HIMACS Seaming (Bonding)

HM2090

Version : 21V3

Updated : December. 2021

Introduction

This section guides seaming (bonding) of HIMACS sheets, and using HIMACS adhesives for seaming.

Overview

The most important goal of seaming is make perfect seam without any visible gaps at all. In addition, the perfect seam means the strong seam that can bear the weight from general using. Poor seam makes visible seam line, and it may make cracks on seam itself during service life of finished products like tops. Therefore, this section guides detailed seaming methods including preparation and reinforcing.

Note !

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1. Edge Preparation

The machining of two pieces of HIMACS sheet to create a seam joint can be carried out in different ways. What is important however, is the quality of the machined edge. Perfect fit of machined two pieces is the most important preparation. The goal is always to create a perfect seam without any visible gaps at all through the perfect fit. As accurate as a seam is prepared as perfect the result of the seam will be to become not seen anymore.

> Think Twice – Before You Cut Once

Before starting the preparation ensure the sheets to assemble are placed in the right position and have been produced according to its production flow and showing a same lot number and color matching.

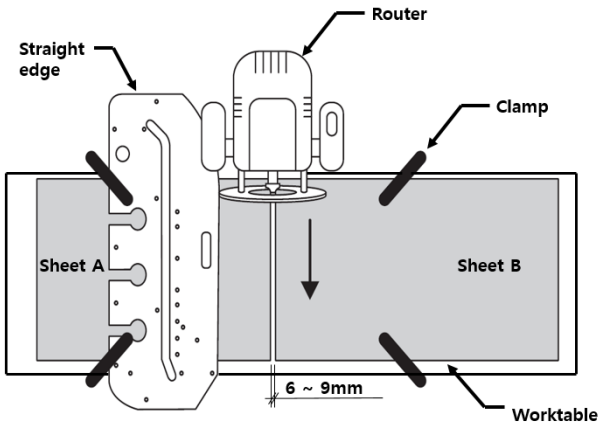
1-1. Mirror cut

The most reliable method for seaming is the "mirror cut" technique with a hand-held router, which works by cutting both adjoining edges in one cut.

Work process

1. Be sure the work surface is clear of any dirt or debris that could cause the materials not to be level, square, and their surfaces perfectly aligned and in the same plane.
2. Place the two pieces onto a seaming table, leaving a gap of 6 ~ 9 mm between them and secure with either G clamps or screw clamps.
3. Clamp a metal or compact straight edge to one of the pieces and to a strong and stable table. The straight edge will then serve as the router guide.
4. With a 12mm double flute tungsten router bit fixed into your hand router, move the machine steadily in one direction away from your body and cut both sections at once. Maintain a slow steady pace without stopping.
5. 12mm router bit will remove 1.5 ~ 3mm of material from each of the two pieces that are to be seamed together creating mirror-image edges.
6. After cutting check that the joint matches perfectly and mark the mating position with a pencil line.

Fig. 1-1. Mirror cut



1-2. Single cut

Another possibility is to machine each edge independently using a standard workbench and straight edge

Work process

1. Clamp the work piece to the bench and attach the straight edge to the sheet, so that the router will remove 1.5mm ~3mm in total.
2. Push the router at a slow steady pace without stopping.
3. Repeat this exercise for the second piece and then check the accuracy of the joint.
4. If the edges do not match then one or both of these edges will require re-machining.

1-3. Other cut methods

The use of CNC cutting and nesting programs is becoming more and more popular. Equipment, such as this, is becoming very efficient, especially for small serial production or individual requirements.

Useful Tip !

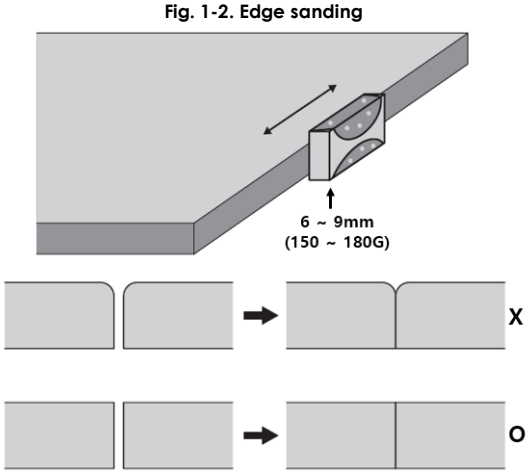
- *Be sure that router path is free from clamps before starting*
- *A square base router will help with accuracy. With one controlled pass of the router, you will create the same edge on each of the two sheets that will be seamed together. The result is the best possible dry fit.*
- *Using a wavy profile router bit can avoid gauge difference between both work pieces.*

1-4. Cleaning

After machining, both edges should be cleaned and properly handled like bellow.

