

GEOMEMBRANE INSTALLATION SPECIFICATION FOR HAND-HELD WEDGE WELDING

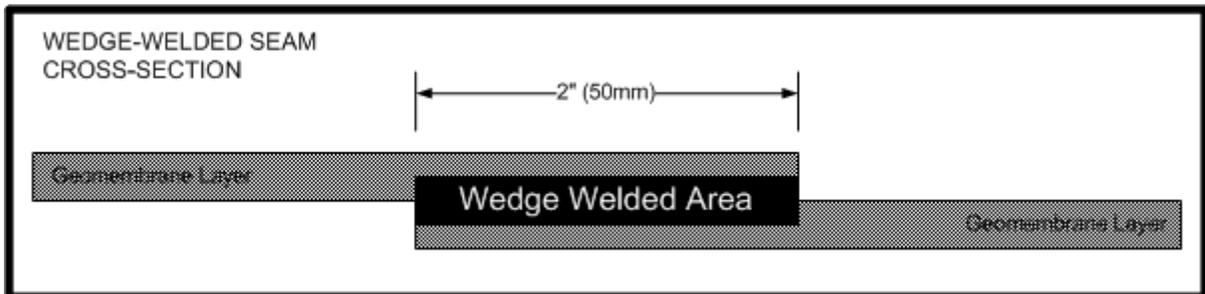
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I. Overview

Hand-Held Wedge Welders are used to “wedge weld” or “seam weld” together two or more sheets of thermoplastic film or synthetic geomembrane materials. Wedge welding can also be used to fold over an edge of material to form a pocket seam. Geomembrane materials that are easy to wedge weld include vinyl (PVC), high density polyethylene (HDPE), low density polyethylene (LDPE), polyethylene (PE), polypropylene (PP), polyurethane (PU), thermoplastic olefins (TPO), Hypalon (CSPE) as used in geomembrane liners and other industrial applications. Material thicknesses best suited for hand-held wedge welding ranges from 10 mil (0.25mm) to 80 mil (2mm). Hand-held wedge welding is typically used for small production applications, patchwork and maintenance of a landfill liner system or repair of just about any plastic sheet or film product.

II. Preparation of Geomembrane Material to be Welded

Prior to wedge welding geomembrane liner materials, clean welding area of dirt and remove standing water or moisture. Next overlap upper geomembrane material by 2 to 2.5-inches over lower geomembrane material. If geomembrane materials are laid out over soft soil, it may be necessary to locate a liner or non-liner covered board under the lower geomembrane material, and this board would then need be pulled along the seam in the direction of welding and remain below the lower sheet.



III. Wedge Welding the Liner Materials

After the liner materials have been prepared for wedge welding, and the top liner is overlapped over the lower liner by 2" (50mm) to 2-1/2" (63.5mm), then the wedge welding process can begin. Refer to the user's manual or operating instructions for the hand-held wedge welder and adjust the temperature control to desired temperature. For thinner materials, set the temperature control to mid range; and for heavier materials, set the temperature control to higher range to accommodate welding speeds of approximately 10 feet per minute (approx 3 meters per minute). This rate of speed of welding is selected for its ease of operation. If you prefer welding at a faster rate, then simply increase the temperature setting. When increasing temperature setting, make sure to wait for the wedge to reach set temperature.

Once the wedge is ready, locate the wedge between the upper and lower geomembrane liners, and insert the wedge such that the wedge is about an 1/8-inch inside of the upper liner and angle the wedge such that the side angle of the wedge is in very close intimate contact with both layers of geomembrane liner materials. Make sure that the wedge is level with the geomembrane material and is not leading front or back or side-to-side. Next, use a silicon hand roller and locate the silicon hand

roller above both layers of geomembrane liner material and “snugged-up” to upper layer of material offset by inserted hot wedge. Welding occurs when silicon roller is pushed down and forward thus pushing the heated wedge between both layers of liner material, and in the direction of the length of geomembrane materials. For a demonstration of wedge welding using a hand-held wedge welder, [click here](http://www.novaseal.com/html/gt-100.html) (<http://www.novaseal.com/html/gt-100.html>).

The thicker and more reinforced the geomembrane liner material, the more heat needs to be absorbed by both layers and the slower the welding speed becomes. For example, the welding speed for a 60-mil (1.5mm) high density polyethylene (HDPE) liner material may range from 6 to 10 feet per minute (1.8 to 3m per minute), while a 20-mil (0.5mm) vinyl liner material may range from 12 to 18 feet per minute (3.5 to 5.5m per minute). Wedge welding a heavy HDPE (i.e., 80mil (2mm))) will require quite a bit of strength to overcome the density and stiffness of the material. Although the tendency is to increase temperature, be careful not to burn material with too much heat. Remember temperature is related to heat sealing rate of speed, not stiffness.

The surface you are wedge welding on also matters. If the surface retains heat, the welding process will be easier. For example, concrete doesn’t retain heat well, and wedge welding a material such as HDPE where the reinforced structure of the material requires a bit of heat over a concrete surface may only prove to be more annoying than beneficial. To improve the surface of concrete, locate a piece of vinyl or HDPE between the geomembrane layers you are sealing and the concrete surface.

IV. Testing for Seam Strength

Refer to ASTM Standard Test Method for strength of thermally bonded geomembranes. There are several ASTM standards that refer to seam strength of seams. Included are D4437 Standard Practice for Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Sheet Geomembranes; D4545 Standard Practice for Determining the Integrity of Factory Seams Used in Joining Manufactured Flexible Sheet Geomembranes; D4885 Standard Test Method for Determining Performance Strength of Geomembranes by the Wide Strip Tensile Method. For direct links to these standards and other ASTM standards for testing geomembrane seam strength, [click here](http://www.geosyn.org/html/d35_10.html) for Geosyn.org link (http://www.geosyn.org/html/d35_10.html).

Additional Specifications:

Link: [Geotextile Installation Specification for Hand-Held Wedge Welding, ©1998.](#)

Glenn W. Lippman is president of Novaseal Corporation. Since 1994, Novaseal has been a leading engineering innovator and manufacturer of heat sealing machinery and equipment using proprietary sealing methods including pulse-type sealing and wedge welding for heat sealing plastics and nonwoven synthetic textiles. For product information on the Novaweld™ GT-100 Hand-Held Wedge Welder, contact Novaseal Corporation or one of Novaseal’s international, or visit their website at www.novaseal.com, or call toll free 800-500-1581 or 561-470-3267, or via email to glippman@novaseal.com. © 2002. All rights reserved.