

# **SPECIFICATIONS FOR REPAIR BLACK FEEDER SWITCHES**

**MQNA 20-1001**

**Portfolio Optimization Office, 65th Civil Engineer Squadron**



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**USAFE**

**Lajes Field, Azores, Portugal**

**65th Civil Engineer Squadron**

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08/08

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SUPPLEMENTARY CONDITIONS FOR AZORES PROJECTS  
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## PART 1 GENERAL

## 1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00.

## SD-01 Preconstruction Submittals

AF Form 103; G

## 1.2 PHYSICAL DATA

Data referred to below is furnished for the Contractor's information. However, it is expressly understood that the Government will not be responsible for interpretation or conclusion drawn therefrom by the Contractor.

- a. The physical conditions indicated on the drawings and in the specifications are the result of site investigations.
- b. Geographic Conditions
  - (1) The Azores are comprised of a group of nine small islands, politically an integral part of Portugal, lying in the North Atlantic, about 2,300 miles east of New York and about 980 miles west of Lisbon, Portugal.
  - (2) The climate is mild and the humidity high. Average annual temperature is 63 degrees F. Diurnal fluctuation in temperature is approximately 10 degrees. Highest recorded temperature, 80 degrees F, lowest recorded temperature, 40 degrees F. The yearly average rainfall is 44.80 inches; the monthly average rainfall and probability of rain is as follows:

<u>Month</u>	<u>Average (in.)</u>	<u>Probability</u>
January	6.00	65 percent
February	5.40	64 percent
March	5.00	61 percent
April	3.10	43 percent
May	1.80	39 percent
June	1.80	33 percent

<u>Month</u>	<u>Average (in.)</u>	<u>Probability</u>
July	7.70	29 percent
August	1.80	35 percent
September	3.20	40 percent
October	5.20	55 percent
November	5.10	57 percent
December	5.30	58 percent

High winds occur from December through March. Average winds during this period are 11.6 knots. The recorded high winds are: November 90 knots, December 72 knots, January 90 knots, February 128 knots, March 106 knots, April 89 knots.

- (3) Terceira Island measures roughly 11 by 18 miles, almost entirely bordered by high cliffs. The terrain is hilly and dominated by volcanic ranges, including two extinct craters. The airfield is located on the northeast side of the island. The total population of Terceira Island is approximately 60,000. The city of Angra do Heroismo, capitol of the district, has a population of about 30,000; and the nearest town to the airfield, Praia da Vitoria, has a population of about 11,000.

c. Transportation Facilities for Lajes Field. Lajes Field is defined as the U.S. Forces Azores operational area on Terceira Island.

- (1) Railroads: There are no railroads on the island.
- (2) Highways and Roads: The majority of the roads are paved. A cobblestone and asphalt highway links Praia da Vitoria and Angra do Heroismo. The use or construction of haul roads and bridges shall be subject to prior approval of the Contracting Officer.
- (3) Ports: The island has two ports capable of handling deep draft ocean freighters, Praia da Vitoria and Angra do Heroismo.
- (4) Air: Lajes Field is served by the commercial Portuguese airline TAP, SATA and Ryanair.

### 1.3 LEGAL HOLIDAYS

For information purpose, the base acknowledges the following United States and Portuguese holidays:

*New Year's Day	01 January
Mardi Gras	Variable
Good Friday	Variable

Day of Liberty	25 April
Day of the Worker	01 May
Holy Spirit Monday	Variable
Corpus Christi	Variable
Day of Portugal	10 June
Praia da Vitoria Day	11 August
Assumption Day	15 August
Founding of the Republic	05 October
All Saint's Day	01 November
Restoration of Independence	01 December
Immaculate Conception	08 December
*Christmas Day	25 December
*Martin Luther King's Birthday	Third Monday in January
*President's Day	Third Monday in February
*Memorial Day	Last Monday in May
*Independence Day	04 July
*Labor Day	First Monday in September
*Columbus Day	Second Monday in October
*Veteran's Day	11 November
*Thanksgiving Day	Fourth Thursday in November
(*) NOTE: Any of the above holidays falling on a Saturday will be observed on the proceeding Friday. Holidays falling on a Sunday will be observed on the following Monday.	

#### 1.4 SPECIAL CONSIDERATIONS

- a. Contractor(s) must use and regard the most current and valid "Lajes Field Facilities Excellence Standards (LFFES)" for construction projects on Lajes Field, Azores. A copy of this standard will be provided to the contractor(s) by the CO upon request by each contractor. All project staging areas, construction sites, and storage areas shall be securely fenced around the entire perimeter of the job site. Fencing shall be completely secured at top and bottom to prevent pedestrian access. Fences shall be screened with opaque screening material to prevent visibility of the fenced area (min 2 m in height) in areas where material storage, contractor work trailers, trash

container and any debris that maybe collected as result of construction. Fences and screens shall be adequately staked and/or anchored to prevent blowing over during high wind conditions. Submit photos or samples of the screening material for approval prior to installation.

- b. The contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, grass) on or adjacent to the work site, which are not to be removed and which do not unreasonably interfere with the work required under this contract. The contractor shall only remove trees when specifically authorized by 65 CES Environmental Management function to do so, and shall avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, the contractor shall trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound. The contractor shall return all areas disturbed during construction to its original condition.
- c. The contractor shall request approval for laydown area and placing an office trailer at any project location. Any office trailer shall be no more than 10' x 32' in size, provided with a skirt on all sides, in like new condition, and painted Cream Beige or an equivalent color of similar tone approved by CO, if it is not obscured and hidden by the opaque fencing material. Office trailers in need of painting and / or repairs or, that are in an unsightly condition will not be allowed at the project site. A nameplate shall be displayed on the exterior of all trailers which lists the name of the contractor's company, contractor's point(s) of contact (POC) and telephone number where he/she can be reached, contract number, and title, and the date trailer was placed at the job site.
- d. All contractor employees shall obey all traffic laws on installation. The contractor shall park all vehicles only in legally designated locations, or within the fence line of the construction site.
- e. The contractor shall perform normal housekeeping functions inside and outside contractor job sites. Such functions include grounds maintenance, sweeping, mopping, dusting, disposal of accumulated waste materials and rubbish and other operations necessary to present a neat appearance at all times. All rubbish and waste materials shall be removed daily and shall be placed in contractor furnished containers. During construction, the contractor shall maintain all areas in a neat and orderly manner. The contractor shall clean the construction site and/or structure of all construction trash, trash generated by employees, debris, demolished building materials, combustible waste material, and/or dust daily or more frequently as necessary for safe operations. During the laying of asphalt roads, streets and/or parking surfaces, areas soiled by residual asphalt shall be cleaned daily. The contractor shall treat with lime entrances and exits to asphalt work site at their own expense. The contractor shall ensure all light or moderate weight debris at the construction site is properly secured in waste receptacles so that it does not blow to another area or onto the airfield. At the end of each project all equipment, rubble and rubbish shall be completely removed from the base by the contractor, leaving the area in a safe, clean and orderly manner to the satisfaction of the CO.
- f. Trucks loaded with loose material that can create a dust, debris or

falling hazard shall be secured and covered. Fasten a suitable cover, such as tarpaulin, over the load before his/her vehicles and such spillage shall be cleaned up immediately. For the duration of entering surrounding streets. The contractor is solely responsible for spillage from this contract and on a daily basis, the contractor shall remove from all base roads and/or streets asphalt, mud, soil, rocks, trash, and debris that result from their construction business on the particular day affected. In the case of asphalt, roads will be cleaned operation on base. All roads and/or streets affected shall be cleaned before close of and/or treated with lime immediately.

- g. Grassy areas disturbed by any type of construction work including storage, equipment staging, and material delivery areas shall be sodded or seeded as required on each delivery order. Contractor shall be responsible for the successful growth and maintenance of all new grass areas under this contract for a period of thirty (30) calendar days, or three mowings, after final acceptance of the work. All grass, shrubbery, and ornamental plants fenced by the construction site shall be maintained to base standards by the contractor.
- h. All contractor owned items such as, but not limited to, stakes, traffic/safety cones, barriers, warning tape, erosion control fences that are erected during construction, shall be removed entirely after completion of project and prior to Government acceptance of the project site. The contractor, at his own expense, shall return to the site to remove any items left at or near the project site after this time period.
- i. The contractor shall coordinate the exact location of each item of work with the inspector, such as drainage systems, drop inlets, repairs, and so forth. Once a week, the contractor shall layout and stake the proposed work in the field, and then review the layout with the inspector, who shall make recommendations as to adjustments needed. Prior to doing any work, the contractor shall receive approval from the inspector, who will coordinate with the CO, engineer, and environmental flight as required.

#### 1.5 CONDUCT OF CONTRACTOR PERSONNEL

The Contractor shall report to the Contracting Officer, immediately upon receipt or discovery of any information, whether or not verified, relating to physical security incidents, misconduct, crimes, and misdemeanors, including but not limited to murder, arson, larceny of any weapon, ammunition, or explosives, larceny of other property, robbery, burglary, narcotics and dangerous drugs, destruction of Government property, fraud, malfeasance, sabotage, subversions, disaffections, treasons, or espionage. The Contractor shall recognize and comply with the rules and regulations promulgated by the foreign country where the work is performed to the extent required by pertinent international agreements.

#### 1.6 TURN-IN OF U.S. GOVERNMENT-OWNED MATERIAL AND EQUIPMENT

Property, material, or equipment removed during the course of repairs, alterations, or renovation of any building or other structure remains the property of the U.S. Government and shall be disposed of as follows:

- a. Material other than scrap shall be turned over to the Government.



- b. The Contracting Officer will designate the time and place and prepare the necessary forms for receiving the materials.
- c. The items designated as scrap by the Contracting Officer shall be disposed of as directed.

#### 1.7 INVESTIGATION OF DAMAGE OR INJURY

The U.S. Government will have the right to conduct an investigation, or participate in the Contractor's investigation, of any damage or injury to U.S. Government property, equipment, or personnel.

#### 1.8 PROCESSING OF CONTRACTOR'S PERSONNEL AND PROPERTY

The Contractor shall process Contractor personnel and property through the Contracting Officer prior to commencement and at the completion of work under this contract. This processing shall include such things as registering and deregistering vehicles, arranging for the issuance and turn-in of identification and passes, and clearing liabilities incurred such as clubs, billeting, and loans.

#### 1.9 VISAS--DIPLOMATIC CLEARANCES

The Contractor shall ensure that his employees obtain the required diplomatic clearances (visas) of sufficient duration to cover the performance period of the contract. (Sixty-day visitor visas are available at Portuguese Immigration at Lajes Field.)

#### 1.10 SPECIAL REQUIREMENTS FOR OUTDOOR SIGNS

In accordance with USFORAZINST 5710.2D outdoor signs displayed on local military facilities are mandatory to be in both Portuguese and English languages. Identical size lettering shall be used for both languages, with Portuguese on top. The same requirement applies to project signs and safety and warning signs as used by the Contractor.

#### 1.11 WRITTEN CORRESPONDENCE

Written correspondence from the Contractor to the Contracting Officer shall be in English language, including but not limited to Contractor's invoice, Contractor's Monthly Estimate for Voucher, Contractor's schedules, samples and submittals, reports, and as-built drawing markups.

#### 1.12 PORTUGUESE EQUIVALENT

Where equipment, materials, or installations are to be in accordance with American standards, the equivalent Portuguese standard may be used subject to the approval of the Contracting Officer. The Contractor shall be responsible for proving the equivalency of the Portuguese standard.

#### 1.13 SECURITY REQUIREMENTS

- a. The contractor shall comply with security regulations imposed by the Installation Commander and/or the agency occupying the space where the work is to be performed, including adhering to, or, obtaining any security clearances.
- b. Closure of Openings: The contractor shall close every fence opening

resulting from work in order to prevent outside intrusion at the end of each workday. The Closure(s) shall remain in place when contractor is not actively engaged in working on the site(s), including each and every day, night, weekends, and holidays, to reduce wind and weather intrusion. The closure(s) shall be constructed of mesh wire anchored in place to stud framing, if necessary, or similar construction as approved by a government representative through the CO.

- c. Contractor Access to Air Force Installations: The contractor shall obtain temporary installation passes for all contractor/subcontractor personnel who visit or perform work on the Air Force Installations cited in the contract. The contractor shall obtain passes through the 65th Contracting Flight. Contractor personnel are required to wear or prominently display contractor furnished badges while visiting or performing work on the installation.
- d. Work Performed in Secured Areas: Projects in secured areas may require a local agency check of contractor personnel and all sub-contractors prior to commencement of work. If a check is required, the contractor should allocate time in the work schedule to accomplish this check. The contractor shall price work performed in secured areas according to standard work hour rates unless prior approval to use non-standard work hour rates is obtained from the CO.
- e. Escort in Restricted Areas: Contractor personnel must be escorted at all times in a controlled/restricted area by a government escort. Escorts for secured areas will be scheduled by the contractor at least ten (10) calendar days prior to starting work. The government will provide an escort as quickly as possible, but the contractor should expect delays due to the sensitive nature of secured areas.
- f. Unauthorized Reconnaissance: The contractor shall inform all personnel working under his/her jurisdiction (including subcontractor and visiting supplier personnel) that access to areas outside the immediate work area (excluding cafeterias and rest rooms near the work site, direct haul and access routes, contracting and points of supply and storage) is strictly prohibited. Circulation of the above personnel shall be limited to official business only. Persons engaged in unauthorized reconnaissance of other contractor or government activity will be referred to the CO for disposition. Infractions involving possible compromise of national security will be turned over to the Office of Special Investigation (OSI) for disposition.

#### 1.14 CONSTRUCTION SITE MAINTENANCE

- a. The contractor shall maintain each site in a neat and orderly manner. All supplies and equipment on the project site shall be stored to preclude mechanical and climatic damage. All grass, weeds, etc. shall be cut as necessary to prevent any fire/safety hazards and shall be no higher than 5 cm at any one time or as directed by the CO. All trash, debris, paper etc. shall be picked up immediately and placed in proper containers.
- b. Contractor Parking: The contractor shall inform his employees, suppliers, and subcontractors that their vehicles shall not be parked on grass, in Fire Lanes or other restricted areas, parking spaces marked as "Handicapped" or "Government", at any time. In addition, vehicles may not be driven over grass surfaces, unless indicated during a site visit or pre-performance conference. Any damage done to lawns,

shrubs, sidewalks etc. shall be repaired or replaced by the contractor at no additional cost to the government.

- c. Trucking: Loose debris on trucks leaving the site shall be loaded in a manner that will prevent dropping of materials on streets and conform to local ordinances and laws. Fasten suitable cover, such as a tarpaulin, over the load before entering surrounding streets. The contractor shall be responsible for immediately cleaning up any materials that fall from trucks.
- d. Fencing of Construction Site: Fences will be used to isolate construction sites as per instructions by the CO and per recommendations of the Lajes Facility Excellence Standards.

e. Barricades

- (1) The contractor shall barricade access to all construction sites. Barricading shall be used to isolate areas from access. The barricades shall be maintained in good condition, and be installed such that people approaching from the predominant direction can clearly read the warning. Barricades on streets shall have battery powered flashers for night use. Construction fencing shall be used to isolate exterior areas from pedestrian access, and shall be maintained in good condition. Cones shall only be used to temporarily block pedestrian traffic. Extended pedestrian blockages or road traffic shall use rigid barrels/barricades. All barricades, barrels, cones, etc., are included in the contractor's supplied equipment/supplies and therefore shall not be a direct cost to any contract unless the CO deems the individual contract requirements so extensive as to warrant payment.
- (2) All projects involving excavation shall be secured with flashing lights on all sides and have construction fencing completely surrounding the site at a minimum of five (5) feet from the hole.

1.15 DRAWING REQUIREMENTS

a. Existing Condition Drawings and As-built Drawings (including utilities):

- (1) Existing condition drawings showing existing underground utilities are available upon request. The contractor shall avail himself of the drawings. Any utility line shown on the record drawings (or made known to the contractor) and damaged during construction work shall be repaired immediately by the contractor at no additional cost to the government.
- (2) The government does not guarantee the accuracy or adequacy of existing record drawings. It is the contractor's responsibility to verify all existing conditions prior to starting work.
- (3) During the progress of the job, the contractor shall keep a careful record at the job site of all work accomplished from the layouts shown on the drawings. The contractor shall provide documents (drawings or sketches) to describe all of the work accomplished, and enter changes and corrections on contract or record drawings promptly and submit to the CO.

b. As-built Work Element in Progress Schedule:

- (1) As-builts shall be in the form of one (1) CD-ROM with all documents and drawings (.pdf/.dwg) and shall be turned over to the CO within twenty-one (21) calendar days of final inspection.
- (2) The as-builts shall be professionally drafted in AutoCAD and the contractor shall use conventional drafting techniques, nomenclature, symbols, lettering, noting, and dimensioning. Resolution of reproducible as-builts shall be legible.
- (3) Computer-Aided Design and Drafting (CADD) drawings shall comply with the most current version of Department of Defense (DOD) Technical Report arcGIS.
- (4) The as-built drawings shall indicate, in addition to all changes and corrections, the actual as-built condition. In order that the location of sub-surface utility lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, utility record drawings shall show by offset dimensions to two permanently fixed surfaced features, the end of each run including each change in direction. Valve, splice boxes, and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The average depth below the surface of each run shall also be recorded.

#### 1.16 PERMITS

- a. Welding Permit: No welding shall be started without first obtaining a permit issued by the 65 CES/CEF, Fire Prevention and Emergency Service Office. Contractor shall request the welding permit not less than five (5) working days before the welding work starts.
- b. Work Clearance Requests:
  - (1) In order to avoid damaging any underground utilities, such as sewer, water, gas, electrical, telephone, cable TV, and possibly others, the contractor must obtain digging permits. The contractor shall process, obtain and maintain a Work Clearance Request (AF Form 103) required, prior to beginning construction.
  - (2) The contractor is responsible for obtaining a Work Clearance Request for each contract right after Notice to Proceed (NTP) is issued. The contractor must fill out the request form (AF Form 103) with pertinent information and attach a plan showing the location of the respective work (contract drawings with areas highlighted is acceptable).
  - (3) Contractor shall submit to CO one (1) signed copy of the form (AF Form 103).
  - (4) Also, as a part of the work request process, the contractor shall be required to mark all locations of excavation work on site with white spray paint or stakes with flagging. Existing utilities will be marked in the field by the respective agency in proposed construction areas. The contractor is required to maintain these markings (or reference points) so that the pertinent agency does not have to duplicate their work.

## 1.17 PROGRESS REPORTS

The reports mentioned in FAR clause 52.236-15, "Schedules for Construction Contracts" shall be accomplished on AF Form 3064, Contracts Progress Schedule, and AF Form 3065, Contract Progress Report.

## 1.18 MATERIAL SUBMITTAL AND APPROVAL FORM

In accordance with FAR clause 52.236-5 "Materials and Workmanship," all material requiring approval shall be submitted by the contractor to the CO for approval on an AF Form 3000 within ten (10) calendar days after NTP (or as other-wise established by the CO).

