

# Fluxtrol

## Material Application & Maintenance



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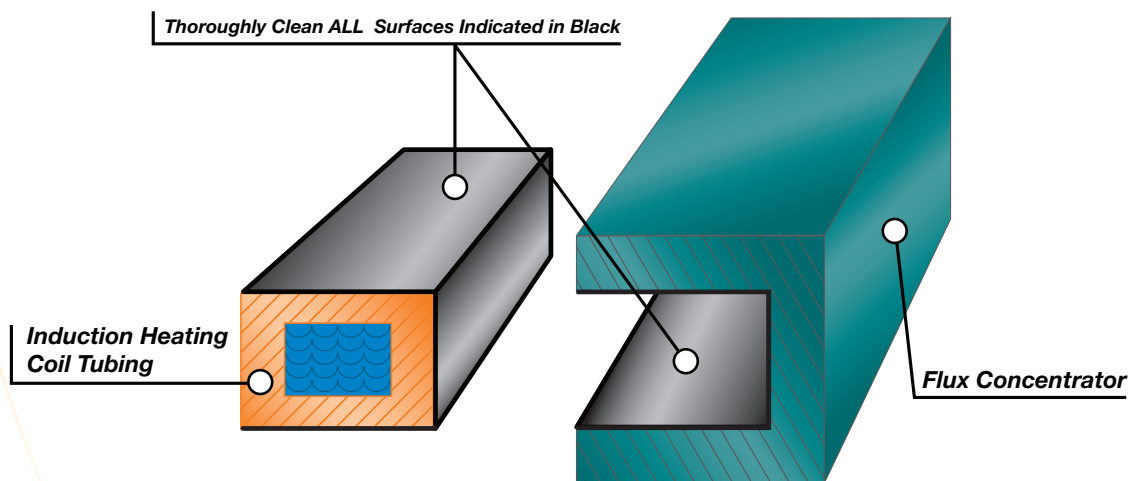
### Surface Preparation

Best **FLUXTROL**<sup>®</sup> & **FERROTRON**<sup>®</sup> material performance may be realized when sufficient care is administered to prepare Flux Concentrator and Induction Heating Coil in the area of attachment/interface as described below:

*Flux Concentrator* - Clean all surfaces that are to be in intimate contact with Induction Heating Coil by removing any paint. Lightly sand with "medium" to "medium-fine" emery paper (80-180 grit) to give adhesive a good "gripping" surface. Remove any accumulated dust by wiping with a clean dry cloth or with an organic solvent such as acetone.

*Induction Heating Coil* - Clean all surfaces that are to be in intimate contact with Flux Concentrator by removing any machining fluids/oils or residual quenchant. This may include sandblasting the copper surface and then wiping it with an organic solvent (such as acetone). Lightly sand with "medium" to "medium-fine" emery paper (80-180 grit) to give epoxy adhesive a good "gripping" surface. Remove any accumulated dust by wiping with a clean dry cloth.

### Surface Preparation



### Attachment of Flux Concentrator to Induction Coils

There are two main methods for attaching **FLUXTROL**<sup>®</sup> & **FERROTRON**<sup>®</sup> flux concentrators to the induction coil: Adhesive and Mechanical.

For both attachment methods, flux concentrator lifetime is advanced when it is in the best possible thermal contact with the induction coil. This can be achieved through the use of a uniform and thin layer of a thermally conductive "medium" in-between the contact surfaces.

### Adhesive Bonding

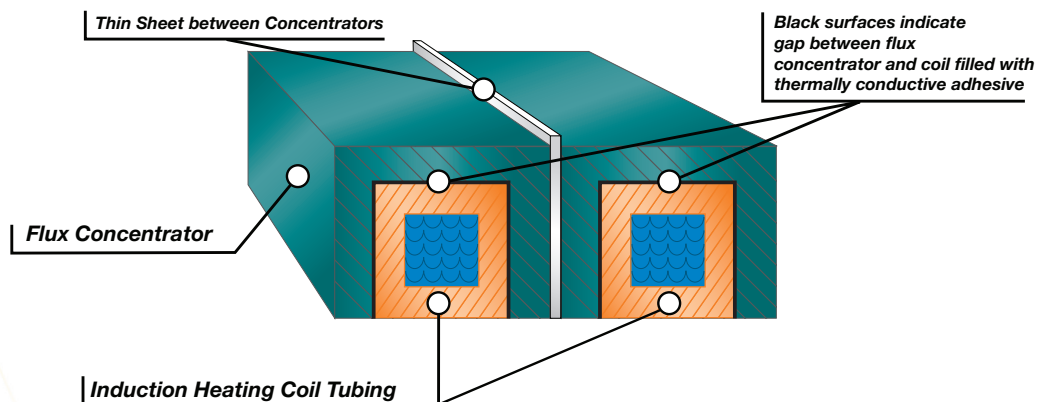
Adhesive Bonding is the most common method of attaching Fluxtrol flux concentrator product to an induction heating coil. Any epoxy adhesive used must have the following characteristics:

high temperature stability  
low moisture absorption  
high bond strength

chemical resistance  
good thermal conductivity  
electrically non-conductive

Care should be taken to clean all dirt, oils, greases and mechanically roughen the contact surfaces prior to bonding. A thin layer of epoxy adhesive should be applied to both the Fluxtrol product and induction coil copper contact surfaces and then these two surfaces are to be brought into contact and held together with light pressure. Wipe away the excess glue with a damp cloth and then follow the curing instructions for the respective adhesive.

