guide – Metric Tube Sizes

*Codes:

- (A) Model 412 — Tube (1/4" thru 3/4" and 6mm thru 20mm) — Worm & Gear
- (B) Model 424 — Tube (1/4" thru 1 1/2" and 6mm thru 38mm) — Worm & Gear
- (C) Model HB632 — Tubeg (3/8" thru 2" and 10mm thru 50mm) — Hydraulic
- (D) Model CP432 — Tube (1/4" thru 2") — Hydraulic

Dimensions and pressures for reference only, subject to change.

Exactol® Crank-Operated Benders

Models 412/424

These portable benders are vise or bench mountable for easy action and fast accurate bending to 180°. Two models are available to bend tube sizes 4 (1/4") through 24 (1 1/2"). Exactol benders are designed with a worm-gear drive with a 60 to 1 gear ratio to allow accurate bending with minimum effort. They bend aluminum, copper, annealed steel and annealed stainless steel without kinks or wrinkles. Easy crank operation permits continuous production without excessive operator fatigue; for use in tube fabrication shops, in the field, or in factory maintenance departments.

A video (on DVD) is included to provide proper instructions for use.

Exactol® Model 412

The Exactol Model 412 will bend tube from size 4 (1/4") through size 12 (3/4") and 6mm through 20mm inclusive and is completely portable. Accessories include a sturdy metal carrying case, which accommodates the 412 bender, slide block, and selected radius blocks. See page S7 for wall thickness capabilities. May be held in a vise or bench mounted using the bench mounting adapter. Bulletin 4391-B400S and DVD are included with bender, which describe the operation in detail.

NOTE: The 412 must be bench mounted if mandrels are used.

COMPONENTS REQUIRED

The minimum components required are a Model 412 Bender with a slide block and a radius block which match the tube O.D. to be bent.

Part Name	Part No.
Exactol Model 412 Bender (for 1/4" through 3/4" O.D.).....	560569
Slide Block (for sizes 4-5-6-8-10-12)	550585
Slide Block (for sizes 6mm-8mm-12mm-12mm-14mm)	820091
Slide Block (for sizes 15mm-16mm-18mm-20mm).....	820092
Radius Blocks (for sizes 4-5-6-8-10-12 and 6mm thru 38mm) ...	See pages S10 – S11

OPTIONAL ACCESSORIES

Carrying Case	
(for bender, slide block and selected radius blocks)	550572
Bench Mounting Adapter	550570

Mandrel Bending Components

for 412 and 424 Benders See [pages S16 – S18](#)



Fig. S10 — 412 Bender



Fig. S11 — Slide Block



Fig. S12 — Bench Mount Adapter

Exactol® Model 412 Kit

This 412 kit contains all the basic tool requirements for bending tube from 1/4" through 3/4".

**Part No.
412 KIT**

The following part numbers are included in the kit:

Part Name	Part No.
Exactol Model 412 Bender	560569
Carrying Case	550572
Slide Block for 1/4" through 3/4" tube	550585
Radius Block – 1/4" O.D. tube	550579
Radius Block – 3/8" O.D. tube.....	550581
Radius Block – 1/2" O.D. tube.....	550582
Radius Block – 5/8" O.D. tube.....	550583
Radius Block – 3/4" O.D. tube.....	550584



Fig. S13 — 412 Kit

Exactol® Model 424

The Exactol Model 424 will bend tube from size 4 (1/4" O.D.) through size 24 (1 1/2" O.D.) and 6mm through 38mm inclusive. See page S7 for wall thickness capabilities. It is completely portable and may be vise or bench mounted. Bulletin 4391-B400S and video are included with the bender, which describe the operation in detail.

NOTE: The 424 must be bench mounted if mandrels are used.

A video (on DVD) is included to provide proper instructions for use.

COMPONENTS REQUIRED

The minimum components required are a Model 424 Bender with a slide block and a radius block that match the tube O.D. to be bent.

Part Name	Part No.
Exactol Model 424 bender (for 1/4" through 1 1/2" O.D.).....	621044
Slide Block (for sizes 4-5-6-8-10-12)	550585
Slide Block (for sizes 14-16-18-20).....	621045
Slide Block (for size 24)	870150
Slide Block (for sizes 6mm-8mm-10mm-12mm-14mm)	820091
Slide Block (for sizes 15mm-16mm-18mm-20mm).....	820092
Slide Block (for sizes 22mm-25mm-28mm-30mm).....	820093
Slide Block (for size 35mm)	820094
Slide Block (for size 38mm)	870150
Radius Blocks (for sizes -4 thru -24 and 6mm thru 38mm)	See pages S10 – S11

OPTIONAL ACCESSORIES

Bench Mounting Adapter.....	631156
Mandrel Bending Components for 412 and 424 Benders	See pages S16 – S18



Fig. S14 — 424 Bender



Fig. S15 — Slide Block

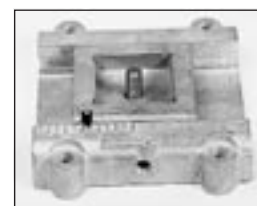


Fig. S16 — Bench Mount
Adapter

Dimensions and pressures for reference only, subject to change.

Exactol® Model 424 Kit**Part No. 424 Kit**

This 424 Kit contains all the basic tool requirements for bending tube from 1/4" through 1 1/2". The following part numbers are included in the kit:

Part Name	Part No.
Exactol Model 424 bender (for 1/4" through 1 1/2" O.D.).....	621044
Slide Block (for sizes 4-5-6-8-10-12)	550585
Slide Block (for sizes 14-16-18-20).....	621045
Slide Block (for size 24)*	870150
Radius Blocks – 1/4" O.D. Tube*	550579
Radius Block – 3/8" O.D. Tube	550581
Radius Block – 1/2" O.D. Tube	550582
Radius Block – 5/8" O.D. Tube	550583
Radius Block – 3/4" O.D. Tube	550584
Radius Block – 1" O.D. Tube	621047
Radius Block – 1 1/4" O.D. Tube	621049
Radius Block – 1 1/2" O.D. Tube*	870149

* Items not shown in the photo, but which are included in the 424 Kit.



Fig. S17 — 424 Kit

Radius Blocks

For use with Exactol Models 412/424 benders.

The 412 and 424 bender radius blocks have built in tube clamps, therefore separate clamp blocks are not required. The radius blocks are interchangeable within bender size ranges. Close bend radius blocks utilize the small bend radii, but also allow the bend to begin closer to the end connection.

412 and 424 Bender – Small Radius Blocks

Size	Tube O.D. (in.)	Bend Radius (in.)	Part No.
4	1/4	9/16.....	550573
5	5/16	11/16.....	550574
6	3/8	15/16.....	550575
8	1/2	1 1/4.....	550576
10	5/8	1 1/2.....	550577
12	3/4	1 3/4.....	550578



Fig. S18 — Small Radius Block

412 and 424 Bender – Large Radius Blocks

Size	Tube O.D. (in.)	Bend Radius (in.)	Part No.
4	1/4	3/4.....	550579
5	5/16	1.....	550580
6	3/8	1 1/4.....	550581
8	1/2	2.....	550582
10	5/8	2 1/2.....	550583
12	3/4	3.....	550584
14	7/8	3 1/2.....	621046
16	1	4.....	621047
18	1 1/8	4 1/2.....	621048
20	1 1/4	5.....	621049
24	1 1/2	5.....	870149



Fig. S19 — Large Radius Block

Dimensions and pressures for reference only, subject to change.

412 and 424 Bender – Close Bend Radius Blocks

Size	Tube O.D. (in.)	Bend Radius (in.)	Part No.
8	1/2	1 1/4.....	590533
10	5/8	1 1/2.....	590535
12	3/4	1 3/4.....	590537

**Fig. S20 — Close Bend Radius Block****412 and 424 Bender – Metric Radius Blocks**

Tube O.D. (mm)	Bend Radius (mm)	Part No.
6	14.....	820090-6mm
8	18.....	820090-8mm
10	24.....	820090-10mm
12	32.....	820090-12mm
14	38.....	820090-14mm
15	38.....	820090-15mm
16	38.....	820090-16mm
18	44.....	820090-18mm
20	44.....	820090-20mm
22	89.....	820090-22mm
25	102.....	820090-25mm
28	102.....	820090-28mm
30	127.....	820090-30mm
32	127.....	820090-32mm
35	127.....	820090-35mm
38	127.....	870419

**Fig. S21 — Radius Block****Close Bend Adapters for Seal-Lok**

These adapters are used when bends are needed close to the end of the tube after the flange has been made or the sleeve has been brazed onto the end of the tube.

HOW TO USE: Screw the Seal-Lok adapter into the internal thread* of the threaded pin on the radius block. Then attach the flanged or brazed tube by threading the tube nut to the Seal-Lok adapter on the radius block threaded pin.

* If the threaded pin does not have an internal thread, a new threaded pin is required.

Tube O.D. (in.)	Description	Part No.
1/2	Seal-Lok Adapter.....	930421-8
5/8	Seal-Lok Adapter.....	930421-10
3/4	Seal-Lok Adapter.....	930421-12
1	Seal-Lok Adapter.....	930421-16
1 1/4	Seal-Lok Adapter.....	930421-20
1 1/2	Seal-Lok Adapter.....	930421-24
1/2	Threaded Pin (for Close Bend Radius Blocks) ..	930420-8
5/8	Threaded Pin (for Close Bend Radius Blocks) ..	930420-10
3/4	Threaded Pin (for Close Bend Radius Blocks) ..	930420-12
1	Threaded Pin (for Close Bend Radius Blocks) ..	930420-16
1 1/4	Threaded Pin (for Close Bend Radius Blocks) ..	930420-20
1 1/2	Threaded Pin (for Close Bend Radius Blocks) ..	930420-24

**Fig. S22 — Seal-Lok Close Bend Adapter**

Dimensions and pressures for reference only, subject to change.

Hydraulic Tube Bender Model HB632

Hydraulic power does the work in bending tube of all materials in sizes from 6 (3/8" O.D.) through size 32 (2" O.D.), 10mm through 50mm, with wall thicknesses as great as .188 for annealed steel, and pipe sizes from 3/8" through 1-1/2". See page S7 for wall thickness capabilities. The radius block, around which the tube is bent, is driven by a roller chain and sprocket powered by a cylinder and a separate hydraulic power unit.

Maximum bend angle is 180° with radii from 1 1/4" to 8". Close second bends can be performed in either direction. An adjustable stop controls the degree of bend to a maximum of 180° and is graduated in 1° increments. After the bend is completed and pressure is released, a spring returns the clamp arm to the zero starting position.

The clamp vise arm features a quick release speed screw for positioning the required clamp block. Each size of tube requires the proper sized radius block, clamp block and slide block.

Written instructions, a DVD and Bulletin 4391-B26 are included with each bender.

HB632 radius blocks, slide blocks and clamp blocks will work with the following benders as well: 624, 824, 832 and 848.

NOTE: For size 28 (1 3/4" O.D. tube) through 32 (2" O.D. tube) radius blocks, an adapter plate is required.

DIMENSIONS: L – 40" W – 11" H – 12"

COMPONENTS REQUIRED

Minimum components required are a Model HB632 Bender, hose assembly, hydraulic pump and a radius, slide and clamp block which match the tube/pipe O.D. to be bent.

Part Name	Part No.
Hydraulic Bender Model HB632 (without pump)	631050
Hydraulic Pump (10,000 psi, 110V AC)	900085
High Flow Hydraulic Pump (10,000 psi, 110V)	974691
Hose Assembly (3' long)	910004

One each of the following is required per tube O.D.:

Radius Block, Clamp Block, Slide Block.

Radius Block..... See [pages S13 – S15](#)

INCH TUBE SIZES

Clamp Block (for -6)	864266
Clamp Block (for -8, -12, -16, -24)	631092
Clamp Block (for -10, -14, -18, -20)	631093
Clamp Block (for -28)	027418-28
Clamp Block (for -32)	027418-32
Slide Block (for -6)	864276
Slide Block (for -8, -12, -16, -24)	520516
Slide Block (for -10, -14, -18, -20)	520518
Slide Block (for -28)	631063
Slide Block (for -32)	631066



Fig. S23 — HB632



Fig. S24 — 900085 Pump



Fig. S25 — High Flow Pump



Fig. S26 — Clamp Block



Fig. S27 — Slide Block

Dimensions and pressures for reference only, subject to change.

METRIC TUBE SIZES	Part No.
Clamp Block (for 10mm, 12mm, 14mm, 16mm)	790017
Clamp Block (for 15mm, 16mm, 18mm, 20mm)	780195
Clamp Block (for 22mm, 25mm, 30mm, 32mm)	780196
Clamp Block (for 35mm)	974346
Clamp Block (for 38mm)	631092
Clamp Block (for 42mm)	974349
Clamp Block (for 50mm)	974352
Slide Block (for 10mm, 12mm, 14mm, 16mm)	790016
Slide Block (for 15mm, 16mm, 18mm, 20mm)	780192
Slide Block (for 22mm, 25mm, 30mm, 32mm)	780193
Slide Block (for 35mm)	974345
Slide Block (for 38mm)	520516
Slide Block (for 42mm)	974348
Slide Block (for 50mm)	974351

INCH PIPE SIZES	
Clamp Block (for 3/8", 1/2", 3/4")	974332
Clamp Block (for 1")	974338
Clamp Block (for 1 1/4")	974341
Clamp Block (for 1 1/2")	974343
Slide Block (for 3/8", 1/2", 3/4")	974331
Slide Block (for 1")	974336
Slide Block (for 1 1/4")	974340
Slide Block (for 1 1/2")	974342

OPTIONAL ACCESSORIES

Radius Block Adapter Plate
(for sizes 1 1/2", 38mm, 1 1/4 IPS and larger) 660221
Mandrel Bending Components for HB632 See [pages S16 – S18](#)
A video (on DVD) is included to provide proper instructions for use.



Fig. S28 — Radius Block Adapter Plate

Radius Blocks

For use with HB632 Bender

Radius blocks for every standard tube size from size 6 (3/8" O.D.) to size 32 (2" O.D.), 10mm through 50mm, and inch pipe sizes 3/8" through 1-1/2" are available.