## 1.19 COORDINATION WITH GOVERNMENT ACTIVITIES

- a. If it becomes necessary to interrupt work activities due to construction, permission to do so must be requested in writing to the CO twenty-one (21) calendar days in advance.
- b. The contractor shall request street closings, both partial and/or total, twenty-one (21) calendar days prior to the closing.
- c. Work in conjunction with this contract which requires utility outages which will affect (as determined by the CO) normal activities in the building, construction area, or other work areas, shall be performed by the contractor at a time other than regular work periods of the organization occupying the facility or area.
- d. Temporary construction for facilities used by the contractor for preventing interruption of normal work activity or loss of utilities shall be subject to approval of 65 CES/CEN through the CO.
- e. Utility Outages:
  - (1) The contractor shall coordinate all utility outages with the using agency through the CO or his representative prior to the outage. Services shall not be interrupted until receipt of approval of proposed hours and dates from the 65 CES/CEN through the CO. All work shall be arranged to ensure that the outage will be of minimum duration. The contractor will provide notice to the CO, in writing, not less than twenty-one (21) working calendar days prior to the required outage or as determined by the CO. No response to the outage/interruption request shall be considered as disapproval for the outage/interruption. In the event a scheduled utility outage is canceled by the Government, notification shall be given to the contractor at least 24 hours in advance of the time for the outage to start and the contractor waives his right to any claim for equitable adjustment or increased cost of performance under this contract as a result of this cancellation. Once a utility outage is arranged and work begun, work must go on continuously until the affected utilities are restored to the affected facility.
  - (2) The contractor's Interruption and Outage Requests shall include specific location of interruption/outage, hours and dates of interruption/outage, services affected by the interruption/outage.
  - (3) Water Mains. Operation of valves on water mains will be by government personnel only. Where shut-off of water lines interrupts service to fire hydrants or fire sprinkler systems, the

contractor shall contact the CO and arrange his operations to have sufficient personnel available to restore service without delay in the event of an emergency as determined by the 65 CES/CEF Fire Prevention Office.

- (4) Fire Protection System. Where interruption of electrical power affects a fire protection system service, the contractor shall notify the CO twenty-one (21) working calendar days before making such interruptions and shall restore service prior to leaving the job site each day.

#### 1.20 REMOVAL AND REPLACEMENT RESPONSIBILITY

The contractor shall be responsible for the replacement or repair of all existing finished surfaces, utilities, equipment, landscapes, grounds, and structures or parts thereof that he/she has damaged, removed, or cut into in order to perform work specified. Removed items to be reinstalled shall be stored by the contractor, free from damage, until reinstalled at no additional cost to the Government.

#### 1.21 WARRANTY SERVICE REQUIREMENTS

- a. The contractor shall furnish, as a minimum, one (1) primary name and telephone number of an individual on his/her management staff, available twenty four (24) hours per day, seven (7) days per week, for the life of this contract to respond to warranty situations. In the event the primary individual is unavailable, the contractor shall furnish an alternate individual and shall notify the CO of the alternate individual's telephone number.
- b. Following notification by the CO or, the COR, the contractor shall respond to a warranty service requirement identified by the CO, or the COR, in accordance with the "Warranty Service Priority List" of this program. This list prioritizes warranty work into the following categories:

**Emergency:** Perform on site inspection to evaluate situation, determine course of action, initiate work within 2 hours and work continuously to completion.

**Urgent:** Perform on site inspection to evaluate situation, determine course of action, initiate work within 24 hours and work continuously to completion.

**Routine:** All other work to be initiated within 48 hours and work continuously to completion.

- c. The "Warranty Service Priority List" is as follows:

**Emergency:** Emergency deemed as any damage on the active runway.

**Urgent:** All repairs on the airfield taxiways and/or parking aprons.

**Routine:** All other areas.

- d. Should parts be required to complete the work and the parts are not immediately available the contractor shall have a maximum of 12 hours after arrival at the job site to provide the CO with firm, written proposals for emergency alternatives and temporary repairs for

government participation with the contractor to provide emergency relief until the required parts are available on site for the contractor to perform permanent warranty repair. The contractor's proposals shall include a firm date and time that the required parts shall be available on site to complete the permanent warranty repair. The CO will evaluate the proposed alternatives and select the alternative considered to be in the best interest of the government to reduce the impact of the emergency condition. Alternatives considered by the CO will include the alternative for the contractor to "do nothing" while waiting until the required parts are available to perform permanent warranty repair. Negotiating a proposal, which will require government participation and the expenditure of government funds, shall constitute a separate procurement action by the government.

#### 1.22 CONTRACTOR PERSONNEL

Contract Manager: The contractor shall provide a contract manager and at least one alternate. The contract manager and alternate shall have full authority to act for the contractor in all contractual matters. The contract manager or alternate shall be available during standard work hours. The contract manager and alternate shall be able to read, speak and write English fluently.

#### 1.23 GOVERNMENT PERSONNEL

Personnel from 65 CES/CEN are designated as the representative (COR) of the CO for the purpose of technical surveillance of workmanship and inspection of materials for work being performed under this contract. This designation in no way authorizes anyone other than the CO to commit the Government to changes in the terms of the contract. No oral statement of any person and no written statement of anyone other than the CO shall modify or otherwise affect the terms or meaning of this contract. All requests by the contractor for interpretations, modifications, or changes shall be made in writing to the CO. The Government shall not be liable for any costs incurred by the government or any action taken by the contractor, which are not in conformance with this statement.

#### 1.24 E-MAIL CAPABILITY

The contractor shall have e-mail capability, via Internet or other means. This will allow the CO and 65 CES/CEN to communicate with contractor via e-mail.

#### 1.25 GOVERNMENT LIABILITY

The Government shall not be liable for any loss or damage to the contractor's property, including stock, or for expenses incidental to such loss or damage. The contractor shall file a report with the Base Security Forces immediately as is practicable to report loss.

### PART 2 PRODUCTS

Not Used

### PART 3 EXECUTION

Not Used

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SECTION 01 11 00

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**08/15**

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## SECTION 01 11 00

SUMMARY OF WORK  
08/15

## PART 1 GENERAL

## 1.1 WORK COVERED BY CONTRACT DOCUMENTS

## 1.1.1 Project Description

The work includes the replacement of all black feeder switches from medium-voltage electrical distribution system and incidental related work.

The work will consist on:

**Switch #S040**

Remove and dispose existing switchgear (1 Ea.);  
Excavate area to build new extension to existing concrete pad - 2'8" all around (approx. 8 B.C.Y.);  
Extend concrete pad - 2'8" all around (approx. 160 SF);  
Install new switchgear with same specifications of existing (1 Ea.);  
Prime and paint switchgear (135 S.F.);  
Install new identification plates (6 Ea.).

**Switch #S120**

Remove and dispose existing switchgear (1 Ea.);  
Excavate area to build new extension to existing concrete pad - 2'8" all around (approx. 3 B.C.Y.);  
Extend concrete pad - 2'8" all around (approx. 70 SF);  
Install new switchgear with same specifications of existing (1 Ea.);  
Prime and paint switchgear (135 S.F.);  
Install new identification plates (8 Ea.).

**Switch #S130**

Remove and dispose existing switchgear (1 Ea.);  
Excavate area to build new extension to existing concrete pad - 2'8" all around (approx. 3 B.C.Y.);  
Extend concrete pad - 2'8" all around (approx. 75 SF);  
Install new switchgear with same specifications of existing and add two extra switched compartments (1 Ea.);  
Prime and paint switchgear (135 S.F.);  
Install new identification plates (6 Ea.).

**Switch #S140**

Remove and dispose existing switchgear (1 Ea.);  
Excavate area to build new extension to existing concrete pad - 2'8" all around (approx. 3 B.C.Y.);  
Extend concrete pad - 2'8" all around (approx. 75 SF);  
Install new switchgear with same specifications of existing (1 Ea.);  
Prime and paint switchgear (135 S.F.);  
Install new identification plates (8 Ea.).

**Switch #S150**

Remove and dispose existing Switchgear (1 Ea.);  
Excavate area to build new extension to existing concrete pad - 2'8" all around (approx. 6 B.C.Y.);

Extend concrete pad - 2'8" all around (approx. 140 SF);  
Install new switchgear with same specifications of existing (1 Ea.);  
Prime and paint switchgear (135 S.F.);  
Install new identification plates (8 Ea.).

**Switch #S160**

Remove and dispose existing Switchgear (1 Ea.);  
Excavate area to build new extension to existing concrete pad - 2'8" all around (approx. 3 B.C.Y.);  
Extend concrete pad - 2'8" all around (approx. 75 SF);  
Install new switchgear with same specifications of existing (1 Ea.);  
Prime and paint switchgear (135 S.F.);  
Install new identification plates (8 Ea.).

**Switch #S170**

Remove and dispose existing Switchgear (1 Ea.);  
Excavate area to build new extension to existing concrete pad - 2'8" all around (approx. 3 B.C.Y.);  
Extend concrete pad - 2'8" all around (approx. 75 SF);  
Install new switchgear with same specifications of existing (1 Ea.);  
Prime and paint switchgear (135 S.F.);  
Install new identification plates (8 Ea.).

**Switch #S180**

Remove and dispose existing Switchgear (1 Ea.);  
Excavate area to build new extension to existing concrete pad - 2'8" all around (approx. 4 B.C.Y.);  
Extend concrete pad - 2'8" all around (approx. 85 SF);  
Install new switchgear with same specifications of existing (1 Ea.);  
Prime and paint switchgear (135 S.F.);  
Install new identification plates (8 Ea.).

**Switch #S190**

Remove and dispose existing Switchgear (1 Ea.);  
Excavate area to build new extension to existing concrete pad - 2'8" all around (approx. 4 B.C.Y.);  
Extend concrete pad - 2'8" all around (approx. 75 SF);  
Install new switchgear with same specifications of existing (1 Ea.);  
Prime and paint switchgear (135 S.F.);  
Install new identification plates (8 Ea.).

**Switch #S500**

Remove and dispose existing Switchgear (1 Ea.);  
Excavate area to build new extension to existing concrete pad - 2'8" all around (approx. 3 B.C.Y.);  
Extend concrete pad - 2'8" all around (approx. 60 SF);  
Install new switchgear with same specifications of existing (1 Ea.);  
Prime and paint switchgear (135 S.F.);  
Install new identification plates (8 Ea.).

**General notes:**

Use appropriate equipment and techniques for demolition or removal work in order to avoid damages on surrounding area.

Concrete pads shall be reinforced in accordance with project drawings.  
Build contraction joint to separate all concrete pads, new and existing.  
New switchgears shall be Federal Pacific type PSI/II or equivalent (all from same manufacturer), steel enclosed with finish coat MUNSELL NO. 7GY 3.29/1.5, GREEN.

Phasing plan shall be discussed in order to keep power interruption times as minimum and keep facilities functions operational.

Contractor shall perform electric insulation tests in all existing cables of black feeder.

Contractor shall provide training during installation of switchgears and insulation tests to at least one technical expert from 65 Electric Shop.

The project is being developed at areas where there is no historical data that may suggest that there is any type of soil contamination. Either way, during excavation work, contractor must look for contaminated soil as evidenced by discoloration, odors and differences in soil properties. If suspicions of contaminated soil arise the contractor must stop all work immediately and apply proper protection and isolation measures to avoid dispersion of any contaminants and cross contamination, inform the Contracting Officer and wait for further instructions.

#### 1.1.2 Location

The work is located at Lajes Field, approximately as indicated in project drawings. The exact location will be shown by the Contracting Officer.

#### 1.1.3 Period of Performance

Contractor is required to complete project within two hundred and forty (240) calendar days, including material acquisition.

### 1.2 OCCUPANCY OF PREMISES

Building(s) will be occupied during performance of work under this Contract.

Before work is started, arrange with the Contracting Officer a sequence of procedure, means of access, space for storage of materials and equipment, and use of approaches, corridors, and stairways.

### 1.3 EXISTING WORK

In addition to FAR 52.236-9 Protection of Existing Vegetation, Structures, Equipment, Utilities, and Improvements:

- a. Remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work which remain.
- b. Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as approved by the Contracting Officer. At the completion of operations, existing work must be in a condition equal to or better than that which existed before new work started.

### 1.4 LOCATION OF UNDERGROUND UTILITIES

Obtain digging permits (AF Form 103 and approval from the 65th CES) prior to start of excavation, and comply with Installation requirements for locating and marking underground utilities.[ Contact local utility locating service a minimum of 15 days prior to excavating, to mark utilities, and within sufficient time required if work occurs on a Monday or after a Holiday.] Verify existing utility locations indicated on

contract drawings, within area of work.

1.4.1 Notification Prior to Excavation

Notify the Contracting Officer at least 15 days prior to starting excavation work.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

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11/11

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- 1.2 SPECIAL SCHEDULING REQUIREMENTS
- 1.3 CONTRACTOR ACCESS AND USE OF PREMISES
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    - 1.3.1.1 Subcontractors and Personnel Contacts
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-- End of Section Table of Contents --

## SECTION 01 14 00

## WORK RESTRICTIONS

11/11

## PART 1 GENERAL

## 1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

List of Contact Personnel; G

Personnel List; G

Vehicle List; G

## 1.2 SPECIAL SCHEDULING REQUIREMENTS

- a. Contractor, materials and equipment must be ready for operation as approved by Contracting Officer before work is started on any asset which would interfere with normal operation.
- b. The black feeder shall remain in operation during the construction period. Power outages will be coordinated and authorized by CO to re-route electrical feeders. The Contractor must conduct his operations so as to cause the least possible interference with normal operations of the activity.
- c. Permission to interrupt any Activity roads, railroads, or utility service must be requested in writing a minimum of 21 calendar days prior to the desired date of interruption.

## 1.3 CONTRACTOR ACCESS AND USE OF PREMISES

## 1.3.1 Activity Regulations

Ensure that Contractor personnel employed on the Activity become familiar with and obey Activity regulations including safety, fire, traffic and security regulations. Keep within the limits of the work and avenues of ingress and egress. Wear hard hats in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. Mark Contractor equipment for identification.

## 1.3.1.1 Subcontractors and Personnel Contacts

Provide a list of contact personnel of the Contractor and subcontractors including addresses and telephone numbers for use in the event of an emergency. As changes occur and additional information becomes available, correct and change the information contained in previous lists.

## 1.3.1.2 Vehicle List

Provide a list of the Contractor and subcontractors vehicles with license plate, make, model and color. Only designated vehicles will have permission to work inside the Airfield area, where portion of the project is located.

## 1.3.1.3 No Smoking Policy

Smoking is prohibited within and outside of all buildings on installation, except in designated smoking areas. This applies to existing buildings, buildings under construction and buildings under renovation. Discarding tobacco materials other than into designated tobacco receptacles is considered littering and is subject to fines. The Contracting Officer will identify designated smoking areas.

## 1.3.2 Working Hours

Regular working hours must consist of an 8 hour period , between 8 a.m. and 5 p.m., Monday through Friday, , excluding Government holidays.

## 1.3.3 Work Outside Regular Hours

Work outside regular working hours requires Contracting Officer approval. Make application 21 calendar days prior to such work to allow arrangements to be made by the Government for inspecting the work in progress, giving the specific dates, hours, location, type of work to be performed, contract number and project title. Based on the justification provided, the Contracting Officer may approve work outside regular hours. During periods of darkness, the different parts of the work must be lighted in a manner approved by the Contracting Officer.

## [ ] [ ] [ ] [ ] PART 2 PRODUCTS

Not Used

## PART 3 EXECUTION

Not Used

-- End of Section --



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SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

**08/15**

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-- End of Section Table of Contents --

## SECTION 01 30 00

## ADMINISTRATIVE REQUIREMENTS

08/15

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

## U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2014) Safety and Health Requirements  
Manual

## 1.2 SUPERVISION

## 1.2.1 Minimum Communication Requirements

Have at least one qualified superintendent, or competent alternate, capable of reading, writing, and conversing fluently in the English language, on the job-site at all times during the performance of contract work. In addition, if a Quality Control (QC) representative is required on the contract, then that individual must also have fluent English communication skills.

## 1.2.2 Superintendent Qualifications

The project superintendent must have a minimum of 5 years experience in construction with at least 3 of those years as a superintendent on projects similar in size and complexity. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification and safety compliance. The individual must be capable of interpreting a critical path schedule and construction drawings. The qualification requirements for the alternate superintendent are the same as for the project superintendent. The Contracting Officer may request proof of the superintendent's qualifications at any point in the project if the performance of the superintendent is in question.

## 1.2.2.1 Duties

The project superintendent is primarily responsible for managing and coordinating day-to-day production and schedule adherence on the project. The superintendent is required to attend partnering meetings, and quality control meetings. The superintendent or qualified alternative must be on-site at all times during the performance of this contract until the work is completed and accepted.

## 1.2.3 Non-Compliance Actions

The Project Superintendent is subject to removal by the Contracting Officer for non-compliance with requirements specified in the contract and for failure to manage the project to insure timely completion. Furthermore, the Contracting Officer may issue an order stopping all or part of the work

until satisfactory corrective action has been taken. No part of the time lost due to such stop orders is acceptable as the subject of claim for extension of time for excess costs or damages by the Contractor.

### 1.3 PRECONSTRUCTION

After award of the contract but prior to commencement of any work at the site, meet with the Contracting Officer to discuss and develop a mutual understanding relative to the administration of the value engineering and safety program, preparation of the schedule of prices or earned value report, shop drawings, and other submittals, scheduling programming, prosecution of the work, and clear expectations of the "Interim DD Form 1354" Submittal. Major subcontractors who will engage in the work must also attend.

### 1.4 ELECTRONIC MAIL (E-MAIL) ADDRESS

Establish and maintain electronic mail (e-mail) capability along with the capability to open various electronic attachments as text files, pdf files, and other similar formats. Within 10 days after contract award, provide the Contracting Officer a single (only one) e-mail address for electronic communications from the Contracting Officer related to this contract including, but not limited to contract documents, invoice information, request for proposals, and other correspondence. The Contracting Officer may also use e-mail to notify the Contractor of base access conditions when emergency conditions warrant, such as hurricanes or terrorist threats. Multiple e-mail addresses are not allowed.

It is the Contractor's responsibility to make timely distribution of all Contracting Officer initiated e-mail with its own organization including field office(s). Promptly notify the Contracting Officer, in writing, of any changes to this e-mail address.

## PART 2 PRODUCTS

Not Used

## PART 3 EXECUTION

Not Used

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## SECTION 01 33 00

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## SECTION 01 33 00

## SUBMITTAL PROCEDURES

08/18

## PART 1 GENERAL

## 1.1 DEFINITIONS

## 1.1.1 Submittal Descriptions (SD)

Submittal requirements are specified in the technical sections. Examples and descriptions of submittals identified by the Submittal Description (SD) numbers and titles follow:

## SD-01 Preconstruction Submittals

Preconstruction Submittals include schedules and a tabular list of locations, features, and other pertinent information regarding products, materials, equipment, or components to be used in the work.

