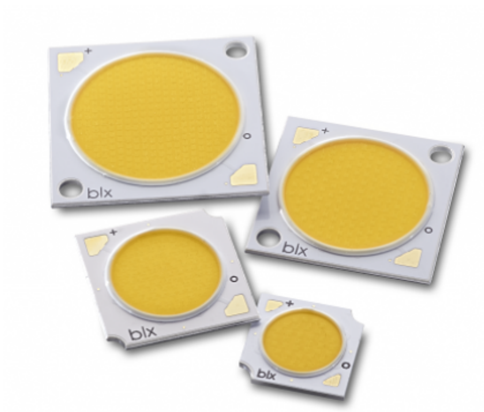
Introduction

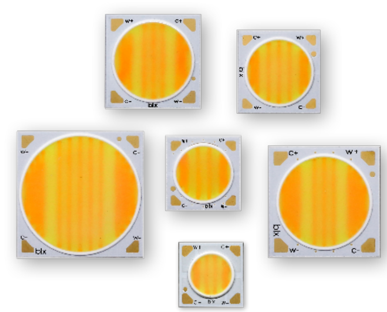
The Bridgelux family of V, VHD, and Vesta Series LED Arrays (LED Arrays) products delivers high performance, compact, cost-optimized solid-state lighting solutions to serve the general lighting market. These cost-effective light engines extend the technology and performance of the highly successful Bridgelux Vero line. The LED Arrays feature high flux density in small source size packages and is well suited for commercial and residential lighting applications where tight beam control and high quality light are essential.

Optimizing the performance and reliability of a lighting system using Bridgelux LED Arrays requires careful consideration of thermal management solutions, electronic drivers and secondary optics. It is equally important to use safe handling and appropriate manufacturing procedures, processes and chemicals during the assembly of the LED Arrays into the lighting system.

This application note provides recommendations for proper mechanical and electrical assembly of LED Arrays into lighting systems that are applicable to only to V, VHD, and Vesta Series LED Arrays. Guidelines for chemical exposure and handling of the LED Arrays are included to avoid damaging the LED Arrays during the assembly process. Recommended assembly procedures to ensure a reliable electrical connection to the LED driver and a mechanically robust, thermally efficient contact between the LED Arrays and underlying heat sink are also provided.



V and VHD LED Arrays



Vesta LED Arrays

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Assembly Overview

A lighting system using LED Arrays requires the following:

1. A robust mechanical connection between the LED Array and the heat sink or lighting fixture body.
2. A thermally conductive path from the case (back of aluminum substrate) of the LED Array to the heat sink or lighting fixture body which in turn has convective or forced airflow with the ambient (cool) air.
3. An electrical connection between the solder pads on the LED Array and the power supply or electronic driver used to power the V Series.

A reference drawing of a lighting system assembly using a LED Array is shown in Figure 1. Components of the assembly include a LED Array, LED Array holder, screws with flat washers and spring washers, heat sink, thermal interface material, reflector and housing.

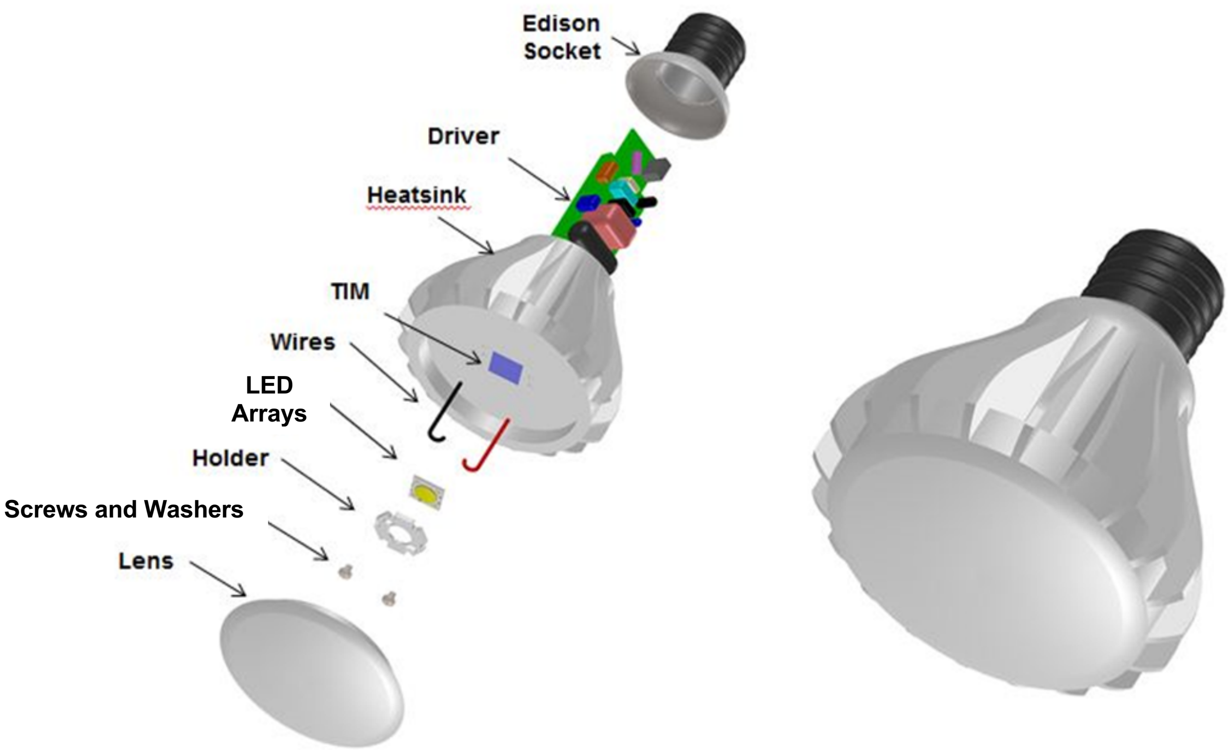


Figure 1: LED Array System Assembly Drawing

Chemical Compatibility

Optimizing performance and reliability of a lighting system using LED Arrays requires safe handling and use of appropriate manufacturing procedures and materials during the assembly of the array into the lighting system. Careful consideration must be given to the materials and chemicals used when processing the LED Arrays and to materials that are incorporated into a luminaire. This section provides a list of commonly used chemicals that should be avoided or carefully managed during processing of LED Arrays and during their subsequent use.

