

# **Jackman** **FUSION EQUIPMENT™**

Plastic Pipe Butt Fusion Welding

INSTRUCTIONS

## **Jackman 14 Butt Fusion Machine**

Welding capacity 1" IPS - 4" DIPS

# Table of Contents

Overview – Page 1

Machine Contents +Technical – Page 2

Heating Plate Operating Instructions– Page 3

Basic Welding Instructions – Page 4 – Page 5

Appendix B. Approximate Melt Bead Size per Wall Thickness – Page 6

Appendix C Final Fusion Bead Widths per Wall Thickness – Page 6

Appendix D Maximum Heater Plate Removal Times – Page 7

Safety – Page 8

Warranty – Page 9

Warranty Receipt – Page 10

## IMPORTANT:

Please read this operation manual carefully to ensure safe operation of the machine. Operators must follow the pipe manufacturers recommended joining procedures.

Jackman Fusion Equipment accepts no responsibility and cannot be held liable for the integrity or quality of the joints completed using this equipment.

It is the operator's responsibility to ensure the pipe manufacturer joining procedures are followed, inspected, and tested.

## Overview:

The Jackman 14 plastic pipe butt welding machine is a mechanical butt fusion welder for joining various types of fusible plastic pipe. The Jackman model 14 Butt Fusion Machine is designed to butt fuse pipe sizes 1" IPS to 4" DIPS. It is easy to operate and incorporates a state-of-the-art heating plate, 4 clamp machine body, manual facer, and storage stand.

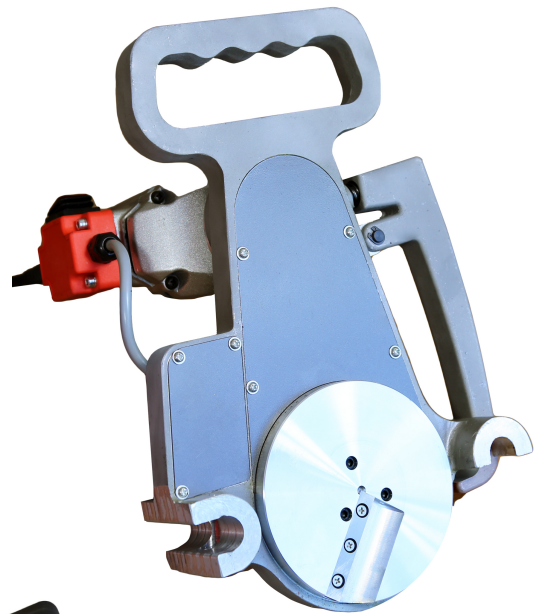
The Jackman 14 butt welding machine is intended for butt fusing HDPE, MDPE or PPR thermoplastic pipe and fittings.

The main 4 jaw machine body is designed to fuse 4" DIPS and 4" IPS pipe without the need of inserts. Additional inserts are available to fuse the additional pipe sizes: 1" IPS, 1-1/4" IPS, 1-1/2" IPS, 2" IPS, and 3" IPS.



## Machine Contents

1. Cast aluminum 4 jaw mechanical machine body.
2. Manual Facer
3. Teflon coated heating plate with digital display and analog thermometer 110 volts 1300 watts.
4. Facer and heating plate storage stand



## Technical

Digital adjustable heating plate range: 394 – 534 degrees Fahrenheit or 200 – 279 degrees Celsius.

Total absorbed power requirement for the heating plate is 1300 watts.



## Heating Plate Operating Instructions

- Digital controller with temperature display screen including following keys: “RDY” and “HEAT” Indicator lamp, !↓key, !↑Key, !←key, and SET Key!!
- Heating Plate!
- Analog Thermometer!

### Important

To switch between F Fahrenheit and C Celsius hold the SET button down and within 2 seconds press the down arrow key once. Decimal point between the digits indicate the welder is set to Celsius.

