

# CGEM-IT - PLANAR GLUING

## Instrumentation

1		Table with reference holes, vacuum system, and plastic protection all over the surface (Fig. 1)
2		Two foils each planar gluing
3		2011 Glue (cartridge and gun)
4		Glue roller
5		Short holding Pins (n.4)
6		At least 3 vacuum foil patches to be used in the transfer (40cm X 4cm)
7		At least 4 Vacuum foil patches to be used in the contro-transfer operation ( <i>longer than the foil X 4cm</i> )
8		2 Vacuum foil patches to be used to protect the overlap during vacuum ( <i>longer than the foil X 5cm</i> )
9		Mylar to mask the foil during gluing procedure (8cm roll)
10		Vacuum bag of the <i>needed size</i> for the protection of the foil during gluing
11		Vacuum bag of the <i>needed size</i> for the vacuum
12		Mastic sealant ready for use
13		White Peel-ply sheet to cover the foils during the vacuum
14		Necessary tape to hold the instrumentation still
15		Lens with graduated rule
16		Light
17		Isopropilic alcohol
18		Tray to move the foils
19		Ruler to be used as weight during transfers
20		

# CGEM-IT - PLANAR GLUING

## Procedure

1	<p>Prepare the ancillary supplies</p> <ul style="list-style-type: none"> <li>• <i>Gluing Area</i>. One rectangular vacuum foil well stretched and fixed to the table with magic tape on three sides (no below the GEM).</li> <li>• <i>Transfers</i>. At least 3 patches of vacuum foils secured on the table</li> <li>• <i>Contro-transfers</i>. At least 4 prepared patches of vacuum foils</li> <li>• <i>Glue</i>. Cartridge, gun and roller</li> <li>• <i>Foil protection</i>. 2 vacuum foils to cover the active area (lenzuolini).</li> </ul>
2	Place a vacuum foil patch in the position designed for the overlap below the foils
3	Dry test of the foils on the table to check carefully the positions. Hold the two foils with with 4 pins (2 each foil). With the lens, check the size of the overlap (must be 3mm). MICROSECTOR FACING UP. (Fig. 2)
4	Fix the foil that will close the overlap (FIXED FOIL) in the final position with 2 pins and two magic tapes. (Fig. 3)
5	With the lens, check the size of the overlap (must be 3mm) (Fig. 3)
6	Mark, on the table, the corners of the GLUED FOIL (Fig. 3)
7	<p>Place the GLUED FOIL on the tray to rotate it</p> <ul style="list-style-type: none"> <li>• Two persons raise the foil from the table by holding it at the corners</li> <li>• Another person slide the tray below the foil</li> <li>• Move the tray+foil above the position for the gluing</li> <li>• Two persons raise the foil from the tray by holding it at the corners</li> <li>• Another person slide out the tray from below the foil</li> <li>• Put the foil down on the table carefully, as close as possible to the final position</li> </ul>
8	Place the foil protection ( <i>lenzuolino</i> ) on the FIXED FOIL
9	Secure the GLUED FOIL on the table. Place safely some magic tape on the Kapton area and the foil protection. Double the tape ( <i>fai la linguetta</i> ) on the side of the foil to handle it carefully for removal. (Fig. 4)
10	Measure and mark the overlap sizes to define the glue area and check them with a lens (Fig. 6, Fig. 7)
11	Place the magic tape on the edge of the foil. With the lens, check the size of the overlap (Fig. 6)
12	Place the mylar on the other side. Secure it on the side with the magic tape and hold it down with the metal ruler (Fig. 6). Careful not to put the metal ruler on the naked foil
13	Check with the lens the overlap sizes
14	Prepare the glue area and secure the transfer patches to the working area (Fig. 5)
15	Prepare the transfer patches (at least 3, right-half-left) with the glue and the roller (Fig. 8): Gun the glue on the dedicated area of the table. Roll it there to uniform it. Then, transfer the glue on the <i>transfer</i> patches with the same roller (at least 3, right-half-left) carefully in the middle of the patch leaving also some handels without glue on the sides. Roll it on the patch to uniform the glue
16	Transfer the glue: Place the patch on the glue-area of the overlap and transfer with a finger. Do not insist in this operation on the edges. Use only one patch each transfer (Fig. 9)

17	Remove the excess of glue with the contro-transfer patches and two persons. The first person places the patch on one edge, then the second person hold the patch down in that position. The first person land the patch on the overlap, check its adhesion, and then remove it with the opposite operation. Pay attention that the removal of the patch must be done with a vertical movement to avoid the spread of the glue in unwanted directions. Repeat this operation with always new patches at least 2 and up to 4 contro-transfers (Fig. 10). If at the end of this operation the overlap is not good (Fig. 11), remove everything with alcohol and restart.
18	Remove the masks starting from the magic tape along the edge, then the ruler and the mylar, and, at the end, the tape that holds the foil
19	<p>Move the GLUED FOIL in position below the fixed foil (Fig. 12):</p> <ul style="list-style-type: none"> <li>• Remove both foil protections (<i>lenzuolini</i>) from above the foils</li> <li>• Two persons raise the GLUED FOIL foil from the table by holding it at the corners</li> <li>• Another person slide the tray below the foil</li> <li>• Move the tray+foil above the position for the gluing</li> <li>• Two persons raise the foil from the table by holding it at the corners</li> <li>• Another person slide out the tray from below the foil</li> <li>• Two persons raise the extremity of the FIXED foil without moving it too much</li> <li>• The persons with the GLUED FOIL place it within the markers</li> <li>• Fix the GLUED FOIL with two pins (one out-side and one in-side, close to the overlap)</li> <li>• The FIXED FOILS PERSONS let the foil fall over the overlap glue</li> </ul>
20	Check the size and the positioning of the overlap. If needed repeat the operations backwards, clean the foils with alcohol and restart.
21	Place a vacuum foil patch in the position designed for the overlap above the foils
22	IMPORTANT. Remove from the FIXED FOIL all the tape and all the pins. (Fig. 12)
23	Place the white peel ply over the foils without touching it above the active area. Try not to form any pinch
24	Place the vacuum bag. First place the sealant on the table without touching the peel ply. Then place the vacuum bag above it a seal it
25	Close the vacuum. Three persons help to stretch the foil above the active area by pulling it at the sides. The fourth person start the pump (Fig. 13)

