

RBE Series Roller Beading Expanders



Expander *	Part Number (Order)	Tube Size	Mandrels	Part Number (Order)	Replacement Rolls			
					Beading Roll	Part Number (Order)	Expanding Roll Set	Part Number (Order)
RBE 200	5524418	2"	RBE 200 RM	2900497	RBE 200 156	2998665	RBE 200 ERS	5524419
RBE 250	5524420	2-1/2"	RBE 250 RM	2900498	RBE 250 156	2998666	RBE 250 ERS	5524421
RBE 300	5524422	3"	RBE 300 RM	2900499	RBE 300 156	2998667	RBE 300 ERS	5524423

* Note: Expanders are sold with Mandrel

Operation

The Airetool Patented Roller Beading Expanders are designed to expand and bead firetube boiler tubes in one operation. This expander eliminates the secondary operation of beading the tube with a chipping hammer and beading chisel. The expander reduces shop noise levels and operator stress, thus increasing overall productivity.

Tube Projection

The tubes must have a uniform projection from the tube sheet of 3/16"- 9/32" (4.75mm- 7.1mm) prior to beading the tube with the Airetool roller beading expander. The tubes must be staked or clamped at one end of the boiler with the opposite end having the 3/16"-9/32" tube projection. To obtain the tube projection from the end of the boiler where the tubes were staked or clamped an internal wheel type boiler tube cutter must be used with the tube cutter's collar positioned to obtain the tube projection. Reference Airetool series FTC Firetube Cutters for accomplishing this task. Failure to comply with the recommended tube projection will cause extreme side load pressure and reduce the expander's life.

Lubrication

The tubes and the roller beading expander must be clean and free of any debris prior to expanding. The Airetool beading expander is sold with lubrication, we call bead lube. ***This is the only lubrication that is to be used during the expanding process.*** This lubrication is water-soluble and is to be mixed with water at approximately twenty (water) to one (lubrication) ratio. After each expansion place the expander in the bucket of lubricant and swish it around until all the debris has been removed from the expander' roller cavity areas. The expander must be kept cool and clean, or the beading roll will start galling the bead, making it unacceptable. This extreme heat will also decrease the expander's life.

Beading Expander Set-up

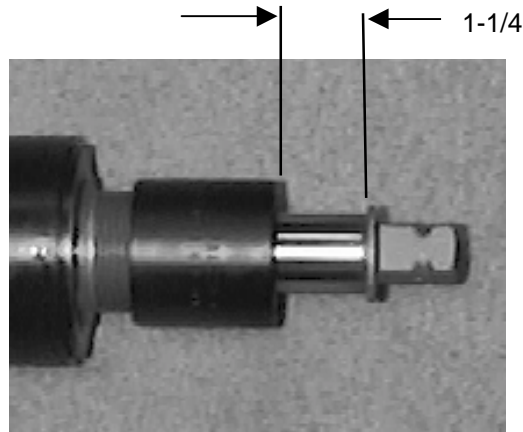
Measure the tube sheet hole ID, tube ID tube OD and the tube wall thickness. Then subtract the tube OD from the tube sheet ID, this will give you the clearance between the two. Then multiply the tube wall thickness by two and again by .10 (this is the expansion at 10%wall reduction). Next add the clearance, the wall reduction calculation to the non-expanded tube ID. This will give you the expansion of the tube at 10% wall reduction. See the chart below for additional reference.

- **Step A Measure tube sheet hole**
- **Step B Measure tube OD**
- **Step C Calculate clearance (A - B)**
- **Step D Measure tube ID**
- **Step E Calculate wall thickness (B - D)**
- **Step F Calculate 5% wall reduction (.10 x E)**
- **Step G Calculate finished rolled ID (C + D + F)**

STEP	EXAMPLE	JOINT #				
		1	2	3	4	5
A Tube Sheet Hole	2.032					
B - Tube OD	2.000"					
C = Clearance	.032"					
D + Tube ID	1.810					
E 2 x Wall Thickness	.190"					
F + 10% Wall Reduction	.019"					
G = Finish Rolled ID	1.861"					

Beading Expander Set-up continued:

After determining the final rolled ID, insert the expander into the tube that is to be beaded. Insert the mandrel into the expander, then tap the mandrel's end slightly with a hammer until the expander's rolls come in contact with the tube ID. Per the example above we are expanding the tube's ID .051" to obtain the 10% wall reduction. For each 1" of mandrel travel, we obtain .041" in expansion, therefore by dividing the total expansion (.051) by .041 (1.244" or 1-1/4") will give you the distance the mandrel needs to travel to obtain the calculated expansion. Now knowing the distance the mandrel needs to travel, we are able to adjust the tool for the proper expansion. Loosen the set screw (18), then move the adjustment sleeve (19) by rotating it so you have an 1-1/4" distance between the mandrel's shoulder and the mandrel thrust plate (21). Then re-secure the set screw (18). See the illustration below:



