



 **CONCRETE CANVAS®**  
Concrete on a Roll

USER GUIDE:  
THERMAL BONDING



The Queen's Awards  
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2019



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## Concrete Canvas® GCCM Thermal Bonding

Impermeability Rating : ●●●○○

Mechanical Strength : ●●●●●

Concrete Canvas® (CC) can be thermally bonded using a manual hand-held heat gun or automatic hot-air welder to provide a high strength, medium impermeability joint. The joint is formed using a 100mm overlap between the PVC backing and fibrous top surface.

The following equipment is required:

- **Automated hot-air welder** (eg Leister Twinny S or T) with a 50mm solid wedge set-up.
- **OR**
- **Hand-held heat gun** with closed loop temperature control (eg. Leister Triac AT) with a 60mm perforated slot nozzle.
- **Seam Roller** 45mm (or similar).
- **Stiff Brush** for cleaning the CC surface.
- **Wire Brush** for cleaning the equipment nozzles.
- **Cleaning rags** for wiping the PVC backing.
- **Safety Gloves.**
- **Mask** (A2P3 filter or equivalent).

1. **Joint Alignment:** Overlap the layers by a minimum of 100mm and ensure the 2 layers are in contact along the length of the joint – for example in the inside corner of a channel, or a transverse layup. NOTE: Unset material can be welded to both set and unset material, but the uppermost layer must be unset.

2. **Surface Preparation:** The fibrous top surface should be cleaned of any surface lying dust using a stiff brush and the PVC backing should be dry.

3. **Tool Preparation:** The automated hot-air welder or hand-held heat gun (fitted with the 60mm perforated slot nozzle) should be adjusted to achieve the required joint strength using the calibration guidance below (450°C is a good starting temperature) to create a 'Trial Joint'.

Leave the gun on for approximately 5 minutes to reach temperature. If using a tool with a digital read-out this should be indicated on the display.

4. **a). Bonding with an automated hot-air welder:** Once up to the required temperature, position the welding nozzle between the two layers of CC and start the automatic welding as per the Leister instructions. A 'Trial Joint' is essential since the speed and temperature settings will vary depending on ambient temperature and humidity. Reasonable starting settings are: Speed = 1.4 Heat = 4.5 (450°C).

While running, adjust the path of the welder as required to maintain joint alignment. **Note:** Overtightening of the clamping pressure setting may result in the welder running off track.

**OR**

**b). Bonding with a Hand-held heat gun:** Once up to temperature, position the heat gun nozzle just inside the joint, with the nozzle perforations upper-most, directing the hot air onto PVC backing. Aim to bond the overlap along a strip nearest to the outside of the joint (see diagram at the end of this document).

Working your way from one end of the joint to the other, follow the welder with the 'Seam Roller' to apply pressure to the softened PVC and top fibres to form a bond. Weld rate is approximately 1m/min.



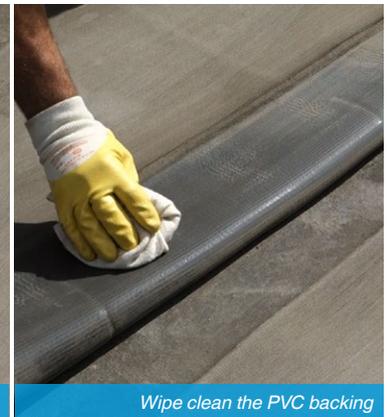
Leister TRIAC AT



Leister Twinny S



Brush to ensure fibres are visible



Wipe clean the PVC backing



Thermal Bonding with the Leister Triac AT



Thermal Bonding with the Leister Twinny S



Thermal Bonding overlap area along the edge of the joint

5. **Trial Joint / Calibration:** Prior to welding a field joint, it is necessary to conduct a 'Trial Joint' to set the Automated welder/heat gun to the correct temperature and weld rate. As a rule of thumb the following can be used as a guide:

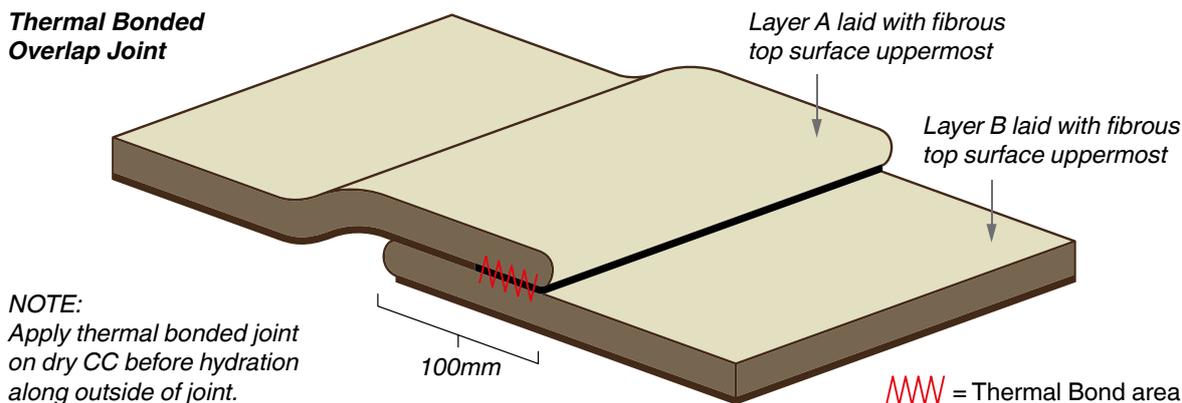


**A. Too slow / Too hot:** Fibres char and turn black whilst producing large amounts of blue/white smoke.  
**B. Too fast / Too cold:** Joint will pull apart after cooling without causing delamination of the PVC.  
**C. Correct Speed / Temperature:** Some smoke produced during welding. Joint will pull apart after cooling with delamination of the PVC.

6. **Cooling and Hydration:** Leave the welded joint to cool for approximately 5 minutes prior to applying any load. The CC can be hydrated as normal (see [CC User Guide: Hydration](#)). Particular attention should be paid to the overlap area to ensure sufficient hydration through wicking.

**Wear heavy gloves and a mask as the heat gun will be hot and give off fumes. Only thermally bond CC in a well ventilated area.**

**Thermal Bonded Overlap Joint**



## Other Useful Guidance

A standard Twinny S or T can be used for bonding CCT1™, however it is necessary to fit a 'Comet' chain guard and shortened nozzle for bonding CCT2™ and CCT3™. Please contact Concrete Canvas Ltd for further information.

When powering down the automatic or manual thermal welders it is recommended to turn down the heating element whilst allowing the air to remain running in order to cool the element and avoid damage.

Routine maintenance of the welding equipment is required and particular attention should be paid to the hot air nozzle which should be regularly cleaned with a wire brush to prevent the build-up of PVC residue.

On uneven ground, sandbags may be used to ensure joints are in contact with the substrate and prevent voids beneath the CC.

Concrete grout can be used in tandem with thermal bonding to aid with jointing around upstands or other infrastructure.

A stiff brush can be used to clean the surface of the CC prior to hydration in order to remove footprints, dust accumulation and prevent staining on the set material.

For containment critical applications, [CC Hydro™](#) should be used.