

Technical Exhibit 33

Electrical Requirements for Facilities on MOTSU

1. In addition to the contents of the latest edition of the National Electrical Code (NFPA 70) and National Electrical Safety Code (NESC), the following items form the minimum electrical requirements for facilities located on MOTSU.

A. All secondary wiring (under 600 volts) shall be run in conduit. Nonmetallic-Sheathed cable (NM or NMC) shall not be allowed (unless specifically stated as acceptable). All secondary wiring (low voltage side of transformers) shall be copper.

B. Minimum wire size used shall be #12. The normal wire type is THWN. Conductors for #8 and larger shall be stranded. Conductors over 500 KCMIL shall not be used, use parallel runs if higher ampere ratings are required. Wire splices shall only be allowed within suitable junction boxes or electrical fixtures.

C. Minimum conduit size shall be $\frac{3}{4}$ inch.

D. 20A/120V branch circuits exceeding 100' and 20A/277V branch circuits exceeding 230' in length from control panel to farthest device or fixture shall use number 10 AWG conductors. 20A/120V branch circuits exceeding 150' shall use number 8 AWG conductors.

E. All electrical circuits shall include a green grounding conductor.

F. A UL listed firestop system shall be used to seal penetrations of electrical and signal conduits through fire rated partitions/walls. The system shall consist of a fire rated caulk type substance and high temperature fiber insulation. See NEC Article 300-21.

G. Provide and install a black laminated plastic nameplate with minimum 1/8 inch high engraved block letters (in white) on each CU, WHP, TTW, EH, AH, HP, and all other electrical equipment, to indicate the designation of the unit on plans and the branch circuit serving the equipment.

H. Provide and install an engraved white laminated plastic nameplate on each electrical panel with 1/2 inch red lettering. Verbiage shall indicate the panel name and if it is the service disconnect; it shall state "Service Disconnect".

I. "Wiremold" and "Plugmold" shall normally not be allowed for new/rehab construction. Circuits should be flush mounted using NEC accepted wiring methods.

J. All panel bus bars shall be copper (includes power buss, neutral and ground buses). Aluminum or tin-coated buses are not acceptable.

K. All circuit breakers shall be bolt-on types unless PW agrees to different types.

L. All ground rods shall be copper clad and shall be a minimum of 3/4" x 10'.

M. All connections to the underground grounding system points shall be via Underwriter's Laboratory (UL) listed exothermic welds (Cadweld).

N. All exterior lights shall be of the High-Pressure Sodium (HPS) type.

O. Minimum pole height in parking lot areas shall be 30 feet. Poles shall be square (not tapered) extruded aluminum with bronze color and box type light fixture. Only high-pressure sodium (HPS) lights will be allowed.

P. All EXIT and EMERGENCY lights shall be on a separate circuit controlled from a lockable circuit breaker (Circuit breaker shall be red in color). EXIT signs shall be of the LED type only.

Q. To satisfy requirements of Public Law 104-133, National Technology Transfer and Advancement Act, the DOD Fire Engineering Committee has determined Military Handbook (MILHDBK) 1008 is the implementing document for this requirement. All fire protection designs on MOTSU shall use this consensus standard.

R. In HAZADROUS locations, INTRINSICALLY safe devices SHALL NOT be allowed. This specifically includes overhead door operating devices and controls.

S. A service power meter shall be installed at the feed into each facility. If one transformer feeds multiple facilities, each facility shall have its own separate service power meter. Service power meters shall be installed on the secondary side of each installed pad mounted transformer or if pole mounted transformers are allowed, at the base of the pole. Each new/rehab facility shall have a Direct Digital Control (DDC) device installed.

T. The Fire Alarm Control Panel (FACP) shall be installed in the mechanical room of all new/rehab facilities. There shall be a smoke detector install directly over the FACP. The MOTSU fire alarm system carrier frequency is 141.375 MHz.

U. Graphical symbols for electrical wiring and layout diagrams used in architecture and building construction shall conform to ANSI Y32.9-1972. Graphic symbols for electrical and electronic diagrams shall conform to ANSI Y32.2-1975 and IEEE Standard 315-1975.