Silicone encapsulation is commonly used by most High Brightness LED manufacturers, including Bridgelux. The silicone encapsulation is permeable to gas molecules. The gas molecules, including volatile organic compounds (VOC's), halogen and sulfur compounds, can interact with silicone and other components that comprise the LED Arrays and cause degradation in performance of the V Series. The possibility and extent of degradation is dependent on the type of chemical, the concentration of the chemical, the temperature during exposure, and the length of time the array is exposed to the chemical. Additional considerations should be given to IP rated or "sealed" luminaires that create "air tight environments" around the V Series. Luminaires sealed in this fashion can trap potentially damaging gas molecules from manufacturing processes or subsequent out-gassing of materials used in the luminaire which can result in long term exposure of the LED Arrays to the contaminant.

The source of the gas molecules can be out-gassing from polymeric or other compounds/elements within the materials such as glues, gaskets, paints and/or under-cured materials. Materials used inside a luminaire with a potential to outgas should be characterized as part of the luminaire design to understand the environment that will be surrounding the LED Arrays during the luminaire lifetime. The silicone encapsulation is also vulnerable to non-polar fluids and solvents commonly used during the manufacturing process of the luminaire such as cleaning, oil assisted drilling and any process that would allow the LED Arrays to come into contact with the fluids or solvents. Care should be taken such that the LED Arrays is protected from such chemicals to avoid ingress of small non-polar molecules into the encapsulation silicone.

Common chemicals that are known to be harmful to LED Arrays are listed in Table 1 below. Note that the chemicals listed in Table 1 may be found in various states – liquid, gas and/or solid. All physical states of these chemicals can be harmful to the V Series, but those that are in a gaseous state, such as volatile organic compounds (VOCs), can readily permeate the lens material of the array and damage the array internally and/or externally.

Table 1: Commonly used chemicals that will cause harm to V Series.

Classification	Chemical Name	Found In Some
Acids	Hydrochloric Acid Sulfuric Acid Nitric Acid Phosphoric acid	Cleaners, cutting fluids
Organic acids	Acetic acid	RTV silicones, cutting fluids, degreasers, adhesives
Bases	Sodium Hydroxide Potassium hydroxide Amines	Detergents, cleaners
Organic Solvents	Ethers such as glycol ether Ketones such as MEK, MIBK Aldehydes such as formaldehyde	Cleaners, mineral spirits, petroleum, paint, gasoline
Aromatic solvents	Xylene Toluene Benzene	Cleaners
Low Molecular Weight Organics (VOC's)	Acetates Acrylates Aldehydes Dienes,	Superglue, Loctite adhesives, threadlockers and activators, common glues, conformal coatings
Petroleum Oils	Liquid hydrocarbons	Machine oil, lubricants
Non-petroleum Oils	Siloxanes, fatty acids	Silicone oil, lard, linseed oil, castor oil
Oxidizers/Reducers	Sulfur compounds	gaskets, paints, sealants, petroleum byproducts
Halogen compounds	Cl, F,or Br containing organic and inorganic compounds	solder fluxes/pastes, flame retardants

Since it is impossible to determine all of the chemicals that may be detrimental to the performance of the V Series, the list of chemicals above may not be exhaustive. It is the responsibility of the luminaire manufacturer to ensure that any and all materials used in the luminaire design or manufacturing process do not cause damage to the V Series.

For additional information on chemicals that are potentially hazardous to LEDs, please refer to the following industry resource:

Lighting Industry Association Technical Statement 13

https://www.thelia.org.uk/page/LIA_TS_v3

Handling LED Arrays

CAUTION: CONTACT WITH OPTICAL AREA

Avoid any contact with the optical area (yellow phosphor area and surrounding white ring). Do not touch the optical area of the LED Arrays or apply stress to the optical area. Contact may cause damage to the LED Arrays.

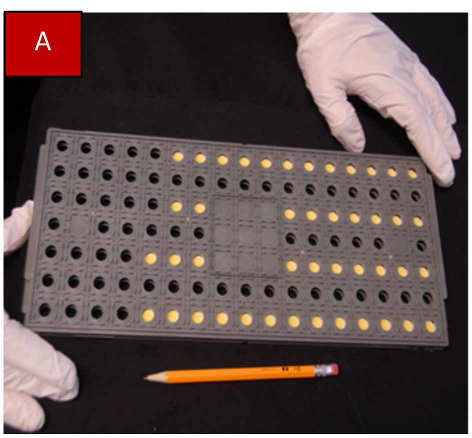
Optics and reflectors must not be mounted in contact with the yellow phosphor resin area or the white ring around the yellow phosphor area. Optical devices may be mounted on the white substrate surface of the LED Arrays. Use the mechanical features of the LED Arrays, edges and/or mounting holes to locate and secure optical devices as needed.

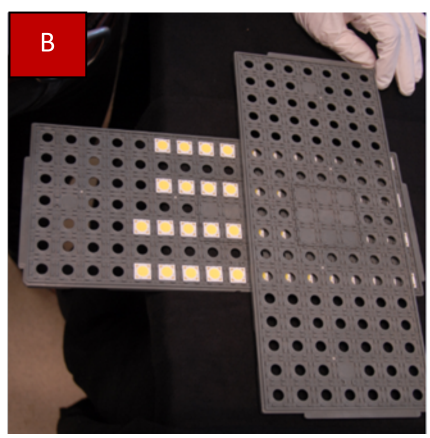
Bridgelux LED Arrays are packaged for volume shipment in trays of various sizes. Low volume sample shipments may be packaged using other methods. To manually remove the LED Arrays simply lift the LED Arrays from the tray by gripping the white plastic portion of the LED Arrays module. The trays come with notched areas around the array that accommodate fingers for grabbing the arrays from the sides. Low volume sample shipments may be packaged using other methods.