- Both cut edges will require sanding with 150/180 grit abrasive sandpaper if the cut edges have rough surface. Edge must be sharp after sanding.
- Remove the sheet number on back side of HIMACS sheets that may make visible seam line.
- Clean the edges that are to be joined using a fresh lint-free white rag (see Note!) and denatured alcohol or acetone.
- If you use colored cloth or paper, alcohol may extract colorants from the cloth or paper, and discolor the seam.
- Do not to let anything touch the edges once they have been cleaned. Even one fingerprint on an edge can affect final finished seam quality.

Fig. 1-2. Edge sanding



Note !

The cloth rags used to clean the edges must be lint-free material. Also, not all white rags are actually "white". Some suppliers use colored material that has been bleached white and may not deliver the same results. In some cases "white rags" may have been treated with a substance (such as a fire-retardant used in children's sleepwear) that can adversely affect seam appearance and/or performance.

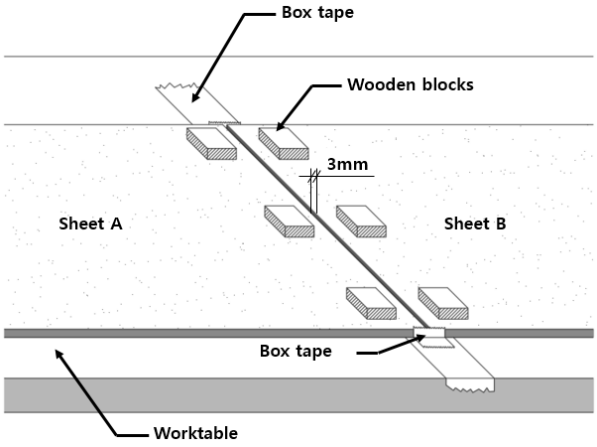
2. Standard Butt Seam

When edges have been machined, sanded and cleaned, they are ready for bonding.

Work process

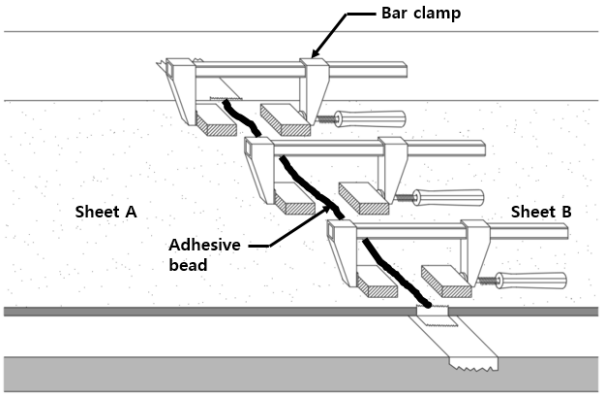
1. Be sure the work surface is clear of any dirt or debris that could cause the materials not to be level, square, and their surfaces perfectly aligned and in the same plane.
2. Place and lay out the both pieces to be bonded on the worktable large enough to support the whole pieces to be seamed.
3. Before bonding, cover the tray beneath the seaming table with a transparent tape or box tape in order to catch any overspill of adhesive.
4. Clean the both edges with clean white cloth and denatured alcohol (acetone).
5. Adjust the sheets until edge alignment is perfect.
6. When the edge alignment is perfect, set the two pieces 3mm apart.
7. Block the both end of the two pieces of HIMACS sheets with transparent tape or box tape to prevent any adhesive leaking.
8. Vacuum clamp system or other clamps like G-clamp, screw clamp and bar clamp are necessary to secure seam. If you are going to use other clamps except vacuum clamp system, fix the small wooden blocks with hot melt glue on the both pieces of HIMACS sheets.

Fig. 1-3. Setting for bonding



9. Prepare HIMACS adhesive system and clamp system.
10. Apply a continuous bead of adhesive along the entire part to be joined.
11. Push the sheets together so that an even bead of adhesive is forced out from the joint.
12. Check if the even bead of adhesive is squeezed from the whole length of the seam. If there are blank points of bead, it will be weak points. Therefore, in this case, do again from step 10th.
13. Clamp the assembly but do not over tighten it, as this will cause weak joints through starvation of adhesive. The joint of HIMACS should not larger than a half thickness of a piece of paper.
14. Check the level of the two pieces of sheet at the seam. Adjust and match the level if there is level difference between the two pieces of sheet using rubber hammer.

Fig. 1-4. Clamping



15. Remove the clamps and wooden blocks once the adhesive is fully cured and firm to the touch.
16. Remove excess cured adhesive with either a portable hand held router, set on skis or a small block plane with a sharp blade. Whenever possible avoid the use of chisels.
17. Finish through sanding. For the details refer to 'HM2100 HIMACS Finishing (Sanding and Polishing)'.

Useful Tip !