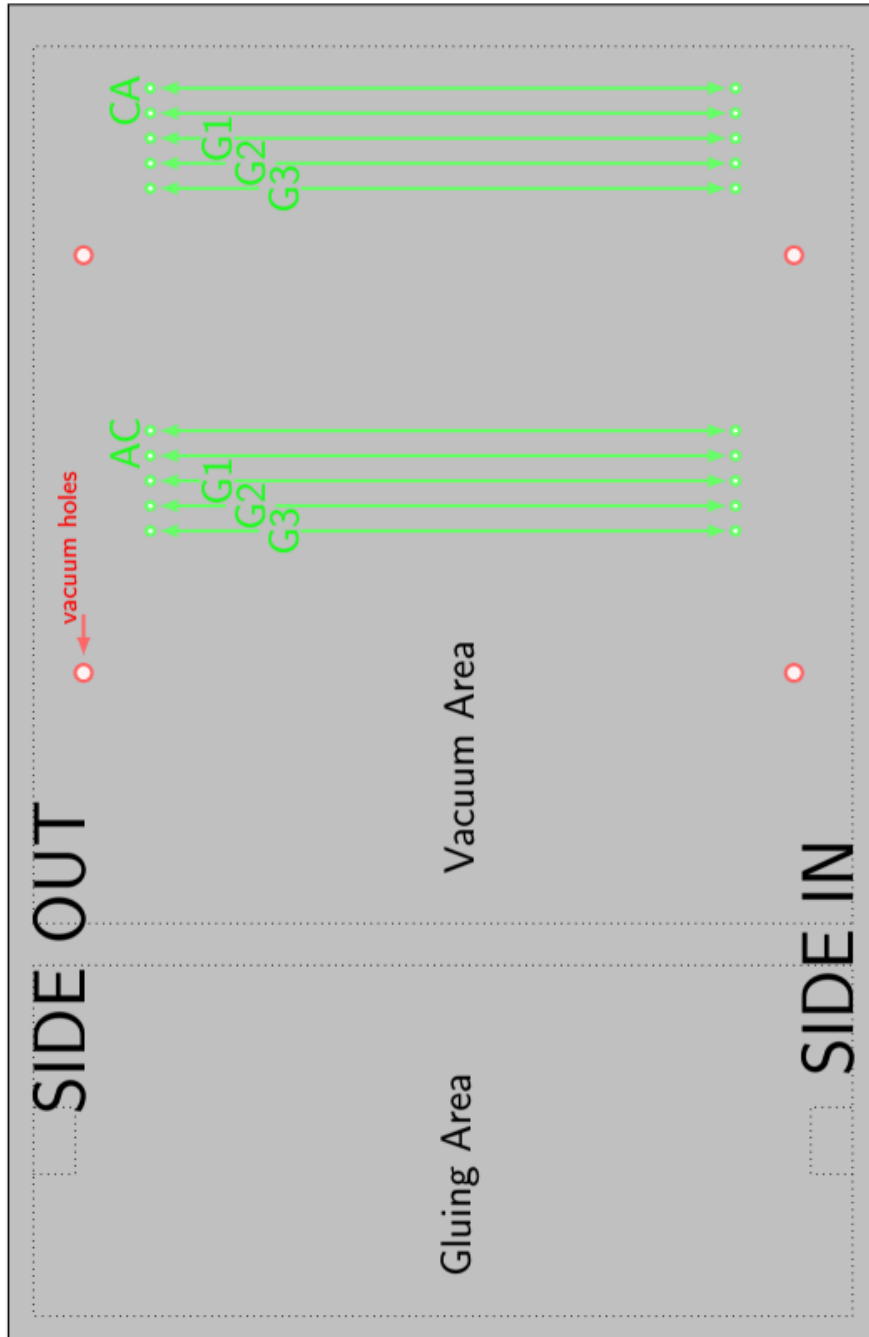


Figure 1: Planar Gluing Table

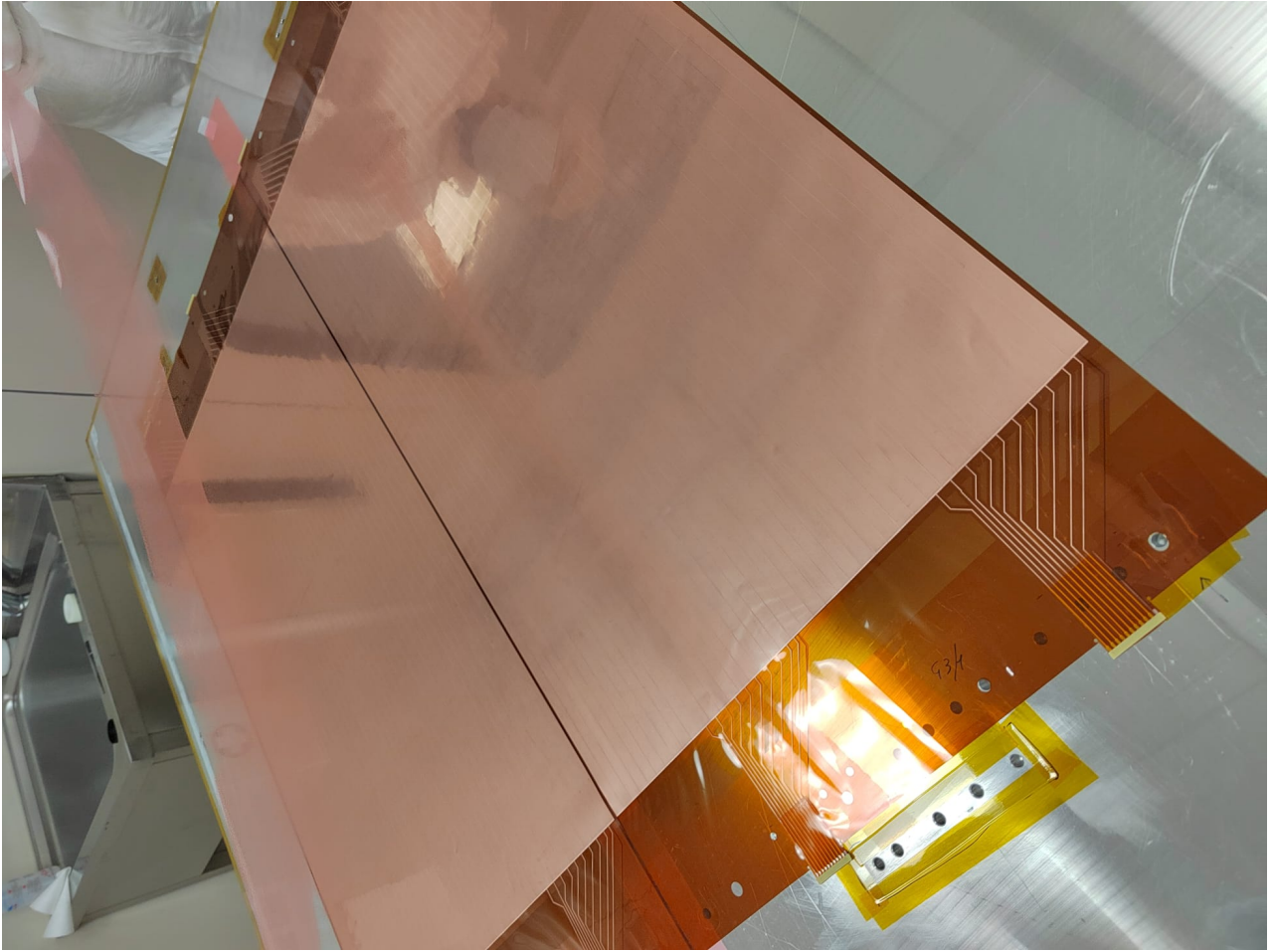


Figure 2: Foil positioning: micro and stiffeners up

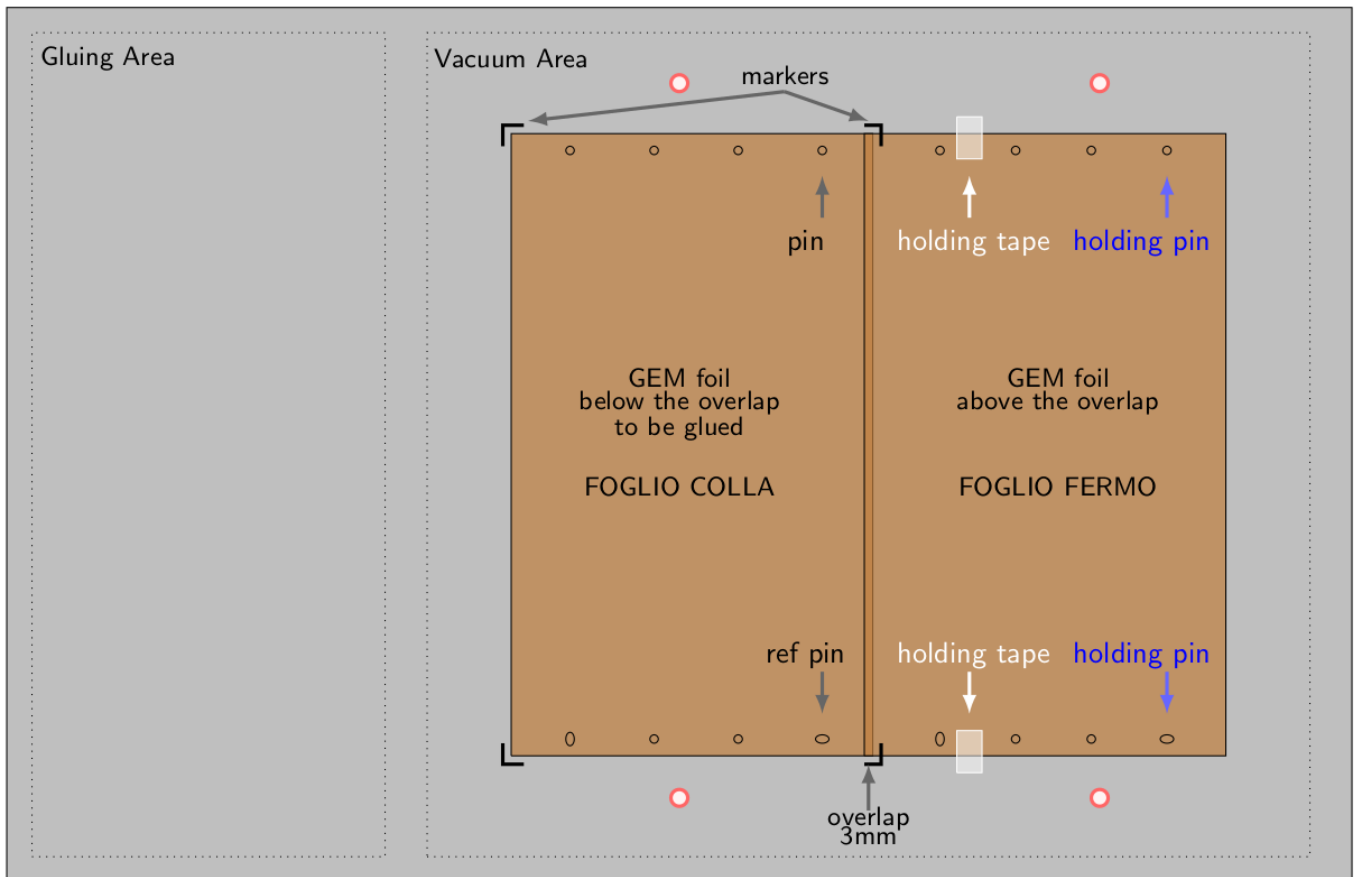


Figure 3: Foil positioning: holding foglio fermo

