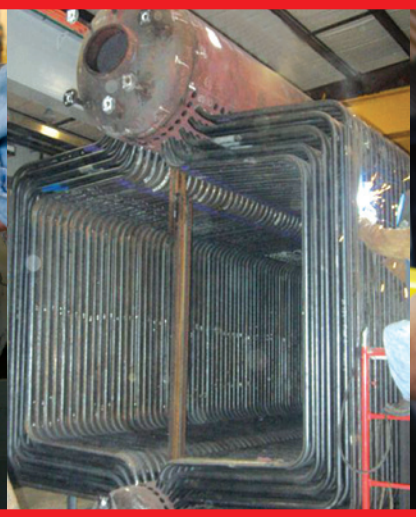
Wilson™

TRUSTED TO PERFORM

Boiler Tube Expanders and Accessories






Tools for the maintenance and repair of...

FIRE TUBE BOILERS

WATER TUBE BOILERS

SUPER HEATERS

PRESSURE VESSELS

and other tubular structures and pressure vessels

Thomas C. Wilson, LLC

www.tcwilson.com

Thomas C. Wilson, LLC

Wilson... A Family Tradition

Thomas C. Wilson was founded in New York, N.Y. by the late Mr. Thomas Wilson in 1925. While serving in the United States Navy as a Chief Engineer, operating the boilers for main propulsion systems aboard Naval ships, Mr. Wilson developed the first mechanical brush system to clean scales in the tubes of boilers. The Wilson Company, from that first product has been the innovators in many tools for heat exchangers, boilers and other tubular apparatus. Through its 89 years of history, its products have improved the process for many clients domestically and internationally for generations. Thomas C. Wilson is well into its 3rd generation of family ownership and continues to retain and improve its processes serving their customers needs.

Sincerely,

Stephen Hanley
C.O.O. &
President

Service Hotline

If you have technical questions about tube cleaning and expanding, or any Thomas C. Wilson, LLC product, call us toll free at (800) 230-2636 and talk to a knowledgeable Thomas C. Wilson, LLC representative.

There is a Thomas C. Wilson, LLC representative or distributor in every major city, domestically and internationally. Please write, call, or fax us to locate your area representative.

Customer Satisfaction/Money Back Guarantee

If, for any reason, you are not satisfied with your purchase, simply return it to us within 10 days, and we will refund the purchase price of the unit, exclusive of shipping and handling costs.

One Year Limited Warranty

All Thomas C. Wilson, LLC products are manufactured, tested, and inspected in accordance with strict engineering requirements and are warranted to be free from defects in materials and workmanship.*

Delivery

Thomas C. Wilson, LLC products are delivered by all major common carriers, and next day delivery is available. We also have same day, counter-to-counter delivery on request.

What's On Your Mind

We're always interested in your comments! At Thomas C. Wilson LLC, we work every day to improve our product offerings and customer service. We want to know what you think. Please write, call, or fax us with your comments or suggestions, **or reach us online at http://www.tcwilson.com.**

THOMAS C. WILSON, LLC MAIN FACILITY:
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www.tcwilson.com

How to Order

Our sales engineers are available Monday - Friday, 8:30am to 6:30pm EST. The easiest way to order is to look up the product that you would like to purchase and note the corresponding part number. Then, call toll free (800) 230-2636. If you are not sure exactly what tool you need, just give our experienced staff the details and they will help you find the right product for your application.

You can use your Visa, Mastercard, or American Express card to order.

* There is a minimum order of $50.

All Thomas C. Wilson, LLC products are designed and manufactured in the U.S.A.

* The warranty is subject to conditions and limitations. Call for details.

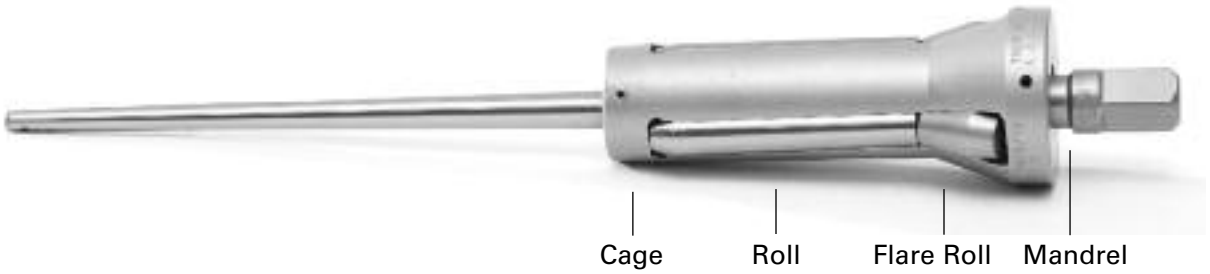
24 HOUR SERVICE
365 days a year...*Call* **1-800-230-2636**

Table of Contents

Product Locator

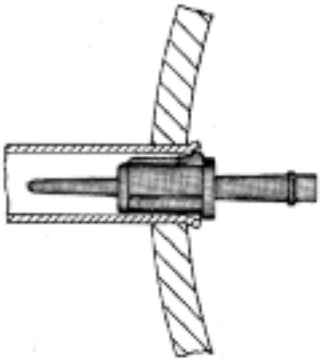
Three Roll - Parallel Expanding - Three Flare Roll Type

38 EXPANDERS WITH DRUM MANDREL



Applications
- Water Tube Boilers
- Superheaters
- Fire Tube Boilers
- Economizers

Features
- Self-Feeding
- Three-Roll
- Three Flare Rolls
- Self-Contained Rolls
- Various Mandrels Available: Drum, Short, Header, Reverse



Steam/Mud Drum: 38 Series with drum mandrel.

Tube OD *Inches (mm)*	GA	Range *Inches*	*(mm)*	Tube Seat Thickness - *Inches (mm)* 1/2 to 7/8 (12.7-22.2) Expander Assembly*	Spare Rolls	3/4 to 1⅛ (19.1-28.6) Expander Assembly*	Spare Rolls	1⅛ to 1⅝ (28.6-41.3) Expander Assembly*	Spare Rolls	1⅝ to 2⅛ (41.3-54.0) Expander Assembly*	Spare Rolls	2⅛ to 2⅝ (54.0-66.7) Expander Assembly*	Spare Rolls	Drum Mandrel 1/2-Inch sq. *Inches (mm)*
	8	.645-.719	(16.4-18.3)	**31001**	**31446**	**31002**	**31450**	**31004**	**31456**	**31006**	**32626**			**32262**
	9	.680-.786	(17.3-20.0)	**31011**	**31478**	**31012**	**31482**	**31014**	**31488**	**31016**	**32632**			7⅞ Lg (200)
1 (25.4)	10	.703-.815	(17.9-20.7)	**31021**		**31022**		**31024**		**31026**		**–**	**–**	**32263**
	11	.734-.845	(18.6-21.5)	**31031**	**31494**	**31032**	**31498**	**31034**	**31504**	**31036**	**31753**			8¾ Lg (220)
	12-13	.760-.881	(19.3-22.4)	**31041**		**31042**		**31044**		**31046**		**31048**	**32355**	**32264**
	14	.813-.944	(20.7-24.0)	**31051**	**31510**	**31052**	**31514**	**31054**	**31520**	**31056**	**32641**	**–**	**–**	9¼ Lg (233)
1⅛ (28.6)	11-12	.859-1.004	(21.8-25.5)	**31071**		**31072**		**31074**		**31076**				**32265**
	13-14	.906-1.068	(23.0-27.1)	**31081**	**31526**	**31082**	**31530**	**31084**	**31536**	**31086**	**32647**	**31088**	**31438**	10¼ Lg (260)
1¼ (31.8)	10-11	.939-1.118	(23.9-28.4)	**31091**		**31092**		**31094**		**31096**		**31098**		**32266**
	12-15	.990-.1.193	(25.2-30.3)	**31101**	**31542**	**31102**	**31546**	**31104**	**31552**	**31106**	**32653**	**31108**	**32249**	11¼ Lg (284)
	8	1.053-1.257	(26.8-31.9)	**31121**	**31558**	**31122**	**31562**	**31124**	**31568**	**31126**	**32656**			
1½ (38.1)	9-11	1.156-1.349	(29.4-34.3)	**31131**		**31132**		**31134**		**31136**		**–**	**–**	**32267**
	12-14	1.248-1.432	(31.7-36.4)	**31151**	**31574**	**31152**	**31578**	**31154**	**31584**	**31156**	**32662**			12 Lg (305)
1¾ (44.5)	9-11	1.400-1.615	(35.6-41.0)	**31161**	**40322**	**31162**	**40324**	**31164**	**40326**	**31166**	**40328**	**31168**	**40330**	**32268** 3/4 sq. 12 Lg (305)

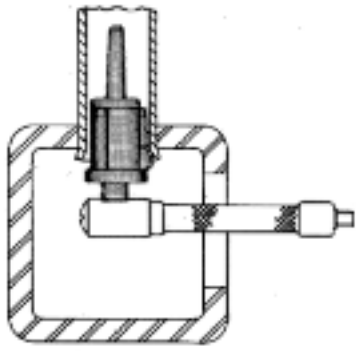
*** No mandrels included in assembly**

TUBE WALL THICKNESS OF WALL IN BIRMINGHAM WIRE GAUGE

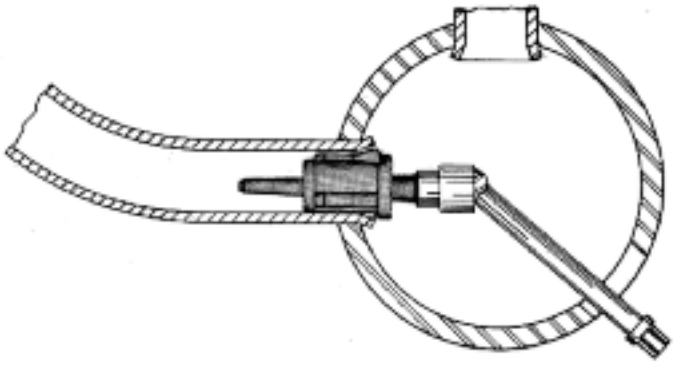
GA	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Inch	.028	.032	.035	.042	.049	.058	.065	.072	.083	.095	.109	.120	.134	.148	.165	.180	.203	.220	.238	.259	.284	.300	.340
mm	.7	.8	.9	1.1	1.2	1.5	1.7	1.8	2.1	2.4	2.8	3.0	3.4	3.8	4.2	4.6	5.2	5.6	6.0	6.6	7.2	7.6	8.6

Header Tube Expansion

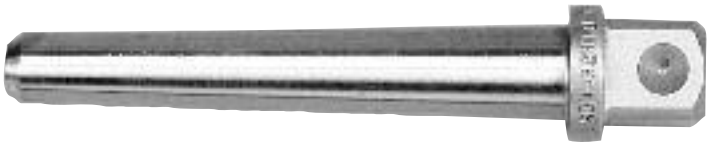
When water tube boilers do not offer easy access to the tube seat,Thomas C. Wilson, Inc. offers a variety of solutions. Our **Series 38** and **Series 114 Expanders** are available with a series of short mandrels. Used with gear trains, right angle drives or universal joints (See Pages 24-25), they make tube rolling possible through a header or handhole.



Square Header: **38 Series Expander** with short series mandrels connected to Wilson Right Angle Worm Gear Drive (pg 25).



Round Header: **38 Series Expander** with short series mandrels connected to Wilson Extension Universal Joint (pg 23).

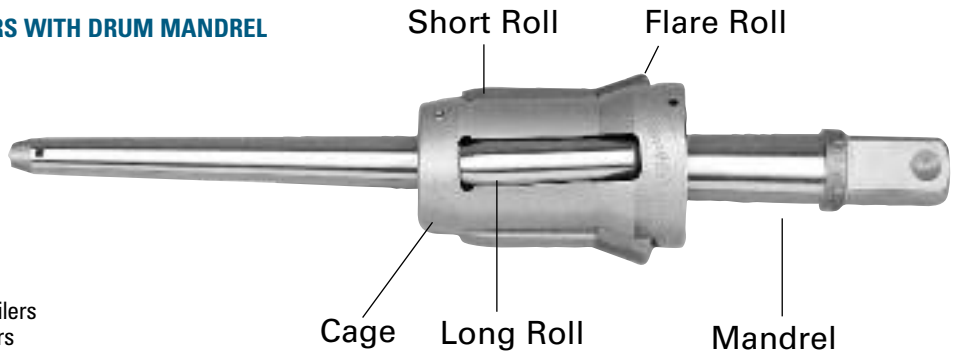


Tube OD *Inches (mm)*	GA	Expander Assembly*	Short Mandrels - 5¾-Inch (136.6mm) lg. - 1/2-Inch Square (12.7mm) Tube Seat Thickness = X *Inches (mm)* 1/2 to 7/8 (12.7-22.2)	3/4 to 1⅛ (19.1-28.6)	1⅛ to 1⅝ (28.6-41.3)	1⅝ to 2⅛ (41.3-54.0)	2⅛ to 2⅝ (54.0-66.7)
1 (25.4)	8	3100X	33624	33623 & 33624	33622 & 33624		–
	9	3101X	33622 & 33624		33621 & 33624	33621, 33623 & 33624	–
	10	3102X	33624	33623 & 33624		33622 & 33624	–
	11	3103X		33623 & 32463		33622, 32351 & 32463	–
	12	3104X		32351 & 32464			32351 & 32463
	13		32465	33624 & 32465			33624 & 32464
	14	3105X	33624		33622 & 33624		–
1⅛ (28.6)	11	3107X	32464 & 32466		32463 & 32466		–
	12		32467	32465 & 32467			–
	13	3108X	32465			32463 & 32465	
	14				32464 & 32467		
1¼ (31.8)	10	3109X			32465 & 32468		
	11			32467 & 32470			32468 & 32471
	12	3110X		32465 & 32468		32464, 32466 & 32468	32464, 32465 & 32466
	13		32469	32466 & 32469			32466, 32467 & 32468
	14			32468 & 32471			32468, 32469 & 32470
	15		32472	32469 & 32472			32469, 32470 & 32471
1½ (38.1)	8	3112X	32470 & 32473		32469, 32471 & 32473		–
	9	3113X		32472 & 32475		32471, 32473 & 32475	–
	10			32474 & 32477		32473, 32475 & 32477	–
	11		32477 & 32480		32476, 32478 & 32480		–
	12	3115X		32471 & 32474			–
	13			32473 & 32476			–
	14			32474 & 32477			–
1¾ (44.5)	9	3116X		32307 & 32308		–	–
	10			32308 & 32309		–	–
	11		32309 & 32310	32308, 32309 & 32310		–	–

*** No mandrels included in assembly**

Four Roll - Parallel Expanding - Double Flare Roll Type

114 EXPANDERS WITH DRUM MANDREL



Applications
- Water Tube Boilers
- Fire Tube Boilers
- Economizers
- Air Heaters

Features
- Self-Feeding
- Four-Roll
- Double Flare Roll Type
- Self-Contained Rolls
- Various Mandrels Available: Drum, Short, Header, Reverse

Tube OD *Inches (mm)*	GA	Range *Inches*	*(mm)*	Tube Seat Thickness - *Inches (mm)* 1/2 to 7/8 (12.7-22.2) Expander Assembly*	Spare Rolls	3/4 to 1⅛ (19.1-28.6) Expander Assembly*	Spare Rolls	1¼ to 1⅝ (31.8-41.3) Expander Assembly*	Spare Rolls	1⅝ to 2⅛ (41.3-54.0) Expander Assembly*	Spare Rolls	2⅛ to 2⅝ (54.0-66.7) Expander Assembly*	Spare Rolls	Drum Mandrel 3/4-Inch sq. (19.1)
2 (50.8)	4-6	1.465-1.692	(37.2-43.0)	–	–	14172	34872	14174	34874	14176	34876	14178	34948	*Inches (mm)* 32269
	7-8	1.585-1.826	(40.3-46.4)	14191	34878	14192	34879	14194	34881	14196	34883	14198	34949	11½ Lg (294) 32270
	9-10	1.645-1.888	(41.8-48.0)	14201		14202		14204		14206		14208		11¼ Lg (286) 32271
	11-13	1.690-1.950	(43.0-49.5)	14211	34885	14212	34886	14214	34888	14216	34890	14218	34950	12⅝ Lg (321) 32270
2½ (63.5)	4-6	1.906-2.259	(48.4-57.4)	–	–	14242	34893	14244	34895	14246	34897	14248	34951	11¼ Lg (286)
	7-10	2.031-2.385	(51.6-60.6)	–	–	14252	34900	14254	34902	14256	34904	14258	34952	32272 14⅛ Lg (359)
	11-13	2.156-2.510	(54.8-63.8)	14261	34899	14262		14264		14266		14268		
3 (76.2)	1-3	2.250-2.625	(57.2-66.7)	–	–	14272	34907	14274	34909	14276	34911	14278	34953	32273 14¼ Lg (360)
	4-6	2.375-2.756	(60.3-70.0)	–	–	14282		14284		14286		14288		
	7-11	2.500-2.912	(63.5-74.0)	–	–	14292	34914	14294	34916	14296	34918	14298	34954	32274** 14¼ Lg (360)
	10-12	2.625-3.047	(66.7-77.4)	14301	34913	14302		14304		14306		14308		32275**
3½ (88.9)	1-4	2.750-3.156	(69.9-80.2)	–	–	14312	34921	14314	34923	14316	34925	14318	34955	14½ Lg (367) 32274**
	4-7	2.875-3.287	(73.0-83.5)	–	–	14322		14324		14326		14328		14¼ Lg (360) 32275**
	7-11	3.000-3.421	(76.2-86.9)	–	–	14332		14334		14336		14338		14½ Lg (367) 32276**
	10-12	3.125-3.537	(79.4-90.0)	–	–	14342		14344		14346		14348		16⅜ Lg (421)
4 (101.6)	4-7	3.375-3.781	(85.7-96.0)	–	–	14362	34928	14364	34930	14366	34932	14368	34956	32277** 16½ Lg (420)
	7-11	3.500-3.884	(88.9-98.7)	–	–	14372		14374		14376		14378		32278** 16 Lg (405)
	8-12	3.563-4.031	(90.5-102.4)	–	–	14382	34935	14384	34937	14386	34939	14388	34957	32277** 16½ Lg (420)
4½ (114.3)	6-12	4.000-4.469	(101.6-113.5)	–	–	14412	34942	14414	34944	14416	34946	14418	34958	32278** 16 Lg (405)

*** No mandrels included in assembly**

**** 1-Inch sq. (25.4)**

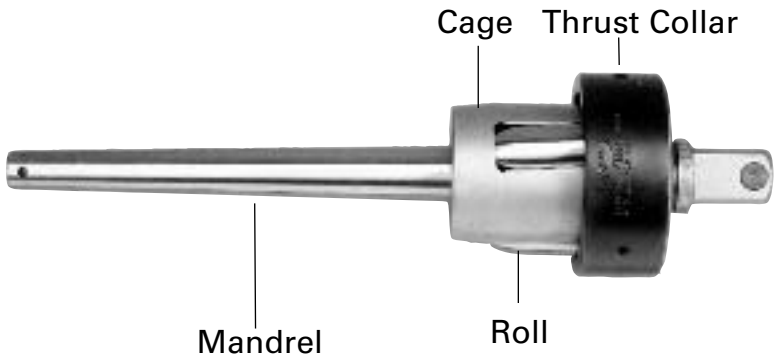
TUBE WALL THICKNESS OF WALL IN BIRMINGHAM WIRE GAUGE

GA	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Inch	.028	.032	.035	.042	.049	.058	.065	.072	.083	.095	.109	.120	.134	.148	.165	.180	.203	.220	.238	.259	.284	.300	.340
mm	.7	.8	.9	1.1	1.2	1.5	1.7	1.8	2.1	2.4	2.8	3.0	3.4	3.8	4.2	4.6	5.2	5.6	6.0	6.6	7.2	7.6	8.6

