PROPANE HEATER

16A FOR RAIL ENDS

SE FOR FROGS, CROSSING, & SWITCHPOINTS

INSTRUCTIONS & PARTS MANUAL

NOVEMBER 2023

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CONTENTS OF MANUAL

SAFETY PRECAUTIONS

WARNING

1. When connecting the heater to a propane cylinder be sure the flash-back arrester (Part No. FBA-238-58) is installed between the regulator and fuel line.
2. Exercise extreme caution in protecting your propane cylinder from any potential impact, arc, or heat that may damage its shell.
3. Unscrew the handle of the propane regulator to its free turning (zero pressure) position before opening the valve on the propane cylinder.
4. Frequently check all thread connections for propane leaks, setting the pressure regulator at 5 psi and using a suitable leak detector fluid at each point. Do not perform such tests in an enclosed area where escaping gas could collect in large quantities and create an explosion hazard.
5. Always set the heater valve to low burn position before removing the heater from the rail.
6. Always pick up a burning heater from the side that permits the crucibles to swing away from your leg. Have the hose trailing behind so it will not be exposed to the flame.
7. Never set a burning heater with its crucibles flat on the ground. Make sure it is set to low burn and lay it on its side.

Please be sure to follow your company's standard operating procedures and personal protective equipment policies.

INSTRUCTIONS

SETTING UP:

Attach the two stage regulator to a standard propane cylinder. (Note: the POL connection to the tank valve utilizes left hand threads.)

OPERATION:

1. Insure that the valve on the heater is closed (handle perpendicular to body) and open the valve on the top of the propane cylinder.
2. Set the regulator to 30 PSI.
3. Open the valve on the heater approximately half way and, using a sparker, ignite the gas emitting from the crucibles.
4. When the heater is positioned on a joint or rail, open the valve completely, (handle parallel to body) for high burning.
5. If necessary, adjust the air washers in 1/2 turn increments until the most efficient burn is achieved.
6. Before removing the heater from the joint or rail, set it to low burn by closing the valve about half way.
7. When shutting the heater off for a short period of time, the valve at the heater may be used. For longer shut downs, it is advisable to shut off the valve at the propane cylinder and let the heater burn out.

RAIL END HEATING:

TIME AND PRESSURE:

The maximum efficient operating pressure is 30 PSI, as indicated by the low pressure gauge attached to the heater. The time and pressure to be used with the heater operation is dependent upon the weight of rail section and the average amount of welding required on the joint. Usually, the preheat and post-heat timing is set up so that each is of the same duration. This timing should also be setup to coincide with the average time to make the weld on a given stretch of track.

(For example, if the rail is 130-131 section and an average of 2-1/2 minutes is required to make welds of about 8" in length, the heaters would both be tentatively adjusted to operate at 25 PSI for 2 minutes heating time.)

This set up will give approximately the correct brinell hardness, using appropriate electrodes. After the weld has been ground and allowed to become cold, hardness readings taken with the Telebrineller will indicate whether the heating operation is set up properly. If the hardness of the cold weld is high, increase the post heat input. If the weld hardness is low, decrease the post heat input. Changing the amount of heat input is done by changing the pressure or time, or both.

Lighter weight rail section requires less heat input than 130-131 pound section because the carbon content in lighter rail is less, and also because the lighter section requires less heat input to raise the rail temperate to the point needed for proper heat treatment of the welded end.

RAIL END HEATING CONT'D...

CRUCIBLE PLACEMENT:

It is desirable that the hardness gradient on each rail end be from a hardness range of 375-400 BHN at rail end, to 350-375 BHN at back end of the weld, or, at the junction of weld and rail. This hardness gradient is obtained by adjusting the position of the heater crucibles in accordance with the length of weld on each rail end.

For example, if the length of weld on the rail end is 4", the crucible for that rail will be placed over the weld limit mark (back end of weld) so that the inner end of the crucible is approximately 1-1/2" from the rail end. In other words, approximately 2/3 of the crucible length is placed beyond the weld limit mark, off 4" or longer in length (on each rail end).

It is usually not necessary to place the inside end of the crucible closer than one inch from the rail end if weld length is less 4".

COORDINATEING HEATING WITH WELDING:

Attempt to have preheating time coincide with the time required to make the weld. The welder should be ready to move to the preheated joint as soon as the heating time has elapsed. To accomplish this on heavy work which requires more welding time than the specified heating time, the operator should set the fuel line valve on low burning position for a short interval before turning to the full burning position. If the heater time elapses before the welder has completed welding the previous joint, the pre-heater is to remain on the joint on low burning position until the welder is ready to move to the joint. Reheat all joints the full specified time if the welder is delayed more than 1 minute in starting the weld after the pre-heater has been removed. The post-heater is to be placed on the weld immediately after the welder completes the weld, and then removed on expiration of the specified post-heating time.

HEATING RE-WELDS:

Re-welds made to fill in metal in a pit or crater left in the original weld are usually very small in size, and therefore are subjected to an extreme quenching action from the surrounding rail metal. As a consequence such re-welds will be dangerously hard if not given sufficient drawing heat. To be on the safe side, all re-welds for pits will be given 1/3 more pre-heat (or post-heat) than is necessary to properly draw the full original weld.

For example, 130 pound rail is heated 3 minutes at 25 PSI for such re-welds.

BRINELLING:

Record several brinells each day on the previous day's work and submit to the proper official for approval of the hardness range. Should any welds be found which are over 400 BHN, a close inspection shall be made of all the welds in the same vicinity. Re-heat all welds of over 400 BHN enough to draw to 400 or under.

An engineering discussion on the arc welding of rail ends...

Wear at rail ends, due to the batter of rolling stock, presents a major maintenance problem for every railroad. With varying degrees of success, railroads for some time have built up worn rail ends by welding.

Because of the harden ability qualities of rail steel, the welding of rail ends has required extensive research and practice to develop satisfactory equipment and procedures.

THE OBJECTIVE

The purpose of rail end welding is to build up the worn ends of the rail with weld metal which, when subjected to the pounding of wheels:

1. Will have a durable, inseparable bond with the rail base metal.
2. Will have sufficient hardness to withstand batter.
3. Will not be so hard that it will spall.

Experience has shown that, for a maximum life, the hardness of the weld at and near the rail end should be 350 to 400 Brinell and the hardness of the remainder of the weld should be 325 to 375 Brinell. Although new rail, with hardness 260-300 Brinell, will, because of the toughness imparted by mill rolling, tolerate batter for a long time before the rail ends will disintegrate, weld metal is a casting and it will disintegrate if it is allowed to batter extensively. It is, therefore, necessary to provide in the weld metal an initial hardness which at the rail end will be resistant to batter.