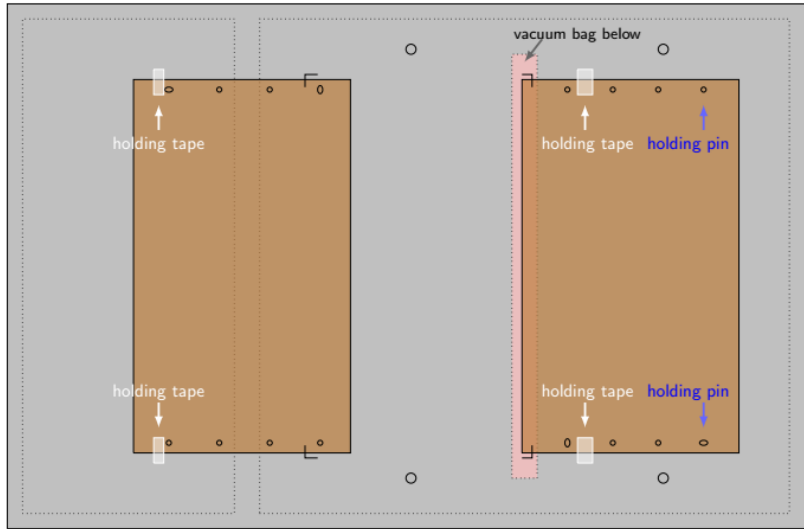


Figure 4: Gluing foil preparation

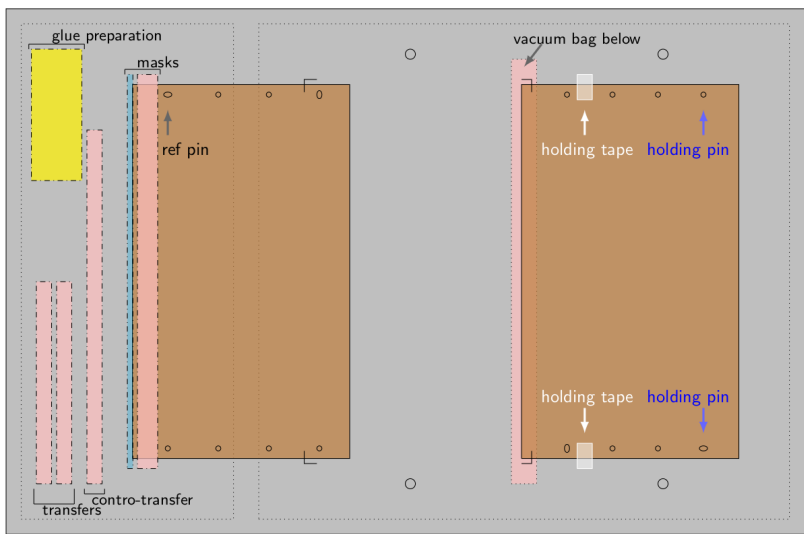


Figure 5: Gluing area preparation

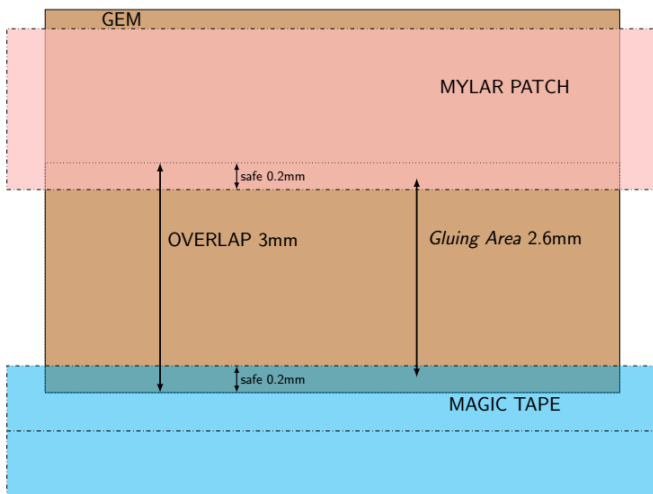


Figure 6: Overlap mask detail



