

Electrical: Distribution Equipment



What Is Electrical Distribution Equipment?

Electrical distribution equipment is responsible for safely transporting and delivering electrical energy from the utility generating station all the way to your outlet or light fixture. For purposes of this article I will refer only to distribution equipment located inside a typical building. The majority of this type of equipment is not visible to the end user with the exception of a light switch or outlet. However, there are many other components that make up the building distribution system. This can include electrical bus duct, circuit breakers, load centers, and a plethora of other items.

Common Failure Mode

There is an action-reaction relationship when discussing loss-related damage to electrical distribution equipment. This relationship is exemplified by what happens when water enters electrical equipment. We all know from an early age that water and electricity do not go well together. This often results in short circuits by allowing electrical energy to travel in unintended ways. Each distribution system should be carefully designed so that the electrical energy travels in predictable ways. The photo on the following page depicts a typical electrical distribution room where the utility feed is terminated.

Technical note: Some distribution systems can be designed to operate in moist or wet environments. However, this type of system is often designed to keep internal components dry by use of special enclosures or internal heaters.

Did you know that there are standard maintenance guides for electrical distribution equipment such as NFPA 70B "Recommended Practice for Electrical Equipment Maintenance"?



Safety Devices

There are several safety devices installed in a typical distribution system. The most familiar items are the circuit breaker or fuse. There are many types of circuit breakers and fuses available for various types of applications. The type of safety device used in a distribution system is often dictated by the type of load placed on the system. For example a single family residential distribution system may not use the same circuit breaker as an industrial building.

A circuit breaker is a device designed to open and close (turn the electrical circuit on or off) by non-automatic means and to open the circuit (turn off the electricity) automatically.¹

From the Residential Service Entrance to an Inside Outlet

A typical path for electricity in a single family residence starts with the utility lines located outside of the structure. The utility lines connect to the meter socket where utility consumer's usage is measured for billing purposes. From here the electricity enters into the home's main load center which contains a whole house circuit breaker or fuse. These are typically rated at 100 to 200 Amps. Within the load center, behind the metal cover, electricity is distributed to various branch circuit breakers. Each branch circuit provides electricity to various parts of the residence like the kitchen, bedroom or bathroom. From the branch circuit breaker, the electricity travels along the branch circuit conductors, often referred to by laymen as wires, to a termination point such as an outlet. Branch circuit conductors come in all types of sizes depending on the electrical load they're being used for. For example, a branch circuit conductor for an electric oven will be larger than one for a bathroom outlet. Once the electricity reaches the outlet, via the branch circuit conductors, it is ready for use by the end user. This can be as simple as plugging in your phone charger or vacuum.

Did you know that the NFPA 70 National Electrical Code is updated every three years?

Many jurisdictions and building departments make changes to the NEC that effects local building codes.

What is NFPA 70 National Electrical Code?

Most people involved with electrical work or claims have heard of the National Electrical Code ("NEC"). The purpose of the NEC "is the practical safeguarding of persons and property from hazards arising from the use of electricity. The Code is not intended as a design specification or an instruction manual for untrained persons."

This NEC is often the backbone for the local jurisdiction having authority over electrical equipment installation and modifications. This code is often adopted, but can be modified depending on the needs of the local jurisdiction. Such modification can require that all branch circuit conductors must be contained in conduit or that certain types of circuit breakers must be used.

Questions that Amset Will Answer about Electrical Distribution Equipment

In evaluating a loss involving electrical distribution equipment, Amset will seek to answer the following questions:

- Was this system recently changed?
 - If so were the necessary permits obtained and was the work completed by a competent professional to local standards?
- Was the equipment properly installed and maintained?
- Are the safety devices correct for the application and properly configured?
- Is replacing the equipment necessary for the loss or can it be repaired?
- What level of repair (if any) is warranted based on the severity of the damages?
- What is a fair and reasonable cost to perform the necessary repairs?

Amset's investigative experience with electrical distribution equipment includes residential, hi-rise buildings, commercial, and industrial systems. Our investigators are experienced with equipment damage assessment, liability, fire related damage, and accident investigations including fatalities.

References

1. NFPA, "NFPA 70 National Electric Code 2014"
-