Thermoplastic Single Ply and Multi-Ply
Roofing & Waterproofing Systems
Flex Membrane International Corp. 5103A Pottsville Pike, Reading, PA 19605 Tel: 610-916-9500 Fax: 610-916-9501

HOT AIR WELDING GUIDELINES

1) Hot Air Welding Equipment

A. Automatic Welding Machine is an electrically powered, self propelled device that utilizes an electric heating element and forced air to weld the seams in Flex Thermoplastic Single Ply Membranes.
B. Hand Held Welder is an electrically powered hand held device that utilizes an electric heating element and forced air to weld the seams in Flex Thermoplastic Single Ply Membranes.
C. Pressure Roller is a silicon hand roller used for rolling the hot air welded seams.
D. Seam probe is a hand held instrument used for probing the hot air welded seams to insure the integrity of the welds.
E. Portable generator is required for providing electrical power to the automatic or hand held welders. A 9500 watt minimum output generator is required to run one automatic and one held welder.

2) Welding Preparation

A. The surfaces to be welded must be clean and dry. Check the membrane overlaps to determine whether they have been contaminated with field dirt. If the seam is contaminated, thoroughly clean the membrane with the recommended cleaner.
B. It is required that all installed membrane seams be hot air welded the same day the membrane is installed.

3) Automatic Hot Air Welder Operation.

A. Consult the welding machine manufacturer's recommendations concerning proper temperature setting and speed control of the equipment. The temperature setting and speed setting vary with ambient temperature, type of substrate and membrane thickness.
B. A test weld must be performed at the start of each welding session to determine the proper settings for the machine. As a general guide for welding the Flex PVC and Flex Elvaloy Membranes the Leister Varimat Automatic Welder suggested starting setting is 1150 ° F at 13' per minute. The Flex TPO Plus Membrane requires a lower temperature setting 1000° F at 12' per minute.
C. Set up the welder and allow it to run for 5 to 10 minutes to warm up.
D. Position the welding unit with the guide handle pointing the same direction the machine will move along the seam.
E. Lift the overlapping membrane and insert the blower nozzle between the 2 sheets of membrane. Immediately engage the machine drive to start the machine moving and prevent over heating or burning the membrane.
F. Guide the machine along the length of the seam keeping the small guide wheel aligned with edge of the top membrane sheet.
G. When the machine reaches the end of its run, remove the blower nozzle from between the overlapped membrane and stop the drive mechanism.
H. The portion of the seam at the beginning and end of the run that could not be welded with the automatic welder must be completed with the hand welder.

I. Test welds should be performed at the start of each welding session. Weld 2 sample pieces of the membrane together. Allow the membrane to cool to ambient temperature. Cut a test sample across the width of the seam at least 1" wide and longer than the width of the seam. Pull the welded seam sample apart and examine the width of the delamination from the reinforcing fabric. The width of the weld should be no less than 1.5" indicating a proper hot air welded seam.

4. Hand Welder Operation

A. The hand welder is generally utilized for flashing details and field seams less than 10' in length.
B. Consult the welding machine manufacturer's recommendations concerning proper temperature setting for the equipment. The temperature setting will vary with ambient temperature, type of substrate and membrane thickness.
C. As a general guide for welding the Flex PVC and Flex Elvaloy Membranes the Leister Triac Hand Welder suggested starting setting is # 7. The Flex TPO Plus Membrane requires a lower temperature setting #6.
D. Start the welder and allow it run for a few minutes to warm up.
E. Insert the nozzle of the welder between the 2 sheets of membrane holding the welder in one hand and the silicon roller in the opposite hand.
F. Slide the welder along the seam while simultaneously applying pressure rolling with hand welder to the outside edge of the seam.
G. The roller must be placed flat against the membrane to be welded. Do not turn the roller on edge when welding the membrane.

5. Seam Probing

A. All welded seams must be probed with the seam probe to determine the quality and integrity of the weld.
B. Allow the hot air welded seam to cool to ambient temperature before beginning the probing process.
C. Apply pressure and pull the point of the seam probe along the edge of the seam.
D. The tool will not penetrate the edge of a properly welded seam.
E. Repair any voids discovered by cleaning and re-welding the seam.
F. After the repair cools probe the area to confirm the proper weld.

6. Defects and Repairs

A. Voids are repaired by cleaning the two sections of membrane and inserting the nozzle of the hand welder into the void. Apply pressure with the silicon roller and roll the top surface towards the outer edge to cause the membrane to fuse together.
B. Wrinkles in the seam, burn marks or overheated areas, and any area where adhesive contaminated the seam must have a patch installed over the defective area.
C. When installing a patch the area to receive the patch must be thoroughly cleaned.
D. The patch is to be made from the reinforced plain backed membrane.
E. The patch should be sized to extend past all edges of the defective area a minimum of 2" with all corners rounded.
F. The patch is hot air welded to the existing membrane.