Figure 7: Gluing mask detail

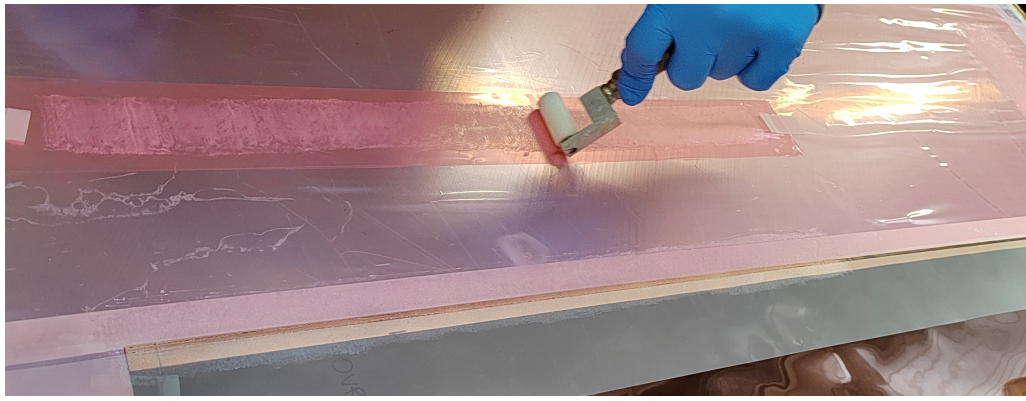


Figure 8: Glue rolling



Figure 9: Glue transfer



Figure 10: Glue contro-transfer



Figure 11: Detail on the glue on the overlap. (This already has too much glue)

