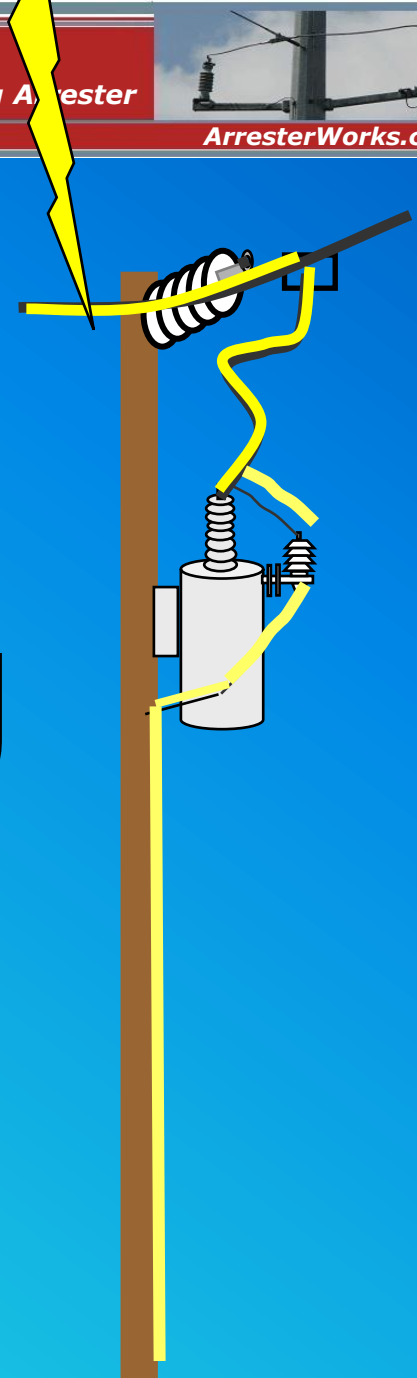
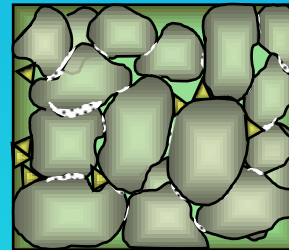
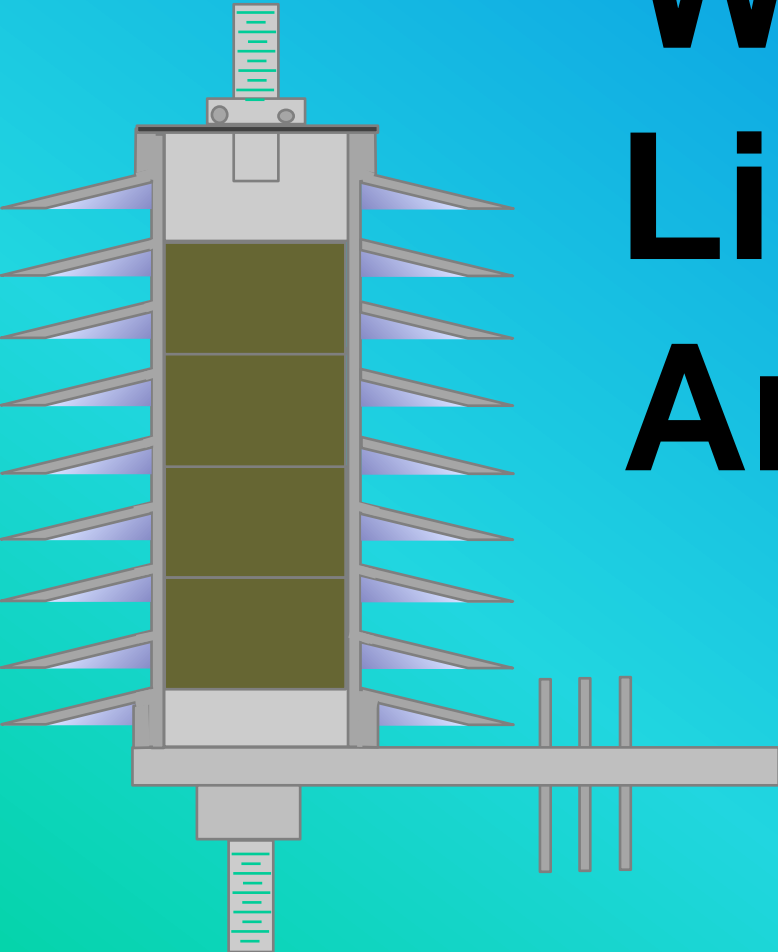


What is a Lightning Arrester?





NO.....
It's not a
very fast
Police
Officer

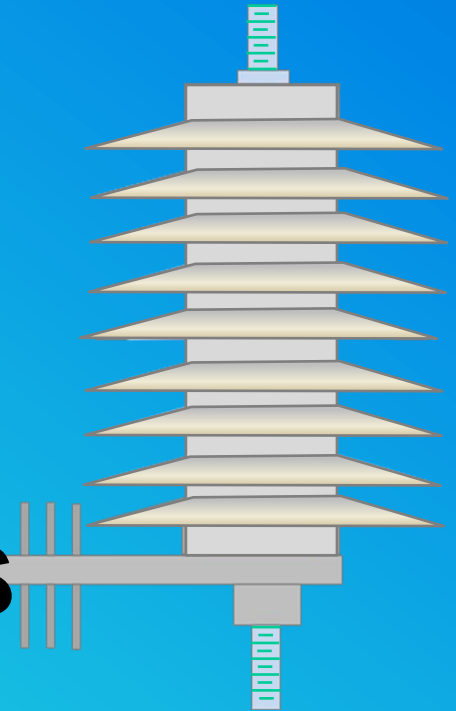
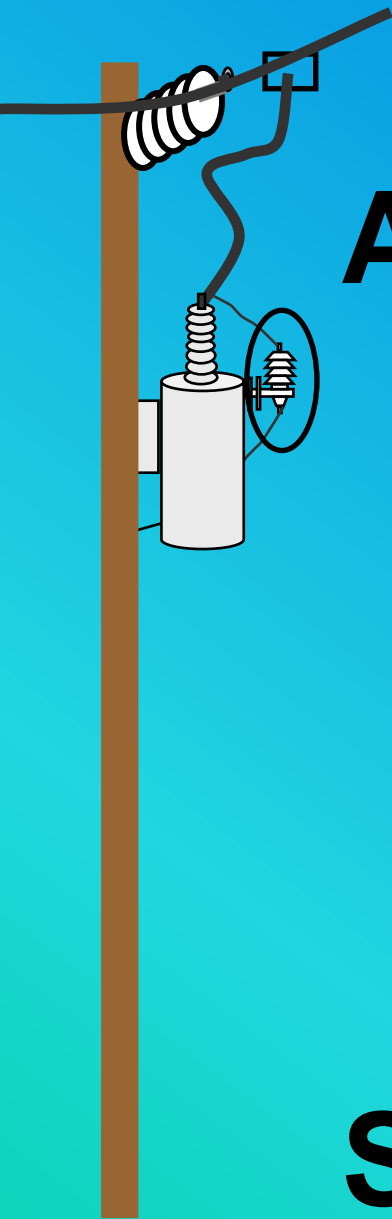




