The SolarLite F Series (Mk4) Flush Stud can be installed by milling or coring depending on the equipment available to the installers. The studs are also available with a snowplough housing for use in areas that are frequently snowploughed. This document contains instructions for each type of installation.

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Always read these instructions even if you are familiar with the installation process for Clearview Intelligence SolarLite flush mounted active road studs. Clearview Intelligence are the creators of the Solarlite Active Road Stud, which have been designed and developed specifically to harness solar energy during the day and provide superior lane guidance and advance warning to driver’s during the hours of darkness.

Under no circumstances should the stud be dismantled. Failure to comply with this or these installation instructions may invalidate the product warranty.

The positioning and colours of the installed studs should conform with the existing laws and regulations, where applicable, of the country of installation.

Correct installation is essential if the road studs are to achieve the correct optical light output and good adhesion within the road surface. SolarLite flush studs must only be installed in a hard-aggregate surface such as asphalt or concrete with an approved installation compound as listed in this document. It is the responsibility of the installer to ensure that road construction and weather conditions are suitable for installation of the studs.

Pre-requisites prior to installation

- Visually inspect the road surface to ensure it is in good condition with no potholes, no broken surface or impairments that will affect driver visibility of SolarLite road studs or integrity of the enhanced delineation once installed
- SolarLite active road studs may only be installed in a hard-aggregate surface such as asphalt or concrete
- Ensure that appropriate Personal Protective Equipment (PPE) is worn throughout installation process and that any blown debris is not directed at any persons or vehicles
- Do not attempt installation work if the road surface is wet, damp or when the road/surface temperature is below 0 degrees celsius.

When to use enhanced delineation on bends in the road

To maximise effectiveness of the enhanced delineation provided by Clearview Intelligence SolarLite studs, installation should commence at least 100m prior to the start of the bend and continue 100m from the end of the bend in addition to the bend itself.

When multiple bends are in close proximity to each other, it is also recommended that Clearview studs are installed between the bends to ensure continuity of the visual effect.

Installation Step by Step Instructions

Step 1

Visually inspect proposed site and ensure surface is smooth and suitable for installation. Studs installed in a surface in poor condition / broken surface may void product warranty. Using chalk or an environmentally friendly aerosol spray, accurately mark the correct positions for the stud cavities on the road surface. SolarLite flush studs must only be installed in a hard-aggregate surface such as asphalt or concrete.

Step 2

Ensure that the milling head is fitted correctly to the milling machine. Centre head and fit to minimise lateral or sideways movement of the head when the milling machine is in operation.

Step 3

When operating the milling machine, ensure that the supporting legs are always fully lowered when milling the hole. When legs are only partially lowered (usually to speed up the process), this results in movement of the milling machine head and gives an unsatisfactory finish and an oversized hole for stud installation.

Step 4

Set the milling teeth to correct dimensions of 130mm x 60mm deep. This tighter diameter counteracts vibrations and makes a hole of the right dimensions into which the stud can be placed, allowing for proper support of the stud by the installation clips over the hole edges. This ensures that the stud is located at the optimal height in the road during the resin pouring and curing phase of the installation process.
Step 5
Ensure all cavities are clean, dry and free from dust & debris prior to stud installation. If any surface shows signs of moisture, this must be removed using a compressed air lance, propane gas torch or similar.
Caution should be used when using the gas torch so as not to overheat and damage the road surface as overheating the bitumen will allow the polymers to burn off, introducing weaknesses into the edges of the hole that can cause the road surface to break up over a short period of time. This in turn could allow the stud to become loose from the road surface.

Step 6
Mix an appropriate amount of fixative resin. An appropriate grade of two pack bitumen extended epoxy resin should be used:
- Approved installation compound for UK DfT type approval is Triflex Cryl R238 (referred to as resin) and must be used for any UK public highway installation. When using Triflex Cryl R238 the following mixing ratios apply:
  - For winter use (0°C to +15°C) Triflex recommend 0.72 kg of catalyst per 18 Kg drum.
  - For summer use (+15°C to +35°C) Triflex recommend 0.36 Kg of catalyst per 18 Kg drum.
- Approved installation compound (excluding UK) is Robnor Polyurethane stud sealant EL628SS (referred to as resin).

