Which type of transformer supplying power to a building is a service transformer? What type of winding material is required?

Pad mounted xfmr

Unit Substation xfmr

Pole mounted xfmr

Dry type xfmr

When any type of xfmr is directly fed by the utility company, it is a “service” xfmr. NEC requirements are found in Articles 230 & 450.

Direct connection to utility

Pad mounted “service” xfmr

Direct connection to utility

Unit Substation “service” xfmr

Direct connection to utility

Pole mounted “service” xfmr

Direct connection to utility

Dry type “service” xfmr

When any type of xfmr is fed by a feeder not owned by the utility company, it becomes a separately derived system, “SDS” and not a “service” xfmr. NEC requirements are found in Articles 225, 250 & 450.

Connection to feeder not owned by utility

SDS-Pad mounted “supply” xfmr

Connection to feeder not owned by utility

SDS-Unit Substation “supply” xfmr

Connection to feeder not owned by utility

SDS-Pole mounted “supply” xfmr

Connection to feeder not owned by utility

SDS-Dry type “supply” xfmr

What determines xfrmr winding type?

As noted in the previous slides, the distinction between being a “service” xfmr and being a separately derived system does not depend on the type of transformer.

The distinction is determine by whether the transformer is fed by a direct connect to a utility of if it is fed by a feeder not owned by the utility.

The feeders from LaRC electrical distribution system to building supply transformers are classified as feeders not owned by the utility.

In either case, the type of transformer winding, either copper or aluminum, is not determined by whether it is a service transformer or a separately derived system. Neither the NEC or industry stds dictate winding type.

The requirement for copper or aluminum windings in the transformer is determined by the customer’s requirements for reliability, service life, available spares, fault tolerance, maintenance program and budget, electrical workforce and other factors.

A utility company has different requirements than those for a customer owned electrical distribution system so an aluminum winding transformer acceptable for the utility may not be suitable for use on a customer owned distribution system.

Excerpts from NEC Handbook

Often, but not always, the source of supply of electricity is the serving electric utility. The point of connection from a premises wiring system to a serving electric utility system is, by definition, referred to as the service point. The conductors on the premises side of the service point are, by definition, referred to as service conductors. (These definitions are found in Article 100.) The requirements for service conductors as well as for service-related equipment are found in Article 230. Article 230 applies only where the source of supply of electricity is from a utility.

The source may be a stand-alone system, such as a generator, a battery system, a photovoltaic system, a fuel cell, a wind turbine, or a combination of those sources. Conductors from stand-alone systems are not service conductors, they are feeders.

Service conductors are only supplied by a utility source. Where the source of supply includes a utility source(s) in combination with alternate energy sources, Article 705 also applies.

Industrial and multibuilding complexes and campus-style complexes often include substations and other installations that employ construction and wiring similar to those of electric utility installations. Because these installations are on the load side of the service point, they are within the purview of the *NEC.* At an increasing number of industrial, institutional, and other campus-style distribution systems, the service point is at an owner-maintained substation, and the conductors extending from that substation to the campus facilities are feeders (see definition in Article 100). *NEC* requirements cover these distribution systems in 225.60 and 225.61 and in Article 399.