Cord Connected Equipment

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Cords in factories are subject to abuse that can result in possible electrical shock and serious personal injury to your employees. Equipment that is frequently moved from place to place in a factory is typically plug and cord connected to a source of electrical power. If you have cord and plug connected equipment in your factory, please read and follow the following recommendations for electrically connecting your equipment and for inspecting the electrical connections to the equipment.

Electrical wiring in your plant, including wiring of plug and cord connected equipment, is covered either by your local electrical code, or by the National Electrical Code, NFPA-70. All wiring is to be done by a "qualified" person, as defined in the Code. The requirements for cord and plug connected equipment identified in the Code, particularly Article 400, although other articles, i.e., Article 250, will also have applicability. The following comments are intended to help your "qualified" person connect your equipment safely and in conformance with the Code.

For purposes of the discussion, we will assume that the machine operates on 460 VAC, 3-phase power. We shall also assume that the plant wiring has all been consistently phased, so that a given three phase motor will run in the same direction no matter where connected in your factory.

The process begins with the selection of appropriate materials, including the cord, plug, and the connector that holds the cord in the machine mounted disconnect. The connector is of vital importance for cord connected equipment. Under the Code, the connector must be of a type that provides strain relief for the cord. In plain language, the connector must absorb the impact of pulls on the cord, rather than transmit the pull to the connections of the phase conductors and ground. The type of connector that holds the cord by means of a flexible woven sire mesh is preferred.

The connections themselves are easily made. One frequently overlooked point important to a safe and secure electrical hookup is that the slack of the ground conductor within the box be substantially greater than that of any of the phase conductors. With the slack in the ground conductor greater than that of the phase conductors and connections prior to failure of the ground. The ground is vital for the overall electrical safety on equipment., so the length of the individual wires inside the disconnect box should be selected so that the ground will be the last to fail.

The phase connections are made to the terminals on the supply side of the disconnect switch. Generally, these are screw terminals under which the individual phase supply wires are placed and the screws tightened to make connection. If necessary, any two of the phase connections can be interchanged to provide for the correct direction of motor rotation. The ground wire should be attached to the machine at a separate ground terminal. If the box that you have does not have a separate ground terminal, add one. The terminal is inexpensive and its use should results in a more reliable ground connection than the common practice of terminating the ground conductor under any available screw.

Operator practices, including regular inspections of the cord, connector and receptacle, are also important for a safe and reliable installation. Your operators should unplug equipment before attempting to move it and not use the cord to drag the machine around the floor. The cord should be coiled and placed on a secure position on the machine before the machine is moved. Dragging the cord behind the machine, or worse, dragging the machine over the cord, can result in damage to the cord and/or the connections of the cord to the machine or plug. Damage to the electrical connections, particularly the ground connection, can lead to potentially unsafe conditions. Finally, the integrity of the ground connection to the machine should be checked at frequent intervals. In the case of stationary equipment, we recommend that ground connections be checked monthly. For plug and cord connected equipment, however, we recommend that the ground connection be checked each time the equipment is moved, each time the cord has been subject to strain, or, if the equipment is left in one position for an extended period of time, no less than monthly.

The cord and connections on plug and cord connected equipment are subject to greater abuse than the electrical supply for stationary equipment. Take extra efforts to maintain the integrity of the cord and its connections,

particularly the ground connection, to maintain the safety of your employees.

- Dave Smith Bartenfeld Gloucester

See also:

- Extrusion and safety
- Machinery installation

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