How to Weld Plastic: Hot Air Thermoplastic Welding SOP with TECHSPAN Equipment

This standard operating procedure explains how to weld plastic using TECHSPAN hot air thermoplastic welding equipment. Most thermoplastics can be joined using this process, and following each step in order will help you produce strong, professional-quality welds every time.

Purpose

This SOP provides a repeatable procedure for performing hot air thermoplastic welding, from selecting the correct equipment through to inspecting the finished weld. It covers surface preparation, tool setup, rod selection, and the tacking, main welding, pendulum welding, and speed welding techniques.

Scope

This procedure applies to anyone performing hot air plastic welding repairs or fabrication with TECHSPAN tools, including flooring welders, tarpaulin welders, extruder welders, wedge welders, and ultrasonic welders. It covers both repair welding of cracked plastic parts and joint welding of new plastic pieces.

Required equipment

Select the appropriate equipment for your application from the following TECHSPAN product range:

- Hot Air Plastic Welders
- Flooring Welders
- Tarpaulin Welders
- Extruder Welders
- Wedge Welders
- Ultrasonic Welders
- Industrial Hot Air Tools & Systems
- Nozzle Heater Bands
- Cartridge Elements
- Ceramic Infrared Heaters

You will also need surface preparation tools (emery paper, a sharp blade, or a clean wire brush), a rotary burr for repair welding, welding rod matching your parent material, and the accessory nozzles required for tacking, main welding, pendulum welding, and speed welding.

List of TECHSPAN welding equipment and heater products displayed on screen, with a fire graphic at the bottom

Step-by-step instructions

1. Select the appropriate welding equipment

Review the full range of TECHSPAN welders and heaters to identify the tool that matches your application. Refer to the product list to confirm your choice before starting work.

2. Prepare the surface

Clean and roughen the plastic surface using emery paper, a sharp blade, or a clean wire brush. Good surface preparation is essential for a successful weld, so make sure the area is free from contaminants and properly roughened for adhesion.

A hand preparing a plastic surface for welding, with the label "SURFACE PREPARATION" on screen

3. Familiarize yourself with the welding tool

The TECHSPAN plastic welder is fully self-contained, with a built-in blower and electronic temperature control. All necessary attachments are available in kit form or can be purchased individually, so confirm you have everything you need before proceeding.

TECHSPAN plastic welding tool shown on a blue work surface, with branded label visible

4. Cut a V-groove for repair welding

If you are repairing a crack, use a rotary burr to cut a V-shaped groove along the crack or joint. Drill a small hole at the end of the crack to prevent it from spreading further, and use adequate jigging and support to stabilize the workpiece while using the rotary burr.

A rotary tool being used to cut a V-groove at the end of a crack in a black plastic part

5. Attach the accessory nozzle

Choose the accessory nozzle that matches your welding application. TECHSPAN nozzles are designed for easy push-fit installation onto the welding tool.

Hands holding a TECHSPAN welding tool and an accessory nozzle, preparing to attach the nozzle

6. Set the correct welding temperature

Use the guide provided with your equipment to select the correct welding temperature, then adjust the electronic temperature control to match the requirements of the thermoplastic material you are welding.

Hand holding the TECHSPAN welding tool, with temperature control and various accessories visible on the workbench

7. Fit the tacking nozzle and tack the weld area

Fit the tacking nozzle to the welding tool and allow it to reach the correct operating temperature. Run the nozzle along the entire length of the area to be welded, tacking wherever you intend to place the welding rod. Tacking slightly presses the two materials together, holding them in place for the main weld. Make sure the tacking pass is continuous and covers the full weld length.

A person uses a TECHSPAN welding tool with a tacking nozzle to run along the joint of two plastic pieces, holding the materials in place on a blue work mat, with the word "TACKING" on screen

8. Select the correct welding rod

Only weld plastics with matching, like-for-like materials. Selecting the correct welding rod for your parent material is critical for a strong, reliable weld. If you are unsure of the plastic type, use the TECHSPAN rod test kit to identify it.

A person points to a selection of welding rods in a TECHSPAN rod test kit, with a list of materials visible on the packaging

9. Set the welding temperature for the rod and material

Adjust the electronic temperature control on the welding tool to the recommended setting for your chosen plastic and welding rod. Refer to the TECHSPAN guide for the correct temperature values.