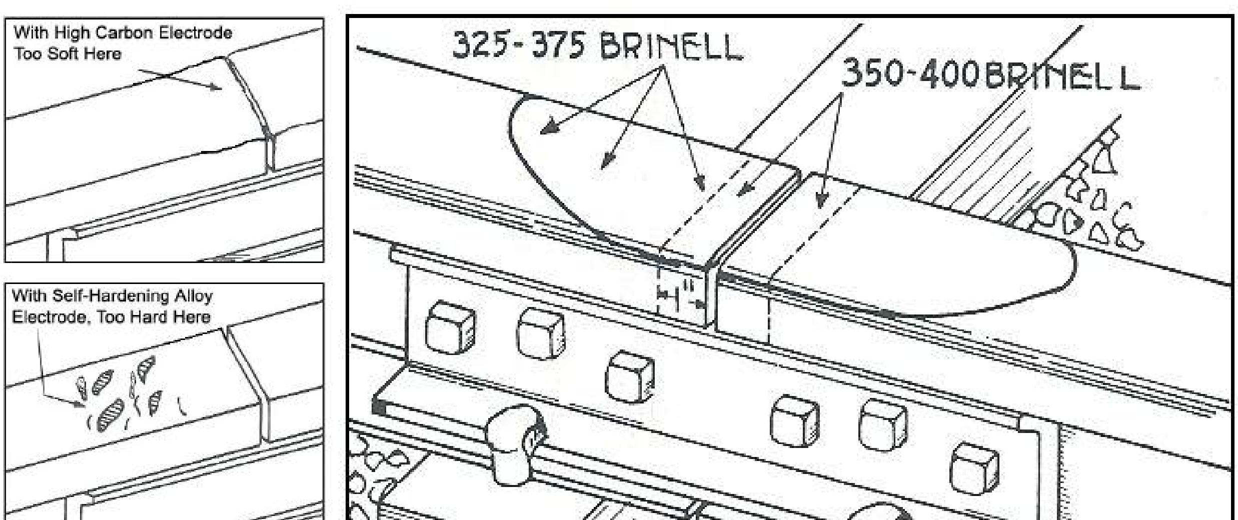
THE PRINCIPLES OF RAIL END WELDING

Hardening Properties of High Carbon Steel.

In order to understand fully the principles of rail end welding, it is necessary first to know how rail steel a sensitive high carbon steel reacts to heating and cooling. The higher the carbon content of steel, the harder it becomes when it is quenched from above the critical temperature assuming that the rate of cooling is constant. The critical temperature for .1% carbon steel is about 1600° F. whereas that for 1% carbon. steel is about 1400° F. For steel of .15% to .20% carbon, very little hardening is obtained if quenched in water from above its critical temperature. However, steel of 1% carbon will have a hardness of more than 700 Brinell if quenched in cold water from above its critical temperature.
This material has practically no ductility.

It is also true that for a given carbon content, the faster the rate of cooling, or quenching (up to a certain limit) the harder the steel becomes. (As a specific example, if .80 carbon steel is heated to 1450° F. and cooled very slowly an annealed structure will result which will probably run around 250 Brinell. If cooled from 1450° F. in still air, the hardness will be approximately 300 Brinnel.) If quenched in oil, about 450 Brinell, and if quenched in cold water, about 600 Brinnel. Quenching in iced brine would increase the hardness still more.

If a bead of weld metal is deposited on a steel place, the temperature of the parent metal is raised.



The objective: To avoid batter and spalling by producing welds of hardness shown

The temperatures at different points vary, ranging from its melting point at the fusion zone down to perhaps no increase at all some distance from the bead. There will be a zone in the parent metal adjacent to the bead which has been heated to the critical temperature or above and the thickness of this zone (when welding on cold plate) will depend on the heat input and thickness, or mass of metal on which the bead is deposited. Using 3/16" wire at 200 amperes with a normal rate of travel, this zone may be 1/8" thick on 2" plate and 1/4" thick for 1" plate.

It is this zone in the parent metal that sometimes cracks—not because it is weakened, but because it is hardened to the point where its ductility is reduced to such an extent that it cannot stretch. This is analogous to "quenching cracks" which are often encountered in heat treating high carbon steel.

When a bead is run on a thick, cold plate, the cooling rate of the parent metal adjacent to the weld is about the same as that by quenching it in water, because the cold metal conducts the heat away very rapidly.

The speed of welding and the rate of heat input to the joint affects the degree of change in hardness. On a given mass of parent metal, at a given temperature, a small bead deposited at high speed produces a greater hardening than one deposited at a greater rate of deposit and at a higher heat input per unit length of joint. This is because the small high-speed bead cools more rapidly than the larger high-heat bead. Also, a weld made of multiple beads (one on top of another) is softer than if made in a single pass-other factors being equal.

Quenching Properties of Welded Rail Ends. To picture the cooling action of a heated rail end, think of a fire poker. When the poker is brought to a cherry red for a distance of 6" or so from the tip, then allowed to cool off in the air, the tip is the last part to cool off and turn black.

With conventional welding procedure, rail ends cool off in like manner. Heat flow is more restricted at the end than it is at other points; hence the end of the rail cools off slowest. And the end of the weld farthest from the rail end cools off fastest.

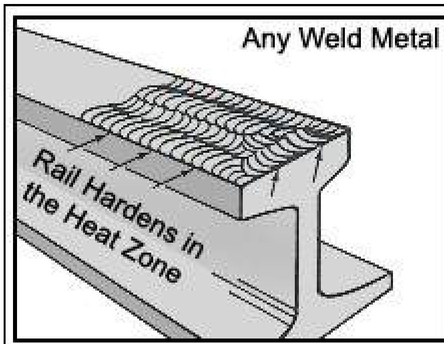
Results with High Carbon Electrode. Because of the variation in cooling or quenching speeds at various points on a welded rail end, varying degrees of hardness are obtained. This shown diagrammatically by the hardness gradient sloping upward away

With conventional welding procedure, rail ends cool off in like manner. Heat flow is more restricted at the end than it is at other points; hence the end of the rail cools off slowest.. And the end of the weld farthest from the rail end cools off fastest from the rail end, in Figure 1, shown on page 8.

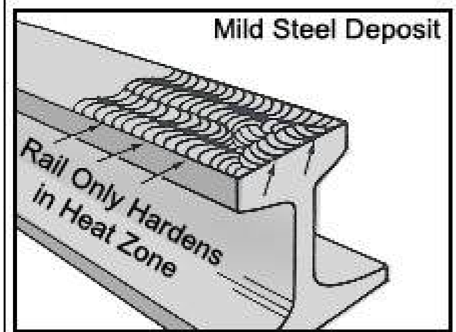
Experience has shown that welds produced by a high carbon electrode under these quenching conditions usually are satisfactory at the far end of the welds. However, because of the slowness in quenching at the rail ends, they are excessively soft at this point and fail prematurely due to mashing. Figure 2 (shown on page 8) shows a rail end of this type after a service life of about two years.