**According to
most definitions,
a Lightning
Arrester is....**

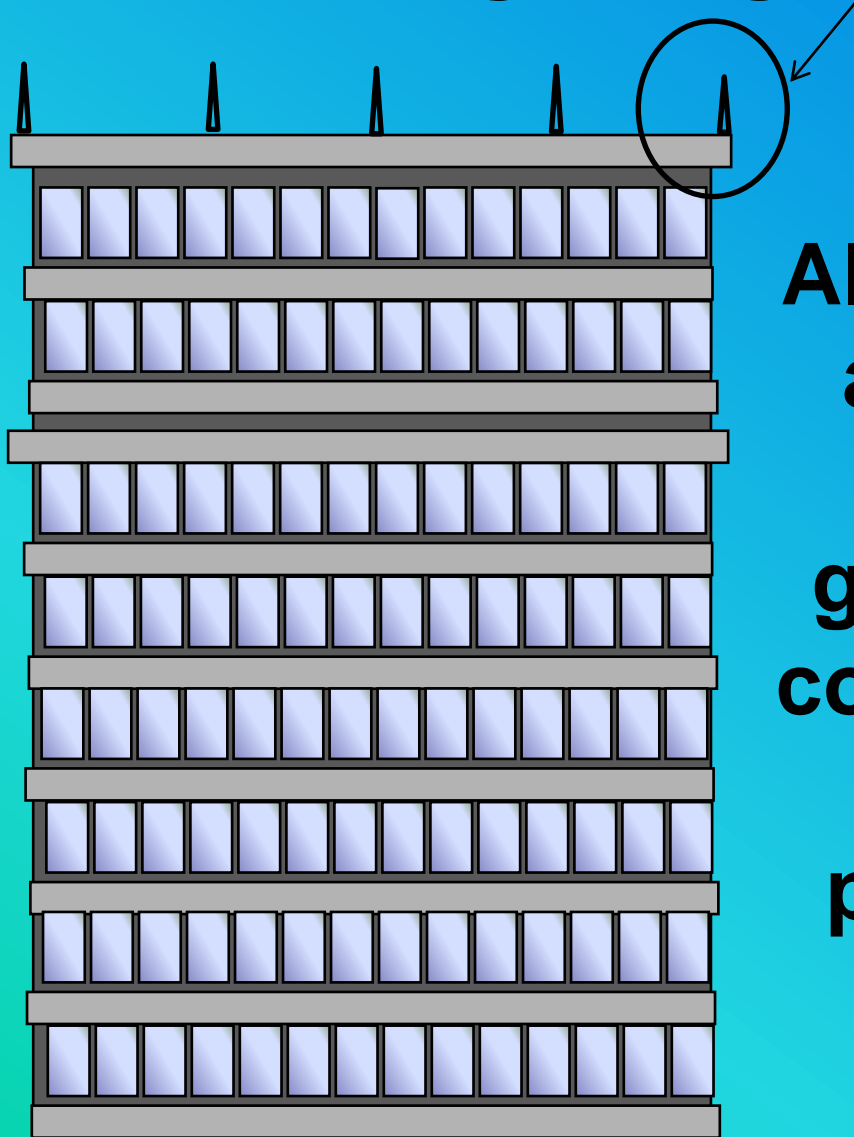


**A Device Used on
Power Systems
above 1000V to
Protect other
Equipment from
Lightning and
Switching Surges**





It is not a Lightning Rod.



Although Lightning Rods are devices that divert lightning surges to ground, they are simple conductive terminals that are always at ground potential and are never energized.



Other Devices Similar to Lightning Arresters

Surge Suppressor: This is also a surge diverter, but generally for voltages well below 1000 volts.

TVSS (Transient Voltage Surge Suppressor) Again this is also a surge diverter, but generally for voltages well below 1000 volts.



How do Lightning Arresters Protect Power Systems?