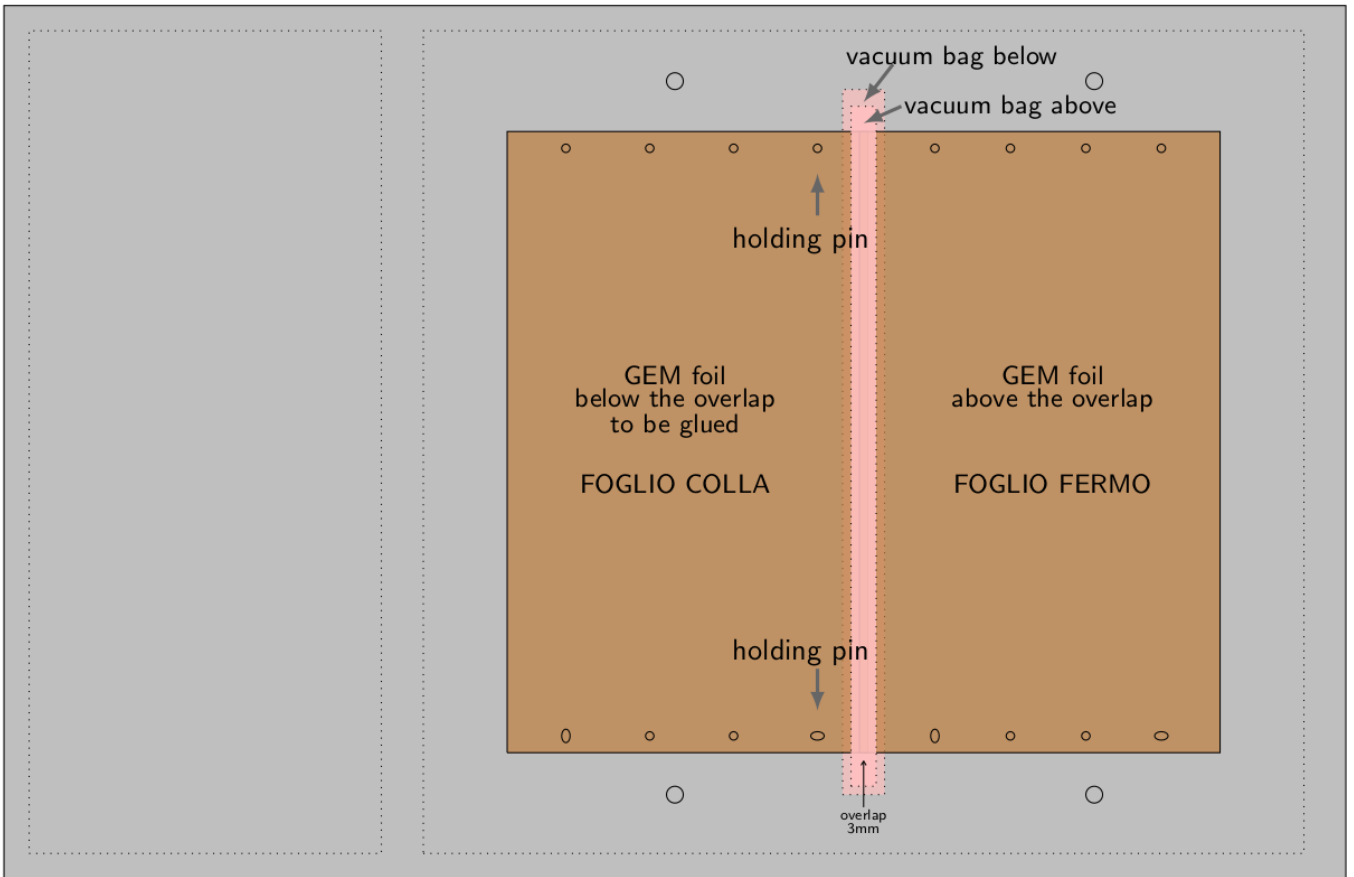


Figure 12: Final foil position for gluing

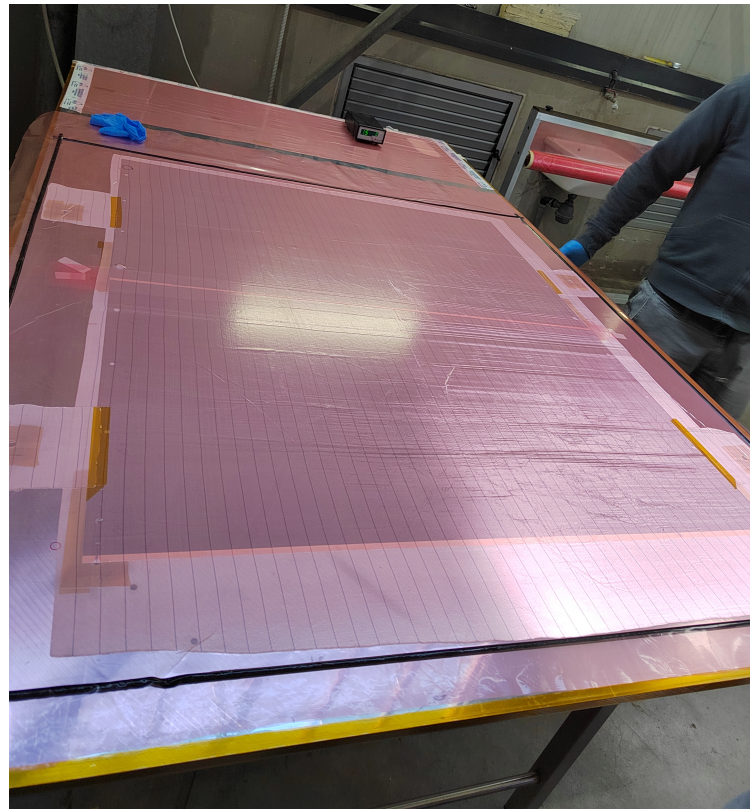


Figure 13: Planar Table with GEM foil in pose



# 1 CGEM-IT - CYLINDRICAL GLUING

## 1.1 Instrumentation

1		Table with mandrel support and mandrel, vacuum system, plastic protection all over the surface (Fig. 1) and blue lifter
2		Glued foils
3		2011 Glue (cartridge and gun)
4		Glue roller
5		Holding Pins (n.4)
6		At least 3 vacuum foil patches to be used in the transfer (40cm X 4cm)
7		At least 8 Vacuum foil patches to be used in the contro-transfer operation (100cm ( <i>longer than the foil</i> ) X 4cm). 4 for planar and 4 for the ring (for the ring also 20cm x 4cm is good)
8		2 Vacuum foil patch to be used to stretch the gluing on the mandrel (( <i>GEM active area size + 5 cm along the circumference</i> )) - LENZUOLINO
9		Mylar to mask the foil during gluing procedure (8cm roll)
10		Vacuum bag of the <i>needed size</i> for the protection of the foil during gluing [L 96cm x C 95/100 cm]
11		Vacuum bag of the <i>needed size</i> for the vacuum already prepared with sealant on three sides (2 crf + 1 lenght) [L 107cm x C 110cm]
12		Peel-ply sheet to roll around the foils during the vacuum (green, large)
13		Necessary tape to hold the instrumentation still
14		Lens with graduated rule
15		Light
16		Isopropilic alcohol
17		Release Agent applied on the mandrel except the teflon area and the sealant area
18		Ring
19		2x Vacuum foil patches to glue the ring
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## 1.2 Procedure