AND10111 Standard Radius Blocks – Inch Sizes

Size	Tube O.D. (in.)	Radius (in.)	Part No.
6	3/8	1 1/4.....	540502
8	1/2	1 1/4.....	530763
10	5/8	1 1/2.....	530764
12	3/4	1 3/4.....	530765
14	7/8	2.....	530766
18	1 1/8	3 1/2.....	530768
24	1 1/2	5.....	530770
28	1 3/4	7.....	631057-112*
32	2	8.....	631060-128*

* Requires the use of Radius Block Adapter Plate, Part No. 660221.



Fig. S29 — Radius Block for use with HB632 Bender

Dimensions and pressures for reference only, subject to change.

MS33611 Standard Radius Blocks – Inch Sizes

Size	Tube O.D. (in.)	Radius (in.)	Part No.
6	3/8	1 1/8.....	590512-18
8	1/2	1 1/2.....	590515-24
10	5/8	1 7/8.....	590518-30
12	3/4	2 1/4.....	590521-36
14	7/8	2 5/8.....	590523-42
16	1	3.....	590524-48
18	1 1/8	3 3/8.....	590526-54
20	1 1/4	3 3/4.....	590527-60
24	1 1/2	4 1/2.....	590530-72

Radius Blocks – Metric Sizes

Size (mm)	Tube O.D./ Radius (mm)	Part No.
10	32	810023
12	32	780175
14	38	780176
15	38	780177
16	38	780178
18	44	780179
20	44	780180
22	89	780181
25	100	780182
30	128	780183
32	128	780184
35	105	974344
38	114	590530-72
42	128	974347*

* Requires the use of Radius Block Adapter Plate, Part No. 660221.

Radius Blocks – Inch Pipe Sizes

Inch Pipe Size (in.)	Bend Radius (in.)	Part No.
3/8	2 1/4	974325
1/2	2 5/8	974326
3/4	3 1/4	974327
1	4	974328
1 1/4	5	974329
1 1/2	6	974330*

* Requires the use of Radius Block Adapter Plate, Part No. 660221.



Fig. S30 — Radius Block for use with HB632 Bender

Close Bend Radius Blocks for HB632

These adapters are used when bends are needed close to the end of the tube after the flare has been made, ferrule has been pre-set, or flange has been made. For flared or Ferulok fittings, attach tube end by threading tube nut onto the radius block threaded pin. To use this block with Seal-Lok fittings, Close Bend Adapters for Seal-Lok must be used to attach the tube to the radius block.



Fig. S31 — Close Bend Radius Block

Close Bend Radius Blocks – Inch Sizes

Size (in.)	Tube O.D. (in.)	Radius (in.)	Part No.
8	1/2	1 1/4	530597
10	5/8	1 1/2	530601
12	3/4	1 3/4	530605
14	7/8	2	530609
16	1	3	530613
20	1 1/4	3 3/4	530621
24	1 1/2	5	530625

Close Bend Radius Blocks – Metric Sizes

Tube O.D./ Size (mm)	Radius (mm)	Thread Size	Part No.
12	32	3/4-16	780185
14	38	7/8-14	780186
15	38	7/8-14	780187
16	38	7/8-14	780188
18	44	1 1/16-12	780189
20	44	1 1/16-12	780190
38	127	1 7/8-12	530625

Dimensions and pressures for reference only, subject to change.

Bender Table (With Locking Casters) for HB632

Sturdy, heavy all steel construction, strongly braced to keep bender, mandrel rod, and mandrel rod stop assembly rigidly aligned. All holes are pre-drilled at factory to accommodate the HB632 bender and rod stop assembly.

DIMENSION: H – 36" W – 30" L – 10'

NOTE: Table is supplied with locking casters for ease of mobility.

Part No.
520515



Fig. S32 — Bender Table
(equipment not included)

Mandrel Bending Components

When bending thin wall tube it may be necessary to insert a mandrel into the tube to prevent excessive distortion or flattening. To accomplish such bending, a Mandrel, Mandrel Rod, and a Mandrel Rod Stop Assembly are required. The Rod Stop Assembly holds the end of the Mandrel Rod in proper alignment with the tube while the Mandrel, which is threaded onto the other end of the Mandrel Rod, supports the tube on its I.D., thus preventing tube kinking or flattening during bending.

The following parts are required for mandrel bending with the 412 and 424 bender:

Part Name	Part No.
Mandrel Rod Stop Assembly	550571
Stop Assembly Adapter Riser (424 only)	631154
Mandrel Rods	See page S18
Mandrel	See page S18

The following parts are required for mandrel bending with the 632 bender:

Part Name	Part No.
Mandrel Rod Stop Assembly	631141
Mandrel Rods	See page S18
Mandrel	See page S18

Example:

Tube O.D.: 2"

Wall Thickness: 0.095"

Centerline Radius: 8"

Vertical Axis = $\frac{8"}{2"} = 4$

Horizontal Axis = $\frac{2"}{.095"} \approx 21$

Answer: Plug Mandrel required

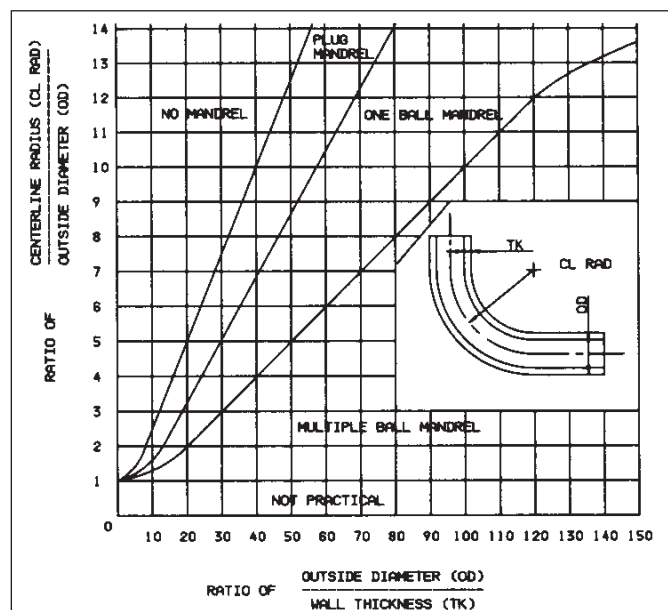


Fig. S33 — Mandrel Graph Chart

Dimensions and pressures for reference only, subject to change.

Mandrels (Plug Type)

For use with Exactol Models 412, 424 and the HB632 benders. Mandrels ensure smooth bends without kinking, or wrinkling when bending thin-walled tube, or when making short-radius bends. Mandrels support the tube wall from the inside to keep it fully open for a smooth bend.

A rule that is generally followed to determine whether or not a mandrel is necessary is as follows: When the wall thickness of the tube to be bent is 7 percent or more of the tube O.D., a mandrel is usually not necessary. On wall thicknesses that range between 4-6 percent of the tube O.D., it is necessary to use a mandrel to avoid wrinkling and flattening in the bend area. This rule is based on a bend radii of between three and four times the tube O.D.

* See Fig. S33 for mandrel usage.

To order mandrel, specify tube O.D. and wall thickness.



Fig. S34 — Mandrel

Part Number Example: 924417-Size X Wall Thickness =
924417-12X058

Size	END SIZE (in.)	Wall Thickness				
		(in.)	(in.)	(in.)	(in.)	(in.)
6	3/8	—	0.035	0.042	—	—
8	1/2	—	0.035	0.042	0.049	—
10	5/8	0.035	0.042	0.049	—	—
12	3/4	0.035	0.042	0.049	0.058	0.065
14	7/8	0.035	—	0.049	0.058	0.065
16	1	0.035	0.042	0.049	0.058	0.065
18	1 1/8	—	0.042	0.049	—	0.065
20	1 1/4	—	0.049	—	0.065	0.095
24	1 1/2	0.049	0.058	0.065	0.083	—

Table S4 — Mandrel Sizes

Mandrel Rods

For use with the HB632 Model Bender and Exactol Models 412/424 benders. Mandrel rods (as well as a mandrel rod stop assembly) are required when using mandrels. Mandrel rod diameters are determined by tube I.D.



Fig. S35 — Mandrel Rods

Mandrel Rod Sizes

Mandrel Rod Dia. (in.)	Tube I.D. (in.)	Part No.
1/4	.283 to .362	520506
5/16	.363 to .484	520507
13/32	.485 to 1.489	520508
5/8	1.49 to 1.87	520509

Dimensions and pressures for reference only, subject to change.

Mandrel Rod Stop Assembly

For use with Model HB632 bender.

The Mandrel Rod Stop Assembly, when bolted to the end of a table opposite of the bender, keeps the mandrel rod in alignment with the tube when mandrel bending.

Part Name	Part No.
Mandrel Rod Stop Assembly (for bender Model HB632).....	631141



Fig. S36 — Mandrel Rod Stop Assembly /632

Mandrel Rod Stop Assembly

For use with Exactol 412/424 Model benders.

Part Name	Part No.
Mandrel Rod Stop Assembly	550571



Fig. S37 — Mandrel Rod Stop Assembly 412/424

Part Name	Part No.
Stop Assembly Adapter/Riser for 424.....	631154



Fig. S38 — Stop Assembly Adapter/Riser

Universal Side Angle Indicator

For use with Model HB632 bender.

Accurately determines angle between tube bends in different planes. Keeps out of plane angles accurate, when making repeated bends. Large, easy-to-read vernier dial. Maximum 3/4" O.D. tube can be used if the tube must be extended through the indicator. Maximum 1 1/2" O.D. tube can be used if end of tube is held in clamp jaw.

Part No.
520520



Fig. S39 — Universal Side Angle Indicator

Dimensions and pressures for reference only, subject to change.

CP432 Tube and Pipe Bender

A 90 psi air supply does all the work for bending steel and stainless steel tube. This bender utilizes a center push bending method which is easy to master. Offered in an all inclusive kit. See Bulletin 4390-CP432 for more information. A separate accessory kit of tooling for bending 10mm through 50mm tube is also available. See [page S20](#) for part number information.

Part No.
CP432



Fig. S40 — Bender Kit

REPLACEMENT COMPONENTS

Part Name	Part No.
Air/Hydraulic Pump.....	PAT-1102N
Hose Assembly.....	975222
Quick Coupler, Receptacle.....	3050-3
Quick Coupler, Nipple.....	3010-3
Hydraulic Cylinder.....	RC-1010
Radius Blocks.....	See below
Slide Blocks.....	See below



Fig. S41 — Pump

Radius Blocks for CP432 – Inch Sizes

Tube O.D. (in.)	Bend Radius (in.)	Part No.
1/4	9/16	975179
3/8	1 1/4	975179
1/2	1 1/2	975179
5/8	1 7/8	975180
3/4	2 1/4	975180
1	3	975181
1 1/4	3 3/4	975182
1 1/2	4 1/2	975183
2	8	975184



Fig. S42 — Multi-Size
Tube Radius Block

Slide Blocks for CP432 (2 required) – Inch Sizes

Tube O.D. (in.)	Part No.
1/4.....	975185
3/8.....	975185
1/2.....	975185
5/8.....	975186
3/4.....	975186
1.....	975187
1 1/4.....	975187
1 1/2.....	975188
2.....	975188



Fig. S43 — Multi-Size
Tube Slide Block

Dimensions and pressures for reference only, subject to change.

Radius Blocks for CP432 – Metric Tube Sizes

Tube O.D. (mm)	Bend Radius (mm)	Part No.
10	34	976503-Block
12	34	976503-Block
14	38	976503-Block
15	38	976505
16	38	976505
18	42	976508
20	42	976508
22	89	976510
25	100	976510
30	100	976512
32	100	976515
35	105	976516
38	114	976517
42	128	976518
50	200	976519

Fig. S44 — Typical
Radius BlockFig. S45 — Typical
Slide Block**Slide Blocks for CP432 (2 required) – Metric Tube Sizes**

Tube O.D. (mm)	Part No.
10	976504
12	976504
14	976504
15	976506
16	976506
18	976509
20	976509
22	976511
25	976511
30	976513
32	976513
35	976520
38	976520
42	976521
50	976521

ACCESSORIES

Part Name	Part No.
Metric Tooling Kit (10-50mm).....	CP432-MM TOOL KIT

Dimensions and pressures for reference only, subject to change.

Braze Flux

Black braze flux can be used for brazing either steel or stainless steel components. When applied liberally this flux helps the flow of the silver braze alloy and prevents oxidation.

Part Name	Part No.
Black Flux	Black Flux 1/2 lb
Black Flux	Black Flux 1 lb



Fig. S46 — Braze Flux

Post Braze Cleaner

This cleaner is used to clean the assembly after brazing. Once the silver braze alloy has solidified, immediately immerse the joint into the braze cleaner solution. The cleaner combined with the sudden change in temperature removes the flux from the assembly. Braze cleaner does not provide corrosion protection. See “Corrosion Protection After Brazing” in the Assembly / Installation section, [page T17](#).

Available in sizes 2 1/2 lb. and 5 lb. jars. When ordering simply denote quantity after Braze Cleaner.

Part Name	Part No.
Braze Cleaner.....	Braze Cleaner 2 1/2 lb
Braze Cleaner.....	Braze Cleaner 5 lb



Fig. S47 — Post Braze Cleaner

Dimensions and pressures for reference only, subject to change.

Kloskut® Tube Cutters

These adjustable tube cutters are designed to produce square cut ends with no external burr and minimum internal burr when used on fully annealed copper, brass, aluminum, and steel tube. Both feature a hardened and burnished tool-steel cutting wheel, flare cut-off grooves in rollers for removal of old flares and a swing-away reamer for removing internal burrs. The handle feeds and adjusts the cutting wheel to uniformly cut tube as the cutter is rotated.

NOTE: Tube cutters are **not recommended** for use with stainless steel tube because of the work hardening effect. The use of a hacksaw with a "Tru-Kut" Sawing Vise or a rotary teeth saw is recommended for stainless steel.