Tube OD *Inches (mm)*	GA	Expander Assembly*	Short Mandrels - 5⅛-Inch (130mm) lg. - 3/4-Inch Square (19.1mm) Tube Seat Thickness = X *Inches (mm)* 1/2 to 7/8 (12.7-22.2)	3/4 to 1⅛ (19.1-28.6)	1⅛ to 1⅝ (28.6-41.3)	1⅝ to 2⅛ (41.3-54.0)	Mandrels 7⅛-Inch Long (181 mm)	Rev Taper Mandrels
2 (50.8)	4	1417X		32309 & 32310		32308, 32309 & 32310	–	20766
	5			32310 & 32311	32309, 32310 & 32311		–	
	6					32309, 32310 & 32311	–	
	7	1419X		32310 & 32311			–	40040
	8			32311 & 32312		32310, 32311 & 32312	–	
	9	1420X		32312 & 32313		32311, 32312 & 32313	32346	20768
	10				32312 & 32313			
	11	1421X			32310 & 32311		32345	40040
	12			32311		32310 & 32311		
	13		32312		32311 & 32312		32346	
2½ (63.5)	4	1424X		32313 & 32314		32312, 32313 & 32314	–	20770
	5			32314 & 32315		32313, 32314 & 32315	–	
	6			32315 & 32316		32314, 32315 & 32316	–	
	7	1425X		32313 & 32314		32312, 32313 & 32314	32348	
	8				32313, 32314 & 32315			
	9				32314 & 32315		32349	
	10			32315 & 32316		32314, 32315 & 32316		
	11	1426X		32316		32315 & 32316	33630	40041
	12			32316 & 32317		32315, 32316 & 32317		
	13			32317		32316 & 32317	33631	
3 (76.2)	1	1427X		32315, 32317 & 32518	32315, 32316, 32317 & 32318	32314, 32315, 32316, 32317 & 32318	–	20771
	2			32316, 32318 & 32519	32316, 32317, 32318 & 32319	32315, 32316, 32317, 32318 & 32319	–	
	3			32317, 32319 & 32320	32317, 32318, 32319 & 32320	32316, 32317, 32318, 32319 & 32320	–	
	4	1428X		32318 & 32320	32318, 32319 & 32320	32317, 32318, 32319 & 32320	–	20773
	5			32319 & 32321	32319, 32320 & 32321	32318, 32319, 32320 & 32321	–	
	6			32320 & 32322		32319, 32320, 32321 & 32322	–	
	7	1429X		32317 & 32319		32317, 32318 & 32319	33632	
	8			32318 & 32320	32318, 32319 & 32320	32317, 32318, 32319 & 32320	33633	
	9			32319 & 32321	32319, 32320, 32321	32318, 32319, 32320 & 32321	33634	
	10			32320 & 32321		32319, 32320 & 32321		
	11	1430X	32320 & 32322		32320, 32321 & 32322		33635	–
	12		32321 & 32322					–
3½ (88.9)	1	1431X		32317, 32318, 32319 & 32320		32316, 32317, 32318, 32319 & 32320	–	–
	2			32318, 32319, 32320 & 32321		32317, 32318, 32319 & 32321	–	–
	3			32319, 32320, 32321 & 32322		32318, 32319, 32320, 32321 & 32322	–	–
	4	1432X		32320, 32321, 32322 & 32323		32319, 32320, 32321, 32322 & 32323	–	–
	5			32321, 32322 & 32323		32320, 32321, 32322 & 32323	–	–
	6			32322, 32323 & 32324		32321, 32322, 32323 & 32324	–	–
	7	1433X		32323, 32324 & 32325		32322, 32323, 32324 & 32325	–	–
	8					32323, 32324 & 32325	–	–
	9				32324, 32325 & 32326		–	–
	10			32325, 32326 & 32327		32324, 32325, 32326 & 32327	–	–
	11	1434X		32326 & 32327		32325, 32326 & 32327	–	–
	12			32326, 32327 & 32328		32325, 32326, 32327 & 32328	–	–
4 (101.6)	4	1436X			32325, 32326, 32327 & 32328		–	–
	5			32326, 32327, 32328 & 32329		32326, 32327, 32328 & 32329	–	–
	6			32327, 32328 & 32329			–	–
	7	1437X		32328, 32329 & 32330		32327, 32328, 32329 & 32330	–	–
	8			32329, 32330 & 32331		32328, 32329, 32330 & 32331	–	–
	9			32330, 32331 & 32332		32329, 32330, 32331 & 32332	–	–
	10				32330, 32331 & 32332		–	–
	11	1438X		32326 & 32327		32325, 32326 & 32327	–	–
	12			32326, 32327 & 32328		32325, 32326, 32327 & 32328	–	–
4½ (114.3)	6	1441X		32325, 32326, 32327 & 32328		32324, 32325, 32326, 32327 & 32328	–	–
	7			32326, 32327 & 32328		32325, 32326, 32327 & 32328	–	–
	8			32327, 32328 & 32329		32326, 32327, 32328 & 32329	–	–
	9			32328, 32329 & 32330		32327, 32328, 32329 & 32330	–	–
	10					32328, 32329 & 32330	–	–
	11			32329, 32330 & 32331		32328, 32329, 32330 & 32331	–	–
	12					32329, 32330 & 32331	–	–

Series 114-S Expanders
Four Roll - Parallel Expanding - Straight Roll Type

114-S EXPANDERS WITH DRUM MANDREL



Features
- Bearing Type Thrust Collar
- Self-Feeding
- Four-Roll
- Non-Flaring
- Self-Contained Rolls
- Various Mandrels Available: Drum, Short, Header, Reverse

Applications
- Water Tube Boilers
- Fire Tube Boilers
- Economizers
- Air Heaters

Tube OD *Inches (mm)*	GA	Range *Inches*	*(mm)*	Tube Seat Thickness - *Inches (mm)* 1/2 to 1 (12.7-25.4) Expander Assembly*	1/2 to 1 (12.7-25.4) Spare Rolls	3/4 to 1¼ (19.1-31.8) Expander Assembly*	3/4 to 1¼ (19.1-31.8) Spare Rolls	1¼ to 1¾ (31.8-44.5) Expander Assembly*	1¼ to 1¾ (31.8-44.5) Spare Rolls	1¾ to 2¼ (44.5-57.2) Expander Assembly*	1¾ to 2¼ (44.5-57.2) Spare Rolls	2¼ to 2¾ (57.2-69.9) Expander Assembly*	2¼ to 2¾ (57.2-69.9) Spare Rolls	Drum Mandrel 3/4 sq. (19.1) *Inches (mm)*
2 (50.8)	4-6	1.465-1.660	(37.2-42.2)	–	–	14172-1000	34853-0004	14174-1000	34857-0004	14176-1000	34861-0004	14178-1000	34866-0004	32269 11½ Lg (294)
	7-8	1.585-1.791	(40.3-45.5)	14191-1000	31591-0004	14192-1000	31595-0004	14194-1000	31601-0004	14196-1000	32669-0004	14198-1000	32675-0004	32270 11¼ Lg (286)
	9-10	1.645-1.856	(41.8-47.1)	14201-1000		14202-1000		14204-1000		14206-1000		14208-1000		32271 12⅝ Lg (321)
	11-13	1.690-1.900	(43.0-48.3)	14211-1000	31607-0004	14212-1000	31611-0004	14214-1000	31617-0004	14216-1000	31757-0004	14218-1000	31751-0004	32270 11¼ Lg (286)
2½ (63.5)	4-6	1.906-2.226	(48.4-56.5)	–	–	14242-1000	31627-0004	14244-1000	31633-0004	14246-1000	32678-0004	14248-1000	32684-0004	32272 14⅛ Lg (359)
	7-10	2.031-2.352	(51.6-59.7)	–	–	14252-1000	31643-0004	14254-1000	31649-0004	14256-1000	32687-0004	14258-1000	32690-0004	
	11-13	2.156-2.450	(54.8-62.2)	14261-1000	31639-0004	14262-1000		14264-1000		14266-1000		14268-1000		32273 14¼ Lg (360)
3 (76.2)	1-3	2.250-2.600	(57.2-66.0)	–	–	14272-1000	31659-0004	14274-1000	31665-0004	14276-1000	32694-0004	14278-1000	32700-0004	
	4-6	2.375-2.721	(60.3-69.1)	–	–	14282-1000		14284-1000		14286-1000		14288-1000		32274** 14¼ Lg (360)
	7-11	2.500-2.877	(63.5-73.1)	–	–	14292-1000	31675-0004	14294-1000	31681-0004	14296-1000	31760-0004	14298-1000	32703-0004	
	10-12	2.625-3.008	(66.7-76.4)	14301-1000	31671-0004	14302-1000		14304-1000		14306-1000		14308-1000		

*** No mandrels included in assembly**

**** 1-Inch sq. (25.4)**

TUBE WALL THICKNESS OF WALL IN BIRMINGHAM WIRE GAUGE

GA	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Inch	.028	.032	.035	.042	.049	.058	.065	.072	.083	.095	.109	.120	.134	.148	.165	.180	.203	.220	.238	.259	.284	.300	.340
mm	.7	.8	.9	1.1	1.2	1.5	1.7	1.8	2.1	2.4	2.8	3.0	3.4	3.8	4.2	4.6	5.2	5.6	6.0	6.6	7.2	7.6	8.6

Tube OD *Inches (mm)*	GA	Expander Assembly*	Short Mandrels - 5⅛-Inch (130mm) lg.-3/4-Inch Sq. (19.1mm) Tube Seat Thickness = X *Inches (mm)* 1/2 to 1 (12.7-25.4)	3/4 to 1¼ (19.1-31.8)	1/2 to 1 (12.7-25.4)	Mandrels - 7⅛-Inch (181mm) lg.-3/4-Inch Sq. (19.1mm) Tube Seat Thickness = X *Inches (mm)* 3/4 to 1¼ (19.1-31.8)	1¼ to 1¾ (31.8-44.5)	1¾ to 2¼ (44.5-57.2)	2¼ to 2¾ (57.2-69.9)	Rev Taper Mandrels
2 (50.8)	4	1417X-1000	–	32310 & 32311	–		32345		32344 & 32345	20766 1/2 Sq. (12.7)
	5		–		–	32346		32345	32345 & 32346	
	6		–	32311 & 32312	–			32346		40040 3/4 Sq. (19.1)
	7	1419X-1000	32311 & 32312				32345		32344 & 32345	
	8			32311,312&313		32346		32345 & 32346		20768 3/4 Sq. (19.1)
	9	1420X-1000	32312 & 32313				32345			
	10		32313 & 32314			32346			32345 & 32346	40040 3/4 Sq. (19.1)
	11	1421X-1000	32311 & 32312				32345			
	12									
	13		32312 & 32313				32346			
2½ (63.5)	4	1424X-1000	–	32314 & 32315	–	32349	32348		32347 & 32348	20770 3/4 Sq. (19.1)
	5		–	32315 & 32316	–		32349		32348	
	6		–		–				32349	
	7	1425X-1000	–	32314 & 32315	–		32348		32347 & 32348	
	8		–		–				32348	
	9		–	32315 & 32316	–		32349			
	10		–		–					
	11	1426X-1000	32316 & 32317				33630		32649 & 33630	40041 3/4 Sq. (19.1)
	12								33630	
	13		32317 & 32318				33631		33630 & 33631	
3 (76.2)	1	1427X-1000	–	32315,316&317	–	33630	32349 & 33360			20772 1 Sq. (25.4)
	2		–	32316 & 32517	–	33631	33630 & 33631		32349 & 33630	
	3		–	32317 & 32318	–	33632	33631 & 33632		33630 & 33631	
	4	1428X-1000	–	–	–		33633			20773 1 Sq. (25.4)
	5		–	–	–		33634		33633 & 33634	
	6		–	–	–	33635		33634 & 33635		
	7	1429X-1000	–	–	–		33632			
	8		–	–	–		33633		33632 & 33633	
	9		–	–	–				33633	
	10	1430X-1000	32320 & 32321	–	–		33634			20775 1 Sq. (25.4)
	11		32321	–	–					
	12		32321 & 32322	–	–		33635			

Expander Lube - Type B

Wilson Expander Lube is a water-soluble lubricant especially compounded for use with tube expanders. When rolling large or small, ferrous or nonferrous tubes, use **Wilson Expander Lube** for smoother rolling and longer expander life. For clean tube ends after rolling, simply wash with water. **Wilson Type B** Expander Lube is used straight from the can without dilution.

Expander Lube Type B	Part No.
1 Pint Can	28115-0001
1 Quart Can	28115-0002
1 Gallon Can	28115-0009
5 Gallon Can	28115-0005
30 Gallon Drum	28115-0030
55 Gallon Drum	28115-0055

Tube Expander Lubrication, Care, and Maintenance

The service demanded of tube expanders is severe, therefore, these precision tools require a reasonable degree of maintenance. For long, trouble-free, and economical service, we suggest:

1. Remove all rust, mill scale, and other foreign matter from the inside and outside of the tube. Foreign matter on the inside of the tube will become imbedded in the tube wall and may cause flaking or galling of the rolls and mandrel. Mill scale or grit left on the outer wall of the tube can cause damage to the tube seat and prevent formation of a pressure-tight joint. Cleaning tube ends is best accomplished with a wire brush or a tube end polisher (see Page 28).

2. Before using, the expander should be washed in a commercial solvent to remove anti-rust, dirt, grease, and other foreign matter. Inspect the expander to make sure the rolls and mandrels are free and in good condition.

3. Before using, an expander should be properly lubricated with a pressure-resistant lubricant, such as Wilson Expander Lube (see Page 7). This water soluble lubricant was developed specifically for tube rolling and may be mixed with water to the desired consistency. For small diameter and light Gauge tubes, immerse the expander in Wilson Expander Lube or a light bodied oil*, such as SAE 10 or 20. For large diameter and heavy Gauge tubes, swab or brush the expander with Wilson Expander Lube or a mixture of SAE 40* and graphite.

4. Expanders should be rotated at a speed proportionate to the tube size, Gauge, and the length of the tube seat. Tube metal must also be taken into consideration. The proper speed will provide safe cold working of the tube metal without crystallization or flaking. It will also ensure maximum expander life without undue roll or mandrel breakdown. The ideal speed will keep to a minimum mandrel slippage and heating of the mandrels and rolls.

5. After rolling each tube, clean and cool the expander in a solvent or light oil*, then properly lubricate the expander. It is a good practice to use two expanders, if possible, so one can be cooling while the other is being used.

6. Inspect the rolls and the mandrel after rolling each tube. Replace a chipped roll or mandrel immediately! A small chip in a roll can damage the entire set of rolls and the mandrel if not replaced at once.

7. When the job is completed, the expander should be cleaned thoroughly with a commercial solvent or light oil*, and it should be stored in a manner which will avoid the possibility of the parts rusting.

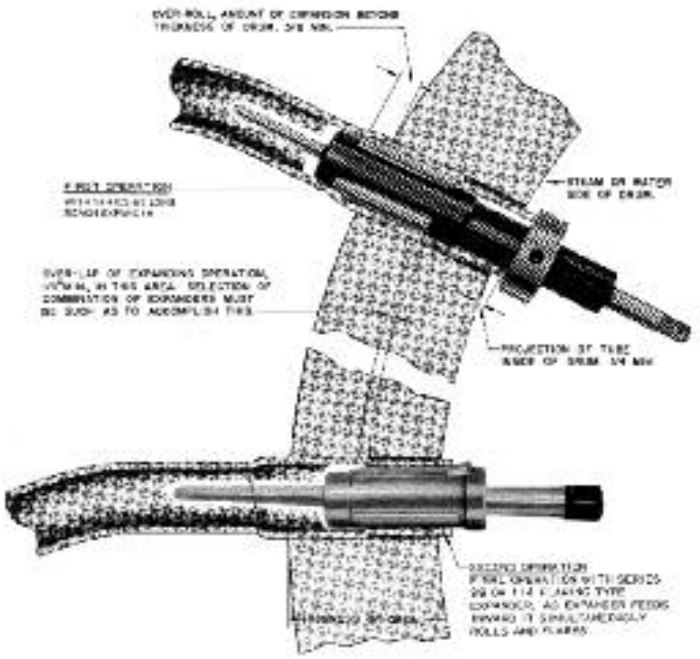
****CAUTION:*** *The presence of oil in the space between the tube and the tube seat can prevent the formation of a leak-tight joint. Do not allow excess lubrication to run down the face of the sheet, so that it can seep into unrolled joints.*

Step Rolling Tube Expansion

When boiler drums are 2½ inches (63.5mm) or thicker, tube expansion must be performed in two or three operations (or steps), depending on the tube seat thickness. Our **Series 65** Expanders are specifically designed for "deep reach" expanding.

Step 1: Use a **Series 65** Expander to "deep roll" the tube, so the area of expansion is 3/8 inches (9.6mm) beyond the inside edge of the drum. (see page 10)

Step 2: Use a **Series 114** Expander to roll and flare the remaining half of the tube length within tube seat. (see page 4)



Guidelines for Tube Expansion

Unproperly rolled joints create considerable additional expense: under-rolled joints must be re-rolled, and over-rolled tubes must be removed and replaced.The optimum joint is one that develops a leak-tight joint with adequate strength for the intended service, but with the minimum amount of cold working (or tube wall reduction).

Application	Tube Wall Reduction*
Nonferrous tubes in surface condensers	3% to 4%
Steel tubes in heat exchangers	5% to 10%
Soft copper and aluminum tubes in heat exchangers	8% to 12%
Boiler tubes	12% to 14%

**After metal-to-metal contact of the tube Outer Diameter with the tubesheet hole.*

Here is an example of the application of this method for a 2-inch Outer Diameter 10 Gauge tube in a boiler.

Tubesheet Hole:	2.010
Tube Outer Diameter :	-2.000
Clearance:	.010
Tube Inner Diameter :	1.732
Clearance:	+.010
Tube Inner Diameter @ Metal-to-Metal:	1.742
13% of .134 x 2:	.035
Tube Inner Diameter @ Metal-to-Metal:	+1.742
Expanded Tube Inner Diameter:	1.777

Tube Rolling Worksheet

1. Tubesheet Hole _____
   Tube Outer Diameter = - _____
   Clearance _____

2. Tube Inner Diameter _____
   Clearance = + _____
   Inner Diameter @ Metal to Metal _____

3. ___% of ____(Wall) x 2 _____
   Tube Inner Diameter
   @ Metal to Metal = + _____
   Expanded Tube Inner Diameter _____

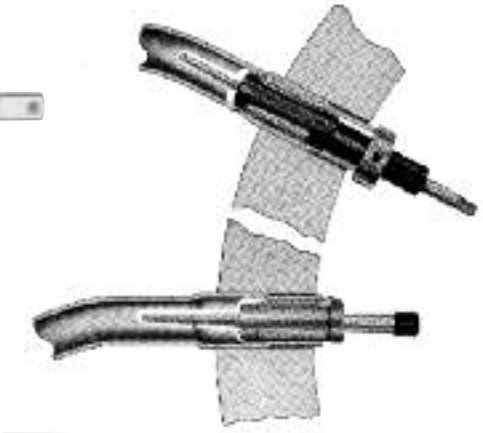
TUBE WALL THICKNESS OF WALL IN BIRMINGHAM WIRE GAUGE

GA	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Inch	.028	.032	.035	.042	.049	.058	.065	.072	.083	.095	.109	.120	.134	.148	.165	.180	.203	.220	.238	.259	.284	.300	.340
mm	.7	.8	.9	1.1	1.2	1.5	1.7	1.8	2.1	2.4	2.8	3.0	3.4	3.8	4.2	4.6	5.2	5.6	6.0	6.6	7.2	7.6	8.6

Series 65 Expanders

Features

- Three Roll • Self-Feeding
- Parallel Expansion
- Adjustable Thrust Collar
- Non-Flaring



This expander is primarily intended for deep reach expanding. Its parallel rolling and long, effective roll length make this tool ideal for "touch up" rolling in thick tubesheets.

A thrust ball bearing collar gives friction-free operation and long tool life. Rolls are self-retained in cage and will not fall in or out of cage when mandrel is withdrawn from expander.

Tube OD		Tube Wall			Expander Assembly*	Reach		Roll Set of 3	Roll Eff. Length		Order Sep.	Mandrel Range		Drive Square	
Inches	*(mm)*	*GA*	*Inches*	*(mm)*		*Inches (mm)* Min.	Max.	Part No.	*Inches*	*(mm)*	Part No.	*Inches*	*(mm)*	*Inches*	*(mm)*
2	(50.8)	4-6	.238-.203	(6.0-5.2)	42891	3⅜ (86)	5⅞ (150)	32675-0003	3⅛	(79)	42911	1.437-1.687	(36.5-42.8)	3/4	(19.1)
		7-8	.180-.165	(4.6-4.2)	42892							1.562-1.812	(39.7-46.0)		
		9-10	.148-.134	(3.8-3.4)	42893			31751-0003			42912	1.625-1.875	(41.3-47.6)		
		11-13	.120-.095	(3.0-2.4)	42894						42913	1.687-1.937	(42.8-49.2)		
2½	(63.5)	4-6	.238-.203	(6.0-5.2)	42895	3⅞₁₆ (87)	5⅞ (150)	32690-0003				1.937-2.250	(49.2-57.2)		
		7-10	.180-.134	(4.6-3.4)	42896						42914	2.063-2.375	(52.4-60.3)		
		11-13	.120-.095	(3.0-2.4)	42897			32700-0003				2.188-2.500	(55.6-63.5)		
3	(76.2)	4-6	.238-.203	(6.0-5.2)	42898			32703-0003	3⅜₆	(81)	42915	2.406-2.781	(61.1-70.6)		
		7-11	.180-.120	(4.6-3.0)	42899						42916	2.531-2.906	(64.3-73.8)		
		10-13	.134-.095	(3.4-2.4)	42900			32712-0003	3¼	(83)	42915	2.656-3.031	(67.5-77.0)	1	(25.4)
3½	(88.9)	4-6	.238-.203	(6.0-5.2)	42939	3½ (89)	5⅝ (143)				42945	2.906-3.281	(73.8-83.3)		
		7-11	.180-.120	(4.6-3.0)	42940						42916	3.031-3.406	(77.0-86.5)		
		10-13	.134-.095	(3.4-2.4)	42941			32721-0003			42945	3.156-3.531	(80.2-89.7)		

*** No mandrels included in assembly**

Series 22 Expanders

Features

- Three Roll • Self-Feeding • Non-Parallel Expansion
- Revolving Collar Type • Non-Flaring

The **Series 22** Self-Feeding Tube Expander is especially designed for use in boiler rooms, boiler repair shops, railroads, Scotch Marine boilers and for all general rolling in fire tube boilers where flaring is not required.