Always refer to the handling and usage instructions provided with the fixative resin.
The fixative resin should be poured to a level of 40mm +/- 1mm from the road surface. This will minimalise any overspill when the stud is inserted.

Step 7
Attach three clips to the stud and insert into the cavity making sure the LEDs are correctly positioned to face oncoming traffic. Make sure that the stud is flush with the road surface by placing a suitable straight edge across the outer ring of the road stud and the road surface.
If the milled hole is oversized, use six clips on the stud prior to locating in ground. This enhances the grip the stud clips have with the sidewall of the hole.
Ensure that once the stud is inserted into the cavity the fixative resin poured in step 6 has been displaced around the stud.
After the stud is fully inserted into the hole, if required, immediately top up the resin around the edge of the road stud to a level of 1mm (+1mm) below the road surface.

Allow a minimum of 30 minutes to cure. Ensure that the top surface of the stud always remains clean. If any fixative resin goes on the top surface of the stud, wipe clean immediately. A funnel or pouring jug is required to aid the accuracy of the pour.

Step 8
The fixative resin should be poured to a level of 40mm +/- 1mm from the road surface.
Once the stud is fully inserted into the hole, any overspill must be removed from around the stud using a wallpaper scraper or similar implement. Any underfill can be carefully topped up with a funnel. A ring of Triflex overfill sat in front of the LEDs will affect the visual impact of the studs and must be removed.

Step 9
Make sure that the top surface of the stud, especially the solar panels and the LED faces are clean.
Installation complete.

Clearview Intelligence reserve the right to change or modify product specifications.
'SolarLite' and 'HazLight' are Trademarks.
Worldwide patents coverage. All values are nominal.
Always read these instructions even if you are familiar with the installation process for Clearview Intelligence Road Studs.

Clearview Intelligence are the creators of the Intelligent Road Stud and have designed and developed the solar powered inset mounted, flush, road stud. These provide a flexible and innovative approach to traffic safety. Designed to provide guidance and advance warning to drivers day and night.

Under no circumstances should the stud be dismantled. Failure to comply with this or these installation instructions will invalidate the warranty.

The positioning and colours of the installed studs should conform with the existing laws and regulations, where applicable, of the country of installation.

Correct installation is essential if the road markers are to achieve good adhesion to the road surface. Solarlite flush studs must only be installed in hard-aggregate surfaces such as tarmac or concrete with an approved installation compound as listed in this document. It is the responsibility of the installer to ensure that road construction and weather conditions are suitable for the installation of studs.

To maximise the effectiveness of the enhanced delineation provided by Clearview Intelligence studs, Clearview studs should commence at least 100m prior to the start and continue 100m from end of the bend in addition to the bend itself. When multiple bends are in close proximity to each other, it is also recommended that Clearview studs are installed between the bends to ensure continuity of the visual effect.

Do not attempt installation work if the road surface is wet, damp or when the road/surface temperature is below 0°C. Ensure that the correct Personal Protection Equipment is worn at all times. Always refer to the handling and usage instructions provided with the fixing materials.

Alignment

When placing the stud into the cavity, ensure that the reflective face of the stud is orientated correctly facing the traffic.

It is recommended that on curves, bi-directional studs in the centre of the road be positioned such that the light output is seen clearly and as early as possible by motorists travelling in either direction.

On tight radii bends it is good practice to align every other bi-directional stud to be optimum for one direction of travel then the other. On such tight radii bends the use of red unidirectional nearside studs is also highly recommended.

Refer to the diagram (right) for examples of typical layouts showing the direction of light output together with the direction of traffic.

Installation Step by Step Instructions

Step 1

Using chalk or an environmentally friendly aerosol spray, accurately mark on the road surface, the correct positions for the stud cavities. Solarlite flush studs must only be installed in a hard-aggregate surface such as tarmac or concrete.
Step 2

Drill a circular hole, 130mm (± 2mm) by 60mm (± 2mm) deep with a core cutter that produces a flat-bottomed cavity with perpendicular sides. The core cutter can be of the wet diamond core type or the tyne based router type (used for Halifax studs). Endeavour to ensure that the top rim of the hole is maintained.