Medium Kloskut

Part Description	Part No.
Tube cutter for 1/8" to 1 1/8" O.D.....	218B
Cutter Wheel for 218B	218B Wheel
Tube Reamer for 218B	218B Reamer
.....	218B Shaft

Large Kloskut

Part Description	Part No.
Tube Cutter for 3/4" to 2" O.D.....	1232
Cutter Wheel for 1232.....	1232 Wheel

Tru-Kut® Sawing Vise

This hacksaw guide will accommodate tube, pipe and hose from sizes 3 (3/16" O.D.) to 32 (2" O.D.), assuring square cut-offs within $\pm 1^\circ$. For use with a fine tooth hacksaw blade for smooth cuts.

HOW TO USE: Mount in a vise or bolt to a bench. Clamp tube, pipe or hose into the Tru-Kut vise and cut off; guide ensures accurate square cuts.

Part Description	Part No.
Tru-Kut Sawing Vise	710439

Cut-Off Saw

The 974250 Cut-Off Saw is designed to operate at low speed to prevent work hardening the tube end. The saw will assure a square cut on the tube with minimum burrs. The saw will cut 1/4" through 2 3/4" copper, brass, aluminum, steel and stainless steel tube. An adequate supply of cutting fluid is provided by an internal recirculating pump. The unit is designed for bench or stand mounting and operates on 110V, 15 amp power supply.

Part Description	Part No.
Cut-Off Saw	974250

Accessories	
Saw Base	AGC10070

Replacement Parts

Cutting Lubricant (Approx. 1 gal. container)	Saw Lube
Saw Blade – 250 mm x 2.0 mm thick (all purpose)	987036
Saw Blade – 200 mm x 2.0 mm thick (all purpose)	987037



Fig. S48 — 218B Medium Kloskut Tube Cutter



Fig. S49 — 1232 Large Kloskut Tube Cutter



Fig. S50 — Sawing Vise



Fig. S51 — Cut-Off Saw (shown on Saw Base)

Dimensions and pressures for reference only, subject to change.

In-Ex® Tube Deburring Tool 226A

A quick twist of the wrist will deburr either the O.D. or the I.D. of the tube end. Parker's In-Ex deburrer can be used on annealed steel, stainless steel, copper and aluminum, for tube sizes 1/8" to 1 5/8" O.D.

Part Description	Part No.
In-Ex Deburring Tool	226A
Blades for 226A Tube Deburr Tool	226A Blades



Fig. S52 — 226A In-Ex
Deburr Tool

Power Deburr Tool

The Parker Power Deburr Tool is designed for deburring the I.D. and O.D. of 1/4" through 2" steel, stainless steel, copper and aluminum tube. The lightweight unit incorporates a modular design which allows Parker's Cut-Off Saw, part number 974250, to be easily mounted on the top. The Power Deburr Tool requires 110V/10A power supply.

Dimensions: L – 20", W – 18", H – 9".

Part Description	Part No.
Power Deburr Tool	972125

Replacement Parts	
I.D. Deburr Cone	971816
O.D. Deburr Blades (six blade set)	910485



Fig. S53 — Power Deburr Tool

Dimensions and pressures for reference only, subject to change.

Parflange® 1050

High-Speed Seal-Lok Flanging (ORFS) and 37° Flaring System

- Eliminates braze joint
- Minimum cleaning prior to and after flanging
- Flanges in only 20% of brazing time (5-8 sec, 15-20 sec full cycle time)
- Meets SAE J1453 performance requirements

Electrical Power: 440 volt / 3 phase, 60 Hz / 5.1 kw

Air Supply: 80 to 120 psi shop air

Dimensions: Height: 42 inches (1035mm)
Width: 28 inches (700mm)
Depth: 34 inches (840mm)

Weight: Basic Unit: 838 lbs. (380 kg.)
Automatic Sleeve Loader: 40 lbs. (18.1 kg.)
Individual Die: 4 lbs. (1.8 kg.)

Sleeve Loader Machine - also available - contact the division for details.

A DVD is included to provide instructions for proper use.
6 language instruction manual.

COMPONENTS REQUIRED

Part Name	Part No.
Parflange 1050	1050
Flanging Pin.....	See page S26
Flanging Die Set.....	See page S26
Flaring Pin	See page S33
Flaring Die Set.....	See page S33
Lubrication Fluid	LB 2000

OPTIONAL ACCESSORIES

Die Adjustment Shims	Shim Kit
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1050 Machine with Automatic Sleeve Loader	Contact Division for more information
-------------------------------------------------	------------------------------------------

*Automatic Sleeve Loader is not available as an accessory

Some Key Features

- Flange/Flare 1/4"-1 1/2", 6mm-38mm (dep. on wall thickness)
- Work Center Setup (Holds 10 die & pin sets)
- Uses Same Tooling as Parflange 1040
- 5-8 Sec. Flange/Flare time (15-20 Full Cycle)
- Transportation options - on wheels, by forklift, lifting attachments



Fig. S54 — Parflange® 1050 Machine



Fig. S55 — Die



Fig. S56 — Pin

Dimensions and pressures for reference only, subject to change.

Parflange® 1025

Bench-Top Flanging and 37° Flaring System

Tooling must be ordered separately

- Eliminates braze joint
- Compact, lightweight design
- Bench mountable
- Easy to operate
- Uses same tooling as Parflange 1050
- Available in 110-volt single-phase or 440-volt 3-phase (please specify by ordering 1025/110 or 1025/440)
- Flanges or flares tube in less than 20 seconds
- For tube sizes 1/4" O.D. thru 1" O.D. (steel); and 1/4" O.D. thru 1" O.D. (stainless steel) – Flanging/flaring of tube sizes 1" & greater results in heavy machine vibration. Therefore, this machine is only recommended for occasional use for preparing tube ends 1" or larger. For efficient production of larger tube ends, use the Parflange 1050.

Tooling is also available for comparable metric tube sizes.

Electrical Power: 110V/20A single-phase, or 440V/3-phase/2.1A

Power Cable Length: 8 feet long (2.5 meters)

Dimensions: Height: 18 1/8 inches (460mm)

Width: 15 3/8 inches (390mm)

Depth: 26 3/8 inches (670mm)

Weight: Basic Unit: 175 lbs. (80 kg.)

Each Die (typical): 4 lbs. (1.8 kg.)

Flanging Pin Lubrication Fluid: **LB2000**

See Bulletin 4390-1025A, 4390-1025 or 4390-B5-USA for more details.

A DVD is included to provide instructions for proper use.

COMPONENTS REQUIRED

Part Name	Part No.
Parflange 1025	1025/110
Parflange 1025	1025/440
Flanging Pin.....	See page S26
Flanging Die Set.....	See page S26
Flaring Pin	See page S33
Flaring Die Set.....	See page S33
Lubrication Fluid	LB 2000
Die Adjustment Shims	Shim Kit

REPLACEMENT PART

Part Name	Part No.
Tube Stop	1025/0281014

OPTIONAL ACCESSORIES



Fig. S57 — Parflange® 1025 Machine

CAUTION: Extension cords are **not** recommended and could cause damage to the machine due to a lack of power supply.



Fig. S58 — Flanging Pin



Fig. S59 — Flanging Die Set



Fig. S60 — LB 2000

Dimensions and pressures for reference only, subject to change.

Inch and Metric Flanging Tooling for 1025 and 1050 Parflange Machines

Tube Size O.D. x Wall Thickness (in.)	Tooling for 90°/180° Tube Flanging			Available Flanging Tooling			
	Flange Pin and Die Set Part Number	Pin Part Number	Die Part Number	1040		1025	
				-S	-SS	-S	-SS
1/4 x .028	4004X028180	B4004X028180	M4004X028180	•	•	•	•
1/4 x .035	4004X035180	B4004X035180	M4004X035180	•	•	•	•
1/4 x .049	4004X049180	B4004X049180	M4004X049180	•	•	•	•
3/8 x .035	4006X035180	B4006X035180	M4006X035180	•	•	•	•
3/8 x .049	4006X049180	B4006X049180	M4006X049180	•	•	•	•
3/8 x .065	4006X065180	B4006X065180	M4006X065180	•	•	•	•
1/2 x .035	4008X035180	B4008X035180	M4008X035180	•	•	•	•
1/2 x .049	4008X049180	B4008X049180	M4008X049180	•	•	•	•
1/2 x .065	4008X065180	B4008X065180	M4008X065180	•	•	•	•
1/2 x .083	4008X083180	B4008X083180	M4008X083180	•	•	•	•
5/8 x .049	4010X049180	B4010X049180	M4010X049180	•	•	•	•
5/8 x .065	4010X065180	B4010X065180	M4010X065180	•	•	•	•
5/8 x .083	4010X083180	B4010X083180	M4010X083180	•	•	•	•
5/8 x .095	4010X095180	B4010X095180	M4010X095180	•	•	•	•
5/8 x .109	4010X109180	B4010X109180	M4010X109180	•	•	•	•
5/8 x .120	4010X120180	B4010X120180	M4010X120180	•	•	•	•
3/4 x .049	4012X049180	B4012X049180	M4012X049180	•	•	•	•
3/4 x .065	4012X065180	B4012X065180	M4012X065180	•	•	•	•
3/4 x .083	4012X083180	B4012X083180	M4012X083180	•	•	•	•
3/4 x .095	4012X095180	B4012X095180	M4012X095180	•	•	•	•
3/4 x .109	4012X109180	B4012X109180	M4012X109180	•	•	•	•
3/4 x .120	4012X120180	B4012X120180	M4012X120180	•	•	•	•
1 x .065	4016X065180	B4016X065180	M4016X065180	•	•	•	•
1 x .083	4016X083180	B4016X083180	M4016X083180	•	•	•	•
1 x .095	4016X095180	B4016X095180	M4016X095180	•	•	•	•
1 x .109	4016X109180	B4016X109180	M4016X109180	•	•	•	•
1 x .120	4016X120180	B4016X120180	M4016X120180	•	•	•	•
1 x .134	4016X134180	B4016X134180	M4016X134180	•	•	•	•
1 x .148	4016X148180	B4016X148180	M4016X148180	•	•	•	•
1 x .156	4016X156180	B4016X156180	M4016X156180	•	•	•	•
1 x .188	4016X188180	B4016X188180	M4016X188180	•	•	•	•
1 1/4 x .065	4020X065180	B4020X065180	M4020X065180	•	•	•	•
1 1/4 x .083	4020X083180	B4020X083180	M4020X083180	•	•	•	•
1 1/4 x .095	4020X095180	B4020X095180	M4020X095180	•	•	•	•
1 1/4 x .109	4020X109180	B4020X109180	M4020X109180	•	•	•	•
1 1/4 x .120	4020X120180	B4020X120180	M4020X120180	•	•	•	•
1 1/4 x .134	4020X134180	B4020X134180	M4020X134180	•	•	•	•
1 1/4 x .148	4020X148180	B4020X148180	M4020X148180	•	•	•	•
1 1/4 x .156	4020X156180	B4020X156180	M4020X156180	•	•	•	•
1 1/4 x .188	4020X188180	B4020X188180	M4020X188180	•	•	•	•
1 1/2 x .065	4024X065180	B4024X065180	M4024X065180	•	•	•	•
1 1/2 x .083	4024X083180	B4024X083180	M4024X083180	•	•	•	•
1 1/2 x .095	4024X095180	B4024X095180	M4024X095180	•	•	•	•
1 1/2 x .109	4024X109180	B4024X109180	M4024X109180	•	•	•	•
1 1/2 x .120	4024X120180	B4024X120180	M4024X120180	•	•	•	•
1 1/2 x .134	4024X134180	B4024X134180	M4024X134180	•	•	•	•
1 1/2 x .148	4024X148180	B4024X148180	M4024X148180	•	•	•	•
1 1/2 x .156	4024X156180	B4024X156180	M4024X156180	•	•	•	•
1 1/2 x .188	4024X188180	B4024X188180	M4024X188180	•	•	•	•
2 x .083	4032X083180	B4032X083180	M4032X083180	•	•	•	•
2 x .095	4032X095180	B4032X095180	M4032X095180	•	•	•	•
2 x .120	4032X120180	B4032X120180	M4032X120180	•	•	•	•

Note: Use “-SS” suffix after part number for flanging tools for stainless steel tube. [Contact the Tube Fittings Division](#) for sizes and/or materials not listed, or for additional SS sizes released for limited use.

Table S5 — Pin & Die Part Numbers for Inch Sizes

Tube Size O.D. x Wall Thickness (mm)	Tooling for 90°/180° Tube Flanging		Available Flanging Tooling			
	Pin Part Number	Die Part Number	1040		1025	
			-S	-SS	-S	-SS
6 x 1	B4018006X1M	M4018006X1M	•	•	•	•
6 x 1.5	B4018006X1.5M	M4018006X1.5M	•	•	•	•
8 x 1	B4018008X1M	M4018008X1M	•	•	•	•
8 x 1.5	B4018008X1.5M	M4018008X1.5M	•	•	•	•
10 x 1	B4018010X1M	M4018010X1M	•	•	•	•
10 x 1.5	B4018010X1.5M	M4018010X1.5M	•	•	•	•
10 x 2	B4018010X2M	M4018010X2M	•	•	•	•
12 x 1	B4018012X1M	M4018012X1M	•	•	•	•
12 x 1.5	B4018012X1.5M	M4018012X1.5M	•	•	•	•
12 x 2	B4018012X2M	M4018012X2M	•	•	•	•
15 x 1.5	B4018015X1.5M	M4018015X1.5M	•	•	•	•
15 x 2	B4018015X2M	M4018015X2M	•	•	•	•
16 x 1	B4018016X1M	M4018016X1M	•	•	•	•
16 x 1.5	B4018016X1.5M	M4018016X1.5M	•	•	•	•
16 x 2	B4018016X2M	M4018016X2M	•	•	•	•
16 x 2.5	B4018016X2.5M	M4018016X2.5M	•	•	•	•
18 x 1	B4018018X1M	M4018018X1M	•	•	•	•
18 x 1.5	B4018018X1.5M	M4018018X1.5M	•	•	•	•
18 x 2	B4018018X2M	M4018018X2M	•	•	•	•
20 x 2	B4018020X2M	M4018020X2M	•	•	•	•
20 x 2.5	B4018020X2.5M	M4018020X2.5M	•	•	•	•
20 x 3	B4018020X3M	M4018020X3M	•	•	•	•
22 x 1.5	B4018022X1.5M	M4018022X1.5M	•	•	•	•
22 x 2	B4018022X2M	M4018022X2M	•	•	•	•
22 x 2.5	B4018022X2.5M	M4018022X2.5M	•	•	•	•
22 x 3	B4018022X3M	M4018022X3M	•	•	•	•
25 x 2	B4018025X2M	M4018025X2M	•	•	•	•
25 x 2.5	B4018025X2.5M	M4018025X2.5M	•	•	•	•
25 x 3	B4018030X2M	M4018030X2M	•	•	•	•
25 x 3.5	B4018025X3.5M	M4018025X3.5M	•	•	•	•
25 x 4	B4018025X4M	M4018025X4M	•	•	•	•
28 x 2	B4018028X2M	M4018028X2M	•	•	•	•
28 x 2.5	B4018028X2.5M	M4018028X2.5M	•	•	•	•
30 x 2	B4018030X2M	M4018030X2M	•	•	•	•
30 x 3	B4018030X3M	M4018030X3M	•	•	•	•
30 x 3.5	B4018030X3.5M	M4018030X3.5M	•	•	•	•
30 x 4	B4018030X4M	M4018030X4M	•	•	•	•
32 x 3	B4018032X3M	M4018032X3M	•	•	•	•
32 x 4	B4018032X4M	M4018032X4M	•	•	•	•
35 x 3	B4018035X3M	M4018035X3M	•	•	•	•
38 x 3	B4018038X3M	M4018038X3M	•	•	•	•
38 x 4	B4018038X4M	M4018038X4M	•	•	•	•
38 x 5	B4018038X5M	M4018038X5M	•	•	•	•

1) Flanging tools (90°/180°) listed are for carbon steel tube. [Contact the Tube Fittings Division](#) for metric flanging tools for tube materials other than carbon steel or for sizes not listed.