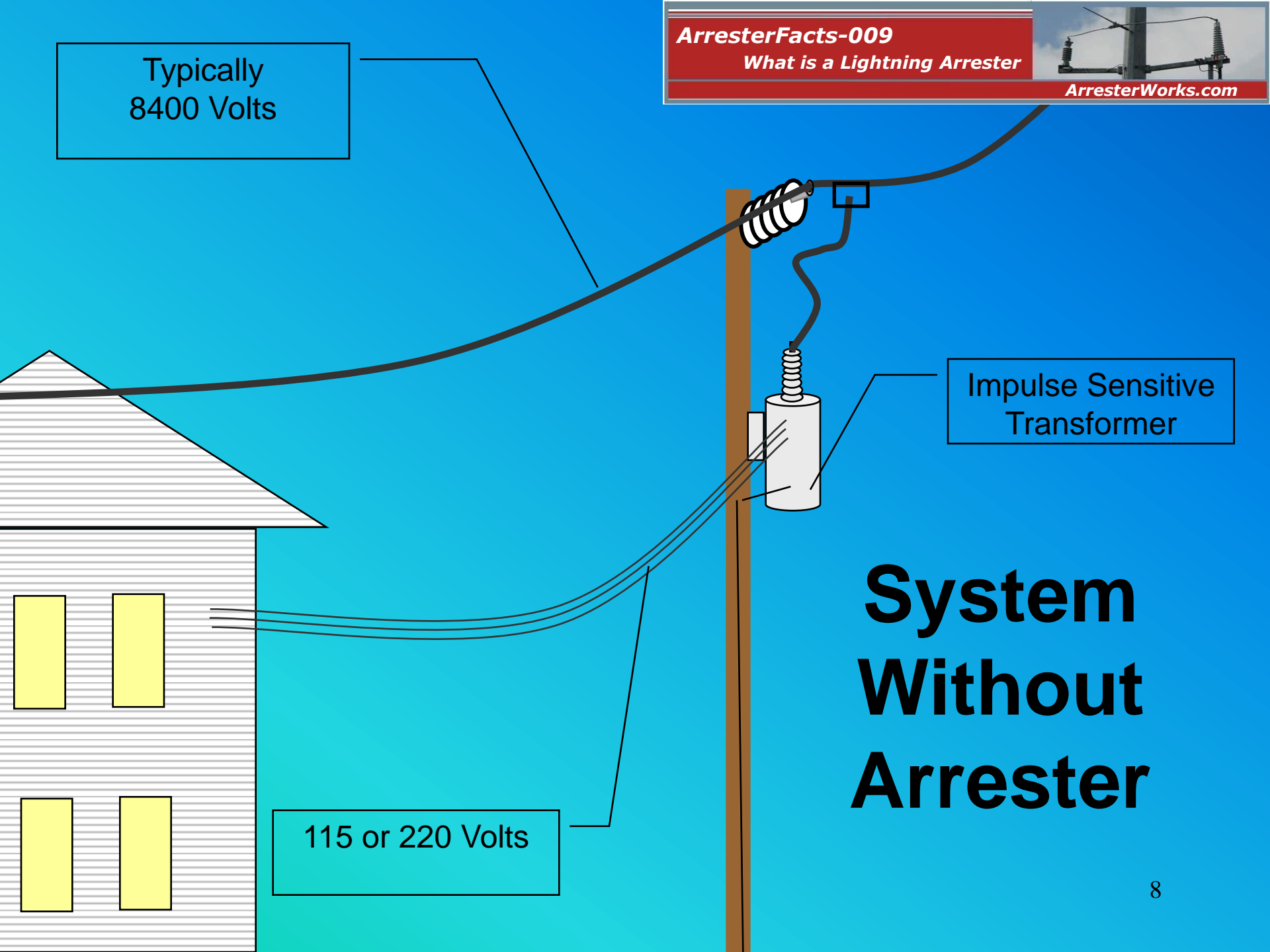


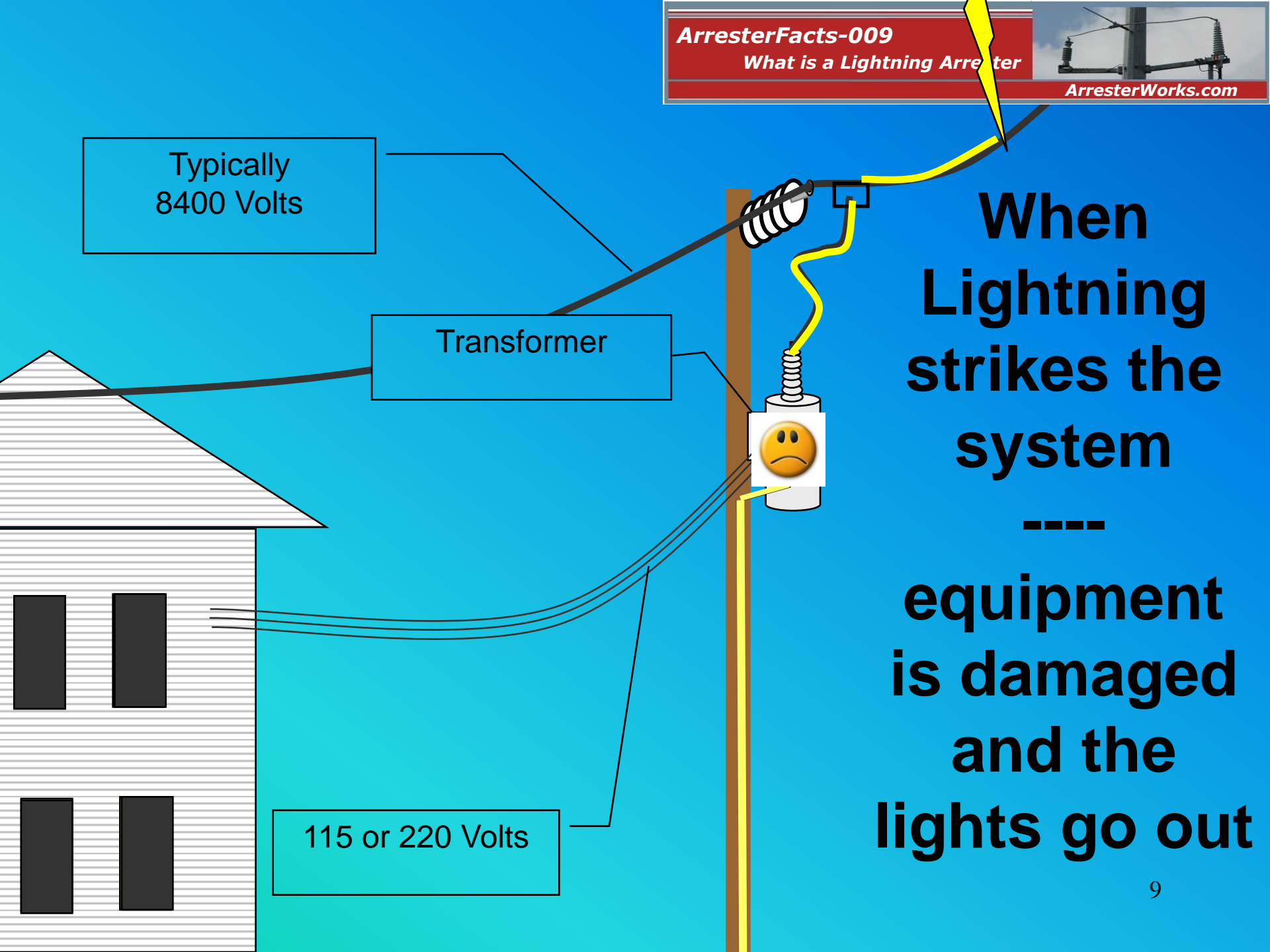
Typically
8400 Volts

Impulse Sensitive
Transformer

System Without Arrester

115 or 220 Volts





Typically
8400 Volts

