

Part 2: Physical Requirements

195) Capacitors

195.00.10) The installation of shunt capacitors for power factor correction in customer substations can have undesirable effects upon We Energies supply and customers distribution system. Care should be taken when specifying capacitors. During off peak conditions, an excessive voltage rise or a leading power factor can occur. If the capacitors are switched, a voltage dip, light flicker, high frequency ringing, etc. are possible. Switching can also result in over and under voltages which can cause variable speed drives to shut down. In some applications, capacitors may provide a low impedance path for harmonics which may result in operation of protective devices. Harmonics may contribute to a "loss of life" for capacitors. It is suggested that customers have some knowledge of their harmonic levels, or pursue a harmonic analysis prior to specifying capacitors. No general limitations on capacitor size can be made, since the factors which produce these effects vary with the location of the customer's substation, characteristics of the customers load, etc.

195.00.20) The customer shall obtain approval from We Energies for the installation of shunt capacitors. We Energies may place restrictions on the use of these capacitors with respect to voltage regulation, telephone interference or other factors. Capacitors operating at lower voltages which are switched with individual loads are exempt from any restrictions.

195.00.30) Shunt capacitors connected to three-phase, three-wire systems are not grounded to:

- avoid possible interference with telephone equipment,
- obtain better compensation for unbalanced voltages.

It may be necessary, however, to ground shunt capacitors installed at certain locations on the three-phase, three-wire systems to obtain proper coordination of protective devices.

195.00.40) Shunt capacitors installed on 13,200 volt, 13,800 volt, 26,400 volt, 34,500 volt, 69,000 volt, and 138,000 volt three-phase, three-wire systems shall be wye-connected for ungrounded operation.