Table S6 — Pin & Die Part Numbers for Metric Sizes

Manual Flaring Tool Vise Block and Flaring Pin — Metric Tube

These 37° flaring tools are designed for use in a vise when flaring metric tube from 6mm O.D. to 38mm O.D.

From 20mm size tube and upward it is necessary to use a pre-flaring pin to start the flare.

- **Clamp tube flush in block halves**
- **Flare tube by hammering the flaring pin.**

A separate block and pin set is used for each tube size.

Pre-Flaring Pins

Tube O.D. (mm)	Part No.
20	PIE
25	PIE
30	PIE
32	PIE
38	PIE

Flaring Pins

Tube O.D. (mm)	Part No.
6	P17408
8	P17408
10	P17408
12	P17414
14	P17414
15	P17414
16	P17414
18	P17418
20	P17418
25	P17422
30	P17432
32	P17432
38	P17438

Vise Blocks

Tube O.D. (mm)	Part No.
6	M27406
8	M27408
10	M27410
12	M27412
14	M27414
15	M27415
16	M27416
18	M27418
20	M27420
25	M27425
30	M27430
32	M27432
38	M27438



Fig. S61 — Vise Block



Fig. S62 — Pre-Flaring Pins



Fig. S63 — Flaring Pin

Dimensions and pressures for reference only, subject to change.

Rolo-Flair®

Manual Rotary Flaring Tool

(For soft metal tube)

Precision burnished 37° and 45° flares in tube sizes from 2 (1/8" O.D.) to 12 (3/4" O.D.) with an easy turn of the handle. For use with copper and aluminum alloys. A depth gauge allows proper positioning of tube for consistent flaring.

HOWTOUSE: Open die, insert tube up to the gauge and clamp the tube in the die. Turn drive handle clockwise to flare, then counterclockwise for retracting flaring cone. Open clamping die by loosening wing nut and remove flared tube.

Part Name

Rolo-Flair for 37° flares

(for 1/8", 3/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4", O.D.) **212FB**

Rolo-Flair for 45° flares

(for 1/8", 3/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4", O.D.) **945TH**

Part No.

Fig. S64 — Rolo-Flair

Combination Flarer

For 1/8", 3/16", 1/4", 5/16", 3/8", 1/2", 5/8", O.D. tube.

The combination flarer is a 7-in-1 impact tool for flaring (37°) soft copper, aluminum and fully annealed steel tube, sizes 2 (1/8" O.D.) through 10 (5/8" O.D.). Maximum wall thickness: 1/8" to 3/8" is 15% of tube O.D., 1/2" and larger is 10% of tube O.D.

HOW TO USE: Insert tube into proper flare hole and fasten with clamping screw. Set hardened-steel flaring punch in tube and form flare with a few **sharp** hammer blows. (Tube should not project more than 1/16" above top of block.)

Part No.
210A

Fig. S65 — 210A Combination Flarer

Vise Block with Flaring Pin

These impact 37° flaring tools are for use with copper, aluminum alloy, and thin wall steel or stainless steel. Separate tooling set for each tube size 4 (1/4" O.D.) through 24 (1 1/2" O.D.). Maximum wall thickness: 1/8" to 3/8" is 15% of tube O.D., 1/2" and larger is 10% of tube O.D.

HOW TO USE: Clamp tube flush in matching halves of block in a bench vise. Give hardened steel flaring pin a few **sharp** blows with a hammer to form the flare.

Size	Tube O.D. (in.)	Part No.
4	1/4"	4-2866
5	5/16"	5-2866
6	3/8"	6-2866
8	1/2"	8-2866
10	5/8"	10-2866
12	3/4"	12-2866
14	7/8"	14-2866
16	1"	16-2866
20	1 1/4"	20-2866
24	1 1/2"	24-2866

Order vise block with flaring pin using part numbers above. The block and pin may be ordered separately by suffixing the part number with either Pin or Block.



Fig. S66 — Vise Block with Flaring Pin

Part Number Example:
4-2866 Block

Dimensions and pressures for reference only, subject to change.

Hydra-Tool

Hydraulic Flaring And Pre-Setting Tool

Flaring

An efficient dependable device for 37° and 45° flaring of steel, stainless steel and copper tube. This task is made easy through hydraulic power provided by a hand or electric pump. The equipment is portable and easy to use.

This tool accommodates dies for tubes ranging in inch sizes from 4 through 32 (1/4" through 2" outside diameters) with wall thicknesses as great as .134", and metric sizes from 6mm through 50mm. The hydraulic "push" of the Hydra-Tool flares the tube to a 37° flare angle. A gauge can be provided to enable the operator to determine the pressure required to adequately flare any given material and wall thickness of the tube. Complete instructions are included with the Hydra-Tool. See bulletin 4392-B10. See the following for Hydra-Tool basic unit or kit, and choice of power sources and necessary tooling.

NOTE: Flaring die sets and other tooling are available in non-standard sizes upon request from the factory.

See [Appendix](#) for flaring pressures.

A video (on DVD) is included to provide instructions for proper use.

COMPONENTS REQUIRED

Part Name	Part No.
Hydra-Tool (basic unit).....	710400B
Hydra-Tool Male Adapter.....	6-8 F5OLO-S
"T" Adapter for Gauge.....	6 R6LO-S
Hose Assembly (for hand or electric pumps).....	910004
Adapter for Gauge.....	6 G6L-S
Pressure Gauge (0 - 10,000 psi).....	900044
Electric Hydraulic Pump (10,000 psi; 1/2 hp; 40-125 volt).....	900085
Hand Hydraulic Pump (10,000 psi; 2 speed).....	900086
Die Ring (1/4" - 1 1/4") (6mm - 32mm).....	710416A
Die Ring (1 1/2" - 2") (35mm - 50mm).....	710412
37° Flaring Cone (1/4" - 1 1/4") (6mm - 32mm).....	710419
37° Flaring Cone (1 1/2" - 2") (35mm - 50mm).....	710411
Die Retainer Assembly (1/4" - 1 1/4") (6mm - 32mm).....	710424-1
Die Retainer Assembly (1 1/2" - 2") (35mm - 50mm).....	710424-2
Flaring Die Sets.....	See pages S30 - S31
Lubricant.....	STP*
45° Flaring Cone (1/4" - 1").....	910312

*STP Lubricant is the only lubricant recommended for use with Hydra-Tool.

REPLACEMENT PART

Part Name	Part No.
Tube Stop Assembly.....	710420B

OPTIONAL ACCESSORIES

Part Name	Part No.
Hydra-Tool Carrying Case.....	720377
Sturdy wood case for Hydra-Tool and tooling. (Hydra-Tool kit is shipped in this carrying case.)	



Fig. S67 — Hydra-Tool



Fig. S68 — Electric Pump



Fig. S69 — Hand Pump



Fig. S70 — Flaring Cone



Fig. S71 — Die Ring



Fig. S72 — Die Retainer



Fig. S73 — Carrying Case

Dimensions and pressures for reference only, subject to change.

Hydra-Tool 37° Flaring Die Sets for Steel – Inch

Size	Tube O.D. (in.)	Part No.
4	1/4	710417-4
5	5/16	710417-5
6	3/8	710417-6
8	1/2	710417-8
10	5/8	710417-10
12	3/4	710417-12
14	7/8	710417-14
16	1	710417-16
20	1 1/4	710417-20
24	1 1/2	710415-24
32	2	710415-32



Fig. S74 — Flaring Die Set

Hydra-Tool 37° Flaring Die Sets for Stainless Steel – Inch

Size	Tube O.D. (in.)	Part No.
4	1/4	710417-4 SS
5	5/16	710417-5 SS*
6	3/8	710417-6 SS
8	1/2	710417-8 SS
10	5/8	710417-10 SS
12	3/4	710417-12 SS
14	7/8	710417-14 SS*
16	1	710417-16 SS
20	1 1/4	710417-20 SS
24	1 1/2	710415-24 SS
32	2	710415-32 SS

* Non-standard.

Hydra-Tool 37° Flaring Die Sets – Metric

Tube O.D./ Size (mm)	Part No.
6	770106-6
8	770106-8
10	770106-10
12	770106-12
15	770106-15
16	770106-16
18	770106-18
20	770106-20
22	770106-22
25	770106-25
28	770106-28
30	770106-30
32	770106-32
35	770095-35
38	770095-38
42	770095-42
50	770095-50

Dimensions and pressures for reference only, subject to change.

Hydra-Tool 45° Flaring Die Sets – Inch

Size	Tube O.D. (in.)	Part No.
4	1/4	977420-4
6	3/8	977420-6
8	1/2	977420-8
10	5/8	977420-10
12	3/4	977420-12
14	7/8	977420-14
16	1	977420-16

Hydra-Tool Kit

Part Name	Part No.
Hydra-Tool Kit (for use with electric or hand pump).....	720370B-3
Includes basic unit, gauge, Hydra-Tool connector, lubricant, adapter, carrying case, hose assembly, operation manual and video.	

**Fig. S75— Hydra-Tool Kit**

Dimensions and pressures for reference only, subject to change.

Karryflare Portable Flaring Machine

The Karryflare is a portable flaring machine that is designed for fabricating 37 degree tube flares. It's lightweight, portable, and is capable of flaring 1/4" through 1-1/2" (6mm-38mm) steel & stainless steel tubing. It's telescopic handle and wheeled carrying case allows it to be easily transported from one work site location to another.

Part Name	Part No.
Karry Flare	KarryFlare

Hydraulic power is generated by a hand operated pump. A pressure gauge is provided which enables the operator to review the necessary pressure requirements for proper flaring of their specific tubing requirements (operating pressures are specific to the tubes O.D. and wall thickness). The complete unit is mounted on a wheeled base plate, with telescopic handle, and includes 37° cone and case cover.

Dimensions: H – 10" W – 14" L – 30"

Application range

The Karryflare machine is capable of flaring tube from 1/4" O.D. to 1 1/2" O.D. or from 6mm O.D. to 38mm O.D.

FLARING COMPONENTS

Part Name	Part No.
Replacement 37° Flaring Cone	Karryflare/FPIN
37° Flaring Die Sets	See below

Tube Die Sets – Inch

Tube O.D. (in.)	Part No.
1/4	M 047415-1
5/16	M 157408-1
3/8	M 067415-1
1/2	M 087415
5/8	M 107415
3/4	M 127415
1	M 167415
1 1/4	M 207415
1 1/2	M 157438

Tube Die Sets – Metric

Tube O.D. (mm)	Part No.
6	M 157406-1
8	M 157408-1
10	M 157410-1
12	M 157412
14	M 157414
15	M 157415
16	M 157416
18	M 157418
20	M 157420
25	M 157425
30	M 157430
32	M 157432
38	M 157438

Parflange® 1025 and Parflange® 1050 37° Flaring and Flanging Systems

Parker's Parflange 1025 and 1050 machines are designed to create 37° flared tube ends. For more detailed information, refer to [pages S24 and S25](#). See [page S33](#) for flaring tool part numbers.

Dimensions and pressures for reference only, subject to change.



