

CALM, COOL & CONNECTED

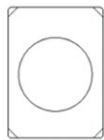
CMC's patented **Sharkbite™** and **Keyhole™** transformer connectors feature a contact surface on the transformer bushing connection that is 10-15 times larger than our closest competitor. Independent tests prove that this additional contact surface leads to a much cooler operating transformer connection, less energy loss, and higher equipment life. These products were designed specifically to respond to our customer needs and represent just some of the ways our products are a good fit.

CMC has built our name on delivering high-quality transformer connectors. We offer industry-leading designs for single-phase and three-phase transformer applications.

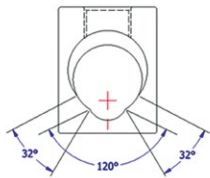
Whether you're looking for connectors for general purpose, heavy duty, or stud mounted applications, CMC delivers:

- Clear-plated connectors for low contact resistance
- The Sharkbite™ stud-mount design provides one hole for both 5/8-inch and 1-inch studs with 140 degrees of surface contact (10 times more contact surface than similar competing designs)
- The Keyhole™ stud-mount design for a 5/8-inch stud with 177 degrees of surface contact (15 times more than similar competing designs)
- Stacked and lay-in designs for three-phase pad mount applications
- Designs with higher mechanical interlock with the transformer stud for no wobble.

SCREW-ON

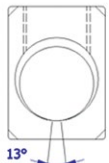


SHARKBITE™

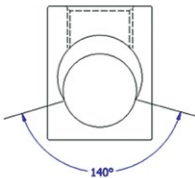


The **CMC® Sharkbite™** design runs cooler than a screw-on style because its design utilizes more pressure (clamping force).

STANDARD SLIP-FIT



KEYHOLE™



The mounting holes of **CMC® Keyhole™** designs are actually sized for the transformer stud, increasing contact area around the circumference of the mounting hole and transformer stud (177°).