You are now ready to expand the first tube. Dip the expander in the bead tube lubricant and re-insert the expander into the tube. Expand the tube until the mandrel's hub comes into contact with the mandrel thrust plate (21) and makes a few revolutions to iron out the bead. You will notice an increase in the drive motor's RPM when the bead is finished. If the bead is not completely pressed up to the tube sheet, rotate the adjustment sleeve 1-1/2 revolutions and re-expand the tube. If this does not pull the bead up to the sheet, then there may be too much tube projection. Reduce the projection on another tube by 1/32" and expand that tube. If the tubes you are roller bead expanding are just shy of being completely pressed to the tube sheet, then expand all the tubes with this adjustment setting. Increase the setting after all the tubes have been expanded. Re-expand only the tubes that the bead is not pressed against the tube sheet. Re-expanding tubes with the roller beading expander that have the bead completely pressed against the tube sheet will put extreme side load on the expander and reduce the expanders life. Remember to always dip and flush the expander into the bead lube to clean and cool the expander after each expansion.

The expander's mandrel is equipped with a square on the front so the expander's drive motor can be used in reverse when expanding the internal tube sheet in the boiler.

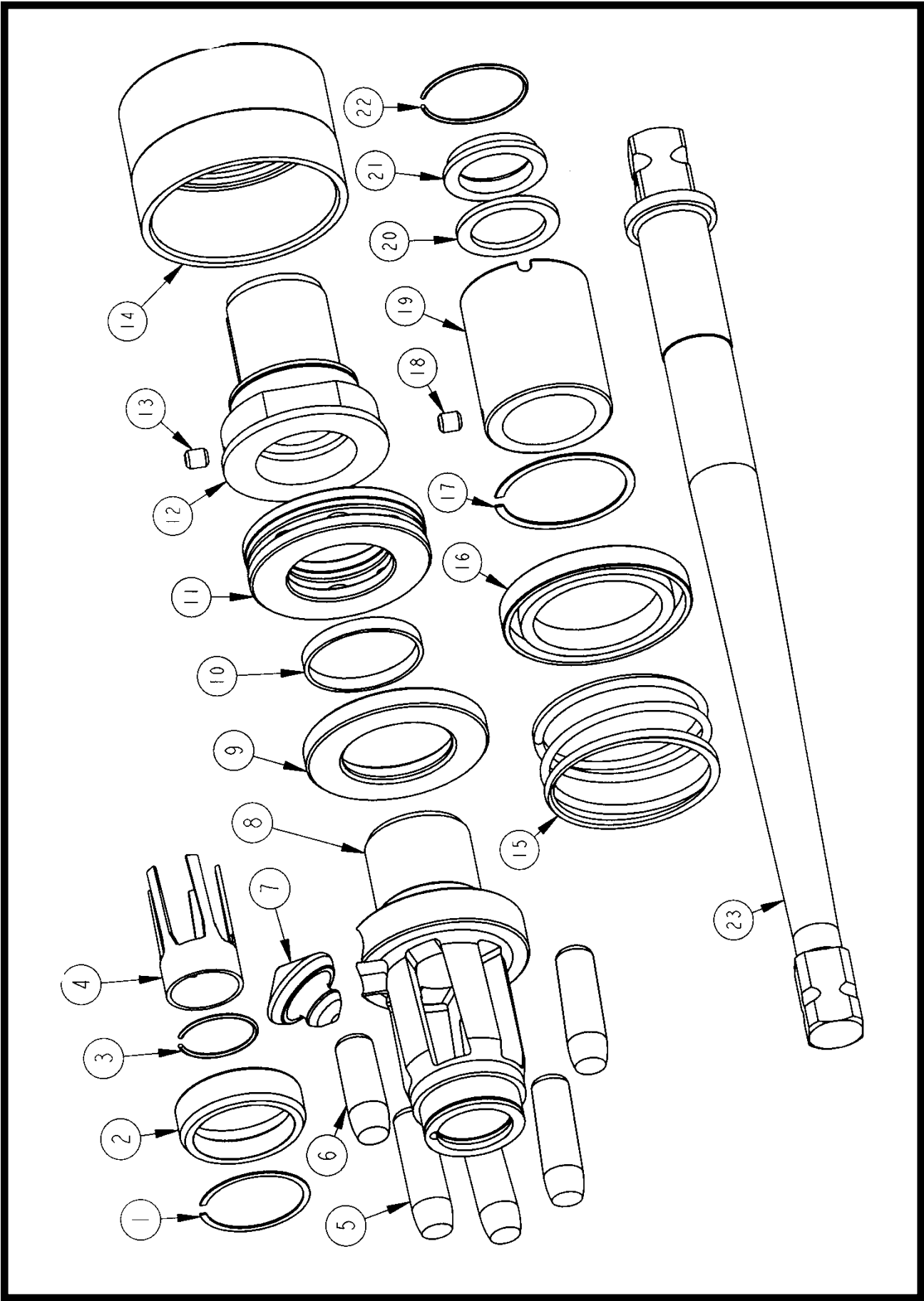


Never attempt to expand the internal tube sheet by reaching through the combustion access hole. The Airetool beading expander generates great force and could cause injury to the operator. Always roll the internal tube sheet with an extension to drive the expander from the opposite end of the boiler.