Transformer

115 or 220 Volts

**When
Lightning
strikes the
system**

**----
equipment
is damaged
and the
lights go out**

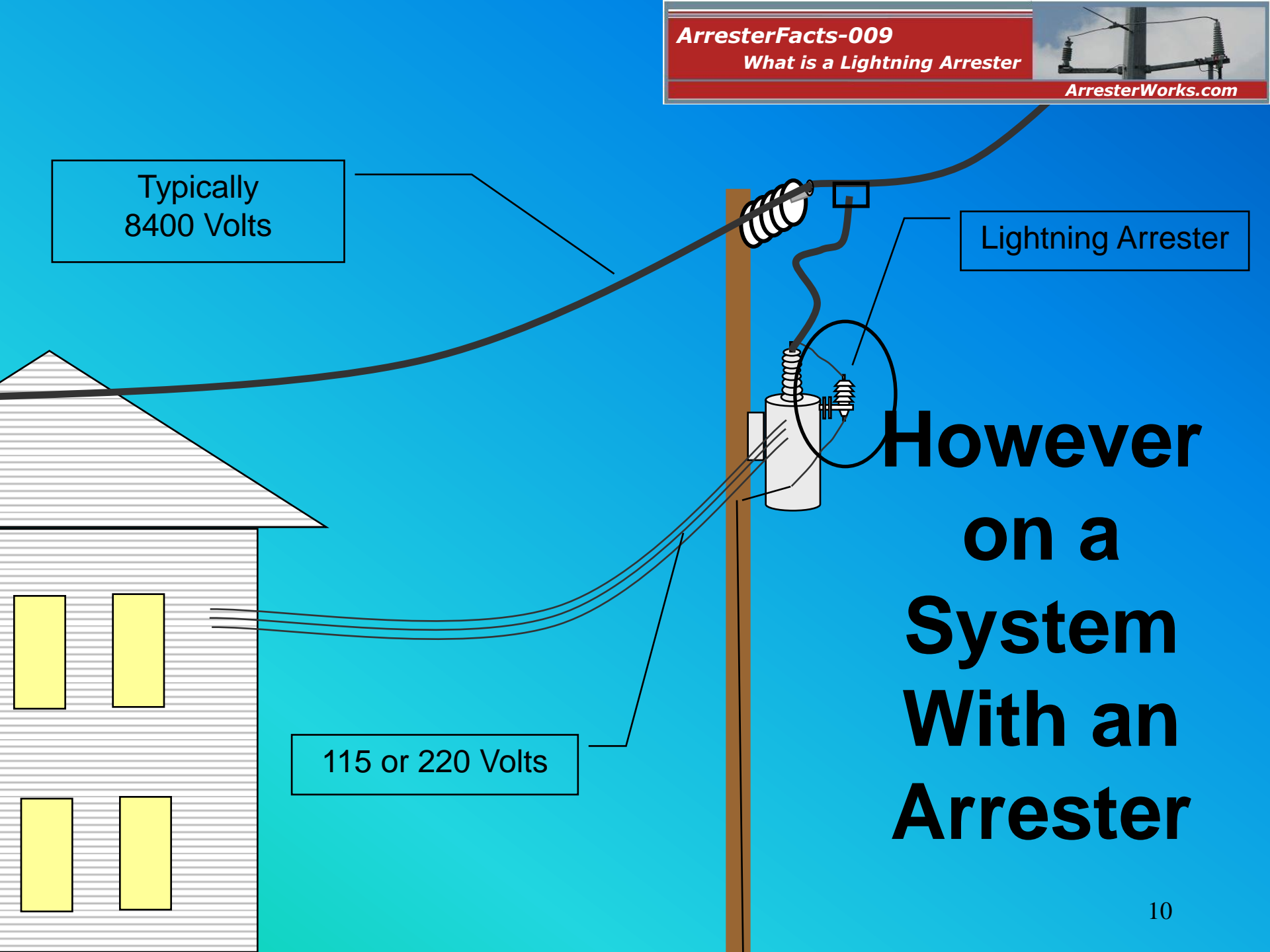
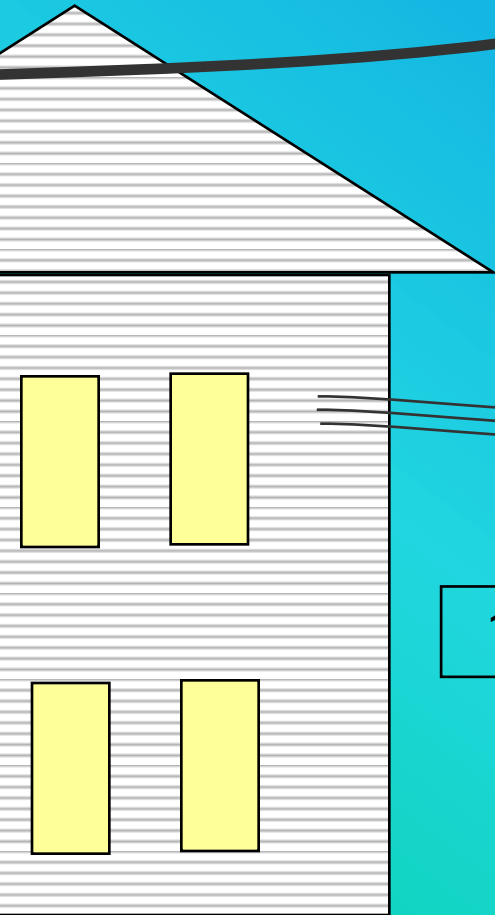