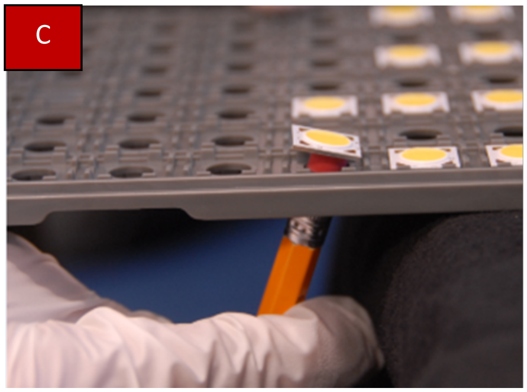
Removing LED Arrays Packaged In Trays

There are two types of trays used to package V, VHD, and Vest Series LED Arrays: one with holes punched through the tray, under the arrays, and the other that does not have holes on the tray.

To manually handle arrays packaged in trays with holes under the arrays, first remove the cover tray by removing the rubber band that holds the trays together. Next move a single tray with arrays to the edge of a table top. Be sure not to drop or jostle the tray. If necessary, use a weight, such as the cover tray, to counter balance the tray with arrays. Push the array upward from the bottom of the tray through the round holes using a Number 2 pencil with an eraser. Lastly, while wearing clean gloves, hold the array from the corners. Be sure not to touch the light emitting surface (yellow area) of the array as this can damage the array. Figures 2 and 3 illustrate a suitable method of removing the LED Arrays from the shipping tray.







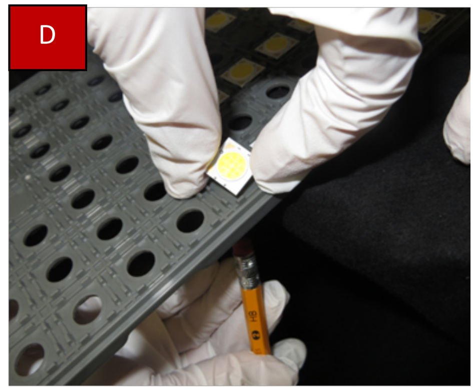


Figure 2: Arrays removal from the tray: (a) remove tray cover, (b) place tray on the edge of table top surface, (c) use a pencil to push the arrays up, and (d) grip the arrays from the corners

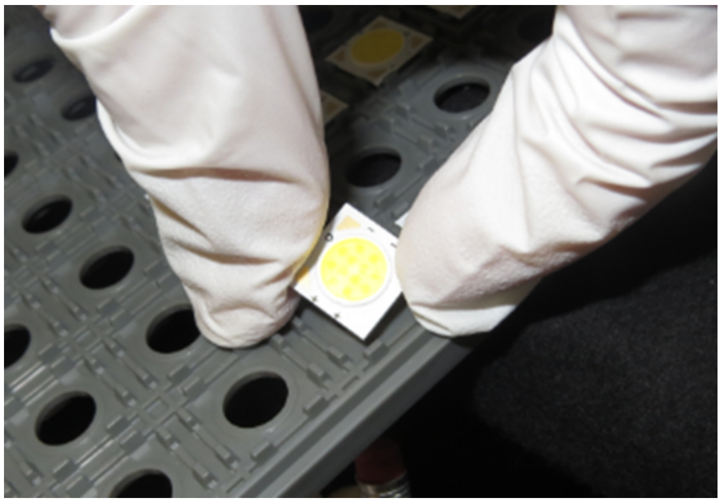
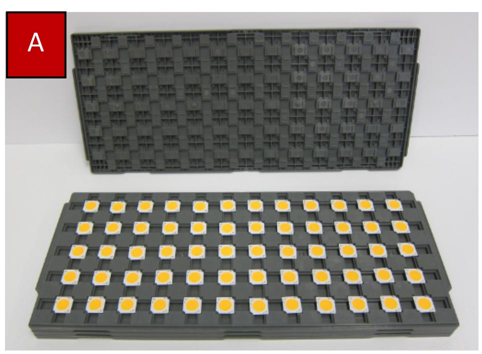


Figure 3: Wear gloves or finger cots when handling V Series. Grip the arrays from the corners. Do not touch the light emitting yellow area.

To manually handle arrays packaged on trays that do not have holes, first remove the cover tray by removing the rubber band that holds the trays together. While wearing clean gloves, gently lift the side of the array by placing a fingertip underneath the array. Once the array is slightly lifted and pivoted on the opposite edge, grab the arrays from two opposite sides. Be sure not to touch the light emitting surface (yellow area) of the array as this can damage the array. Figure 4 illustrates a suitable method of removing the LED Arrays from the shipping tray.



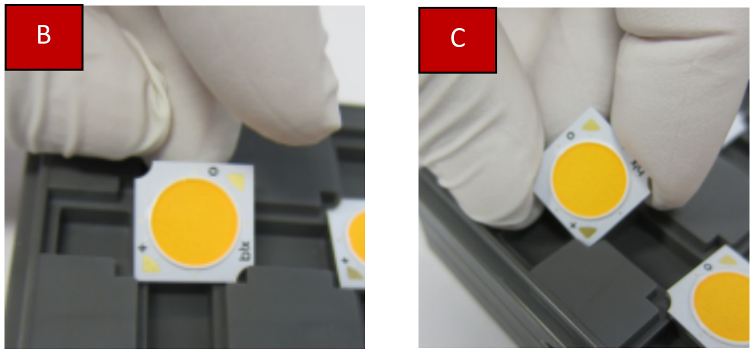


Figure 4: LED Arrays removal from the tray: (a) remove tray cover, (b) use a finger to push the array up away from its pocket, and (c) grip the arrays from the sides to lift the array out of the pocket while the arrays pivots on one corner

If debris contacts the resin, gently remove it by rinsing it with isopropyl alcohol (commonly called rubbing alcohol). This is best done using a plastic rinse bottle.