Maintenance

Inspect the mandrel and rolls on a continuous basis. Any time pitting or extreme wear is observed, replace these parts immediately to avoid damage to other expander components.

After each shifts production completely disassemble the expander and wash all parts thoroughly with a solvent such as mineral sprits. To disassemble remove mandrel (23) from expander, remove retaining clip (1) and remove cage ring (2), remove retaining ring (3), pull roll retainer (4) from cage (8), loosen set screw (18) and unthread adjustment sleeve (19), remove retaining ring (22) and remove mandrel bearing (20) and mandrel thrust plate (21), remove retaining ring (17) and remove spring stop (16), spring (15) and retaining collar (14), loosen set screw (13), place nose of cage (8) in a vise and unthread thrust stem (12) from cage (8), **(left hand thread)** remove bearing (11) and thrust plate (9). After all parts have been thoroughly cleaned, apply grease to bearings (10), (11) and (20) and re-assemble the tool in reverse order.



AIRETOOL RBE SERIES ROLLER BEADING EXPANDER PARTS LIST

Item No.	Description	Tube OD						QTY
		2"		2-1/2"		3'		
		Description No.	Material No.	Description No.	Material No.	Description No.	Material No.	
1	Ret. Ring	US 137	2900473	US 187	2900475	US 225	2900476	1
2	Cage Ring	RBE 200 CR	2900371	RBE 250 CR	2900372	RBE 300 CR	2900373	1
3	Ret. Ring	B 1158 RR	2993548	B 1205 RR	2993659	B 1276 RR	2993662	1
4	Roll Retainer	RBE 200	2998686	RBE 250	2998696	RBE 300	2998743	1
5	Long Roll	RBE 200 LR	2900368	RBE 250 LR	2900369	RBE 300 LR	2900370	4
6	Short Roll	RBE 200 SR	2998705	RBE 250 SR	2998706	RBE 300 SR	2998753	1
7	Beading Roll	RBE 200 156	2998665	RBE 250 156	2998666	RBE 300 156	2998667	2*
8	Cage	RBE 200	2998685	RBE 250	2998695	RBE 300	2998742	1
9	Thrust Plate	RBE 200 TP	2998694	RBE 250 TP	2998704	RBE 300 TP	2998751	1
10	Plate Bearing	RBE 200 PB	2900374	RBE 250 PB	2900375	RBE 300 PB	2900376	1
11	Thrust Bearing	D 16	2973171	D 20	2900381	D-25	2900382	1
12	Thrust Stem	RBE 200 TS	2998693	RBE 250 TS	2998703	RBE 300 TS	2998750	1
13	Brass Tip Set Screw	1/4 20 X 1/4 BT	8010931	1/4 20 X 1/4 BT	8010931	1/4 20 X 1/4 BT	8010931	1
14	Retaining Collar	RBE 200	2998687	RBE 250	2998697	RBE 200	2998744	1
15	Spring	RBE 200 SPR	2998689	RBE 250 SPR	2998699	RBE 300 SPR	2998746	1
16	Spring Stop	RBE 200 SPS	2998688	RBE 250 SPS	2998698	RBE 300 SPS	2998745	1
17	Retaining Ring	US 175	2900474	US 212	2998762	US 250	2900612	1
18	Set Screw	1/4 20 X 1/4	8006600	1/4 20 X 1/4	8006600	1/4 20 X 1/4	8006600	1
19	Adjustment Sleeve	RBE 200 AS	2998690	RBE 250 AS	2998700	RBE 300 AS	2998747	1
20	Mandrel Bearing	RBE 200 MTB	2998692	RBE 250 MTB	2998702	RBE 300 MTB	2998749	1
21	Mandrel Thrust Plate	RBE 200 MTP	2998691	RBE 250 MTP	2998701	RBE 300 MTP	2998748	1
22	Ret Ring	5/8	2120600	1	2001200	B 1355 RR	2994211	1
23	Mandrel	RBE 200 RM	2900497	RBE 250 RM	2900498	RBE 300 RM	2900499	1
24	Bead Lube	Bead Lube	2900585	Bead Lube	2900585	Bead Lube	2900585	1**
	* One roll is sent as a spare.							
	** Not shown							

Notes:

Sales & Service Centers

Note: All locations may not service all products. Please contact the nearest Sales & Service Center for the appropriate facility to handle your service requirements.

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