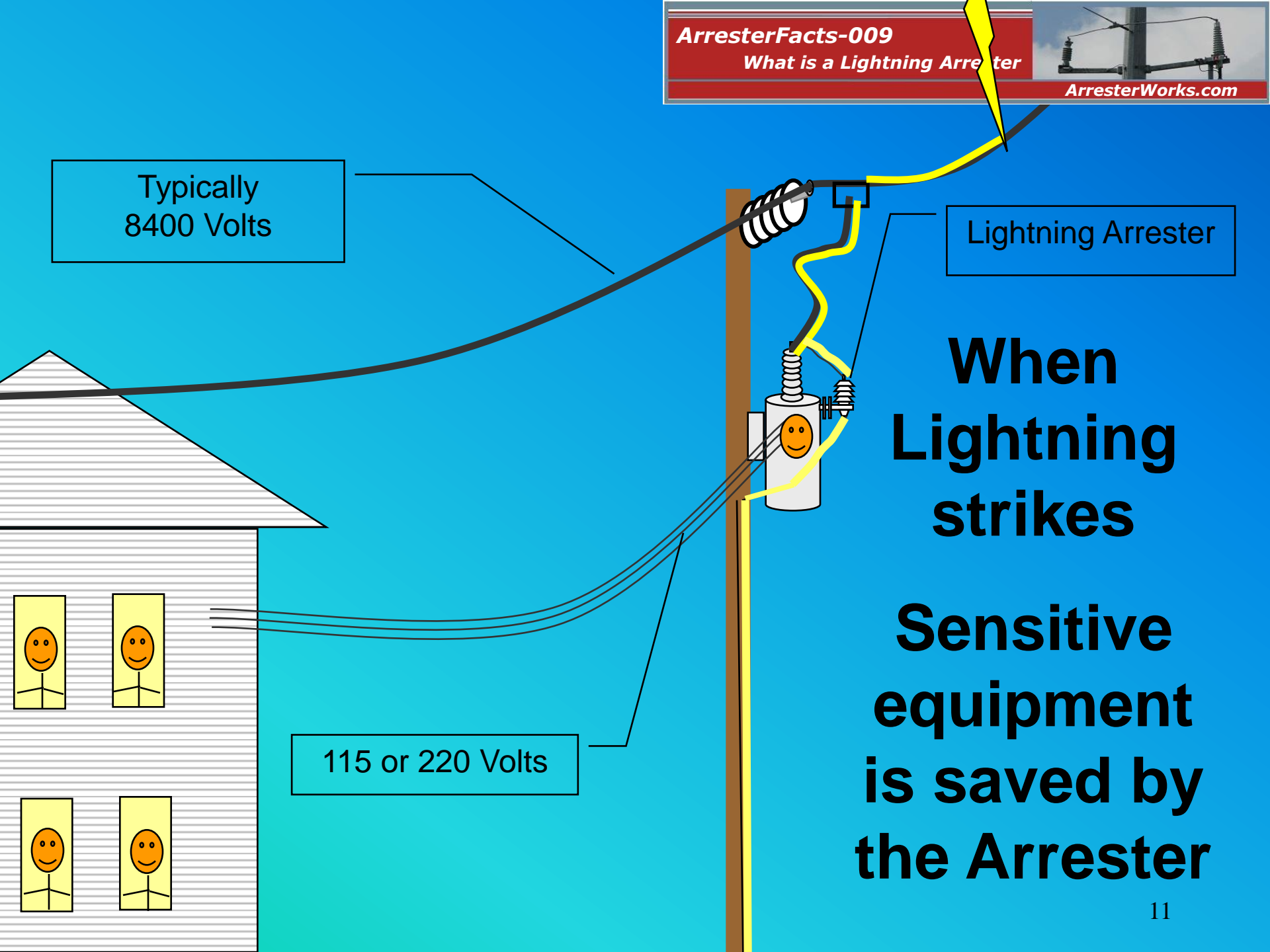
Typically
8400 Volts

Lightning Arrester

**However
on a
System
With an
Arrester**

115 or 220 Volts





Typically
8400 Volts

Lightning Arrester

**When
Lightning
strikes**

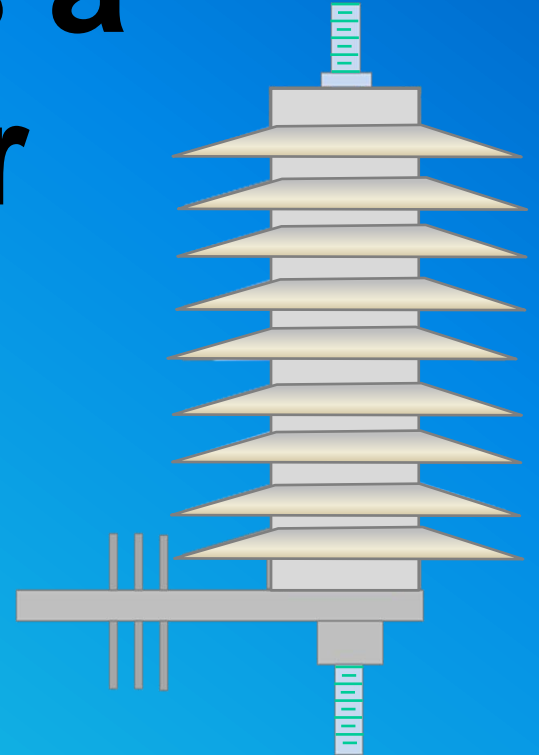
**Sensitive
equipment
is saved by
the Arrester**

115 or 220 Volts



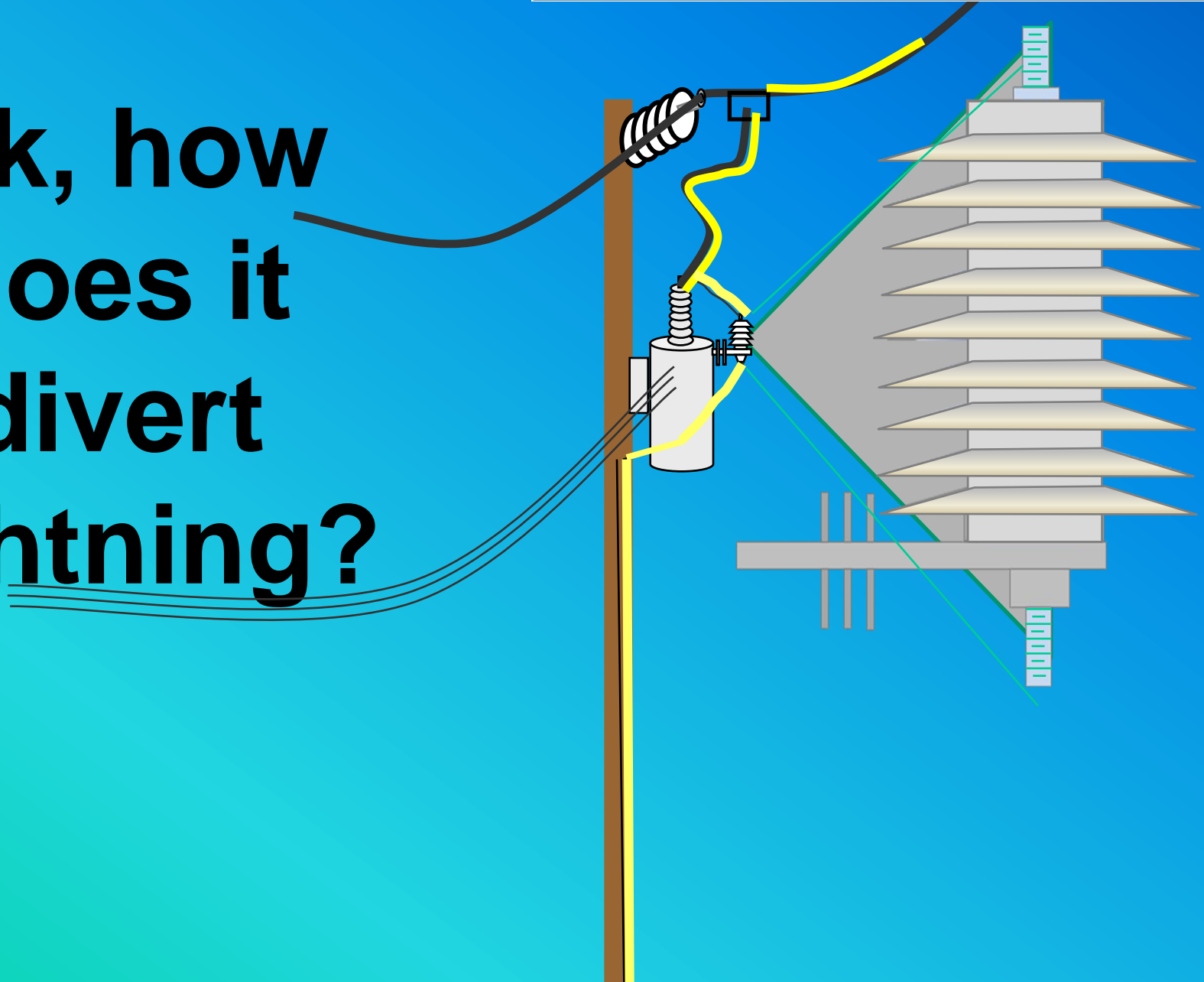
What exactly does a lightning arrester do?

- It Does not Absorb the Lightning
- It Does not Stop the Lightning
- It Does **Divert** the Lightning to Ground
- It Does Clamp (limit) the Voltage produced by the Lightning
- It Only protects equipment electrically in parallel with it.





Ok, how
does it
divert
lightning?