The revolving thrust collar, of hardened steel, bears against the tube seat and provides non-jamming operation with maximum resistance to abrasive action. Compact design permits working close to wall or adjacent tubes.

For sizes 2-Inch and up, the rolls are self-retained and the expanders are suitable for far end rolling with reverse taper mandrel and extension drive.

Tube OD		Tube Wall		Assembly with Mandrel	Spares Standard Mandrel	Square		Roll Set	Reverse Taper Mandrel	Square		Expansion Range*
Inches	*(mm)*	*GA*	*(mm)*	Part No.	Part No.	*Inch*	*(mm)*	Part No.	Part No.	*Inch*	*(mm)*	*Inches*
1½	(38.1)	13-18	(2.4-1.2)	30008	30564	3/4	(19.1)	30040	–	–	–	1.281-1.480
2	(50.8)	12-18	(2.8-1.2)	30012	30565			30044	20766	1/2	(12.7)	1.718-1.973
2¼	(57.2)	11-18	(3.0-1.2)	30014	30566			30045	20767			1.973-2.229
2½	(63.5)	10-18	(3.4-1.2)	30016				30047	20768	3/4	(19.1)	2.156-2.478
2¾	(69.9)			30018	30567			30048	20769			2.406-2.727
3	(76.2)	9-18	(3.8-1.2)	30020	30568	1	(25.4)	30049	21692	1	(25.4)	2.625-2.986
3¼	(82.6)	9-18	(3.8-1.2)	30021				30050				2.875-3.237

* Expander range is taken at front of thrust collar.

Series 116 Expanders

Features

- Four Roll • Self-Feeding • Flaring Type
- Non-Parallel Expansion up to 3/4-Inch Tubesheet

This non-parallel, self-feeding expander features a design embodying four (4) expanding rolls and two (2) flare rolls. It simultaneously flares and rolls an unusually fine surface with a minimum amount of indentation by the flare rolls. The flaring operation is ideal for HRT and other fire tube boilers where final beading of tube ends is the practice.

Mandrels and rolls are made of alloy steel ground after hardening to a fine surface finish. The rolls of these expanders are self-retained. The self-retained roll feature makes this expander suitable for use with reverse taper mandrels for far end tube expanding.

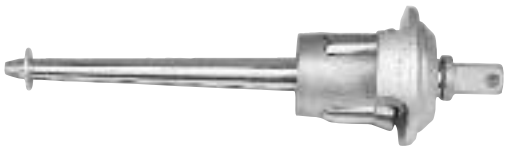
Tube OD		Tube Wall		Assembly with Mandrel	Spares Standard Mandrel			Roll Set	Reverse Taper Mandrel			Expansion Range*
						Square				Square		
Inches	(mm)	GA	(mm)	Part No.	Part No.	Inch	(mm)	Part No.	Part No.	Inch	(mm)	Inches
1½	(38.1)	11-14	(3.0-2.1)	36607	30064	3/4	(19.1)	36653	–	–	–	1.215-1.389
2	(50.8)	10-16	(3.4-1.7)	36612	30566			36654	20768	3/4	(19.1)	1.680-1.959
2½	(63.5)	10-18	(3.4-1.2)	36616	30567			36655	20771			2.192-2.453
3	(76.2)	9-18	(3.8-1.2)	36620	30569	1	(25.4)	36656	20774	1	(25.4)	2.654-2.954

* Expander range is taken at front of thrust collar.

Series 28 Expanders

Features

- Three Roll • Self-Feeding • Flaring Type
- Non-Parallel Expansion • Flaring Type to 3/4-Inch Tubesheet



The **Model 28** Expander features three flare rolls and three straight self-retained rolls. The use of this expander simultaneously flares the tube as a preliminary to beading operations. If on close centers, the revolving thrust collar sets the tube and is notched to clear adjacent tubes. Ideal for most HRT and other fire tube boilers. The self-retained roll feature also makes this expander a popular one for far end rolling when used in conjunction with reverse mandrels and extension drives.

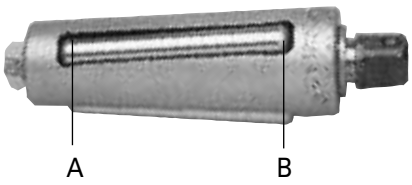
Tube OD		Tube Wall		Assembly with Mandrel	Spares Standard Mandrel			Roll Set	Reverse Taper Mandrel			Expansion Range*
						Square				Square		
Inches	(mm)	GA	(mm)	Part No.	Part No.	Inch	(mm)	Part No.	Part No.	Inch	(mm)	Inches
2	(50.8)	10-16	(3.4-1.7)	35004	35024	3/4	(19.1)	35037	20766	1/2	(12.7)	1.687-2.000
2½	(63.5)			35008	35026			35040	20769	3/4	(19.1)	2.156-2.500
3	(76.2)			35012	35028	1	(25.4)	35043	20772	1	(25.4)	2.625-3.000

* Expander range is taken at front of thrust collar.

Series 92 Expanders

Features

- Three Roll • Self-Feeding
- Non-Parallel Expansion • Non-Flaring Type to 5/8-Inch Tubesheet



The **Series 92** Self-Feeding Tube Expander was designed for both boiler erection and boiler repair, either complete re-tubing or just touching up leaky joints. Tube expansion is recommended in the tubesheet range from 1/8-inch to 5/8-inch thick. The short mandrel is used for expanding tubes in open tubesheets as found, for example, in most HRT, Scotch Marine, and package boilers and is included with expanders offered. The header mandrel is offered for expanding through a waterleg or other obstruction which necessitates reach. Order header mandrel separately.

Tube OD		Tube Wall		Assembly with Mandrel	Spares Standard Mandrel			Roll Set	Header Mandrel			Specifications Eff. Roll Length	Expansion Range*	
						Square				Square				
Inches	(mm)	GA	(mm)	Part No.	Part No.	Inch	(mm)	Part No.	Part No.	Inch	(mm)	Inches	Dim. A	Dim. B
1	(25.4)	10-13	(3.4-2.4)	36019	36054	1/2	(12.7)	36064	36093	1/2	(12.7)	3 5/16	.681	.937
1¼	(31.8)			36021	36055			36065	36094				.940	1.206
1½	(38.1)			36023	36056			36066	36095			4	1.156	1.469
2	(50.8)			36027	36057	3/4	(19.1)	36067	36096	3/4	(19.1)	3⅝	1.665	1.960

* This self-feeding expander has no collar or flare to prevent the cage from pulling into the tube. Expansion corresponds to movement of tube rolling from Dim. A to Dim. B.

Wilson Combination Beading Expander

Applications

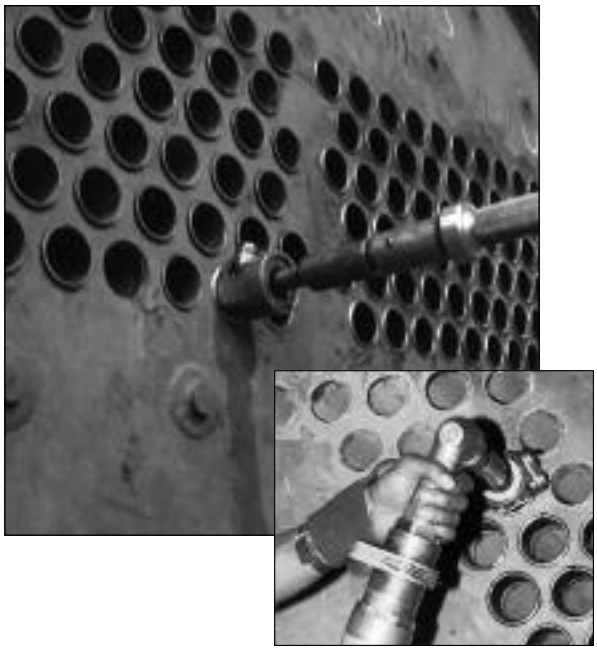
- Expand and Bead 2, 2½ and 3-Inch Tubes in One Operation
- For the Fabrication and Re-tubing of Fire Tube Boilers

Features

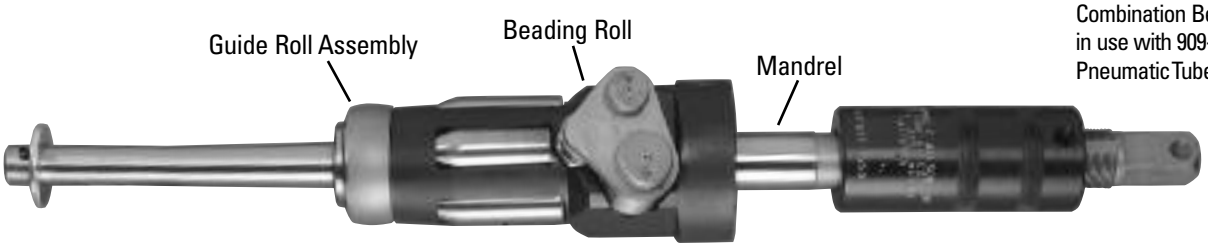
- Turn three operations (expanding, beading, and re-rolling) into one. time-saving, labor-reducing process performed by just one tool!
- Cut labor costs by 50 to 65%!
- Purchase and maintain one tool instead of three.
- Minimal employee training or experience required.
- Produce a perfect, tight bead every time!
- Eliminate all noise for beading operation.

The **Wilson Combination Beading Expander** *is one of our smartest tools!* Rather than expand a tube, then manually bead it, and then re-roll it with a straight roll expander, the patented **Combination Beading Expander (CBE)** from Thomas C. Wilson, Inc. does all three jobs in one seamless process.

And, the **Wilson CBE** doesn't just save time, cut labor costs, and reduce your equipment investment: *it produces a perfect bead every time!* Designed primarily for the fabrication and re-tubing of fire tube boilers, the **Combination Beading Expander** rolls and beads 2-inch, 2½-inch and 3-inch Outer Diameter tubes, 10 to 13 Gauge.



Combination Beading Expander in use with 909-Right-Angle Pneumatic Tube Roller



Tube OD Inches	Tube OD (mm)	GA	Beading Expander Assembly*	Mandrel† Part No.	Square	Rolls Before 7/02 Part No.	Rolls for Serialized Expanders	Beading Roll Part No.	Guide Roll Assembly	Expansion Range Inches (mm)
2	(50.8)	10	41633-0010	42157	3/4 (19.1)	42811 Set of 4	41677 Set of 4	41631-0010	41701-0010	1.700-1.906 (43.2-48.4)
		11	41633-0011						41701-0011	
		12	41633-0012					41631-0012	41701-0012	
		13	41633-0013						41701-0013	
2½	(63.5)	10	41634-0010	42158		41673 Set of 5	41678 Set of 5	41651-0010	41702-0010	2.200-2.440 (55.9-62.0)
		11	41634-0011						41702-0011	
		12	41634-0012					41651-0012	41702-0012	
		13	41634-0013						41702-0013	
3	(76.2)	10	41359-0010	42159	1 (25.4)	41676 Set of 5	41679 Set of 5	41666-0010	41703-0010	2.700-2.940 (68.6-74.7)
		11	41359-0011						41703-0011	
		12	41359-0012					41651-0010	41703-0012	

* Assembly includes standard mandrel, grease gun (Part No. 53553) and service manual/parts list (SM-140).
† Short Series Mandrels for wet back or tight turnaround are available.

The **Wilson CBE** for 2-inch Outer Diameter tubes is a 4-roll expander. For 2½-inch and 3-inch tubes, it is a 5-roll expander. And, the **Wilson Combination Beading Expander** is a self-feeding, parallel-rolling unit. For best results, trim the tube to be expanded and beaded to a 3/16-inch projection. (See Hydraulic Tube Cutter, P. 14)

To order, simply locate your tube Outer Diameter and Gauge. Each **CBE** assembly includes a standard mandrel, a grease gun (to lubricate the tool), and a service manual. You should order extra mandrels, straight rolls, beading rolls, and guide roll assemblies, based on the number of tubes you will be expanding and beading. Your Wilson Product Application Specialist can help you determine how many spare mandrels, straight rolls, beading rolls, and guide roll assemblies you should order. To prolong the life of your **Combination Beading Expander,** we recommend **B-Kool.**

Product Recommendations:
Prolong the life—and *improve the efficiency*—of the **Wilson Combination Beading Expander** with **B-Kool! B-Kool** dissipates the heat generated by the **CBE**, increasing this *Smart Tool's* longevity, performance, and productivity. **B-Kool** is available as a concentrate. Mix 20-24 parts water to one part **B-Kool.**

Product Description	Part No.
B-Kool (Concentrate) 1 Quart	**42161-0001**
B-Kool (Concentrate) 1 Gallon	**42161-0004**

Series 985 Chipping Hammers

Product Description	Part No.
#2 Chipping Hammer (2-Inch Stroke)	**985-0200**
#3 Chipping Hammer (3-Inch Stroke)	**985-0300**
#4 Chipping Hammer (4-Inch Stroke)	**985-0400**
Includes:	
1- Collar Retainer - 1.970-Inch Dia	**53613-0001**
1- Lock Spring	**53613-0002**
1- Rubber Bumper	**53613-0003**
Service Manual	**SM-134**

Tool Specification: . . . . . .Part No. 985-0200
1⅛-Inch Dia and 16-Inch OAL
2-Inch Stroke, 2150 Blows per Min.
Weight 13 lbs. (6 kg)
Air Inlet 3/8 - 18 NPT, 90 psi @ 25 SCFM MAX.

Optional Accessory:
3/8-Inch Inner Diameter Hose – 8 ft. . . . . .**#50007**

Tools For Chipping Hammer

BEADING TOOLS .680 Diameter Straight Shank

Part No.	Radius Bead	Tube GA
42689	9/64	13 and lighter
42690	3/16	10, 11 and 12
42691	7/32	8 and 9

CHISELS .680 Diameter Straight Shank

Part No.	Cutter Blade Width Inches	(mm)
53812	3/4	(19.1)
53815	7/8	(22.2)
53809	1	(25.4)
53839	1½	(38.1)

COLLAPSING TOOLS

Tube OD Inches	(mm)	Part No.	Overall Length Inches	(mm)	Type Shank Inch
1	(25.4)	**21913**	11½	(292.0)	.580/.680 Round
1⅛	(28.6)	**40514**	11⅞	(301.6)	
1¼	(31.8)	**21914**			.680 Round
1½	(38.1)	**21915**	12	(304.8)	
2	(50.8)	**74010-0800**	12⅝	(320.6)	

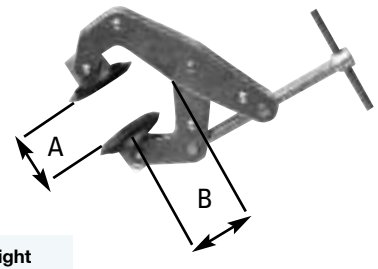
KNOCKOUT TOOL - For use with No. 80 Boyer Gun

Tube OD Inches	(mm)	Part No.	Overall Length Inches	(mm)
1	(25.4)	**73750**	11	(279.4)
1¼	(31.8)	**72626**	8	(203.2)
1½	(38.1)	**72806**	10	(254.0)
2	(50.8)	**72230**		
		72940	12	(304.8)

Tube Clamp

Applications
To hold on the tubes while rolling at the opposite end.

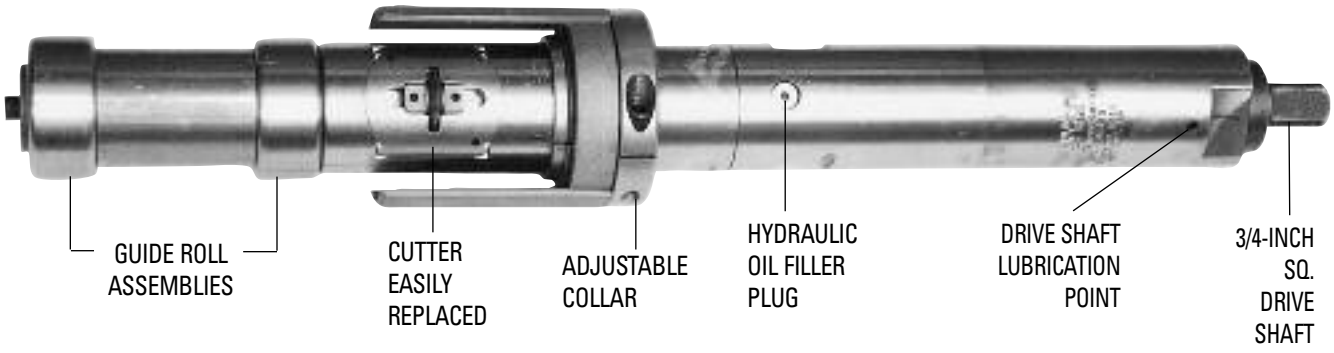
Features
- Round flat plastic pads.
- Designed to bring the jaws together without turning or twisting.
- High strength-to-weight ratio.

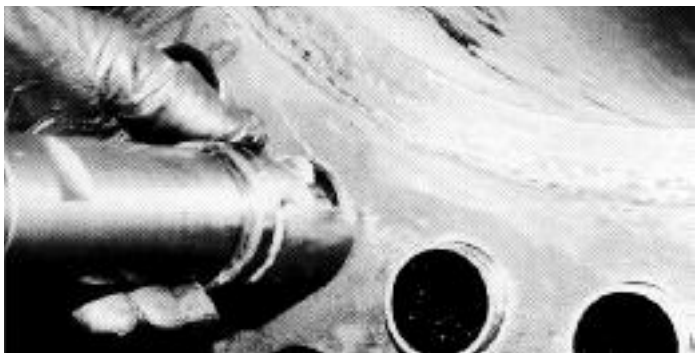


Tube OD Inches	(mm)	Pipe Size Inches	(mm)	Part No.	A Inches	(mm)	B Inches	(mm)	Weight Lb
2	(50.8)	1½	(38.1)	**76461-4054**	1¾	44.45	1⅛	28.57	0.25
2½	(63.5)	2	(50.8)	**76461-4104**	2¾	69.85	1¼	31.75	0.75
3	(76.2)	2½	(63.5)						

Hydraulic Tube Cutters

For 2, 2½ and 3-Inch OD Tubes





Kit Includes:
- Hydraulic Tube Cutter with Guide Rolls
- 3 Sets of Cutter Wheels and Pins
- Hex Keys
- Service Manual – SM146C

The **Wilson Hydraulic Tube Cutter** quickly and efficiently cuts tubes in front of the tubesheet (prior to flaring and/or beading) in seconds. In fact, it cuts a 2-inch Outer Diameter tube in just 8 seconds!

The **Wilson Hydraulic Tube Cutter** automatically raises the cutter wheel, cleanly cutting through the tube. When the rolling motor is reversed, the cutter wheel is automatically retracted.

Overall tool length is 22 inches.

This tool needs a minimum 1/2-inch projection to trim tubes, and an adjustable collar ensures that tubes are consistently cut at precisely the right position.

We recommend the **909** or **910 Series** Air-Driven Rolling Motor (Page 15-17) or the **41238** Electric Rolling Motor (Page 18). The **Wilson Hydraulic Tube Cutter** is available for rental.

