LED Strip Installation Guide

The Basics

LED Strips Are Fragile

LED strips are extremely delicate and should be handled with care to maintain the warranty.
Imagine taking a circuit board from a computer ....you would handle it with extreme care.
LED strips lack the 2mm thick backing board that computer PCBs have and so LED strips are far more fragile and should be treated as such.

Things Not To Do

Never pull up a strip after sticking it down to re adjust its position.
Doing so will break resistors, ICs or solder joints, voiding the warranty and will cause premature failure after install or not to work at all. If this inadvertently happens the strip should be replaced.

Soldering Tails Vs Clip On Tails

Where possible always solder on tails.
At Task we always solder tails to the strips and use a special flux to ensure a lasting connection. Push on clips with tails can fail due to corrosion and movement etc and may waste installers time going back to projects to resolve failed connections.

Things To Do

Always use some sort of heat sink to mount the LED strips on as heat dissipation is a critical factor in determining LED life. Task Lighting profiles not only provide good heat sinking but also protect the LEDs with the diffuser from physical damage and dust & dirt build up.
Always do a dry run before peeling and sticking strips in place.
Centre your strip in its profile so any unlit areas are equal at each end as this avoids the temptation to pull the strip up if its located wrong.
Clean all mounting surfaces of any dust & dirt etc plus wipe with methylated spirits or similar solvent to remove any greasy surface.
Always peel and stick the strips, where possible, starting from the cable entry end as this avoids the possibility of the strip cable not being positioned well to exit the profile.

Strip Load Calculations, Voltage Drop & Cable Size

The strip load calculation is a simple one.
Load (Watts)= strip W/m x meters. Example 15W/m x 10m=150Watts.
Current= Watts/volts. Example 150Watts/24VDC=6.25Amps. Controllers are limited by the current rating eg an RGBW controller may be rated as 5Amps per colour (5Amps per channel) as well as working voltage.
In the example above if this was an RGBW LED strip then the current can be divided by 4 to get the current per colour or per channel to size your controller eg 6.25Amps total/4=1.56Amps.
Best practice when choosing power supplies & controllers etc is to load them to no more than 90% of their full load rating (10% head room).

https://www.jcalc.net/voltage-drop-calculator-as3008 is the voltage drop calculator we recommend as it handles low voltage DC well.
Aim for a max 8% (less is better) volt drop for single colour strips and a max of 5% for colour changing strips.
Entering your DC voltage, current, cable length & volt drop will calculate the required cable size.

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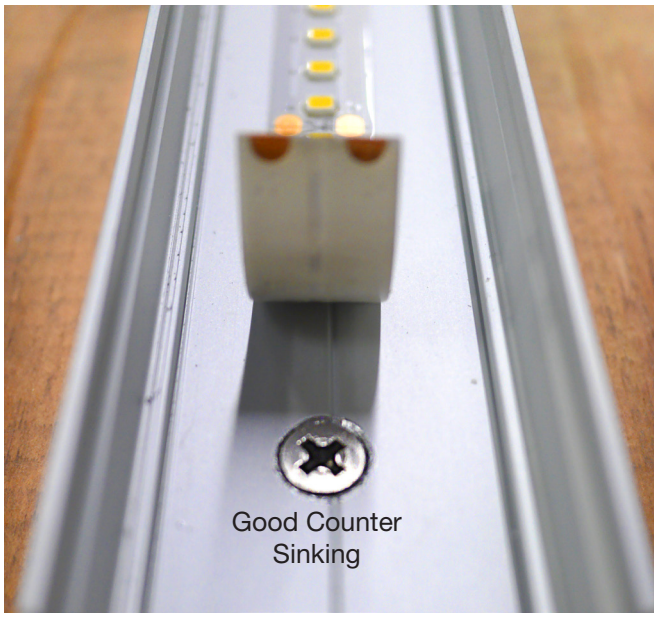
Strip Load Calculations, Voltage Drop & Cable Size (continued)

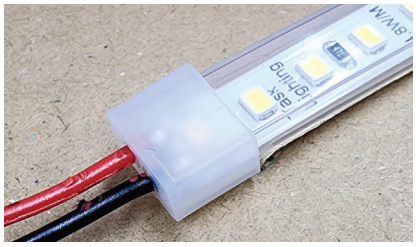
Using the current from above (6.25Amps) and a 15m power cable feed, Jcalc.net gives us a 4mm2 cable for a volt drop of 4.38% or 1.05VDC drop.
It can be surprising with low voltages like 12, 24 & 48V how large cable size can become when a power supply is a long way from the LED strips.
So where possible locate power supplies & controllers as close as possible to the load.
Do not enclose power supplies and controllers. Ensure good ventilation.