Certificates Of Insurance

Surety Bonds

List Of Proposed Subcontractors

List Of Proposed Products

Baseline Network Analysis Schedule (NAS)

Submittal Register

Schedule Of Prices Or Earned Value Report

Work Plan

Quality Control (QC) plan

Environmental Protection Plan

## SD-02 Shop Drawings

Drawings, diagrams and schedules specifically prepared to illustrate some portion of the work.

Diagrams and instructions from a manufacturer or fabricator for use in producing the product and as aids to the Contractor for integrating the product or system into the project.

Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be coordinated.

## SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions and brochures illustrating size, physical appearance and other characteristics of materials, systems or equipment for some portion of the work.

Samples of warranty language when the contract requires extended product warranties.

#### SD-04 Samples

Fabricated or unfabricated physical examples of materials, equipment or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged.

Color samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project.

Field samples and mock-ups constructed on the project site establish standards ensuring work can be judged. Includes assemblies or portions of assemblies that are to be incorporated into the project and those that will be removed at conclusion of the work.

#### SD-05 Design Data

Design calculations, mix designs, analyses or other data pertaining to a part of work.

#### SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material, product or system to be provided has been tested in accord with specified requirements. Unless specified in another section, testing must have been within three years of date of contract award for the project.

Report that includes findings of a test required to be performed on an actual portion of the work or prototype prepared for the project before shipment to job site.

Report that includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

Investigation reports

Daily logs and checklists

Final acceptance test and operational test procedure

#### SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that the product, system, or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

Document required of Contractor, or of a manufacturer, supplier, installer or Subcontractor through Contractor. The document purpose is to further promote the orderly progression of a portion of the work by documenting procedures, acceptability of methods, or personnel qualifications.

Confined space entry permits

Text of posted operating instructions

#### SD-09 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must be signed by an authorized official of a testing laboratory or agency and state the test results; and indicate whether the material, product, or system has passed or failed the test.

Factory test reports.

#### SD-10 Operation and Maintenance Data

Data provided by the manufacturer, or the system provider, including manufacturer's help and product line documentation, necessary to maintain and install equipment, for operating and maintenance use by facility personnel.

Data required by operating and maintenance personnel for the safe and efficient operation, maintenance and repair of the item.

Data incorporated in an operations and maintenance manual or control system.

#### SD-11 Closeout Submittals

Documentation to record compliance with technical or administrative requirements or to establish an administrative mechanism.

Submittals required for Guiding Principle Validation (GPV) or Third Party Certification (TPC).

Special requirements necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a major phase of construction on a multi-phase contract.

##### 1.1.2 Approving Authority

Office or designated person authorized to approve the submittal.

##### 1.1.3 Work

As used in this section, on-site and off-site construction required by contract documents, including labor necessary to produce submittals, construction, materials, products, equipment, and systems incorporated or to be incorporated in such construction. In exception, excludes work to



produce SD-01 submittals.

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with this section.

### SD-01 Preconstruction Submittals

Submittal Register; G

### SD-11 Closeout Submittals

Interim DD Form 1354; G

## 1.3 SUBMITTAL CLASSIFICATION

### 1.3.1 Government Approved (G)

Within the terms of the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, submittals are considered to be "shop drawings."

### 1.3.2 For Information Only

Submittals not requiring Government approval will be for information only. Within the terms of the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, they are not considered to be "shop drawings."

## 1.4 PREPARATION

### 1.4.1 Submittal Format

#### 1.4.1.1 Format of SD-01 Preconstruction Submittals

When the submittal includes a document that is to be used in the project, or is to become part of the project record, other than as a submittal, do not apply the Contractor's approval stamp to the document itself, but to a separate sheet accompanying the document.

Provide data in the unit of measure used in the contract documents.

#### 1.4.1.2 Format for SD-02 Shop Drawings

Provide shop drawings not less than 8 1/2 by 11 inches nor more than 30 by 42 inches, except for full-size patterns or templates. Prepare drawings to accurate size, with scale indicated, unless another form is required. Ensure drawings are suitable for reproduction and of a quality to produce clear, distinct lines and letters, with dark lines on a white background.

- a. Include the nameplate data, size, and capacity on drawings. Also include applicable federal, military, industry, and technical society publication references.
- b. Dimension drawings, except diagrams and schematic drawings. Prepare drawings demonstrating interface with other trades to scale. Use the same unit of measure for shop drawings as indicated on the contract drawings. Identify materials and products for work shown.

Submit an electronic copy of drawings in PDF and DWG format.

#### 1.4.1.2.1 Drawing Identification

Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph IDENTIFYING SUBMITTALS.

Number drawings in a logical sequence. Each drawing is to bear the number of the submittal in a uniform location next to the title block. Place the Government contract number in the margin, immediately below the title block, for each drawing.

#### 1.4.1.3 Format of SD-03 Product Data

Present product data submittals for each section. Include a table of contents, listing the page and catalog item numbers for product data.

Indicate, by prominent notation, each product that is being submitted; indicate the specification section number and paragraph number to which it pertains.

#### 1.4.1.3.1 Product Information

Supplement product data with material prepared for the project to satisfy the submittal requirements where product data does not exist. Identify this material as developed specifically for the project, with information and format as required for submission of SD-07 Certificates.

#### 1.4.1.3.2 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), Association of Edison Illuminating Companies (AEIC), European Committee for Standardization (CEN), European Committee for Electrotechnical Standardization (CENELEC), European Telecommunications Standards Institute (ETSI), EU Declaration of Conformity (CE Marking) submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

#### 1.4.1.3.3 Data Submission

Collect required data submittals for each specific material, product, unit of work, or system into a single submittal that is marked for choices, options, and portions applicable to the submittal. Mark each copy of the product data identically.

Submit the manufacturer's instructions before installation.

#### 1.4.1.4 Format of SD-04 Samples

##### 1.4.1.4.1 Sample Characteristics

Furnish samples in the following sizes, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately the same size as specified:

- a. Sample of Equipment or Device: Full size.
- b. Sample of Materials Less Than 2 by 3 inches: Built up to 8 1/2 by 11 inches.
- c. Sample of Materials Exceeding 8 1/2 by 11 inches: Cut down to 8 1/2 by 11 inches and adequate to indicate color, texture, and material variations.
- d. Sample of Linear Devices or Materials: 10 inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are conduit and handrails.
- e. Sample Volume of Nonsolid Materials: Pint. Examples of nonsolid materials are sand and paint.
- f. Color Selection Samples: 2 by 4 inches. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified. Sizes and quantities of samples are to represent their respective standard unit.
- g. Sample Panel: 4 by 4 feet.
- h. Sample Installation: 100 square feet.

##### 1.4.1.4.2 Sample Incorporation

Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples are to be in undamaged condition at the time of use.

Recording of Sample Installation: Note and preserve the notation of any area constituting a sample installation, but remove the notation at the final clean-up of the project.

##### 1.4.1.4.3 Comparison Sample

Samples Showing Range of Variation: Where variations in color, finish, pattern, or texture are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range. Mark each unit to describe its relation to the range of the variation.

When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

##### 1.4.1.5 Format of SD-05 Design Data

Provide design data and certificates on 8 1/2 by 11 inch paper.

#### 1.4.1.6 Format of SD-06 Test Reports

By prominent notation, indicate each report in the submittal. Indicate the specification number and paragraph number to which each report pertains.

#### 1.4.1.7 Format of SD-07 Certificates

Provide design data and certificates on 8 1/2 by 11 inch paper.

#### 1.4.1.8 Format of SD-08 Manufacturer's Instructions

Present manufacturer's instructions submittals for each section. Include the manufacturer's name, trade name, place of manufacture, and catalog model or number on product data. Also include applicable federal, military, industry, and technical-society publication references. If supplemental information is needed to clarify the manufacturer's data, submit it as specified for SD-07 Certificates.

Submit the manufacturer's instructions before installation.

#### 1.4.1.8.1 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), Association of Edison Illuminating Companies (AEIC), European Committee for Standardization (CEN), European Committee for Electrotechnical Standardization (CENELEC), European Telecommunications Standards Institute (ETSI), EU Declaration of Conformity (CE Marking) submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

#### 1.4.1.9 Format of SD-09 Manufacturer's Field Reports

By prominent notation, indicate each report in the submittal. Indicate the specification number and paragraph number to which each report pertains.

#### 1.4.1.10 Format of SD-10 Operation and Maintenance Data (O&M)

Comply with the requirements specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA for O&M Data format.

#### 1.4.1.11 Format of SD-11 Closeout Submittals

When the submittal includes a document that is to be used in the project or is to become part of the project record, other than as a submittal, do not apply the Contractor's approval stamp to the document itself, but to a separate sheet accompanying the document.

Provide data in the unit of measure used in the contract documents.

#### 1.4.2 Source Drawings for Shop Drawings

##### 1.4.2.1 Source Drawings

The entire set of source drawing files (DWG) will not be provided to the Contractor. Request the specific Drawing Number for the preparation of shop drawings. Only those drawings requested to prepare shop drawings will be provided. These drawings are provided only after award.

##### 1.4.2.2 Terms and Conditions

Data contained on these electronic files must not be used for any purpose other than as a convenience in the preparation of construction data for the referenced project. Any other use or reuse is at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor must make no claim, and waives to the fullest extent permitted by law any claim or cause of action of any nature against the Government, its agents, or its subconsultants that may arise out of or in connection with the use of these electronic files. The Contractor must, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities, or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic source drawing files are not construction documents. Differences may exist between the source drawing files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic source drawing files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. The Contractor is responsible for determining if any conflict exists. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished source drawing files, the signed and sealed construction documents govern. Use of these source drawing files does not relieve the Contractor of the duty to fully comply with the contract documents, including and without limitation the need to check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction data related to this contract, remove all previous indication of ownership (seals, logos, signatures, initials and dates).

##### 1.4.3 Electronic File Format

Provide submittals in electronic format, with the exception of material samples required for SD-04 Samples items. Compile the submittal file as a single, complete document, to include the Transmittal Form described within. Name the electronic submittal file specifically according to its contents, and coordinate the file naming convention with the Contracting Officer. Electronic files must be of sufficient quality that all information is legible. Use PDF and DWG as the electronic format, unless otherwise specified or directed by the Contracting Officer. Generate PDF files from original documents with bookmarks so that the text included in the PDF file is searchable and can be copied. If documents are scanned, optical character resolution (OCR) routines are required. Index and bookmark files exceeding 30 pages to allow efficient navigation of the file. When required, the electronic file must include a valid electronic signature or a scan of a signature.

## 1.5 QUANTITY OF SUBMITTALS

### 1.5.1 Number of SD-01 Preconstruction Submittal Copies

Unless otherwise specified, submit two sets of administrative submittals.

### 1.5.2 Number of SD-04 Samples

- a. Submit two samples, or two sets of samples showing the range of variation, of each required item. One approved sample or set of samples will be retained by the approving authority and one will be returned to the Contractor.
- b. Submit one sample panel or provide one sample installation where directed. Include components listed in the technical section or as directed.
- c. Submit one sample installation, where directed.
- d. Submit one sample of nonsolid materials.

## 1.6 INFORMATION ONLY SUBMITTALS

Submittals without a "G" designation must be certified by the QC manager and submitted to the Contracting Officer for information-only. Approval of the Contracting Officer is not required on information only submittals. The Contracting Officer will mark "receipt acknowledged" on submittals for information and will return only the transmittal cover sheet to the Contractor. Normally, submittals for information only will not be returned. However, the Government reserves the right to return unsatisfactory submittals and require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

## 1.7 PROJECT SUBMITTAL REGISTER

A sample Project Submittal Register showing items of equipment and materials for when submittals are required by the specifications is provided as "Appendix A - Submittal Register."

### 1.7.1 Submittal Management

Prepare and maintain a submittal register, as the work progresses. Do not change data that is output in columns (c), (d), (e), and (f) as delivered by Government; retain data that is output in columns (a), (g), (h), and (i) as approved. As an attachment, provide a submittal register showing items of equipment and materials for which submittals are required by the specifications. This list may not be all-inclusive and additional submittals may be required.

Column (c): Lists specification section in which submittal is required.

Column (d): Lists each submittal description (SD Number. and type, e.g., SD-02 Shop Drawings) required in each specification section.

Column (e): Lists one principal paragraph in each specification section where a material or product is specified. This listing is only to facilitate locating submitted requirements. Do not consider entries in column (e) as limiting the project requirements.

Thereafter, the Contractor is to track all submittals by maintaining a complete list, including completion of all data columns and all dates on which submittals are received by and returned by the Government.

#### 1.7.2 Preconstruction Use of Submittal Register

Submit the submittal register. Include the QC plan and the project schedule. Verify that all submittals required for the project are listed and add missing submittals. Coordinate and complete the following fields on the register submitted with the QC plan and the project schedule:

Column (a) Activity Number: Activity number from the project schedule.

Column (g) Contractor Submit Date: Scheduled date for the approving authority to receive submittals.

Column (h) Contractor Approval Date: Date that Contractor needs approval of submittal.

Column (i) Contractor Material: Date that Contractor needs material delivered to Contractor control.

#### 1.7.3 Contractor Use of Submittal Register

Update the following fields with each submittal throughout the contract.

Column (b) Transmittal Number: List of consecutive, Contractor-assigned numbers.

Column (j) Action Code (k): Date of action used to record Contractor's review when forwarding submittals to QC.

Column (l) Date submittal transmitted.

Column (q) Date approval was received.

#### 1.7.4 Approving Authority Use of Submittal Register

Update the following fields:

Column (b) Transmittal Number: List of consecutive, Contractor-assigned numbers.

Column (l) Date submittal was received.

Column (m) through (p) Dates of review actions.

Column (q) Date of return to Contractor.

#### 1.7.5 Delivery of Copies

Submit an updated electronic copy of the submittal register to the Contracting Officer with each invoice request. Provide an updated Submittal Register monthly regardless of whether an invoice is submitted.

#### 1.8 INTERIM DD FORM 1354

Interim "DD Form 1354 - Transfer and Acceptance of DoD Real Property" with cost breakout for all assets 30 calendar days prior to facility turnover.

#### 1.9 VARIATIONS

Variations from contract requirements require Contracting Officer approval pursuant to contract Clause FAR 52.236-21 Specifications and Drawings for Construction, and will be considered where advantageous to the Government.

##### 1.9.1 Considering Variations

Discussion of variations with the Contracting Officer before submission will help ensure that functional and quality requirements are met and minimize rejections and resubmittals. When contemplating a variation that results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

Specifically point out variations from contract requirements in transmittal letters. Failure to point out variations may cause the Government to require rejection and removal of such work at no additional cost to the Government.

##### 1.9.2 Proposing Variations

When proposing variation, deliver a written request to the Contracting Officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to Government. Include the DOR's written analysis and approval. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

##### 1.9.3 Warranting that Variations are Compatible

When delivering a variation for approval, the Contractor warrants that this contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of work.

##### 1.9.4 Review Schedule Extension

In addition to the normal submittal review period, a period of 14 days will be allowed for the Government to consider submittals with variations.

#### 1.10 SCHEDULING

Schedule and submit concurrently product data and shop drawings covering component items forming a system or items that are interrelated. Submit pertinent certifications at the same time. No delay damages or time extensions will be allowed for time lost in late submittals. .



- a. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. The Contractor is responsible for additional time required for Government reviews resulting from required resubmittals. The review period for each resubmittal is the same as for the initial submittal.
- b. Submittals required by the contract documents are listed on the submittal register. If a submittal is listed in the submittal register but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the contract documents but that have been omitted from the register or marked "N/A."
- c. Resubmit the submittal register and annotate it monthly with actual submission and approval dates. When all items on the register have been fully approved, no further resubmittal is required.

#### 1.11 GOVERNMENT APPROVING AUTHORITY

When the approving authority is the Contracting Officer, the Government will:

- a. Note the date on which the submittal was received.
- b. Review submittals for approval within the scheduling period specified and only for conformance with project design concepts and compliance with contract documents.
- c. Identify returned submittals with one of the actions defined in paragraph REVIEW NOTATIONS and with comments and markings appropriate for the action indicated.

Upon completion of review of submittals requiring Government approval, stamp and date submittals. 1 copy of the submittal will be retained by the Contracting Officer and 1 copy of the submittal will be returned to the Contractor.

##### 1.11.1 Review Notations

Submittals will be returned to the Contractor with the following notations:

- a. Submittals marked "approved" or "accepted" authorize proceeding with the work covered.
- b. Submittals marked "approved as noted" or "approved, except as noted, resubmittal not required," authorize proceeding with the work covered provided that the Contractor takes no exception to the corrections.
- c. Submittals marked "not approved," "disapproved," or "revise and resubmit" indicate incomplete submittal or noncompliance with the contract requirements or design concept. Resubmit with appropriate changes. Do not proceed with work for this item until the resubmittal is approved.
- d. Submittals marked "not reviewed" indicate that the submittal has been previously reviewed and approved, is not required, does not have

evidence of being reviewed and approved by Contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by Contractor or for being incomplete, with appropriate action, coordination, or change.

- e. Submittals marked "receipt acknowledged" indicate that submittals have been received by the Government. This applies only to "information-only submittals" as previously defined.

#### 1.12 DISAPPROVED SUBMITTALS

Make corrections required by the Contracting Officer. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications, give notice to the Contracting Officer as required under the FAR clause titled CHANGES. The Contractor is responsible for the dimensions and design of connection details and the construction of work. Failure to point out variations may cause the Government to require rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, make such revisions and resubmit in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

#### 1.13 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals is not to be construed as a complete check, and indicates only that

Approval or acceptance by the Government for a submittal does not relieve the Contractor of the responsibility for meeting the contract requirements or for any error that may exist, because under the Quality Control (QC) requirements of this contract, the Contractor is responsible for ensuring information contained within each submittal accurately conforms with the requirements of the contract documents.

After submittals have been approved or accepted by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

#### 1.14 APPROVED SAMPLES

Approval of a sample is only for the characteristics or use named in such approval and is not to be construed to change or modify any contract requirements. Before submitting samples, provide assurance that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.

