

Bonding and Grounding wire mesh cable tray.

 **legrand**[®]

Cablofil

Don't be misled by false advertising claims relating to field cut wire mesh cable tray voiding UL Classification.

Recent claims have suggested a field cut (modification) to cable tray for the creation of bends and turns will cause that system to lose its UL Classification. If you take what UL states literally, ANY cut to tray (ladder or wire) would cause a loss of UL Classification. For example, when a straight section of tray is cut to length and used in conjunction with a factory fitting — this installation would also lose its UL Classification since per UL definition the tray has been “field modified”.

Now consider that it has been standard practice to field modify wire mesh tray for more than 40 years.

How should Contractors and Inspectors interpret the rules, versus standard practice?

Since EVERY cable tray installation has been in some way “field modified”, are we really interpreting UL correctly? Consider this: **UL only classifies the tray when it is the EGC (Equipment Grounding Conductor) and studies show wire mesh tray is the EGC less than 1% of the time.**

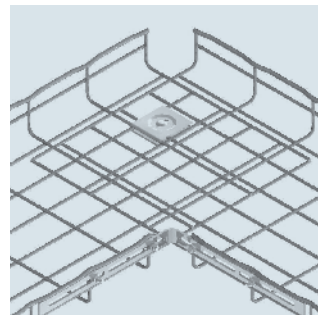
Therefore, 99% of tray installations only require bonding, not grounding serving as the EGC. Grounding relates to power cables and is governed by NEC 392.7(B) (see pages 2 & 3 of this document). Bonding relates NEC 392.7(A). In most cases, wire mesh tray installations that support data or power cables are required only to be bonded.

THE FACTS ON BONDING: As long as UL Classified Splices are used to BOND tray together, splicing field modified Wire Mesh Cable Tray (typical examples shown below) is no different than splicing two straight sections of tray together.

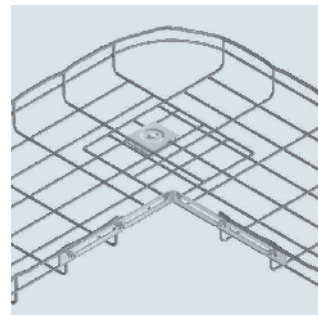
THE FACTS ON GROUNDING: For rare applications when tray is to act as an EGC (Electrical Grounding Conductor), whatever cross-sectional area is removed from the tray in the field, Cablofil states (as per their website), “The standard industrial practice is that an appropriate sized jumper be placed across the field modified tray(s).” Most often a continuous ground wire is run the length of the tray.



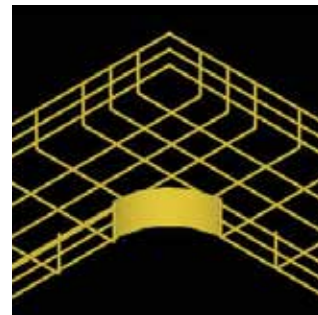
UL Classified WMCT Bonded with UL Classified Splices



Two UL Classified WMCT's Bonded with UL Classified Splices



One UL Classified WMCT Bonded with Splices



UL Classified Pre-formed fitting which loses its UL Classification when the adjoining straight section is cut to length

What is UL's position on this matter?

The following is reprinted from the online certification directory with permission from Underwriters Laboratories, Inc.:

“Cable tray assemblies have been investigated for bonding between sections using the minimum hardware provided by the manufacturer. The manufacturer may supply cable tray sections and fittings without a positive mechanical means for completing the grounding connection. Assemblies not provided with positive mechanical grounding connections are intended to be bonded with mechanical connectors or bonding jumpers provided by the installer, in accordance with 392.7(B)(4) of the NEC.”

UL certification directory: Go to www.ul.com/database and type “cable tray assemblies” in the search field.

If you are confused about UL Classification accusations or want to find out more, download our white paper: **The facts on field modification of UL Classified wire mesh cable tray** by Fred Hartwell, and read our recently published **Wire Mesh Technical Guide** available on our website at: www.legrand.us/cablofil.

For other questions regarding bonding and grounding wire mesh cable tray, please call Legrand/Cablofil at: 1-800-658-4641.

In 99% of installations, the tray is only required be bonded and cannot be the EGC (Equipment Grounding Conductor). According to NEC and UL, EGC does not apply to Data or Multi-conductor Cable Tray applications.

BONDING

Illustration 1: Data Cables

Tray bonded per NEC 250.96 with UL splices. No EGC Required.

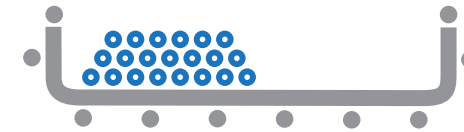


Illustration 2: Multi-conductor Power

Tray bonded per NEC 250.96 with UL splices. EGC inside conductor per UL.

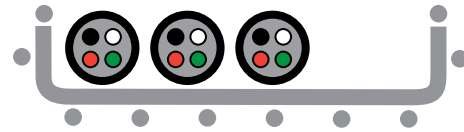
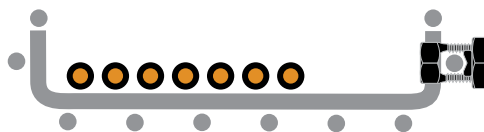


Illustration 3: Single Conductor Power

Tray bonded with EGC continuous ground wire on side, sized per max breaker.



