

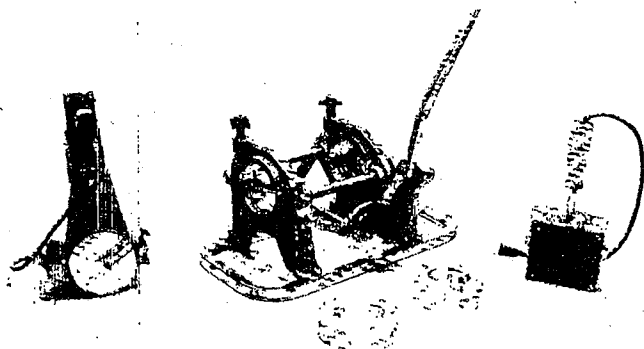


# Butt Fusion

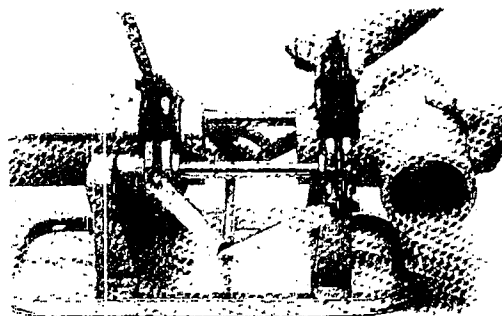
## Procedures for Making Butt Fusion Joints

### Tools Required:

- 1- Butt Fusion Machine
- 2- Trimming Device
- 3- Heating Tool
- 4- Butt Fusion Heating Faces

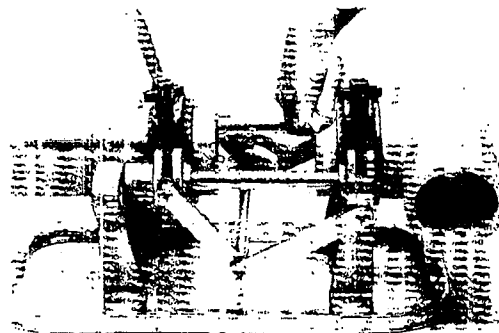


1. Align pipe and fitting in a clamping device.

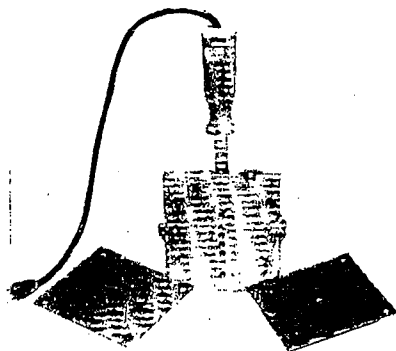


Allow ends to protrude through clamps approximately 1" (25.40 mm) for facing purposes.

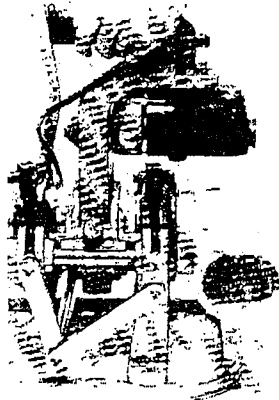
2. Clean pipe and fitting ends.



Remove any dirt or foreign material from ends with a clean cloth.

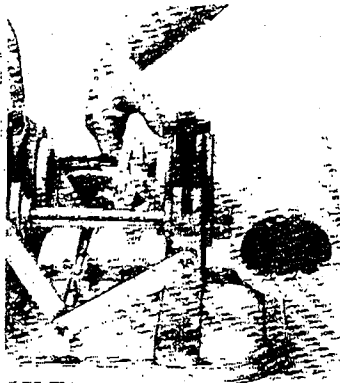


## 3. Trim pipe and fitting ends.



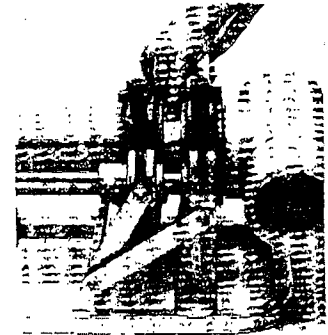
Place trimmer between pipe and fitting ends. Bring ends firmly against cutter blades and trim. A thin, continuous strip of material should be trimmed from both pipe and fitting end. When the trimmer stops are against both clamps, ends should be completely faced. Pull ends away from cutter disc, discontinue trimming, and remove trimming tool.

## 4. Remove shavings



Be careful not to touch newly faced ends with your hands as perspiration or body oils could contaminate joining area resulting in a weakened fusion joint.

## 5. Check pipe and fitting alignment

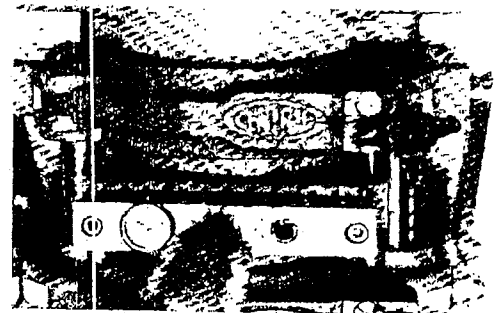


Bring ends together and carefully run your finger over the junction of the two ends to check for alignment and fit. Gaps between pipe ends should not exceed .010" (.25 mm). If misalignment does occur, tighten clamp on end appearing to be larger in diameter. If adjustments are made, always reface the pipe ends.