Match the approved samples for materials and equipment incorporated in the work. If requested, approved samples, including those that may be damaged in testing, will be returned to the Contractor, at its expense, upon completion of the contract. Unapproved samples will also be returned to the Contractor at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient

cause for refusal to consider, under this contract, any further samples of the same brand or make as that material. The Government reserves the right to disapprove any material or equipment that has previously proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in place may be taken by the Contracting Officer for testing. Samples failing to meet contract requirements will automatically void previous approvals. Replace such materials or equipment to meet contract requirements.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

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## SECTION 01 35 26

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11/15

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## SECTION 01 35 26

## GOVERNMENTAL SAFETY REQUIREMENTS

11/15

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

## AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.22	(2007; R 2017) Safety Requirements for Rope-Guided and Non-Guided Workers' Hoists
ASSE/SAFE A10.34	(2001; R 2012) Protection of the Public on or Adjacent to Construction Sites
ASSE/SAFE A10.44	(2014) Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations
ASSE/SAFE Z244.1	(2003; R 2014) Control of Hazardous Energy Lockout/Tagout and Alternative Methods
ASSE/SAFE Z359.0	(2012) Definitions and Nomenclature Used for Fall Protection and Fall Arrest
ASSE/SAFE Z359.1	(2016) The Fall Protection Code
ASSE/SAFE Z359.11	(2014) Safety Requirements for Full Body Harnesses
ASSE/SAFE Z359.12	(2009) Connecting Components for Personal Fall Arrest Systems
ASSE/SAFE Z359.13	(2013) Personal Energy Absorbers and Energy Absorbing Lanyards
ASSE/SAFE Z359.14	(2014) Safety Requirements for Self-Retracting Devices for Personal Fall Arrest and Rescue Systems
ASSE/SAFE Z359.15	(2014) Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems
ASSE/SAFE Z359.2	(2017) Minimum Requirements for a Comprehensive Managed Fall Protection Program
ASSE/SAFE Z359.3	(2017) Safety Requirements for Lanyards and Positioning Lanyards

ASSE/SAFE Z359.4	(2013) Safety Requirements for Assisted-Rescue and Self-Rescue Systems, Subsystems and Components
ASSE/SAFE Z359.6	(2016) Specifications and Design Requirements for Active Fall Protection Systems
ASSE/SAFE Z359.7	(2011) Qualification and Verification Testing of Fall Protection Products

## ASME INTERNATIONAL (ASME)

ASME B30.20	(2013; INT Oct 2010 - May 2012) Below-the-Hook Lifting Devices
ASME B30.22	(2016) Articulating Boom Cranes
ASME B30.23	(2011) Personnel Lifting Systems Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings
ASME B30.26	(2015; INT Jun 2010 - Jun 2014) Rigging Hardware
ASME B30.3	(2016) Tower Cranes
ASME B30.5	(2014) Mobile and Locomotive Cranes
ASME B30.7	(2011) Winches
ASME B30.8	(2015) Floating Cranes and Floating Derricks
ASME B30.9	(2014; INT Feb 2011 - Nov 2013) Slings

## ASTM INTERNATIONAL (ASTM)

ASTM F855	(2015) Standard Specifications for Temporary Protective Grounds to Be Used on De-energized Electric Power Lines and Equipment
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## INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE 1048	(2003) Guide for Protective Grounding of Power Lines
IEEE C2	(2017; Errata 1-2 2017; INT 1 2017) National Electrical Safety Code

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(2018; TIA 18-1) Standard for Portable Fire Extinguishers
NFPA 241	(2013; Errata 2015) Standard for Safeguarding Construction, Alteration, and Demolition Operations



NFPA 51B	(2014) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2; TIA 17-3; TIA 17-4; TIA 17-5; TIA 17-6; TIA 17-7; TIA 17-8; TIA 17-9; TIA 17-10; TIA 17-11; TIA 17-12; TIA 17-13; TIA 17-14) National Electrical Code
NFPA 70E	(2018; TIA 18-1; TIA 81-2) Standard for Electrical Safety in the Workplace

## TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA-1019	(2012; R 2016) Standard for Installation, Alteration and Maintenance of Antenna Supporting Structures and Antennas
TIA-222	(2005G; Add 1 2007; Add 2 2009; Add 3 2014; Add 4 2014; R 2016) Structural Standards for Steel Antenna Towers and Antenna Supporting Structures

## U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2014) Safety and Health Requirements Manual
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## U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1910.147	The Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1910.333	Selection and Use of Work Practices
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1915.89	Control of Hazardous Energy (Lockout/Tags-Plus)
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.1400	Cranes and Derricks in Construction
29 CFR 1926.16	Rules of Construction
29 CFR 1926.500	Fall Protection
29 CFR 1926.552	Material Hoists, Personal Hoists, and Elevators

29 CFR 1926.553	Base-Mounted Drum Hoists
CPL 02-01-056	(2014) Inspection Procedures for Accessing Communication Towers by Hoist
CPL 2.100	(1995) Application of the Permit-Required Confined Spaces (PRCS) Standards, 29 CFR 1910.146

## 1.2 DEFINITIONS

### 1.2.1 Competent Person (CP)

The CP is a person designated in writing, who, through training, knowledge and experience, is capable of identifying, evaluating, and addressing existing and predictable hazards in the working environment or working conditions that are dangerous to personnel, and who has authorization to take prompt corrective measures with regards to such hazards.

### 1.2.2 Competent Person, Confined Space

The CP, Confined Space, is a person meeting the competent person requirements as defined EM 385-1-1 Appendix Q, with thorough knowledge of OSHA's Confined Space Standard, 29 CFR 1910.146, and designated in writing to be responsible for the immediate supervision, implementation and monitoring of the confined space program, who through training, knowledge and experience in confined space entry is capable of identifying, evaluating and addressing existing and potential confined space hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

### 1.2.3 Competent Person, Cranes and Rigging

The CP, Cranes and Rigging, as defined in EM 385-1-1 Appendix Q, is a person meeting the competent person, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the Crane and Rigging Program, who through training, knowledge and experience in crane and rigging is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

### 1.2.4 Competent Person, Excavation/Trenching

A CP, Excavation/Trenching, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and 29 CFR 1926, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the excavation/trenching program, who through training, knowledge and experience in excavation/trenching is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

### 1.2.5 Competent Person, Fall Protection

The CP, Fall Protection, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and in accordance with ASSE/SAFE Z359.0, who has been designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the fall protection program, who through training, knowledge and experience in

fall protection and rescue systems and equipment, is capable of identifying, evaluating and addressing existing and potential fall hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

#### 1.2.6 Competent Person, Scaffolding

The CP, Scaffolding is a person meeting the competent person requirements in EM 385-1-1 Appendix Q, and designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the scaffolding program. The CP for Scaffolding has enough training, knowledge and experience in scaffolding to correctly identify, evaluate and address existing and potential hazards and also has the authority to take prompt corrective measures with regard to these hazards. CP qualifications must be documented and include experience on the specific scaffolding systems/types being used, assessment of the base material that the scaffold will be erected upon, load calculations for materials and personnel, and erection and dismantling. The CP for scaffolding must have a documented, minimum of 8-hours of scaffold training to include training on the specific type of scaffold being used (e.g. mast-climbing, adjustable, tubular frame), in accordance with EM 385-1-1 Section 22.B.02.

#### 1.2.7 Competent Person (CP) Trainer

A competent person trainer as defined in EM 385-1-1 Appendix Q, who is qualified in the material presented, and who possesses a working knowledge of applicable technical regulations, standards, equipment and systems related to the subject matter on which they are training Competent Persons. A competent person trainer must be familiar with the typical hazards and the equipment used in the industry they are instructing. The training provided by the competent person trainer must be appropriate to that specific industry. The competent person trainer must evaluate the knowledge and skills of the competent persons as part of the training process.

#### 1.2.8 High Risk Activities

High Risk Activities are activities that involve work at heights, crane and rigging, excavations and trenching, scaffolding, electrical work, and confined space entry.

#### 1.2.9 High Visibility Accident

A High Visibility Accident is any mishap which may generate publicity or high visibility.

#### 1.2.10 Load Handling Equipment (LHE)

LHE is a term used to describe cranes, hoists and all other hoisting equipment (hoisting equipment means equipment, including crane, derricks, hoists and power operated equipment used with rigging to raise, lower or horizontally move a load).

#### 1.2.11 Medical Treatment

Medical Treatment is treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.

#### 1.2.12 Near Miss

A Near Miss is a mishap resulting in no personal injury and zero property damage, but given a shift in time or position, damage or injury may have occurred (e.g., a worker falls off a scaffold and is not injured; a crane swings around to move the load and narrowly misses a parked vehicle).

#### 1.2.13 Operating Envelope

The Operating Envelope is the area surrounding any crane or load handling equipment. Inside this "envelope" is the crane, the operator, riggers and crane walkers, other personnel involved in the operation, rigging gear between the hook, the load, the crane's supporting structure (i.e. ground or rail), the load's rigging path, the lift and rigging procedure.

#### 1.2.14 Qualified Person (QP)

The QP is a person designated in writing, who, by possession of a recognized degree, certificate, or professional standing, or extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems related to the subject matter, the work, or the project.

#### 1.2.15 Qualified Person, Fall Protection (QP for FP)

A QP for FP is a person meeting the requirements of EM 385-1-1 Appendix Q, and ASSE/SAFE Z359.0, with a recognized degree or professional certificate and with extensive knowledge, training and experience in the fall protection and rescue field who is capable of designing, analyzing, and evaluating and specifying fall protection and rescue systems.

#### 1.2.16 USACE Property and Equipment

Interpret "USACE" property and equipment specified in USACE EM 385-1-1 as Government property and equipment.

#### 1.2.17 Load Handling Equipment (LHE) Accident or Load Handling Equipment Mishap

A LHE accident occurs when any one or more of the eight elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; or collision, including unplanned contact between the load, crane, or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents, even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, or roll over).

### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G

## SD-06 Test Reports

Accident Reports; G

## SD-07 Certificates

Standard Lift Plan; G

Critical Lift Plan ; G

Activity Hazard Analysis (AHA); G

Hot Work Permit

## 1.4 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, comply with the most recent edition of USACE EM 385-1-1, and the following host nation laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

## 1.5 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

## 1.5.1 Personnel Qualifications

## 1.5.1.1 Site Safety and Health Officer (SSHO)

Provide an SSHO that meets the requirements of EM 385-1-1 Section 1. The SSHO must ensure that the requirements of 29 CFR 1926.16 are met for the project. Provide a Safety oversight team that includes a minimum of one (1) person at each project site to function as the Site Safety and Health Officer (SSHO). The SSHO or an equally-qualified Alternate SSHO must be at the work site at all times to implement and administer the Contractor's safety program and government-accepted Accident Prevention Plan. The SSHO and Alternate SSHO must have the required training, experience, and qualifications in accordance with EM 385-1-1 Section 01.A.17, and all associated sub-paragraphs.

If the SSHO is off-site for a period longer than 24 hours, an equally-qualified alternate SSHO must be provided and must fulfill the same roles and responsibilities as the primary SSHO. When the SSHO is temporarily (up to 24 hours) off-site, a Designated Representative (DR), as identified in the AHA may be used in lieu of an Alternate SSHO, and must be on the project site at all times when work is being performed. Note that the DR is a collateral duty safety position, with safety duties in addition to their full time occupation.

## 1.5.1.1.1 Additional Site Safety and Health Officer (SSHO) Requirements and Duties

The SSHO may not serve as the Quality Control Manager. The SSHO may not

serve as the Superintendent.

#### 1.5.1.2 Competent Person Qualifications

Provide Competent Persons in accordance with EM 385-1-1, Appendix Q and herein. Competent Persons for high risk activities include confined space, cranes and rigging, excavation/trenching, fall protection, and electrical work. The CP for these activities must be designated in writing, and meet the requirements for the specific activity (i.e. competent person, fall protection).

The Competent Person identified in the Contractor's Safety and Health Program and accepted Accident Prevention Plan, must be on-site at all times when the work that presents the hazards associated with their professional expertise is being performed. Provide the credentials of the Competent Persons(s) to the the Contracting Officer for information in consultation with the Safety Office.

##### 1.5.1.2.1 Competent Person for Fall Protection

Provide a Competent Person for Fall Protection who meets the requirements of EM 385-1-1, Section 21.C.04, 21.B.03, and herein.

#### 1.5.1.3 Crane Operators/Riggers

Provide Operators, Signal Persons, and Riggers meeting the requirements in EM 385-1-1, Section 15.B for Riggers and Section 16.B for Crane Operators and Signal Persons. Provide proof of current qualification.

#### 1.5.2 Personnel Duties

##### 1.5.2.1 Duties of the Site Safety and Health Officer (SSHO)

The SSHO must:

- a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily production report.
- b. Conduct mishap investigations and complete required accident reports. Report mishaps and near misses.
- c. Use and maintain OSHA's Form 300 to log work-related injuries and illnesses occurring on the project site for Prime Contractors and subcontractors, and make available to the Contracting Officer upon request. Post and maintain the Form 300A on the site Safety Bulletin Board.
- d. Maintain applicable safety reference material on the job site.
- e. Attend the pre-construction conference, pre-work meetings including preparatory meetings, and periodic in-progress meetings.
- f. Review the APP and AHAs for compliance with EM 385-1-1, and approve, sign, implement and enforce them.

- g. Establish a Safety and Occupational Health (SOH) Deficiency Tracking System that lists and monitors outstanding deficiencies until resolution.
- h. Ensure subcontractor compliance with safety and health requirements.
- i. Maintain a list of hazardous chemicals on site and their material Safety Data Sheets (SDS).
- j. Maintain a weekly list of high hazard activities involving energy, equipment, excavation, entry into confined space, and elevation, and be prepared to discuss details during QC Meetings.
- k. Provide and keep a record of site safety orientation and indoctrination for Contractor employees, subcontractor employees, and site visitors.

Superintendent, QC Manager, and SSHO are subject to dismissal if the above duties are not being effectively carried out. If Superintendent, QC Manager, or SSHO are dismissed, project work will be stopped and will not be allowed to resume until a suitable replacement is approved and the above duties are again being effectively carried out.

### 1.5.3 Meetings

#### 1.5.3.1 Preconstruction Conference

- a. Contractor representatives who have a responsibility or significant role in accident prevention on the project must attend the preconstruction conference. This includes the project superintendent, Site Safety and Occupational Health officer, quality control manager, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).
- b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, and Government review of AHAs to preclude project delays.
- c. Deficiencies in the submitted APP, identified during the Contracting Officer's review, must be corrected, and the APP re-submitted for review prior to the start of construction. Work is not permitted to begin until an APP is established that is acceptable to the Contracting Officer.

### 1.6 ACCIDENT PREVENTION PLAN (APP)

A qualified person must prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of EM 385-1-1, Appendix A, and as supplemented herein. Cover all paragraph and subparagraph elements in EM 385-1-1, Appendix A. The APP must be job-specific and address any unusual or unique aspects of the project or activity for which it is written. The APP must interface with the Contractor's overall safety and health program referenced in the APP in the applicable APP element, and made site-specific. Describe the methods to evaluate past safety

performance of potential subcontractors in the selection process. Also, describe innovative methods used to ensure and monitor safe work practices of subcontractors. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP must be signed by an officer of the firm (Prime Contractor senior person), the individual preparing the APP, the on-site superintendent, the designated SSHO, the Contractor Quality Control Manager, and any designated Certified Safety Professional (CSP) or Certified Health Physicist (CIH). The SSHO must provide and maintain the APP and a log of signatures by each subcontractor foreman, attesting that they have read and understand the APP, and make the APP and log available on-site to the Contracting Officer. If English is not the foreman's primary language, the Prime Contractor must provide an interpreter.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP. Once reviewed and accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP is cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified. Continuously review and amend the APP, as necessary, throughout the life of the contract. Changes to the accepted APP must be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and Quality Control Manager. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered. Should any severe hazard exposure (i.e. imminent danger) become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate and remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34), and the environment.

#### 1.6.1 Names and Qualifications

Provide plans in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

- a. Names and qualifications (resumes including education, training, experience and certifications) of site safety and health personnel designated to perform work on this project to include the designated Site Safety and Health Officer and other competent and qualified personnel to be used. Specify the duties of each position.
- b. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; and personal protective equipment and clothing to include selection, use and maintenance.



## 1.6.2 Plans

Provide plans in the APP in accordance with the requirements outlined in Appendix A of EM 385-1-1, including the following:

### 1.6.2.1 Confined Space Entry Plan

Develop a confined or enclosed space entry plan in accordance with EM 385-1-1, applicable OSHA standards 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926, OSHA Directive CPL 2.100, and any other federal, state and local regulatory requirements identified in this contract. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created.)

### 1.6.2.2 Standard Lift Plan (SLP)

Plan lifts to avoid situations where the operator cannot maintain safe control of the lift. Prepare a written SLP in accordance with EM 385-1-1, Section 16.A.03, using Form 16-2 for every lift or series of lifts (if duty cycle or routine lifts are being performed). The SLP must be developed, reviewed and accepted by all personnel involved in the lift in conjunction with the associated AHA. Signature on the AHA constitutes acceptance of the plan. Maintain the SLP on the LHE for the current lift(s) being made. Maintain historical SLPs for a minimum of 3 months.

### 1.6.2.3 Critical Lift Plan - Crane or Load Handling Equipment

Provide a Critical Lift Plan as required by EM 385-1-1, Section 16.H.01, using Form 16-3. In addition, Critical Lift Plans are required for the following:

- a. Lifts over 50 percent of the capacity of barge mounted mobile crane's hoist.
- b. When working around energized power lines where the work will get closer than the minimum clearance distance in EM 385-1-1 Table 16-1.
- c. For lifts with anticipated binding conditions.
- d. When erecting cranes.

#### 1.6.2.3.1 Critical Lift Plan Planning and Schedule

Critical lifts require detailed planning and additional or unusual safety precautions. Develop and submit a critical lift plan to the Contracting Officer 30 calendar days prior to critical lift. Comply with load testing requirements in accordance with EM 385-1-1, Section 16.F.03.

#### 1.6.2.3.2 Lifts of Personnel

In addition to the requirements of EM 385-1-1, Section 16.H.02, for lifts of personnel, demonstrate compliance with the requirements of 29 CFR 1926.1400 and EM 385-1-1, Section 16.T.

#### 1.6.2.4 Multi-Purpose Machines, Material Handling Equipment, and Construction Equipment Lift Plan

Multi-purpose machines, material handling equipment, and construction equipment used to lift loads that are suspended by rigging gear, require proof of authorization from the machine OEM that the machine is capable of making lifts of loads suspended by rigging equipment. Written approval from a qualified registered professional engineer, after a safety analysis is performed, is allowed in lieu of the OEM's approval. Demonstrate that the operator is properly trained and that the equipment is properly configured to make such lifts and is equipped with a load chart.

#### 1.6.2.5 Fall Protection and Prevention (FP&P) Plan

The plan must comply with the requirements of EM 385-1-1, Section 21.D and ASSE/SAFE Z359.2, be site specific, and address all fall hazards in the work place and during different phases of construction. Address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 6 feet. A competent person or qualified person for fall protection must prepare and sign the plan documentation. Include fall protection and prevention systems, equipment and methods employed for every phase of work, roles and responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Review and revise, as necessary, the Fall Protection and Prevention Plan documentation as conditions change, but at a minimum every six months, for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. Keep and maintain the accepted Fall Protection and Prevention Plan documentation at the job site for the duration of the project. Include the Fall Protection and Prevention Plan documentation in the Accident Prevention Plan (APP).

#### 1.6.2.6 Rescue and Evacuation Plan

Provide a Rescue and Evacuation Plan in accordance with EM 385-1-1 Section 21.N and ASSE/SAFE Z359.2, and include in the FP&P Plan and as part of the APP. Include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility.

#### 1.6.2.7 Hazardous Energy Control Program (HECP)

Develop a HECP in accordance with EM 385-1-1 Section 12, 29 CFR 1910.147, 29 CFR 1910.333, 29 CFR 1915.89, ASSE/SAFE Z244.1, and ASSE/SAFE A10.44. Submit this HECP as part of the Accident Prevention Plan (APP). Conduct a preparatory meeting and inspection with all effected personnel to coordinate all HECP activities. Document this meeting and inspection in accordance with EM 385-1-1, Section 12.A.02. Ensure that each employee is familiar with and complies with these procedures.