Step 3

After drilling, remove the centre core from the cut to expose the cavity. Make sure the bottom of the cavity is flat. If necessary trim flat.

Step 4

Remove all debris from the cavity, either using compressed air or vacuum removal. Ensure that when using compressed air that the correct Personal Protection Equipment (PPE) is worn and that blown debris is not directed at persons or vehicles.

Step 5

Ensure all cavities are clean, dry, and free from dust and debris prior to installation, if any surface shows signs of moisture, the moisture must be removed either using a compressed air lance or a propane gas torch.

Ensure that the correct Personal Protection Equipment is worn and that any blown debris is not directed at persons or vehicles.

Caution should be used when using the gas torch so as not to over heat and damage the surface. As overheating the bitumen will allow the polymers to burn off, causing the road surface to break up over a short period of time. This in turn could allow the stud to become dislodged from the road.

Step 6

Attach the three installation clips to the stud housing. Position the installation clip onto the base rim of the housing and push the installation clip towards the top of the housing to clamp onto the stud.

The stud housing must be thoroughly cleaned and decontaminated using white spirit applied with a clean lint free cloth. The stud housing must be clean to provide a good bonding surface for the resins and sealants. The stud should be dry before being fixed into place.

Step 7

Mix an appropriate amount of fixative resin. An appropriate grade of two pack bitumen extended epoxy resin should be used, see approved resins note below.

Approved installation compound for United Kingdom DfT type approval is Triflex Cryl R238 (referred to as resin) and must be used for any United Kingdom public highway installation.

Approved installation compound (excluding United Kingdom) is Robnor Polyurethane Stud Sealant EL628SS (referred to as resin).

When using Triflex Cryl R238 the following mixing ratios apply:

- For winter use (0°C to + 15°C) Triflex recommend 0.72 kg of catalyst per 18 kg drum.
- For summer use (+15°C to +35°C) Triflex recommend 0.36 kg of catalyst per 18 kg drum.

Always refer to the handling and usage instructions provided with the fixative resin.

The fixative resin should be poured to a level of 40mm +/- 1mm from the road surface.

Step 8

Insert the stud with its clips attached into the cavity making sure the LEDs are correctly facing oncoming traffic. Make sure that the stud is flush with the road surface by placing a suitable straight edge across the outer ring of the road stud and the road surface.

Ensure that once the stud is inserted into the cavity some of the installation compound poured in step 7 has been displaced around the edge of the stud.

After the stud is inserted, if required, immediately top up the resin around the edge of the road stud to a level of 1mm (±1mm) below the road surface.

Allow a minimum of 30mins to cure.

Ensure that the lens remains clean at all times. If the compound gets on the lens, wipe clean immediately. To aid the accuracy of the pour the use of a funnel or pouring jug will be required.

Step 9

Clean site after the installation and remove all debris from the carriageway.

Installation complete.

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Under no circumstances should the stud be dismantled. Failure to comply with this or these installation instructions will invalidate the warranty.

The positioning and colours of the installed studs should conform with the existing laws and regulations, where applicable, of the country of installation.

Correct installation is essential if the road markers are to achieve good adhesion to the road surface. Solarlite flush studs must only be installed in hard-aggregate surfaces such as tarmac or concrete with an approved installation compound as listed in this document. It is the responsibility of the installer to ensure that road construction and weather conditions are suitable for the installation of studs.

To maximise the effectiveness of the enhanced delineation provided by Clearview Intelligence studs, Clearview studs should commence at least 100m prior to the start and continue 100m from end of the bend in addition to the bend itself. When multiple bends are in close proximity to each other, it is also recommended that Clearview studs are installed between the bends to ensure continuity of the visual effect.

- Do not attempt installation work if the road surface is wet, damp or when the road/surface temperature is below 5ºC.
- Ensure that the correct Personal Protection Equipment is worn at all times.
- Always refer to the handling and usage instructions provided with the fixing materials.