Installing Profiles

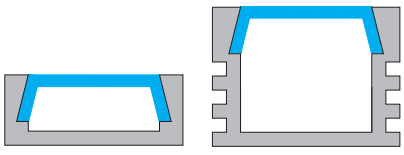

Good Counter Sinking

When installing always allow for the profile to expand as it warms up with the LEDs on.
Never have profiles hard up to walls at each end.
This is extremely relevant for long runs of profile due to the linear thermal expansion of metals as they warm up.
The linear expansion of aluminium, for example, is 0.024mm per meter per degC.
Example ... a 30m run of profile warming up by 40degC will expand approx 29mm (0.024x30x40=29mm).
A rough guide would be to allow at least 1.5mm per meter of profile plus endcap thickness.
Failure to allow for expansion can result in profiles buckling and diffusers dropping out as they warm up.
Surface mounted profiles can be secured by drilling through the base and screw fixing to ensure the screw heads are flush with the profile so (Image right) the LED strip makes full contact with the profile. Screw holes should be slightly larger than the screw as this allows for small expansion.
Screw fixing is OK for short runs.
Long runs will be better secured using mounting clips as this allows for the profile to expand easily through the clip. This ensures the LEDs get the best heat dissipation to the metal. Failure to do this will shorten the life of the LEDs and void the warranty.
Profiles can be cut on site using a drop saw with a suitable blade.
Best practice is to cut the diffuser and aluminium profile together as this ensures both are the same length plus the diffuser helps to stabilise the profile during cutting.
Tidy up the cut with a small fine file to ensure endcaps fit correctly.

Weather proof LED strips, when sealed up are wider due to the endcaps and may not fit into smaller profiles. See image to the right.



Not all profiles have snap in diffusers.
LEDCHAN450 & 470 have slide in diffusers so choose your profile to suit the location.


LEDCHAN450 LEDCHAN470

LED Strip Soldering Guide

Interior LED Strips

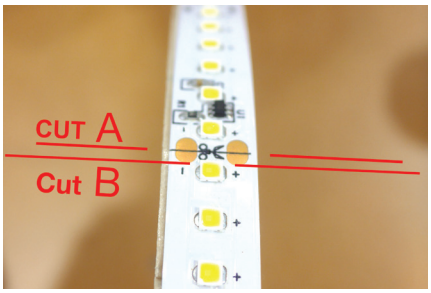
Task Lighting offers a fast custom cutting/soldering service for LEDs strips and profiles and we warrant our work for the warranted period of the product.
However if you wish to buy bulk rolls of strip and cut/solder tails yourself below is our guide and recommended method.

Recommended Tools

- A good quality temperature controlled soldering station with a fine tip.
- Clamps to hold strips and tails to free your hands
- Bench mounted magnifying glass.
- Bench top power supply.
- Heat gun.
- Heat shrink.
- Good quality flux.
- Solder sipper.
- Wire cutters.
- Wire strippers.
- Sharp scissors.
- Solder.
- LED strip roller.

Preparing The Strip

Determine the required length by laying the LED tape out into the extrusion without removing the adhesive backing.
Look for scissor marks that clearly dictate where it is possible to cut the LED strip. Sharp scissors must be used to prevent a potential deformation and short circuit when cutting. Cut the strip down to the nearest scissor cut point (Cut A) but also allowing sufficient space for the power feed wires to enter without extreme bending and straining the solder points on the strip.
Sometimes its a good ideal to cut off centre (Cut B) to give yourself a larger solder pad the work with. This means wasting a section of LED strip but is worth doing to give yourself more solder pad to work with and ensure a better result when soldering on wire tails.
This is an especially useful technique with high density LED strips, RGB, RGBW & COB strips due to the small solder pads.



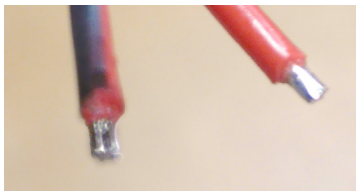
Wasted Section

LED Strip Installation Guide

Leaded Or Unleaded Solder

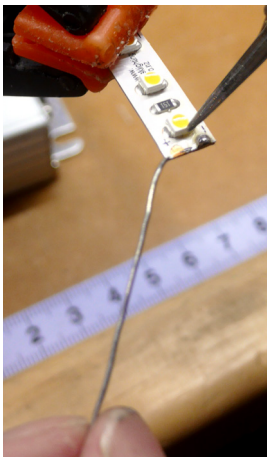
You will find that unleaded solder is extremely difficult to solder LED strips.
Leaded solder flows far better