#### 1.6.2.8 Site Demolition Plan

Identify the safety and health aspects, and prepare in accordance with Section 02 41 00 DEMOLITION and referenced sources.

### 1.7 ACTIVITY HAZARD ANALYSIS (AHA)

Before beginning each activity, task or Definable Feature of Work (DFOW)

involving a type of work presenting hazards not experienced in previous project operations, or where a new work crew or subcontractor is to perform the work, the Contractor(s) performing that work activity must prepare an AHA. AHAs must be developed by the Prime Contractor, subcontractor, or supplier performing the work, and provided for Prime Contractor review and approval before submitting to the Contracting Officer. AHAs must be signed by the SSHO, Superintendent, QC Manager and the subcontractor Foreman performing the work. Format the AHA in accordance with EM 385-1-1, Section 1 or as directed by the Contracting Officer. Submit the AHA for review at least 15 working days prior to the start of each activity task, or DFO. The Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

AHAs must identify competent persons required for phases involving high risk activities, including confined entry, crane and rigging, excavations, trenching, electrical work, fall protection, and scaffolding.

#### 1.7.1 AHA Management

Review the AHA list periodically (at least monthly) at the Contractor supervisory safety meeting, and update as necessary when procedures, scheduling, or hazards change. Use the AHA during daily inspections by the SSHO to ensure the implementation and effectiveness of the required safety and health controls for that work activity.

#### 1.7.2 AHA Signature Log

Each employee performing work as part of an activity, task or DFO must review the AHA for that work and sign a signature log specifically maintained for that AHA prior to starting work on that activity. The SSHO must maintain a signature log on site for every AHA. Provide employees whose primary language is other than English, with an interpreter to ensure a clear understanding of the AHA and its contents.

### 1.8 DISPLAY OF SAFETY INFORMATION

#### 1.8.1 Safety Bulletin Board

Within one calendar day(s) after commencement of work, erect a safety bulletin board at the job site. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method, acceptable to the Contracting Officer, that is accessible and includes all mandatory information for employee and visitor review, may be deemed as meeting the requirement for a bulletin board. Include and maintain information on safety bulletin board as required by EM 385-1-1, Section 01.A.07. Additional items required to be posted include:

- a. Confined space entry permit.
- b. Hot work permit.

#### 1.8.2 Safety and Occupational Health (SOH) Deficiency Tracking System

Establish a SOH deficiency tracking system that lists and monitors the status of SOH deficiencies in chronological order. Use the tracking system to evaluate the effectiveness of the APP. A monthly evaluation of the data must be discussed in the QC or SOH meeting with everyone on the project.

The list must be posted on the project bulletin board and updated daily, and provide the following information:

- a. Date deficiency identified;
- b. Description of deficiency;
- c. Name of person responsible for correcting deficiency;
- d. Projected resolution date;
- e. Date actually resolved.

#### 1.9 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in paragraph REFERENCES. Maintain applicable equipment manufacturer's manuals.

#### 1.10 EMERGENCY MEDICAL TREATMENT

Contractors must arrange for their own emergency medical treatment in accordance with EM 385-1-1. Government has no responsibility to provide emergency medical treatment.

#### 1.11 NOTIFICATIONS and REPORTS

##### 1.11.1 Mishap Notification

Notify the Contracting Officer as soon as practical, but no more than twenty-four hours, after any mishaps, including recordable accidents, incidents, and near misses, as defined in EM 385-1-1 Appendix Q, any report of injury, illness, or any property damage. For LHE or rigging mishaps, notify the Contracting Officer as soon as practical but not more than 4 hours after mishap. The Contractor is responsible for obtaining appropriate medical and emergency assistance and for notifying fire, law enforcement, and regulatory agencies. Immediate reporting is required for electrical mishaps, to include Arc Flash; shock; uncontrolled release of hazardous energy (includes electrical and non-electrical); load handling equipment or rigging; fall from height (any level other than same surface); and underwater diving. These mishaps must be investigated in depth to identify all causes and to recommend hazard control measures.

Within notification include Contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (for example, type of construction equipment used and Personal Protective Equipment (PPE) used). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted. Assist and cooperate fully with the Government's investigation(s) of any mishap.

##### 1.11.2 Accident Reports

- a. Conduct an accident investigation for recordable injuries and illnesses, property damage, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. The Contracting Officer will provide copies of any required or special forms.

- b. Near Misses: Near miss reports are considered positive and proactive Contractor safety management actions.
- c. Conduct an accident investigation for any load handling equipment accident (including rigging accidents) to establish the root cause(s) of the accident. Complete the LHE Accident Report (Crane and Rigging Accident Report) form and provide the report to the Contracting Officer within 30 calendar days of the accident. Do not proceed with crane operations until cause is determined and corrective actions have been implemented to the satisfaction of the Contracting Officer. The Contracting Officer will provide a blank copy of the accident report form.

#### 1.11.3 LHE Inspection Reports

Submit LHE inspection reports required in accordance with EM 385-1-1 and as specified herein with Daily Reports of Inspections.

#### 1.11.4 Certificate of Compliance and Pre-lift Plan/Checklist for LHE and Rigging

Provide a FORM 16-1 Certificate of Compliance for LHE entering an activity under this contract and in accordance with EM 385-1-1. Post certifications on the crane.

Develop a Standard Lift Plan (SLP) in accordance with EM 385-1-1, Section 16.H.03 using Form 16-2 Standard Pre-Lift Crane Plan/Checklist for each lift planned. Submit SLP to the Contracting Officer for approval within 15 calendar days in advance of planned lift.

#### 1.12 HOT WORK

##### 1.12.1 Permit and Personnel Requirements

Submit and obtain a written permit prior to performing "Hot Work" (i.e. welding or cutting) or operating other flame-producing/spark producing devices, from the Fire Division. A permit is required from the Explosives Safety Office for work in and around where explosives are processed, stored, or handled. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. Provide at least two 20 pound 4A:20 BC rated extinguishers for normal "Hot Work". The extinguishers must be current inspection tagged, and contain an approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch must be trained in accordance with NFPA 51B and remain on-site for a minimum of one hour after completion of the task or as specified on the hot work permit.

When starting work in the facility, require personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency Fire Division phone number. REPORT ANY FIRE, NO MATTER HOW SMALL, TO THE RESPONSIBLE FIRE DIVISION IMMEDIATELY.

Before each job starts, the contractor shall inform the Fire Department, 295-57-5166, that welding operations will be conducted.

#### 1.13 CONFINED SPACE ENTRY REQUIREMENTS

Confined space entry must comply with Section 34 of EM 385-1-1, OSHA

29 CFR 1926, OSHA 29 CFR 1910, OSHA 29 CFR 1910.146, and OSHA Directive CPL 2.100. Any potential for a hazard in the confined space requires a permit system to be used.

#### 1.13.1 Entry Procedures

Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. Comply with EM 385-1-1, Section 34 for entry procedures. Hazards pertaining to the space must be reviewed with each employee during review of the AHA.

#### 1.13.2 Forced Air Ventilation

Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its action level.

#### 1.13.3 Rescue Procedures and Coordination with Local Emergency Responders

Develop and implement an on-site rescue and recovery plan and procedures. The rescue plan must not rely on local emergency responders for rescue from a confined space.

#### 1.14 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must:

- a. Secure outside equipment and materials and place materials that could be damaged in protected areas.
- b. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.
- c. Ensure that temporary erosion controls are adequate.

#### PART 2 PRODUCTS

Not used.

#### PART 3 EXECUTION

##### 3.1 CONSTRUCTION AND OTHER WORK

Comply with EM 385-1-1, NFPA 70, NFPA 70E, NFPA 241, the APP, the AHA, Federal and State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.

PPE is governed in all areas by the nature of the work the employee is performing. Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks. Safety glasses must be worn or carried/available on each person. Mandatory PPE includes:

- a. Hard Hat

- b. Long Pants
- c. Appropriate Safety Shoes
- d. Appropriate Class Reflective Vests

#### 3.1.1 Worksite Communication

Employees working alone in a remote location or away from other workers must be provided an effective means of emergency communications (i.e., cellular phone, two-way radios, land-line telephones or other acceptable means). The selected communication must be readily available (easily within the immediate reach) of the employee and must be tested prior to the start of work to verify that it effectively operates in the area/environment. An employee check-in/check-out communication procedure must be developed to ensure employee safety.

#### 3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint, and hexavalent chromium, are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials. Low mercury lamps used within fluorescent lighting fixtures are allowed as an exception without further Contracting Officer approval. Notify the Radiation Safety Officer (RSO) prior to excepted items of radioactive material and devices being brought on base.

#### 3.1.3 Unforeseen Hazardous Material

Contract documents identify materials such as PCB, lead paint, and friable and non-friable asbestos and other OSHA regulated chemicals (i.e. 29 CFR Part 1910.1000). If material(s) that may be hazardous to human health upon disturbance are encountered during construction operations, stop that portion of work and notify the Contracting Officer immediately. Within 14 calendar days the Government will determine if the material is hazardous. If material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification pursuant to FAR 52.243-4 Changes and FAR 52.236-2 Differing Site Conditions.

### 3.2 UTILITY OUTAGE REQUIREMENTS

Apply for utility outages at least 21 days in advance. At a minimum, the written request must include the location of the outage, utilities being affected, duration of outage, any necessary sketches, and a description of the means to fulfill energy isolation requirements in accordance with EM 385-1-1, Section 11.A.02 (Isolation). Some examples of energy isolation devices and procedures are highlighted in EM 385-1-1, Section 12.D. In accordance with EM 385-1-1, Section 12.A.01, where outages involve Government or Utility personnel, coordinate with the Government on all activities involving the control of hazardous energy.

These activities include, but are not limited to, a review of HECP and HEC procedures, as well as applicable Activity Hazard Analyses (AHAs). In accordance with EM 385-1-1, Section 11.A.02 and NFPA 70E, work on energized electrical circuits must not be performed without prior government authorization. Government permission is considered through the permit process and submission of a detailed AHA. Energized work permits are considered only when de-energizing introduces additional or increased hazard or when de-energizing is infeasible.

### 3.3 OUTAGE COORDINATION MEETING

After the utility outage request is approved and prior to beginning work on the utility system requiring shut-down, conduct a pre-outage coordination meeting in accordance with EM 385-1-1, Section 12.A. This meeting must include the Prime Contractor, the Prime and subcontractors performing the work, the Contracting Officer, and the Installation representative. All parties must fully coordinate HEC activities with one another. During the coordination meeting, all parties must discuss and coordinate on the scope of work, HEC procedures (specifically, the lock-out/tag-out procedures for worker and utility protection), the AHA, assurance of trade personnel qualifications, identification of competent persons, and compliance with HECP training in accordance with EM 385-1-1, Section 12.C. Clarify when personal protective equipment is required during switching operations, inspection, and verification.

### 3.4 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Provide and operate a Hazardous Energy Control Program (HECP) in accordance with EM 385-1-1 Section 12, 29 CFR 1910.333, 29 CFR 1915.89, ASSE/SAFE A10.44, NFPA 70E, and paragraph HAZARDOUS ENERGY CONTROL PROGRAM (HECP).

#### 3.4.1 Safety Preparatory Inspection Coordination Meeting with the Government or Utility

For electrical distribution equipment that is to be operated by Government or Utility personnel, the Prime Contractor and the subcontractor performing the work must attend the safety preparatory inspection coordination meeting, which will also be attended by the Contracting Officer's Representative, and required by EM 385-1-1, Section 12.A.02. The meeting will occur immediately preceding the start of work and following the completion of the outage coordination meeting. Both the safety preparatory inspection coordination meeting and the outage coordination meeting must occur prior to conducting the outage and commencing with lockout/tagout procedures.

#### 3.4.2 Lockout/Tagout Isolation

Where the Government or Utility performs equipment isolation and lockout/tagout, the Contractor must place their own locks and tags on each energy-isolating device and proceed in accordance with the HECP. Before any work begins, both the Contractor and the Government or Utility must perform energy isolation verification testing while wearing required PPE detailed in the Contractor's AHA and required by EM 385-1-1, Sections 05.I and 11.B. Install personal protective grounds, with tags, to eliminate the potential for induced voltage in accordance with EM 385-1-1, Section 12.E.06.



### 3.4.3 Lockout/Tagout Removal

Upon completion of work, conduct lockout/tagout removal procedure in accordance with the HECF. In accordance with EM 385-1-1, Section 12.E.08, each lock and tag must be removed from each energy isolating device by the authorized individual or systems operator who applied the device. Provide formal notification to the Government (by completing the Government form if provided by Contracting Officer's Representative), confirming that steps of de-energization and lockout/tagout removal procedure have been conducted and certified through inspection and verification. Government or Utility locks and tags used to support the Contractor's work will not be removed until the authorized Government employee receives the formal notification.

## 3.5 FALL PROTECTION PROGRAM

Establish a fall protection program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify roles and responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures in accordance with ASSE/SAFE Z359.2 and EM 385-1-1, Sections 21.A and 21.D.

### 3.5.1 Fall Protection Equipment and Systems

Enforce use of personal fall protection equipment and systems designated (to include fall arrest, restraint, and positioning) for each specific work activity in the Site Specific Fall Protection and Prevention Plan and AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in EM 385-1-1, Section 21.

Provide personal fall protection equipment, systems, subsystems, and components that comply with EM 385-1-1 Section 21.I, 29 CFR 1926.500 Subpart M, ASSE/SAFE Z359.0, ASSE/SAFE Z359.1, ASSE/SAFE Z359.2, ASSE/SAFE Z359.3, ASSE/SAFE Z359.4, ASSE/SAFE Z359.6, ASSE/SAFE Z359.7, ASSE/SAFE Z359.11, ASSE/SAFE Z359.12, ASSE/SAFE Z359.13, ASSE/SAFE Z359.14, and ASSE/SAFE Z359.15.

#### 3.5.1.1 Additional Personal Fall Protection

In addition to the required fall protection systems, other protection such as safety skiffs, personal floatation devices, and life rings, are required when working above or next to water in accordance with EM 385-1-1, Sections 21.0 through 21.0.06. Personal fall protection systems and equipment are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall protection systems are required when operating other equipment such as scissor lifts. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, travel, or while performing work.

#### 3.5.1.2 Personal Fall Protection Harnesses

Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. The use of body belts is not acceptable. Harnesses must have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Snap hooks and carabiners must be self-closing and self-locking, capable of

being opened only by at least two consecutive deliberate actions and have a minimum gate strength of 3,600 lbs in all directions. Use webbing, straps, and ropes made of synthetic fiber. The maximum free fall distance when using fall arrest equipment must not exceed 6 feet, unless the proper energy absorbing lanyard is used. Always take into consideration the total fall distance and any swinging of the worker (pendulum-like motion), that can occur during a fall, when attaching a person to a fall arrest system. All full body harnesses must be equipped with Suspension Trauma Preventers such as stirrups, relief steps, or similar in order to provide short-term relief from the effects of orthostatic intolerance in accordance with EM 385-1-1, Section 21.I.06.

### 3.5.2 Rescue and Evacuation Plan and Procedures

When personal fall arrest systems are used, ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue or assisted-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan within the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP). The plan must comply with the requirements of EM 385-1-1, ASSE/SAFE Z359.2, and ASSE/SAFE Z359.4.

## 3.6 EQUIPMENT

### 3.6.1 Material Handling Equipment (MHE)

- a. Material handling equipment such as forklifts must not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions. Material handling equipment fitted with personnel work platform attachments are prohibited from traveling or positioning while personnel are working on the platform.
- b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions. Material Handling Equipment Operators must be trained in accordance with OSHA 29 CFR 1910, Subpart N.
- c. Operators of forklifts or power industrial trucks must be licensed in accordance with OSHA.

### 3.6.2 Load Handling Equipment (LHE)

The following requirements apply. In exception, these requirements do not apply to commercial truck mounted and articulating boom cranes used solely to deliver material and supplies (not prefabricated components, structural steel, or components of a systems-engineered metal building) where the lift consists of moving materials and supplies from a truck or trailer to the ground; to cranes installed on mechanics trucks that are used solely in the repair of shore-based equipment; to crane that enter the activity but are not used for lifting; nor to other machines not used to lift loads suspended by rigging equipment. However, LHE accidents occurring during such operations must be reported.

- a. Equip cranes and derricks as specified in EM 385-1-1, Section 16.

- b. Notify the Contracting Officer 15 working days in advance of any LHE entering the activity, in accordance with EM 385-1-1, Section 16.A.02, so that necessary quality assurance spot checks can be coordinated. Contractor's operator must remain with the crane during the spot check. Rigging gear must comply with OSHA, ASME B30.9 Standards and host country safety standards.
- c. Comply with the LHE manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.
- d. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, ASME B30.8 for floating cranes and floating derricks, ASME B30.9 for slings, ASME B30.20 for below the hook lifting devices and ASME B30.26 for rigging hardware.
- e. When operating in the vicinity of overhead transmission lines, operators and riggers must be alert to this special hazard and follow the requirements of EM 385-1-1 Section 11, and ASME B30.5 or ASME B30.22 as applicable.
- f. Do not use crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane. Additionally, submit a specific AHA for this work to the Contracting Officer. Ensure the activity and AHA are thoroughly reviewed by all involved personnel.
- g. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.
- h. All employees must keep clear of loads about to be lifted and of suspended loads, except for employees required to handle the load.
- i. Use cribbing when performing lifts on outriggers.
- j. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.
- k. A physical barricade must be positioned to prevent personnel access where accessible areas of the LHE's rotating superstructure poses a risk of striking, pinching or crushing personnel.
- l. Maintain inspection records in accordance by EM 385-1-1, Section 16.D, including shift, monthly, and annual inspections, the signature of the person performing the inspection, and the serial number or other identifier of the LHE that was inspected. Records must be available for review by the Contracting Officer.
- m. Maintain written reports of operational and load testing in accordance with EM 385-1-1, Section 16.F, listing the load test procedures used along with any repairs or alterations performed on the LHE. Reports must be available for review by the Contracting Officer.
- n. Certify that all LHE operators have been trained in proper use of all

safety devices (e.g. anti-two block devices).

- o. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. At wind speeds greater than 20 mph, the operator, rigger and lift supervisor must cease all crane operations, evaluate conditions and determine if the lift may proceed. Base the determination to proceed or not on wind calculations per the manufacturer and a reduction in LHE rated capacity if applicable. Include this maximum wind speed determination as part of the activity hazard analysis plan for that operation.

### 3.6.3 Machinery and Mechanized Equipment

- a. Proof of qualifications for operator must be kept on the project site for review.
- b. Manufacture specifications or owner's manual for the equipment must be on-site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Incorporate such additional safety precautions or requirements into the AHAs.

