

## Notice

This procedure is informative and do not replace recommendations given in adhesive data sheets.  
Please read carefully adhesive data sheet before operating.

## Security

READ CAREFULLY ADHESIVE SAFETY DATA SHEET BEFORE OPERATING.  
Always wear mask, gloves and glasses when manipulating adhesives.

## Fiber optic cable handling

If the following rules are not applied, there are major risks of light losses or fiber breaks:

- Optical cables radius of curvature must always be greater than 2.5cm.
- Optical cables must not be crushed: loads or collars too tight. It should always be possible to move the cable in collars.
- Avoid as much as possible to have the optical cable passing on a sharp ridge. If it cannot be avoided, protect the cable inserting a soft layer in between (rubber, adhesive...).
- Do not have long unattached parts of cable since they might be hit unintentionally.
- Pull the optical cable moderately.
- During installation, pay particular attention to cable loops since they could lead to hose folding, thus to fiber break.
- Overprotect the optical cables and sensors when they are located in a risky zone (people passing, risks of falling objects, other cables passing above...). Imagine the worst possible scenario and protect consequently.

## Sensors adhesive bonding

### Recommended adhesives

For bonding on metals or thermoplastics	ARALDITE® 2022 from Huntsman Advanced Materials ( <a href="http://www.huntsman.com">www.huntsman.com</a> )
For bonding on concrete	Sikadur® 31 CF from Sika ( <a href="http://www.sika.com">www.sika.com</a> )

### Surface preparation

The strength and durability of a bonded joint are dependent on proper pre-treatment of the surfaces to be bonded; however the adhesives we selected can be used effectively with easy surface preparation.

Substrates must be sound, dry, clean and free from laitance, ice, standing water, grease, oils, old surface treatments or coatings and all loose or friable particles must be removed to achieve a laitance and contaminant free, open textured surface.

For painting removal, abrasive paper, sand blasting, angle grinder... or even chemical paint thinners can be used. The paint must be completely removed under the whole sensor surface.

The surface has to be made rather smooth even though a small non uniformity of few tenths of millimetres is acceptable with the selected adhesives.

Ideally joint surfaces should be cleaned with a good degreasing agent such as Acetone or recommended in adhesive data sheet.  
**For degreasing, alcohol, gasoline (petrol) or paint thinners should never be used.**

The strongest and most durable joints are obtained by either mechanically abrading or chemically etching (“pickling”) the degreased surface.

## Adhesive preparation

**ARALDITE® 2022:** Mix an even quantity of resin and hardener.

**Sikadur® 31 CF:** Mixing: Part A : part B = 2 : 1 by weight or volume.

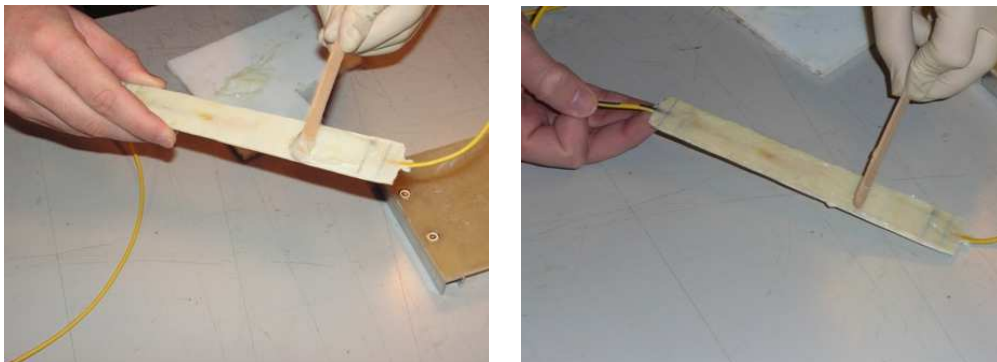


Mix parts together for at least 3 minutes.

## Bonding

The resin/hardener mix is applied directly to the prepared and dry joint surfaces.

