Saddle Fusion (PPI TR-41)

Saddle Fusion Parameters

Heater Adapter Surface Temperature	500°F +/- 10°F
Initial Interfacial Pressure	60 +/- 6 psi
Heat Soak Interfacial Pressure	0 psi
Fusion Interfacial Pressure	30 +/- 3 psi
Total Heating Time on Main 1” IPS Pressure Main	15 seconds max.
Total Heating Time on Main 2” IPS Pressure Main	25-35 seconds max.
Total Heating Time on non-pressure 1” IPS, 2” IPS mains, and on pressure or non-pressure 3” IPS and larger mains.	Look for a 1/16” bead around the fitting base

Definitions

Initial Heat (Bead-up) - The heating step used to develop an initial melt bead on the main pipe.

Initial Heat Force (Bead-up force) - The force (pounds) applied to establish an initial melt pattern on the main pipe. The Initial Heat Force is determined by multiplying the fitting base area (sq. inches) by the initial interfacial pressure (pounds per square Inch.

Heat Soak Force - The force (pounds) applied after an initial melt pattern is established on the main pipe. The Heat Soak Force is the minimum force (essentially zero pounds) that ensures that the fitting, heater and main stay in contact with each other.

Fusion Force -The force (pounds) applied to establish the fusion bond between the fitting and the pipe. The Fusion Force is determined by multiplying the fitting base area (square inches) by the fusion interfacial pressure (pounds per square inch).

Total Heat Time - A time that starts when the heater is placed on the main pipe and initial heat force is applied and ends when the heater is removed.

Cool Time—The time required to cool the joint to approximately 120°F (49°C). The fusion force must be maintained for 5 minutes on 1 _" IPS or 10 minutes for all other main sizes, after which the saddle fusion equipment can be removed. The joint must fusion force must be maintained for 5 minutes on 1 _" IPS or 10 minutes for all other main sizes, after which the saddle fusion equipment can be removed. The joint must be allowed to cool undisturbed for an additional 30 minutes before tapping the main or joining to the branch outlet.

Interfacial Area for rectangular base fittings-- The major width times the major length of the saddle base, without taking into account the curvature of the base or sides, minus the area of the hole in the center of the base.

Interfacial Area for round base fittings-- The radius of the saddle base squared times (3.1416), without taking into account the curvature of the base or sides, minus the area of the hole in the center of the base.

Fitting Label—The initial heat force, heat soak force and the fusion force may be listed in the lower right hand corner of the fitting label for all saddle fusion fittings (depending upon the manufacturer, This will eliminate the need to calculate the fusion forces in the field. (example: 180/0/90)

Saddle Fusion Procedure

Preparation

This procedure requires the use of a Saddle Fusion Tool. This tool must be capable of holding and supporting the main, rounding the main for good alignment between the pipe and fitting, holding the fitting, and applying and indicating the proper force during the fusion process.

1. Install the Saddle Fusion Tool on the main according to the manufacturer's instructions. The tool should be centered over a clean, dry location where the fitting will be fused. Secure the tool to the main. A main bolster or support is recommended under the pipe on 6" IPS and smaller main pipe sizes.

2. Abrade the main, where the fitting will be joined, with a 50-60 grit utility cloth until a thin layer of the pipe surface is removed. The abraded area must be larger than the area covered by the fitting base. After abrading, brush residue away with a clean, dry cloth.

3. Abrade the fusion surface of the fitting with 50 to 60 grit utility cloth; remove all dust and residue. Insert the fitting in the Saddle Fusion Tool loosely. Using the Saddle Fusion Tool, move the fitting base against the main pipe and apply about 100 pounds-force to seat the fitting. Secure the fitting in the Saddle Fusion Tool.

Heating

4. The heater must be fitted with the correct heater adapters. The temperature of the heater adapter fusion surfaces must be 490-510°F.

5. Place the heating tool on the main centered beneath the fitting base. Immediately move the fitting against the heater faces, apply the Initial Heat Force (see fitting label), and start the heat time. Apply the Initial Heat Force until melt is first observed on the crown of the pipe main (Initial Heat is the term used to describe the initial heating (bead-up) step to develop a melt bead on the main pipe and usually is 3-5 seconds) and then reduce the force to the Heat Soak Force (Bead-up force) (see fitting label). Maintain the Heat Soak Force until the Total Heat Time is complete.

6. At the end of the Total Heat Time, remove the fitting from the heater and the heater from the main with a quick snapping action. Quickly check for an even melt pattern on the pipe main and fitting heated surfaces (no unheated areas). Total Heat Time ends:

a. When the Total Heating Time expires for a pressurized 1 _" IPS or 2" IPS main, or

b. When a melt bead of about 1/16" is visible all around the fitting base for a 1 1/4 " IPS or 2" IPS non-pressurized main, or a larger pressurized or non-pressurized main.

Fusion and Cooling

7. Whether or not the melt patterns are satisfactory, press the fitting onto the main pipe very quickly (within 3 seconds) after removing the heater and apply the Fusion Force (see the fitting label). Maintain the Fusion Force on the assembly for 5 minutes on 1 _" IPS and for 10 minutes on all larger sizes, after which the saddle fusion equipment may be removed. (Fusion Force adjustment may be required during Cool Time, but never reduce the Fusion Force during cooling.)

8. Cool the assembly for an additional 30 minutes before rough handling or tapping the main. (If step 7 melt patterns were not satisfactory or if the fusion bead is unacceptable, cut off the saddle fitting above the base to prevent use, relocate to a new section of main, and make a new saddle fusion using a new fitting.)

NOTE:
These procedures are based on tests conducted under controlled ambient temperature conditions. Environmental conditions on a job site could affect heating and cooling times. Regardless of job site conditions or ambient temperature, the prescribed heating tool temperature is required. Do not increase or decrease the heating tool temperature.