**Section 220.90 Low and Medium-Voltage Alternating Current Circuits**

a) Low-voltage and medium-voltage circuits serving portable, mobile and stationary, three (3)-phase alternating-current equipment; protective devices.

1) Low and medium-voltage circuits supplying power to portable or mobile three (3)-phase alternating-current equipment shall be protected by suitable circuit breakers of adequate interrupting capacity, which are properly tested and maintained and equipped with devices to provide protection against grounded phase, short circuit, and overload.

2) Low and medium-voltage circuits supplying power to stationary equipment shall be deenergized with the occurrence of an overload or, short circuit, by a circuit breaker, or fuses of the correct type and capacity. Such devices shall, in addition, on solidly grounded or resistance grounded systems deenergize the circuit on the occurrence of a phase-to-ground fault. Ungrounded low and medium-voltage circuits supplying power to stationary equipment shall be provided with ground detectors to indicate visually the presence of a grounded on any phase. Other no less effective devices may be approved by an authorized representative of the Department.

b) Testing, examination, and maintenance of circuit breaker; procedures.

1) Circuit breakers and their auxiliary devices shall be tested and examined at least once each month by a qualified person.

2) In performing such tests, the circuit breaker auxiliaries or control circuits shall be actuated in any manner which causes the circuit breaker to open. In the absence of auxiliaries or control circuits, the breaker will be operated manually. All components of the circuit breaker and its auxiliary devices shall be visually examined and such repairs or adjustments as are indicated by such tests and examinations shall be carried out immediately.

c) Testing, examination, and maintenance of circuit breakers; record.

 The operator shall maintain a written record of each test, examination, repair, or adjustment of all circuit breakers protecting low and medium-voltage circuits serving three (3)-phase alternating-current equipment and such record shall be kept in an approved book.

d) Low-voltage and medium-voltage three (3)-phase circuits; system grounding.

1) Low-voltage and medium-voltage circuits supplying power to portable or mobile three (3)-phase alternating-current equipment shall contain:

A) Either a direct or derived neutral grounded through a suitable resistor as the power source; or

B) A grounding circuit originating at the grounded side of the grounding resistor which extends along with the power conductors and serves as a grounding conductor for the frames of all the electric equipment supplied power from the circuit.

2) Grounding resistors shall be connected to a low resistance ground field, and shall be of an CHMIC value which limits the ground fault current to no more than twenty-five (25) amperes. Such grounding resistors shall be rated for maximum fault current continuously and provide insulation from ground for a voltage equal to the phase-to-phase voltage of the system.

e) Grounding resistors; continuous current-rating.

The ground fault current rating of grounding resistors shall meet the "extended time rating" set forth in American Institute of Electrical Engineers Standard No. 32.

f) Low-voltage and medium-voltage ground check circuits.

Present technology does not provide for a fail safe ground monitor system. In the event such technology becomes available, The Mining Board has the authority to adopt rules requiring such systems.

g) Systems grounding.

Three (3)-phase low-voltage and medium-voltage circuits of more than two hundred forty (240) volts phase-to-phase extending to stationary equipment shall be grounded in one of following ways:

1) Solidly grounded through a direct or derived neutral;

2) Contain a direct or derived neutral grounded through a suitable resistor located at the power source; or

3) Ungrounded Delta.

h) Disconnecting devices.

Disconnecting devices shall be installed at the beginning of each branch line supplying power to each piece of portable or mobile equipment and shall provide visual evidence that the power is disconnected.

i) Connection of single-phase loads.

Single-phase loads shall be connected phase-to-phase in resistance grounded systems.

j) Qualified person.

An individual is a qualified person within the meaning of this Section 220.90 of this Part, if such person is a qualified person under Section 220.50(e) of this Part.