1	<p>Prepare the ancillary supplies</p> <ul style="list-style-type: none"> <li>• <i>Table</i>. Clean the table accurately.</li> <li>• <i>Gluing Area</i>. One rectangular vacuum foil well stretched and fixed to the table with magic tape on three sides (no below the GEM).</li> <li>• <i>Transfers</i>. At least 3 patches of vacuum foils secured on the table</li> <li>• <i>Contro-transfers</i>. At least 4 prepared patches of vacuum foils</li> <li>• <i>Glue</i>. Cartridge, gun and roller</li> <li>• <i>Foil protection</i>. 2 vacuum foils to cover the active area (lenzuolini)</li> <li>• <i>Release Agent</i> already given on the mandrels anodized part except for the part where the mastic sealant have to stick.</li> <li>• <i>Vacuum bag</i> already ready with the mastic sealant on three sides.</li> </ul>
2	<p>Dry test around the mandrel to check the size of the overlap once the foil is in position with all the reference holes. Measure the overlap with a lens. If the pins create tensions on the foil, it can be considered to substitute a pin with tape only on one side. (Fig. 14)(1. and 2. operation need to be coordinated in order not to move the foil back and forth too many times)</p>
3	<p>Move the foils in the gluing area paying attention not to set it above the reference holes (Fig. 15)</p>
4	<p>Secure the GLUED FOIL on the table. Place safely some magic tape on the Kapton area and the foil protection on the active area (Fig. 5)</p>
5	<p>Measure and mark the overlap sizes to define the glue area and check them with a lens (Fig. ??)</p>
6	<p>Place the magic tape on the edge of the foil. With the lens, check the size of the overlap (Fig. ??)</p>
7	<p>Place the mylar on the other side. Secure it on the side with the magic tape and hold it down with the metal ruler (Fig. ??)</p>
8	<p>Measure the overlap sizes to define the glue area and check them with a lens</p>
9	<p>Prepare the ring to be glued with kapton tape on the holes and vacuum patches below the rings (Fig. 16)</p>
10	<p>Prepare the transfer patches with the glue and the roller (half-length each time) (Fig. 8). Gun the glue on the dedicated area of the table. Roll it to uniform it. Then, transfer the glue on the <i>transfer</i> patches (at least 2).</p>
11	<p>Transfer the glue. Place the patch on the glue-area of the overlap and transfer with a finger. Do not insist in this operation on the edges. Use only one patch each transfer (Fig. 9)</p>
12	<p>Remove the excess of glue with the contro-transfer patches and two persons. The first person places the patch on one edge, then the second person hold the patch down in that position. The first person land the patch on the overlap, check its adhesion, and then remove it with the opposite operation. Pay attention that the removal of the patch must be done with a vertical movement to avoid the spread of the glue in unwanted directions. Repeat this operation with always new patches at least 2 and up to 4 contro-transfers (Fig. 11). If at the end of this operation the overlap is not good, remove everything with alcohol and restart.</p>
13	<p>Remove the masks starting from the tape along the edge, the mylar, and the tape that holds the foil.</p>
14	<p>Glue the ring with a soft roller. Do not spill glue on the surrounding surfaces of the mandrel</p>
15	<p>Remove the kapton tape from the holes of the ring and with the finger move a bit of glue towards them</p>
16	<p>Contro-transfer the glue from the ring with patches.</p>

17		Move the foil below the mandrel and rotate the mandrel in order to have the reference pins as close as possible to the table, but still in a comfortable position for working
18		Raise the foil from the not-glued side(end of the table) up until the reference pin that are located in the lower part of the mandrel and place the pins (Fig. 19)
19		Continue to rotate the mandrel, while two persons hold the foil on the other side stretched and away from the mandrel, and align the foil at the ring until it is glued for half its length
20		Two people raise the other part of the foils and everybody pays attention to the alignment (Fig. 20)
21		Check that the foil would fall in place on the overlap, without closing the overlap. Two people are holding the foil in position
22		Two people prepare the lenzuolino, starti from the side of the foil fully glued, securing it on the side with kapton tape. and holding with a finger over the Kapton.
23		Check that the foil would fall in place on the overlap, without closing the overlap
22		Check that the foil would fall in place on the overlap, without closing the overlap
22		With the vacuum foil (pin to pin wide and longer than the circumference), help the placing of the foil in position, by stretching it around the GEM and fix it with a tape
23		PROTEZIONE CODINE
24		Wrap everything (one way and back) with the green peel-ply foil without forming air bubbles or creases in the movements
25		Place the vacuum bag with at least three fold not to create too many creases on the surface
26		Turn on the vacuum pump while checking the surface
27		Measure with the graduated lens the overlap size and log it
28		
29		
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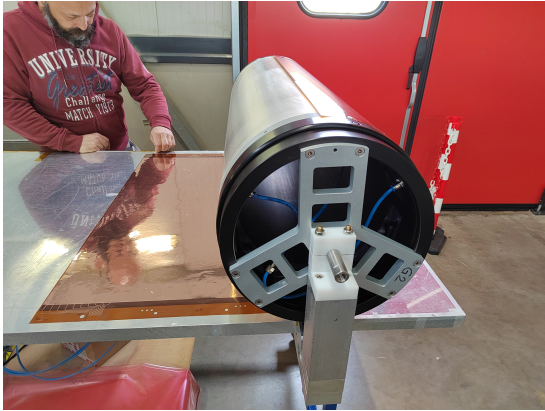