Fig. S76 — KarryFlare



Fig. S77 — Flaring Die Set



Fig. S78 — Parflange 1025



Fig. S79 — Parflange 1050

Inch and Metric Flaring Tooling for 1025 and 1050 Parflange Machines

Tube Size O.D. x Wall Thickness (in.)	Tooling for 37°/74° Tube Flaring		Available Flaring Tooling			
	Pin Part Number	Die Part Number	1040		1025	
			-S	-SS	-S	-SS
1/4 x .020	B4004X020074	M4004074	•	•	•	•
1/4 x .028	B4004X028074	M4004074	•	•	•	•
1/4 x .035	B4004X035074	M4004074	•	•	•	•
1/4 x .049	B4004X049074	M4004074	•	•	•	•
1/4 x .065	B4004X065074	M4004074	•	•	•	•
3/8 x .020	B4006X020074	M4006074	•	•	•	•
3/8 x .028	B4006X028074	M4006074	•	•	•	•
3/8 x .035	B4006X035074	M4006074	•	•	•	•
3/8 x .049	B4006X049074	M4006074	•	•	•	•
3/8 x .065	B4006X065074	M4006074	•	•	•	•
1/2 x .028	B4008X028074	M4008074	•	•	•	•
1/2 x .035	B4008X035074	M4008074	•	•	•	•
1/2 x .049	B4008X049074	M4008074	•	•	•	•
1/2 x .065	B4008X065074	M4008074	•	•	•	•
1/2 x .083	B4008X083074	M4008074	•	•	•	•
5/8 x .035	B4010X035074	M4010074	•	•	•	•
5/8 x .049	B4010X049074	M4010074	•	•	•	•
5/8 x .065	B4010X065074	M4010074	•	•	•	•
5/8 x .083	B4010X083074	M4010074	•	•	•	•
5/8 x .095	B4010X095074	M4010074	•	•	•	•
3/4 x .035	B4012X035074	M4012074	•	•	•	•
3/4 x .049	B4012X049074	M4012074	•	•	•	•
3/4 x .065	B4012X065074	M4012074	•	•	•	•
3/4 x .083	B4012X083074	M4012074	•	•	•	•
3/4 x .095	B4012X095074	M4012074	•	•	•	•
3/4 x .109	B4012X109074	M4012074	•	•	•	•
1 x .035	B4016X035074	M4016074	•	•	•	•
1 x .049	B4016X049074	M4016074	•	•	•	•
1 x .065	B4016X065074	M4016074	•	•	•	•
1 x .083	B4016X083074	M4016074	•	•	•	•
1 x .095	B4016X095074	M4016074	•	•	•	•
1 x .109	B4016X109074	M4016074	•	•	•	•
1 x .120	B4016X120074	M4016074	•	•	•	•
1 1/4 x .049	B4020X049074	M4020074	•	•	•	•
1 1/4 x .065	B4020X065074	M4020074	•	•	•	•
1 1/4 x .083	B4020X083074	M4020074	•	•	•	•
1 1/4 x .095	B4020X095074	M4020074	•	•	•	•
1 1/4 x .109	B4020X109074	M4020074	•	•	•	•
1 1/4 x .120	B4020X120074	M4020074	•	•	•	•
1 1/2 x .065	B4024X065074	M4024074	•	•	•	•
1 1/2 x .083	B4024X083074	M4024074	•	•	•	•
1 1/2 x .095	B4024X095074	M4024074	•	•	•	•
1 1/2 x .109	B4024X109074	M4024074	•	•	•	•
1 1/2 x .120	B4024X120074	M4024074	•	•	•	•

Tooling suitable for 37°/74° flaring of steel, stainless steel, aluminum, monel, copper, and cupro-nickel tube materials. For 37°/74° flaring, one die covers each tube O.D.; a different pin is required for each tube wall. Setscrews in flaring dies may require slight adjustment for different tube materials and/or tube walls.

Table S7 — Parflange Flaring Tooling for Inch Sizes

Tube Size O.D. x Wall Thickness (mm)	Tooling for 37°/74° Tube Flaring		Available Flaring Tooling			
	Pin Part Number	Die Part Number	1040		1025	
			-S	-SS	-S	-SS
6 x 1	B4007406X1M	M4007406M	•	•	•	•
6 x 1.5	B4007406X1.5M	M4007406M	•	•	•	•
8 x 1	B4007408X1M	M4007408M	•	•	•	•
8 x 1.5	B4007408X1.5M	M4007408M	•	•	•	•
10 x 1	B4007410X1M	M4007410M	•	•	•	•
10 x 1.5	B4007410X1.5M	M4007410M	•	•	•	•
12 x 1.5	B4007412X1.5M	M4007412M	•	•	•	•
12 x 2	B4007412X2M	M4007412M	•	•	•	•
15 x 1.5	B4007415X1.5M	M4007415M	•	•	•	•
15 x 2	B4007415X2M	M4007415M	•	•	•	•
16 x 1.5	B4007416X1.5M	M4007416M	•	•	•	•
16 x 2	B4007416X2M	M4007416M	•	•	•	•
18 x 2	B4007418X2M	M4007418M	•	•	•	•
20 x 2	B4007420X2M	M4007420M	•	•	•	•
20 x 2.5	B4007420X2.5M	M4007420M	•	•	•	•
25 x 2	B4007425X2M	M4007425M	•	•	•	•
25 x 2.5	B4007425X2.5M	M4007425M	•	•	•	•
25 x 3	B4007425X3M	M4007425M	•	•	•	•
30 x 2.5	B4007430X2.5M	M4007430M	•	•	•	•
30 x 3	B4007430X3M	M4007430M	•	•	•	•
32 x 3	B4007432X3M	M4007432M	•	•	•	•
38 x 3	B4007438X3M	M4007438M	•	•	•	•
38 x 4	B4007438X4M	M4007438M	•	•	•	•

Tooling suitable for 37°/74° flaring of steel, stainless steel, aluminum, monel, copper, and cupro-nickel tube materials. Apply LB 2000 lube to flaring pin. Setscrews in flaring dies may require slight adjustment for different tube materials and/or tube walls.

Table S8 — Parflange Flaring Tooling for Metric Sizes



Fig. S80 — Flaring Pin



Fig. S81 — Flaring Die

SAE Straight Thread Port Tapping Tools

Taps are available for SAE J1926-1 female straight thread ports in sizes 2 through 32. Taps are bottoming type and made from high speed tool steel.

SAE Dash Size	Overall Length (in.)	Shank Dia. (in.)	Wrench Flat Size (in.)	Part No.
2	2 23/32	0.318	0.238	5/16X24 UNF-2B
3	2 15/16	0.381	0.286	3/8X24 UNF-2B
4	3 5/16	0.323	0.242	7/16X20 UNF-2B
5	3 3/8	0.367	0.275	1/2X20 UNF-2B
6	3 19/32	0.429	0.322	9/16X18 UNF-2B
8	4 1/4	0.590	0.442	3/4X16 UNF-2B
10	4 11/16	0.697	0.523	7/8X14 UNF-2B
12	5 1/8	0.896	0.672	1 1/16X12 UNF-2B
14	5 7/16	1.021	0.766	1 3/16X12 UNF-2B
16	5 3/4	1.108	0.831	1 5/16X12 UNF-2B
20	6 11/16	1.305	0.979	1 5/8X12 UNF-2B
24	7 5/16	1.519	1.139	1 7/8X12 UNF-2B
32	8 3/4	2.100	1.575	2 1/2X12 UNF-2B



Fig. S82 — SAE Straight Thread Port Tapping Tool

SAE Straight Thread Port Counterboring Tools

Parker offers counterboring tools for SAE J1926-1 female straight thread ports in sizes 2 through 32. Counterbores are 4-fluted high speed tool steel.

SAE Dash Size	Shank Dia. (in.)	Shank Length (in.)	Overall Length (in.)	Recommended Pilot Drill or Bore Size (in.)	Part No.
2	1/2	1 1/2	2 1/2	0.266	Y-34730
3	1/2	1 1/2	2 1/2	0.328	Y-34731
4	1/2	1 1/2	2 41/64	0.377	Y-34732
5	1/2	1 1/2	2 41/64	0.438	Y-34733
6	3/4	1 1/2	2 47/64	0.500	Y-34734
8	3/4	1 1/2	2 53/64	0.672	Y-34735
10	1	2	3 29/64	0.797	Y-34736
12	1	2	3 19/32	0.969	Y-34737
14	1	2	3 41/64	1.095	Y-34738
16	1	2	3 41/64	1.220	Y-34739
20	1 1/2	2	3 37/64	1.530	Y-34740
24	1 1/2	2	3 37/64	1.780	Y-34741
32	1 1/2	2	3 49/64	2.405	Y-34743



Fig. S83 — SAE Straight Thread Port Counterboring Tool

* See [Appendix](#) for recommended use of port tools.

Dimensions and pressures for reference only, subject to change.

BSPP Straight Thread Port Counterboring Tools*

Parker offers counterboring/spotfacing tools for DIN 3852-1 female straight thread port connections in sizes 1/8" through 2". Counterbores are carbide tipped.

Size	Shank Dia. (in.)	Shank Length (in.)	Overall Length (in.)	Part No.
G1/8	1/2	1 1/2	2 1/2	974094-G1/8
G1/4	1/2	1 1/2	2 1/2	974094-G1/4
G3/8	3/4	1 1/2	2 1/2	974094-G3/8
G1/2	3/4	2	3	974094-G1/2
G3/4	1	2	3	974094-G3/4
G1	1	2	3 1/2	974094-G1
G1-1/4	1 1/2	2	3 1/2	974094-G1-1/4
G1-1/2	1 1/2	2	3 1/2	974094-G1-1/2



Fig. S84 — BSPP Straight Thread Port Counterboring Tool

BSPP Straight Thread Tapping Tools*

BSPP taps are available for ISO 228-1 threaded connections in sizes 1/8" through 1 1/2". All taps are bottoming type manufactured from high speed steel.

Size	Shank Dia. (in.)	Overall Length (in.)	Thread Size	Part No.
G1/8	0.438	2 1/8	1/8-28	974242-G1/8
G1/4	0.563	2 7/16	1/4-19	974242-G1/4
G3/8	0.700	2 9/16	3/8-19	974242-G3/8
G1/2	0.688	3 1/8	1/2-14	974242-G1/2
G3/4	0.906	3 1/4	3/4-14	974242-G3/4
G1	1.125	3 3/4	1-11	974242-G1
G1-1/4	1.313	4	1 1/4-11	974242-G1-1/4
G1-1/2	1.500	4 1/4	1 1/2-11	974242-G1-1/2



Fig. S85 — BSPP Straight Thread Tapping Tool

BSPT Taper Pipe Thread Tapping Tools*

BSPT taps are available for ISO 7-1 taper thread connections in sizes 1/8" through 1 1/2". All taps are bottoming type manufactured from high speed steel.

Size	Shank Dia. (in.)	Overall Length (in.)	Thread Size	Part No.
R1/8	0.438	2 1/8	1/8-28	974243-R1/8
R1/4	0.563	2 7/16	1/4-19	974243-R1/4
R3/8	0.700	2 9/16	3/8-19	974243-R3/8
R1/2	0.688	3 1/8	1/2-14	974243-R1/2
R3/4	0.906	3 1/4	3/4-14	974243-R3/4
R1	1.125	3 3/4	1-11	974243-R1
R1-1/4	1.313	4	1 1/4-11	974243-R1-1/4
R1-1/2	1.500	4 1/4	1 1/2-11	974243-R1-1/2



Fig. S86 — BSPT Taper Pipe Thread Tapping Tool

* See [Appendix](#) for recommended use of port tools.

Dimensions and pressures for reference only, subject to change.

NPTF Thread Tapping Tools*

NPTF taps are available for taper pipe thread connections in sizes 1/8" through 1 1/2". All taps are bottoming type manufactured from high speed steel.

Shank Dia. (in.)	Overall Length (in.)	Thread Size	Part No.
0.438	2 1/8	1/8-27	974244-1/8
0.563	2 7/16	1/4-18	974244-1/4
0.700	2 9/16	3/8-18	974244-3/8
0.688	3 1/8	1/2-14	974244-1/2
0.906	3 1/4	3/4-14	974244-3/4
1.125	3 3/4	1-11 1/2	974244-1
1.313	4	1 1/4-11 1/2	974244-1-1/4
1.500	4 1/4	1 1/2-11 1/2	974244-1-1/2



Fig. S87 — NPTF Port Tap

ISO 6149-1 Straight Thread Port Tapping Tools*

ISO 6149-1 female straight thread port taps are available for M8 to M48 port sizes. Taps are bottoming type and made from high speed steel.

Overall Length (in.)	Shank Dia. (in.)	Wrench Flat Size (in.)	Thread Size	Part No.
2 23/32	0.318	0.238	M8x1	M8X1
2 15/16	0.381	0.286	M10x1	M10X1-6H
3 3/8	0.367	0.275	M12x1.5	M12X1.5-6H-TAP
3 19/32	0.429	0.322	M14x1.5	M14X1.5-6H-TAP
3 13/16	0.400	0.360	M16x1.5	M16X1.5-6H-TAP
4 1/32	0.542	0.406	M18x1.5	M18X1.5-6H-TAP
4 11/16	0.697	0.523	M22x1.5	M22X1.5-6H-TAP
5 1/8	0.896	0.672	M27x2	M27X2-6H-TAP
5 3/4	1.108	0.831	M33x2	M33X2-6H-TAP
7	1.430	1.072	M42x2	M42X2-6H-TAP
7 5/8	1.644	1.233	M48x2	M48X2-6H-TAP



Fig. S88 — ISO 6149-1 Straight Thread Port Tap

ISO 6149-1 Straight Thread Port Counterbore*

Tool..... [See page \(S37\)](#)

ISO 6149-1 Straight Thread Port Counterbore*

Tool w/I.D. Groove..... [See page \(S37\)](#)

* See [Appendix](#) for recommended use of port tools.

Dimensions and pressures for reference only, subject to change.

ISO 6149-1 Straight Thread Port Counterboring Tools — Small Spotface

ISO 6149-1 female straight thread port counterboring tools are available with small spotface for M8 to M48 port sizes. Counterbores are 4-fluted*, carbide-tipped.

Shank Dia. (in.)	Shank Length (in.)	Overall Length (in.)	Recommended Pilot Drill or Bore Size (in.)	Use with Thread Size	Part No.
1/2	2	4 1/8	0.272	M8x1*	R1449B
1/2	2	4 1/8	0.348	M10x1*	R1450B
1/2	2	4 1/8	0.406	M12x1.5	R 1451B-S
1/2	2	4 1/8	0.484	M14x1.5	R 1452B-S
1/2	2	4 1/8	0.563	M16x1.5	R 1453B-S
1/2	2	4 1/8	0.641	M18x1.5	R 1454B-S
1/2	2	4 1/8	0.797	M22x1.5	R 1455B-S
3/4	2 1/2	5	0.969	M27x2.....	R 1456B-S
3/4	2 1/2	5	1.210	M33x2.....	R 1457B-S
3/4	2 1/2	5	1.565	M42x2.....	R 1458B-S
3/4	2 1/2	5	1.801	M48x2	R1459B

* M8 and M10 are 3-fluted

ISO 6149-1 Straight Thread Port Counterboring Tools with ID Groove

ISO 6149-1 female straight thread port counterboring tools are available with identification groove for M8 to M48 port sizes. Counterbores are 4-fluted*, carbide-tipped.

