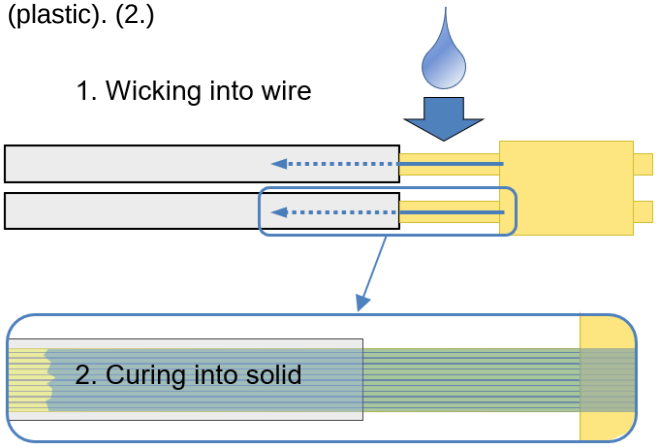
Technical Data Sheet

Product Description

BluSeal is a next-generation sealing solution for wire harness splices that can provide a superior barrier against contaminated water ingression, caused by capillary action and pressure differentials due to temperature changes.

As a low viscosity liquid, BluSeal wicks between wire strands (1.) and cures quickly to form a durable barrier. Fully cured BluSeal becomes a flexible acrylic polymer (plastic). (2.)



Features

As a unique automotive-grade formulation, BluSeal has excellent flexibility over a wide range of temperatures and is extremely resistant to moisture and chemical exposure. Normally used in conjunction with a secondary insulator such as electrical tape or heat shrink tubing, BluSeal is designed to provide a permanent and effective sealed splice over the life of the wire harness.

Unlike other splice sealing methods which rely on a relatively high-viscosity exterior encapsulation, BluSeal works by penetrating between each wire strand and deep under the wire insulating jacket. BluSeal can provide sealing on most splices even with high wire count and construction variances.

Physical Properties (typical)

Liquid State before cure	Appearance	Translucent blue liquid
	Base	Cyanoacrylate
	Viscosity @ 25C	11±3 cps
	Specific Gravity (d20)	1.06
	Storage @ 23C, 60% RH	6 months
	Application Conditions	23C, 60% RH

Cont.

Solid State after cure	Appearance	Translucent blue solid film
	UV Tracer, 50ppm	Glows yellow-green under black light
	Specific Gravity (d20)	1.17
	Hardness (Shore 00)	70-80
	Operating Temp. Range	-40C - 125C

@ 23C, 60% RH	Bonding Strength	Setting Time (5mg/cm² thickness)
Material	**Tensile (MPa)**	**(sec)**
PMMA	6.9	60
Rigid PVC	6.9	90
Flexible PVC	1.3	60
Crosslinked PE	2.0	20
Copper	4.8	3

Application Performance

Sealing Performance	
Thermal Aging	PVC Wire, 100C@3000hr, 125C@240hr XPE Wire, 125C@3000hr, 150C@ 240hr
Thermal Shock	-40C / 100C, 15min transfer, 144 cyc.
Chemical Resistance	Group1: @ 100C, 1000hr, 5 exposures Group2: @ 100C, 240hr, 1 exposures
Environment Cycling	Temperature: 100C / 25C / -10C Humidity: 93% / 80% / na Cycles: 10 cyc. (10 day)
Hot Water Jet	14-161 L/min, 8000-10,000 kPa, 80C, 30s per position
Vibration	IEC 60068-2-6 @ 8hr Freq.10-20hz, 9.8 m/s^2, -1 oct/min Freq. 25-500hz, 44 m/s^2, -1 oct/min
Cold Impact	200g @ -40C / 16hr
Flammability	No burn rate change w/ BluSeal
Cyclic Corrosion	1% complex salt mist application. High temp/humidity, High temp/dry. Cycle, 24hr. 32 cyc.
Flexibility	LV312-3 bend test
Seal Test Method	Performed before and after each test. 0.5 BAR (7.5psi) @ 30sec, no leakage under water

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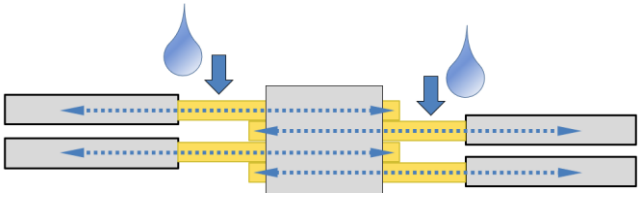
Applying BluSeal

Before storing, handling or applying BluSeal, it is very important to fully read and understand the precautions and guidelines found in Eurotech Safety Data Sheet Document Number: ETD-55.