Results with Self-Hardening Alloy Electrode, Only. In order to overcome the objection of the high carbon electrode, a sensitive, self-hardening, allow electrode was developed. With this rod, under normal quenching conditions, a satisfactory weld hardness was obtained at the rail end. However, because of the fast cooling at the far end, hardness there was excessive. With continual pounding, spalling results, as shown in Figure 3, shown on page 8.

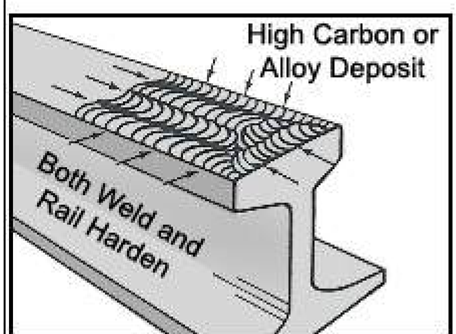
Conclusion. The above explains why welding alone, regardless of the electrode used, is not capable of reaching the objectives of rail end maintenance to assure maximum life of the reclaimed rail ends.



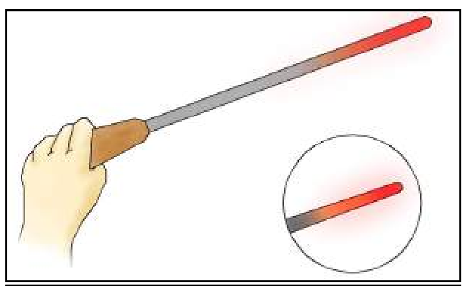
Result of depositing weld metal on high carbon steel.



Result of depositing mild steel weld metal on high carbon rail.



Result of depositing high carbon steel or other alloy steels on high carbon rail.


The tip of the heated fire poker cools off slowest. It's the same way with a heated rail.

HOW TO OBTAIN MAXIMUM LIFE FOR WELDED RAIL ENDS

Most satisfactory results in rail end maintenance are obtained by a combination of arc welding and a special system of heat-treatment. The arc welding employs a special self-hardening alloy electrode. The heat-treatment consists of:

1. Proper pre-heating of the parent metal before welding.
2. Proper post-heating of the rail end after welding.
3. Slow-cooling under asbestos blanket after post-heating during sub-freezing atmospheric temperatures.

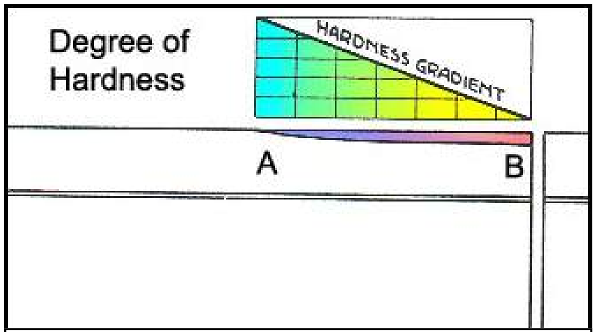
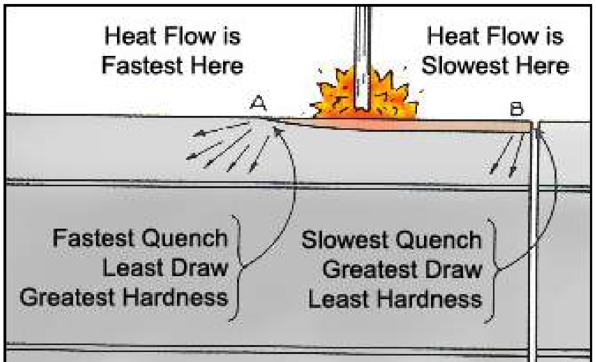


Fig.1—Hardness gradient resulting from differences in quenching speeds and tempering at various points along the rail.

Preheating. This operation employs a specially developed propane gas heating device which applies heat differently (greatest heat where cooling is fastest) to the rail end. The temperature is brought to about 700° F. The results of this preheating are:

1. It avoids shock stresses in the rail metal. (Welding heat, applied to high carbon steel when cold, sometimes sets up stresses which cause tiny cracks in the rail metal.)
2. It improves penetration with the base metal– avoids cracks at line of fusion which sometimes results from improper penetration.
3. It provides a deeper, stronger, tougher foundation in the zone heated by welding.

Heating time and exact temperatures are determined for each individual job. The important factors for which adjustments of heating time have to be made are size of rail, welding current, size and composition of electrodes and the initial temperature of the rail.



How heat flows in the welded rail end, causing various rates of quenching and tempering at various points.

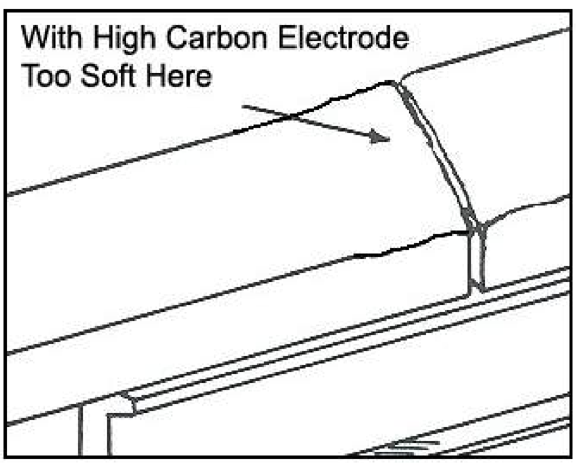


Fig.2—Line drawing from an actual photograph of welded rail end after 2 years' service showing mashed end due to excessive softness. This is typical of the results of using a high carbon electrode with the conventional welding method.

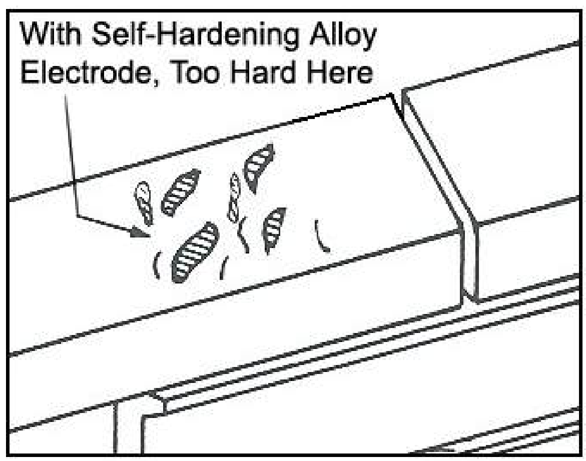


Fig.3– Line drawing from an actual photograph of welded rail end after 3 years' service showing spalling due to excessive hardness at junction of weld and rail. This is typical of results obtained with a self-hardening alloy electrode with conventional welding procedure.