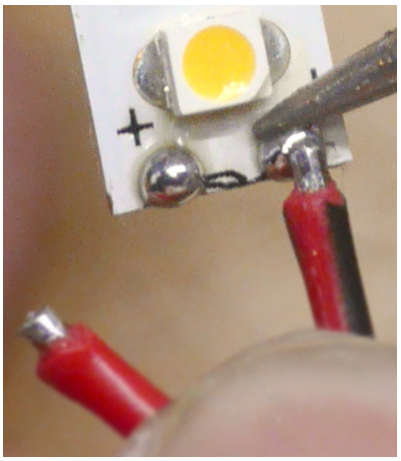
Tinning The Tails

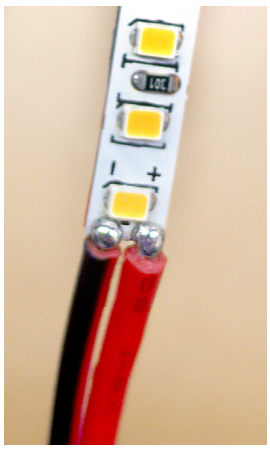


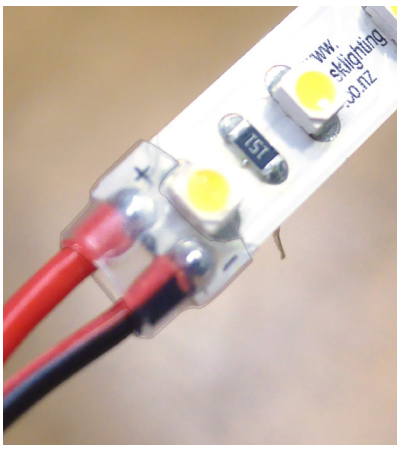
Strip approximately 10mm of insulation, twist the cable cores, apply flux and tin the bare cable. The flux will help the solder flow and gives a shiny finish to the soldered tails indicating good adhesion.
Trim the tinned tails so they are no longer than the solder pad on the strip.

Tinning The Strip & Attaching Cables









Similarly pre solder the copper pads on the LED strip by adding flux first to the pads then applying solder with the soldering iron.
Before sweating the cables to the strip slide a small length of heat shrink onto the cables.
Next add a little more flux to the copper pad and the tinned cables then sweat the cables to the solder pads.
Ensure the red/black cable is to the -ve pad and the red cable to the +ve pad.
Practice helps develop a good technique.
Completed solder joints should look shiny.
If the joints look dull and furry then you may have a dry joint which will not work.
This usually means not enough flux was used or dwelling too long during the sweating process.
The recommended settings for soldering LEDs is to set the iron to 300degC and solder to the pads for a max of 5secs.
If the solder hasn't flowed to a nice shiny join by this time it usually means more solder & flux were needed.
Once the cables are attached power up the strip and visually check all LEDs are working.
Now position the heat shrink and shrink into place with a heat gun.
Solder sippers can be used to remove excess solder that may cause a bridge between solder pads.
Joints may need re soldering after using the solder sipper.
Lastly power up the strip and check all LEDs are working.
Bench top power supplies (page 2) are best as they can set to limit the current in case there is a short eg a solder bridge.

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Installing The Strip Into The Profile

Make sure the profile is clean of dirt and grease.
Methylated spirit or similar can be used to wipe clean the surface where the LED strip will be mounted.
If in a critical installation consider using 3M primer 94 to provide a permanent bond.
Decide if your power feed cables will exit the profile through the end caps or through the rear.
A rear exit will require a hole drilled and a grommet inserted to protect the power feed cables.

Before peeling and sticking the LED strip do a dry run locating the strip to ensure power feed cables can exit cleanly without undue bends or strain on the solder joints.
Also try to locate the strip evenly from each end of the profile so any unlit areas are even at each end.
Using some masking tape or electrical tape during this dry to temporarily hold the strip can be helpful.
Once you are satisfied the strip is located correctly peel and stick the strip applying pressure to ensure a good adhesion. An LED strip roller can be sometimes useful to assist with strip adhesion to the aluminium profile.
Poor adhesion to the aluminium profile will result in insufficient heat dissipation to the aluminium profile.
This will result in quick colour shift and premature strip failure which will void the warranty.
When installing LED strips overhead it is best to use two people, one person ahead of the installer who guides the strip and prevents it from dangling and bending at severe angles.