### Setting the temperature

Setting the temperature: Press the key “SET”. The unit will display the original set temperature. The unit figure (0- digit) will flash. By pressing the !↑Key or !↓Key, you can adjust the unit figure. To adjust the data on the decimal figure (00-digit), press the !←Key. Once the decimal figure begins to flash, press !↑Key or !↓Key to adjust.

Press the !←Key to adjust the unit and decimal figure. The temperature range is fixed. The maximum is 534°F and the minimum is 392°F. Once the temperature setting is complete, press the “SET” key once again. The tool is ready to work.

### Over-heating alarm:

The tool will sound an alarm if the temperature rises above 534°F. If this happens, the power must be switched off. After troubleshooting, the tool can be turned back on.

### Temperature compensates automatically:

This tool has a function that will automatically compensate for external temperature. When the external temperature drops below 44°F, the tool will increase the set temperature by 10°F. When the external temperature rises above 86°F, the tool will decrease the set temperature 8°F. If there is a wide fluctuation in external temperature, the tool temperature can be manually set to appropriate temperature.

## Basic Welding Instructions

Pipe must be clean and free of any damage. Pipe with surface scratches that exceed 10 % of the pipe's wall thickness should not be used. 99% Isopropyl Alcohol should be used to clean the pipe before and after clamping pipe into the machine body. Allow alcohol to fully evaporate before facing pipe. Clean the heating plate faces with isopropyl alcohol while the heating plate is cold.

**Clamping:** Insert the pipe into the clamps. Be sure to allow the ends of the pipe to protrude at least 1" beyond the inner clamp on each side. Tighten the clamps equally on each side to ensure the pipe is uniformly aligned. Do not overtighten carriage clamps. Overtightening clamps can crush the pipe and damage your machine. Once you have the pipe ends securely in place; clean the pipe ends with 99% isopropyl alcohol to remove any dirt or oils that may have gotten on to the pipe during this process.

**Facing:** Load the facer into the machine carriage. Crank the facer handle counterclockwise to begin facing. Apply enough pressure to allow the facer blades to uniformly trim full ribbons of material. Complete this process by facing the pipe until the facer makes contact with the facer stops on each side. Remove the facer from the machine.

**Alignment:** Apply your required fusion force to ensure the pipe is adequately secured in the machine clamps and does not slide or slip. Inspect the pipe joint to confirm that the pipe ends are in complete alignment all around the joint with no detectable gaps. If the pipe alignment is not acceptable you must remove the pipe from the clamps and start the clamping/facing over from the beginning. Once alignment is acceptable and you have verified that the pipe does not slide in the clamps when applying your specific fusion force for the pipe size you are working with you can move on to the heat soak process.

**Heat Soak:** Recommended heating temperture : (set to 400°F - 450°F for HDPE Pipe).

Verify that the contact surface of the heating tool is maintaining the correct temperature. Place the heating tool between the pipe ends and move the pipe against the heating plate. Bring the component ends together and apply enough pressure to ensure full contact. The initial contact pressure should be held very briefly. Once the melt bead has started to form on both sides of the heating plate the heat soak pressure can be reduced to just enough pressure to prevent the pipe from breaking contact with the heating plate. When the proper melt bead size is formed, quickly separate the pipe ends and remove the heating tool. The proper bead size is dependent upon the size of the pipe and wall thickness you are using.

Approximate values are shown in (**appendix B**). During heating, the melt bead will expand out flush to the heating tool surface or may curl slightly away from the surface. If the melt bead curls significantly away from the heating tool surface,

unacceptable pressure during heating may have occurred.

The maximum amount of time between heater plate removal and fusion joining is detailed in (**appendix D**). This means you must move fast to remove the heater, inspect the pipe ends and immediately bring the melted pipes together and up to your desired fusion pressure.

Note: During this heat soak process you can lift the locking cams into lock position.