10. Begin main welding

Position the welding rod at the start of the prepared joint and heat the area until the rod softens enough to feed smoothly into the joint. Continue feeding new rod into the weld area as it softens, ensuring good contact and fusion with the parent material. Complete the weld in one continuous run along the length of the joint.

A person holds a welding rod and positions it at the start of the joint, with the TECHSPAN welding tool and rod test kit visible, and the words "MAIN WELDING" displayed on screen

11. Use the pendulum welding technique for short welds or difficult access

Fit the standard pendulum welding nozzle to the tool. For short welds, repairs, or areas with limited access, use a pendulum action to evenly heat both the welding rod and the parent material, moving the nozzle back and forth while feeding the rod into the joint.

A close-up of the pendulum welding technique, showing the nozzle moving in a pendulum motion while the welding rod is fed into the joint, with the words "PENDULUM WELDING" visible

12. Complete the weld and allow it to cool

Continue the pendulum or speed welding technique until the entire joint is welded. Ensure the weld bead is smooth and fully fused to both the rod and the parent material, then allow the weld to cool naturally before handling or finishing.

A completed weld showing the welding rod fused along the joint, with the TECHSPAN welding tool set aside

13. Apply downward pressure during speed welding

Hold the welding tool with the appropriate speed welding nozzle fitted, and position the welding rod in the nozzle aligned with the prepared joint. Apply approximately 2–3 kilograms of downward pressure so the softening rod is forced into the weld area, promoting proper fusion with the parent material. Maintain a steady, controlled movement along the joint for a consistent weld bead.

Operator holds a TECHSPAN welding tool with a speed welding nozzle, applying downward pressure to a welding rod at the joint of two plastic pieces, with the words "SPEED WELDING" displayed on screen

14. Confirm proper fusion of the welding rod

Watch the welding rod as it softens and is pressed into the joint, confirming that it is fully embedded into the weld area with no gaps or incomplete fusion. Adjust pressure and speed as needed to maintain a smooth, continuous weld.

Close-up of the welding nozzle and rod at the joint, with the operator pressing the rod into the weld area and TECHSPAN branding visible

15. Inspect and finish the weld

After completing the weld, inspect the bead for uniformity and full fusion. If necessary, use a tool such as a pen or spatula to press down or smooth the bead so it is properly seated and finished. Allow the weld to cool naturally before handling.

Operator uses a pen to press down and finish the weld bead along the joint, ensuring a smooth and uniform finish

16. Repeat the process for additional joints

For multiple joints or longer welds, repeat the speed welding process described above, always maintaining the correct downward pressure and steady movement for each weld.

Operator continues welding along a new joint, holding the TECHSPAN tool and feeding the welding rod into the nozzle

17. Monitor the weld up close

Observe the weld area closely to confirm the rod is melting and fusing correctly, checking for proper flow and bonding between the rod and the parent material.

Close-up of the welding nozzle and rod in action, with the rod melting and fusing into the joint

18. Continue welding along the entire joint

Move the tool and rod steadily along the full length of the joint, maintaining consistent pressure and speed for a uniform weld bead.

Operator continues to guide the welding rod and tool along the joint, ensuring a continuous weld

19. Perform a final quality check

Complete the weld, ensuring the entire joint is covered and the bead is smooth. Inspect the finished weld for any defects or areas that need touch-up.

Close-up of the final section of the weld, showing the rod fully fused into the joint

20. Read the tool's operating instructions

Before using the TECHSPAN welding tool, thoroughly read the operating instructions provided by the manufacturer, and follow all safety guidelines and recommended procedures for optimal results.

Operator continues welding, illustrating the importance of reading the tool's operating instructions before use

Verification and summary

Before signing off on a completed weld, confirm the following:

- The surface was properly prepared before welding began.
- The correct nozzle, rod, and temperature setting were used for the specific plastic material.
- Rotary tools and welding equipment were used with proper safety precautions, including adequate jigging and support.
- The weld bead is smooth, continuous, and fully fused along the entire joint, with no gaps.
- The weld was allowed to cool naturally before handling or finishing.

TECHSPAN supplies a full range of plastic welding equipment and thermoplastic welding rods for various applications, along with service and backup support for all major brands of plastic welding equipment.

TECHSPAN logo and branding displayed on a black background with flames, representing the company's product and service availability

What's next

Consult the TECHSPAN guide for detailed temperature recommendations, accessory selection, and troubleshooting for advanced welding techniques. Always follow the manufacturer's operating instructions for your specific welding tool before starting a new job.