Conductors, insulators and splices to be sealed with BluSeal must be completely free of contamination including water, oil, dirt, excess solder, flux, etc..

BluSeal can be applied to a splice by precision drop application or by dipping the entire splice into a BluSeal bath. The final method and process selected will depend on the splice construction and the process capability of the manufacturer.

BluSeal is designed to wick between wire strands and insulators at the microscopic level (exactly the way water and contaminants do) so it is critical to insure BluSeal is applied to every entry area and surface that water could penetrate into the crimp, welded nugget, and wire lead. BluSeal applied at one side of a crimp or weld nugget will be drawn to the opposite side through any existing gaps or cavities. It will also be drawn under the wire insulator.



Target Application Locations

There are three general target areas for applying BluSeal:

1. The tip of the terminated wire strands (if exposed)
2. The crimp or weld nugget (where multiple leads are joined)
3. The area where the wire strands enter the insulation.

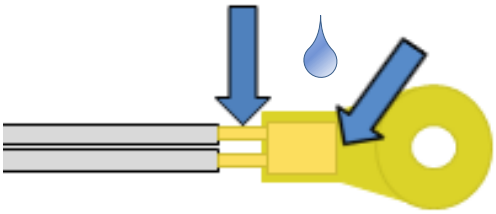
Eyelet Application

First apply BluSeal to the tip of the strands. If more than one drop is needed, allow the first drop to penetrate before adding the next. If the terminal is a closed barrel or lug type, or the terminal has been solder-dipped, this step should not be necessary.

Next, apply BluSeal to the area between the terminal and the wire insulators. This application should allow the BluSeal to penetrate under each wire insulator, as well as into any remaining spaces that may have been left unfilled in the crimp or nugget, from the first application site.

Eyelet Application Tips

1. It is important to keep BluSeal away from the conductive mating surface of the terminal, therefor dipping the entire terminal in BluSeal is not possible.
2. It may be helpful to position the eyelet upright (wire leads down), until the BluSeal is sufficiently cured, to prevent any excess liquid BluSeal from running over the conductive mating surface.



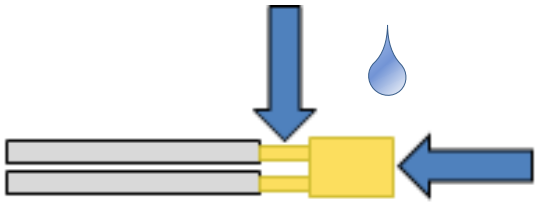
Eyelet Application

One Sided Splice

First apply BluSeal to the tip of the strands. If more than one drop is needed, allow the first drop to penetrate before adding the next. If the terminal has been properly solder-dipped, this step should not be necessary.

Next, apply BluSeal to the area between the nugget and the wire insulators. This application should allow BluSeal to penetrate under each wire insulator, as well as any remaining unfiled spaces in the crimp or nugget from the previous application site.

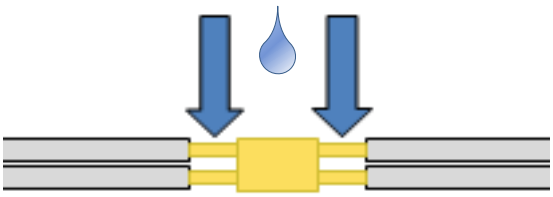
As an alternative application method, this splice construction can be dipped in a BluSeal bath. See section on Dip Application for more information.



One Sided Splice Application

Two Sided Splice

Apply BluSeal to each area between the nugget and the wire insulators. This application should allow BluSeal to penetrate under each wire insulator, as well as any remaining unfiled spaces in the crimp or nugget from the previous application.
As an alternative application method, this splice construction can be dipped in a BluSeal bath. See section on Dip Application for more information.