Welding. The procedure is based on using 1/4" shielded-arc stick electrode. The weld metal must be a self-hardening alloy which will quench and draw at relatively high temperatures. Preferred welding current is 350 to 400 amps but, with suitable adjustments in the heating procedures, smaller electrodes or core wires may be used at lower currents.

Post-Heating. The same differential heating device used for pre-heating is used for heating immediately after welding. This heater applies more heat to the junction end than to the rail end of the weld. The temperature of the weld is raised to about 900 to 1100° F. during the post-heating operation. This differential post-heating operation avoids excessive hardness and consequent spalling at the junction end than it is at the rail end, which is as it should be for maximum service life. In other words, the hardness gradient with this system has the reverse slope of the gradient with normal welding practice. This is shown in Figure 4.

Cooling. After post-heating, during sub-freezing atmospheric temperatures, an insulated cover is placed over the weld so as to prolong the drawing period and avoid excessive hardness. The blanketing period is not less than 2 minutes. The cover is then removed and the weld is allowed to cool the remainder of the way in the air.

Grinding. Surface-grinding of the completed weld is performed with a powered track grinder, accurately adjustable to make the welded area conform to the present (not original) section of the existing rail.

Cross-Grinding is done with a wheel of 5/32" or less thickness. This operation makes a smooth cross-cut about 3/16" wide and 3/16" deep on closed joints. On open joints, it bevels the top of each rail end and removes all overhanging metal from the rail ends.

Testing. Check for pre-heat and post-heat temperatures frequently. Commercially available temperature-indicating crayons, "Tempilstiks", are satisfactory for making these tests. The pre-heat temperature should be 700° F. when checked at the rail surface adjacent the weld limit marks. The post-heat temperature should be 1100 ° F. when checked near the outer limits of the weld deposit. Some variation of the post-heat temperatures may be required on various sizes of rail because of variations in the carbon/manganese content. Desired post-heat temperature can be determined by testing the initial joints welded on a given rail section with the Telebrineller. If the hardness at the outer limits of the weld deposit is equal to or higher than the hardness near the rail ends, the post-heat temperature should be increased. If the hardness at the outer limits of the weld deposit is below 300 BHN the post-heat temperature should be decreased.

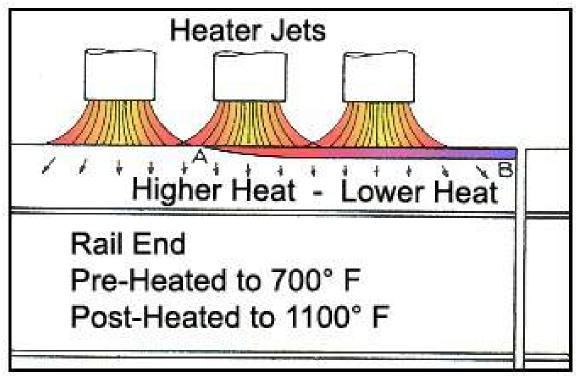
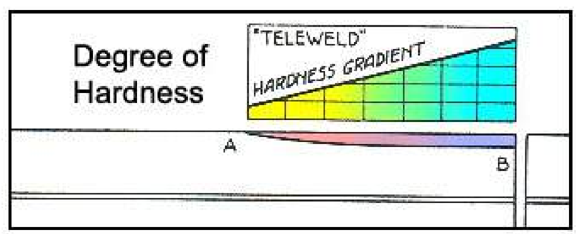
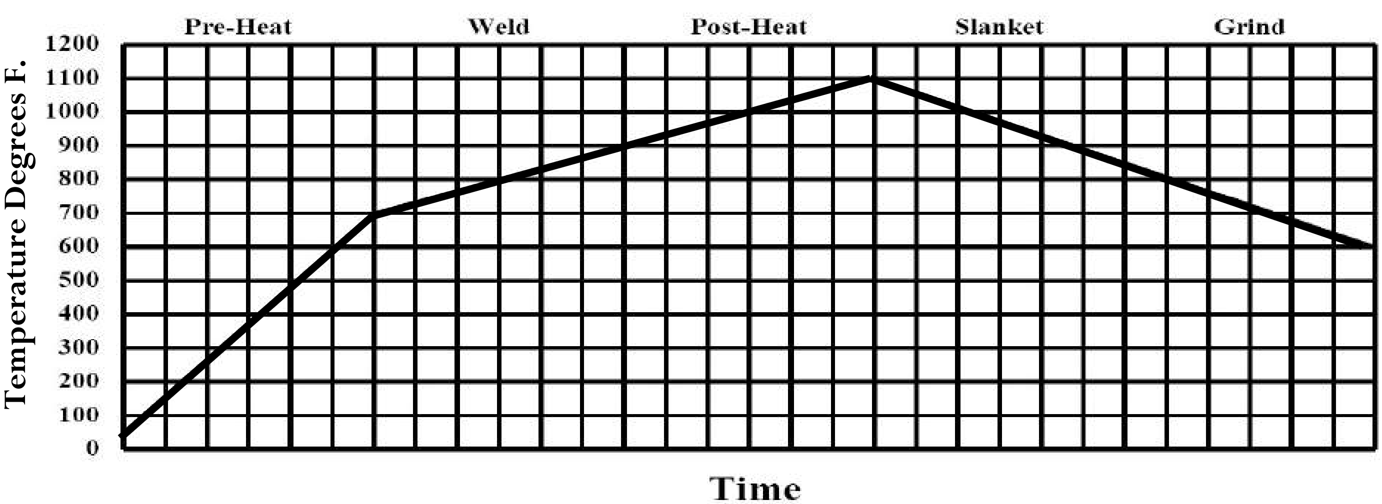


Fig.4– Differential post-heating produces a hardness gradient for ideal results.





Typical heating and cooling curve corresponding to various steps in "Teleweld" procedure.

SPECIFICATIONS FOR ELECTRIC WELDING AND GRINDING RAIL JOINTS

1. Procedure for Marking Joints:

All rail joints shall be marked for welding with a tolerance of not more than .003" depth at end of batter on either rail end. Figure A below illustrates this point and is applicable to high rail on one way traffic and both rails on two way traffic. If one rail is on a lower plane than abutting rail, particularly on one way traffic, the grade of ramp shall be determined by allowing .007" rise per inch of weld length. Figure B illustrates method of marking for length of ramp. Place straight edge on high rail with end extending straight out above the low rail, and measure indicated batter between the end of low rail and the straight edge. This measurement in thousandths inch, divided by .007" determines the length of weld on the low rail.