Alignment

When placing the stud into the cavity, ensure that the reflective face of the stud is orientated correctly facing the traffic.

It is recommended that on curves, bi-directional studs in the centre of the road be positioned such that the light output is seen clearly and as early as possible by motorists travelling in either direction.

On tight radii bends it is good practice to align every other bi-directional stud to be optimum for one direction of travel then the other. On such tight radii bends the use of red unidirectional nearside studs is also highly recommended.

Refer to the diagram on the right for examples of typical layouts showing the direction of light output together with the direction of traffic.

Installation Step by Step Instructions

Step 1

Using chalk or an environmentally friendly aerosol spray, accurately mark on the road surface, the correct positions for the stud cavities. Solarlite flush studs must only be installed in a hard-aggregate surface such as tarmac or concrete.

Step 2

Drill a circular hole, 162mm (± 2mm) by 70mm (± 2mm) deep with a core cutter that produces flat-bottomed cavity with perpendicular sides. The
core cutter can be of the wet diamond core type or the tyne based router type (used for Halifax studs). Endeavour to ensure that the top rim of the hole is maintained.

**Step 3**

After drilling, remove the centre core from the cut to expose the cavity. Make sure the bottom of the cavity is flat. If necessary trim flat.

**Step 4**

Remove all debris from the cavity, either using compressed air or vacuum removal. Ensure that when using compressed air that the correct Personal Protection Equipment (PPE) is worn and that blown debris is not directed at persons or vehicles.

**Step 5**

Ensure all cavities are clean, dry, and free from dust and debris prior to installation, if any surface shows signs of moisture; the moisture must be removed either using a compressed air lance or a propane gas torch. Ensure that the correct Personal Protection Equipment is worn and that any blown debris is not directed at persons or vehicles. Mix an appropriate amount of fixing material. An appropriate grade of two pack bitumen extended epoxy resin should be used such see approved resins note below.

Caution should be used when using the gas torch so as not to overheat and damage the cavity. As overheating the road bitumen will allow the polymers to burn off causing the road surface to break up over a short period of time. This in turn could allow the stud to become dislodged from the road.

**Step 6**

The stud and snowplough housing are supplied as a single assembly. Attach the Six installation clips to the cast snowplough housing. Position the installation clips into each recess on the top rim of the housing and push the installation clip towards the base rim of the housing to clamp onto the housing. The stud housing must be thoroughly cleaned and decontaminated using white spirit applied with a clean lint free cloth. The stud housing must be clean to provide a good bonding surface for the resins and sealants. The stud should be dry before being fixed into place.

**Step 7**

The fixative resin (730ml / 805g per stud) should be poured to a level of 35mm from the road surface. This level is a guideline and may have to be varied slightly in order to achieve the correct amount of resin. As a guide, a fixing clip positioned on the road surface with the top flat down the side of the cavity, has the 35mm dimension marked as an arrow. Pour in the resin until the level aligns with the point of the arrow.

Always refer to the handling and usage instructions provided with the fixing materials. If alternative resin is to be used to that recommended, the compound must have a Shore A hardness of not less than 85A or more than 87A at 20°C and not more than 95A or less than 87A at minus 20°C and be capable of bonding metal, plastic and road surface.

**Step 8**

Insert the stud and housing with its fixing clips attached into the cavity making sure the LEDs are correctly facing oncoming traffic. Make sure that the stud housing is fully inserted into the cavity and level, with each fixing clip resting on the surface. The recesses in the casting for the LED light output should be flush with the road surface. Ensure that once the stud is inserted into the cavity some of the installation compound poured in step 7 has been displaced around the edge of the stud. After the stud is inserted, if required, immediately top up the resin around the edge of the housing to a level of 1mm (±1mm) below the road surface. Ensure an identical level has been reached between the housing and the road stud. Allow a minimum of 30mins to cure. Ensure that the lens remains clean at all times. If the compound gets on the lens, wipe clean immediately. To aid the accuracy of the pour the use of a funnel or pouring jug will be required.

**Step 9**

Clean site after the installation and remove all debris from the carriageway. Installation complete.

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