U.S. Patent No. 4,424,629

Tube OD *Inches*	Tube OD *(mm)*	Wall *GA*	Wall *(mm)*	Hydraulic Tube Cutter Part No.	Guide Roll Assembly (2 per set) Part No.	Guide Roll Assembly (2 per set) OD	Cutter Wheel Part No.	Wheel Pin Part No.	Length of Tube Cut-Off Min *Inches*	Length of Tube Cut-Off Max. *(mm)*
2	(50.8)	9	(3.8)	**42741-0009**	**42366-0009**	1.640	**42752**	**42754**	F L U S H	*4¾ (120.6)
		10	(3.4)	**42741-0010**	**42366-0010**	1.668				
		11	(3.0)	**42741-0011**	**42366-0011**	1.696				
		12	(2.8)	**42741-0012**	**42366-0012**	1.718				
		13	(2.4)	**42741-0013**	**42366-0013**	1.746				
2½	(63.5)	9	(3.8)	**42742-0009**	**41735-0009**	2.140	**42753**	**42755-0001**	F L U S H	9 (228.6)
		10	(3.4)	**42742-0010**	**41735-0010**	2.168				
		11	(3.0)	**42742-0011**	**41735-0011**	2.196				
		12	(2.8)	**42742-0012**	**41735-0012**	2.218				
		13	(2.4)	**42742-0013**	**41735-0013**	2.246				
3	(76.2)	9	(3.8)	**42743-0009**	**41771-0009**	2.640				
		10	(3.4)	**42743-0010**	**41771-0010**	2.668				
		11	(3.0)	**42743-0011**	**41771-0011**	2.696				
		12	(2.8)	**42743-0012**	**41771-0012**	2.718				
		13	(2.4)	**42743-0013**	**41771-0013**	2.746				

* 6-Inch with modified collar

Series 909 Right-Angle Tube Rollers: 1 to 4-Inch OD Tubes – Stall Type

Series 909-1700/with 114 Flare Expander

Applications

- Rolling ferrous and nonferrous tubes in water and fire tube boilers and other pressure vessels.
- Ideal for hard-to-reach and confined spaces.

Features

- Lightweight
- Reversible – stall type
- Heavy-duty gear system
- Right-angle design gives users built-in leverage
- Powerful motor
- 3/4-Inch square spindle

Kit Includes:

- Right-Angle Tube Roller
- Quick Connector (3/4-Inch square) 21137-0756
- Operating Hose 8973-0008
- Inline Lubricator 53360
- Carrying Case 44099
- Service Manual SM-156 (909-1600, 1700), SM-253 (909-1900)

Series 909-1600, 1700

Series 909-1900

Kit 909

Tube OD Inches	Tube OD (mm)	Free Speed rpm	Tube Roller Part No.	Max Torque @90psiG Air Press. Ft. Lbs.	Max Torque @90psiG Air Press. NM	Min Torque @90psiG Air Press. Ft. Lbs.	Min Torque @90psiG Air Press. NM	Lever and Controls	Weight	Air Consumption CFM	Service Manual
1 to 2½	(25.4-63.5)	160	**909-1600**	165	224	10	14	Lever Throttle Stall Type	13.3 lbs (6.0 Kg)	72	SM-156
1 to 2½	(25.4-63.5)	95	**909-1700**	240	326	10	14		13.3 lbs (6.0 Kg)		
1½ to 4	(38.1-101.6)	90	**909-1900**	305	414	150	214	Roll Throttle Stall Type	18.5 lbs (8.8 Kg)	90	SM-253

Tube Outer Diameter capacity varies with tube Gauge and tubesheet thickness.

Accessories for 909 rolling motors:

Descriptions	Part No.
Filter-Lubrication Unit (1/2-Inch Coupling)	**8597**
1-gallon Can (3.8 Liters) of WilsoLube	**9047**
1/2-Inch Square (12.7 mm) Coupling	**53782**
1/2-Inch Square (12.7 mm) Quick Connector	**21138-0756**
3/4-Inch Square (19.1 mm) Coupling	**53777**
1-Inch Square (25.4 mm) Coupling	**53778**
1-Inch Square (25.4 mm) Quick Connector	**21489-0756**

Series 909 Right-Angle Tube Rollers: 2 to 4-Inch OD Tubes – Torque-Controlled

Applications

- Rolling ferrous and nonferrous tubes in water and fire tube boilers and other pressure vessels.
- Ideal for hard-to-reach and confined spaces.

Features

- Lightweight
- Reversible – torque-controlled
- Heavy-duty gear system
- Right-angle design gives users built-in leverage
- Powerful motor
- 3/4-Inch square spindle

Kit Includes:

- Right-Angle Tube Roller
- Quick Connector (3/4-Inch square) 21137-0756
- Operating Hose 8973-0008
- Inline Lubricator 53360
- Adjusting Tool 909-2127
- Carrying Case 44099
- Service Manual SM-253

Series 909-2000, 2100

The 909 Torque-Controlled Rolling Motor has the ability to control the torque, simply by adjusting this dial ranging from 150 to 305 ft-lb.

Kit 909

Tube OD Inches	Tube OD (mm)	Free Speed rpm	Tube Roller Part No.	Max Torque @90psiG Air Press. Ft. Lbs.	Max Torque @90psiG Air Press. NM	Min Torque @90psiG Air Press. Ft. Lbs.	Min Torque @90psiG Air Press. NM	Lever and Controls	Weight	Air Consumption CFM	Service Manual
2 to 4	(50.8-101.6)	90	909-2000	305	414	150	214	Lever Throttle Torque Control	18.5 lbs (8.8 Kg)	90	SM-253
2 to 4	(50.8-101.6)	90	909-2100	305	414	150	214	Roll Throttle Torque Control	18.5 lbs (8.8 Kg)		

Tube Outer Diameter capacity varies with tube Gauge and tubesheet thickness.

Accessories for 909 rolling motors:

Descriptions	Part No.
Filter-Lubrication Unit (1/2-Inch Coupling)	8597
1-gallon Can (3.8 Liters) of WilsoLube	9047
3/4-Inch Square (19.1 mm) Coupling	53777
1-Inch Square (25.4 mm) Coupling	53778
1-Inch Square (25.4 mm) Quick Connector	21489-0756

Electric Tube Rollers: 1/2 to 3-Inch OD Tubes

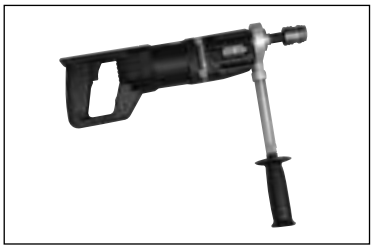
Series 22488 with CB Expander

Applications

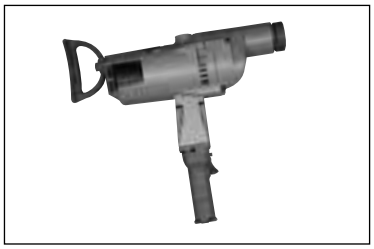
- Rolling ferrous and nonferrous tubes in boilers, heat exchangers, and other pressure vessels.

Features

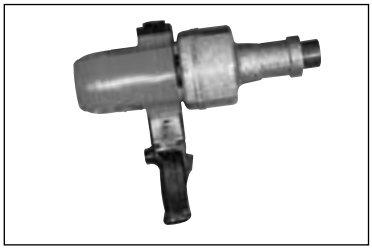
- **Wilson Electric Tube Rollers** are durable, reliable, and easy to use.
- Both the **41238** and **22488** include dead handles for added leverage.
- On-Off and reverse switches are conveniently located on the fixed handle.
- Exceeding their stall points will not damage these rugged machines.
- Wilson offers a complete line for various tube sizes and voltages. See chart below for selection.



The **22480** Electric Rolling Motor rolls tubes to 1 1/2-inch Outer Diameter.



The **41238** Electric Rolling Motor rolls tubes to 2 1/2-inch Outer Diameter.



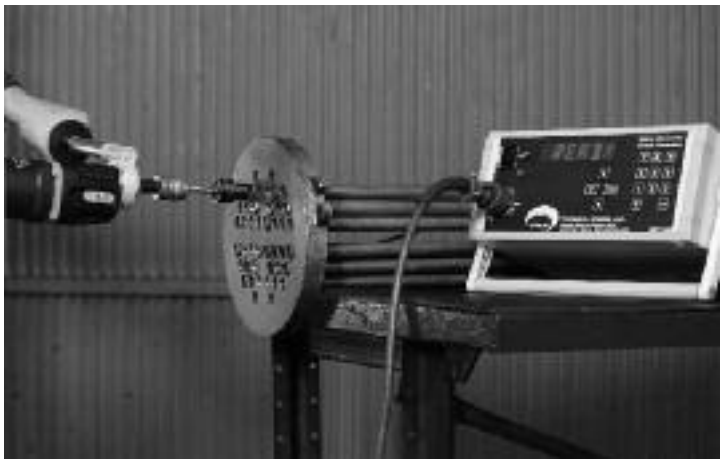
The **22488** Electric Rolling Motor rolls tubes up to 3-inch Outer Diameter.

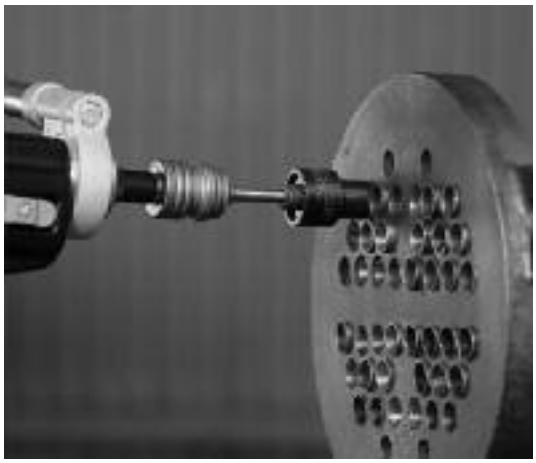
Tube OD Inches	(mm)	Voltage and Frequency	Motor Part No.	Free Speed rpm	Amps/ Wattage	Drive Spindle	Weight	Overall Length Inches	(cm)	Service Manual
½ to 1 ½	(12.7-38.1)	110 Volts 60 Hz	**22480-7000**	750	10 Amps					
		220 Volts 50 Hz	**22480-7220**		5 Amps					
1 to 2 ½	(25.4-63.5)	110 Volts 60 Hz	**41238-0000**	250	10 Amps	#3 Morse Taper Socket	19 lbs. (8.6 Kg)	18 ½	(47)	SM-133
		220 Volts 50 Hz	**22487-0220**		900 Watts		22.7 lbs. (10.3 Kg)	15 ⅝	(40)	SM-188
2 to 3	(50.8-76.2)	110 Volts 60 Hz	**22488-0000**	100	900 Watts	#4 Morse Taper Socket	23 ½ lbs. (10.6 Kg)	16 ¾	(42)	SM-188
		220 Volts 50 Hz	**22488-0220**							

Connectors	Part No.
For 22480:	
For 41238 & 22487:	
1/2-Inch (12.7mm) Square Socket x 3 M.T.	**41237-0000**
3/4-Inch (19.1mm) Square Socket x 3 M.T.	**20211-0000**
1-Inch (25.4mm) Square Socket x 3 M.T.	**20497-0000**
For 22488:	
3/4-Inch (19.1mm) Square Socket x 4 M.T.	**20212-0000**
1-Inch (25.4mm) Square Socket x 4 M.T.	**20213-0000**

Accessories	Part No.
For 22480:	
For 41238:	
On/Off, Forward/Reverse Switch	**41238-0105**
Set of Motor Brushes (must order 2 sets)	**41238-0125**
For 22487 & 22488:	
Forward/Reverse Switch	**22488-8691**
On/Off Switch	**22488-0080**
Set of Motor Brushes (must order 2 sets)	**22488-0008**

Electronic Torque-Controlled Tube Rollers: 1/2 to 3-Inch OD Tubes



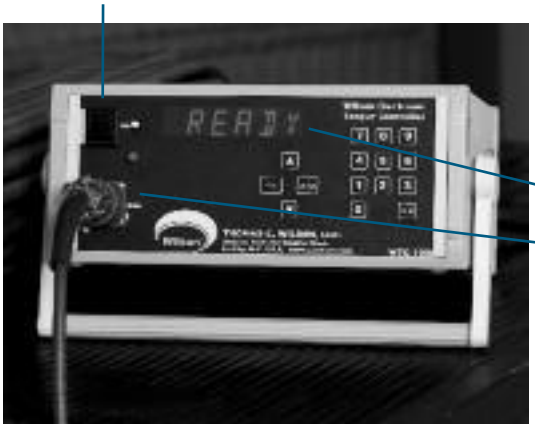


Applications

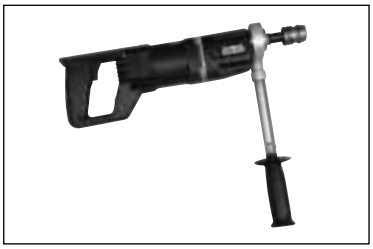
- Rolling ferrous and non-ferrous tubes in boilers, heat exchangers, condensers, and other pressure vessels with accurate and repeatable torque control.

Features

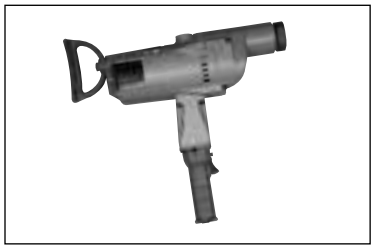
- **Wilson Electric Torque-Controlled Tube Rollers** are durable, reliable, and easy to use. In most cases, you are ready to roll tubes in less than 3 minutes.
- The torque control box is adjustable for expanding torque and will automatically reverse the motor when selected torque is reached.
- Control boxes are available in 110V or 220V single-phase supply choices. Motors are on/off reversing and equipped with dead handle that gives operator added leverage and maneuverability.
- The system consists of a range of electric motors and control boxes. See chart below for selection.



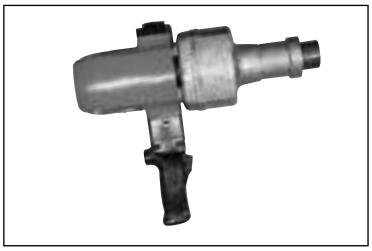
Control Box Panel



22480



41238



22488

Tube OD Inches	Tube OD (mm)	Voltage and Frequency	Motor Part No.	Free Speed rpm	Amps/ Wattage	Control Box Part No.	Control Box Amps
½ to 1 ½	(12.7-38.1)	110 Volts 60 Hz	22480-7000	750	10 Amps	76500-0000	20
		220 Volts 50 Hz	22480-7220		5 Amps	76500-0000	
1 to 2 ½	(25.4-63.5)	110 Volts 60 Hz	41238-7000	250	10 Amps	76500-0000	
		220 Volts 50 Hz	22487-7220		900 Watts	76500-0000	
2 to 3	(50.8-76.2)	110 Volts 60 Hz	22488-7000	100	900 Watts	76500-0000	
		220 Volts 50 Hz	22488-7220			76500-0000	

Control Box Service Manual: SM-281

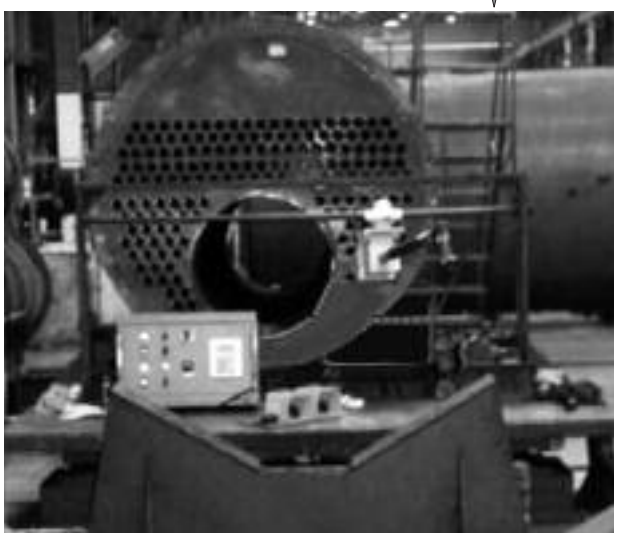
Wils-Tronic™ Tube Roller

Electronic Tube Expansion
For 1/2 to 3-Inch OD Tubes

New Product

Patent Pending

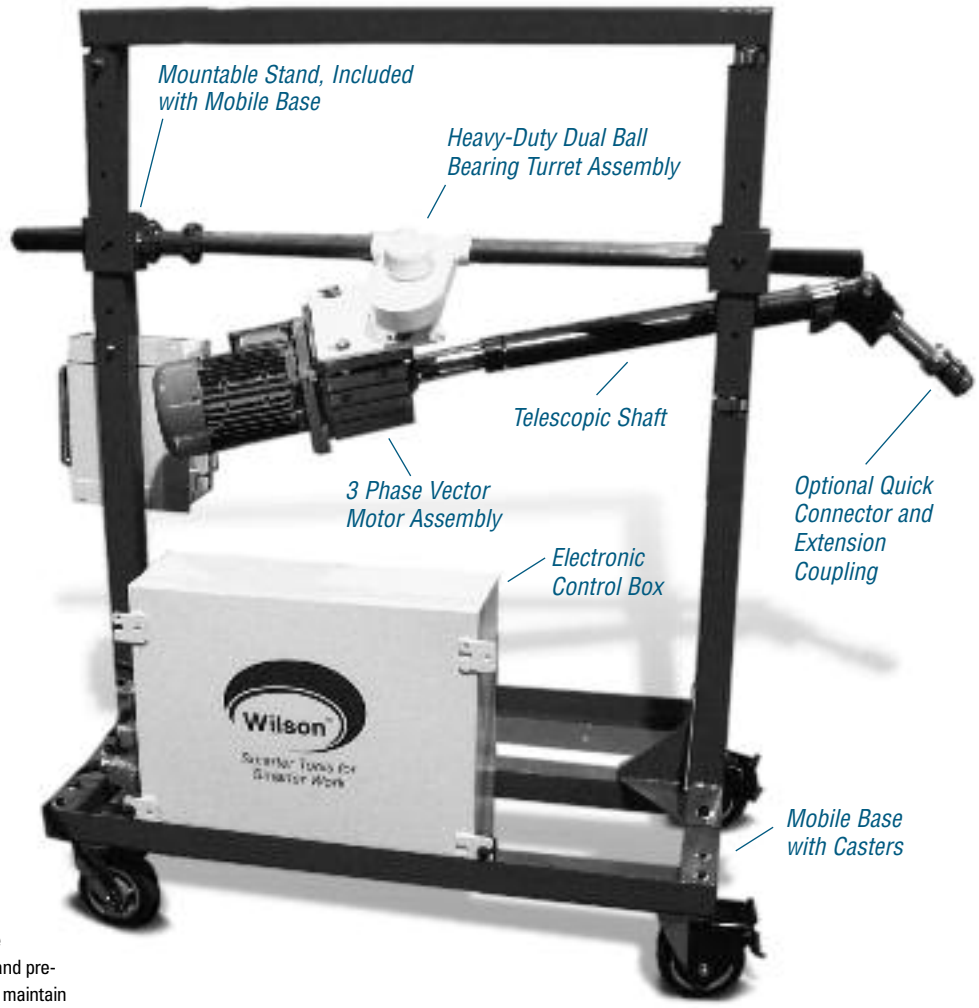
Features
- Two Modes of Operation (Manual and Automatic)
- Constant rpm at Various Torque Settings
- Auto Cycle for Continuous Rolling of Multiple Tubes
- Fully Programmable Keypad
- Security Lockout by Password
- Very Low Noise Level
- Telescopic Shaft Eliminates Operator Fatigue
- Flexible Tool that Allows for a Variety of Tools, including Expanders, Cutters, and Reamers.



Specifications

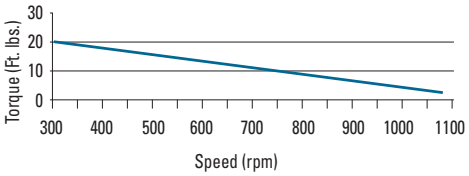
Power Requirements:	220V 3 Phase 50 or 60 Hz - or - 440V 3 Phase 50 or 60 Hz
Speed:	Up to 1,400 rpm
Torque (programmable):	1 to 300 ft. lbs.
Weight:	350 lb.
Work Envelope Dimensions:	up to 10 ft. x 10 ft. with standard cart

The most important feature of the **Wils-Tronic™** is its ability to maintain constant speed during the entire rolling process, even at various torque settings, making it faster and more efficient than conventional tube rollers. It also runs much quieter than any other tool on the market.

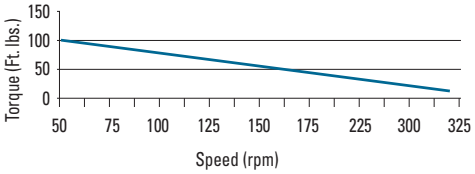


Patent Pending

Performance Data - Low Torque



Performance Data - Mid Torque



3-phase asynchronous drive motor has an extremely flat torque curve. Tube rolling rpm is determined by desired output torque and pre-programmed into the Wils-Tronic™. Vector drive technology will maintain that rpm throughout the rolling process.

