

# Can AC insulators be used for DC application?

✓ **No, DC insulators must be used**

**DC current is unidirectional** and will lead to **ionic currents** which can have a **destructive impact on the dielectric** (puncture of porcelain or shattering of glass).

**Corrosion of the end fittings** will also be more severe and therefore special galvanic protections are added to the fittings.

The **added pollution** inherent to a DC environment will require higher leakage distance.

That is why specific insulators must be used for DC applications



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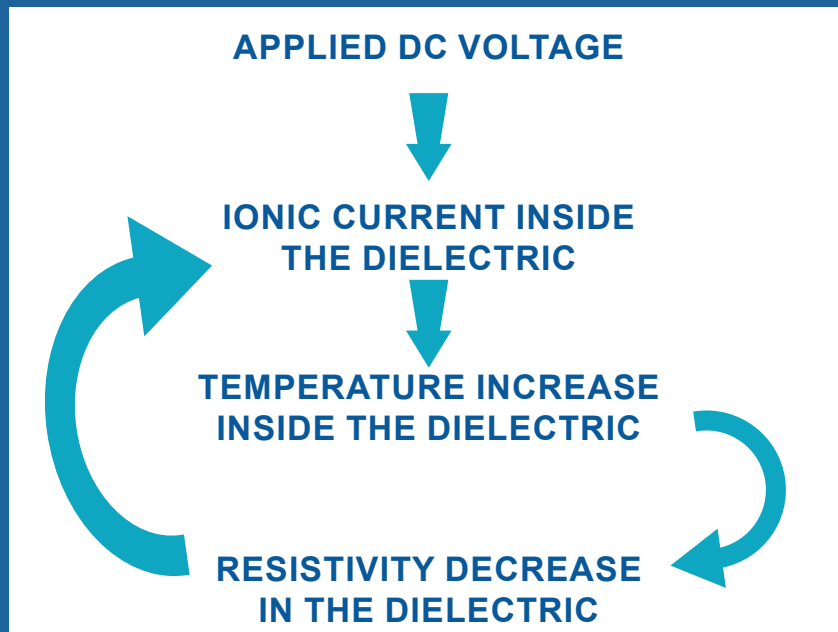
# Do you know which dielectric characteristic to increase to prevent thermal runaway?

## ☑ The resistivity

In DC, the **ionic current** inside the dielectric **increases the temperature** and **decreases the resistivity** of the dielectric till reaching a **thermal runaway**.

To avoid that, you need to use a **dielectric which resistivity is much higher than for an AC insulator**.

This phenomenon is not a surface current, therefore surface resistance is irrelevant.

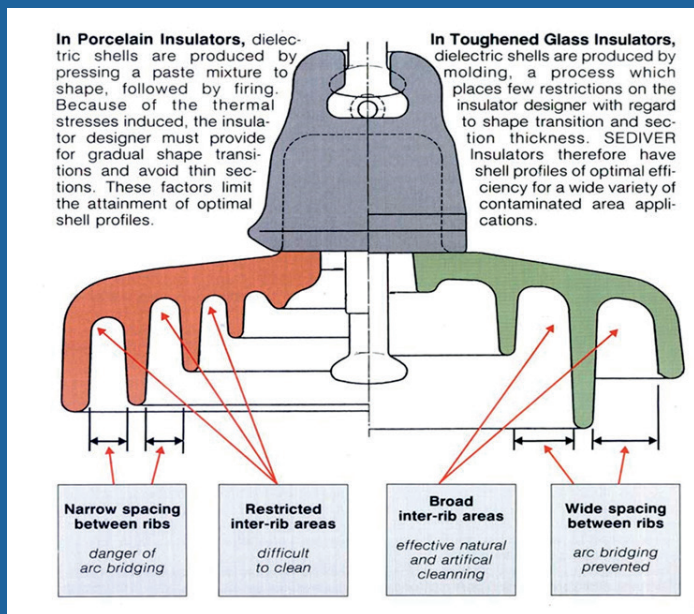


# How to limit the pollution effect on DC insulators ?

## ☑ Use a specific design of insulators

More leakage distance is needed. DC lines are using “fog type profiles” for a combination of higher leakage distance and optimized profile (leakage distance distributed in a way that will **prevent rib to rib arc bridging typical in DC**. This is optimum with glass thanks to the manufacturing process).