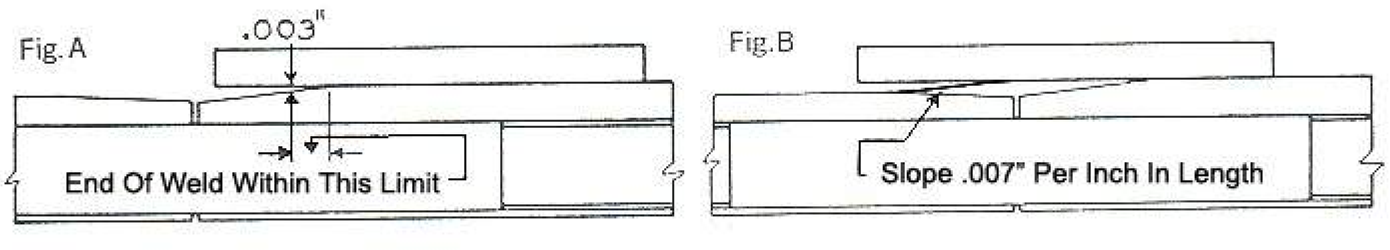
7. Hardness Limits:

The hardness limits at surface of weld as shown by test with a Telebrineller shall be within the limits of 350 and 400 BHN.

8. Cross-Grinding:

Cross-grinding shall be done in a neat and work manlike manner. On closed joints, cut shall not be more than 3/16" wide and at least 3/16" deep. On open joints, rail ends shall be beveled 1/32" at top on each rail, with bevel extending 3/16" deep. All overhang on end of rail shall be removed. Grinding wheels used for cross-cutting shall not exceed 5/32" in thickness.

Hardness is tested with a Telebrineller. A hammer blow on this device produces an indention on the rail. The size of this indentation is then measured and the hardness is determined by comparison with the indentation in a bar of known hardness made by the same hammer blow.



2. Pre-heating:

All rail joints shall be pre-heated before welding to a temperature of approximately 700° F. Preheating shall be done with Teleweld differential heater using propane gas as a fuel.

3. Welding Procedure:

A bead shall be laid from outer edge of rail across rail end, down gauge side to weld limit mark, thence diagonally to outside and down outside of rail to the point of beginning. The width of this bead shall be such as to fully cover ball when weld has been completed to the point of beginning.

4. Post-heating:

Immediately after welding, all welds shall be post-heated to a temperature sufficient to draw weld to correct Brinell hardness. Post-heating shall be done with a Teleweld differential heater using propane gas as fuel.

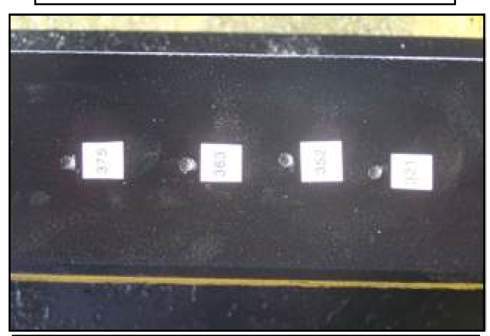
5. Blanketing:

Upon completion of post-heating all welds shall be covered with a rail blanket during winter weather when temperature is below freezing point. This blanket shall be allowed to remain on the weld not less than two minutes.

6. Surface Grinding:

Surface grinding shall be done after the period of blanketing and shall be such that the welded area will conform to the present (not original) section of existing rail. Tolerance for rail surface grinding shall be not more than .005" high or .010" low.

RAIL END WELD RESULTS



FINISHED RAIL SECTION
Typical brinell hardness pattern of rail end welded by Teleweld process.

16A MODEL ONLY

SPECIAL PROCEDURES FOR RAIL ENDS REQUIRING A DEEP FILL (Standard Rail)

When building up a rail end requires 3 or more layers of weld fill because deep chips, and end fracture, or old weld metal had to be ground out, a special welding procedure should be followed.

Welding Procedures:

1. Grind out bad metal until only sound base steel remains.
2. Pre-heat to 700° F.
3. Using 1/4" SC32Electrode, build up the rail end peening vigorously as each layer of deposit is made, including the final layer in the multi-layer area.
4. Finish grind.
5. Post-heat to 1100° F.
6. Cross slot.

Teleweld's SC32 welding electrode is formulated to provide a proper hardness pattern in deep fill rail ends where the upper layer of weld deposit contains no mixture of the parent rail steel.

Please be sure to follow your company's standard operating procedures and personal protective equipment policies.

SE MODEL ONLY

TELEWELD PROCEDURE FOR ARC WELDING REPAIR OF OPEN-HEARTH (RAIL STEEL), TURNOUT FROGS, AND CROSSING CORNERS

1. All bolts must be in place with nuts properly applied and tightened. All spikes, other hold downs, or braces shall be properly in place, on good ties, tamped to a satisfactory surface.
2. The length and depth of batter or wear, on the transitional area of frogs or crossings to be restored to level surface, shall be determined by use of a straight edge laid parallel with the flangway from wing to point.
3. All fatigued, chipped, flowed or otherwise defective metal, in or near the thread surface, shall be removed by grinding.
4. After completion of all preparatory grinding, the area to be built up shall be pre-heated to 700° F. and weld metal of a proper alloy shall be deposited in successive beads applied parallel to the flangeways. Each bead shall be peened before cooling.
5. Immediately after welding, the welded area shall be post-heated to about 1000° F. and allowed to cool. When cooled to ambient temperature, use a Telebrineller to check the hardness of the weld deposit near any junctions with the base metal. If hardness exceeding 350 BHN are found repeat the post-heating process.
6. Finish grind the weld metal to the general level plane of wear common to the running surfaces at the ends of the weld. On frogs, the 1/2" wide point will be left 1/4" lower than the adjacent wings and rise from that to the general level plane in a run-off equal to 1/2 the frog number in inches.

   Overhang must be ground off on all gauge edges for frogs or crossings.
7. The interfacing edges between rails shall be slotted if conditions require it.
8. 1/4" Teleweld SC32 electrode is recommended for frog and crossing repairs. 3/16" SC32 or other suitable electrodes or core wires may be used.

Please be sure to follow your company's standard operating procedures and personal protective equipment policies.