If pick-and-place equipment is used for automated assembly, the vacuum collet should be designed to avoid contact with the yellow phosphor resin area and the thin white ring surrounding the yellow phosphor resin area. Contact with the outer perimeter area of the array is acceptable.

Removing LED Arrays Packaged in Tubes

To manually remove the arrays from the tubes, rotate the tube such that the parts face upward. The yellow phosphor resin side of the array should point up, toward the ceiling. Remove the stopper at one end of the tube, place the open end of the tube on a clean flat surface, and lift the opposite end. The arrays should begin to slide down and out of the low end of the tube. If the arrays do not slide freely, apply either a slight pressure to the top and bottom of the tube (such as between two fingers) or apply a small vibration to the tube to facilitate movement. Figure 5 illustrates removing the LED Arrays from the shipping tube.

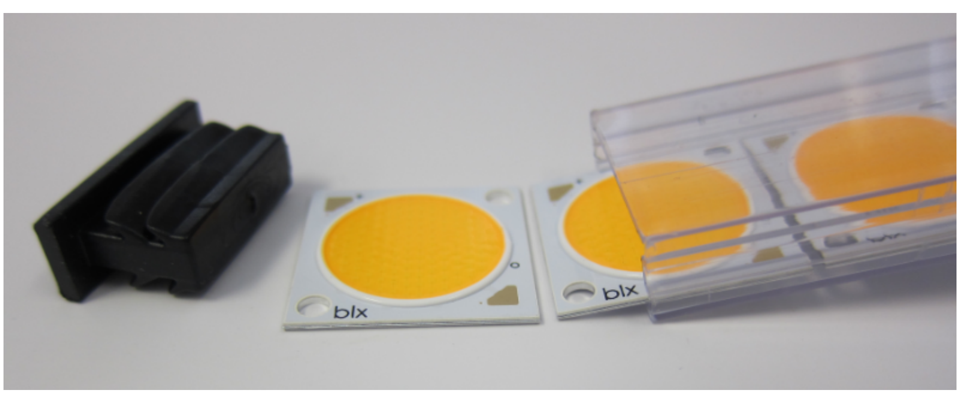


Figure 5: Arrays, resin side up, sliding out of the shipment tube

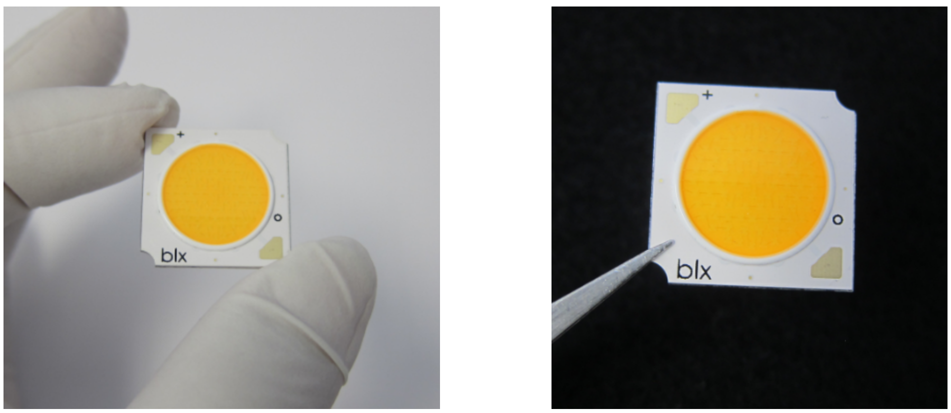
Handling LED Arrays

Handle the parts with care. It is recommended to wear finger cots or gloves to prevent dirt or other contaminants from adhering to the LED Arrays (see Figure 6). LED Arrays are optical devices. Please ensure that nothing comes into contact with the yellow resin area, as this may adversely affect performance.

Although use of a clean room is not required, the environment in which the LED Arrays are assembled should be clean, avoiding dust and particles which may adhere to the resin area of the V Series.

LED Arrays have passed ESD testing to levels which do not require special handling for most assembly processes. However, to prevent inadvertent damage, Bridgelux recommends using appropriate ESD grounding procedures while handling the V Series.

Figure 6a and 6b: Proper handling of the LED Arrays array using fingers and tweezers



If pick-and-place equipment is used for automated assembly, the vacuum collet should be designed to avoid contact with the yellow phosphor resin area and the thin white ring surrounding the yellow phosphor resin area. Contact with the outer perimeter area of the array is acceptable.

Soldering LED arrays

Soldering Process
Modern manual soldering iron systems consist of a control unit, soldering pencil and soldering tip. In order to have the capability to produce satisfactory solder joints, the proper equipment and operating conditions for that equipment must be specified. The technique utilized by the operator can cause dramatic variation in the results obtained even with proper equipment. The information provided in this section provides reasonable starting points for developing a suitable manual soldering process for soldering wires on V Series. As with all manual soldering processes, some degree of adaptation, experimentation and optimization may be required to meet the objectives of a particular manufacturer, product design constraints or manufacturing sequence and equipment limitations.

Required Materials

1. Soldering Iron System

   Bridgelux recommends the use of a temperature-controlled soldering iron of no more than 50-watt capacity and a temperature control range of at least 250°C to 350°C. Systems having an electronic temperature control are preferred as they generally provide more accurate and constant solder tip temperature.

The soldering iron tip should be a “single flat”, “screwdriver” or “chisel” shape of appropriate size that will fit the solder pad size and be within appropriate range of heat capacity matching the LED Arrays substrate thermal capacity. Conical, round or point shaped tips should not be used, due to the limited heat transfer surface that they provide.

Table 3 lists commercially available soldering systems from Weller that have been found satisfactory for soldering LED Arrays and summarizes recommended tip for the LED Arrays form factors. Many similar soldering systems are commercially available from other manufacturers.