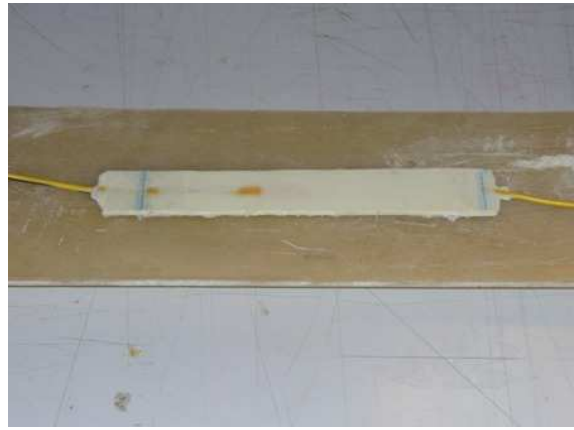
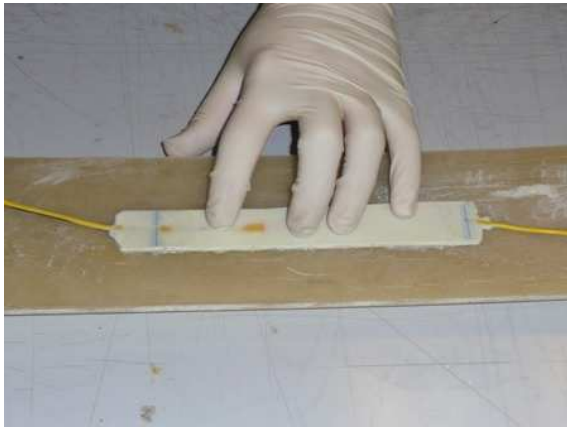
Spread a uniform layer of adhesive roughly 1mm thick on the sensor surface.



The joint components should be assembled and clamped as soon as the adhesive has been applied. An even contact pressure throughout the joint area will ensure optimal cure.



Hold the sensor during few minutes (see adhesive data sheet for appropriate timing)



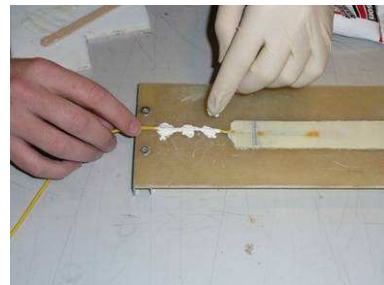
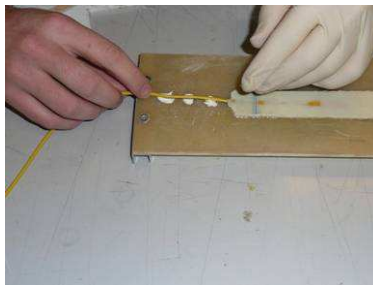
## Output cables protection

Optical cables should be fixed just after sensor bonding to make sure that any traction on the cable will not be transmitted to the sensor during adhesive polymerisation.

Adhesive rubbers such as silicone or acrylate compositions can be used to fix the cable, especially when it has to be bonded over long distances.

First put the glue (small pots or continuous line) and then put the cable on the adhesive.

Alternatively, optical cables can be clamped with plastic collars but not too tight: it should always be possible to move the cable in the collar.

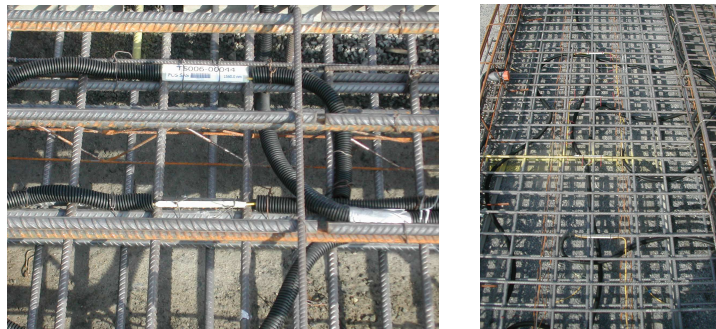


## Integration into concrete or tar

### Sensors installation

Place the sensors at desired location and fix them with clamps or metallic wires to make sure they won't move during pouring.  
For better protection, optical cables should be placed into a relevant tube (ex. PVC for concrete, high temperature resistant plastic for hot tar...).

**The cables must be fixed so that they cannot move during pouring, otherwise they might be pulled away and then damaged.**



**Cover with attention sensors AND cables over their whole length with the concrete (resp. tar). Then compress slightly and carefully.**