How to Order

Wils-Tronic™ Model		Ultra-Low Torque	Low Torque	Mid Torque	High Torque
Technical Data					
Tube Capacity		1/2 to 3/4-Inch Tubes	1/2 to 1½-Inch Tubes	3/4 to 3-Inch Tubes	Up to 3-Inch Tubes
rpm		50-1000 rpm	0-1400 rpm	0-400 rpm	0-400 rpm
Torque Ranges		1-10 Ft-lbs.	1-30 Ft-lbs.	15-120 Ft-lbs.	80-300 Ft-lbs.
Wils-Tronic™ Kits	3ø 230V, 60 Hz	**45500-0000**	**46000-0000**	**46500-0000**	**47000-0000**
Consisting of: Base Control, Foot Switch	3ø 230V, 50 Hz	**45005-0000**	**46005-0000**	**46505-0000**	**47005-0000**
Power Cable, Motor Mount, Accessory Tool Kit	3ø 440V, 60 Hz	**45040-0000**	**46040-0000**	**46540-0000**	**47040-0000**
Telescopic Shaft, Shipping Crate, and Manual	3ø 440V, 50 Hz	**45045-0000**	**46045-0000**	**46545-0000**	**47045-0000**
Accessories					
Mobile Stand		**48000-7000**		**46000-5400**	
Stationary Stand		**48000-7010**		**46000-5010**	
3/8-Inch Quick Connector		**46000-4200**	**46000-4200**		**—**
1/2-Inch Quick Connector		**46000-4250**	**46000-4250**		**21489-0500**
3/4-Inch Quick Connector					**21489-0750**
3/4-Inch Extension Coupling					**46500-4400**
1-Inch Extension Coupling					**46500-4500**
1/2-Inch Jacobs Chuck		**46000-4600**	**46000-4600**		**—**
#2MT Adaptor					**46500-6000**
Telescopic Shaft		**46000-4000**	**46000-4000**		**46500-4000**
Service Manual			**SM-293**	**SM-287**	**SM-296**

Electronic Tube Expansion

Enforcer-500 Tube Expanding Systems

Wilson Enforcer-500 systems offer the latest in electronic torque controll for tube expanding. These systems feature an articulating arm mount for reduced operator fatigue. A torque sensing system allows the unit to accurately sense torque levels as low as 1 ft/lb and in 1/4 ft/lb increments. The unit also includes an automatic lubrication system that feeds lubricant directly to the collar to ensure longer life of both expanders and tubes.

- Two Modes of Operation (Manual and Automatic)
- Constant RPM at Various Torque Settings
- Auto Cycle for Continuous Rolling of Multiple Tubes
- Fully Programmable Human-Machine Interface for Parameter Input
- Pressure Regulation System to Adjust Level of Lifting Assistance for Arm and Tool
- Automatic Lubrication System (Optional)
- Outstanding Torque Accuracy (+/- 0.5 ft-lbs.)
- Very Low Noise Level
- Low Operator Fatigue
- Holding Fixture Increases Expander Life

Self-Lubricating Motor Assembly

Enforcer Model		Ultra-Low Torque	Low Torque
Technical Data			
Tube Capacity		1/2 to 3/4 Inch Tubes	3/4 to 1-1/2-Inch Tubes
Speed		50-1000 rpm	50-800 rpm
Torque Ranges		1-10 Ft-lbs.	3-30 Ft-lbs.
Enforcer Kits	3ø 220V, 60 Hz	48000-2000	48000-2200
	3ø 220V, 50 Hz	48005-2000	48005-2200
	3ø 440V, 60 Hz	48040-2000	48040-2200
	3ø 440V, 50 Hz	48045-2000	48045-2200

Human-Machine Interface

Power Requirements	220V 50 Hz, or 60 Hz; 440V 50 Hz, or 60 Hz
Speed	50 to 1,000 rpm
Torque	1 to 30 ft. lbs. (programmable)
Weight	350 lbs. (700 lbs. incl. Dead Wt.)
Footprint	29 in. x 37 in.
Total Height	7 ft., 4 in.
Vert. Arm Range	1 to 6 ft.
Horiz. Arm Range	8 ft.
Arm Reach	4 ft.

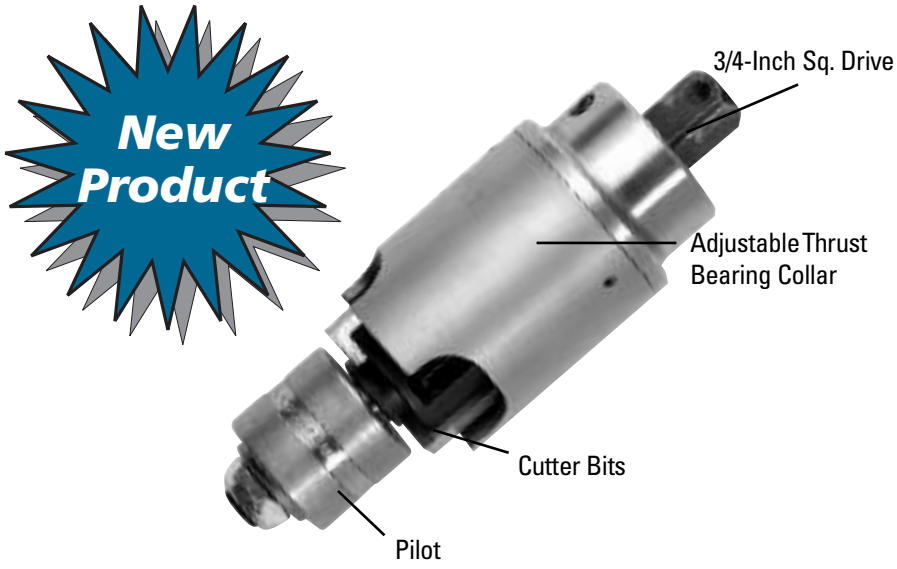
Tube Plugs - One Piece - 1 to 3-Inch OD Tubes

Wilson Tube Plugs offer a low-cost, quick, and effective method of sealing off leaky tubes. They are inserted easily, allowing the return of tubular units back on-stream without undue interruption of process schedules. Only a minimum amount of driving is required to accomplish a positive seal without special tools. Plugs may also be welded. Certification and traceability are provided.

Tube OD Inches	Tube OD (mm)	Tube Wall GA	Tube Wall Inches	Tube Wall (mm)	Steel SA-105 Part No.
1	(25.4)	11-14	.120-.083	3.0-2.1	39710
1	(25.4)	15-22	.072-028	1.8-0.7	22034
1⅛	(28.6)	15-22	.072-.028	1.8-0.7	40508
1¼	(31.8)	15-22	.072-028	1.8-0.7	42163
1⅜	(34.9)	15-22	.072-.028	1.8-0.7	42164
1½	(38.1)	15-22	.072-028	1.8-0.7	42162
1¾	(44.5)	10-13	.134-.095	3.4-2.4	42606†
2	(50.8)	10-13	.134-.095	3.4-2.4	42600†
2½	(63.5)	10-13	.134-.095	3.4-2.4	42601†
3	(76.2)	10-13	.134-.095	3.4-2.4	42602†

Packaged 10 Plugs per Box
†Above 1½-inch Outer Diameter quantity as ordered.
Custom sizes and material available.

Tube End Facers - 2 to 3-Inch OD Tubes



Applications

- To prepare a uniform projection of tube ends prior to expanding the tubes.
- Trim boiler tube ends to a consistent projection before they are bead-rolled.
- De-burr tubes after they are cut or rolled.

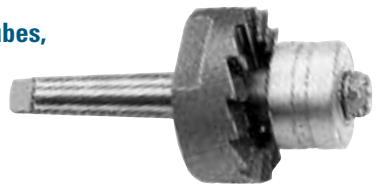
Features

- Adjustable Thrust Bearing Collar
- Quickly trim tube ends to desired projection
- Interchangeable, reversible cutter bits are easily replaced
- High Speed Steel Tool Bit
- Recommended speed: 150 rpm

Tube OD Inches	Tube OD (mm)	Wall GA	Wall (mm)	Tube Facer Part No.	Pilot Part No.	Cutter Bits (3) Part No.
2	(50.8)	10	(3.4)	44391-0010	39673-1700	74600-0562
		11	(3.0)	44391-0011	39673-1730	
		12	(2.8)	44391-0012	39673-1750	
		13	(2.4)	44391-0013	39673-1790	
2½	(63.5)	10	(3.4)	44392-0010	39674-2200	74600-0750
		11	(3.0)	44392-0011	39674-2230	
		12	(2.8)	44392-0012	39674-2250	
		13	(2.4)	44392-0013	39674-2290	
3	(76.2)	10	(3.4)	44393-0010	39674-2700	74600-0750
		11	(3.0)	44393-0011	39674-2730	
		12	(2.8)	44393-0012	39674-2750	
		13	(2.4)	44393-0013	39674-2790	

Tube or Pipe End Cutters

Flat Seal Weld Removers For 2 to 3-Inch Outer Diameter Tubes, 1½ to 2½-Inch Pipe



This tool with high-speed steel, multiple-tooth cutter, and rotating pilot is used principally to remove seal welds of welded boiler tubes, but is also ideal for flat facing tube ends. The cutter diameters are large enough to cut a minimum of a quarter inch beyond the outside of the tubes.

There is complete interchangeability of cutters, pilots, and shanks between inside or outside chamfering cutter and flat seal weld remover tools.

Tube OD *Inches*	Tube OD *(mm)*	Pipe Size *Inches*	Pipe Size *(mm)*	Tool Assembly Part No.	Spare Cutter OD *Inches*	Spare Cutter Cut Diameter *Inches* Outer	Spare Cutter Cut Diameter *Inches* Inner	Spare Cutter Part No.	Standard Shank M.T. No.	Standard Shank Part No.	Pilot Part No.
				40243					2	39671	
2	(50.8)	1½	(38.1)	39693	2½	2½	1 7/16	39701	3	39672	
				40244					4	39673	
				40245					2	39671	
2½	(63.5)	2	(50.8)	39694	3	3	1½	39702	3	39672	39674
				40246					4	39673	
				40247					2	39671	
3	(76.2)	2½	(63.5)	39695	3½	3½	1⅞	39703	3	39672	
				40248					4	39673	

45° Outside Chamfering Tools for 2 to 3-Inch Outer Diameter Tubes, 1½ to 2½-Inch Pipe

This tool with high-speed steel cutters and rotating pilots is used for outside chamfering of tubes or pipe ends prior to welding. The replaceable cutters are of multiple-tooth design to avoid chattering and provide long life.

Tube OD *Inches*	Tube OD *(mm)*	Pipe Size *Inches*	Pipe Size *(mm)*	Tool Assembly Part No.	Spare Cutter OD *Inches*	Spare Cutter Cut Diameter *Inches* Outer	Spare Cutter Cut Diameter *Inches* Inner	Spare Cutter Part No.	Standard Shank M.T. No.	Standard Shank Part No.	Pilot Part No.
				40221					2	39671	
2	(50.8)	1½	(38.1)	39655	2¼	2⅛	1⅜	39663	3	39672	
				40222					4	39673	
				40223					2	39671	
2½	(63.5)	2	(50.8)	39656	2¾	2⅝	1½	39664	3	39672	39674
				40224					4	39673	
				40225					2	39671	
3	(76.2)	2½	(63.5)	39657	3¼	3⅛	1⅞	39665	3	39672	
				40226					4	39673	

45° Inside Chamfering Tools for 2 to 3-Inch Outer Diameter Tubes, 1½ to 2½-Inch Pipe

This tool with high-speed steel cutters and rotating pilots is used for inside chamfering of tubes or pipe ends prior to welding. The replaceable cutters are of multiple-tooth design to avoid chattering and provide long life.

Tube OD *Inches*	Tube OD *(mm)*	Pipe Size *Inches*	Pipe Size *(mm)*	Tool Assembly Part No.	Spare Cutter OD *Inches*	Spare Cutter Cut Diameter *Inches* Outer	Spare Cutter Cut Diameter *Inches* Inner	Spare Cutter Part No.	Standard Shank M.T. No.	Standard Shank Part No.	Pilot Part No.
				40232					2	39671	
2	(50.8)	1½	(38.1)	39677	2⅛	2⅛	1 7/16	39685	3	39672	
				40233					4	39673	
				40234					2	39671	
2½	(63.5)	2	(50.8)	39678	2⅝	2⅝	1½	39686	3	39672	39674
				40235					4	39673	
				40236					2	39671	
3	(76.2)	2½	(63.5)	39679	3⅛	3⅛	1⅞	39687	3	39672	
				40237					4	39673	

NOTE 1: Alternate Morse taper shanks are interchangeable on all tools and may be selected in place of the listed standard shanks.
#2 M.T., No. 39671 #3 M.T., No. 39672 #4 M.T., No. 39673

NOTE 2: The pilots are furnished in a diameter to suit the specific Tube Inner Diameter.
When ordering, either specify pilot diameter desired or the Outer Diameter and Gauge or wall thickness of the tube or pipe with which the cutter is to be used.

Mandrel Drives

Mandrel drives serve the purpose of adapting tube expander mandrels to existing air or electric drills. Loosening the knurled nut releases the square insert type of socket for the introduction of another size.

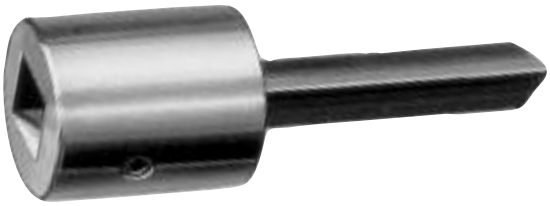
Assembly includes one insert only.
Specify catalog numbers.

Morse Taper No.	Insert Square Size *Inches*	Assembly Part No.	Extra Inserts Square Size *Inches*	Extra Inserts Part No.
2	3/8	**20112-0037**	3/8	**20123**
	1/2	**20112-0050**	1/2	**20124**
3	3/8	**21288-0037**	3/8	**21059**
	1/2	**21288-0050**	1/2	**20113**
	3/4	**21288-0075**	3/4	**20125**
	1	**21288-0100**	1	**20126**
4	3/8	**20115-0037**	3/8	**20159**
	1/2	**20115-0050**	1/2	**20113**
	3/4	**20115-0075**	3/4	**20125**
	1	**20115-0100**	1	**20126**

Taper Shank - Female Square

Morse Taper No.	Square Size *Inches*	Part No.
1	3/8	**20208**
	1/2	**20209**
2	3/8	**21290**
	1/2	**20210**
3	3/8	**41236**
	1/2	**41237**
	3/4	**20211**
	1	**20497**
4	3/4	**20212**
	1	**20213**

Triangle Shank - Female Square



Square Size *Inches*	Chuck Size *Inches*	Part No.
3/8	1/4	**21359**
	3/8	**20214**
1/2	1/2	**21360**
		20215

Drive Extensions

General purpose drive extensions are used with universal joints and parallel gear trains, as well as with couplings for extending expander mandrels through water legs, header, etc.

Male Square Size *Inches*	Overall Length *Inches*	Diameter *Inches*	Part No.
3/8	6	1/2	**20041**
	12		**20043**
	18		**20197**
1/2	4	5/8	**20044**
	6		**20045**
	9		**20046**
	12		**20047**
	18		**20048**
	24		**20339**
3/4	4	15/16	**20049**
	6		**20050**
	12	3/4	**20052**
	18		**20053**
	24		**20054**
1	6	1¼	**20056**
	12		**20058**
	14	1	**20196**
	24		**20060**

Extension Couplings

Wilson Extension Couplings are available in either a plain or reducing type. They are generously proportioned and heat-treated to withstand applicable torque loads. Sockets have clearances to accommodate drive extensions, universals, etc.

Square Size *Inches*	Overall Length *Inches*	Diameter *Inches*	Part No.
3/8 x 3/8	1 7/16	13/16	**20061**
3/8 x 1/2	1 9/16	1 1/16	**20189**
1/2 x 1/2	1 11/16		**20063**
1/2 x 3/4	2 1/16	1 3/8	**20191**
1/2 x 1	2 5/16	1 7/8	**20193**
3/4 x 3/4	2 1/8	1 1/2	**20065**
3/4 x 1	2 3/8	1 7/8	**20202**
1 x 1	3		**20067**

Universal Joints

"GP" Universal Joints

The Model GP is a female square type, smoothly rotating and deflecting upon a common axis. It has unusual strength for its size and is popular with all boilermakers. Minimum working angle is 135°.

Square Size Female *Inches*	Square Size Female *Inches*	Overall Length *Inches*	Major Dia. *Inches*	Part No.
3/8	3/8	2 1/4	7/8	**42853**
1/2	1/2	2 3/8	1	**20186**
3/4	3/4	3 1/4	1 1/2	**20187**
1	1	3 3/4	1 3/4	**20188**

Bi-Universal Joints

The Wilson Bi-Universal Joint is suitable for the unusual situation requiring deflecting greater than that provided by the Model GP Universal Joint.

Square Size Female *Inches*	Square Size Female *Inches*	Overall Length *Inches*	Major Dia. *Inches*	Part No.
3/8	3/8	3 15/16	1 1/8	**20081**
1/2	1/2	4	1 5/16	**20083**
3/4	3/4	4 11/16	1 5/8	**20085**
1	1	6 1/32	2 1/4	**20087**

Male-Female Universal Joints

The Wilson Male-Female Universal Joint is suitable for use in superheater headers. It has the same features as the Model GP.

Square Size Female *Inches*	Square Size Male *Inches*	Overall Length *Inches*	Major Dia. *Inches*	Part No.
3/8	3/8	2 1/2	7/8	**42803**
1/2	1/2	2 19/32	1	**21285**
*1/2	1/2	2 3/8	1	**21356**
3/4	3/4	3 9/32	1 1/2	**21286**
1	1	4	1 3/4	**21287**

*Male-Female Universal Joint, Part no. 21356, is extremely short and most suitable for work in crowded superheater headers. It is only used with shortened shanks of expander mandrels.

Extension Universal Joints

Wilson Extension Universal Joints are useful for many applications when expanding tubes through waterwall headers, superheaters, water legs, etc. The integral design eliminates coupling an extension with a separate universal joint. The 140° working angle matches the standard location of many tubes from the accessible handhole.

Square Size Female *Inches*	Square Size Male *Inches*	Overall Length *Inches*	Major Dia. *Inches*	Part No.
3/8	3/8	6	1 1/8	**21239**
		12		**20001**
	1/2	9		**21015**
		16		**21236**
1/2	1/2	6	1 5/16	**21242**
		12		**20008**
		16		**20009**
		20		**20010**
3/4	3/4	9	1 5/8	**21244**
		16		**20019**
1	1	9	2 1/4	**21246**
		16		**20028**

Parallel Gear Train Drives

Wilson Parallel Gear Drives are suitable for many expanding applications in various types of boiler headers. The inner gears have individual bronze bushings, rotating on shafts that are an integral part of the steel housing. These rigid gear shafts cannot come loose, hence gears are maintained in perfect alignment under any operating conditions. The alloy steel gears are specially heat-treated for maximum strength. All parts are readily replaceable. For maximum service, lubricate with Texaco Starfak grease M or equivalent. Select the proper square hole size when ordering.

Square Size *Inches*	No. Opgs.	Assembly Part No.	Replacement Parts Double Hub Gear Part No.	Double Hub Gear No Req'd.	Center Gear Sub-Assy. Part No.	Center Gear Sub-Assy. No Req'd.	Distance Between Outer Squares *Inches*	Length *Inches*	Dimensions Width *Inches*	Thick *Inches*
3/8	2	**20105**	**20108**	2	**20988**	3	6	8½	2	1 15/16
1/2	2	**20079**	**20080**	2						
	3	**38131**		3		2				
3/4	2	**20077**	**20078**	2	**20878**			9	2½	
	3	**38134**		3		1				
1	2	**20069**	**20072**	2		2				

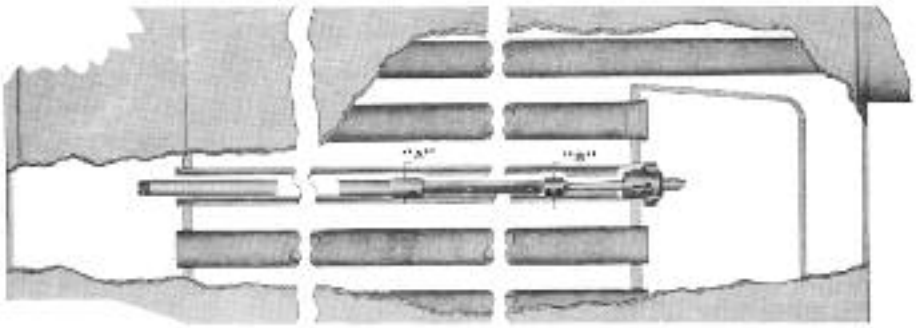
Reversible Ratchet Wrench

Wilson Ratchet Wrenches are suitable for tube expanding operations, such as tube replacement and tube tightening. Reversing is accomplished by releasing the knurled knob at the handle end and turning it 180 degrees.

Square Size *Inches*	Length *Inches*	Width *Inches*	Thickness *Inches*	Part No.
3/8	7	1 9/16	7/8	**20198**
	10	2 1/16	1 1/16	**20036**
1/2	7	1 9/16	7/8	**20199**
	10	2 1/16	1 1/16	**20200**
	12	2 3/8	1 1/8	**20037**
3/4				**20201**
	15	3 1/8	1 5/16	**20038**
	18	3 3/4	1 7/16	**20989**
1	15	3 1/8	1 5/16	**20039**
	24	3 13/16	1 7/16	**20954**

Extension Drives

This telescopic extension is suitable for the far end rolling of tubes in such HRT types of boilers as Fitzgibbons, Pacific, and similar types. It is used with the same expander used for the front sheet. The extension can be as short as 49" or extend as far as desired. It will perform in a space as small as 7" at the back end.