Table 3: Soldering Systems and Tip Size

Model	Wattage	Solder Pencil	Solder Iron Tip LED Arrays
WES51	50	PES51	ETCC (0.125 in x 3.17mm Single Flat Tip)

Table 4: LED Arrays Wire Sizes and Soldering Temperature/Time

Array Type	Suggested wire Gauge	Wire Diameter	Suggested Soldering Temperature	Suggested Soldering Time
V & VHD LED Arrays	22 AWG	0.644 mm	**300**°C	4 to 6 Secs
V, VHD, & Vesta LED Arrays **Except following models:** **V6, V8, V10, VHD3, VHD4, VHD6, NTW6, DW6, DW9**	20 AWG	0.812 mm	**300**°C	4 to 6 Secs

2. Wire

Bridgelux recommends the use of stranded copper wire which has been ‘pre-tinned’ and stripped to the correct length prior to soldering. The correct wire gauge for each application is design dependent. The customer is responsible for selecting the wire gauge that meets all codes and regulatory requirements. The wire gauge will affect the thermal load placed on the soldering system, so a larger diameter wire (smaller gauge numbers) may require a higher soldering iron temperature setting or a longer soldering cycle time then a smaller diameter wire with the same LED Arrays. The wire gauge will also affect the final pull and peel loads to failure, and therefore must be chosen carefully. Suggested wire size, soldering temperatures and soldering times are provided in Table 4.

Other considerations for selecting a suitable wire include the allowable voltage drop across the length of wire, temperature requirements, insulating material requirements, and flexibility requirements to facilitate wire routing in the lighting system.

Wires should be cut to size and stripped to remove a couple millimeters of insulating material at the ends and be tinned with the same solder alloy as will be used in the soldering process. Many commercially available tools are available to perform this task. Bridgelux recommends that the length of the stripped wire be equal to or within 0.5mm greater than the dimension of the pad that the attached wire will be oriented to. This will minimize the overhang of bare wire over the non-pad area of the array, and possible heat damage to the LED Arrays phosphor area during the soldering process. It is good practice to minimize the amount of exposed wire beyond the soldering pad to minimize the possibility of a short circuit between the lead wires through the aluminum substrate to other parts of a luminaire.

3. Solder Alloy

Bridgelux recommends using lead free solders, such as SnAgCu, with high flux content. The flux core of the solder should be of a “No-Clean” type, with little or no Halide content, such as Kester “275” No-Clean. Typically solder wires with a small diameter, such as a 0.040 inch or 1mm, are easier to use. The final selection of a suitable solder is design dependent. Selection considerations include reliability requirements (such as thermal fatigue and corrosion), melting temperature, strength, reactivity with other components and wettability. Table 5 lists a sampling of solder alloy and their melting temperatures. For environmental reasons, lead free solders are becoming more widely used. If a low melting point solder is used, care should be exercised to ensure that the array case operating temperature will not weaken the joint during operation.

Table 5: Solder and Associated Melting Points

Solder Alloy	Melting Point	RoHS Compliant
63/37 Sn/Pb (Eutectic)	183°C	NO
SnAgCu	217 to 220°C	YES
$SnBi_{58}$	138°C	YES
$SnIn_{52}$	118°C	YES

4. Flux

Flux, a chemical cleaning agent, is typically used to remove oxidation from the metals to be joined prior to soldering. When using tin based solders, use the rosin recommended by the manufacturer. Some fluxes are water soluble or self-cleaning. The use of a water soluble or self-cleaning flux facilitates the removal of excess flux after the soldering process, and is therefore recommended. If a non-water soluble or non-self-cleaning flux is used, excess flux may be removed from the solder pad area using small amounts of isopropyl alcohol and a lint free cotton swab. Bridgelux encourages the use of “No-Clean” or Halide-free fluxes such as Kester 959T.

Solder flux is typically applied using a flux applicator. The flux applicator may be a bottle with a thin needle tip, a thin brush, or a flux pen with a fine tip.

5. Flux Cleaner

   If there is a need to clean the LED Arrays to remove excess solder flux, Bridgelux recommends using IPA (Isopropyl Alcohol) or de-ionized water and a clean cotton swab.

Recommended Soldering Process

In addition to the process recommendations that follow, all safety and operation guidelines provided by the soldering station manufacturer should be strictly followed at all times.

As noted in the Product Data Sheets in the Absolute Maximum Ratings section, the temperature of the Bridgelux LED Arrays solder pad should not exceed **300°C for more than 6 seconds**. The temperature and size of the solder iron tip, as well as the gauge (diameter) of the wire being attached and the soldering technique used will all affect how quickly and to what temperature the solder pad heats. The settings below are suggested starting points for evaluation when the specific equipment mentioned above is used. Other equipment may require different settings or techniques. The manufacturer should evaluate the quality of solder joints obtained before commencing with full production.

1. Select the appropriate solder iron tip for the array to be soldered from Table3 above. Set the soldering iron tip temperature to 275 to 300°C.
2. Pre-tin the tip of the soldering iron and the tip of the wires with a small amount of solder (see Figures 7a and 7b).

Note: Either a soldering iron or a “solder pot” can be used to pre-tin the wires. If a solder pot is used, it is recommended that the wire first be dipped into a container of liquid flux and then be dipped into the solder pot. Figure 7 illustrates methods to pre tin wires.