Shank Dia. (in.)	Shank Length (in.)	Overall Length (in.)	Recommended Pilot Drill or Bore Size (in.)	Use with Thread Size	Part No.
1/2	2	4 1/8	0.348	M10x1*	R1450A
1/2	2	4 1/8	0.406	M12x1.5	R1451A
1/2	2	4 1/8	0.484	M14x1.5	R1452A
1/2	2	4 1/8	0.563	M16x1.5	R1453A
1/2	2	4 1/8	0.641	M18x1.5	R1454A
1/2	2	4 1/8	0.797	M22x1.5	R1455A
3/4	2 1/2	5	0.969	M27x2.....	R1456A
3/4	2 1/2	5	1.210	M33x2.....	R1457A

* M10 are 3-fluted

* See [Appendix](#) for recommended use of port tools.



Fig. S89 — ISO 6149-1 Straight Thread Port Counterboring Tool — Small Spotface



Fig. S90 — ISO 6149-1 Straight Thread Port Counterboring Tool with ID Groove

Ferulset® Pre-Setting Tool

For Ferulok® flareless tube fittings.

Ferulset provides a fast and easy way to manually pre-set the ferrule onto steel and stainless steel tube with the famous Ferulok “bite.” Ferulset bodies are manufactured from hardened steel for withstanding repeated pre-sets. A separate tool is required for each size tube; size 2 (1/8” O.D.) through size 32 (2” O.D.).

HOW TO USE: Lubricate threads on tool, threads on nut, as well as tail and lead ends of ferrule with a suitable lubricant such as STP. Insert tube end with ferrule into tool until it bottoms against shoulder and thread the nut down until finger tight. Light wrenching may be required to get to a consistent starting position, especially with larger sizes. Hold tube steady against internal shoulder and tighten nut 1-3/4 turns. Loosen nut and inspect bite using inspection criteria outlined for Ferulok in the [Assembly / Installation section](#).



Fig. S91 — Ferulset®

Size	Tube O.D. (in.)	Part No.
2	1/8	560576
3	3/16	560577
4	1/4	560578
5	5/16	560579
6	3/8	560580
8	1/2	560581
10	5/8	560582
12	3/4	560583
14	7/8	560584
16	1	560585
20	1 1/4	560586
24	1 1/2	560587
32	2	560589

Dimensions and pressures for reference only, subject to change.



VOMO Pre-Assembly Bodies

For “EO” and “EO-2” Flareless Metric Tube Fittings

VOMO tools are made of hardened tool-steel, for standard assembly of steel fittings, stainless steel fittings and hose standpipes (BE).

Refer to the [EO/EO2 Assembly and Installation section](#) for use information

NOTE: It is strongly recommended that a hydraulic tool be used to preset EO-2 fittings in sizes 30S, 35L, 38S and 42L.



Fig. S92 — VOMO Pre-Assembly Tool

Series	Tube O.D. (mm)	Part No.
LL	4.....	VOMO04LLX
LL	6.....	VOMO06LLX
LL	8.....	VOMO08LLX
LL	10.....	VOMO10LLX
LL	12.....	VOMO12LLX
L	6.....	VOMO06LX
L	8.....	VOMO08LX
L	10.....	VOMO10LX
L	12.....	VOMO12LX
L	15.....	VOMO15LX
L	18.....	VOMO18LX
L	22.....	VOMO22LX
L	28.....	VOMO28LX
L	35.....	VOMO35LX
L	42.....	VOMO42LX
S	6.....	VOMO06SX
S	8.....	VOMO08SX
S	10.....	VOMO10SX
S	12.....	VOMO12SX
S	14.....	VOMO14SX
S	16.....	VOMO16SX
S	20.....	VOMO20SX
S	25.....	VOMO25SX
S	30.....	VOMO30SX
S	38.....	VOMO38SX

User instructions located on [page T28](#).

Hyferset

Parker Hydraulic Ferrule Pre-Setting Tool for Ferulok® Fittings and EO/EO-2 Metric Fittings

PORTABLE...EFFICIENT...EASY TO USE

The Hyferset is an efficient, dependable device for pre-setting Parker ferrules on tube of steel and stainless steel. This task is made easy through hydraulic power provided by a hand or electric pump. The equipment is portable, and has an optional sturdy wood carrying case.

In hydraulic pre-setting, little physical strength is required by the operator to set ferrules properly. Although the amount of force needed increases as the ferrule size increases, the pressure can be easily achieved.

This tool accommodates pre-setting dies for tubes ranging in size from 4 through 32 (1/4" through 2" outside diameter) and 6mm to 28mm O.D. metric sizes. The tube, with tube nut and ferrule, is positioned in the die. The hydraulic "push" of the Hyferset pre-sets the ferrule onto the tube — producing a visible ridge of metal, in front of the sleeve bite edge, that can be easily inspected.

Positive Stop Body Dies (For Ferulok Fittings Only)

The positive stop body die design eliminates the need for predetermined relief valve settings, pressure gauges or chart reading. Positive stop feature allows for uniform assemblies to be made on tube from 1/4" thru 2". One set of dies can be used on both steel and stainless steel tube. When used in conjunction with the Ferulok visible bite ferrules, the entire system is the most reliable method available for assembling a fitting to a piece of tube.

See [Appendix](#) for pre-setting pressures for EO and EO-2 steel fittings.

A video (on DVD) is included to provide instructions for proper use.

COMPONENTS REQUIRED

Part Name	Part No.
Hyferset (basic unit, no accessories).....	611011A
Hyferset Adapter.....	6 FLO-S
Gauge "T" Adapter.....	6 R6LO-S
Hose Assembly.....	910004
Gauge Swivel Adapter.....	6 G6L-S
Pressure Gauge (0 - 10,000 psi).....	900044
Hand pump (10,000 psi, 2 speed).....	900086
Electric pump (10,000 psi, 1/2 HP, 40-125 volt).....	900085
Nut die set (1/4" to 2" O.D.).....	See page S41
Positive Stop body die (1/4" to 2" O.D.).....	See page S41
Nut Die Set (6mm to 28mm).....	See page S42
Body Die (6mm to 28mm).....	See page S42



Fig. S93 — Hyferset



Fig. S94 — Electric Pump



Fig. S95 — Hand Pump

Dimensions and pressures for reference only, subject to change.

OPTIONAL ACCESSORIES

Part Name	Part No.
Wooden carrying case.....	651085



Fig. S96 — Hyferset Wood Carrying Case

Part Name	Part No.
Hyferset Kit.....	611049C
Includes basic unit, hand hydraulic pump, hose assembly, 1 adapter (6 FLO-S), wooden carrying case, operation manual and video.	



Fig. S97 — Hyferset Kit

Hyferset Body Dies for Ferulok Fittings

Size	Tube O.D. (in.)	Part No.
4	1/4	720105-4
6	3/8	720105-6
8	1/2	720105-8
10	5/8	720105-10
12	3/4	720105-12
14	7/8	720105-14
16	1	720105-16
20	1 1/4	720105-20
24	1 1/2	720105-24
32	2	720105-32



Fig. S98 — Body Die

Hyferset Nut Dies for Ferulok Fittings

Size	Tube O.D. (in.)	Part No.
4	1/4	680370-4
6	3/8	680370-6
8	1/2	680370-8
10	5/8	680370-10
12	3/4	680370-12
14	7/8	680370-14
16	1	680370-16
20	1 1/4	680370-20
24	1 1/2	680370-24
32	2	680370-32



Fig. S99 — Nut Die

Dimensions and pressures for reference only, subject to change.

Hyferset Body Dies for EO / EO-2 Fittings

Series	Tube O.D. Size (mm)	Part No.
L	6.....	910290-6L
L	8.....	910290-8L
L	10.....	910290-10L
L	12.....	910290-12L
L	15.....	910290-15L
L	18.....	910290-18L
L	22.....	910290-22L
L	28.....	910290-28L
L	35.....	910290-35L
L	42.....	910290-42L
S	6.....	910289-6S
S	8.....	910289-8S
S	10.....	910289-10S
S	12.....	910289-12S
S	14.....	910289-14S
S	16.....	910289-16S
S	20.....	910289-20S
S	25.....	910289-25S
S	30.....	910289-30S
S	38.....	910289-38S

**Fig. 100 — Body Die****Hyferset Nut Dies for EO / EO-2 Fittings**

Tube O.D. Size (mm)	Part No.
6.....	910291-6 mm
8.....	910291-8 mm
10.....	910291-10 mm
12.....	910291-12 mm
14.....	910291-14 mm
15.....	910291-15 mm
16.....	910291-16 mm
18.....	910291-18 mm
20.....	910291-20 mm
22.....	910291-22 mm
25.....	910291-25 mm
28.....	910291-28 mm

**Fig. S101 — Nut Die**

Dimensions and pressures for reference only, subject to change.

Hydra-Tool

Pre-Setting Components

COMPONENTS REQUIRED

Part Name	Part No.
Hydra-Tool (basic unit) (Fig. S102)	710400B
Hand pump (10,000 psi, 2 speed)	900086
Electric pump (10,000 PSI, 1/2 HP, 40-125 volt)	900085
Hose Assembly	910004
Back-up Plate (sizes -4 to -32 and 6mm to 28mm)	770102
Back-up Plate (sizes 30 to 42mm)	See page S46
Ram Insert (sizes -4 to -32)	770101
Small Ram Insert (EO & EO-2 only)	971108
Large Piston Stop Adapter (EO & EO-2 only)	971107
Nut die set (1/4" to 2" O.D.)	See below
Positive Stop body die (1/4" to 2" O.D.)	See below
Nut Die Set (6mm to 42mm)	See page S46
Body Die (6mm to 42mm)	See page S46
Pressure Gauge (0 - 10,000 psi)	900044
Male Adapter	6-8 F5OLO-S
Adapter	6 G6L-S
Hydra-Tool Gauge Adapter	6 R6LO-S

See [Appendix](#) for pre-setting pressures.



Fig. S102 — Hydra Tool



Fig. S103 — Ram Insert
(Ferulok Only)

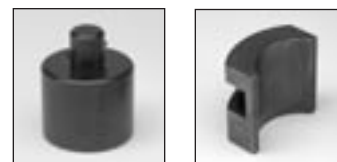


Fig. S104 — Small Ram Insert
and Stop Adapter
(EO and EO-2 only)

Hydra-Tool Body Dies for Ferulok Fittings

Size	Tube O.D. (in.)	Part No.
4	1/4	720105-4
6	3/8	720105-6
8	1/2	720105-8
10	5/8	720105-10
12	3/4	720105-12
14	7/8	720105-14
16	1	720105-16
20	1 1/4	720105-20
24	1 1/2	720105-24
32	2	720105-32

Hydra-Tool Nut Dies for Ferulok Fittings

Size	Tube O.D. (in.)	Part No.
4	1/4	680370-4
6	3/8	680370-6
8	1/2	680370-8
10	5/8	680370-10
12	3/4	680370-12
14	7/8	680370-14
16	1	680370-16
20	1 1/4	680370-20
24	1 1/2	680370-24
32	2	680370-32



Fig. S105 — Body Die



Fig. S106 — Nut Die Set

Dimensions and pressures for reference only, subject to change.

Hydra-Tool Body Dies for EO / EO-2 Fittings

Series	Tube O.D. Size (mm)	Part No.
L	6.....	910290-6L
L	8.....	910290-8L
L	10.....	910290-10L
L	12.....	910290-12L
L	15.....	910290-15L
L	18.....	910290-18L
L	22.....	910290-22L
L	28.....	910290-28L
L	35.....	910290-35L
L	42.....	910290-42L
S	6.....	910289-6S
S	8.....	910289-8S
S	10.....	910289-10S
S	12.....	910289-12S
S	14.....	910289-14S
S	16.....	910289-16S
S	20.....	910289-20S
S	25.....	910289-25S
S	30.....	910289-30S
S	38.....	910289-38S



Fig. S107 — Body Die

Fig. S108 — Back up
Plate**Hydra-Tool Nut Die / Split Back-up Plate
Sets for EO / EO-2 Fittings**

Tube O.D. Size (mm)	Part No.
6.....	910291-6 mm
8.....	910291-8 mm
10.....	910291-10 mm
12.....	910291-12 mm
14.....	910291-14 mm
15.....	910291-15 mm
16.....	910291-16 mm
18.....	910291-18 mm
20.....	910291-20 mm
22.....	910291-22 mm
25.....	910291-25 mm
28.....	910291-28 mm
30.....	970135-30 mm
35.....	970135-35 mm
38.....	970135-38 mm
42.....	970135-42 mm

Fig. S109 — Split Nut
Dies

Fig. S110 — Nut Die

Dimensions and pressures for reference only, subject to change.

EO-Karrymat

Part No.
EO-Karrymat

The EO-Karrymat is a dependable device for safe and efficient bite-type pre-setting. It allows pre-assembly of all sizes of EO, EO-2 and Ferulok fittings without the need for electric power.

The EO-Karrymat consists of a hydraulic drive, Handpump and pressure gauge, all firmly attached to a carrying case.



Fig. S111— EO-Karrymat

EO-Karrymat Body Dies for EO / EO-2 Fittings

Series	Tube O.D. (mm)	Part No.
LL	4.....	MOK04LLX
LL	6.....	MOK06LLX
LL	8.....	MOK08LLX
LL	10.....	MOK10LLX
LL	12.....	MOK12LLX
L	6.....	MOK06LX
L	8.....	MOK08LX
L	10.....	MOK10LX
L	12.....	MOK12LX
L	15.....	MOK15LX
L	18.....	MOK18LX
L	22.....	MOK22LX
L	28.....	MOK28LX
L	35.....	MOK35LX
L	42.....	MOK42LX
S	6.....	MOK06SX
S	8.....	MOK08SX
S	10.....	MOK10SX
S	12.....	MOK12SX
S	14.....	MOK14SX
S	16.....	MOK16SX
S	20.....	MOK20SX
S	25.....	MOK25SX
S	30.....	MOK30SX
S	38.....	MOK38SX



Fig. S112 — MOK Body Die

Dimensions and pressures for reference only, subject to change.