6. After pipe ends are properly faced and alignment adjustments are made, melt and fusion procedures can be started.

It is important that heater faces are clean from contaminants and coating is free from scratches. Either of these conditions could result in a weakened fusion joint.

7. Heating tool should be preheated to pipe manufacturers' recommendations. (The general heating temperature for Butt Fusion is 500° F.  $\pm$  10°F.) (260°C  $\pm$  5°C). An accurate temperature reading for the heater may be obtained by checking the heater face with a pyrometer or tempestix.



Place heating tool between pipe and fitting ends. Bring ends of pipe into contact with the heater and apply finger tip pressure only. Observe the melt bead as it develops. Maintain finger tip pressure for the required amount of time or until the proper bead size is achieved.

(Refer to Table 5 - Bead Chart.) Heat for recommended times shown in Table 3 and 4.

### Table 3 - Butt Fusion Time Cycles (PE2406 Fittings)

Pipe Size (IPS)	Heating Time (Sec.)		Cooling Time (Sec.)
	440°F ± 10°F	500°F ± 10°F	
	226°C ± 5°C	260°C ± 5°C	
3/4"	15	7	50
1"	20	10	50
1 1/4"	25	12	50
1 1/2"	40	15	60
2"	40	15	60
3"	50	20	80
4"	55	20	80
6"	90	40	150
8"	**	**	**

Guideline only, exact time could vary depending on environmental conditions or fusion equipment used.

\*\* Heating Cycle for 8" diameter and larger should be determined by bead thickness. (Refer to Table 5-Bead Chart.)

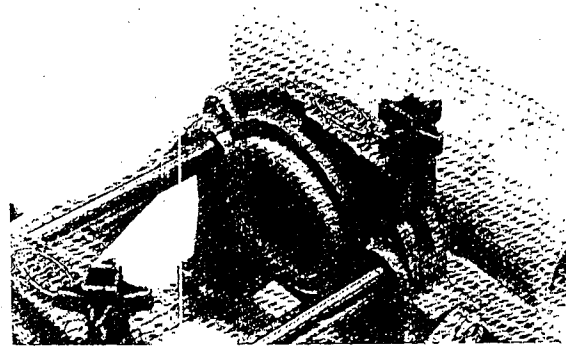
### Table 4 - Butt Fusion Time Cycles (PE3408 Fittings)

Pipe Size (IPS)	Heating Time (Sec.)		Cooling Time (Sec.)
	500°F ± 10°F		
	260°C ± 5°C		
3/4"	12		50
1"	15		50
1 1/4"	18		70
1 1/2"	22		70
2"	25		70
3"	30		70
4"	35		90
6"	55		160
8"	**		**

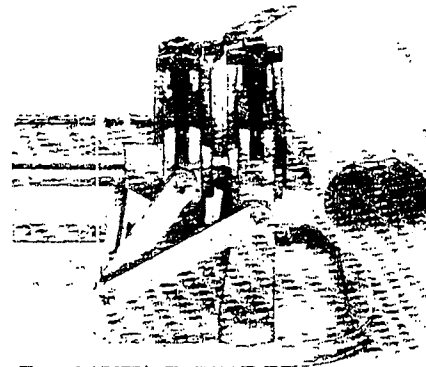
Guideline only, exact time could vary depending on environmental conditions or fusion equipment used.

\*\* Heating Cycle for 8" diameter and larger should be determined by bead thickness. (Refer to Table 5-Bead Chart.)

8. After proper bead is obtained (visually or by elapsed cycle time), snap moveable fitting end away from heating tool. Bump heating tool slightly to snap away from stationary pipe end. Remove heating tool being careful not to remove any molten material from the fusion area. Quickly inspect ends for even melt pattern.



9. Immediately bring ends together with enough force to obtain a roll back of each bead onto pipe and fitting ends.



10. Joining pressure should be maintained or locked in place for recommended cooling times shown in Tables 3 and 4.

11. Inspect the entire circumference of the fusion joint for uniform roll back of the melt bead. The edges of the bead should be against the pipe and fitting.