Square Sizes *Inches* Male Driven	Female Driven	Adjustable Telescopic Drive	Diameters *Inches* Dim. "A"	Dim. "B"	Reach *Inches* Max	Min
3/4	1/2	**20405**	1 1/16	1 1/16	49	92
	3/4	**21581**	1 3/16	1 1/4		
1	1	**20412**	2	1 7/8		

Female Square *Inches*	Plain Square Extension	Added Reach *Inches*	For Use With Assembly	Reach *Inches* Max	Min
1/2	**20471**	47	**20405**	96	139
3/4	**21588**		**21581**		
1	**20473**		**20412**		

Right Angle Gear Drives

Right Angle Worm Gear Drive

Wilson Worm Gear Drives were designed for maximum duty and service life and are expressly suitable for operating in very confined areas of boiler headers. The gear housing is specially shaped and the knurled shank is small enough to provide for expander feed movement when working through a handhole. They will conveniently "reach in" for expanding tubes at right angles to, but offset from, a handhole.

The Wilson exclusive one piece steel housing and one piece worm shaft assures complete rigidity, continued gear alignment, and extended service life. For maximum service, lubricate with Vital E.P. SAE 250 oil or equivalent. Select the proper square hole size when ordering.

Features:

- One piece, steel housing with knurled shank.
- Replaceable bronze bushings and thrust washers.
- One piece worm and shaft.
- Hardened and ground alloy steel worm and shaft.
- Gear ratio - see chart.
- Handhole entrance - see chart.

Male Square *Inches*	Female Square *Inches*	Overall Length *Inches*	Length *Inches*	Gear Housing Width *Inches*	Thickness *Inches*	Minimum Hand Hole Diameter *Inches*	Gear Ratio *Inches*	Part No.
1/2	1/2	10 3/16	3 3/16	2 1/4	1 3/8	3 3/8	4 1/2 to 1	**20135**
3/4	3/4		3 27/32	2 5/8	1 7/8	4		**20136**
	1	11 3/32	4 1/4	3 1/16		4 1/2	5 1/2 to 1	**20137**
								20138

Heavy-Duty Bronze Type

Right Angle Bevel Gear Drive - Heavy-Duty Bronze Housing Type

Enter handholes:
Round - 3¾-Inch diameter
Oval - 3⅜-Inch x 3¾-Inch
Elliptical - 3⅜-Inch x 4¼-Inch

Male Square *Inches*	Female Square *Inches*	Overall Length *Inches*	Width *Inches*	Thickness *Inches*	Part No.
1/2	1/2	11 3/16	3 5/8	3 1/8	**21885**
3/4	3/4				**21001**
	1				**21000**
1	3/4				**21002**
	1				**20972**

Light Duty

Right Angle Bevel Gear Drive - Maximum 2-Inch Outer Diameter Tube

This small, all steel, bevel gear drive is used in small headers. It is generally used in conjunction with a universal joint and extension for tubes located approximately 100° radially from a handhole. Its use is restricted to a maximum 2-inch diameter tube and for extended service life it should be rotated in the slower ranges of speed.

Features:

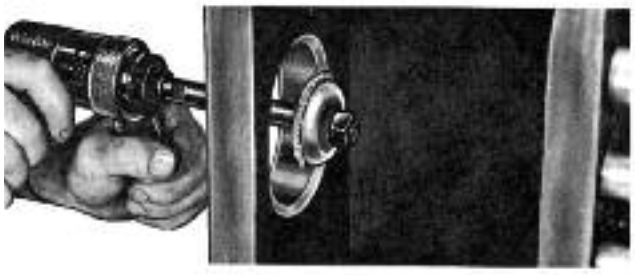
- All steel one piece housing.
- Alloy steel gears.
- Replaceable bronze bushing and thrust washer.
- Exceptionally compact.
- Gear ratio: 1-to-1.
- Will enter minimum 2¾-Inch round handhole.

Male Square *Inches*	Female Square *Inches*	Overall Length *Inches*	Width *Inches*	Thickness *Inches*	Part No.
3/8	3/8	6 3/8	1 3/4	2 13/32	**21601**
1/2	1/2				**21602**

Handhole Seat Cleaning Kit

The **Wilson Handhole Seat Cleaning Kit** includes all the tools you need to remove rust, deposits, torn gaskets, and other encrustations from boiler drums, sectional headers, plug seats, handholes and pipe flanges. It is also suitable for the surfacing of corners, as well as flat areas of tanks, stacks, and bulkheads, prior to painting.

- *Light rust and encrustation, a frequent cause of handhole leaks, are rapidly removed with the kit's special 2-inch diameter cup brush.*
- *The air motor that comes with the kit readily converts to a powerful 1/4-inch capacity 4500 rpm drill.*
- *The spindle and brush supplied with the kit clean drums and internals.*
- *Expanding brushes can be used with the extension spindle to clean tube seat holes to insure optimum rolled joints.*



*Light rust and gasket encrustations, a frequent cause of handhole leaks, are quickly removed with the special **Wilson Cup Brush.** A smooth seat is produced up to the corner of the outerbore. The short bristle will not damage the seat.*

Handhold Seat Cleaning Kit (Part No. 9175-1)

Includes:

Product Description	Part No.
Air Motor includes	**93-2321**
Dead Handle	**51199**
Hex Key and Wrench (1/2-Inch and 3/4-Inch opening)	**5760**
Spare Set (4) of Rotor Blades	**51139**
Drill Chuck with Key (1/4-Inch capacity)	**51211**
3½-Inch Cup Brush (1/2-Inch A.H. Twisted Wire)	**52066**
4-Inch Radial Brush (also 1/2-Inch A.H.)	**8122**
2-Inch Cup Brush for Handhole Seats	**8399**
Wrench Set for Cup Brush that includes	**51841**
1/2-Inch Angle Wrench	**52376**
3/4-Inch Socket Wrench	**52377**
4-Inch Extension Spindle with Nut	**51829-0004**
2-Inch Extension Spindle with Nut	**51829-0002**
Expanding Brush	**2463-0003**
Extension Spindle for Expanding Brush	**51846-0004**
3/8-Inch ID Air Hose (with 1/4-Inch NPT Couplings, 8 Ft)	**50371**
Tool Box/Carrying Case	**6404-0003**
Service Manual	**SM-193**

Cup Brush Assembly	Part No.
2-Inch Diam. Cup Brush with 2-Inch Extension Spindle	**8399-0002**
2-Inch Diam. Cup Brush with 4-Inch Extension Spindle	**8399-0004**

Air Motor Specifications

1/4-Inch Capacity
4500 rpm
90 psi
30 SCFM
1/4-Inch NPT Inlet
3 Lbs.
3/8-Inch x 24 Thread

Clean tube seat holes are essential to producing optimum rolled joints. Both the inside and outside of the drum or sheet hole, as well as the outside of the tube, must be cleaned. Expanding brushes may be used with the extension spindle furnished with the kit.

Handhole Seat Grinding Kit

The **Wilson Handhole Seat Grinding Kit** restores to a smooth flat surface the gasket seal of any size handhole, ensuring a perfect seal when the hole is closed. And the unique **Wilson Alignment Indicator** eliminates guesswork as to proper alignment of the grinding wheel with the seat to be ground.

*The unique **Wilson Alignment Indicator (Part No. 1043)** is available as optional equipment and is included in the **Handhole Seat Grinding Kit No. 1041-2601.***

Optional Grinding Wheels

Product Description	Part No.
2¼-Inch Diameter-Coarse Grit	**1041-0081**
2¼-Inch Diameter-Fine Grit	**1041-1081**
2½-Inch Diameter-Coarse Grit	**1041-0082**
2½-Inch Diameter-Fine Grit	**1041-1082**
2¾-Inch Diameter-Coarse Grit	**1041-0083**
2¾-Inch Diameter-Fine Grit	**1041-1083**

Optional Carbide Surfacers

Product Description	Part No.
2-Inch Diameter	**62524**
2¼-Inch Diameter	**62525**
2½-Inch Diameter	**62526**

Air Motor Specifications

12,600 rpm
90 psi
22 SCFM
0.25 HP
3/8-Inch NPT Inlet

Handhold Seat Grinding Kit (Part No. 1041-1601)

includes:

Product Description	Part No.
Air Motor (90 psi, 22 SCFM Max)	**1041-0088**
2-Inch Grinding Wheel (Coarse Grit)	**1041-0029**
2-Inch Grinding Wheel (Fine Grit)	**1041-1029**
Extension Arm Assembly	**1041-0093**
2-Inch Cup Brush	**8340**
Guide Roller (1⅝-Inch diameter)	**1041-0025**
Guide Roller (1⅝-Inch diameter)	**1041-0026**
Guide Roller (1½-Inch diameter)	**1041-0027**
Guide Roller (1⅞-Inch diameter)	**1041-0028**
MF Adapter (1-Inch-8M x 7/8-9F)	**1041-0035**
MF Adapter (1-Inch-8M x 3/4-10F)	**1041-0036**
5/16-Inch Hex Key	**52147**
3/16-Inch Hex Key	**51254**
5/64-Inch Hex Key	**52142**
Filter/Lubricator	**8596**
Offset Socket Wrench (9/16-Inch x 7/16-Inch)	**1041-0072**
Wheel Dressing Stone	**1041-0066**
Inspection Mirror	**1041-0030**
Mounting Assembly	**1041-3067**
Tool Box/Carrying Case	**24939**
Service Manual	**SM-121**

Handhole Seat Grinding Kit (Part No. 1041-2601)

includes items in Kit No. **1041-1601** *plus*

Product Description	Part No.
Alignment Indicator	**1043**
Motor Clamp Assembly	**1041-0087**
Service Manual	**SM-122**

Boilermaker's Grinding Kit

The **Wilson Boilermaker's Grinding Kit** includes a variety of the tools and accessories that are needed on most boiler repair projects. Many combinations of tools are possible from the accessories supplied with the kit, so many boiler repair tasks can be performed with this comprehensive and affordable kit.

The powerful ball bearing-type **921-18 Wilson Air Motor** supplied with the kit uses 90 psi of air and consumes 25 SCFM, and it runs at 18,000 rpm. It is furnished with a 3/8 – 24-Inch spindle and a 1/4-inch NPT hose connection. It weighs just 2 pounds and is less than 6½ inches in overall length, permitting use in confined areas.

The accessories supplied with the **Boilermaker's Grinding Kit** makes these combinations of tools possible:

- **General Purpose Grinding and Handhole Dressing:** Use the 2-inch diameter all purpose wheel. Circular wire brushes can also be used.
- **Two-Inch Outer Diameter Tube Hole Dressing and Weld Removal:** Attach the 1¼-inch diameter cone wheel and wheel adapter.
- **One-Inch Outer Diameter Tube Hole Dressing:** Attach the 1-inch diameter mounted points with 1/4-inch collet chuck adapter and the 1/4-inch collet.
- **Preparation of Weld and Dressing:** Use the 1/2-inch diameter carbide burr with the collet chuck adapter and 1/4-inch collet.

Boilermaker's Grinding Kit (Part No. 9189)
includes

Product Description	Part No.
921-18 Air Motor includes	**921-1800**
Wrench (1/2-Inch and 3/4-Inch Opening)	**5760**
Spare Set (3) of Rotor Blades	**50817**
Wheel Guard	**53535**
2-Inch Grinding Wheels (2)	**50123**
1¼-Inch Cone Wheel (2)	**50177**
Adapter for Cone Wheel	**50834-0003**
Spacer for Cone Wheel	**50850**
SF-13 Carbide Burr, 1/2-Inch diameter	**52793-0025**
Collet Chuck Adapter	**50833**
1/4-Inch Collet	**50904**
1-Inch Diameter Mounted Points (2)	**50370**
2-Inch Diameter Radial Wire Brush (2)	**50297**
3-Inch Diameter Radial Wire Brush	**53264**
8-Foot Length of Hose	**50371**
1/4-Inch Hose Line Lubricator	**52035**
Tool Box/Carrying Case	**6404-0003**
Service Manual	**SM-85**

WilsoLube
Rust-inhibiting Lubricant

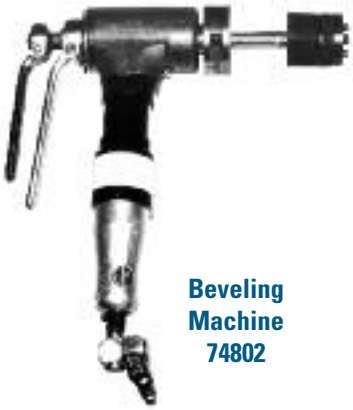
WilsoLube	Part No.
Oil-Based (Gallon)	**9047**
Water-Soluble (Quart)	**9047-0002**
Water-Soluble (Gallon)	**9047-0009**

Pneumatic Beveling Machines: 5/8- to 3 7/8-Inch ID Tubes

Applications
- The removal of weld, the preparation of tube ends prior to welding, and for facing operation.
- For light or heavy wall tubes or pipes.
- Two models covering 5/8-inch (12.7mm) Inner Diamater to 3 7/8-inch (102mm) Outer Diameter tubes.

Features
- Compact and lightweight.
- Simultaneously bevel inside or outside and for facing cuts.
- Heavy-duty bevel gear set.
- Reliable pneumatic motor.
- Internal locking holds tool securely in position for safety and accuracy.
- Choice of crank feed (for 74805) or wrench feed.
- Dual swivel air connection eliminates hose twisting and binding.

Kit Includes:
- Beveling Machine
- Complete Set of Inner Diameter Locking Wedges
- Wedge Rods
- 6 Cutter Bits
- 1 Hose Whip with Oiler
- Service Wrenches
- Carrying Case
- Service Manual - SM-308(74802), SM-309(74805)



Beveling Machine 74802

Beveling Machine 74805

Kit 74802

Cutter Bits:
The cutter bits illustrated at the right cover the standard machining applications. Standard bits are made from high-quality tool steel. Custom bits are available with carbide and titanium materials, and for other machining configurations.

Plain End Facing #74806

37 1/2°, 30° Outside Bevel #74807 (37 1/2°) #74808 (30°)

Tube Capacities ID Inches	(mm)	Kit No.	Free Speed rpm	Horsepower HP	(kw)	Minimum Clearance Inches	(mm)	Length Inches (mm)		Weight Lbs.	Kg.
5/8 - 2 7/8	(15.9 - 73.0)	**74802**	90	1.0	(.66)	2 5/8 x 12 1/2	(67 x 318)	16	(406.4)	11	(5.0)
7/8 – 3 7/8	(22.2 - 98.4)	**74805**	110	1.6	(1.2)	3 x 15	(76.2 x 381)	16	(406.4)	16	(7.3)

Air Consumption: 38 CFM (1.1m³/min.) at 90psi (6.1 bar)

Pneumatic Accessories

It is very important to provide every air-operated tool with clean, lubricated, and properly pressurized air. Many job sites lack such conditions and the air provided may actually harm these air-operated tools. These popular assemblies, the Filter-Regulator-Lubricator and Filter-Lubricator, are offered as portable units.

Manifold Type

Filter **Regulator** **Lubricator**

Portable Type

Pipe Thd. *Inches*	Filter-Reg.-Lub. Manifold Type Part No.	Filter-Reg.-Lub. Portable Type Part No.	Filter-Lubricator Manifold Type Part No.	Filter-Lubricator Portable Type Part No.	Air Line Filter 150psi (Max) Part No.	Air Line Filter 150psi (Max) Max. CFM @100psi	Pressure Regulator Part No.	Pressure Regulator psi Range	Air Line Lubricator Part No.	Air Line Lubricator psi Range
*1/4	**8905**	**8905-0250**	**8595**	**8595-0250**	**8910**	79	**8915**		**8894**	
3/8	**8906**	**8906-0375**	**8596**	**8596-0375**	**8911**	112	**8916**	5-125	**3611**	10
1/2	**8907**	**8907-0500**	**8597**	**8597-0500**	**8912**	138	**8917**		**3612**	
3/4	**8908**	**8908-0750**	**8598**	**8598-0750**	**8913**	226	**8918**	10-125	**3613**	24
1	**8909**	**8909-1000**	**8599**	**8599-1000**	**8914**	331	**8919**		**3627**	

Air Line Lubricator

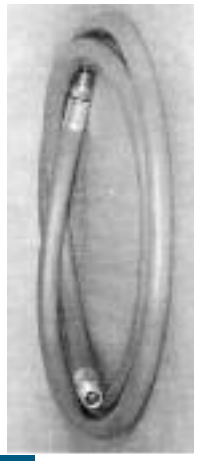
For use between supply hose and whip.

Pipe Thd. *Inches*	Air Line Lubricator Part No.	Capacity Ozs.
1/4	**52035**	.25
3/8	**52399**	
1/2	**53360**	2.6
3/4	**53361**	5.3
	53362	8
1	**53363**	16

Air Valve

Pipe Thd. *Inches*	Air Valve Part No.	Major Diam. *Inches*
1/4	**9439**	.735
3/8	**8774**	.906
1/2	**8654**	1.375
3/4	**8647**	1.750
1	**8669**	2.000

Hose Whips



These short lengths of hose are fitted with couplings and are used between the supply hose and the pneumatic tool. The hose is very flexible and lighter in weight than the operating or air supply hose. All hose used in Wilson Hose Whips is designed to withstand 250 pounds working pressure (psi).

Hose Size *Inches* ID	Hose Size *Inches* OD	Hose Whip Assembly with End Fittings Part No.	Length	Pipe Thread *Inches*
3/16	27/64	**50001**	8 Ft.	1/8 x 1/4
1/4	15/32	**50003**		1/4 x 1/4
3/8	39/64	**50371**		1/4 x 3/8
		50007		3/8 x 3/8
1/2	7/8	**8973-0008**		1/2 x 1/2

WilsoLube

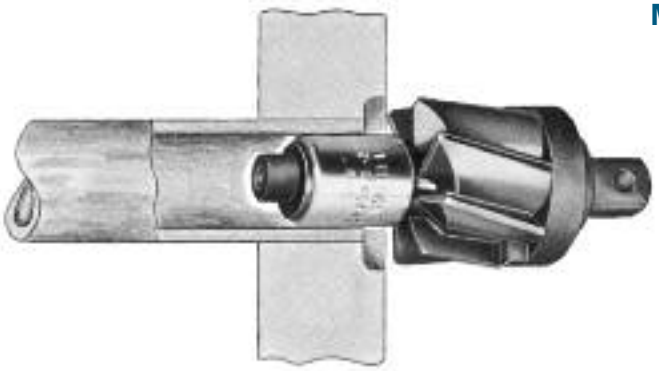
Rust-inhibiting Lubricant

WilsoLube	Part No.
Oil-Based (Gallon)	**9047**
Water-Soluble (Quart)	**9047-0002**
Water-Soluble (Gallon)	**9047-0009**

Superheater Tube Cutters

Seal Weld Facing or Counterbore Cutter - Flat Cut Type

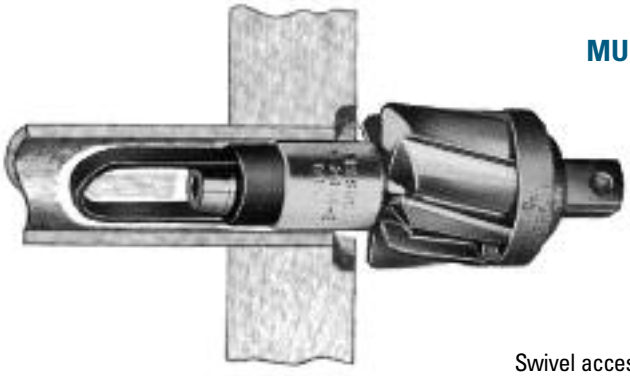
MULTI-TOOTH - Without Swivel



1/2-Inch Square Drive Motor 100-125 rpm

Tube OD Inches	Tube OD (mm)	Pilot Diameter	Cutter Diameter Inches	Cutter Assembly Part No.	Cutter Part No.	Shank Part No.	Cutter Assembly Parts Pilot Part No.	Cutter Assembly Parts Washer Part No.	Cutter Assembly Parts Screw Part No.
1	(25.4)	.805	1½	73488-8053	72464-0001	72464-0002	72464-8053	30573	20784
1¼	(31.8)	1.010	1¾	72537-0103	72537-0001		72464-0103		
			1⅞	72915-0103	72941-0001				
1½	(38.1)	1.262	1⅞	73142-2623	72555-0004		72464-2623		

MULTI-TOOTH - With Swivel

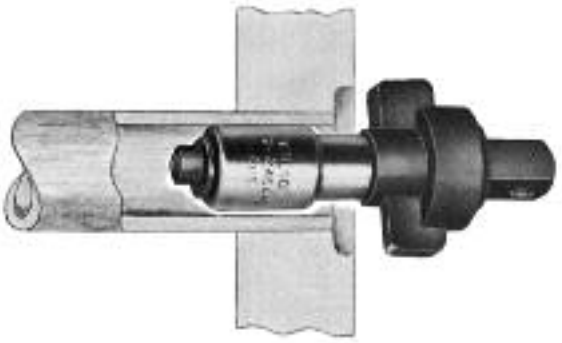


1/2-Inch Square Drive Motor 100-125 rpm

Swivel accessories are ball bearing for tubes 1¼-inch Outer Diameter and up.