**Fusion Joining:** Immediately after the heating plate is removed quickly inspect the melted ends, which should be flat, smooth and completely melted. If the melt surfaces are acceptable, immediately apply the correct joining force or fusion pressure. Maintain the desired fusion force for at least 10 seconds. The locking cam mechanism will continue to hold joining pressure for the duration of this step. The correct fusion pressure will form a double bead that is rolled over and contacts the pipe surface.

The final double roll back bead should be uniform and measure between the minimum and maximum widths detailed in (**appendix C**).

A concave melt is unacceptable; it indicates too much pressure during the heat soak. Do not continue. Allow the components ends to cool, cut the pipe, and start over.

**Cooling:** Allow the pipe joint to cool under pressure. Cool for a minimum of 11 minutes per inch of wall thickness. For ambient temperatures above 100F, longer cooling times may be required.

Once the cooling time is complete the pipe can be removed from the machine carriage. Avoid pulling, installation, pressure testing, and rough handling until the pipe had enough to cool.

## Appendix B

**Approximate Melt Bead Size per Wall Thickness**

<b>Approximate Wall Thickness, Inches</b>	<b>Melt Bead Size (Approximate)</b>
<b>0.15 or less</b>	<b>1/32" – 1/16"</b>
<b>0.15 – 0.30</b>	<b>1/16"</b>
<b>Above 0.30 – 0.75</b>	<b>1/8" – 3/16"</b>
<b>Above 0.75 – 1.15</b>	<b>3/16" – 1/4"</b>
<b>Above 1.15 – 1.60</b>	<b>1/4" – 5/16"</b>
<b>Above 1.60 – 2.20</b>	<b>5/16" – 7/16"</b>
<b>Above 2.20 – 3.00</b>	<b>7/16" – 9/16"</b>

This is the approximate melt bead size that should form against the heating plate during the heat soak cycle.

For example: When working with 2" IPS SDR11 pipe which has a wall thickness of 0.216" the approximate melt bead should be at least 1/16" wide before the heating plate is removed.

## Appendix C

**Final Fusion Bead Widths per Wall Thickness**

<b>Wall Thickness inches</b>	<b>Final Double Bead Width Minimum</b>	<b>Final Double Bead Width Maximum</b>
<b>.118</b>	<b>5/32"</b>	<b>1/4"</b>
<b>.157</b>	<b>5/32"</b>	<b>9/32"</b>
<b>.197</b>	<b>3/16"</b>	<b>5/16"</b>
<b>.246</b>	<b>1/4"</b>	<b>11/32"</b>
<b>.315</b>	<b>9/32"</b>	<b>3/8"</b>
<b>.354</b>	<b>5/16"</b>	<b>7/16"</b>
<b>.433</b>	<b>11/32"</b>	<b>1/2"</b>
<b>.512</b>	<b>3/8"</b>	<b>9/16"</b>
<b>.630</b>	<b>7/16"</b>	<b>19/32"</b>
<b>.710</b>	<b>1/2"</b>	<b>5/8"</b>
<b>.750</b>	<b>1/2"</b>	<b>11/16"</b>
<b>.870</b>	<b>1/2"</b>	<b>11/16"</b>
<b>.940</b>	<b>9/16"</b>	<b>3/4"</b>
<b>1.06</b>	<b>19/32"</b>	<b>25/32"</b>

For example, 2" IPS SDR11 pipe which has a wall thickness of 0.216" the appropriate double melt bead after fusion should be 3/16" – 1/4" wide.

## Appendix D

### Maximum Heater Plate Removal Times (in seconds)

Pipe Wall Thickness, inches	MAX DURATION OF PLATE REMOVAL
Less than 0.20"	As quickly as possible.
0.20" to 0.36"	8 Seconds
0.36 to 0.55	10 Seconds
0.55" to 1.18"	15 Seconds

For example, 2" IPS SDR11 and pipe which has a wall which has a wall thickness of 0.216" the total time allowed to remove the heating plate is no more than 8 seconds.