SE MODEL ONLY

PROCEDURE FOR ARC WELDING REPAIR OF CARBON (RAIL) STEEL SWITCHPOINTS

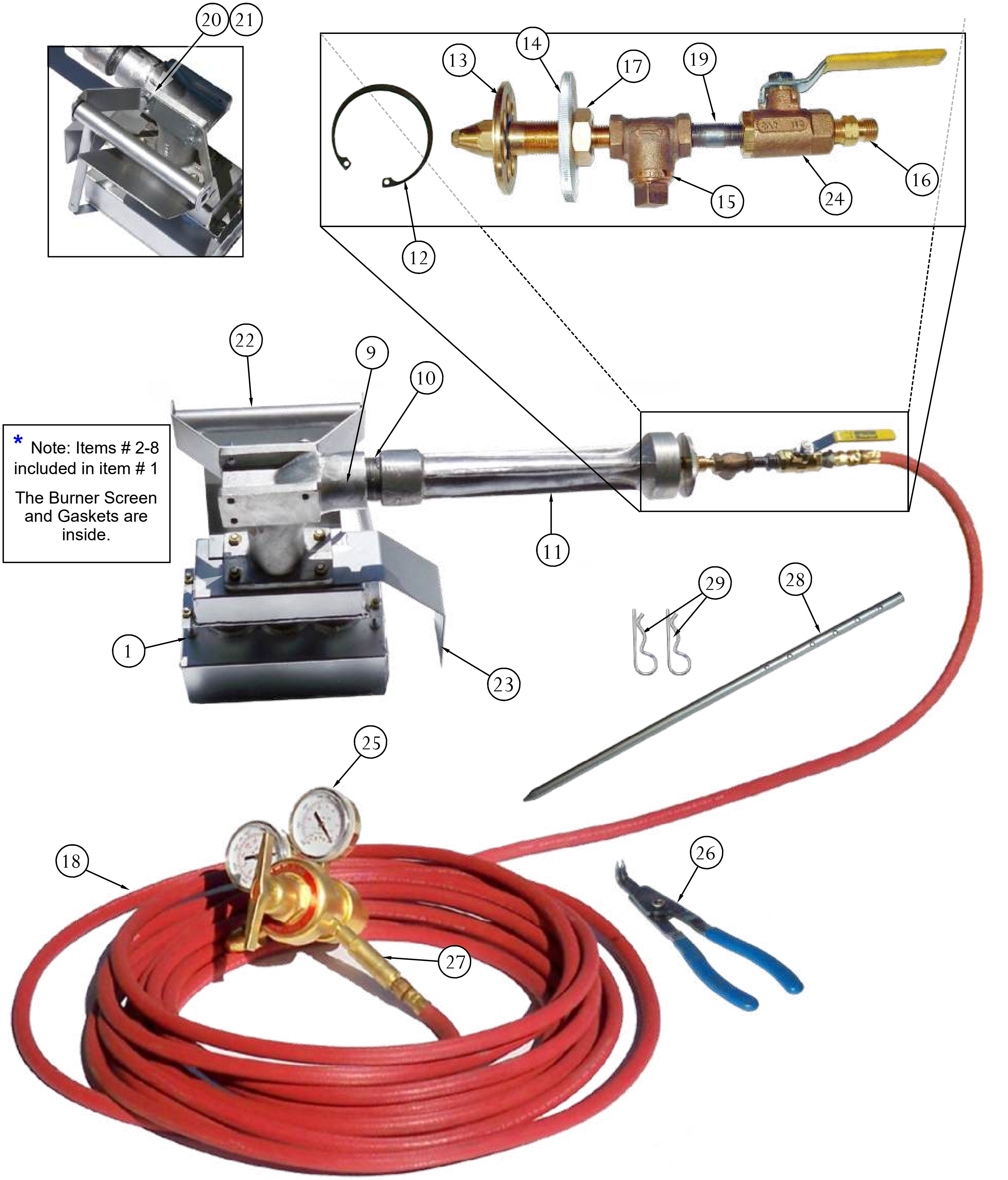
1. Reclamation of a switch point shall consist of restoring the metal on the point back to that section of the point where it has ball or top thickness of 3/4 of an inch.
2. All fatigued, chipped, flawed, or otherwise defective metal in area to be welded shall be removed by grinding and the area shall be pre-heated to 700° F.
3. Upon completion of the pre-heating, welding shall be accomplished by applying successive beads until the contour of the switch point is restored in relation to the stock rail.

   In the case of badly worn points a 1/4" x 4" x 20 to 24" copper plate pinched between the switch point and the stock rail will facilitate making the weld deposit and eliminate excessive grinding.
4. No post heating is required on switch points.
5. The applied metal shall be ground in a tapering manner to a thin edge at the extreme end of the point. The top of the point shall be ground to a height which will be lower than the adjacent stock rail. The end of the point shall be rounded by grinding.

   The overhang on the stock rail and on the back of he point shall be ground off through the area of contact between the point and the stock rail.
6. The switch must be re-adjusted by sectionmen, immediately after completion of the repairs, to close the gap left between the point and the stock rail by removal of the overhang.
7. 3/16" Teleweld SC32 electrode is recommended for switch point repairs. 1/4" SC32 or other suitable electrodes or core wires may be used.

Please be sure to follow your company's standard operating procedures and personal protective equipment policies.

PROPANE HEATER — SE



PARTS LIST— SE

Item#	Description	Qty	Part#
1	Crucible Assembly (Includes items 2-8, not shown in picture)	1	1400-58
2*	Crucible Bottom	1	1401-85
3*	Burner Screen	3	7617-4
4*	Screen Gasket (Set) Upper & lower gasket	3	5535-9
5*	Crucible Top	1	1401-84
6*	Nut 1/4-20 Brass	4	714HN-BR
7*	Elbow Gasket	1	5535-8
8*	Nut 5/16-18 Brass	4	7516HN-BR
9	Elbow Casting	1	2404-59
10	Close Nipple 1-1/2	1	2404-37
11	Inspirator Neck	1	2301-25
12	Snap Ring	1	7204-4
13	Nozzle Assembly	1	JM1-1A
14	Air Adjusting Plate	1	1401-82
15	Single End Strainer	1	5154-2
16	Hose Nipple L.H.	1	2417-54
17	3/4-16 UNF Brass Jam Heater Nut	1	SM6-7213-0000A
18	Hose Line 50’	1	2346-22
19	Close Nipple 1/4”	1	514-112
20	Hex Bolt 5/16-18 x 1”	3	7516HB-1
21	Lockwasher 5/16	3	7516LW
22	Handle Assembly	1	1302-32
23	Handle Shield Assembly	1	8404-2
24	Shut off Valve	1	MK1-78A
25	Gas Regulator	1	7800-2
26	Snap Ring Pliers	1	394
27	Flashback Arrestor	1	FBA-238-58
28	18” Foot Rod	1	6604-19
29	Cotter Pin	2	718HCP-12