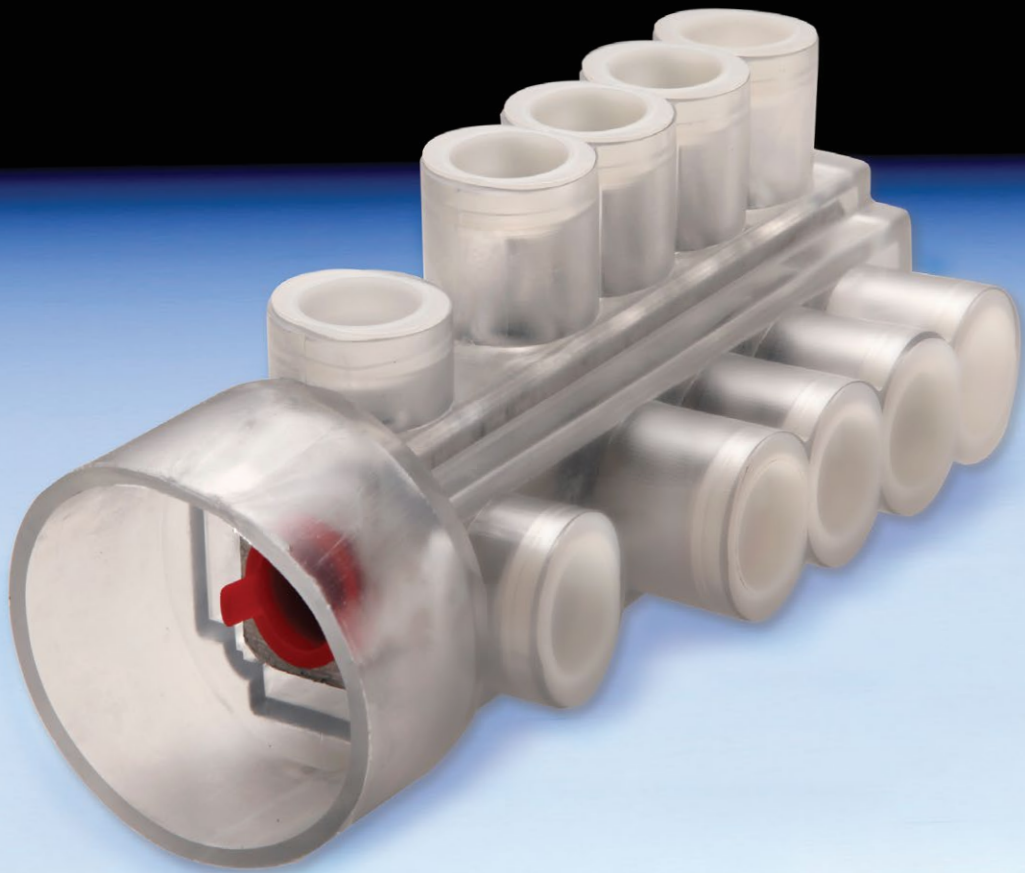


www.cmclugs.com | 1-513-860-4455

Run With A Cooler Crowd

Sharkbite™ and Keyhole™
Transformer Connector Designs

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At our core, Connector Manufacturing Company is a connector manufacturer, offering both mechanical and compression designs. Our products are marketed to utilities, original equipment manufacturers and commercial/industrial accounts.

Our connectors are known industry-wide for:

- Compact design
- Range-taking capability
- Reliability
- Relatively easy installation
- Certification with Underwriters Laboratories and the Canadian Standards Association requirements for listing

These factors—together with our dedication to the highest quality ISO certified standards available and an unsurpassed service level — deliver maximum reliability.

CMC® is also involved in the standard development process with UL, CSA, ANSI, CANENA, NFPA, ESFI and NEMA Committees — this is designed to ensure that CMC products safely meet the challenges and requirements out in the field.



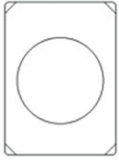
BETTER CONNECTIONS

When current flows through resistance, heat is generated. The transformer stud and connector have internal resistance, but the joint between the two produce the highest resistance. By nature, the current will flow between the mated surfaces at the points or areas of least resistance. To avoid concentrated paths of current flow (hot spots) the clamping forces must distribute the contact pressure as uniformly as possible over the greatest area of surface contact. Clearly, one can reduce the amount of heat generated, by reducing the contact resistance of the electrical joint.



The contact resistance of an electrical joint is determined by two elements: pressure and surface preparation. The contact resistance is related to the pressure applied. The greater the pressure applied, the lower the electrical joint resistance. Obviously, the goal is to achieve the lowest possible joint resistance in order to run the coolest and suffer the least amount of energy loss. Surface preparation includes the cleaning and removal of dirt, grease, oxidation and the application of oxide inhibitor.

The pressure (clamping force) is created in a transformer stud connector by tightening the jam nut (on a screw-on style), or tightening the set-screws (on a slip-fit style). Specific design features of a connector will influence the amount of pressure at the joined surfaces. The pressure actually used can be significantly less than the total pressure applied to the joint. Since pressure at the joint is what directly affects the electrical resistance, the connector design that uses the greatest amount of uniformly applied force will have the lowest joint resistance. By design, a slip-fit style connector uses more of the total pressure and produces an electrical connection with a lower joint resistance.



Screw-On

First impressions may have one thinking a **screw-on style connector** provides the greatest amount of surface contact area. However, the threads in the connector are slightly oversized, providing some "slop" and allowing them to screw on freely, otherwise seizing would occur. This typically allows about half of the thread on the stud to make contact with the opposing thread on the connector. The jam nut then shifts the connector to one side, making surface contact on only one side of the screw thread. Taking into account all the angles — thread faces, thread pitch, etc. — and a screw-on connector's total surface area, the contact area is reduced to approximately 25% of the total thread area available.