## Safety Warnings


Excessive fusion force could damage your machine.

### Danger

  This machine is not to be used in the presents of flammable materials, explosive gases, chemical containments, or excessive dust.

  Electric heating plates are NOT explosion proof.

 Facer Blades are sharp.

 Heater is very hot. Wait until the heating plate has completely cooled down before storing the equipment inside a structure or vehicle. Never leave the heating plate plugged in while unattended.

### Proper Wear

Do not wear loose clothes or decorations. They may become entangled in the machine and cause injury.

### Handling

This equipment is to be operated by qualified personnel only, use of this equipment by non-qualified personnel can be dangerous to the operator or others.

Operator must wear gloves and correct PPE. Heating plate must be placed into the storage support after heating After the heating plate is completely cooled, place the storage support in a suitable place with warning notice. Never touch the heater plate faces, they are hot.

Before facing, clean the pipe ends to prevent dirt from damaging the blades. Make sure the facer's is locked in place before commencing to face the pipe. Always return the facer to the original storage place.

## **2 Year Butt Fusion Machine Warranty**

JACKMAN FUSION EQUIPMENT Jackman Fusion Equipment is warranted to the original purchaser only to be free from defects in material and workmanship for a period of two (2) years after the date of purchase for Socket Fusion and Butt Fusion Equipment and (1) year after purchase for Electrofusion Equipment unless otherwise noted. Subject to certain exceptions\*\*, Jackman will repair or replace any defective part including electronics after examination, is determined by Jackman to be defective in material or workmanship for a period of two (2) years after the date of purchase unless otherwise noted. Return of the welder to Jackman Fusion Equipment Service Center or freight prepaid is required. A copy of the proof of purchase should be included with the return product. This warranty does not apply to damage that Jackman Fusion Equipment determines to be from repairs made or attempted by anyone other than Jackman authorized personnel, misuse, alterations, abuse, normal wear and tear, lack of maintenance, or accidents.

**\*\*NOTE:** This warranty does not cover Teflon coatings on heating adapters, pipe cutter blades, chamfer tool blades, consumable parts, water damage or normal wear and tear.

ACCEPTANCE OF THE EXCLUSIVE REPAIR AND REPLACEMENT REMEDIES DESCRIBED HEREIN IS A CONDITION OF THE CONTRACT FOR THE PURCHASE OF JACKMAN FUSION PRODUCT. IF YOU DO NOT AGREE TO THIS CONDITION, YOU SHOULD NOT PURCHASE THE PRODUCT. IN NO EVENT SHALL JACKMAN FUSION BE LIABLE FOR ANY INCIDENTAL, SPECIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, OR FOR ANY COSTS, ATTORNEY FEES, EXPENSES, LOSSES OR DELAYS ALLEGED TO BE AS A CONSEQUENCE OF ANY DAMAGE TO, FAILURE OF, OR DEFECT IN ANY PRODUCT INCLUDING, BUT NOT LIMITED TO, ANY CLAIMS FOR LOSS OF PROFITS. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS WARRANTIES, WRITTEN OR ORAL. TO THE EXTENT PERMITTED BY LAW, JACKMAN FUSION DISCLAIMS ANY IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE; TO THE EXTENT SUCH DISCLAIMER IS NOT PERMITTED BY LAW, SUCH IMPLIED WARRANTIES ARE LIMITED TO THE DURATION OF THE APPLICABLE EXPRESS WARRANTY AS DESCRIBED ABOVE. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU, THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE

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## Warranty Receipt

Must mail Jackman a copy to register warranty

Customer's name \_\_\_\_\_

Telephone \_\_\_\_\_

Purchase date \_\_\_\_\_

Name of Distributor Who Sold You The Machine \_\_\_\_\_

Address \_\_\_\_\_

Serial # \_\_\_\_\_

Model \_\_\_\_\_

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