### Adhesive Bonding



### Adhesive Bonding (Continued)

For common applications, we suggest a gap or space in-between inductor copper and Fluxtrol product of ~0.008" – .012" (0.2 – 0.3 mm) and the use of J-B Weld Epoxy Resin Part Nos. 8265-S & 8265 (<http://jbweld.net/sales/index.php#map>).

For very severe environments, we recommend 50–3100 High Thermal K Heat Transfer Epoxy Resin (from [www.epoxies.com](http://www.epoxies.com)) with a suggested gap in-between inductor copper and Fluxtrol product of 0.004"– 0.006" (0.10 – 0.15 mm).

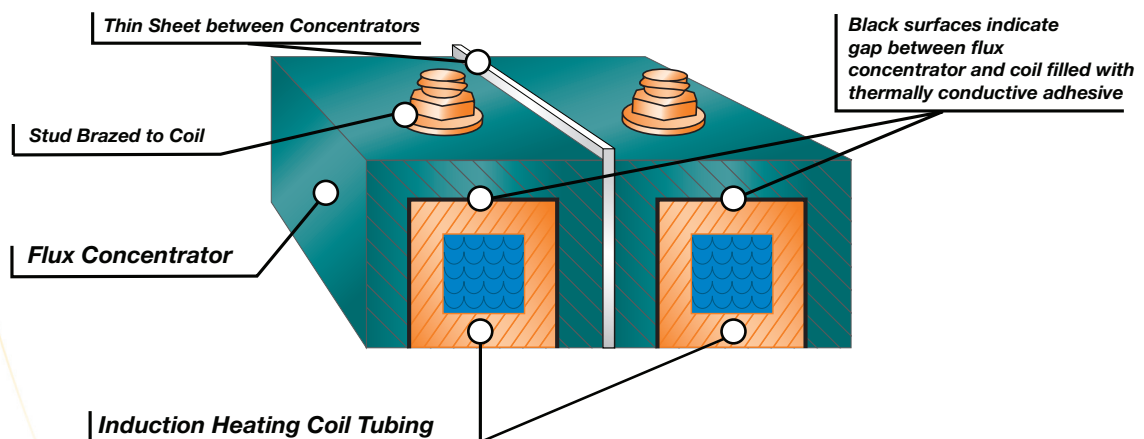
NOTE: Silicone rubber is a poor thermal conductor and is recommended for use only in lightly loaded or short duty cycle inductor coils.

### Mechanical Fastening

Mechanical Fastening is another example of how Fluxtrol flux concentrators are attached to an induction heating coil. The purpose of the mechanical fastener is to keep the flux concentrator in place. A technique may be used where a stud (i.e., screw or bolt made from brass or copper) is brazed to the induction coil coupled with a clearance hole drilled through the Fluxtrol product. Use where possible a thermal medium that is electrically non-conductive and thermally conductive i.e., "heat sink paste" (usually silicone based), like those used for mounting transistors in power supplies. Both the Fluxtrol product and Inductor contact surfaces should be coated with a thin and uniform layer prior to fastening. After tightening down the nut on the stud, excess paste should be wiped away with a dry rag. Be careful not to over tighten the nut, as this may lead to cracking of the Fluxtrol flux concentrator. Use of plastic nuts may work to lessen the chance of cracking the concentrator.

Fluxtrol recommends using the appropriate removable thread locker such as *Loctite 246* high temp/medium strength thread locker for metal fasteners and *Loctite 425* for plastic fasteners. This will work to eliminate the possibility of the mechanical fasteners loosening over time due to vibration and insure the Fluxtrol material stays properly in place on the coil.

### Mechanical Fastening



### Maintenance of Coils with Fluxtrol Concentrators

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In many applications Fluxtrol concentrators work longer than the coil copper.

Mechanical damage is one of the main factors in coil / concentrator failure and proper preventive measures must be taken.

#### *Visual Control of Fluxtrol Concentrators:*

Periodically check concentrator integrity (loose fasteners, cracks in adhesive, mechanical damage) and insulation conditions when applicable.

Periodically clean metallic chips and scale from concentrator.

If Fluxtrol concentrator is seen to have a dark surface this may be due to smoke and quenchant residue build up. Gently scratch the surface of the concentrator with a knife or other sharp object. If material surface exposed has a grey metallic color and is solid, concentrator is still OK for operation.

A surface that is both dark and crumbling results from the material being overheated and in this case the concentrator must be replaced. If coil lifetime was not sufficient, supply additional cooling or make coil design changes.

In some applications, especially in installations with tube generators, sparking from the concentrator to the part or fixturing may occur. If there is ground protection the equipment will turn off quickly however there may be small areas of the concentrator damaged by this sparking. Remove the damaged volume of material with a sharp tool and eliminate the factor that caused the sparking to occur (too small a gap, metal particles, etc.). The concentrator can continue to work as long as the damaged area is small.