The above illustrations represent over 99% of all cable tray installations.

These installations must be bonded per NEC 392.7(A) which states:

“Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96 and part IV of Article 250.”

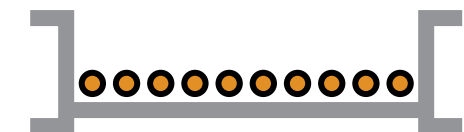
Article 250.96(A) “Metal raceways, cable trays, cable armor, cable sheath, enclosures, frames, fittings, and other metal non-current-carrying parts that are to serve as grounding conductors, with or without the use of supplementary equipment grounding conductors, shall be bonded where necessary to ensure electrical continuity and the capacity to conduct safely any fault current likely to be imposed on them.”

- To ensure a low impedance grounding path, all steel conduit, wireway, enclosures, and cable tray products are recommended be spliced with UL Classified Splices and bonded to the building steel at the end of every tray run and every 50-65 feet to ensure electrical continuity and the capacity to conduct safely any fault current likely to be imposed on them which is based on relatively high resistance of steel products. should be bonded every 50-65 feet as well to reduce impedance.
- Common connections to building steel facilitate this bonding practice, namely beam clamps, threaded rod and trapeze supports. When firmly attached to building steel with threaded connections and galvanized components, cable tray installations are adequately bonded without additional jumpers.
- If the cable tray supports are attached to concrete or other nonconductive materials, bonding jumpers from the cable tray to building steel are required every 50-65 feet or a continuous ground wire attached every 50-65 feet of cable tray run may be a simpler approach.

GROUNDING

Illustration 4: Single Conductor Power

Tray bonded with EGC continuous ground wire on side, sized per max breaker



The above illustration represents less than 1% of all cable tray installations (mainly used in refineries and other large industrial areas).

These installations must be grounded per NEC 392.7, which states:

“In order for Cable Tray to be permitted to be used as EGC (Equipment Grounding Conductor), all of the following 1-4 requirements must be met.”

1. The cable tray sections and fittings are identified as an EGC.
2. The minimum cross-sectional area of cable trays conform to the requirements in Table 392.7(B).
3. All cable tray sections and fittings are legibly and durably marked to show the cross-sectional area of metal in channel cable trays, or cable trays of one-piece construction and the total cross-sectional area of both side rails for ladder or trough cable trays.
4. Cable tray sections, fittings, and connected raceways are bonded in accordance with 250.96, using bolted mechanical connectors or bonding jumpers sized and installed in accordance with 250.102.

WHAT ARE THE OTHER BENEFITS OF BONDING AND GROUNDING?

Reduces Noise and EMC

- Remove electro-static potential
- Remove induced magnetic currents

Increases Equipment Safety

- Remove lightning currents
- Remove transient currents

Improves Personal Safety

- Remove potential fault currents
- Low impedance path to trip breaker

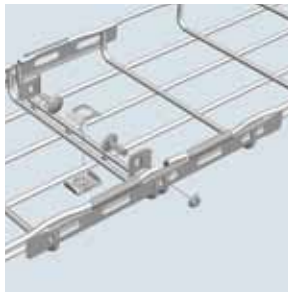
Legrand/Cablofil accessories for bonding and grounding installations

Legrand/Cablofil wire cable tray and our wide range of splices are tested and comply with CSA, IEC, NEC, NEMA and UL requirements for low resistance. Excellent electrical continuity and grounding is essential for safe installations and reduces shock hazards. To see a complete list of UL Classified splices for bonding and grounding wire mesh cable tray: visit www.legrand.us/cablofil.

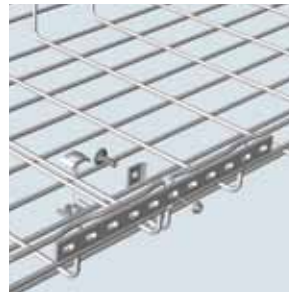
UL CLASSIFIED SPLICES



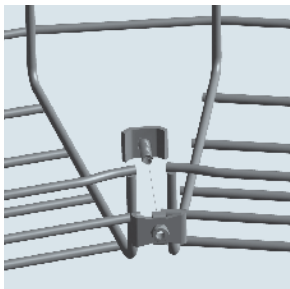
EDRN Fast Splice



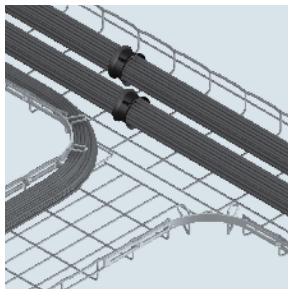
EDT Splice Plate



ED 275 Universal Splice Bar



SWK Splice Washer Kit



RADT 90 Kit Radius Tee Kit

GROUNDING ACCESSORIES



GNDSB Grounding Lug for AWG 4-14 ground wire



GNDCL Grounding Lug for AWG 1/0-6 ground wire

www.legrand.us/cablofil

800-658-4641

8319 State Route 4

Mascoutah, IL 62258 USA

 **legrand**[®]

Cablofil

designed to be better.