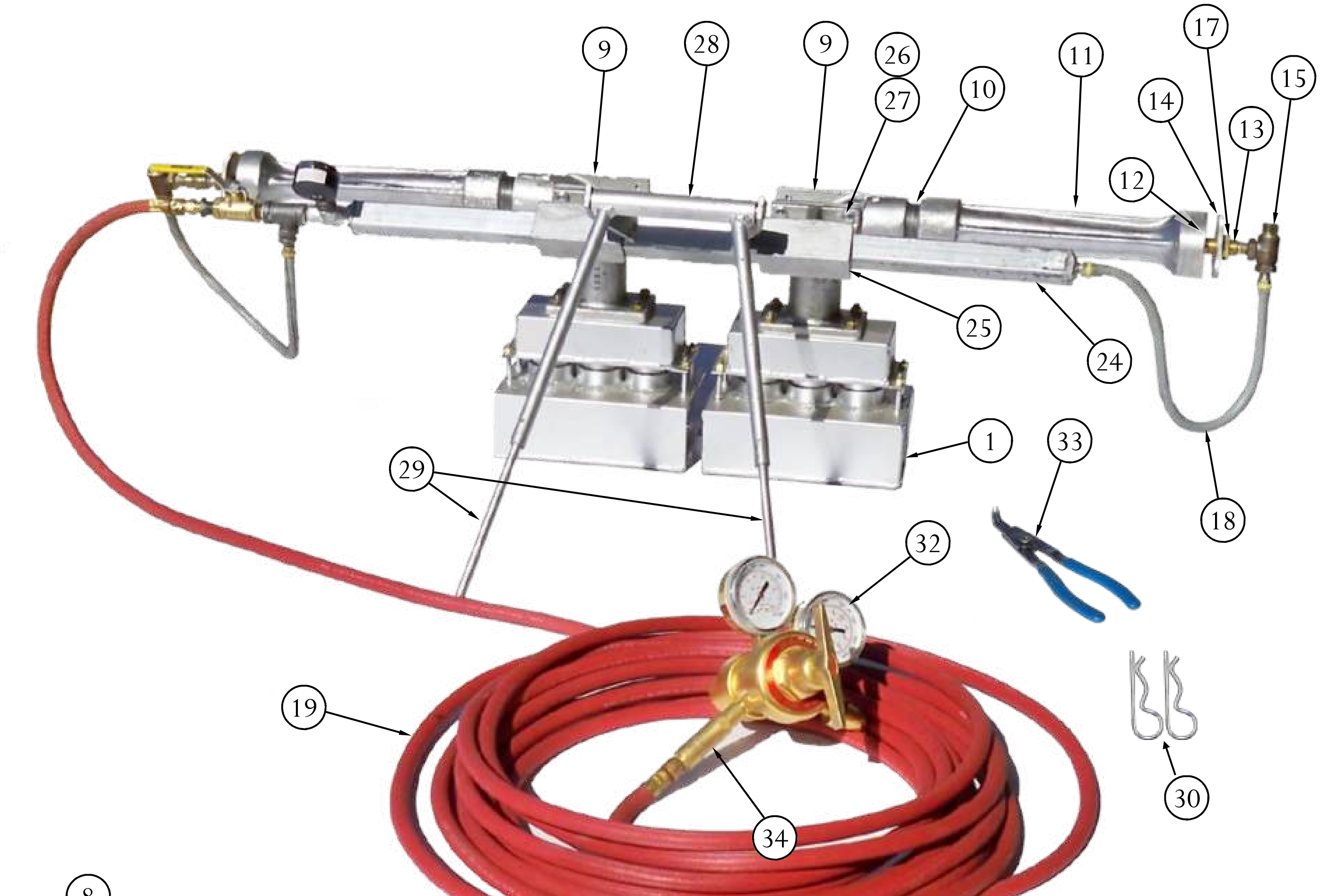
TELEWELD, INC.

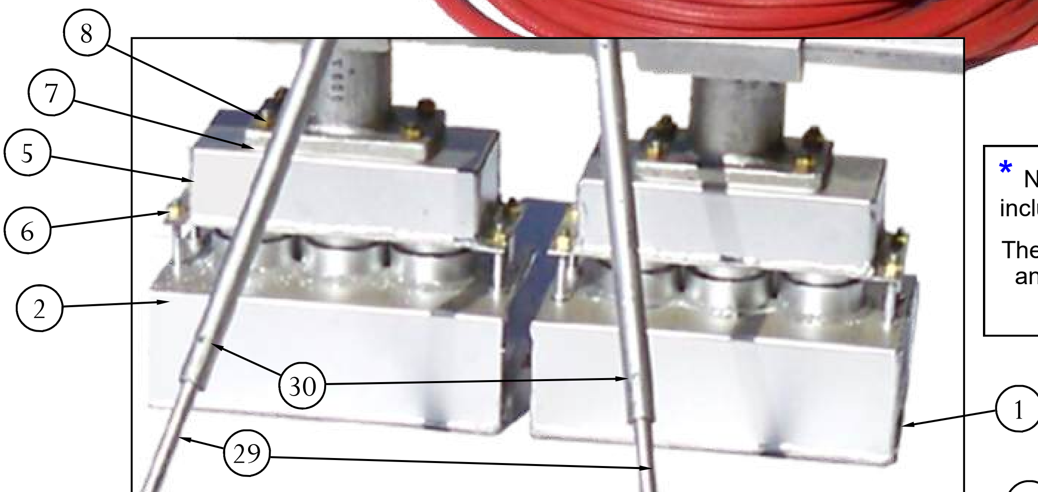
STREATOR, IL

DRAWING NUMBER: 238-41

PROPANE RAIL HEATER TYPE-SE

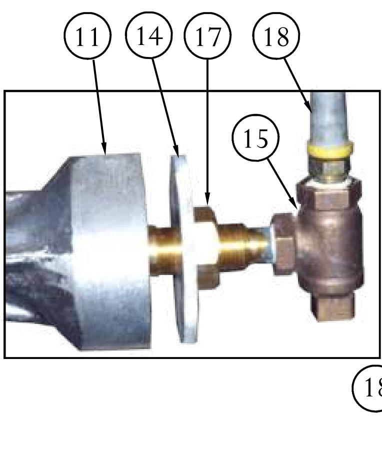
PROPANE HEATER —16A

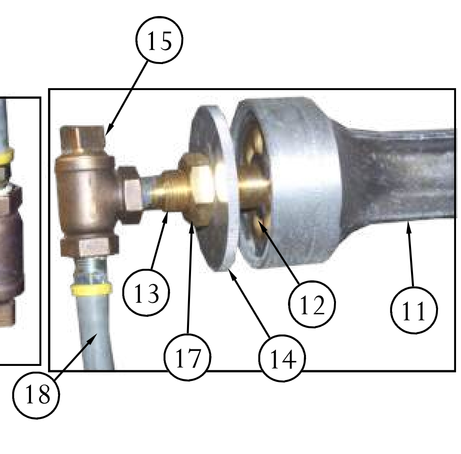


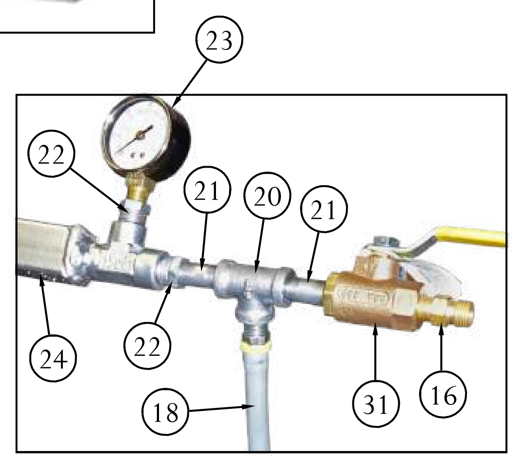


* Note: Items # 2-8 included in item # 1

The Burner Screen and Gaskets are inside.