Standard Slip-Fit

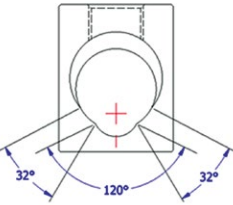
A **standard slip-fit style connector** also operates with a reduced contact area between the connector and transformer stud. Studies show that both faces of the connector threads and stud threads make contact. The pressure drives the threads together which provides a greater area of contact per thread than with a screw-on connector. However, this contact is only taking place over a few degrees (less than 13°) where the stud touches the oversized mounting hole.



Stud-mount transformer connector, insulated slip-fit with patented Sharkbite™ mount

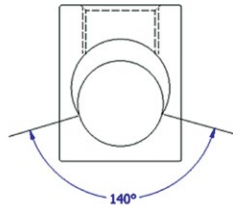


Space-saver stud-mount transformer connector, offset, compact secondary transformer stud connector with patented keyhole mounting



Sharkbite™

The **CMC Sharkbite™** design runs cooler than a screw-on style because its design utilizes more pressure (clamping force). It runs cooler than a standard-fit because it has more surface area in contact with the transformer stud. With a 1" transformer stud, approximately 98° of thread surfaces are engaged. The Sharkbite™ design also accepts a 5/8" transformer stud in the same mounting hole providing over 140° of surface contact area on the smaller stud.



Keyhole™

The **CMC Keyhole™** design provides the maximum thread engagement (approximately 177° of surface contact) and utilizes more of the total force applied. This makes the Keyhole™ design the coolest running of the available transformer stud mounting designs. The Keyhole™ is designed to fit one size transformer stud, either a 1" or a 5 / 8" stud. Both the Sharkbite™ and Keyhole™ designs provide more surface area contact than the standard slip-fit and the screw-on connector. This is because the mounting holes of the connector are actually sized for the transformer stud. This increases the contact area around the circumference of the mounting hole and the transformer stud up to 98° on the Sharkbite™ design and 177° on the Keyhole™ design.



Stud-mount transformer connector, insulated slip-fit with patented Sharkbite™ mount



Space-saver stud-mount transformer connector, offset, compact secondary transformer stud connector with patented keyhole mounting

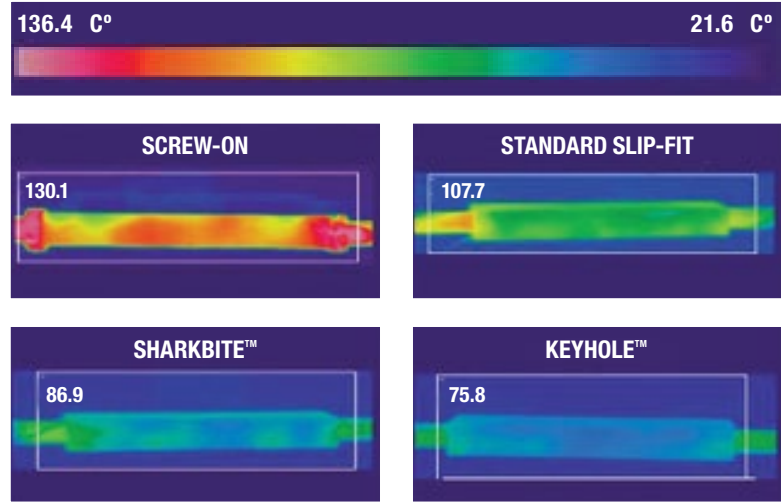


Stud-mount transformer connector

SOMETHING COOL TO TALK ABOUT

Lower Operating Temperatures Lower the Energy Loss and Extend Equipment Life

Third-party test lab results and certified thermographic images show a dramatic difference in hotspot temperatures between standard slip-fit and screw-on connectors versus CMC's patented Sharkbite™ and Keyhole™ designs.



6061-T6 Aluminum Alloy

CMC proudly uses 6061-T6 aluminum alloy, which was chosen to balance strength and conductivity. This aluminum has nearly a 2:1 advantage in yield strength to that of a sand-cast alloy 356 or die-cast alloy AXS679.

This allows for a higher safety margin while the conductivity is a most favorable 43% IACS (International Annealed Copper Standard).