Figure 14: Dry test to check foil sizes and holes' alignment



Figure 15: Cylindrical table ready for cylindrical gluing

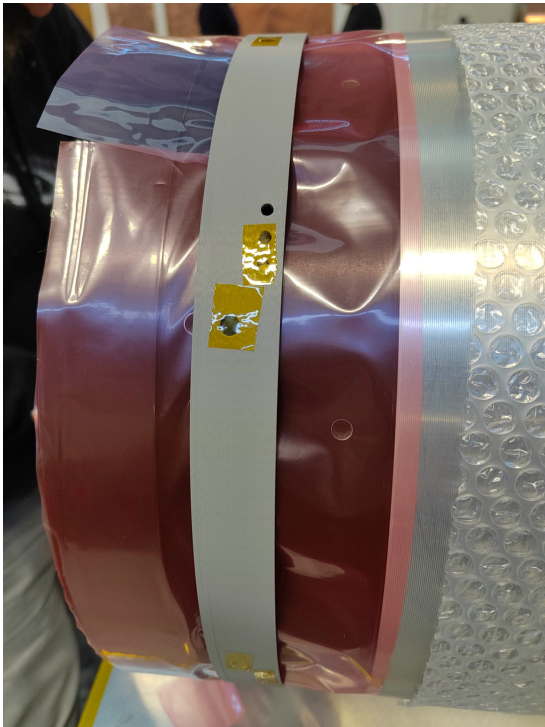


Figure 16: Preparation for the int-ring gluing

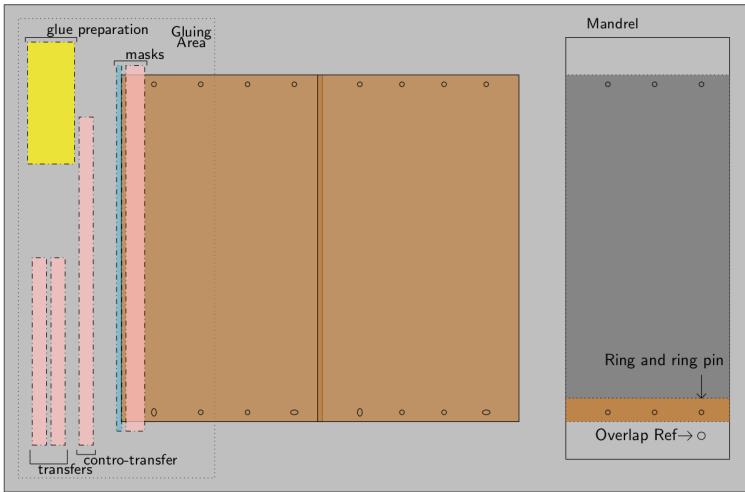


Figure 17: Scheme of the overlap setup for gluing following the instruction as in the planar gluing

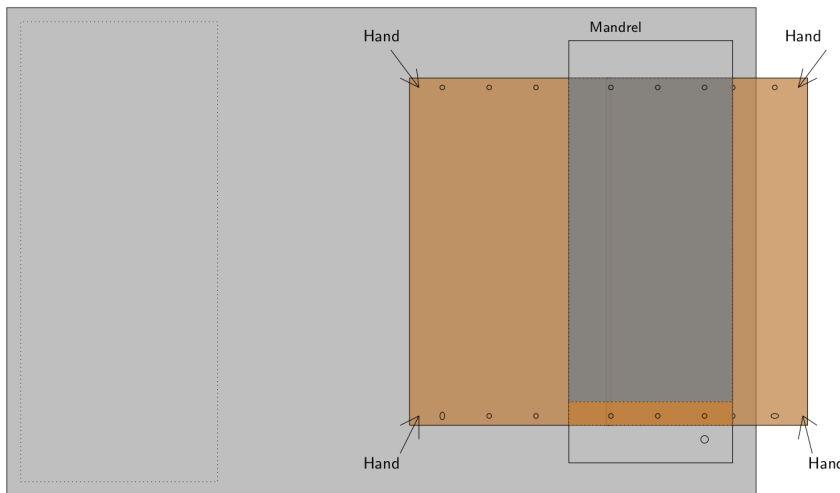


Figure 18: Scheme of the operation to move the glued foil below the mandrel to start the cylindrical gluing. The 4 *hands* indicate the position to hold the foil carefully

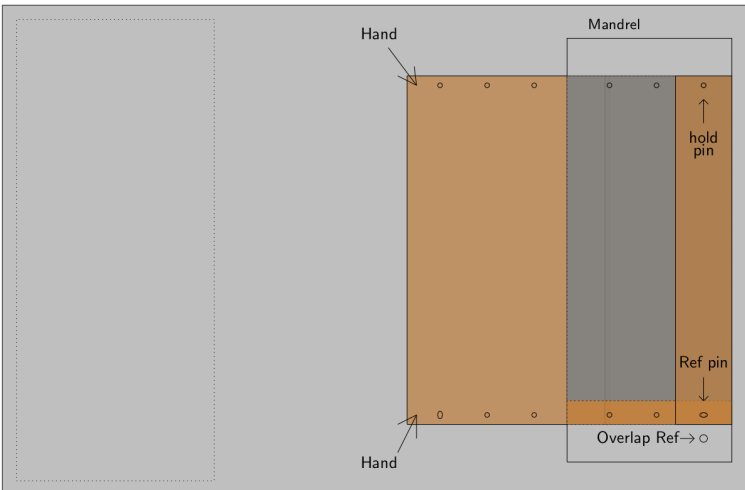


Figure 19: Scheme of the operation to place the foil on the mandrel. The *Overlap Ref* helps to identify the position of the edge of the foil and fix the *ref and hold pins*. If the pins stretch too much the foil, remove one pin and replace it with tape

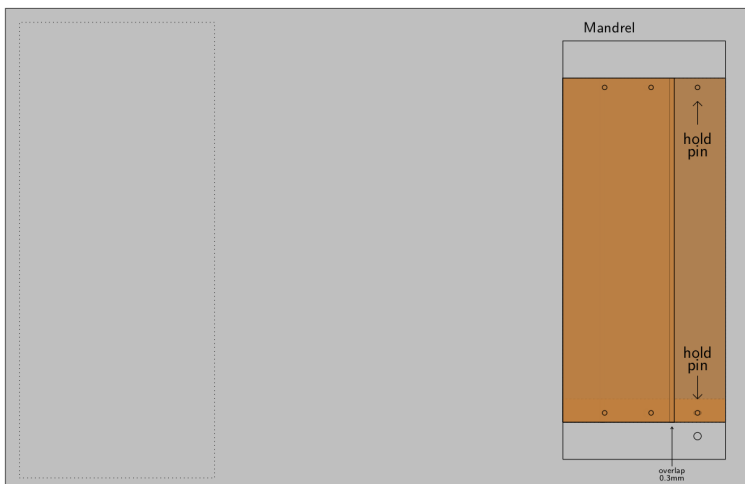


Figure 20: Scheme to conclude the cylindrical gluing. After the first half is ready and fixed on the mandrel raise the second half in position until the glued edge fall on the other one and check the size of the overlap