EO-Karrymat Nut Dies for EO / EO-2 Fittings

Series	Tube O.D. (mm)	Part No.
LL	4.....	GHP04X
LL	6.....	GHP06X*
LL	8.....	GHP08X*
LL	10.....	GHP10X*
LL	12.....	GHP12X*
L	6.....	GHP06X*
L	8.....	GHP08X*
L	10.....	GHP10X*
L	12.....	GHP12X*
L	15.....	GHP15X
L	18.....	GHP18X
L	22.....	GHP22X
L	28.....	GHP28X
L	35.....	GHP35X
L	42.....	GHP42X
S	6.....	GHP06X*
S	8.....	GHP08X*
S	10.....	GHP10X*
S	12.....	GHP12X*
S	14.....	GHP14X
S	16.....	GHP16X
S	20.....	GHP20X
S	25.....	GHP25X
S	30.....	GHP30X
S	38.....	GHP38X

* Nut Dies for 6-12mm are identical in LL, L and S series.



Fig. S113 — GHP Nut Die

EO-Karrymat Body Dies for Ferulok Fittings

Tube Size (in.)	Part No.
1/4.....	976521-4
3/8.....	976521-6
1/2.....	976521-8
5/8.....	976521-10
3/4.....	976521-12
7/8.....	976521-14
1.....	976521-16
1 1/4.....	976521-20
1 1/2.....	976521-24
2.....	976521-32



Fig. S114 — EO-Karrymat Body Die for Ferulok

EO-Karrymat Back-up Plates for Ferulok Fittings

Tube Size (in.)	Part No.
1/4.....	975867-4
3/8.....	975867-6
1/2.....	975867-8
5/8.....	975867-10
3/4.....	975867-12
7/8.....	975867-14
1.....	975867-16
1 1/4.....	975867-20
1 1/2.....	975867-24
2.....	975867-32



Fig. S115 — EO-Karrymat Back-up Plates for Ferulok

Dimensions and pressures for reference only, subject to change.

EOMAT III

Pre-Setting Machine for EO and EO-2 Fittings

The EOMAT III is an electronically controlled hydraulic drive unit for pre-assembly of cutting rings for both EO and EO-2 fittings. It can be utilized with steel and stainless steel tube with an outer diameter of 6mm through 42mm. The required operating pressure depends on the tube type, material and tube dimensions, and is automatically selected by a microprocessor. The EOMAT III is available with 440V/60Hz.

For additional technical information, please see Catalog 4303-GB.

DIMENSIONS: W – 27.17" H – 12.6" D – 20.87"

COMPONENTS REQUIRED

Part Name	Part No.
EOMAT III	EOMATIII/A440V60HZX
Assembly Fixture (pre-setting)	EOMATSCHNEIDRX
Fixture for Flaring	EOMATBOERDELBX
Body Die	See page S47
Nut Die	See page S47

OPTIONAL ACCESSORIES

Part Name	Part No.
Foot Pedal Switch	EOMATIIIIFUSSX
Tool Compartment	EOMATWERKZGAUFN.X



Fig. S116 — EOMAT IIIA

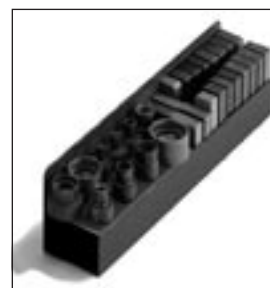


Fig. S117 — Tool Compartment (tooling shown, but not included)



Fig. S118 — Assembly Fixture



Fig. S119 — Foot Pedal Switch

Dimensions and pressures for reference only, subject to change.

O-Ring Pick

Part No.
O-Ring Pick

Plastic O-ring pick allows for easy removal of O-rings without causing damage to the fitting.



Fig. S120 — O-Ring Pick

Captive O-Ring Assembly Tool

The captive O-ring (CORG) assembly tool utilizes a Parker patented method for inserting O-rings in ORFS fittings, such as Seal-Lok, without causing O-ring damage. These tools can be used both as a hand tool and a bench-mounted tool. All CORG tools have a #8-32 tapped hole to allow easy mounting.

Fitting Size	L (in.)	D1 (in.)	D2 (in.)	O-Ring Size	Part No.
-4	1.4	0.8	0.6	2-011	CORG-4
-6	1.5	0.9	0.6	2-012	CORG-6
-8	1.5	1.1	0.8	2-014	CORG-8
-10	1.6	1.3	0.9	2-016	CORG-10
-12	1.9	1.4	1.1	2-018	CORG-12
-16	1.9	1.7	1.3	2-021	CORG-16
-20	2.1	1.9	1.6	2-025	CORG-20
-24	2.1	2.3	1.9	2-029	CORG-24
-32	2.2	2.8	2.4	2-135	CORG-32



Fig. S121 — Captive O-Ring Assembly Tool

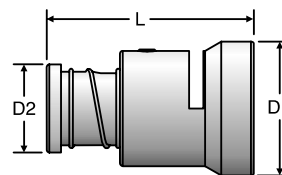


Fig. S122 — Captive O-Ring Assembly Tool dimensions

Dimensions and pressures for reference only, subject to change.

Lubricants

Lubricants act as friction reducers to ease forming processes, fitting assembly and prevent galling, corrosion and seizing of components. The use of the correct lubricant for various purposes is critical to achieve maximum tool life during forming processes and performance of threaded connections.

Parflange® Lubricants

Lubricants are used to maximize tool life during the flanging process. Selection of the appropriate lubricant for the type of Parflange machine is critical to its proper operation.

Part Description

Recommended for use with steel or stainless steel	Part No. LB 2000 (8 oz.)
Recommended for use with carbon steel only	MPG-2 Grease/1030



Fig. S123 — Parflange Lubricants, LB 2000 and MPG-2

Flaring and Presetting Lubricants

High pressure lubricant is necessary to maximize tool life and assure flare/preset quality during the associated processes. STP lubricant is recommended for lubrication of all presetting tools and for the flaring tooling associated with the Hydra-Tool and Karryflare machines.

Part Description

Flaring and Presetting Lubricant	Part No. STP
----------------------------------------	-------------------------------



Fig. S124 — STP Lubricant

EO / EO-2 Fitting Lubricants

EO Niromont lubricants are specifically developed for lubrication of threads prior to assembly of EO and EO-2 fittings.

Part Description

EO Niromont – Liquid 250cc bottle.....	Part No. Niromont-Liquid
EO Niromont – Paste 130 g. tin	Niromont-Paste



Fig. S125 — EO Niromont

Loctite Anti-Seize Lubricant

This highly refined blend of aluminum, copper and graphite lubricant is designed for use during assembly of threaded components to prevent galling, corrosion and seizing in temperatures of -65°F to +1600°F. This lubricant also assures easier assembly. The lubricant is salt-, corrosion- and moisture-resistant. Applications: Stainless steel threads for reduced chance of galling.

Part Description

4 oz. Tube, Brush Top	Part No. 80209
8 oz. Bottle, Brush Top	76732
13 oz. Aerosol.....	76759
8 oz. Bottle, Marine Grade.....	34395
16 oz. Bottle, Marine Grade.....	34026



Fig. S126 — Loctite Anti-Seize Lubricant

Dimensions and pressures for reference only, subject to change.

Super-Lube® PTFE Grease

Super-Lube® is developed for lubricating against friction and wear of mating components. It withstands temperatures ranging from -45°F to +450°F.

Part Description	Part No.
Super-Lube® 11 oz. Aerosol	20029

Loctite Penetrating Oil

This product penetrates, lubricates and displaces moisture in mating components. Loctite Penetrating Oil also protects against rust and corrosion.

Part Description	Part No.
16 oz. Aerosol.....	51221



Fig. S127 —
Super-Lube



Fig. S128 — Loctite
Penetrating Oil

O-Ring Lubricants**Parker O-Lube**

O-Lube is an outstanding general-purpose grease intended for use with O-rings and other seals in hydraulic and pneumatic systems. The temperature range is from -29°C to +82°C (-20°F to +180°F).

Part Description	Part No.
O-ring Lubricant.....	OLUBE-884-4-TFD



Fig. S129 — Parker O-Lube

Parker Super O-Lube

Super O-Lube is an all-purpose O-ring lubricant. It is not a grease, but rather a high-viscosity silicone oil. The temperature range is -54°C to +204°C (-65°F to +400°F).

Part Description	Part No.
O-ring Lubricant.....	SLUBE-884-2-TFD



Fig. S130 — Parker
Super O-Lube

Dimensions and pressures for reference only, subject to change.

Thread Sealants

Thread sealants seal and secure metal pipes and fittings by filling the space between the threaded metal parts. Thread sealants harden to prevent leakage caused by vibration loosening, solvent evaporation, damaged threads and temperature cycling. Designed for low and high pressure applications, thread sealants seal quickly for on-line low pressure testing. When fully cured, they seal to the burst strength of most systems. Thread sealants are easily remove with basic hand tools. Thread sealants can be used on pipe thread fittings.

Threadmate™ Sealant/Lubricant

Threadmate™ is an extreme-duty lubricant developed to reduce galling during the assembly of pipe thread fittings. Threadmate™ promotes reliable sealing of pipe threads, even at high pressure. Recommended for use on stainless steel pipe threads.

Size available	Part No.
4 oz. tube	MTM04T-TFD



Fig. S131 — Threadmate Sealant/Lubricant

Loctite Thread Sealant 567

Formulated specifically for metal tapered pipe thread fittings. PST 567 cures rapidly to provide immediate low pressure sealing. Its controlled lubricity prevents galling and it protects mated thread areas from rust and corrosion. Performs in temperatures ranging from -65°F to +44°F. Application: Stainless steel tapered pipe threads.

Part Description	Part No.
6 ml Tube	56707
50 ml Tube	56747



Fig. S132 — Loctite Thread Sealant 567

Loctite Thread Sealant 545

Designed for both hydraulic and pneumatic systems, 545 contains no fillers or particles which could contaminate system fluids, foul valves, or clog fine filters and screens. Applications: Steel and brass tapered pipe threads. Temperature range: -65°F to +300°F.

Part Description	Part No.
.5 ml Capsule.....	54505
50 ml Bottle.....	54531



Fig. S133 — Loctite Thread Sealant 545

Dimensions and pressures for reference only, subject to change.

Pipe Thread Sealing Cord

Loctite 55 Pipe Sealing Cord is a general purpose threaded pipe sealant. It is a non-curing, coated multifilament cord that seals fluids and gases in pipe threads up to 4". Sealant temperature ranges from -65°F to +300°F.

Part Description	Part No.
Pipe Thread Sealing Cord, 5,700 in.....	35082



Fig. S134 — Pipe Thread Sealing Cord

Thread Sealant Tape

Part Description	Part No.
1/2" x 520" Spools.....	PTFE Tape



Fig. S135 — PTFE Tape

Threadlockers

Thread lockers perform by filling the space between threaded metal parts and hardening to form a tough, adhesive bond and seal. Threadlockers seal the threads against leakage and prevent rust and corrosion. Threadlockers can be used on fasteners. Some threadlockers require extra effort or special tools for removal.

Loctite Primer N

Loctite 7649 Primer N decreases the set-up time of Loctite threadlockers and increases breakaway torque on most fastener surfaces. It allows for cold weather application. Applications: Use with Loctite threadlockers, thread sealants and retaining compounds.

Part Description	Part No.
25 g Aerosol	21347
4.5 oz. Aeorosol.....	21348



Fig. S136 — Loctite 7649 Primer N

Threadlocker 242

All-purpose, medium strength threadlocker is ideal for all nut and bolt applications. It eliminates the need for stocking expensive locknuts and washers. Its other advantages include locking and sealing while preventing parts loosening during vibration, protecting threads from corrosion, and easy disassembly with hand tools. Applications: All fastener applications. Temperature range: -65°F to +300°F.

Part Description	Part No.
10 ml Tube	24221
50 ml Tube	24231



Fig. S137 — Loctite Threadlocker 242

Dimensions and pressures for reference only, subject to change.

Loctite High Strength Threadlocker 271

High strength threadlocker for heavy-duty applications is especially well-suited for permanently locking studs and press fits. It replaces set screw and snap rings and locks against vibration loosening. Applications: Permanent fastener requirements. Temperature range: -65°F to +300°F. DO NOT USE THIS PRODUCT WITH PARKER TUBE FITTINGS. RECOMMENDED ONLY FOR FASTENER APPLICATIONS.

Part Description	Part No.
10 ml Tube	27121
50 ml Tube	27131



Fig. S138 — Loctite High Strength Threadlocker 271

Cleaners

Loctite cleaners and degreasers are designed for various applications to remove grease, grime, paint, adhesives and other soils your working hands get into. Fast Orange hand cleaners have added conditioners to prevent your hands from cracking and drying out.

Loctite Fast Orange Hand Cleaner

Fast Orange is the #1 selling biodegradable, waterless petroleum solvent-free hand cleaner that contains no harsh chemicals, mineral oils or ammonia that can sting cuts and abrasions. Pure, fresh smelling natural citrus power does the cleaning. With aloe, lanolin, jojoba, and now Corn Huskers Lotion® for added skin conditioning and protection, its smooth formula gently deep cleans the toughest dirt. Applications: Clean-up of resins, oil, grease, tar, ink, epoxies, paint and various adhesives.

Part Description	Part No.
Industrial Hand Wipes, 75 count.....	34943
15 oz. bottle	25116
1 gal. with pump.....	25218



Fig. S139 — Loctite Fast Orange Hand Cleaner

Loctite Natural Blue® Degreaser

This biodegradable, all-purpose, industrial strength, concentrated cleaner and degreaser can be easily diluted with water for use in a variety of cleaning applications. Non-flammable and non-toxic.

Part Description	Part No.
24 oz. Spray Bottle	82249
1 Gallon Concentrate.....	82251



Fig. S140 — Loctite Natural Blue® Degreaser

Dimensions and pressures for reference only, subject to change.

Loctite Pro Strength Parts Cleaner

This product was developed to aggressively penetrate, dissolve and remove oil and grease from parts. Dries quickly with no residue.

Part Description

19 oz. Aerosol.....