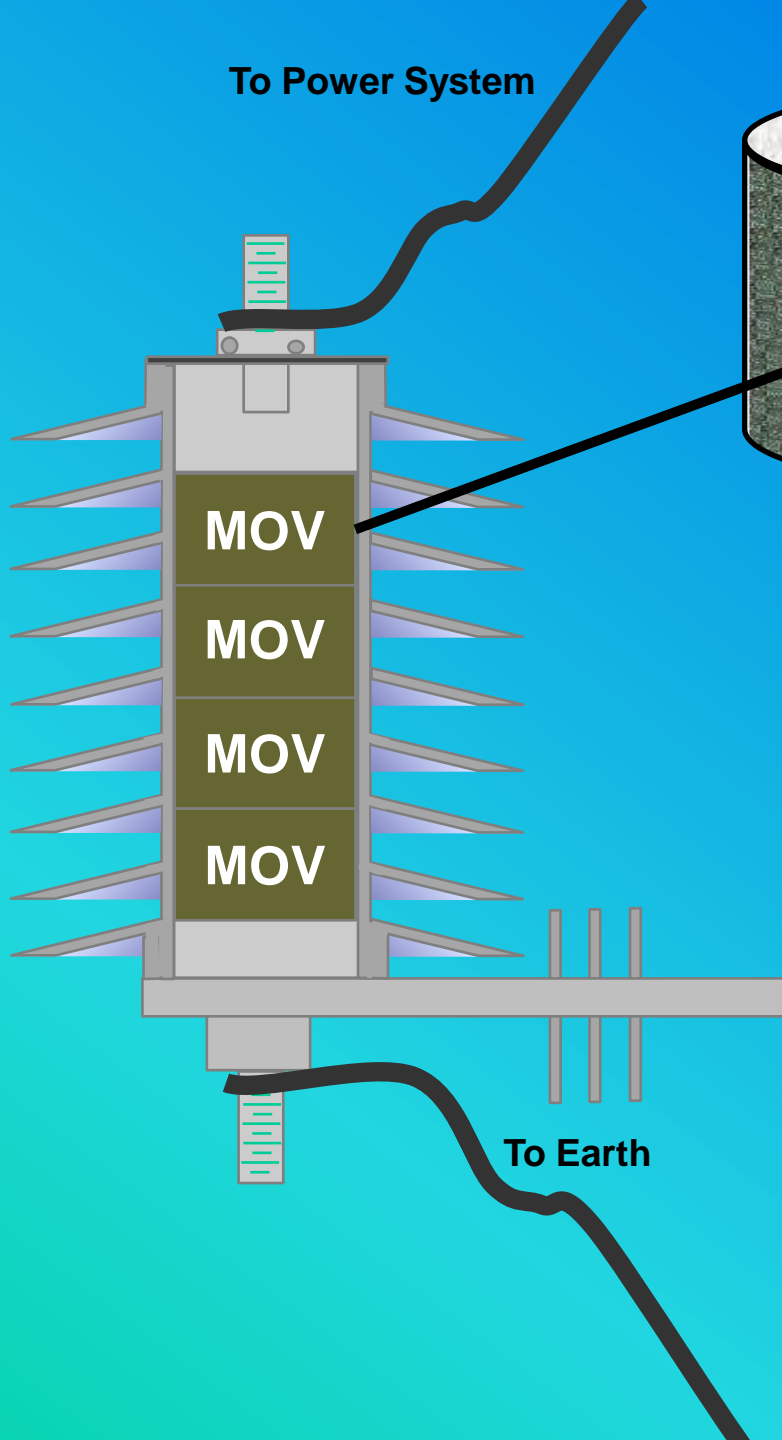


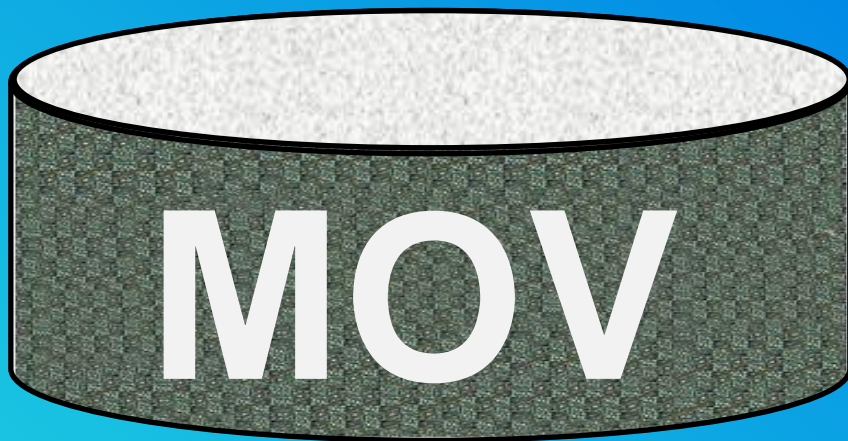


At the Heart of All Arresters is the Metal Oxide Varistor (MOV)

The MOV Disk is a Semiconductor that is sensitive to Voltage.

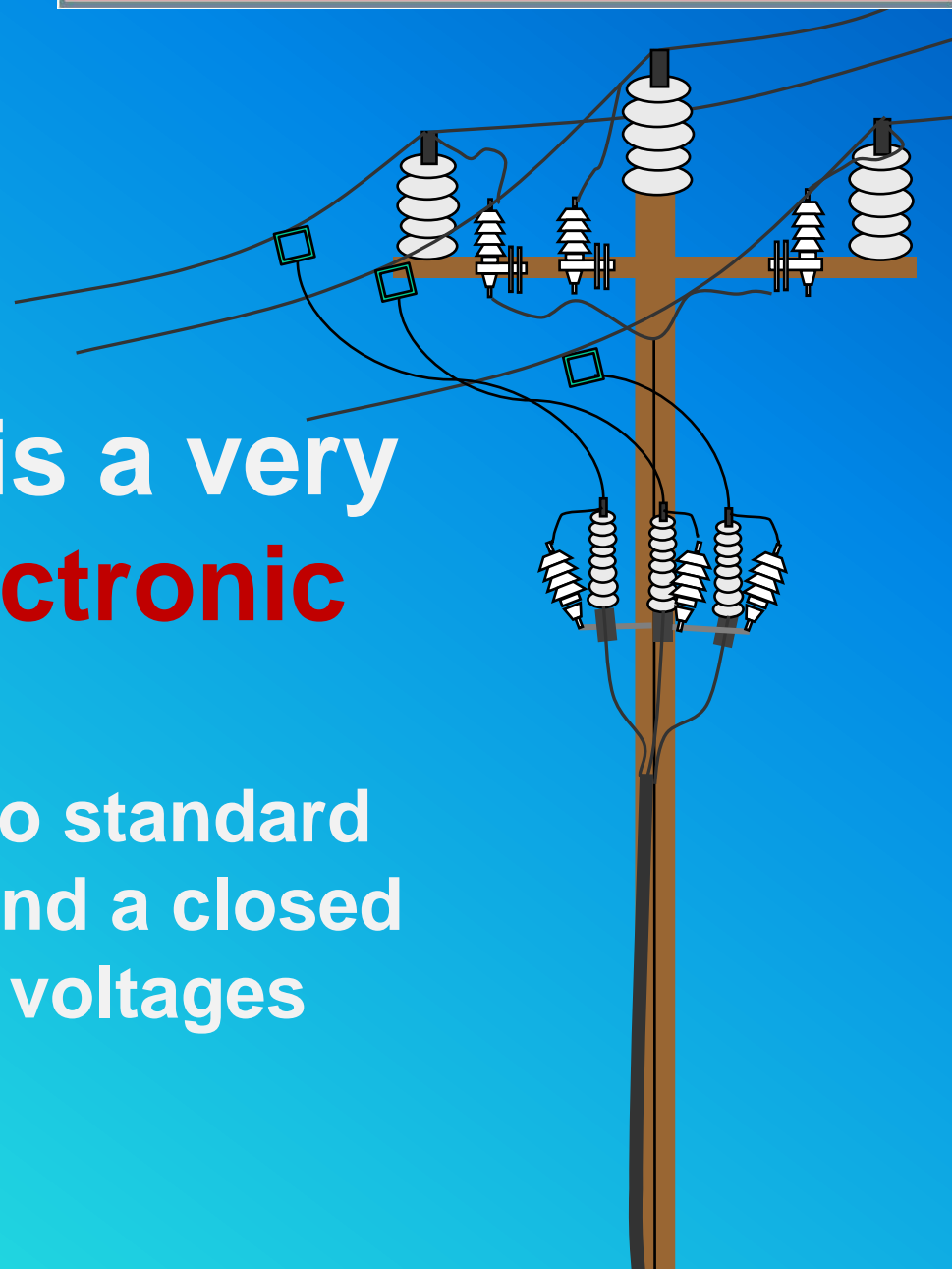
At normal Voltages the MOV disk is an insulator and will not conduct current. But at higher voltages caused by lightning it becomes a conductor