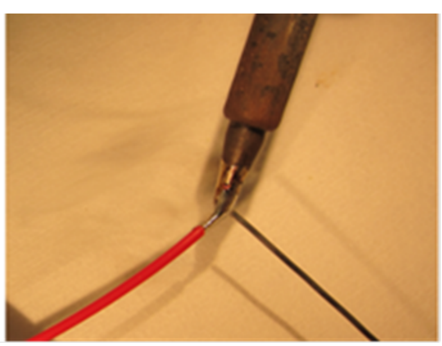


Figure 7a: Pre-tin the wire using a soldering iron

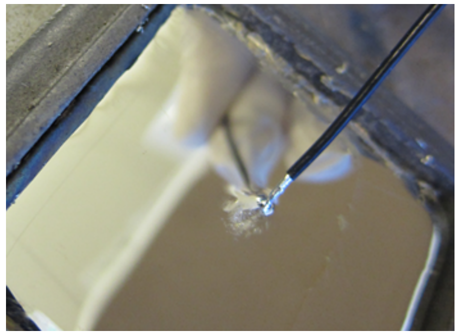


Figure 7b: Pre-tin the wire by dipping the tip of the wire into a solder pot

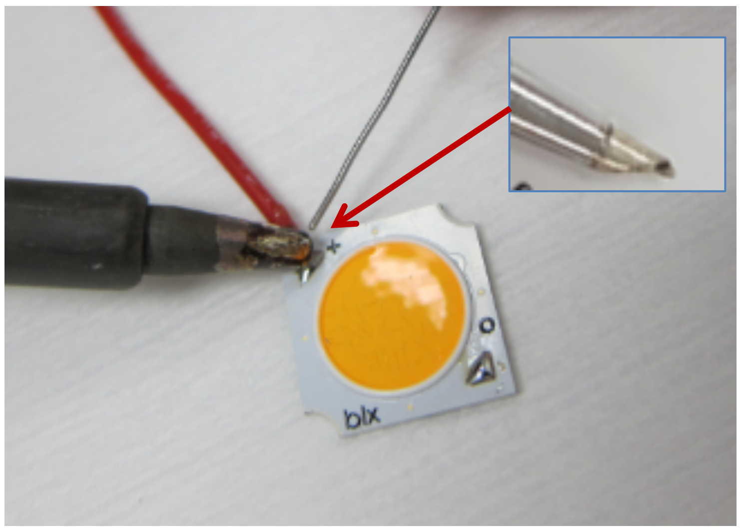


Figure 8: Pre-tinned solder pads and soldering a pre-tinned wire to a solder pad

3. Pre-tin the LED Arrays solder pads using the following process:
    a. Hold the soldering iron tip on the solder pad, allowing the pad to reach the temperature at which the solder wets and flows. This can be determined by touching the end of the solder wire to the junction of the soldering iron tip and the pad, and observing that the solder melts to and wets the pad.
    b. Apply solder to the solder pad and solder tip, allowing sufficient time for the solder to wet. The solder should form a small dome shape on the solder pad (see Figure 8).

4. Solder the pre-tinned wires onto solder pads using the process described below:
    a. Pre-tin the tip of the soldering iron.
    b. Place the pre-tinned wire tip on the solder pad.
    c. Place the hot tip of the soldering iron on top of the tinned wire end. Bring the solder wire to the area just below the solder tip (see Figure 8). Only a small amount of solder is necessary to form a joint. After the solder melts and while holding the wire in place, quickly remove the

soldering iron to prevent the formation of icicles. Allow the solder joint to cool until the molten solder solidifies. Do not move the wire or the array during this time. Figure 9 shows an example of a good solder joint. Signs of an overheated solder joint include solder spike formations and burnt flux residue. If these signs are observed, consider reducing the solder time or the soldering iron temperature. The process of soldering wires to the array should take just a few seconds.

d. Allow the solder joint to cool until the molten solder solidifies. Do not move the wire of the array during this time. Figure 9 shows an example of a good solder joint.

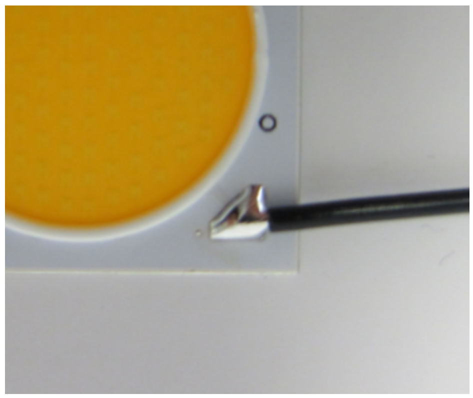


Figure 9: Example of a good solder joint

e. (Optional) Remove excess flux from the LED Arrays using IPA and allow to dry.

Figure 10 shows examples of bad solder joints or problems associated with soldering.

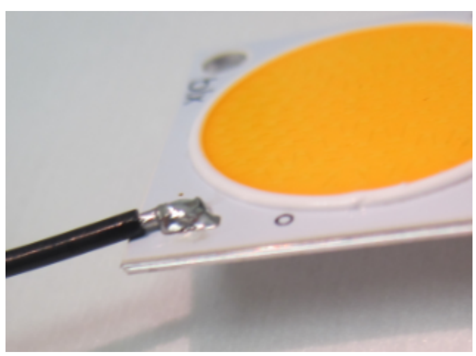


Figure 10a: Cold solder joint due to insufficient heat

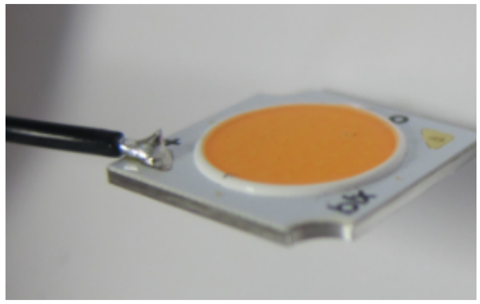


Figure 10b: Icicle due to excess solder and slow tip withdrawal

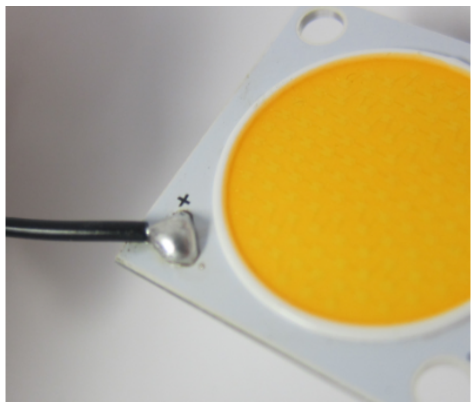


Figure 10c: Too much solder on the joint

In addition to not moving the wire or the array during the time that the solder joint is cooling, the soldered joint must also be handled with care while the fixture is being handled and placed inside a luminaire. Wires that are laid down and soldered horizontal or parallel to the array substrate should not be bent at a steep angle as this can apply mechanical forces on the solder pad that might make the solder joint fail. Likewise, wires that are soldered perpendicular to the array substrate should not be bent at a steep angle to be made to lay parallel to the array substrate as this will also apply mechanical forces on the solder pad that might make the solder joint fail. Example of problematic wire bending is shown in Figure 11 below:

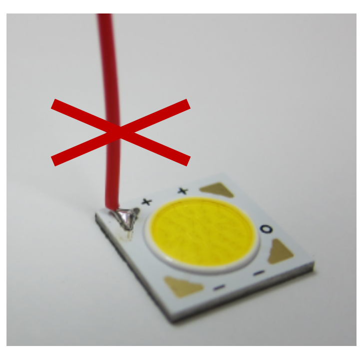


Figure 11: Example of problematic wire bending that induces stress on the solder joint

Mechanical Assembly and Fasteners for V and VHD LED Arrays (Not Applicable to Vesta)

All V and VHD LED Arrays **except the V8 LED Arrays** have either mouse-bites or mounting holes for securing the array to a heatsink mounting surface. In addition to the mounting features provided on the substrate, other attachment options include mechanical holders and dispensed or film adhesives, all of which can be used to secure the V Series. Please review LED Arrays data sheets and 3D CAD files for additional information regarding the LED Arrays size, feature locations, and optimal center-to-center mounting screw hole distances.

Screws

For all V and VHD LED Arrays products **except the V4HD and V8 LED Arrays** screws can be used to secure the LED Arrays to the mounting surface. The mouse-bites and holes are sized for M3 screws and Figure 12 below shows the LED Arrays and the mounting feature locations for use with standard machine screws. When using a screw, it is best to position the LED Arrays by aligning the threaded holes in the mounting surface with the mounting locations for the LED Arrays. Tighten each screw in an alternating pattern until each screw is tightened to the correct torque setting. If one screw is tightened fully first, the array could warp, the TIM material may not be compressed evenly, and the other screw may not tighten correctly.

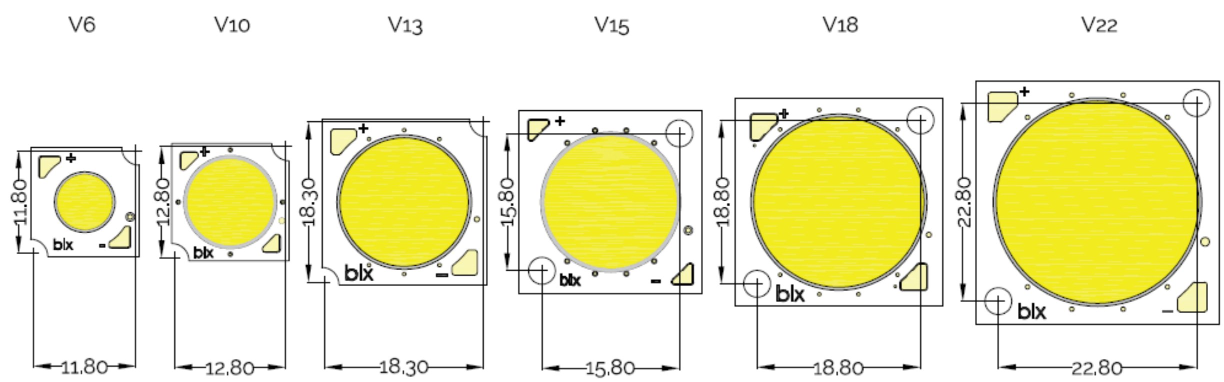


Figure 12: Mounting Locations for securing LED arrays to Mounting Surface (dimensions are in mm).

Screw Head Type

Bridgelux recommends using screws with a flat shoulder for mounting LED Arrays (see Figure 13 below). A wide variety of commercially available screws types can be used to meet design requirements. Examples include pan head, button head, round head, and truss head screws. Flat head and oval head screws or other screws with an angled surface should not be used.

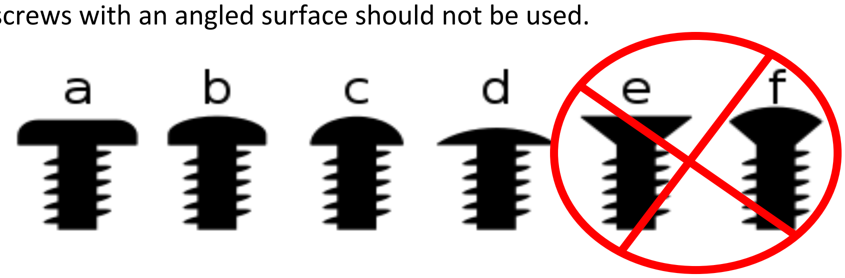


Figure 13: Screw Head Types for V Series

When selecting a screw, consider screws that have a low profile screw head. A low-profile screw head has the advantage of blocking less of the light emitted from LED array. Additionally, if a secondary optic is to be used in the application, a low-profile screw head allows more room for the optical components.

Screw Torque

It is critical to ensure the proper torque is applied to the fasteners when mounting the LED Arrays to a heat sink. If too little torque is applied, the thermal path between the LED Arrays and the heat sink will be compromised while excessive torque may result in damage to the LED array. Many variables affect the actual torque required to seat the screw such as thread friction, materials of the heat sink and screw, screw head friction, etc. For example, a machine screw with typical thread friction can be seated with < 1 lbf-in of torque, but it may take much higher torque to seat a thread forming screw. Table 6 below lists the suggested torque values based on the screw size shown and typical friction factors for machine screws in a pre-tapped hole. It is the responsibility of the customer to test and ensure the correct torque values are specified and used during the assembly process.