For the most severe environments **silicone coated insulators** will enhance the performance of these insulators, thus preventing the need for longer strings.



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# How to limit the metal parts' early corrosion on DC line?

## ☑ Use specific zinc protections on the fittings

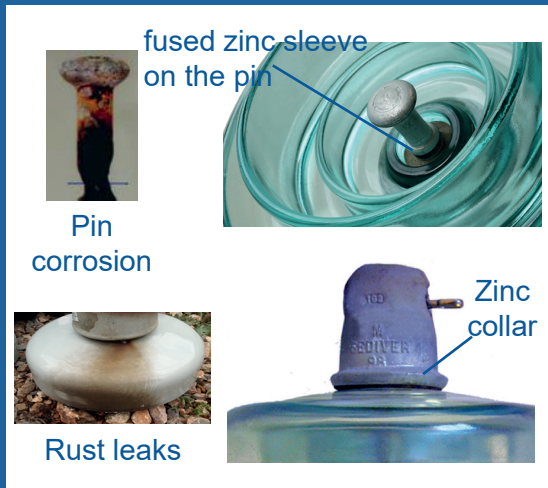
To prevent early corrosion on metal parts of DC insulators **sacrificial zinc mass is added to both cap and pin.**

For the pin, a **zinc sleeve needs to be fused on the shank of the pin at the manufacturing stage** in order to be fully adherent and avoid electro corrosion between the pin and the sleeve itself.

For the **cap corrosion** needs to be avoided as well even if in this case there is no mechanical risk like for the pin but the rust generated by the corrosion of the cap will create rust leaks on the skirt of the insulator.

**A full zinc ring is fused at the base of the cap** with similar adhesion characteristics to what is required at the pin.

**In DC both fittings need to have special protection**

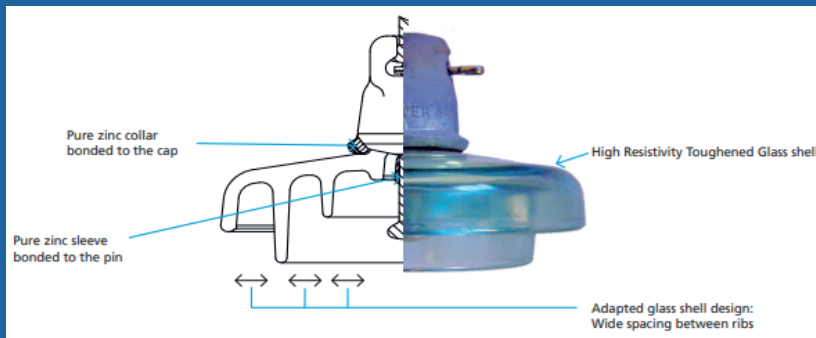


# How to select the best insulator technology?

## ✓ Follow industry HVDC standards (IEC 61325, CSA C1325)

Existing DC standards were written years ago and Sediver was a main contributor in the description and design of the relevant tests required. **Field assessments made over the years have shown the value of the existing standards** (with the exception of the zinc collar not sufficiently described in IEC 61325 and systematically applied by Sediver).