### 3.6.4 Base Mounted Drum Hoists

- a. Operation of base mounted drum hoists must comply with EM 385-1-1 and ASSE/SAFE A10.22.
- b. Rigging gear must comply with applicable ASME/OSHA standards
- c. When used on telecommunication towers, base mounted drum hoists must comply with TIA-1019, TIA-222, ASME B30.7, 29 CFR 1926.552, and 29 CFR 1926.553.
- d. When used to hoist personnel, the AHA must include a written standard operating procedure. Operators must have a physical examination in accordance with EM 385-1-1 Section 16.B.05 and trained, at a minimum, in accordance with EM 385-1-1 Section 16.U and 16.T. The base mounted drum hoist must also comply with OSHA Instruction CPL 02-01-056 and ASME B30.23.
- e. Material and personnel must not be hoisted simultaneously.
- f. Personnel cage must be marked with the capacity (in number of persons) and load limit in pounds.
- g. Construction equipment must not be used for hoisting material or personnel or with trolley/tag lines. Construction equipment may be used for towing and assisting with anchoring guy lines.

## 3.7 EXCAVATIONS

Soil classification must be performed by a competent person in accordance with 29 CFR 1926 and EM 385-1-1.

### 3.7.1 Utility Location Verification

Physically verify underground utility locations, including utility depth, by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within 3 feet of the underground

system.

### 3.7.2 Utilities Within and Under Concrete, Bituminous Asphalt, and Other Impervious Surfaces

Utilities located within and under concrete slabs or pier structures, bridges, parking areas, and the like, are extremely difficult to identify. Whenever contract work involves chipping, saw cutting, or core drilling through concrete, bituminous asphalt or other impervious surfaces, the existing utility location must be coordinated with station utility departments in addition to location and depth verification by a third party, independent, private locating company. The third party, independent, private locating company must locate utility depth by use of Ground Penetrating Radar (GPR), X-ray, bore scope, or ultrasound prior to the start of demolition and construction. Outages to isolate utility systems must be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the Contractor from meeting this requirement.

## 3.8 ELECTRICAL

Perform electrical work in accordance with EM 385-1-1, Appendix A, Sections 11 and 12.

### 3.8.1 Conduct of Electrical Work

As delineated in EM 385-1-1, electrical work is to be conducted in a de-energized state unless there is no alternative method for accomplishing the work. In those cases obtain an energized work permit from the Contracting Officer. The energized work permit application must be accompanied by the AHA and a summary of why the equipment/circuit needs to be worked energized. Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Attach temporary grounds in accordance with ASTM F855 and IEEE 1048. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator is allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method.

When working in energized substations, only qualified electrical workers are permitted to enter. When work requires work near energized circuits as defined by NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves and electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA. Ensure that each employee is familiar with and complies with these procedures and 29 CFR 1910.147.

### 3.8.2 Qualifications

Electrical work must be performed by QP personnel with verifiable credentials who are familiar with applicable code requirements. Verifiable credentials consist of State, National and Local Certifications or Licenses that a Master or Journeyman Electrician may hold, depending on work being performed, and must be identified in the appropriate AHA.

Journeyman/Apprentice ratio must be in accordance with State, Local and Host Nation requirements applicable to where work is being performed.

### 3.8.3 Arc Flash

Conduct a hazard analysis/arc flash hazard analysis whenever work on or near energized parts greater than 50 volts is necessary, in accordance with NFPA 70E.

All personnel entering the identified arc flash protection boundary must be QPs and properly trained in NFPA 70E requirements and procedures. Unless permitted by NFPA 70E, no Unqualified Person is permitted to approach nearer than the Limited Approach Boundary of energized conductors and circuit parts. Training must be administered by an electrically qualified source and documented.

### 3.8.4 Grounding

Ground electrical circuits, equipment and enclosures in accordance with NFPA 70 and IEEE C2 to provide a permanent, continuous and effective path to ground unless otherwise noted by EM 385-1-1.

Check grounding circuits to ensure that the circuit between the ground and a grounded power conductor has a resistance low enough to permit sufficient current flow to allow the fuse or circuit breaker to interrupt the current.

### 3.8.5 Testing

Temporary electrical distribution systems and devices must be inspected, tested and found acceptable for Ground-Fault Circuit Interrupter (GFCI) protection, polarity, ground continuity, and ground resistance before initial use, before use after modification and at least monthly. Monthly inspections and tests must be maintained for each temporary electrical distribution system, and signed by the electrical CP or QP.

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## SECTION 01 42 00

## SOURCES FOR REFERENCE PUBLICATIONS

02/19

## PART 1 GENERAL

## 1.1 REFERENCES

Various publications are referenced in other sections of the specifications to establish requirements for the work. These references are identified in each section by document number, date and title. The document number used in the citation is the number assigned by the standards producing organization (e.g. ASTM B564 Standard Specification for Nickel Alloy Forgings). However, when the standards producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

## 1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided.

ASME INTERNATIONAL (ASME)  
Two Park Avenue  
New York, NY 10016-5990  
Ph: 800-843-2763  
Fax: 973-882-1717  
E-mail: [customercare@asme.org](mailto:customercare@asme.org)  
Internet: <https://www.asme.org/>

ASTM INTERNATIONAL (ASTM)  
100 Barr Harbor Drive, P.O. Box C700  
West Conshohocken, PA 19428-2959  
Ph: 610-832-9500  
Fax: 610-832-9555  
E-mail: [service@astm.org](mailto:service@astm.org)  
Internet: <https://www.astm.org/>

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)  
933 North Plum Grove Road  
Schaumburg, IL 60173-4758  
Ph: 847-517-1200  
Fax: 847-517-1206  
Internet: <http://www.crsi.org/>

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)  
445 and 501 Hoes Lane  
Piscataway, NJ 08854-4141  
Ph: 732-981-0060 or 800-701-4333  
Fax: 732-981-9667  
E-mail: [onlinesupport@ieee.org](mailto:onlinesupport@ieee.org)  
Internet: <https://www.ieee.org/>



INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)  
3050 Old Centre Ave. Suite 101  
Portage, MI 49024  
Ph: 269-488-6382  
Fax: 269-488-6383  
Internet: <https://www.netaworld.org/>

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)  
1 Batterymarch Park  
Quincy, MA 02169-7471  
Ph: 800-344-3555  
Fax: 800-593-6372  
Internet: <https://www.nfpa.org>

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)  
100 Bureau Drive  
Gaithersburg, MD 20899  
Ph: 301-975-2000  
Internet: <https://www.nist.gov/>

NATIONAL READY MIXED CONCRETE ASSOCIATION (NRMCA)  
Manager, Customer Service  
900 Spring Street  
Silver Spring, MD 20910  
Ph: 240-485-1165  
E-mail: [jjenkins@nrmca.org](mailto:jjenkins@nrmca.org) (Jacques Jenkins)  
Internet: <https://www.nrmca.org/>

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)  
1320 North Courthouse Road, Suite 200  
Arlington, VA 22201  
Ph: 703-907-7700  
Fax: 703-907-7727  
E-mail: [marketing@tiaonline.org](mailto:marketing@tiaonline.org)  
Internet: <https://www.tiaonline.org/>

U.S. ARMY CORPS OF ENGINEERS (USACE)  
CRD-C DOCUMENTS available on Internet:  
<http://www.wbdg.org/ffc/army-coe/standards>  
Order Other Documents from:  
Official Publications of the Headquarters, USACE  
E-mail: [hqpublications@usace.army.mil](mailto:hqpublications@usace.army.mil)  
Internet: <http://www.publications.usace.army.mil/>  
or  
<https://www.hnc.usace.army.mil/Missions/Engineering-Directorate/TECHINFO/>

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)  
8601 Adelphi Road  
College Park, MD 20740-6001  
Ph: 866-272-6272  
Internet: <https://www.archives.gov/>  
Order documents from:  
Superintendent of Documents  
U.S. Government Publishing Office (GPO)  
732 N. Capitol Street, NW  
Washington, DC 20401  
Ph: 202-512-1800 or 866-512-1800

Bookstore: 202-512-0132  
Internet: <https://www.gpo.gov/>

UNDERWRITERS LABORATORIES (UL)  
2600 N.W. Lake Road  
Camas, WA 98607-8542  
Ph: 877-854-3577 or 360-817-5500  
E-mail: [CustomerExperienceCenter@ul.com](mailto:CustomerExperienceCenter@ul.com)  
Internet: <https://www.ul.com/>  
UL Directories available through IHS at <https://ihsmarkit.com/>

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

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## SECTION 01 45 00.10 20

## QUALITY CONTROL FOR MINOR CONSTRUCTION

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## SECTION 01 45 00.10 20

QUALITY CONTROL FOR MINOR CONSTRUCTION  
02/10

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

## U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2014) Safety and Health Requirements  
Manual

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-01 Preconstruction Submittals

## QC Plan; G

Submit a QC plan within 15 calendar days after receipt of Notice of Award.

## 1.3 QC PROGRAM REQUIREMENTS

Establish and maintain a QC program as described in this section. The QC program consists of a QC Manager, a QC plan, a Coordination and Mutual Understanding Meeting, QC meetings, three phases of control, submittal review and approval, testing, and QC certifications and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of this contract. The QC program shall cover on-site and off-site work and shall be keyed to the work sequence. No work or testing may be performed unless the QC Manager is on the work site.

## 1.3.1 Preliminary Work Authorized Prior to Acceptance

The only work that is authorized to proceed prior to the acceptance of the QC plan is mobilization of storage and office trailers, temporary utilities, and surveying.

## 1.3.2 Acceptance

Acceptance of the QC plan is required prior to the start of construction. The KO reserves the right to require changes in the QC plan and operations as necessary, including removal of personnel, to ensure the specified quality of work. The KO reserves the right to interview any member of the QC organization at any time in order to verify the submitted qualifications.

### 1.3.3 Notification of Changes

Notify the KO, in writing, of any proposed change, including changes in the QC organization personnel, a minimum of seven calendar days prior to a proposed change. Proposed changes shall be subject to the acceptance by the KO.

## 1.4 QC ORGANIZATION

### 1.4.1 QC Manager

#### 1.4.1.1 Duties

Provide a QC Manager at the work site to implement and manage the QC program. In addition to implementing and managing the QC program, the QC Manager may perform the duties of project superintendent. The QC Manager is required to attend the Coordination and Mutual Understanding Meeting, conduct the QC meetings, perform the three phases of control, perform submittal review and approval, ensure testing is performed and provide QC certifications and documentation required in this contract. The QC Manager is responsible for managing and coordinating the three phases of control and documentation performed by others.

#### 1.4.1.2 Qualifications

An individual with a minimum of 5 years combined experience as a superintendent, inspector, QC Manager, project manager, or construction manager on similar size and type construction contracts which included the major trades that are part of this contract. The individual must be familiar with the requirements of the EM 385-1-1 and have experience in the areas of hazard identification and safety compliance.

#### 1.4.1.3 Construction Quality Management Training

In addition to the above experience and education requirements, the QC Manager shall have completed the course Construction Quality Management for Contractors and will have a current certificate.

### 1.4.2 Alternate QC Manager Duties and Qualifications

Designate an alternate for the QC Manager to serve in the event of the designated QC Manager's absence. The period of absence may not exceed two weeks at one time, and not more than 30 workdays during a calendar year. The qualification requirements for the Alternate QC Manager shall be the same as for the QC Manager.

## 1.5 QC PLAN

### 1.5.1 Requirements

Provide, for acceptance by the KO, a electronic QC plan that covers both on-site and off-site work and includes the following with a table of contents listing the major sections identified with tabs.

- I. QC ORGANIZATION: A chart showing the QC organizational structure and its relationship to the production side of the organization.
- II. NAMES AND QUALIFICATIONS: In resume format, for each person in the QC organization. Include the CQM for Contractors course

certification required by the paragraph entitled "Construction Quality Management Training".

- III. DUTIES, RESPONSIBILITY AND AUTHORITY OF QC PERSONAL: Of each person in the QC organization.
- IV. OUTSIDE ORGANIZATIONS: A listing of outside organizations such as architectural and consulting engineering firms that will be employed by the Contractor and a description of the services these firms will provide.
- V. APPOINTMENT LETTERS: Letters signed by an officer of the firm appointing the QC Manager and Alternate QC Manager and stating that they are responsible for managing and implementing the QC program as described in this contract. Include in this letter the QC Manager's authority to direct the removal and replacement of non-conforming work.
- VI. SUBMITTAL PROCEDURES AND INITIAL SUBMITTAL REGISTER: Procedures for reviewing, approving and managing submittals. Provide the name(s) of the person(s) in the QC organization authorized to review and certify submittals prior to approval.
- VII. TESTING LABORATORY INFORMATION: Testing laboratory information required by the paragraphs "Accredited Laboratories" or "Testing Laboratory Requirements", as applicable.
- VIII. TESTING PLAN AND LOG: A Testing Plan and Log that includes the tests required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test.
- IX. PROCEDURES TO COMPLETE REWORK ITEMS: Procedures to identify, record, track and complete rework items.
- X. DOCUMENTATION PROCEDURES: Use Government formats.
- XI. LIST OF DEFINABLE FEATURES: A Definable Feature of Work (DFOW) is a task, which is separate and distinct from other tasks, has the same control requirements and work crews. The list shall be cross-referenced to the Contractor's Construction Schedule and the specification sections. For projects requiring a Progress Chart, the list of definable features of work shall include but not be limited to all items of work on the schedule. For projects requiring a Network Analysis Schedule, the list of definable features of work shall include but not be limited to all critical path activities.
- XII. PROCEDURES FOR PERFORMING THREE PHASES OF CONTROL: For each DFOW provide Preparatory and Initial Phase Checklists. Each list shall include a breakdown of quality checks that will be used when performing the quality control functions, inspections, and tests required by the contract documents. The preparatory and initial phases shall be conducted with a view towards obtaining quality construction by planning ahead and identifying potential problems.
- XIII. PERSONNEL MATRIX: Not Applicable.
- XIV. PROCEDURES FOR COMPLETION INSPECTION: See the paragraph

entitled "COMPLETION INSPECTIONS".

XV. TRAINING PROCEDURES AND TRAINING LOG: Not Applicable.

#### 1.6 COORDINATION AND MUTUAL UNDERSTANDING MEETING

During the Pre-Construction conference and prior to the start of construction, discuss the QC program required by this contract. The purpose of this meeting is to develop a mutual understanding of the QC details, including documentation, administration for on-site and off-site work, and the coordination of the Contractor's management, production and the QC personnel. At the meeting, the Contractor will be required to explain how three phases of control will be implemented for each DFW. Contractor's personnel required to attend shall include the QC Manager, project manager, and superintendent. Minutes of the meeting will be prepared by the QC Manager and signed by both the Contractor and the KO. The Contractor shall provide a copy of the signed minutes to all attendees. Repeat the coordination and mutual understanding meeting when a new QC Manager is appointed.

#### 1.7 QC MEETINGS

After the start of construction, the QC Manager shall conduct QC meetings once every two weeks at the work site with the superintendent and the foreman responsible for the ongoing and upcoming work. The QC Manager shall prepare the minutes of the meeting and provide a copy to the KO within two working days after the meeting. As a minimum, the following shall be accomplished at each meeting:

- a. Review the minutes of the previous meeting;
- b. Review the schedule and the status of work and rework;
- c. Review the status of submittals;
- d. Review the work to be accomplished in the next two weeks and documentation required;
- e. Resolve QC and production problems (RFIs, etc.);
- f. Address items that may require revising the QC plan; and
- g. Review Accident Prevention Plan (APP).

#### 1.8 THREE PHASES OF CONTROL

The three phases of control shall adequately cover both on-site and off-site work and shall include the following for each DFW.

##### 1.8.1 Preparatory Phase

Conduct the preparatory phase with the superintendent and the foreman responsible for the definable feature of work. Document the results of the preparatory phase actions in the daily CQC Report and in the QC checklist. Perform the following prior to beginning work on each definable feature of work:

- a. Review each paragraph of the applicable specification sections;



- b. Review the contract drawings;
- c. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required;
- d. Review the testing plan and ensure that provisions have been made to provide the required QC testing;
- e. Examine the work area to ensure that the required preliminary work has been completed;
- f. Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data;
- g. Review the APP and appropriate Activity Hazard Analysis (AHA) to ensure that applicable safety requirements are met, and that required Safety Data Sheets (SDS) are submitted; and
- h. Discuss specific controls used and the construction methods and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW.

#### 1.8.2 Initial Phase

When construction crews are ready to start work on a DFOW, conduct the Initial Phase with the foreman responsible for that DFOW. Observe the initial segment of the work to ensure that it complies with contract requirements. Document the results of the Initial Phase in the daily CQC Report and in the QC checklist. Perform the following for each DFOW:

- a. Establish the quality of workmanship required;
- b. Resolve conflicts;
- c. Ensure that testing is performed by the approved laboratory; and
- d. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.

#### 1.8.3 Follow-Up Phase

Perform the following for on-going work daily, or more frequently as necessary, until the completion of each DFOW and document in the daily CQC Report and in the QC checklist:

- a. Ensure the work is in compliance with contract requirements;
- b. Maintain the quality of workmanship required;
- c. Ensure that testing is performed by the approved laboratory;
- d. Ensure that rework items are being corrected; and
- e. Assure manufacturers representatives have performed necessary inspections, if required.

#### 1.8.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same DFOW if the quality of on-going work is unacceptable, if there are changes in the applicable QC organization, if there are changes in the on-site production supervision or work crew, if work on a DFOW is resumed after substantial period of inactivity, or if other problems develop.

#### 1.8.5 Notification of Three Phases of Control for Off-Site Work

Notify the KO at least two weeks prior to the start of the preparatory and initial phases.

#### 1.9 SUBMITTAL REVIEW AND APPROVAL

Procedures for submission, review, and approval of submittals are described in the submittal section of the specification.

#### 1.10 TESTING

Except as stated otherwise in the specification sections, perform sampling and testing required under this contract.

##### 1.10.1 Accreditation Requirements

Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (i.e.; E 329, C 1077, D 3666, D 3740, A 880, E 543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing shall meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the "Corporate Office."

##### 1.10.2 Laboratory Accreditation Authorities

Laboratory Accreditation Authorities include the National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology, the American Association of State Highway and Transportation Officials (AASHTO), International Accreditation Services, Inc. (IAS), U. S. Army Corps of Engineers Materials Testing Center (MTC), the American Association for Laboratory Accreditation (A2LA), the Washington Association of Building Officials (WABO) (Approval authority for WABO is limited to projects within Washington State), and the Washington Area Council of Engineering Laboratories (WACEL) (Approval authority by WACEL is limited to projects within the NAVFAC WASH and Public Works Center Washington geographical area).

##### 1.10.3 Capability Check

The KO retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in this contract.

##### 1.10.4 Test Results

Cite applicable Contract requirements, tests or analytical procedures

used. Provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. If the item fails to conform, notify the KO immediately. Conspicuously stamp the cover sheet for each report in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements, whichever is applicable. Test results shall be signed by a testing laboratory representative authorized to sign certified test reports. Furnish the signed reports, certifications, and other documentation to the KO.

#### 1.11 QC CERTIFICATIONS

##### 1.11.1 Contractor Quality Control Report Certification

Each CQC Report shall contain the following statement: "On behalf of the Contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge except as noted in this report."

##### 1.11.2 Invoice Certification

Furnish a certificate to the KO with each payment request, signed by the QC Manager, attesting that as-built drawings are current and attesting that the work for which payment is requested, including stored material, is in compliance with contract requirements.