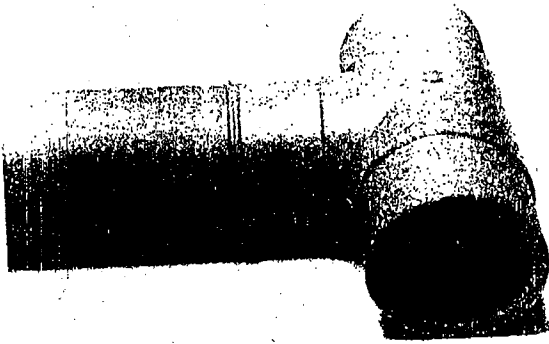


Table 5 - Bead Chart

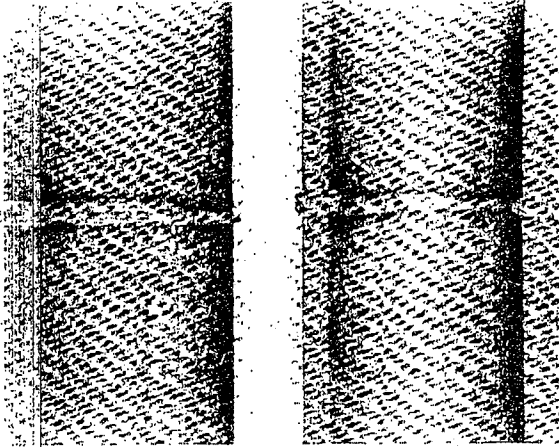
Pipe Size (IPS)	Bead Thickness	
3/4"	1/16"	1.6mm
1"	1/16"	1.6mm
1 1/4"	1/16" to 1/8"	1.6mm to 3.18mm
1 1/2"	1/16" to 1/8"	1.6mm to 3.18mm
2"	1/16" to 1/8"	1.6mm to 3.18mm
3"	1/8"	3.18mm
4"	1/8"	3.18mm
6"	3/16"	4.76mm
8"	3/16" to 1/4"	4.76mm to 6.35mm

Bead Chart shows approximate bead diameter after fusion.

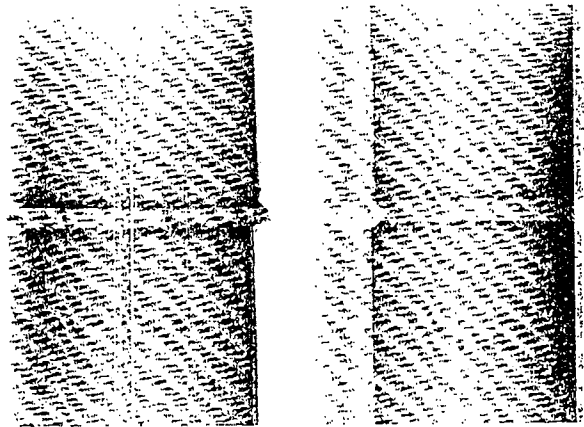
Joint should remain in a secure position for an additional 3 minutes after cooling time. Allow an additional 10 minutes cooling time before subjecting the joint to bending, burying, pressure testing, or similar handling and backfill stress.

## Improper Butt Fusion Joints

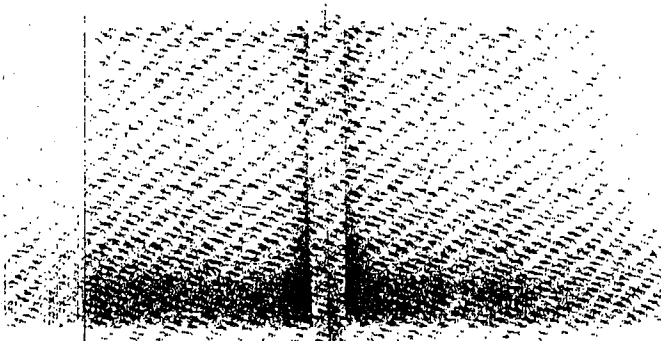
**Figure 3 - Incomplete Facing  
Unacceptable Joint**



**Figure 4 - Poor Alignment  
Unacceptable Joint**

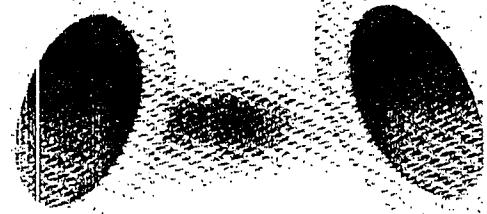


**Figure 5 - "Cold Joint" - Excessive  
Pressure During Heat Cycle  
Unacceptable Joint**

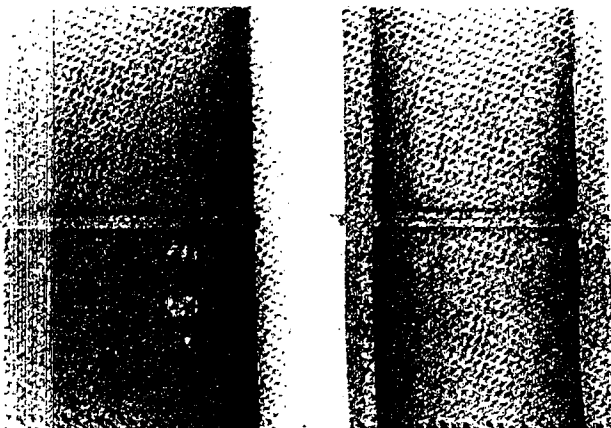


Joint appears acceptable

**Figure 6 - "Cold Joint" - Breaks Apart**



**Figure 7 - Melt Bead Too Small  
Unacceptable Joint**



**Figure 8 - Melt Bead Too Large  
Unacceptable Joint**