- *Remember clamping pressures. You do not need to use excessive pressure. You will create a dry seam if you squeeze all the glue from the seam joint. And the dry seam will be weak parts.*
- *Clamp pressures should be tight enough to allow a bead of adhesive to squeeze out.*
- *The adhesive will shrink slightly, so do not completely clean off the joint of excess adhesive.*
- *Look for glue voids and air pockets. Take care of this before the seam adhesive sets up.*
- *Inspect the seam to ensure a tight fit.*
- *Any adjustments needed must be done promptly before the joint adhesive begins to harden.*
- *Let the adhesive cure for a minimum of 40 minutes in normal conditions or until hard to your fingernail touch.*
- *Remove the excess adhesive by "Leveling" the seam with a router with a set of skis and a small leveling bit.*
- *Do not use a belt sander to perform this operation. Excessive heat will weaken the integrity or fail the seam all together.*
- *Finish sanding all surfaces to semi-gloss finish according to recommendation.*

Note !

The color match of seam will be guaranteed by LX Hausys when you used only HIMACS adhesives. For more details of HIMACS adhesives refer to 'HM2022 HIMACS Adhesive Information'.

3. Reinforcing Seams

Properly made standard butt seams are strong, but will remain a less strengthen part of the assembly, therefore to strengthen the joint, reinforce the underside with an offcut strips of HIMACS sheets. But, it must be correctly applied to the entire length of the underside of the seams, and same thickness and color of HIMACS sheet is recommended as a material for the reinforcement strips. Refer to the following process for reinforcing.

Work process

1. Upside down the joined sheets.
2. Remove cured excessive adhesive on back side with either a portable hand held router, set on skis or a small block plane with a sharp blade. Whenever possible avoid the use of chisels.
3. Sand the back side with 150/180 grit sandpaper, and wipe with denatured alcohol and white cloth.
4. Make a 50~100mm width reinforcement strip as the same length of seam.
5. In cases where the joint could be affected by heat, it is strongly recommended to bevel (45°) the edges of the reinforcement strip.
6. Sand the surfaces of reinforcement strip with 150/180 grit abrasive sandpaper until smooth for more firm bonding to the sheets, and wipe with denatured alcohol and white cloth.
7. Prepare the same color adhesive used for seam.
8. Apply joint adhesive so that it can cover the full surface of reinforcement strip that will be contacted to the sheet.
9. Place and attach the reinforcement strip evenly over the seam.
10. Press and clamp the strip into place on the seam.
11. Make sure there are no voids or dry area between sheet and reinforcement strip.
12. The end of reinforcement strip and buildup strip (front skirt) should be bonded with joint adhesive if there are buildup strip (front skirt).
13. Remove the excess adhesive that is squeezed out, and smoothen to create “Cove” along the edges of the strip.
14. Finish through sanding process.

For more details of storage refer to ‘HM2040 HIMACS Safe Handling, Storage and Transportation’.

Fig. 3-1. General reinforcement section

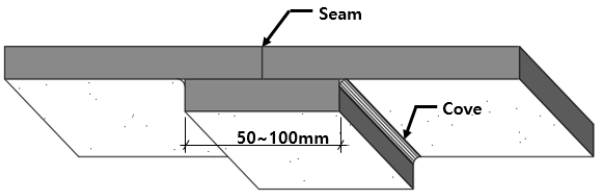


Fig. 3-2. Heating zone reinforcement section

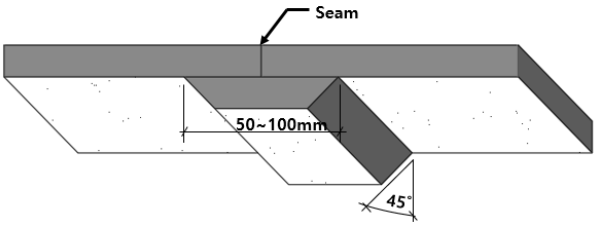
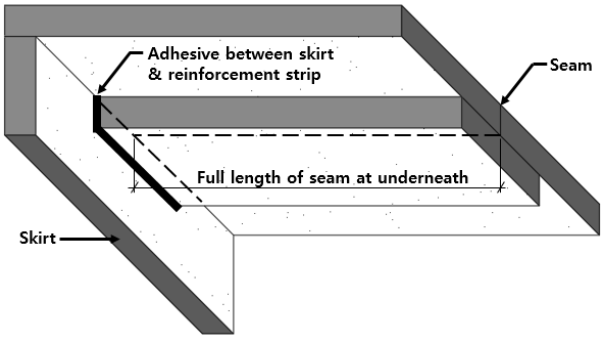


Fig. 3-3. Joining with skirt



Referenced documents

‘HM2022 HIMACS Adhesive Information’

‘HM2040 HIMACS Safe Handling, Storage and Transportation’

‘HM2100 HIMACS Finishing (Sanding and Polishing)’

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