PARTS LIST—16A

Item#	Description	Qty	Part#
1	Crucible Assembly (Includes items 2-8)	2	1400-58
2*	Crucible Bottom	2	1401-85
3*	Burner Screen	6	7617-4
4*	Screen Gasket (Set)	6	5535-9
5*	Crucible Top	2	1401-84
6*	Nut 1/4-20 Brass	8	714HN-BR
7*	Elbow Gasket	2	5535-8
8*	Nut 5/16-18 Brass	8	7516HN-BR
9	Elbow Casting	2	2404-59
10	Close Nipple 1-1/2	2	2404-37
11	Inspirator Neck	2	2301-25
12	Snap Ring	2	7204-4
13	Nozzle Assembly	2	JM1-1A
14	Air Adjusting Plate	2	1401-82
15	Strainer	2	5154-1
16	Hose Nipple L.H.	1	2417-54
17	3/4" Brass Jam Nut	2	SM6-7213-0000A

Item#	Description	Qty	Part#
18	Fuel Hose 21"	2	2329-29
19	Hose Line 50'	1	2346-22
20	Pipe Tee 1/4	1	61440T
21	Close Nipple 1/4	2	51440-CL
22	Reducer 3/8" -1/4"	2	2402-31
23	Pressure Gage	1	7800-1
24	Manifold	1	2300-20
25	Hanger Casting	2	2404-60
26	Hex Bolt 5/16-18 x 1	6	7516HB-1
27	Lockwasher 5/16	6	7516LW
28	Handle Assembly for double end preheater	1	1302-31A
29	18" Foot Rod	2	6604-19
30	Cotter Pin	2	718HCP-12
31	Shut off Valve	1	MK1-78A
32	Gas Regulator	1	7800-2
33	Snap Ring Pliers	1	394
34	Flashback Arrestor	1	FBA-238-58

TELEWELD, INC.

STREATOR, IL

DRAWING NUMBER: 238-47

PROPANE RAIL HEATER TYPE-16A

REGULATOR-TO-HOSE FLAMEBUSTER™ PLUS FLASHBACK ARRESTOR WITH CHECK VALVE

The FLAMEBUSTER™ model FBR is a regulator-mounted flashback arrestor with a replaceable reverse flow check valve. It is designed to prevent flashback flame and reverse flowing gases from burning or mixing in the regulator and gas supply system.

The reverse flow check valve stops reverse flow of gas and a very fine "filter-like" sintered stainless steel flame barrier stops flashback flame.

NOTE

For maximum service life of the flashback arrestor and check valve, purge all supply lines/hoses before installing. This removes loose material that could restrict flow through the flashback arrestor and/or cause the check valve to leak.

CAUTION

Always clear hoses in well-ventilated areas away from any flames or other sources of ignition. The escaping gases create conditions for fires and explosions.

WARNING

This product contains chemicals, including lead, or otherwise produces chemicals know to the State of California to cause cancer, birth defects and other reproductive harm. WASH HANDS AFTER HANDLING. (California Health & Safety Code § 25249.5 et seq.)

INSTALLATION

Wrench-tighten to regulator and hose. Test all apparatus for leaks before use.

WARNING

Leaking gas may cause fires and explosions! To reduce the possibility of gas leaks, never leave the coupler pressurized for an extended length of time. To prevent the accumulation of dangerous gases, never use or leave the torch in a work area that does not have adequate ventilation. Always follow the torch manufacturer's operation instructions before using the torch. Always shut off gas at source when work is completed, or at lunch periods, or overnight.

OPERATING DATA

Gas	Maximum Pressure*
Oxygen	150 PSI (1034 kPa)
Acetylene	15 PSI (103 kPa)
Hydrogen	30 PSI (206 kPa)
Other Fuel	50 PSI (344 kPa)

*Always use correct opening data. Refer to manufacturer's operating information.

CAUTION

Flow restriction and torch overheating will result if dirt or "oily" LPG residuals are allowed to flow into the flashback arrestor.

CAUTION

It is not recommended to use accessory flashback arrestors on a torch that has these devices built in. Excessive flow restrictions may occur.

TESTING THE INTERNAL CHECK VALVES

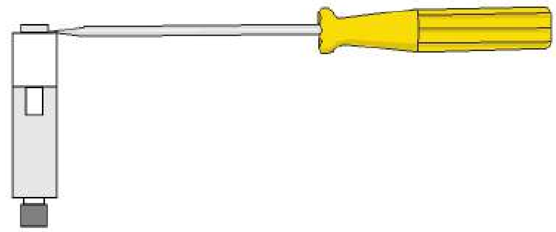
WARNING

No Smoking or open flame should be allowed in the test area.

1. Adjust both regulator screws so no pressure will be delivered.
2. Disconnect hoses from the torch.
3. Remove the FLAMEBUSTERS™ from the regulators and hoses. Connect the hoses to the regulators.
4. Connect the FLAMEBUSTERS™ to the outlets (torch end) of the hose.
5. Adjust both regulators until a 2-5 PSIG (14-35 kPa) reading is obtained on the low pressure gauge of each regulator.
6. Put the end of each FLAMEBUSTER™ under water, or cover the end with an approved leak detector solution. Wait 15 seconds for trapped air to escape.
7. Bubbles will appear if the check valve is leaking. There should be no more than two bubbles in 10 seconds.
8. If a check valve is leaking, turn off the oxygen and fuel. Remove the FLAMEBUSTER™ and reinstall the normal position on the end of the hose. Flush for 3-5 seconds with either 10 PSIG (69 kPa) fuel gas for the fuel FLAMEBUSTER™ or 30 PSIG (206 kPa) oxygen for the oxygen FLAMEBUSTER™.
9. Repeat steps 3-7.
10. If the check valve is still leaking, replace with a new one.
11. Remove the FLAMEBUSTER™ from the hose. If the check valves passed test, install the FLAMEBUSTERS™ in the normal position on the regulator.
12. After both check valves have passed testing, purge both the oxygen and fuel lines before lighting the torch.

REPLACING THE INTERNAL CHECK VALVE

1. Remove the FLAMEBUSTER™ from the regulator.
2. Thread a 1/4"- 20" x 1/2" bolt into the check valve.
3. Wedge a screwdriver between the head of the bolt and the FLAMEBUSTER™.
4. Pry out the check valve.
5. Install the new check valve by inserting it into the FLAMEBUSTER™ body with your thumb. Finish the installation by threading the FLAMEBUSTER™ onto the regulator outlet connection. Tighten until you feel the check valve bottom out.
6. Test the check valve before use (see "Testing the Internal Check Valve").



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