V. When underground conduit is run (1 1/2" and larger), it shall be encased in concrete and shall have spare runs equal to 100 percent of the base run (for base runs of three conduits or less). For base runs of four to eight, 50 percent spare runs shall be

required (rounded upward). Additional runs will be determined on case-by-case basics. Spare runs shall have installed a nylon fish-wire extending to each end and shall be capped.

W. All electrical equipment furnished shall be listed and labeled by Underwriters Laboratories, Inc. (UL).

X. Interior fluorescent lighting shall be type T-8, with electronic ballast, and shall be switched to allow one, two, or three lamps (for a three tube fixture) or either two or four lamps (for a four tube fixture) to be lit depending on lighting needs in a particular area.

Y. All electrical work done on MOTSU shall be performed by personnel authorized to engage in electrical contracting within the state of North Carolina and shall hold a North Carolina electrical license (suitable for the costs and voltages of the project). An electrical license from another state may be acceptable if it qualifies under North Carolina's reciprocity process. Submittal of a certified copy of the electrical license shall be required.

Z. On Military Construction projects, run telephone copper cabling to the nearest manhole. Cable shall be run in 4" PVC conduit buried a minimum of 24" below grade. Where it goes under roads, sidewalks, parking lots, etc., it shall be encased in concrete (4" minimum). Run 100% spare communication conduits (i.e.... if it requires 1 duct, run 2; if it requires 2 ducts, run 4; etc....).

AA. Where electrical panels are flush mounted, a minimum of three ¾" empty conduits shall be run to an area above the ceiling. The empty conduit shall have a nylon pull line and be capped at both ends. Where the panel is installed above a crawl space, install an additional three empty and capped ¾" conduits between the bottom of the panel and six inches below the floor joists.

AB. The construction contractor shall provide a minimum five (5) days notice to the Contracting Officer and receive written notice to proceed before interrupting any base utility.

AC. The construction contractor shall be responsible for locating utilities (above and below ground) that may be affected by the project. PW shall provide copies of available utility drawings relating to the project area. The contractor shall either mark the utilities or obtain the services of a company that normally performs such work. The contractor shall not perform any digging until he has marked the utilities. The contractor shall be totally responsible for the repairs to utilities that he may damage. Any damaged utilities shall be repaired within eight hours of the initial damage, or the Government (at its option) may have the utility repaired and then charge the contractor.

AD. The construction contractor shall use an indelible ink wide tip marker and identify on the cover plate of each junction box and pull box the circuit designation installed therein.

AE. All receptacle devices shall be installed with ground on top.

AF. If dry type transformers are required, they shall be installed on a concrete housekeeping pad four inches high and extending three inches beyond all sides of the transformer base. Install four neoprene pads between the transformer base and the concrete pad. Bolt the transformer to the concrete pad.

AG. All underground cables (electrical and/or communication) running under roads, parking lots, sidewalks and other "hard" surfaces shall be bored under these structures. The technique of cutting and resurfacing shall not be allowed.

AH. On new construction projects, temporary utilities (electrical, potable water and sewage) shall be made available to the contractor (if they are available in the work area or after site work is completed). The contractor shall perform

connections/disconnections and supply any transformers, reducing valves, piping, etc... required to make such a temporary connection. All such connections shall be done by personnel licensed and qualified to perform such connections. The term "temporary utilities" shall specifically not include heat and/or air conditioning. If heat and/or air conditioning are required by the contractor prior to acceptance of the project by the Government, he shall provide it at no expense to the Government. Temporary electrical service shall not be utilized for heat and/or air conditioning. Fuel oil shall not be provided by the Government.

AI. On maintenance or rehab type projects, the contractor may utilize existing utilities. If heat or air conditioning is available, the heat shall not be set above 50 degrees and the air conditioning shall not be set lower than 80 degrees.

AJ. Each facility shall have one main disconnect.

AK. Each sub-panel shall have its own main disconnect, unless it meets all of the following criteria: the sub-panel is located within 25 feet from the MDP; the sub-panel is in the same room as the MDP; and the sub-panel is in direct visual site of the MDP.

AL. Electrical wiring for all panels and disconnects shall be sized for the full (100%) panel or disconnect rating, regardless of the breaker or fuse size actually installed. For example, if a 225-ampere rated panel is installed with a 100-ampere circuit breaker, then wiring shall be sized for the 225-ampere rated panel. In this example, 100-ampere rated wire is not acceptable.