

VariSTAR® type composite light-duty under-oil (CLU) MOV arrester FAQs

Q: *What is the benefit of a non-fragmenting failure mode for under-oil arresters?*

A: All under-oil arresters in the past were designed to eject the MOV disks into the tank during failure to allow for the arrester to be removed from the circuit. Transformer designs were limited because they had to be constructed for fragmentation to occur without damaging transformer components. The CLU arrester is uniquely designed to not fragment upon failure. Since the CLU arrester remains intact, the arrester cannot physically damage other components in the transformer if it fails. This non-fragmenting feature allows for more compact, reliable transformer designs.

Q: *What functionality does the composite wrap on the CLU provide?*

A: Previous under-oil designs use a mechanical spring system to put the MOV disk stack in compression and provide the needed current path through the MOV disks. The composite wrap provides the needed MOV module compression and hoop strength to make the CLU arrester function throughout its life and also be non-fragmenting in the case of an end-of-life event. The composite wrap also provides a sealed module system from all transformer fluids, including Envirotemp™ FR3™ fluid for the life of the arrester. This sealed unit does not allow the transformer fluid to interfere with the MOV current path.

Q: *What is the functionality of the isolation link?*

A: The isolation link is a fuse that is designed to operate if exposed to line current. It has been carefully chosen to be lightning surge durable (up to 40 kA) and operate only if the arrester MOV disks fail and the arrester starts to conduct system 60-hertz current. Upon operation, the link will remove the arrester from the circuit and allow the transformer to continue in service.

Q: *What is the functionality of the arc-shortening tabs?*

A: The arc-shortening tabs define and maintain the basic insulation level (BIL) of the arrester after the isolation link operates.

Q: *Will reducing the arrester classification from heavy duty to light duty cause a reduction in the transformer over-voltage protection?*

A: No, transformer protection is based on the discharge voltage of the arrester, not the maximum lightning amplitude classification. The discharge voltage of the CLU arrester is comparable to the AZU design. The light-duty classification of the CLU arrester defines the maximum lightning amplitude at 40 kA and is designed specifically for pad-mount applications. The light duty classification of the IEEE Std C62.11™ standard was established for elbow arresters because the industry recognizes the limited lightning duty that pad-mounted transformers experience. Elbow arresters and under-oil arresters provide equal protection.

Q: *Can the CLU be used in overhead applications?*

A: It is not recommended that the CLU be used for overhead applications because the isolation link does not have the needed surge durability for overhead applications (65 kA – Normal Duty or 100 kA – Heavy Duty). In overhead applications, there is a small chance that the CLU isolation link would operate pre-maturely from a larger amplitude lightning surge duty these applications can periodically experience. Eaton is investigating a higher surge durable link design to be able to provide the same features of the CLU arrester for overhead applications. In the mean time, please continue to use the AZU for all overhead transformer applications.



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