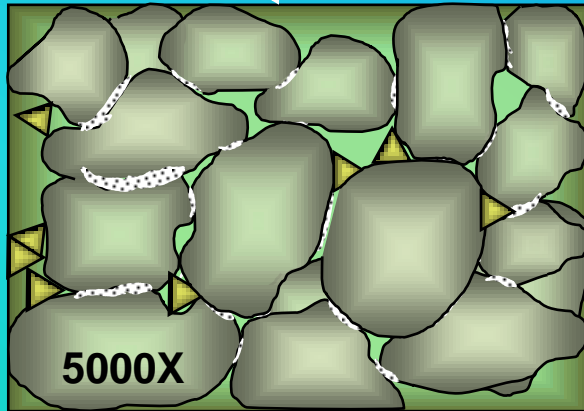
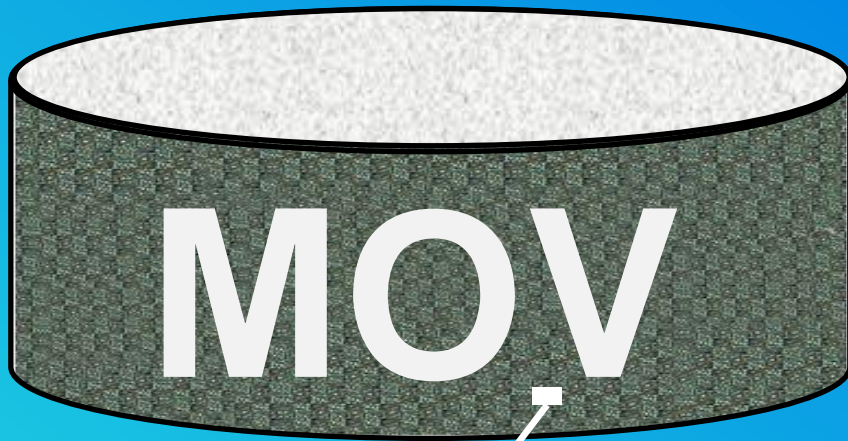




The MOV Disk is a very
**fast acting electronic
switch**

It is an open switch to standard
system AC voltages and a closed
switch to lightning voltages





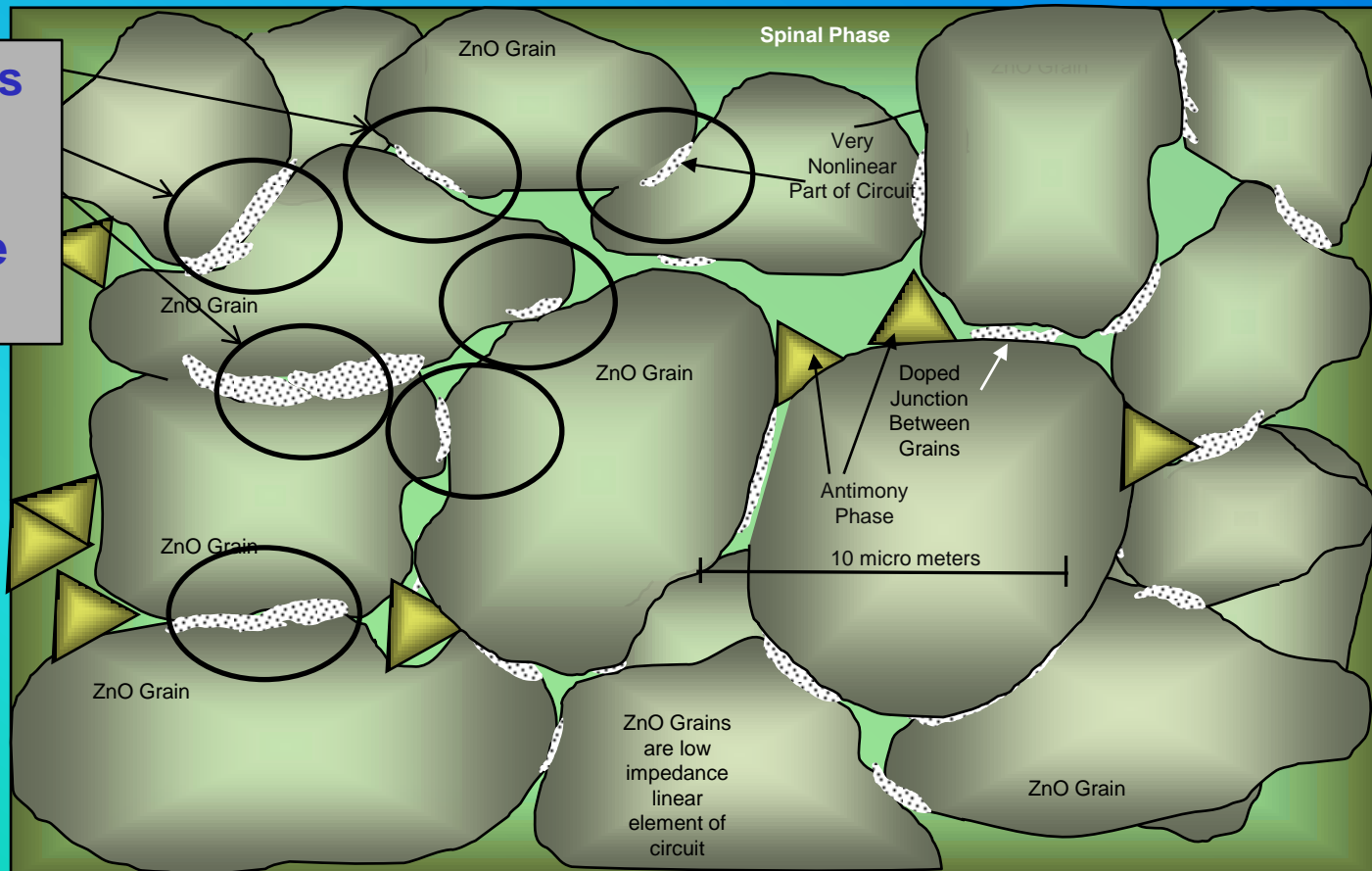
By magnifying the MOV material 5000 times, Metal Oxide Grains and Dopants in the material can be discerned

Each MOV Disk with a 35mm diameter and a 35mm height contains about **28 Billion** MOV Grains



