

Seismic requirements for Dry-Type Transformers

What is Seismic Qualified?

Many construction projects require components to be “Seismic Qualified”. A seismic qualification ensures the component will withstand and operate after an earthquake. In addition to requiring structural components to meet specific seismic regulations many jurisdictions also require nonstructural building systems, including electrical systems, to be “Seismic Qualified”.

Seismic requirements are defined by International Building Code (2006/2009) and the California Building Code (2007/2010).

OSHPD, Office of Statewide Health Planning and Development (California Health and Human Services Agency) requires actual “shake-testing” of product prior to allowing products to be specified for construction or retrofit projects in the state of California. This testing must be reviewed by a California state certified engineer. Without a widespread nationwide approval process, many other jurisdictions require the OSHPD Special Seismic Certification Preapproval (OSP) for projects.

How are Seismic units rated?

Three criteria are typically defined for seismic units, S_{ds} , I_p , z/h

S_{ds} = Design ground motion coefficient

The required motion coefficient is dependent on the location of the facility. Most of the United States requires S_{ds} = 0.05 to 1.5g. Specific regions require a S_{ds} = 2.0g or better such as: northeastern Los Angeles, Eureka, and Arcata California and along the Missouri state line south of Illinois.

I_p = Nonstructural Component Importance Factor

For Dry-Type transformers the I_p = must equal 1.0, minimum or better.

z/h = Ratio dealing with the horizontal force verses the vertical force. For dry-type transformers the z/h will always be 1.0.

What about Zones?

Previous versions of seismic standards classified areas range from zone 0 to zone 4, where zone 0 is indicating the weakest earthquake ground motion and 4 indicating the strongest. The zone classification is no longer used. The current standard specifies the S_{ds} Design ground motion coefficient as described above.

Who needs Seismic?

Healthcare facilities, emergency response locations including fire stations, police stations and other critical government facilities will often include a seismic qualification requirement.

To determine the S_{ds} criteria, for a specific location, the U.S. Geological Survey provides a utility on their website. See this link <http://earthquake.usgs.gov/hazards/designmaps/javacalc.php>

How did Jefferson Electric complete the qualification? As required by the California Office of Statewide Planning and Development (OSHPD) the testing has been completed by an independent laboratory. We chose Tobolski Watkins Engineering Inc. as our approved engineering firm. All testing information has been filed with OSHPD per OSP-0109-10.

What Jefferson Electric products meet the Seismic requirements?

| Product Line | Seismic rating |
|--|---|
| Single and three phase encapsulated Wall mount 1 kVA to 25 kVA Floor mount 30 kVA to 75 kVA NEMA 3R enclosures | $S_{ds}=2.00g$; $z/h = 1.00$; $I_p = 1.5$ |
| Single phase ventilated Floor mount 1 kVA to 167 kVA NEMA 1 or 3R enclosures | $S_{ds}=1.60g$; $z/h = 1.00$; $I_p = 1.5$ |
| Three phase ventilated Floor mount 1 kVA to 1000 kVA NEMA 1 or 3R enclosures | $S_{ds}=1.60g$; $z/h = 1.00$; $I_p = 1.5$ |

The product nameplate on Jefferson Electric's qualified products will show the following logo with the proper $S_{ds}=1.60g$ or $S_{ds}=2.00g$ depending on the product line.