Tube OD Inches	Tube OD (mm)	Pilot Diameter	Cutter Diameter Inches	Cutter Assembly Part No.	Cutter Part No.	Cutter Assembly Parts Shank Part No.	Cutter Assembly Parts Pilot Part No.	Swivel Assembly Part No.	Swivel Part No.	Swivel Assembly Parts Washer Part No.	Swivel Assembly Parts Screw Part No.	Bearing Part No.
1	(25.4)	.805	1½	72601-8053	72464-0001	72464-0002	72464-8053	72544-0002	72544-0008	72544-0007	38070	–
1¼	(31.8)	1.035	1¾	72546-0353	72537-0001		72464-0353	72951	72951-0001	–	39523	72951-0004
		1.010	1⅞	72914-0103	72914-0001		72464-0103					
			2	73292-0103	73292-0001							
1½	(38.1)	1.262	1⅞	72555-2623	72555-0001		72464-2623					
			2 3/32	73510-2623	72906							

FLY CUTTER - Without Swivel

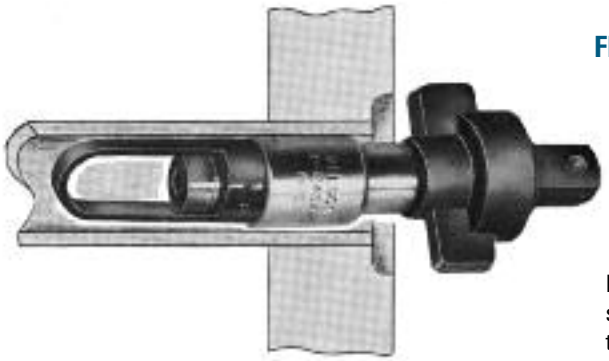


1/2-Inch Square Drive Motor 100-125 rpm

Tube OD Inches	Tube OD (mm)	Pilot Diameter	Cutter Diameter Inches	Cutter Assembly Part No.	Blade Part No.	Shank Part No.	Cutter Assembly Parts Pilot Part No.	Cutter Assembly Parts Washer Part No.	Cutter Assembly Parts Screw Part No.
1	(25.4)	.805	1½	72474-8053	72474-0001	72474-0002	72464-8053	2821	39924
1¼	(31.8)	1.010	1¾	72538-0103	38138		72464-0103		
		.980	1⅞	72917-9803	72916-0001		72464-9803		
1½	(38.1)	1.262	1⅞	73502-2623	73502-0001		72464-2623		

Superheater Tube Cutters

Seal Weld Facing or Counterbore Cutter - Flat Cut Type



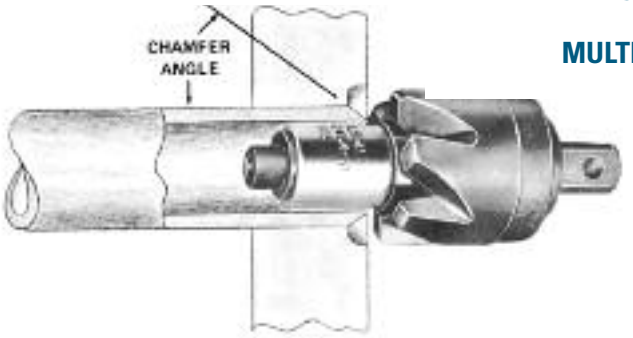
FLY CUTTER - With Swivel

1/2-Inch Square Drive Motor 100-125 rpm

Fly blade set screw **Part No. 28207** is accessible by removing swivel and swivel screw. Swivel accessories are ball bearing for tubes 1¼-inch Outer Diameter and up.

Tube OD Inches	Tube OD (mm)	Pilot Diameter	Cutter Diameter Inches	Cutter Assembly Part No.	Blade Part No.	Cutter Assembly Parts Shank Part No.	Cutter Assembly Parts Pilot Part No.	Swivel Assembly Part No.	Swivel Part No.	Swivel Assembly Parts Washer Part No.	Swivel Assembly Parts Screw Part No.	Bearing Part No.
1	(25.4)	.805	1½	72661-8053	72474-0001	72474-0002	72464-8053	72544-0002	72544-0008	72544-0007	38070	–
1¼	(31.8)	1.010	1¾	72557-0103	38138		72464-0103	72951	72951-0001	–	39523	72951-0004
			1⅞	72916-0103	72916-0001							
1½	(38.1)	1.262	1⅞	73503-2623	73502-0001		72464-2623					

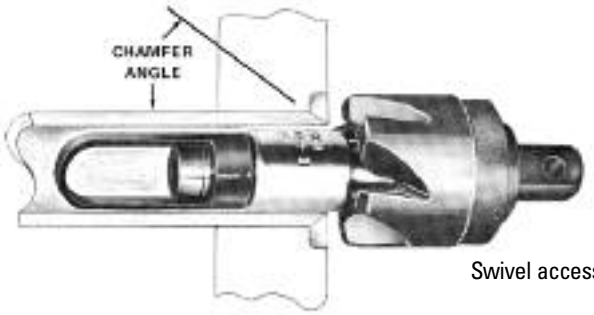
Seal Weld Groove and Tube End Outside Chamfer - Miscellaneous Angles



MULTI-TOOTH - Without Swivel

1/2-Inch Square Drive Motor 100-125 rpm

Tube OD Inches	Tube OD (mm)	Pilot Diameter	Cutter Diameter Inches	Chamfer Angle	Cutter Assembly Part No.	Cutter Part No.	Cutter Assembly Parts Shank Part No.	Cutter Assembly Parts Pilot Part No.	Washer Part No.	Screw Part No.
1	(25.4)	.805	1½	22½°	72659-8053	72600-0001	72464-0002	72464-8053	30573	20784
1¼	(31.8)	1.010	1¾	28°	72660-0103	72545-0001		72464-0103		
		.980	1⅞		72937-9803	72936-0001		72464-9803		
1½	(38.1)	1.145	1⅞		73501-1453	72554-0001		72464-1453		



MULTI-TOOTH - With Swivel

1/2-Inch Square Drive Motor 100-125 rpm

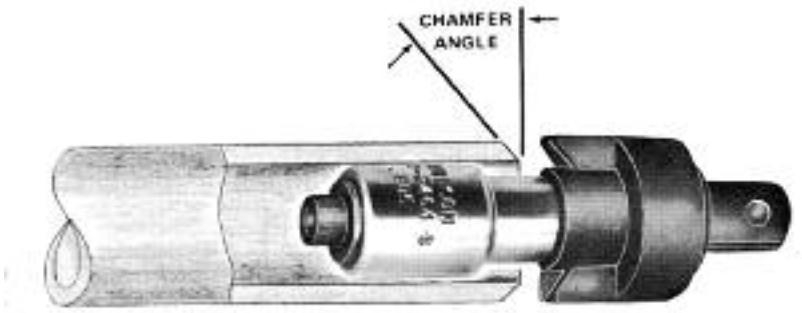
Swivel accessories are ball bearing for tubes 1¼-inch Outer Diameter and up.

Tube OD Inches	Tube OD (mm)	Pilot Diam.	Cutter Diam. Inches	Chamfer Angle	Cutter Assembly Part No.	Cutter Part No.	Cutter Assembly Parts Shank Part No.	Cutter Assembly Parts Pilot Part No.	Swivel Assem. Part No.	Swivel Part No.	Swivel Assembly Parts Washer Part No.	Swivel Assembly Parts Screw Part No.	Bearing Part No.
1	(25.4)	.805	1½	22½°	72600-8053	72600-0001	72474-0002	72464-8053	72544-0002	72544-0008	72544-0007	38070	–
1¼	(31.8)	.980	2⅛	20°	73621-9803	73621-0001		72464-9803	72951	72951-0001	–	39523	72951-0004
		1.035	1¾	28°	72545-0353	72545-0001		72464-0353					
			1⅞		72936-0353	72936-0001							
			2	20°	73293-0353	73293-0001							
1⅜	(34.9)	1.130	1¾	28°	72655-1303	72655-0001		72464-1303					
1½	(38.1)	1.230	2	20°	73620-2303	73620-0001		72464-2303					
		1.247	1⅞	28°	72554-2473	72554-0001		72464-2473					
			2 3/32		72907-2473	72907-0001							

Superheater Tube Cutters

Tube End Outside Chamber
Fly-Cutter - Miscellaneous Angles

CHAMFER

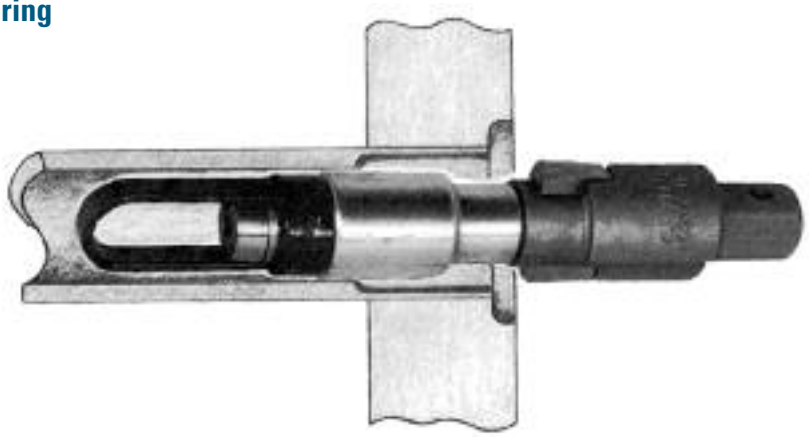


1/2-Inch Square Drive Motor 100-125 rpm

Tube OD Inches	Tube OD (mm)	Pilot Diameter	Blade Diameter Inches	Chamfer Angle	Cutter Assembly Part No.	Blade Part No.	Cutter Assembly Parts: Shank Part No.	Cutter Assembly Parts: Pilot Part No.	Cutter Assembly Parts: Washer Part No.	Cutter Assembly Parts: Screw Part No.	Cutter Assembly Parts: Shim Part No.
1	(25.4)	.805	1 3/16	37½°	72658-8053	72636-0001	72474-0002	72464-8053	2821	39924	72540-0003
1¼	(31.8)	1.010	1½		72540-0103	72540-0001		72464-0103			
1½	(38.1)	1.262	1⅝	20°	72638-2623	72638-0001		72464-2623			
				36°	73153-2623	73153-0001					
2	(50.8)	1.540	2¼		73936-5403	73936-0001		72464-5403			

Tube Wall Boring
Fly Cutter

BORE



1/2-Inch Square Drive Motor 100-125 rpm

Tube OD Inches	Tube OD (mm)	Pilot Diameter	Cutter Diameter Inches	Cutter Assembly Part No.	Blade Part No.	Cutter Assembly Parts: Shank Part No.	Cutter Assembly Parts: Pilot Part No.	Screw Part No.	Swivel Assem.	Swivel Assembly Parts: Swivel Part No.	Swivel Assembly Parts: Washer Part No.	Swivel Assembly Parts: Screw Part No.	Bearing Part No.
1	(25.4)	.775	.990	72599-7753	72599-0001	72544-0004	72464-7753	28207	72544-0002	72544-0008	72544-0007	38070	–
1¼	(31.8)	.980	1 7/32	72544-9803	72544-0001		72464-9803		72951	72951-0001	–	39523	72951-0004
			1¼	73511-9803	72921								
1⅜	(38.1)	1.130	1 5/16	72654-1303	72654-0001		72464-1303						
1½	(50.8)	1.212	1 7/16	72556-2123	38137		72464-2123						

Fly blade set screw **Part No. 28207** is accessible by removing swivel and swivel screw. Swivel accessories are ball bearing for tubes 1¼-inch Outer Diameter and up.

Flo-Breaker - Safely Cuts Off Excess Air Flow

The powerful force of compressed air escaping from a broken air hose causes the hose to whip, creating a dangerous hazard to personnel and equipment. The Flo-Breaker safely cuts off excess air flow, so the hose will not whip.

Features

- Non-Clogging
- Automatic Reset
- No Adjustment Necessary
- Stainless Steel Springs (unaffected by temperature)
- Low Pressure Drop-means high productivity

New York State BSA approved-patent no. 3,561,471

Excerpt from the Department of Labor Occupational Safety and Health Administration regulation 29 CFR part 1926 for Construction.

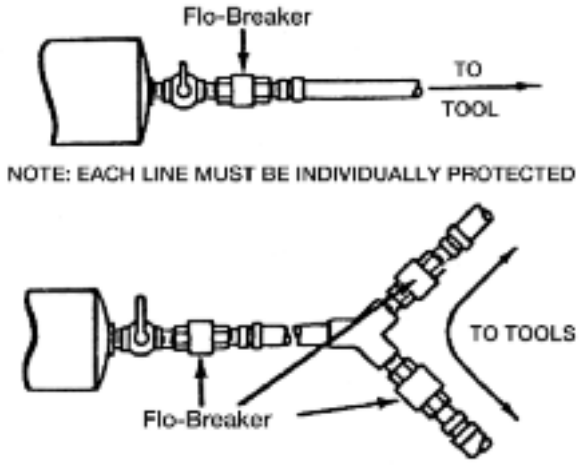
§ 1926.302 Power-operated hand tools:
(7) All hoses exceeding 1/2-inch inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.

Standard Model – Inserts Between Male Pipe Threads

Pipe Size NPT	A	Outline Dimensions B	C	Hex
Inches	*Inches*	*Inches*	*Inches*	*Inches*
3/8	4¼	1¼	1 5/16	1
1/2	3 7/32	1¼	1 5/16	1
3/4	3 17/32	1⅝	1 21/32	1⅜
1	4 1/32	2	2⅛	1¾
1¼	5	3	2¼	2½
1½	5¼	3½	2¾	2¾
2	6¼	4¼	3½	3½

Pipe Size NPT *Inches*	Shut-Off Flow Rate @90psi SCFM	Standard Model Part No.	Weight *Pounds*	Shut-Off Flow Rates at Selected Air Pressures 60psi SCFM	90psi SCFM	110psi SCFM	130psi SCFM	150psi SCFM
3/8	45	**1050-1040**		38	45	49	52	56
1/2	65	**1051-1030**	1/4	55	65	71	76	82
	80	**1051-1040**		68	80	87	94	100
	115	**1052-1020**		97	115	125	135	144
3/4	135	**1052-1030**	3/8	114	135	147	159	169
	180	**1052-1040**		152	180	196	212	226
1	250	**1053-1020**	3/4	211	250	273	294	314
1¼	450	**1054-1020**	5¼	380	450	491	529	564
1½	650	**1055-1020**	7	549	650	709	764	815
2	1200	**1056-1200**	13	845	1050	1120	1190	1250

3-Inch Pipe Size Also Available upon Request.



Shut-off Flow Rate

Be certain to select a **Flo-Breaker** with a safe shut-off flow rating (i.e., a sufficiently low rating). This rating may be calculated from installation data or determined by a test which simulates hose rupture.

Any test should be in the actual installation and simulated hose failure should be at the farthest protected downstream location from the **Flo-Breaker.** The simulated hose-rupture must trip the **Flo-Breaker,** safely shutting off air flow. If it does not, the test should be repeated with a **Flo-Breaker** of lower rating.

Precaution should be taken in the above tests to protect personnel and equipment against possible hose whip in the event that the **Flo-Breaker** rating is too high for the installation.

American Standard Welded and Seamless Steel Pipe

PIPE			PIPE SCHEDULES (ALL DIMENSIONS IN INCHES)												
SIZE	OD	WALL ID	5	10	20	30	STAN-DARD	40	60	EX. HVY.	80	100	120	140	160	DBLE. EX. HVY.
1/8	.405	Wall	.035	.049			.068			.095						
		ID	.335	.307			.269			.215						
1/4	.540	Wall	.049	.065			.088			.119						
		ID	.442	.410			.364			.302						
3/8	.675	Wall	.049	.065			.091			.126						
		ID	.577	.545			.493			.423						
1/2	.840	Wall	.065	.083			.109			.147					.187	.294
		ID	.710	.674			.622			.546					.466	.252
3/4	1.050	Wall	.065	.083			.113			.154					.218	.308
		ID	.920	.884			.824			.742					.614	.434
1	1.315	Wall	.065	.109			.133			.179					.250	.358
		ID	1.185	1.097			1.049			.957					.815	.599
1-1/4	1.660	Wall	.065	.109			.140			.191					.250	.382
		ID	1.530	1.442			1.380			1.278					1.160	.896
1-1/2	1.900	Wall	.065	.109			.145			.200					.281	.400
		ID	1.770	1.682			1.610			1.500					1.338	1.100
2	2.375	Wall	.065	.109			.154			.218					.343	.436
		ID	2.245	2.157			2.067			1.939					1.689	1.503
2-1/2	2.875	Wall	.083	.120			.203			.276					.375	.552
		ID	2.709	2.635			2.469			2.323					2.125	1.771
3	3.500	Wall	.083	.120			.216			.300					.438	.600
		ID	3.334	3.260			3.068			2.900					2.624	2.300
3-1/2	4.000	Wall	.083	.120			.226			.318						.636
		ID	3.834	3.760			3.548			3.364						2.728
4	4.500	Wall	.083	.120			.237		.218	.337			.438		.531	.674
		ID	4.334	4.260			4.026		4.064	3.826			3.624		3.438	3.152
4-1/2	5.000	Wall		.134			.247			.355						.710
		ID		4.732			4.506			4.290						3.580
5	5.563	Wall	.109	.134			.258			.375			.500		.625	.750
		ID	5.345	5.295			5.047			4.813			4.563		4.313	4.063
6	6.625	Wall	.109	.134		.250	.280			.432			.562		.718	.864
		ID	6.407	6.357		6.125	6.065			5.761			5.501		5.189	4.897
7	7.625	Wall					.301			.500						.875
		ID					7.023			6.625						5.875
8	8.625	Wall	.109	.148	.250	.277	.322		.406	.500		.593	.718	.812	.906	.875
		ID	8.407	8.329	8.125	8.071	7.981		7.813	7.625		7.439	7.189	7.001	6.813	6.875
10	10.750	Wall	.134	.165	.250	.307	.365		.500	.500	.593	.718	.843	1.000	1.125	
		ID	10.482	10.420	10.250	10.136	10.020		9.750	9.750	9.564	9.314	9.064	8.750	8.500	
12	12.750	Wall	.165	.180	.250	.330	.375	.406	.562	.500	.687	.843	1.000	1.125	1.312	
		ID	12.420	12.390	12.250	12.090	12.000	11.938	11.626	11.750	11.376	11.064	10.750	10.500	10.126	
14	14.000	Wall		.250	.312	.375	.375	.437	.594	.500	.750	.937	1.094	1.250	1.406	
		ID		13.500	13.376	13.250	13.250	13.126	12.812	13.000	12.500	12.126	11.812	11.500	11.188	
16	16.000	Wall		.250	.312	.375	.375	.500	.656	.500	.843	1.031	1.218	1.437	1.593	
		ID		15.500	15.376	15.250	15.250	15.000	14.688	15.000	14.314	13.938	13.564	13.126	12.814	
18	18.000	Wall		.250	.312	.438	.375	.562	.750	.500	.937	1.156	1.375	1.562	1.781	
		ID		17.500	17.376	17.124	17.250	16.876	16.500	17.000	16.126	15.688	15.250	14.876	14.438	
20	20.000	Wall		.250	.375	.500	.375	.593	.812	.500	1.031	1.280	1.500	1.750	1.968	
		ID		19.500	19.250	19.000	19.250	18.814	18.376	19.000	17.938	17.440	17.000	16.500	16.064	
24	24.000	Wall		.250	.375	.562	.375	.687	.969	.500	1.218	1.531	1.812	2.062	2.343	
		ID		23.500	23.250	22.876	23.250	22.626	22.062	23.000	21.564	20.938	20.376	19.876	19.314	