**The quality of DC glass insulators remains however directly a function of the ability of the manufacturer to produce DC glass with a high purity level.** This property cannot be tested but can easily be demonstrated through field inspection reports and summarized in independent performance certificates based on the self shattering rate which needs to be at or below 1/10000/year



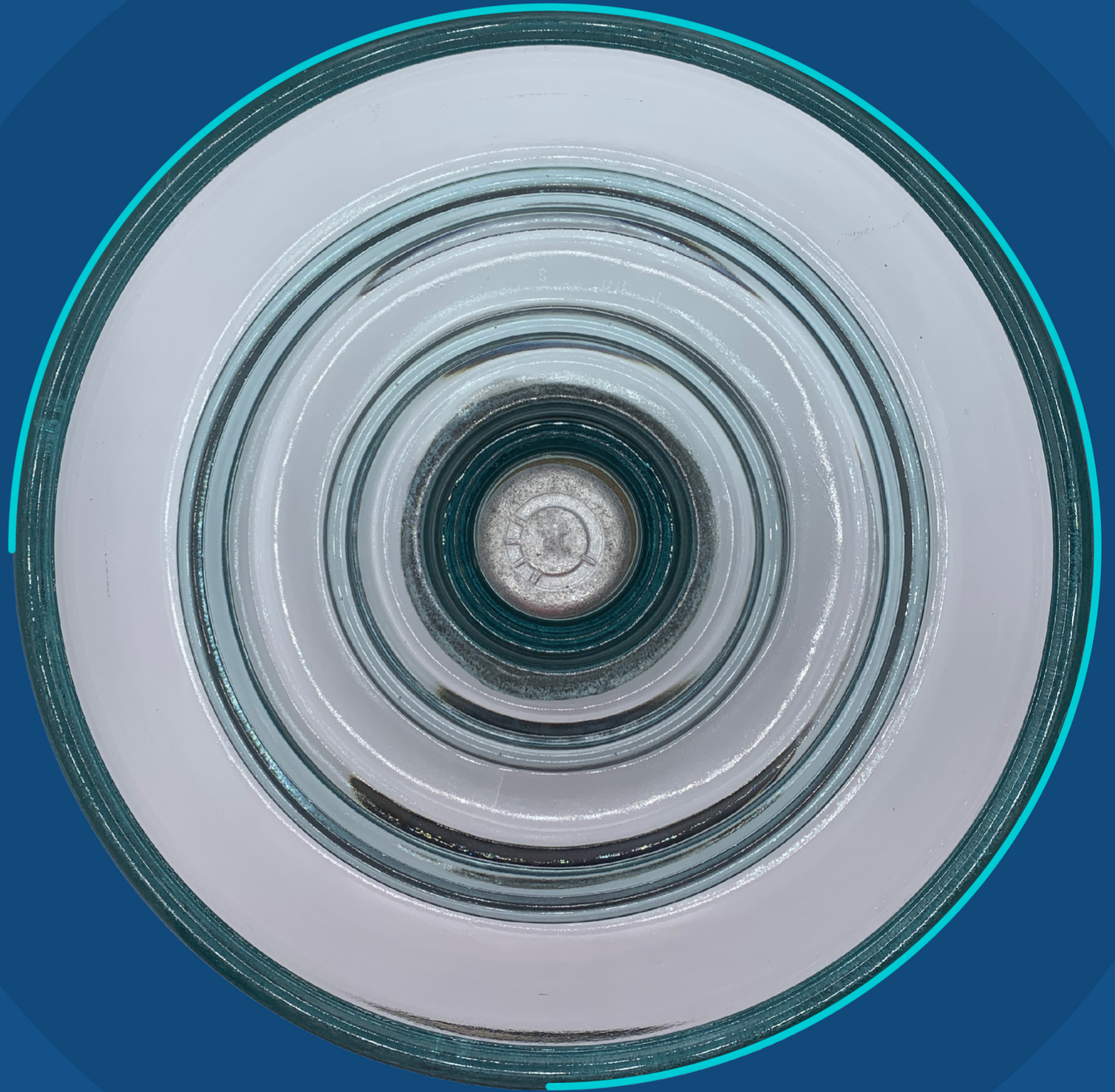
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# TECHNICAL WEBINAR

HVDC

HRTG INSULATORS

7<sup>TH</sup> DECEMBER 2023



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