Flat Washers, Lock Washers, Self-Locking Fasteners, and Thread Sealants

Flat washers may be used to protect the LED Arrays from damage resulting from excess torque and to provide a wider distribution of the force applied by the screw. Flat washers, however, do not prevent fasteners from loosening in vibration environments. To prevent loosening of screws during vibration or thermal cycling, Bridgelux recommends using lock washers, self-locking fasteners, or thread locking sealants.

Table 6: LED Arrays LED Arrays Mounting Specifications

Array	Recommended Mounting Screws	Nominal Radius or Diameter	Suggested Screw Size	Recommended Torque N-cm (lbf-in)
Bridgelux V6	2 (see Figure 14)	R 2.0	M3.0	67 (6)
Bridgelux V10	2 (see Figure 14)	R 2.0	M3.0	67 (6)
Bridgelux V13	2 (see Figure 14)	R 2.0	M3.0	67 (6)
Bridgelux V15	2 (see Figure 14)	R 3.1	M3.0	67 (6)
Bridgelux V18	2 (see Figure 14)	D 3.1	M3.0	67 (6)
Bridgelux V22	2 (see Figure 14)	D 3.1	M3.0	67 (6)
Bridgelux V6 HD	2 (see Figure 14)	R 2.0	M3.0	67 (6)
Bridgelux V9 HD	2 (see Figure 14)	R 2.0	M3.0	67 (6)

Holders for LED array

For V8 LED arrays, holders have been developed by Bridgelux partners and can be used to secure LED Arrays to the mounting surface instead of using mounting screws. See figure 14 below for reference. These holders are intended to provide mechanical and electrical attachment, and it can contain features for optical alignment and COB pre-hold features to aid in assembly. There are other holders available for various forma factor of Bridgelux V, VHD, and Vesta LED Series LED Arrays. Contact Bridgelux Sales for more information about these holders.

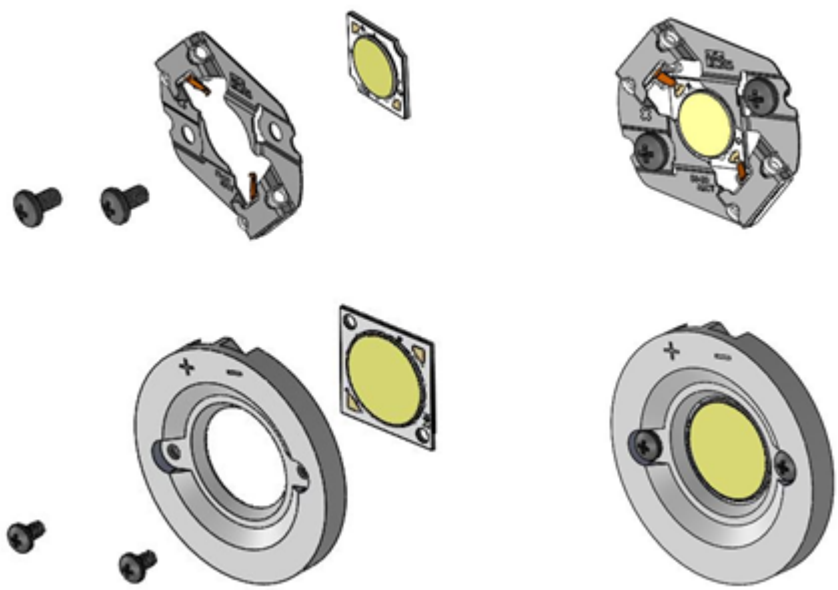


Figure 14: LED Arrays Holder Examples

Adhesive Attachment

There are various adhesive products in the market which can be used to secure the LED Arrays to the mounting surface. It is important to note that the adhesive must also provide thermal connection between the LED Arrays and the heat sink, so the adhesive must provide both a structural and a thermal interface function. Dispensed adhesives and film adhesives offer several advantages such as reduced components (no screws or holders), less interference with optics, etc. However, there are additional items to consider when using adhesives. Such items include wetting, % entrapped air, CTE mis-match, long term reliability due to temperature cycling, application consistency, mixing consistency, application time, cure time, curing processes, etc. It is best to work with adhesive suppliers directly to be sure the optimal adhesive product can be selected for the application in terms of thermal performance, mechanical holding performance, cost, manufacturing requirements, etc.

Heat Sink and Thermal Interface Materials

For information on the effective thermal management of arrays please refer to AN30.

Design Resources

Included below is a partial list of available design resources that may be used to handle and assemble LED Arrays LED Arrays into a lamp or luminaire. This is by no means an exhaustive and complete list, nor a recommended list of Bridgelux approved or qualified suppliers. It is the responsibility of the customer to fully qualify and validate luminaire design components and assembly processes to meet all code and regulatory requirements.

Bridgelux Design Resources
http://www.bridgelux.com/resources

Wire Gauge Maximum Current Capacity
www.powerstream.com/Wire_Size.htm

Mounting Screws, Washers, Lock Washers, and Self Locking Fasteners
www.longloklocking.com
www.nord-lock.com
www.nylok.com

Soldering and Pick and Place Tools
www.micro-mechanics.com
www.smallprecisiontools.com

Soldering Processes and Procedures
IPC J-STD-001 Requirements for Soldered Electrical and Electronic Assemblies
IPC/EIA J-STD-002 Solder ability Tests for Component Leads, Terminals and Wires
J-STD-004 Requirements for Soldering Fluxes

Disclaimer

This applications note has been prepared to provide guidance on the application of LED Arrays Arrays in customer applications. Bridgelux provides this information in good faith, but does not assume any responsibility or liability for design deficiencies that might exist in a customer design.

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It is the responsibility of the customer to ensure that the design meets all necessary requirements and safety certifications for its intended use.

About Bridgelux

At Bridgelux, we help companies, industries and people experience the power and possibility of light. Since 2002, we’ve designed LED solutions that are high performing, energy efficient, cost effective and easy to integrate. Our focus is on the light’s impact on human behavior, delivering products that create better environments, experiences, and returns—both experiential and financial. And our patented technology drives new platforms for commercial and industrial luminaires.

For more information about the company, please visit www.bridgelux.com