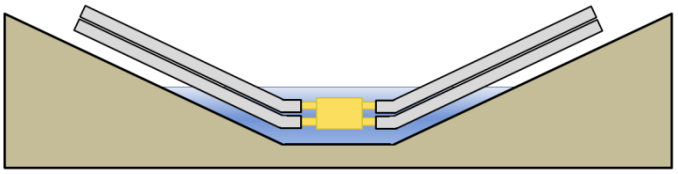
Two Sided Splice Application

Splice Application Tips

1. For effective splice sealing, it is critical that each wire lead come in contact with BluSeal. At contact, capillary action will draw BluSeal where it is needed.
2. At times, one drop of BluSeal is sufficient to make contact with leakage points simultaneously. In this case, the BluSeal should be drawn equally into the entire crimp nugget. Then additional drops can be applied at the same location as needed.
3. In applications with three or more leads, it may be necessary to apply BluSeal to more than one application site around the bundle to insure BluSeal comes in direct contact with each individual lead.
4. In applications with four or more leads, flooding the gaps between the wire leads may be necessary to insure there are no dry wires in the interior of the bundle construction.

Dip Application

Another application method is dipping the entire splice into a BluSeal bath. This method is recommended for more complex splices where cavities are formed in the center of the bundle core, or where some leads are not accessible using perimeter applications.



Two Sided Splice Dip Application

Dip Application Tips

1. The nugget should be fully submerged for multiple seconds to allow the BluSeal to permeate between the wire strands. Optimal dip duration depends on the complexity and construction of the splice.
2. Creating a bend or twist motion on the leads may assist in removing any air pockets in the core of the nugget.
3. Surplus BluSeal should be allowed to drip back into the bath after dipping.
4. Excess BluSeal trapped in larger voids should be displaced to avoid extended cure times and/or undesired transfer to surrounding work areas.
5. Excessive adhesion between wire lead insulators can be minimized by controlling dip depth and maintaining the orientation until surplus BluSeal is displaced.

Optimal Volume Of BluSeal

BluSeal is designed to cure quickly at an optimal film layer thickness of 5 mg/cm^2. Excessive BluSeal in the form of puddles, drips or filling wide gaps will cure much slower. The capillary effect between wire strand surfaces will draw the BluSeal to the proper thickness. After BluSeal begins to set up, the addition of more product will cause puddling, running or dripping. This will not degrade the final sealing performance, however it can result in unwanted contamination of surrounding surfaces, equipment and hands.
As with any splice sealing technology, careful attention to detail and process validation is highly recommended prior to serial production activity.

Removing Excess BluSeal

If required, excess BluSeal removal can normally be achieved by tapping the splice assembly on a hard surface. The method and degree of force should be determined by the wire harness manufacture. Excess BluSeal is best discarded onto a hard cleanable metal surface or disposable paper.
Other displacement methods include using a low-pressure air knife, or vibration.

Curing

BluSeal should be surface cured prior to the samples being handled or stacked. With the optimal layer of BluSeal, cure time can range from seconds to minutes, depending on the atmosphere and conditions. Cure times can be reduced with the introduction of high humidity, moderate-temperature convection heating or other heating methods including application of heat shrink tubing. Contact Eurotech for more information on forced air blow-off or superheated steam applicators.

Storage

- The shelf life of a unopened 500g bottle of BluSeal is 6 months @ 23C, 60% relative humidity.
- Usage of BluSeal beyond the recommended storage period can result in increased viscosity, lowering the effectiveness of the product.
- Avoid moist or humid storage conditions.
- Fasten cap tightly to avoid exposure to moisture.
- Avoid direct exposure to ultraviolet light (keep in light-proof packaging).
- Avoid storing at a high temperatures.
- Never store BluSeal with an accelerator.
- If contaminated during use, it is not recommended to return BluSeal to its original container.

To extend the shelf life:

- Store BluSeal with a desiccant in an aluminized pouch.
- Refrigerate at approximately 5C when not in use. BluSeal must be brought back to room temperature prior to application.

Disclaimer

All product data provided is prepared in a controlled laboratory environment. Results may vary under actual application conditions.

BluSeal is a result of extensive research and development, and is manufactured using the highest quality and process control. The product specifications provided herein correspond to the latest technical standards. However, the end user shall be responsible to validate the application process and final product performance of each specific application.

Warning

Eye and Skin irritant. Bonds skin instantly.
Combustible – keep away from heat and flames.

If cyanoacrylate is spilled or dripped onto cotton surfaces or clothing, rapid polymerization will occur and can create a strong exothermic reaction, generating heat.

BluSeal can be removed from surfaces using Acetone.

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