##### 1.11.3 Completion Certification

Upon completion of work under this contract, the QC Manager shall furnish a certificate to the KO attesting that "the work has been completed, inspected, tested and is in compliance with the contract."

#### 1.12 COMPLETION INSPECTIONS

##### 1.12.1 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time stated in the Contract clause "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the QC Manager shall conduct an inspection of the work and develop a punch list of items which do not conform to the approved drawings and specifications. Include in the punch list any remaining items of the "Rework Items List", which were not corrected prior to the Punch-Out inspection. The punch list shall include the estimated date by which the deficiencies will be corrected. A copy of the punch list shall be provided to the KO. The QC Manager or staff shall make follow-on inspections to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government "Pre-Final Inspection".

##### 1.12.2 Pre-Final Inspection

The Government and QC manager will perform this inspection to verify that the facility is complete and ready to be occupied. A Government pre-final punch list may be developed as a result of this inspection. The QC Manager shall ensure that all items on this list are corrected prior to notifying the Government that a "Final" inspection with the customer can be scheduled. Any items noted on the "Pre-Final" inspection shall be corrected in a timely manner and shall be accomplished before the contract

completion date for the work or any particular increment thereof if the project is divided into increments by separate completion dates.

#### 1.12.3 Final Acceptance Inspection

The QC Manager, the superintendent, or other Contractor management personnel and the KO will be in attendance at this inspection. Additional Government personnel may be in attendance. The final acceptance inspection will be formally scheduled by the KO based upon results of the "Pre-Final Inspection". Notice shall be given to the KO at least 14 days prior to the final inspection. The notice shall state that all specific items previously identified to the Contractor as being unacceptable will be complete by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the KO to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause "Inspection of Construction".

#### 1.13 DOCUMENTATION

Maintain current and complete records of on-site and off-site QC program operations and activities. The forms identified under the paragraph "INFORMATION FOR THE CONTRACTING OFFICER (KO)" shall be used. Reports are required for each day work is performed. Account for each calendar day throughout the life of the contract. Every space on the forms must be filled in. Use N/A if nothing can be reported in one of the spaces. The superintendent and the QC Manager must prepare and sign the Contractor Production and CQC Reports, respectively. The reporting of work shall be identified by terminology consistent with the construction schedule. In the "remarks" section in this report which will contain pertinent information including directions received, problems encountered during construction, work progress and delays, conflicts or errors in the drawings or specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, delays encountered and a record of visitors to the work site. For each remark given, identify the Schedule Activity No. that is associated with the remark.

##### 1.13.1 Quality Control Validation

Establish and maintain the following in a series of three ring binders. Binders shall be divided and tabbed as shown below. These binders shall be readily available to the Government's Quality Assurance Team during all business hours.

- a. All completed Preparatory and Initial Phase Checklists, arranged by specification section.
- b. All milestone inspections, arranged by Activity/Event Number.
- c. A current up-to-date copy of the Testing and Plan Log with supporting field test reports, arranged by specification section.
- d. Copies of all contract modifications, arranged in numerical order. Also include documentation that modified work was accomplished.
- e. A current up-to-date copy of the Rework Items List.
- f. Maintain up-to-date copies of all punch lists issued by the QC

Staff on the Contractor and Sub-Contractors and all punch lists issued by the Government.

#### 1.13.2 As-Built Drawings

The QC Manager is required to review the as-built drawings, required by Section 01 78 00 CLOSEOUT SUBMITTALS, are kept current on a daily basis and marked to show deviations, which have been made from the Contract drawings. Ensure each deviation has been identified with the appropriate modifying documentation, e.g. PC number, modification number, RFI number, etc. The QC Manager shall initial each deviation or revision. Upon completion of work, the QC Manager shall submit a certificate attesting to the accuracy of the as-built drawings prior to submission to the KO.

#### 1.14 NOTIFICATION ON NON-COMPLIANCE

The KO will notify the Contractor of any detected non-compliance with the foregoing requirements. The Contractor shall take immediate corrective action. If the contractor fails or refuses to correct the non-compliant work, the KO will issue a non compliance notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the KO may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall make no part of the time lost due to such stop orders the subject of claim for extension of time, for excess costs, or damages.

#### PART 2 PRODUCTS

Not Used

#### PART 3 EXECUTION

Not Used

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SECTION 01 78 00

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**05/19**

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## SECTION 01 78 00

## CLOSEOUT SUBMITTALS

05/19

## PART 1 GENERAL

## 1.1 DEFINITIONS

## 1.1.1 As-Built Drawings

As-built drawings are the marked-up drawings, maintained by the Contractor on-site, that depict actual conditions and deviations from the Contract Documents. These deviations and additions may result from coordination required by, but not limited to: contract modifications; official responses to submitted Requests for Information (RFI's); direction from the Contracting Officer; design that is the responsibility of the Contractor, and differing site conditions. Maintain the as-builts throughout construction as red-lined hard copies on site.

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals;

SD-11 Closeout Submittals

DD Form 1354; G

As-Built Drawings; G

## 1.3 DD FORM 1354

"DD Form 1354 - Transfer and Acceptance of DoD Real Property" with cost breakout for all assets at the facility turnover.

## PART 2 PRODUCTS

Not Used.

## PART 3 EXECUTION

## 3.1 AS-BUILT DRAWINGS

## 3.1.1 Markup Guidelines

Make comments and markup the drawings complete without reference to letters, memos, or materials that are not part of the As-Built drawing. Show what was changed, how it was changed, where item(s) were relocated and change related details. These working as-built markup prints must be neat,

legible and accurate as follows:

- a. Use base colors of red, green, and blue. Color code for changes as follows:
  - (1) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.
  - (2) Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.
  - (3) Additions (Green) - Added items, lettering in notes and leaders.
- b. Provide a legend if colors other than the "base" colors of red, green, and blue are used.
- c. Add and denote any additional equipment or material facilities, service lines, incorporated under As-Built Revisions if not already shown in legend.
- d. Use frequent written explanations on markup drawings to describe changes. Do not totally rely on graphic means to convey the revision.
- e. Use legible lettering and precise and clear digital values when marking prints. Clarify ambiguities concerning the nature and application of change involved.
- f. Wherever a revision is made, also make changes to related section views, details, legend, profiles, plans and elevation views, schedules, notes and call out designations, and mark accordingly to avoid conflicting data on all other sheets.
- g. For deletions, cross out all features, data and captions that relate to that revision.
- h. For changes on small-scale drawings and in restricted areas, provide large-scale inserts, with leaders to the applicable location.
- i. Indicate one of the following when attaching a print or sketch to a markup print:
  - 1) Add an entire drawing to contract drawings
  - 2) Change the contract drawing to show
  - 3) Provided for reference only to further detail the initial design.
- j. Incorporate all shop and fabrication drawings into the markup drawings.

### 3.1.2 As-Built Drawings Content

Show on the as-built drawings, but not limited to, the following information:

- a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, show by offset dimensions to two permanently fixed surface features the end of each run including each change in



direction on the record drawings. Locate valves, splice boxes and similar appurtenances by dimensioning along the utility run from a reference point. Also record the average depth below the surface of each run.

- b. The location and dimensions of any changes within the building structure.
- c. Layout and schematic drawings of electrical circuits and piping.
- d. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.
- e. Changes in details of design or additional information obtained from working drawings specified to be prepared or furnished by the Contractor; including but not limited to shop drawings, fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment, and foundations.
- f. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.
- g. Changes or Revisions which result from the final inspection.
- h. Where contract drawings or specifications present options, show only the option selected for construction on the working as-built markup drawings.
- i. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, furnish a contour map of the final borrow pit/spoil area elevations.
- j. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.
- k. Changes in location of equipment and architectural features.
- l. Modifications.
- m. Actual location of anchors, construction and control joints, etc., in concrete.
- n. Unusual or uncharted obstructions that are encountered in the contract work area during construction.
- o. Location, extent, thickness, and size of stone protection particularly where it will be normally submerged by water.

### 3.2 OPERATION AND MAINTENANCE MANUALS

Provide project operation and maintenance manuals. Provide one electronic copies of the Operation and Maintenance Manual files. Submit to the Contracting Officer for approval within 15 calendar days of the Beneficial Occupancy Date (BOD). Update and resubmit files for final approval at BOD.

## 3.3 CLEANUP

Leave premises "broom clean." Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition. Clean debris from roofs, gutters, downspouts and drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site.

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05/10

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## SECTION 02 41 00

DEMOLITION  
05/10

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

## AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.6 (2006) Safety Requirements for Demolition Operations

## U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2014) Safety and Health Requirements Manual

## U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 61 National Emission Standards for Hazardous Air Pollutants

## 1.2 PROJECT DESCRIPTION

## 1.2.1 Demolition/Deconstruction Plan

Prepare a Demolition Plan and submit proposed salvage, demolition, and removal procedures for approval before work is started. Include in the plan procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress, a disconnection schedule of utility services, a detailed description of methods and equipment to be used for each operation and of the sequence of operations. Coordinate with Waste Management Plan. Provide procedures for safe conduct of the work in accordance with EM 385-1-1. Plan shall be approved by Contracting Officer prior to work beginning.

## 1.2.2 General Requirements

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. The work includes demolition, deconstruction, and removal of resulting rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the Contracting Officer.

In the interest of occupational safety and health, perform the work in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections.

## 1.3 ITEMS TO REMAIN IN PLACE

Take necessary precautions to avoid damage to existing items to remain in

place, to be reused, or to remain the property of the Government. Repair or replace damaged items as approved by the Contracting Officer. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload pavements to remain. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work.

#### 1.3.1 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove dust, dirt, and debris from work areas daily.

#### 1.3.2 Weather Protection

For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and workmen ready to provide adequate and temporary covering of exposed areas.

#### 1.3.3 Trees

Protect trees within the project site which might be damaged during demolition or deconstruction, and which are indicated to be left in place, by a 6 foot high fence. Erect and secure fence a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Replace any tree designated to remain that is damaged during the work under this contract with like-kind or as approved by the Contracting Officer.

#### 1.3.4 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations. Prior to start of work, utilities serving each area of alteration or removal will be shut off by the Government and disconnected and sealed by the Contractor .

#### 1.3.5 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Contracting Officer. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this

contract.

#### 1.4 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted. Where burning is permitted, adhere to federal, state, and local regulations.

#### 1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

##### SD-01 Preconstruction Submittals

Demolition Plan; G

Existing Conditions

##### SD-07 Certificates

Notification; G

##### SD-11 Closeout Submittals

Receipts

#### 1.6 QUALITY ASSURANCE

Submit timely notification of demolition and renovation projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M. Notify the local air pollution control district/agency and the Contracting Officer in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSE/SAFE A10.6. Comply with the Environmental Protection Agency requirements specified. Use of explosives will not be permitted.

##### 1.6.1 Dust and Debris Control

Prevent the spread of dust and debris and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Sweep pavements as often as necessary to control the spread of debris that may result in foreign object damage potential to aircraft.

#### 1.7 PROTECTION

##### 1.7.1 Traffic Control Signs

a. Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Anchor barricades in a manner to prevent displacement by wind, jet or prop blast. Notify the Contracting Officer prior to beginning such work.

### 1.7.2 Protection of Personnel

Before, during and after the demolition and deconstruction work continuously evaluate the condition of the structure being demolished and deconstructed and take immediate action to protect all personnel working in and around the project site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

### 1.8 FOREIGN OBJECT DAMAGE (FOD)

Aircraft and aircraft engines are subject to FOD from debris and waste material lying on airfield pavements. Remove all such materials that may appear on operational aircraft pavements due to the Contractor's operations. If necessary, the Contracting Officer may require the Contractor to install a temporary barricade at the Contractor's expense to control the spread of FOD potential debris. The barricade shall include a fence covered with a fabric designed to stop the spread of debris. Anchor the fence and fabric to prevent displacement by winds or jet/prop blasts. Remove barricade when no longer required.

### 1.9 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair or replace items to be relocated which are damaged by the Contractor with new undamaged items as approved by the Contracting Officer.

### 1.10 EXISTING CONDITIONS

Before beginning any demolition or deconstruction work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs sized 4 inch will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of surface conditions that exist prior to before starting work. It is the Contractor's responsibility to verify and document all required outages which will be required during the course of work, and to note these outages on the record document. Submit survey results.

## PART 2 PRODUCTS

### 2.1 FILL MATERIAL

- a. Comply with excavating, backfilling, and compacting procedures for soils used as backfill material to fill basements, voids, depressions or excavations resulting from demolition or deconstruction of structures.

## PART 3 EXECUTION

### 3.1 EXISTING FACILITIES TO BE REMOVED

Dismantled and removed materials are to be separated, set aside, and prepared as specified, and stored or delivered to a collection point for reuse, remanufacture, recycling, or other disposal, as specified. Materials shall be designated for reuse onsite whenever possible.

#### 3.1.1 Utilities and Related Equipment

##### 3.1.1.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

#### 3.1.2 Concrete

Saw concrete along straight lines. Make each cut in walls perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete provided that the broken area is concealed in the finished work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete.

#### 3.1.3 Patching

Where removals leave holes and damaged surfaces exposed in the finished work, patch and repair these holes and damaged surfaces to match adjacent finished surfaces, using on-site materials when available. Where new work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new work. Finished surfaces of patched area shall be flush with the adjacent existing surface and shall match the existing adjacent surface as closely as possible as to texture and finish. Patching shall be as specified and indicated, and shall include:

- a. Concrete and Masonry: Completely fill holes and depressions, left as a result of removals in existing masonry walls to remain, with an approved masonry patching material, applied in accordance with the manufacturer's printed instructions.

### 3.2 CONCURRENT EARTH-MOVING OPERATIONS

Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition or deconstruction work in areas occupied by structures to be demolished or deconstructed until all demolition and deconstruction in the area has been completed and debris removed. Fill holes, open basements and other hazardous openings.



### 3.3 DISPOSITION OF MATERIAL

#### 3.3.1 Title to Materials

All materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition, deconstruction, and removal procedures, and authorization by the Contracting Officer to begin demolition and deconstruction. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

#### 3.4 CLEANUP

Remove debris and rubbish from basement and similar excavations. Remove and transport the debris in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

#### 3.5 DISPOSAL OF REMOVED MATERIALS

##### 3.5.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations with all applicable federal, state and local regulations. Storage of removed materials on the project site is prohibited.

##### 3.5.2 Burning on Government Property

Burning of materials removed from demolished and deconstructed structures will not be permitted on Government property .

##### 3.5.3 Removal from Government Property

Transport waste materials removed from demolished and deconstructed structures, except waste soil, from Government property for legal disposal. Dispose of waste soil as directed.

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## CAST-IN-PLACE CONCRETE

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## PART 1 GENERAL

## 1.1 UNIT PRICES

## 1.1.1 Measurement

Measurement of concrete for payment will be made on the basis of the actual volume within the pay lines of the structure as indicated on the contract drawings. Measurement for payment of concrete placed against the sides of any excavation without intervening forms will be made only within the pay lines of the structure as shown on the contract drawings. No deductions will be made for rounded or beveled edges, for space occupied by metal work, for conduits, for voids, or for embedded items which are less than 5 cubic feet in volume or 1 square foot in cross section.

## 1.1.2 Payment

Unless otherwise specified, payment for concrete will be made at the respective unit prices per cubic yard for the various items of the schedule, measured as specified above, which price includes the cost of all labor, materials, and the use of equipment and tools required to complete the concrete work, except for any reinforcement and embedded parts specified to be paid separately. Unit price payment will not be made for concrete placed in structures for which payment is made as a lump sum.

## 1.2 LUMP SUM CONTRACT

Under this type of contract, concrete items will be paid for by lump sum and will not be measured. The work covered by these items consists of furnishing all concrete materials, reinforcement, miscellaneous embedded materials, and equipment, and performing all labor for the forming, manufacture, transporting, placing, finishing, curing, and protection of concrete in these structures.

## 1.3 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

## AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

- |           |  |
|-----------|--|
| ACI 117   | (2010; Errata 2011) Specifications for Tolerances for Concrete Construction and Materials and Commentary |
| ACI 121R  | (2008) Guide for Concrete Construction Quality Systems in Conformance with ISO 9001                      |
| ACI 211.1 | (1991; R 2009) Standard Practice for   |

	Selecting Proportions for Normal, Heavyweight and Mass Concrete
ACI 211.2	(1998; R 2004) Standard Practice for Selecting Proportions for Structural Lightweight Concrete
ACI 214R	(2011) Evaluation of Strength Test Results of Concrete
ACI 301	(2016) Specifications for Structural Concrete
ACI 304.2R	(1996; R 2008) Placing Concrete by Pumping Methods
ACI 304R	(2000; R 2009) Guide for Measuring, Mixing, Transporting, and Placing Concrete
ACI 305.1	(2014) Specification for Hot Weather Concreting
ACI 306.1	(1990; R 2002) Standard Specification for Cold Weather Concreting
ACI 309R	(2005) Guide for Consolidation of Concrete
ACI 318	(2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016) Building Code Requirements for Structural Concrete and Commentary
ACI SP-15	(2011) Field Reference Manual: Standard Specifications for Structural Concrete ACI 301-05 with Selected ACI References

## ASTM INTERNATIONAL (ASTM)

ASTM C1017/C1017M	(2013; E 2015) Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM C1064/C1064M	(2011) Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
ASTM C1077	(2016) Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C1107/C1107M	(2014a) Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C1116/C1116M	(2010a; R 2015) Standard Specification for Fiber-Reinforced Concrete
ASTM C1157/C1157M	(2011) Standard Specification for

## Hydraulic Cement

ASTM C1260	(2014) Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C131/C131M	(2014) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136/C136M	(2014) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143/C143M	(2015a) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150/C150M	(2016; E 2016) Standard Specification for Portland Cement
ASTM C1567	(2013) Standard Test Method for Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C1602/C1602M	(2012) Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete
ASTM C172/C172M	(2014a) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173/C173M	(2016) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C192/C192M	(2016a) Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C231/C231M	(2014) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260/C260M	(2010a; R 2016) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C309	(2011) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C31/C31M	(2015a; E 2016) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33/C33M	(2016) Standard Specification for Concrete Aggregates
ASTM C330/C330M	(2014) Standard Specification for

	Lightweight Aggregates for Structural Concrete
ASTM C39/C39M	(2016b) Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C42/C42M	(2013) Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
ASTM C494/C494M	(2016) Standard Specification for Chemical Admixtures for Concrete
ASTM C552	(2016a) Standard Specification for Cellular Glass Thermal Insulation
ASTM C567/C567M	(2014) Determining Density of Structural Lightweight Concrete
ASTM C578	(2015b) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
ASTM C591	(2016) Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
ASTM C595/C595M	(2016) Standard Specification for Blended Hydraulic Cements
ASTM C618	(2012a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C78/C78M	(2016) Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C937	(2016) Grout Fluidifier for Preplaced-Aggregate Concrete
ASTM C94/C94M	(2016a) Standard Specification for Ready-Mixed Concrete
ASTM C989/C989M	(2014) Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM D75/D75M	(2014) Standard Practice for Sampling Aggregates
CONCRETE REINFORCING STEEL INSTITUTE (CRSI)	
CRSI 10MSP	(2009; 28th Ed) Manual of Standard Practice
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)	
NIST HB 44	(2013) Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices



## NATIONAL READY MIXED CONCRETE ASSOCIATION (NRMCA)

NRMCA CPMB 100	(2000; R 2006) Concrete Plant Standards
NRMCA QC 3	(2011) Quality Control Manual: Section 3, Plant Certifications Checklist: Certification of Ready Mixed Concrete Production Facilities
NRMCA TMMB 100	(2001; R 2007) Truck Mixer, Agitator and Front Discharge Concrete Carrier Standards

## U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 104	(1980) Method of Calculation of the Fineness Modulus of Aggregate
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## 1.4 Definitions

## 1.4.1 Cementitious Material

As used herein, includes all portland cement, pozzolan, fly ash, ground granulated blast-furnace slag.