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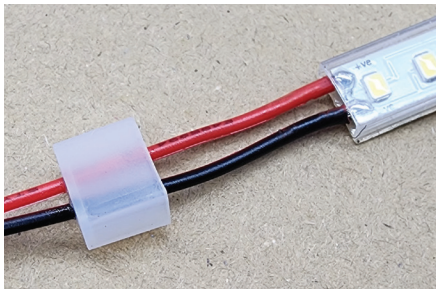
Weather Proof LED Strips

Exterior Installations

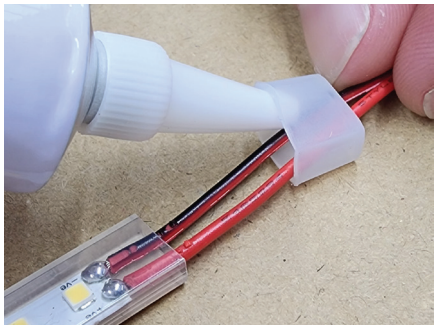
Exterior LEDs strips and their profiles are best not exposed to direct sunlight as this can cause premature failure of LEDs and diffusers.
Installation under eves and bench seats etc is OK.
Exposure to direct sunlight may cause premature failure of the LEDs and void the warranty.
Neon flex products are far more suitable where direct sunlight is a possibility as neon flexes fully encase the LEDs in PVC or silicone providing good protection.

Preparing Weatherproof LED Strip



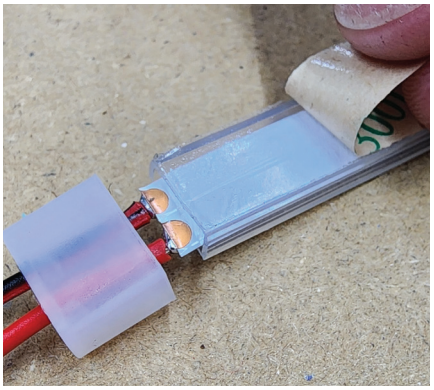
Follow the previous steps for interior LED strips covering load calculations, pre tinning tails, pre tinning the LED strip solder pads, sweating tails to the LED strips, powering up the strip & checking for faults etc.
Heat shrink is not necessary as the solder joints are protected by the weather proof silicone sleeve.
Slide the endcap with cable holes along the cables ready to seal. This can be done at the time of soldering tails especially if the tails are long.

Fill The Endcap



Using the silicone glue supplied by Task Lighting insert to filling tube and fill approximately 60% of the endcap.
The special silicone glue supplied by Task Lighting is not a filler but specially formulated to bond the two parts.

Peel Back The Paper Tape



Peel back the paper tape protecting the double sided tape ready to pre glue the silicone sleeve.

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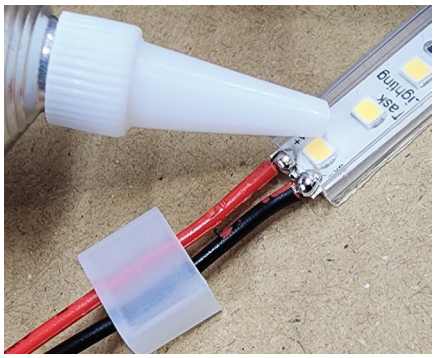
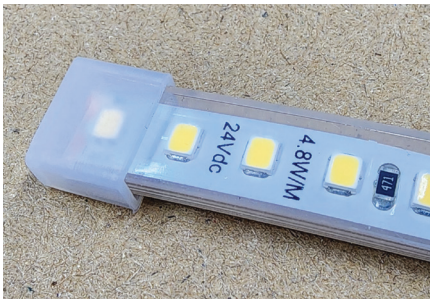
Pre Glue the Silicone Sleeve

After peeling back the paper tape pre glue the outside of the silicone sleeve as this makes for a better join.
Smear the glue all around the silicone sleeve covering to the extent the endcap will cover the sleeve (approximately 10mm).
Repeat the process for the endcap at the far end of the strip.



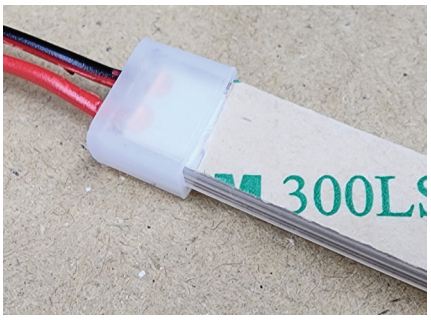
Push The Endcaps Onto The Sleeve

Push on the endcaps at the cable entry end and the far end. Usually the endcap will bulge as its pushed on. If this happens gently squeeze the endcap back into shape.
This usually forces more of the glue into the silicone sleeve.



Trim The Paper Tape

Trim back the protective paper tape at both ends of the LED strip.



Curing Time

Once you have sealed the endcaps its best to leave the sealed strips undisturbed overnight to cure.
Before leaving the strip to dry over night its best to tape the endcaps in place as the silicone glue can tend to squeeze back and push the endcaps off.
This ensures the best possible bond.