Part No.

30548

Loctite Rack

Parker's Loctite Rack makes a convenient counter top display for Loctite products. No supplies included.

Part Description

Loctite Product Rack

Part No.

RACK



Fig. S141 — Loctite Pro Strength Parts Cleaner



Fig. S142 — Loctite Rack (Supplies not included)

Dimensions and pressures for reference only, subject to change.

Tube Preparation Centers

Parker offers five different styles of tube preparation centers to meet various user's needs, from the basic TP-1 unit which includes a cabinet and deburr unit, to the TP1025 which offers the ability to cut, deburr, Parflange and flare tube.

Utilizing a sturdy steel cabinet with bins for fitting storage, tooling shelves and heavy duty casters to ease mobility, Parker Tube Preparation Centers cover almost every tube preparation need. All machines require 110V, 20A power supply.

Part Description

Part Description	Part No.
Tube Prep Center with Deburr Unit.....	TP-1
Tube Prep Center with Deburr and Saw	TP-974250
Tube Prep Center with Deburr, Saw and Hydratool	TP432
Tube Prep Center with Deburr, Saw and Hyferset	TP-611011A
Tube Prep Center with Deburr, Saw and Karryflare Tool	TP-Karryflare
Tube Prep Center with Deburr, Saw and 1025 Parflange	TP1025

Replacement Parts

Replacement Parts	Part No.
I.D. Deburr Cone	971816
O.D. Deburr Blades (set of 6).....	910485
Cutting Lubricant	Saw Lube
Saw Blade – 250 mm x 2.0 mm thick (all purpose)	987036
Saw Blade – 200 mm x 2.0 mm thick (all purpose)	987037
Flaring tooling for TP432	See page S29 - S31
Presetting tooling for TP432 and TP-Hyferset	See page S40 - S42
Karryflare Flaring tooling	See page S32
Flanging tooling for TP1025.....	See page S26
Flaring tooling for TP1025	See page S26
Lubricant for TP432 / TP-Hyferset	STP
Lubricant for TP1025	LB 2000



Fig. S143 — Tube Preparation Center TP1025

Dimensions and pressures for reference only, subject to change.

Thread Identification Kit

**Part No.
MIK-1**

The Thread Identification Kit can be used to identify metric, BSP, SAE and NPT threads, as well as SAE flanges. It contains thread gauges, calipers, thread profiles, and an instruction booklet that details most thread forms and connection styles found in fluidpower systems worldwide.



Fig. S144 — Thread Identification Kit

Portboards

The Portboards can be used for identification of ISO, SAE, BSP and NPT ports and port threads. They are machined with female threads for quick and easy identification by screwing in the male port end.

**Part No.
Portboard A**

Portboard A (SAE Straight Thread -2 through -32 and NPT 1/8 through 1 1/2).



Fig. S145— Portboard A

**Part No.
Portboard B**

Portboard B (Metric 8mm through 48mm and BSP 1/8 through 1 1/2).



Fig. S146 — Portboard B

Part No. ITK

Parker's International Thread Kit offers the necessary tools to identify almost any thread you may encounter. The new ITK has LL, L and S series plugs to identify female DIN threads such as EO style hose ends. It also includes the MIK-1 and BSPP plugs in order to identify BSPP hose ends from 1/8" to 2".



Fig. S147 — International Thread Kit (ITK)

Dimensions and pressures for reference only, subject to change.

Par-Lok® Wrench

360° Snap-action ratchet wrench for hex sizes from 3/8" to 2 1/4" across the flats and metric from 10mm to 50mm. Inch sizes meet government specifications and are listed as NSN-5120-00-474-7227. Wrenches are covered by a limited lifetime warranty. Damage due to over-torque is not covered by warranty.

Install Tube Fittings Faster

Easy access ratchet wrench speeds fittings installation in tight locations. Rugged, snap-action jaws can be opened over tube lines, locked onto fitting hex and ratcheted within 1/8 turn. Full six point contact prevents fitting distortion common with wrench slippage. Ideal for tube line installations where compact runs require multiple fittings make-up, disassembly and remakes.

Specifications

Par-Lok wrenches are available individually or in six different kit combinations. Par-Lok jaws are constructed from drop-forged, high carbon steel material with a black conversion coat finish. Par-Lok handles are made from heavy gauge steel material, heat treated and with a corrosion resistant black finish. Solid stainless steel rivets and tempered jaw springs are designed into every wrench for maximum strength.

Inch Hex Size Par-Lok Wrenches

Hex Size (in.)	Max. Torque (ft.-lbs.)	Part No.
3/8	24	860062-6
7/16	27	860062-7
1/2	32	860062-8
9/16	43	860062-9
5/8	65	860062-10
11/16	81	860062-11
3/4	92	860062-12
13/16	108	860062-13
7/8	135	860062-14
15/16	152	860062-15
1	162	860062-16
1 1/8	206	860062-18
1 1/4	238	860062-20
1 3/8	282	860062-22
1 1/2	314	860062-24
1 5/8	346	860062-26
1 7/8	364	860062-30
2	373	860062-32
2 1/4	391	860062-36

Part Description	Part No.
Full kit of sizes 3/8" to 1"	860062-KIT
Full kit of sizes 1 1/8" to 2 1/4"	860062-KIT2
Seal-Lok Wrench Kit	
(5/8", 11/16", 3/4", 13/16", 7/8", 15/16")	860062-LKIT
Triple-Lok and Ferulok Wrench Kit	
(9/16", 11/16", 7/8", 1", 1 1/4")	860062XUKIT



Fig. S148 — Par-Lok Wrench



Fig. S149 — Par-Lok Wrench Kit



Fig. S150 — Par-Lok Wrench

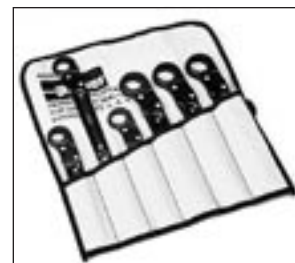


Fig. S151 — Seal-Lok Wrench Kit

Dimensions and pressures for reference only, subject to change.

Metric Hex Size Par-Lok Wrenches

Hex Size (mm)	Max. Torque (ft.-lbs.)	Max. Torque (N-m)	Part No.
10	26	35	860063-10
11	27	37	860063-11
12	31	42	860063-12
13	33	45	860063-13
14	42	57	860063-14
16	65	88	860063-16
17	79	107	860063-17
19	92	125	860063-19
21	110	149	860063-21
22	131	178	860063-22
24	154	209	860063-24
27	74	100	860063-27
30	74	100	860063-30
32	125	170	860063-32
36	125	170	860063-36
41	229	310	860063-41
46	243	330	860063-46
50	243	330	860063-50

Part Description	Part No.
Full kit of sizes 10mm to 22mm	860063-KIT
Full kit of sizes 27mm to 50mm	860063-KIT2



Fig. S152 — Triple-Lok and Ferulok Wrench Kit



Fig. S153 — Par-Lok Wrench Kit

Dimensions and pressures for reference only, subject to change.

Tube Fabricating Equipment Weights		Tube Fabricating Equipment Weights		Tube Fabricating Equipment Weights	
Part No.	Approx. Ship Weight (lbs.)	Part No.	Approx. Ship Weight (lbs.)	Part No.	Approx. Ship Weight (lbs.)
Vise Block with Flaring Pin		Ferulset Tools (Ferulok Pre-Set Tool)		Straight Thread Taps and Counterbores (Cont'd)	
4-2866	2	560576	0.5	Y-34730	0.5
5-2866	2	560577	0.5	Y-34731	0.5
6-2866	3	560578	0.5	Y-34732	0.5
8-2866	3.5	560579	0.5	Y-34733	0.75
10-2866	4	560580	0.5	Y-34734	1
12-2866	12	560581	0.5	Y-34735	1
14-2866	15	560582	0.5	Y-34736	1.5
16-2866	18	560583	0.5	Y-34737	1.5
20-2866	18	560584	0.5	Y-34738	1.75
24-2866	20	560585	0.5	Y-34739	2
Combination Flaring Tool		560586	0.5	Y-34740	2
210A	3	560587	1	Y-34741	2.5
Rolo-Flare Tool		560589	1	Y-34743	2.5
945 TH	4	Hyferset (Ferulok Pre-Set Tool)		Par-Lok Wrenches	
212FB	4	611011A	35	860062-Kit	4.5
Hydra-Tool		Hyferset Accessories		860062-Kit 2	28
710400B	62	900086	10	860063-Kit	4
720370B-3	85	910004	2	Tube Cutters	
Accessories (Hydra-Tool)		651085	15	218B	1
900044	1	Hyferset and Tooling		1232	3
910004	1.5	611049C	53	Parker Tru-Kut Sawing Vise	
720377	16	680370-4	3.5	710439	9
710416	4	720105-4	0.5	974250	198
710412	3	680370-6	3	Deburring Tools	
710419	2	720105-6	0.5	226A	1
710411	2	680370-8	3	972125	90
710424-1	4	720105-8	0.5	Hand Tube Benders	
710424-2	4	680370-10	2.5	2-2829S	2
710417-4	2	720105-10	0.5	3-2829S	2
710417-5	2	680370-12	2.5	4-2829S	2.5
710417-6	2	720105-12	0.5	5-2829S	2.5
710417-8	2	680370-14	2.5	6-2829S	3
710417-10	2	720105-14	0.5	8-2829S	3
710417-12	2	680370-16	1.5	10-2829	8
710417-14	2	720105-16	1	12-2829	15
710417-16	2	680370-20	2	14-2829	15
710417-20	2	720105-20	1	16-2829	16
710417-24	2	680370-24	1.5	4-2829AH	1.2
710417-32	2	720105-24	1	6-2829AH	3.7
Power Source (Pumps)		680370-32	1.5	8-2829AH	7.6
900085	30	720105-32	1	Exactol Tube Benders (412, 420 & 424)	
900086	10	Straight Thread Taps and Counterbores		560569 (412)	18.5
Flaring Dies - Metric (Hydra-Tool)		7/16-20 UNF-2B	1	550570	5
770106-6	2	9/16-18 UNF-2B	1	550572	25.5
770106-8	2	3/4-16 UNF-2B	1	621044 (420)	68
770106-10	2	7/8-14 UNF-2B	1.5	631156	10
770106-12	2	1 1/16-12 UN-2B	1.75	890127 (424)	73
770106-16	2	1 3/16-12 UN-2B	2	412 Kit	42
770106-18	2	1 5/16-12 UN-2B	2	424 Kit	—
770106-20	2	1 5/8-12 UN-2B	2.5	Slide Blocks (412, 420 & 424)	
770106-25	2	1 7/8-12 UN-2B	2.5	550585	3.5
770106-30	2	2 1/2-12 UN-2B	3	621045	5
770106-32	2			870150	5
Hydra-Tool				(Continued on next page)	
Ferulok Pre-Set Tooling					
770101	5				
770102	3				

Table N9 — Tube Fabricating Equipment Weight Chart

Dimensions and pressures for reference only, subject to change.



Tube Fabricating Equipment Weights		Tube Fabricating Equipment Weights		Tube Fabricating Equipment Weights	
Part No.	Approx. Ship Weight (lbs.)	Part No.	Approx. Ship Weight (lbs.)	Part No.	Approx. Ship Weight (lbs.)
Radius Blocks (412, 420 & 424)		HB632 Hydraulic Tube Bender		Clamp Blocks for HB632	
550579	1	631050 (632)	245	864266	4
550580	1	660221	8	631092	3
550581	2.5	900085	30	631093	3
50582	3	Radius Blocks (HB632)		027418-28	5
50583	4	540502	3	027418-32	5
550584	5	530763	3.5	Metric Clamp Blocks for HB632	
621046	7	530764	4	790017	3
621047	9	530765	6	780194	4
621048	9.5	530766	10	780195	3
621049	10	530768	14	780186	4
870149	11	530770	54	Metric Slide Blocks for HB632	
Small Radius Blocks (412, 420 & 424)		590512-18	35	790016	8
550573	2	590515-24	4	780191	11
550574	2	590518-30	6	780192	9
550575	2.5	590521-36	7	780193	8
550576	2.5	590523-42	8	Bender Table	
550577	3	590524-48	10	520515	470
550578	4	590526-54	12	Mandrel Rod Stop Assemblies	
Close Bend Radius Blocks		590630-72	16	550571	5
590533	2	631060-128	50	631141	20
590535	3	Close Bend Radius Blocks for HB632		Universal Side Angle Indicator	
590537	3	530597	3.5	520520	25
Metric Slide Blocks (412, 420 & 424)		530601	5	Karryflare Inch Flaring Dies for Karryflare	
820091	3	530605	6	M 047415-1	4
820092	5	530609	8	M 157408-1	4
820093	5	530613	10.5	M 067415-1	4
Metric Radius Blocks (412, 420 & 424)		530621	12	M 087415	4
820090-6mm	1	530625	13	M 107415	3.5
820090-8mm	2	Metric Radius Blocks for HB632		M 127415	3.5
820090-10mm	2	810023	3	M 167415	3.5
820090-12mm	3	780175	3.5	M 207415	3
820090-14mm	3	780176	4	M 157438	3
820090-16mm	4	780177	4	Parflange Tooling	
820090-18mm	4.5	780178	5	Pin and Die Set (1025)	4.5
820090-20mm	7	780179	6	Pin (1025)	.75
820090-22mm	9	780180	8	Die (1025)	3.75
820090-25mm	9.5	780181	9		
820090-28mm	10	780182	10.5		
820090-30mm	10.5	780183	12		
820090-32mm	11	780184	13		
Tube Preparation Centers		780186	225		
TP432	560	CP432 Parflange Machines			
TP1025	880	1050	840		
EO Presetting Tooling		1025	175		
EOMAT-III A	221	Metric Close Bend Radius Blocks for HB632			
Nut Die	1.75	780185	3.5		
Body Die	.75	780186	3.5		
Foot Pedal Switch	9.5	780187	4		
EO-Karrymat	55	780188	5		
		780189	6		
		780190	6.5		

Table N9 — Tube Fabricating Equipment Weight Chart (cont'd.)

Dimensions and pressures for reference only, subject to change.