MILLIMETER/INCH AND DECIMAL/FRACTION CONVERSIONS

Inches		Milli-meters	Inches		Milli-meters	Inches		Milli-meters	Inches		Milli-meters
Fractions	Decimals		Fractions	Decimals		Fractions	Decimals		Fractions	Decimals	
1/64	.015625	.397	33/64	.515625	13.097	49/64	.765625	19.447
1/32	.03125	.794	17/32	.53125	13.494	25/32	.78125	19.844
3/64	.046875	1.191	35/64	.546875	13.891	51/64	.796875	20.241
1/16	.0625	1.588	9/16	.5625	14.288	13/16	.8125	20.638
5/64	.078125	1.984	37/64	.578125	14.684	53/64	.828125	21.034
3/32	.09375	2.381	19/32	.59375	15.081	27/32	.84375	21.431
7/64	.109375	2.778	39/64	.609375	15.478	55/64	.859375	21.828
1/8	.125	3.175	5/8	.625	15.875	7/8	.875	22.225
9/64	.140625	3.572	41/64	.640625	16.272	57/64	.890625	22.622
5/32	.15625	3.969	21/32	.65625	16.669	29/32	.90625	23.019
11/64	.171875	4.366	43/64	.671875	17.066	59/64	.921875	23.416
3/16	.1875	4.763	11/16	.6875	17.463	15/16	.9375	23.813
13/64	.203125	5.159	45/64	.703125	17.859	61/64	.953125	24.209
7/32	.21875	5.556	23/32	.71875	18.256	31/32	.96875	24.606
15/64	.234375	5.953	47/64	.734375	18.653	63/64	.984375	25.003
1/4	.250	6.350	3/4	.750	19.050	1	1.000	25.400

Thickness of Wall in Birmingham Wire GA in Millimeters

TUBE			20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
OD (IN.)	OD (MM)	ID	.9	1.1	1.2	1.5	1.7	1.8	2.1	2.4	2.8	3.0	3.4	3.8	4.2	4.6	5.2	5.6	6.0	6.6	7.2	7.6	8.6
1/2	12.7	Min.	10.7	10.4	10.0	9.5	9.1	8.7	8.1	7.4	6.6	6.0											
		Nom.	10.9	10.6	10.2	9.8	9.4	9.0	8.5	7.9	7.2	6.6											
5/8	15.9	Min.	13.9	13.5	13.1	12.6	12.2	11.9	11.3	10.6	9.8	9.2	8.4	7.6	6.7	6.6							
		Nom.	14.1	13.7	13.4	12.9	12.6	12.2	11.7	11.0	10.3	9.8	9.1	8.4	7.5	6.7							
3/4	19.1	Min.	17.1	16.7	16.3	15.8	15.4	15.0	14.4	13.8	13.0	12.3	11.6	10.8	9.8	9.0	7.7	6.8	5.7	4.6			
		Nom.	17.3	16.9	16.6	16.1	15.7	15.4	14.8	14.2	13.5	13.0	12.2	11.5	10.7	9.9	8.7	7.9	7.0	5.9			
7/8	22.2	Min.	20.2	19.8	19.5	19.0	18.6	18.2	17.6	16.9	16.2	15.6	14.7	13.9	13.0	12.2	10.9	9.9	8.9	7.7			
		Nom.	20.4	20.1	19.7	19.3	18.9	18.6	18.0	17.4	16.7	16.1	15.4	14.7	13.8	13.1	11.9	11.0	10.1	9.1			
1	25.4	Min.	23.4	23.1	22.7	22.2	21.8	21.4	20.8	20.1	19.3	18.7	17.9	17.1	16.2	15.3	14.0	13.1	12.1	10.9	9.5	8.6	6.4
		Nom.	23.6	23.3	22.9	22.5	22.1	21.7	21.2	20.6	19.9	19.3	18.6	17.9	17.0	16.3	15.1	14.2	13.3	12.2	11.0	10.2	8.1
1-1/8	28.6	Min.	26.6	26.2	25.8	25.3	24.9	24.6	24.0	23.3	22.5	21.9	21.1	20.3	19.4	18.5	17.2	16.3	15.3	14.1	12.7	11.8	9.6
		Nom.	26.8	26.4	26.1	25.6	25.3	24.9	24.4	23.7	23.0	22.5	21.8	21.1	20.2	19.4	18.3	17.4	16.5	15.4	14.1	13.3	11.3
1-1/4	31.8	Min.	29.8	29.4	29.0	28.5	28.1	27.7	27.1	26.4	25.7	25.0	24.3	23.5	22.5	21.7	20.4	19.5	18.4	17.3	15.9	15.0	12.8
		Nom.	30.0	29.6	29.3	28.8	28.4	28.1	27.5	26.8	26.2	25.7	24.9	24.2	23.4	22.6	21.4	20.6	19.7	18.5	17.3	15.5	14.5
1-3/8	34.9	Min.	32.9	32.5	32.2	31.7	31.3	30.9	30.3	29.6	28.9	28.2	27.5	26.6	25.7	24.9	23.6	22.6	21.6	20.4	19.1	18.2	15.9
		Nom.	33.1	32.8	32.4	32.0	31.6	31.3	30.7	30.1	29.4	28.8	28.1	27.4	26.5	25.8	24.6	23.7	22.8	21.8	20.5	19.7	17.7
1-1/2	38.1	Min.	36.1	35.8	35.4	34.8	34.5	34.1	33.5	32.8	32.0	31.4	30.6	29.8	28.9	28.0	26.7	25.8	24.8	23.6	22.2	21.3	19.1
		Nom.	36.3	36.2	35.6	35.2	34.8	34.4	33.9	33.3	32.6	32.0	31.3	30.6	29.7	29.0	27.8	26.9	26.0	24.9	23.7	22.9	20.8
1-3/4	44.5	Min.	42.5	42.1	41.7	41.2	40.8	40.4	39.8	39.1	38.4	37.7	37.0	36.2	35.2	34.4	33.1	32.2	31.1	30.0	28.6	27.7	25.5
		Nom.	42.7	42.3	42.0	41.5	41.1	40.8	40.2	39.6	38.9	38.4	37.6	36.9	36.1	35.3	34.1	33.3	32.4	31.3	30.0	29.2	27.2
2	50.8	Min.	48.8	48.5	48.1	47.5	47.2	46.8	46.2	45.5	44.7	44.1	43.3	42.5	41.6	40.7	39.4	38.5	37.5	36.3	34.9	34.0	31.8
		Nom.	49.0	48.7	48.3	47.9	47.5	47.1	46.6	46.0	45.3	44.7	44.0	43.3	42.4	41.7	40.5	39.6	38.7	37.5	36.4	35.6	33.5
2-1/4	57.2	Min.	55.2	54.8	54.4	53.9	53.5	53.1	52.5	51.8	51.1	50.4	49.7	48.9	47.9	47.1	45.8	44.9	43.8	42.7	41.3	40.4	38.2
		Nom.	55.4	55.0	54.7	54.2	53.8	53.5	52.9	52.3	51.6	51.1	50.3	49.5	48.8	48.0	46.8	46.0	45.1	44.0	42.7	41.9	39.9
2-1/2	63.5	Min.	61.5	61.2	60.8	60.2	59.9	59.5	58.9	58.2	57.4	56.8	56.0	55.2	54.3	53.4	52.1	51.2	50.2	49.0	47.6	46.7	44.5
		Nom.	61.7	61.4	61.0	60.6	60.2	59.8	59.3	58.7	58.0	57.4	56.7	56.0	55.1	54.4	53.2	52.3	51.4	50.3	49.1	48.3	46.2
2-3/4	69.9	Min.	67.9	67.5	67.1	66.6	66.2	65.8	65.2	64.5	63.8	63.1	62.4	61.6	60.6	59.8	58.5	57.6	56.5	55.4	54.0	53.1	50.9
		Nom.	68.1	67.7	67.4	66.9	66.5	66.2	65.6	65.0	64.3	63.8	63.0	62.3	61.5	60.7	59.5	58.7	57.8	56.7	55.4	54.6	52.6
3	76.2	Min.	74.2	73.9	73.5	72.9	72.6	72.2	71.6	70.9	70.1	69.5	68.7	67.9	67.0	66.1	64.8	63.9	62.9	61.7	60.3	59.4	57.2
		Nom.	74.4	74.1	73.7	73.3	72.9	72.5	72.0	71.4	70.7	70.1	69.4	68.7	67.8	67.1	65.9	65.0	64.1	63.0	61.8	61.0	58.9
3-1/4	82.6	Min.	80.6	80.2	79.8	79.3	78.9	78.5	77.9	77.2	76.5	75.8	75.1	74.3	73.3	72.5	71.2	70.3	69.2	68.1	66.7	65.8	63.6
		Nom.	80.8	80.4	80.1	79.6	79.2	78.9	78.3	77.7	77.0	76.5	75.7	75.0	74.2	73.4	72.2	71.4	70.5	69.4	68.1	67.3	65.3
3-1/2	88.9	Min.	86.9	86.6	86.2	85.6	85.3	84.9	84.3	83.6	82.8	82.2	81.4	80.6	79.7	78.8	77.5	76.6	75.6	74.4	73.0	72.1	69.9
		Nom.	87.1	86.8	86.4	86.0	85.6	85.2	84.7	84.1	83.4	82.8	82.1	81.4	80.5	79.8	78.6	77.7	76.8	75.7	74.5	73.7	71.6
3-3/4	95.3	Min.	93.3	92.9	92.5	92.0	91.6	91.2	90.6	89.9	89.2	88.5	87.8	87.0	86.0	85.2	83.9	83.0	81.9	80.8	79.4	78.5	76.3
		Nom.	93.5	93.1	92.8	92.3	91.9	91.6	91.0	90.4	89.7	89.2	88.4	87.7	86.9	86.1	84.9	84.1	83.2	82.1	80.8	80.0	78.0
4	101.6	Min.	99.6	99.3	98.9	98.3	98.0	97.6	97.0	96.3	95.5	94.9	94.1	93.3	92.4	91.5	90.2	89.3	88.3	87.1	85.7	84.8	82.6
		Nom.	99.8	99.5	99.1	98.7	98.3	97.9	97.4	96.8	96.1	95.5	94.8	94.1	93.2	92.5	91.3	90.4	89.5	88.4	87.2	86.4	84.3
4-1/2	114.3	Min.	112.3	112.0	111.6	111.0	110.7	110.3	109.7	109.0	108.2	107.6	106.8	106.0	105.1	104.2	102.9	102.0	101.0	99.8	98.4	97.5	95.3
		Nom.	112.5	112.2	111.8	111.4	111.0	110.6	110.1	109.5	108.8	108.2	107.5	106.8	105.9	105.2	104.0	103.1	102.2	101.1	99.9	99.1	97.0
5	127.0	Min.	125.0	124.7	124.3	123.7	123.4	123.0	122.4	121.7	120.9	120.3	119.5	118.7	117.8	116.9	115.6	114.7	113.7	112.5	111.1	110.2	108.0
		Nom.	125.2	124.9	124.5	124.1	123.7	123.3	122.8	122.2	121.5	120.9	120.2	119.5	118.6	117.9	116.7	115.8	114.9	113.8	112.6	111.8	109.7

ADDITIONAL BIRMINGHAM WIRE GAUGE

NUMBER	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	00	000	0000	00000
MM	.1	.1	.2	.2	.2	.3	.3	.3	.4	.4	.5	.5	.6	.6	.7	.8	9.7	10.8	11.5	12.7

Thickness of Wall in Birmingham Wire GA in Inches

TUBE		20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
OD	ID	.035	.042	.049	.058	.065	.072	.083	.095	.109	.120	.134	.148	.165	.180	.203	.220	.238	.259	.284	.300	.340
1/2	Min.	.422	.408	.392	.373	.357	.342	.318	.291	.260	.236											
	Nom.	.430	.416	.402	.384	.370	.356	.334	.310	.282	.260											
5/8	Min.	.547	.533	.517	.498	.482	.467	.443	.417	.385	.361	.330	.299	.262	.229							
	Nom.	.555	.541	.527	.509	.495	.481	.459	.435	.407	.385	.357	.329	.293	.265							
3/4	Min.	.672	.658	.642	.623	.607	.592	.568	.542	.510	.486	.455	.424	.387	.354	.303	.266	.226	.180			
	Nom.	.680	.666	.652	.634	.620	.606	.584	.560	.532	.510	.482	.454	.420	.390	.344	.310	.274	.232			
7/8	Min.	.797	.783	.767	.747	.732	.717	.693	.666	.636	.611	.580	.549	.512	.479	.428	.391	.351	.305			
	Nom.	.805	.791	.777	.759	.745	.731	.709	.685	.657	.635	.607	.579	.545	.515	.469	.435	.399	.357			
1	Min.	.922	.908	.892	.873	.857	.842	.818	.791	.761	.738	.708	.675	.637	.604	.553	.516	.476	.430	.375	.340	.252
	Nom.	.930	.916	.902	.884	.870	.856	.834	.810	.782	.760	.732	.704	.670	.640	.594	.560	.524	.482	.432	.400	.320
1-1/8	Min.	1.047	1.033	1.017	.997	.982	.967	.943	.916	.886	.861	.831	.800	.762	.729	.678	.641	.601	.555	.500	.465	.377
	Nom.	1.055	1.041	1.027	1.009	.995	.981	.959	.935	.907	.885	.857	.829	.795	.765	.719	.685	.649	.607	.557	.525	.445
1-1/4	Min.	1.172	1.158	1.142	1.122	1.107	1.092	1.068	1.041	1.011	.985	.956	.925	.887	.854	.803	.766	.726	.680	.625	.590	.502
	Nom.	1.180	1.166	1.152	1.134	1.120	1.105	1.084	1.060	1.032	1.010	.982	.954	.920	.890	.844	.810	.774	.732	.682	.650	.570
1-3/8	Min.	1.297	1.283	1.267	1.247	1.232	1.217	1.192	1.166	1.136	1.111	1.081	1.049	1.012	.979	.928	.891	.851	.805	.750	.715	.627
	Nom.	1.305	1.291	1.277	1.259	1.245	1.231	1.209	1.185	1.157	1.135	1.107	1.079	1.045	1.015	.969	.935	.899	.857	.807	.775	.695
1-1/2	Min.	1.422	1.408	1.392	1.372	1.357	1.342	1.318	1.291	1.260	1.236	1.205	1.174	1.137	1.104	1.053	1.016	.976	.930	.875	.840	.752
	Nom.	1.430	1.416	1.402	1.384	1.370	1.356	1.334	1.310	1.282	1.260	1.232	1.204	1.170	1.140	1.094	1.060	1.024	.982	.932	.900	.820
1-3/4	Min.	1.672	1.658	1.642	1.622	1.607	1.592	1.568	1.541	1.510	1.486	1.455	1.424	1.387	1.354	1.303	1.266	1.226	1.180	1.125	1.090	1.002
	Nom.	1.680	1.666	1.652	1.634	1.620	1.606	1.584	1.560	1.532	1.510	1.482	1.454	1.420	1.390	1.344	1.310	1.274	1.232	1.182	1.150	1.070
2	Min.	1.922	1.908	1.892	1.872	1.857	1.842	1.817	1.791	1.760	1.736	1.705	1.674	1.637	1.604	1.553	1.516	1.476	1.430	1.375	1.340	1.252
	Nom.	1.930	1.916	1.902	1.884	1.870	1.856	1.834	1.810	1.782	1.760	1.732	1.704	1.670	1.640	1.594	1.560	1.524	1.482	1.432	1.400	1.320
2-1/4	Min.	2.172	2.158	2.142	2.122	2.107	2.092	2.067	2.041	2.010	1.986	1.955	1.924	1.887	1.854	1.803	1.766	1.726	1.680	1.625	1.590	1.502
	Nom.	2.180	2.166	2.152	2.134	2.120	2.106	2.084	2.060	2.032	2.010	1.982	1.954	1.920	1.890	1.844	1.810	1.774	1.732	1.682	1.650	1.570
2-1/2	Min.	2.422	2.408	2.392	2.372	2.357	2.342	2.317	2.291	2.260	2.236	2.205	2.174	2.137	2.104	2.053	2.016	1.976	1.930	1.875	1.840	1.752
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3-1/4	Min.	3.172	3.158	3.142	3.122	3.107	3.092	3.067	3.041	3.010	2.986	2.955	2.924	2.887	2.854	2.803	2.766	2.726	2.680	2.625	2.590	2.502
	Nom.	3.180	3.166	3.152	3.134	3.120	3.106	3.084	3.060	3.032	3.010	2.982	2.954	2.920	2.890	2.844	2.810	2.774	2.732	2.682	2.650	2.570
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	Nom.	3.680	3.666	3.652	3.634	3.620	3.606	3.584	3.560	3.532	3.510	3.482	3.454	3.420	3.390	3.344	3.310	3.274	3.232	3.182	3.150	3.070
4	Min.	3.922	3.908	3.892	3.872	3.857	3.842	3.817	3.791	3.760	3.736	3.705	3.674	3.637	3.604	3.553	3.516	3.476	3.430	3.375	3.340	3.252
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4-1/2	Min.	4.422	4.408	4.392	4.372	4.357	4.342	4.317	4.291	4.260	4.236	4.205	4.174	4.137	4.104	4.053	4.016	3.976	3.930	3.875	3.840	3.752
	Nom.	4.430	4.416	4.402	4.384	4.370	4.356	4.334	4.310	4.282	4.260	4.232	4.204	4.170	4.140	4.094	4.060	4.024	3.982	3.932	3.900	3.820
5	Min.	4.922	4.908	4.892	4.872	4.857	4.842	4.817	4.791	4.760	4.736	4.705	4.674	4.637	4.604	4.553	4.516	4.476	4.430	4.375	4.340	4.252
	Nom.	4.930	4.916	4.902	4.884	4.870	4.856	4.834	4.810	4.782	4.760	4.732	4.704	4.670	4.640	4.594	4.560	4.524	4.482	4.432	4.400	4.320

ADDITIONAL BIRMINGHAM WIRE GAUGE

NUMBER	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	00	000	0000	00000
INCH	.004	.005	.007	.008	.009	.010	.012	.013	.014	.016	.018	.020	.022	.025	.028	.032	.380	.425	.454	.500

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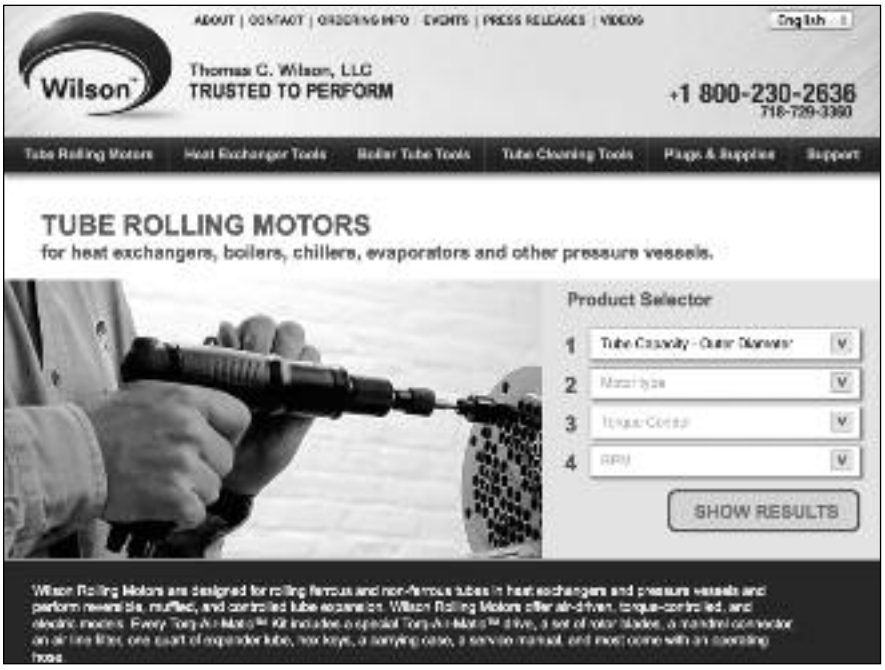

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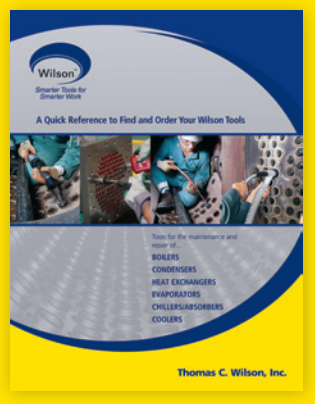

Quick Reference Catalog
An easy-to-use overview of Wilson's electric and pneumatic tube cleaning systems for heat exchangers, fire tube and water tube boilers, condensers, chillers, and absorbers, as well as other Wilson tools, accessories, and supplies.

Heat Exchanger Tube Expanders and Accessories Catalog
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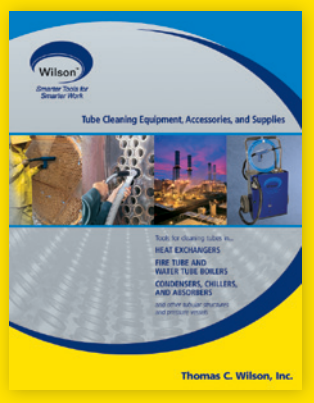

Tube Cleaners and Accessories Catalog
A detailed guide to the most extensive line of tube cleaning equipment and accessories available anywhere, including electric, pneumatic, and air-driven tube cleaning systems, spiral and expanding brushes, cutter heads and cutter bits, Blo-Guns and Blo-Brushes, and shafts & casings.

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