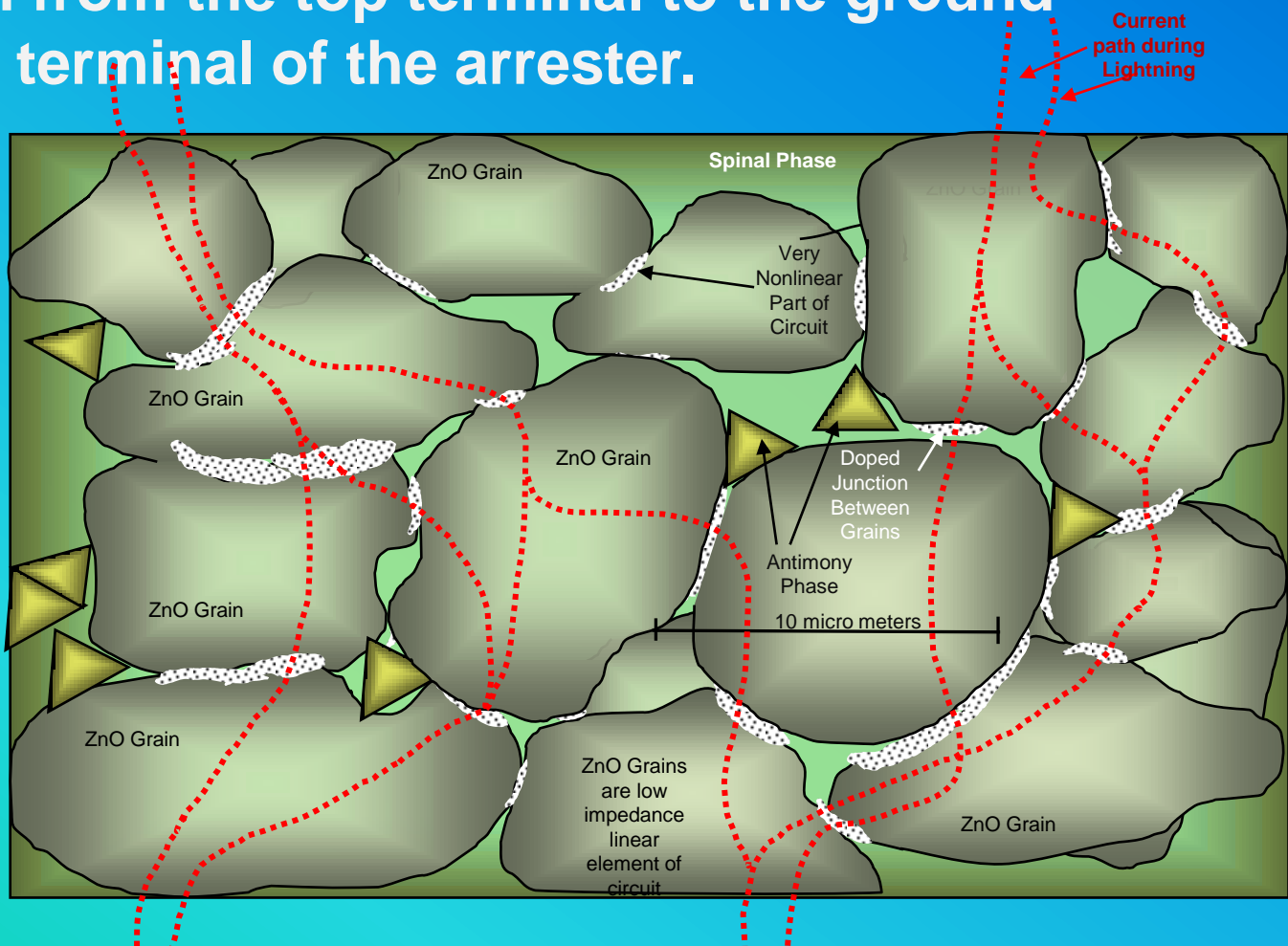
The MOV Grains and their Junctions are the Electronic Switches that turn on and off in unison to divert the lightning around the equipment.

The Switches are at the junctions between the grains



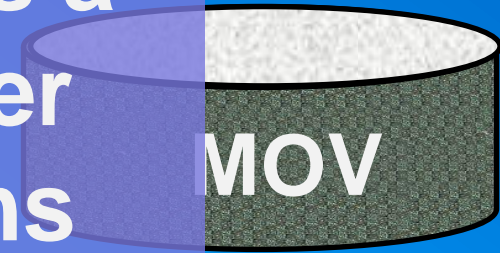


A lightning arrester is essentially a collection of billions of microscopic junctions of Metal Oxide Grains that turn on and off in microseconds to form a current path from the top terminal of the arrester to the ground terminal of the arrester.

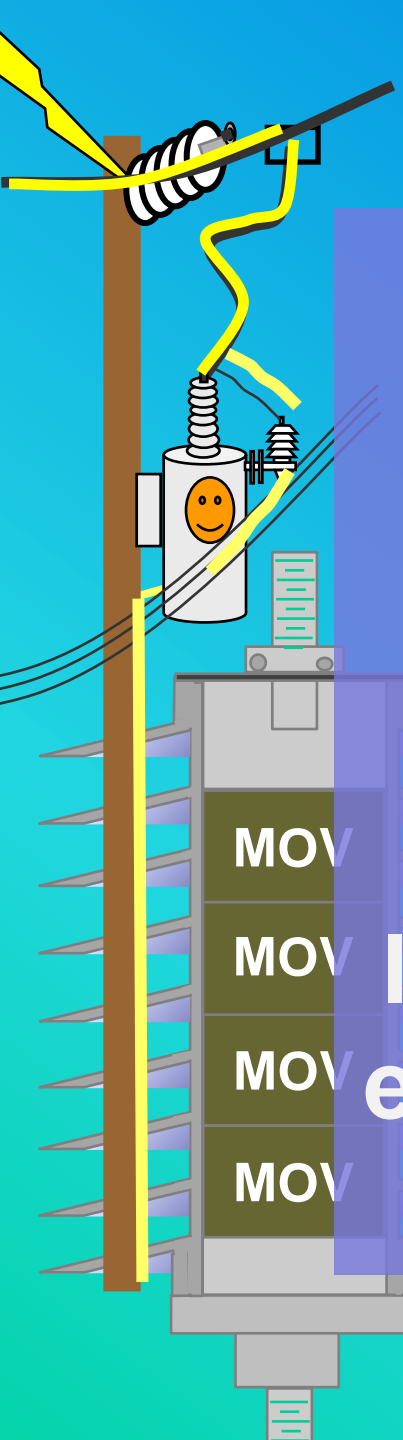
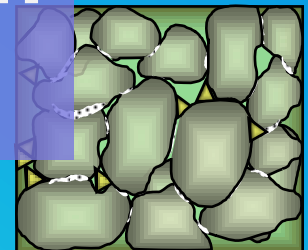




So there you have it. A Lightning Arrester is a device, used on power systems, that contains billions of electronic switches that divert lightning around sensitive equipment and saves them from damage.



MOV
MOV
MOV
MOV



ArresterFacts-009 ***What is a Lightning Arrester***



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Jonathan Woodworth