## 1.4.2 Chemical Admixtures

Materials in the form of powder or fluids that are added to the concrete to give it certain characteristics not obtainable with plain concrete mixes.

## 1.4.3 Complementary Cementing Materials (CCM)

Coal fly ash, granulated blast-furnace slag, natural or calcined pozzolans, and ultra-fine coal ash when used in such proportions to replace the portland cement that result in considerable improvement to sustainability, durability.

1.4.4 Design Strength ( $f'_c$ )

The specified compressive strength of concrete at time(s) specified in this section to meet structural design criteria.

## 1.4.5 Mass Concrete

Any concrete system that approaches a maximum temperature of 158 degrees F within the first 72 hours of placement. In addition, it includes all concrete elements with a section thickness of 3 feet or more regardless of temperature.

## 1.4.6 Mixture Proportioning

The process of designing concrete mixture proportions to enable it to meet the strength, service life and constructability requirements of the project.

## 1.4.7 Mixture Proportions

The masses or volumes of individual ingredients used to make a unit measure (cubic yard) of concrete.

#### 1.4.8 Pozzolan

Siliceous or siliceous and aluminous material, which in itself possesses little or no cementitious value but will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds possessing cementitious properties.

#### 1.4.9 Workability or Consistency

The ability of a fresh (plastic) concrete mix to fill the form/mould properly with the desired work (vibration) and without reducing the concrete's quality. Workability depends on water content, chemical admixtures, aggregate (shape and size distribution), cementitious content and age (level of hydration).

### 1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

#### SD-01 Preconstruction Submittals

- Quality Control Plan; G
- Laboratory Accreditation
- Sampling Plan; G

#### SD-03 Product Data

- Recycled Content Products; (LEED)
- Cementitious Materials
- Vapor Retarder
- Vapor Barrier
- Floor Finish
- Floor Hardener
- Chemical Admixtures

#### SD-04 Samples

- Surface Retarder

#### SD-05 Design Data

- Mixture Proportions; G
- Lightweight Aggregate Concrete

#### SD-06 Test Reports

- Mixture Proportions; G
- Testing and Inspection for CQC; G
- Fly Ash
- Ground Granulated Blast-Furnace (GGBF) Slag
- Aggregates
- Air Content
- Slump
- Compressive Strength
- Water

#### SD-07 Certificates

Contractor Quality Control personnel  
Ready-Mix Plant

### 1.6 QUALITY ASSURANCE

Submit qualifications for Contractor Quality Control personnel assigned to concrete construction as American Concrete Institute (ACI) Certified Workmen in one of the following grades or show written evidence of having completed similar qualification programs:

Concrete Field Testing Technician	Grade I
Concrete Laboratory Testing Technician	Grade I or II
Concrete Construction Inspector	Level II
Concrete Transportation Construction Inspector or Reinforced Concrete Special Inspector	Jointly certified by American Concrete Institute (ACI), Building Official and Code Administrators International (BOCA), International Code Council (ICC), and Southern Building Code Congress International (SBCCI)
Foreman or Lead Journeyman of the flatwork finishing crew	Similar qualification for ACI Concrete Flatwork Technician/Finisher or equal, with written documentation

#### 1.6.1 Laboratory Accreditation

Provide laboratory and testing facilities. The laboratories performing the tests must be accredited in accordance with ASTM C1077, including ASTM C78/C78M and ASTM C1260. The accreditation must be current and must include the required test methods, as specified. Furthermore, the testing must comply with the following requirements:

##### 1.6.1.1 Aggregate Testing and Mix Proportioning

Perform aggregate testing and mixture proportioning studies in an accredited laboratory, under the direction of a registered professional engineer who is competent in concrete materials. This person is required to sign all reports and designs.

##### 1.6.1.2 Acceptance Testing

Furnish all materials, labor, and facilities required for molding, curing, testing, and protecting test specimens at the site and in the laboratory. Furnish and maintain boxes or other facilities suitable for storing and curing the specimens at the site while in the mold within the temperature range stipulated by ASTM C31/C31M.

##### 1.6.1.3 Contractor Quality Control

All sampling and testing must be performed by an approved, onsite,

independent, accredited laboratory.

#### 1.6.2 Quality Control Plan

Submit a concrete quality control program in accordance with the guidelines of ACI 121R and as specified herein. Identify the approved laboratories. Provide direct oversight for the concrete qualification program inclusive of associated sampling and testing. Provide all quality control reports to the Quality Manager, Concrete Supplier and the Contracting Officer. Maintain a copy of ACI SP-15 and CRSI 10MSP at the project site.

#### 1.6.3 Pre-installation Meeting

A pre-installation meeting with the Contracting Officer is required at least 10 days prior to start of construction on location to be defined by the CO. Conduct the meeting with the Project Superintendent and active installation personnel present.

#### 1.6.4 Special Properties and Products

Concrete may contain admixtures other than air entraining agents, such as water reducers, superplasticizers, or set retarding agents to provide special properties to the concrete, if specified or approved. Include any of these materials to be used on the project in the mix design studies.

#### 1.6.5 Technical Service for Specialized Concrete

Obtain the services of a factory trained technical representative to oversee proportioning, batching, mixing, placing, consolidating, and finishing of specialized structural concrete. The technical representative must be on the job full time until the Contracting Officer is satisfied that field controls indicate concrete of specified quality is furnished and that the crews are capable of continued satisfactory work. Make the technical representative available for consultation with and advising Government forces.

#### 1.6.6 Government Assurance Inspection and Testing

Day-to day inspection and testing is the responsibility of the Contractor Quality Control (CQC) staff. However, representatives of the Contracting Officer can and will inspect construction as considered appropriate and will monitor operations of the CQC staff. Government inspection or testing will not relieve any CQC responsibilities.

##### 1.6.6.1 Materials

The Government will sample and test aggregates, cementitious materials, other materials, and concrete to determine compliance with the specifications as considered appropriate. Provide facilities and labor as may be necessary for procurement of representative test samples. Samples of aggregates will be obtained at the point of batching in accordance with ASTM D75/D75M. Other materials will be sampled from storage at the jobsite or from other locations as considered appropriate. Samples may be placed in storage for later testing when appropriate.

##### 1.6.6.2 Fresh Concrete

Fresh concrete will be sampled as delivered in accordance with ASTM C172/C172M and tested in accordance with these specifications, as

considered necessary.

#### 1.6.6.3 Hardened Concrete

Tests on hardened concrete will be performed by the Government when such tests are considered necessary.

#### 1.6.6.4 Inspection

Concrete operations may be tested and inspected by the Government as the project progresses. Failure to detect defective work or material will not prevent rejection later when a defect is discovered nor will it obligate the Government for final acceptance.

### 1.7 DELIVERY, STORAGE, AND HANDLING

Follow ACI 301 and ACI 304R requirements and recommendations. Store cement and other cementitious materials in weathertight buildings, bins, or silos that exclude moisture and contaminants and keep each material completely separated. Arrange and use aggregate stockpiles in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of aggregates. Do not store aggregate directly on ground unless a sacrificial layer is left undisturbed. Store reinforcing bars and accessories above the ground on platforms, skids or other supports. Store other materials in a manner to avoid contamination and deterioration. Admixtures which have been in storage at the project site for longer than 6 months or which have been subjected to freezing cannot be used unless retested and proven to meet the specified requirements. Materials must be capable of being accurately identified after bundles or containers are opened.

## PART 2 PRODUCTS

In accordance with Section 01 33 29 SUSTAINABILITY REPORTING submit documentation indicating: distance between manufacturing facility and the project site, distance of raw material origin from the project site, percentage of post-industrial and post-consumer recycled content per unit of product and relative dollar value of recycled content products to total dollar value of products included in project. Provide Submittals as specified in the subject Section.

### 2.1 SYSTEM DESCRIPTION

Provide concrete composed of portland cement, other cementitious and pozzolanic materials as specified, aggregates, water and admixtures as specified.

#### 2.1.1 Proportioning Studies-Normal Weight Concrete

Trial design batches, mixture proportions studies, and testing requirements for various types of concrete specified are the responsibility of the Contractor. Base mixture proportions on compressive strength as determined by test specimens fabricated in accordance with ASTM C192/C192M and tested in accordance with ASTM C39/C39M. Obtain mix design approval from the Contracting Officer prior to concrete placement.

- a. Samples of all materials used in mixture proportioning studies must be representative of those proposed for use in the project and be accompanied by the manufacturer's or producer's test reports indicating compliance with these specifications.

- b. Make trial mixtures having proportions, consistencies, and air content suitable for the work based on methodology described in ACI 211.1, using at least three different water-cementitious material ratios for each type of mixture, which produce a range of strength encompassing those required for each type of concrete required on the project.
- c. The maximum water-cementitious material ratios allowed in subparagraph WATER-CEMENTITIOUS MATERIAL RATIO below will be the equivalent water-cementitious material ratio as determined by conversion from the weight ratio of water to cement plus pozzolan by the weight equivalency method as described in ACI 211.1. In the case where silica fume or GGBF slag is used, include the weight of the silica fume and GGBF slag in the equations in ACI 211.1 for the term P, which is used to denote the weight of pozzolan. If pozzolan is used in the concrete mixture, the minimum pozzolan content is 15 percent by weight of the total cementitious material, and the maximum is 35 percent.
- d. Design laboratory trial mixtures for maximum permitted slump and air content. Make separate sets of trial mixture studies for each combination of cementitious materials and each combination of admixtures proposed for use. No combination of either may be used until proven by such studies, except that, if approved in writing and otherwise permitted by these specifications, an accelerator or a retarder may be used without separate trial mixture study. Separate trial mixture studies must also be made for concrete for any conveying or placing method proposed which requires special properties and for concrete to be placed in unusually difficult placing locations. For previously approved concrete mix designs used within the past twelve months, the previous mix design may be re-submitted without further trial batch testing if accompanied by material test data conducted within the last six months.
- e. Report the temperature of concrete in each trial batch. For each water-cementitious material ratio, make at least three test cubes for each test age, cure in accordance with NP ENV 206 and test at 7 and 28 days in accordance with NP ENV 206. From these test results, plot a curve showing the relationship between water-cementitious material ratio and strength for each set of trial mix studies. In addition, plot a curve showing the relationship between 7 day and 28 day strengths. Design each mixture to promote easy and suitable concrete placement, consolidation and finishing, and to prevent segregation and excessive bleeding.
- f. Submit the results of trial mixture design studies along with a statement giving the maximum nominal coarse aggregate size and the proportions of ingredients that will be used in the manufacture of each strength of concrete, at least 60 days prior to commencing concrete placing operations. Base aggregate weights on the saturated surface dry condition. Accompany the statement with test results from an approved independent commercial testing laboratory, showing that mixture design studies have been made with materials proposed for the project and that the proportions selected will produce concrete of the qualities indicated. No substitutions may be made in the materials used in the mixture design studies without additional tests to show that the quality of the concrete is satisfactory.

### 2.1.2 Proportioning Studies-Lightweight Aggregate Structural Conc

Trial design batches, mixture proportioning studies, and testing requirements must conform to the requirements specified in paragraph PROPORTIONING STUDIES-NORMAL WEIGHT CONCRETE above, except as follows. Trial mixtures having proportions, consistencies and air content suitable for the work must be made based on methodology described in ACI 211.2, using at least three different cement contents. Proportion trial mixes to produce air dry unit weight, concrete strengths, maximum permitted slump, and air content. Test specimens and testing must be as specified for normal weight concrete except that 28-day compressive strength must be determined from test cylinders that have been air dried at 50 percent relative humidity for the last 21 days. Determine air dry unit weight in accordance with ASTM C567/C567M, designed to be at least 2.0 pcf less than the maximum specified air dry unit weight. Plot curves using these results showing the relationship between cement factor and strength and air dry unit weight. Normal weight fine aggregate may be substituted for part or all of the lightweight fine aggregate, provided the concrete meets the strength and unit weight. A correlation must also be developed showing the ratio between air dry unit weight and fresh concrete unit weight for each mix.

### 2.1.3 Average Compressive Strength

The mixture proportions selected during mixture design studies must produce a required average compressive strength ( $f'_{cr}$ ) exceeding the specified compressive strength ( $f'_c$ ) by the amount indicated below, but may not exceed the specified strength at the same age by more than 20 percent. This required average compressive strength,  $f'_{cr}$ , will not be a required acceptance criteria during concrete production. However, whenever the daily average compressive strength at 28 days drops below  $f'_{cr}$  during concrete production, or daily average 7-day strength drops below a strength correlated with the 28-day  $f'_{cr}$ , adjust the mixture, as approved, to bring the daily average back up to  $f'_{cr}$ . During production, the required  $f'_{cr}$  must be adjusted, as appropriate, based on the standard deviation being attained on the job.

### 2.1.4 Computations from Test Records

Where a concrete production facility has test records, establish a standard deviation in accordance with the applicable provisions of ACI 214R. Test records from which a standard deviation is calculated must represent materials, quality control procedures, and conditions similar to those expected; must represent concrete produced to meet a specified strength or strengths ( $f'_c$ ) within 1000 psi of that specified for proposed work; and must consist of at least 30 consecutive tests. A strength test must be the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days. Required average compressive strength  $f'_{cr}$  used as the basis for selection of concrete proportions must be in accordance with ACI 318 Chapter 5.

### 2.1.5 Mix Design for Bonded Topping for Heavy Duty Floors

The concrete mix design for bonded topping for heavy duty floors must contain the greatest practical proportion of coarse aggregate within the specified proportion limits. Design the mix to produce concrete having a 28-day strength of at least 5000 psi. Concrete for the topping must consist of the following proportions, by weight:

1.00 part portland cement  
 1.15 to 1.25 parts fine aggregate  
 1.80 to 2.00 parts coarse aggregate

Maximum water-cementitious material ratio must be 0.33. The topping concrete must not be air-entrained. The concrete must be mixed so as to produce a mixture of the driest consistency possible to work with a sawing motion of the strike-off and which can be floated and compacted as specified without producing water or excess cement at the surface. In no case must slump exceed 1 inch as determined by ASTM C143/C143M.

#### 2.1.6 Tolerances

Except as otherwise specified herein, tolerances for concrete batching, mixture properties, and construction as well as definition of terms and application practices must be in accordance with ACI 117. Take level and grade tolerance measurements of slabs as soon as possible after finishing; when forms or shoring are used, the measurements must be made prior to removal.

#### 2.1.7 Strength Requirements

Specified compressive strength ( $f'_c$ ) must be as follows:

COMPRESSIVE STRENGTH	STRUCTURE OR PORTION OF STRUCTURE
5000 psi at 28 days	N/A
4000 psi at 28 days	N/A
3000 psi at 28 days	concrete pads
N/A psi at N/A days	N/A

Concrete made with high-early strength cement must have a 7-day strength equal to the specified 28-day strength for concrete made with Type I or II portland cement. Compressive strength must be determined in accordance with ASTM C39/C39M.

##### 2.1.7.1 Evaluation of Concrete Compressive Strength

Fabricate six compressive strength specimens, 4 inch by 8 inch cylinders, laboratory cure them in accordance with ASTM C31/C31M and test them in accordance with ASTM C39/C39M. Test two cylinders at 7 days, two cylinders at 28 days, and hold two cylinder in reserve. The strength of the concrete is considered satisfactory so long as the average of all sets of three consecutive test results do not exceed the specified compressive strength  $f'_c$  by 20 percent and no individual test result falls below the specified strength  $f'_c$  by more than 500 psi), unless approved by the Contracting Officer. A "test" is defined as the average of two companion cylinders, or if only one cylinder is tested, the results of the single cylinder test. Additional analysis or testing, including taking cores and/or load tests may be required when the strength of the concrete in the structure is considered potentially deficient.



## 2.1.1.7.2 Investigation of Low-Strength Compressive Test Results

When any strength test of standard-cured test cylinders falls below the specified strength requirement by more than 500 psi or if tests of field-cured cylinders indicate deficiencies in protection and curing, take steps to assure that the load-carrying capacity of the structure is not jeopardized. When the strength of concrete in place is considered potentially deficient, obtain cores and test in accordance with ASTM C42/C42M. Take at least three representative cores from each member or area of concrete in place that is considered potentially deficient. The location of cores will be determined by the Contracting Officer to least impair the strength of the structure. Concrete in the area represented by the core testing will be considered adequate if the average strength of the cores is equal to at least 85 percent of the specified strength requirement and if no single core is less than 75 percent of the specified strength requirement. Non-destructive tests (tests other than test cylinders or cores) may not be used as a basis for acceptance or rejection. Perform the coring and repair the holes; cores will be tested by the Government.

## 2.1.1.7.3 Load Tests

If the core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be directed by the Contracting Officer in accordance with the requirements of ACI 318. Correct concrete work evaluated by structural analysis or by results of a load test as being understrength in a manner satisfactory to the Contracting Officer. Perform all investigations, testing, load tests, and correction of deficiencies approved by the Contracting Officer, except that if all concrete is found to be in compliance with the drawings and specifications, the cost of investigations, testing, and load tests will be at the expense of the Government.

## 2.1.1.8 Slump

Slump of the concrete, as delivered to the point of placement into the forms, must be within the following limits. Determine slump in accordance with ASTM C143/C143M.

Structural Element	Slump inches	
	Minimum	Maximum
Walls, columns and beams	2	4
Foundation walls, substructure walls, footings, slabs	1	3
Any structural concrete approved for placement by pumping:		
At pump	2	8
At discharge of line	1	4

### 2.1.9 Concrete Temperature

The temperature of the concrete as delivered must not exceed 90 degrees F. When the ambient temperature during placing is 40 degrees F or less, or is expected to be at any time within 6 hours after placing, the temperature of the concrete as delivered must be between 55 and 75 degrees F.

### 2.1.10 Size of Coarse Aggregate

Use the largest feasible nominal maximum size aggregate (NMSA), specified in PART 2 paragraph AGGREGATES, in each placement. However, do not exceed nominal maximum size of aggregate for any of the following: three-fourths of the minimum cover for reinforcing bars, three-fourths of the minimum clear spacing between reinforcing bars, one-fifth of the narrowest dimension between sides of forms, or one-third of the thickness of slabs or toppings.

## 2.2 CEMENTITIOUS MATERIALS

Cementitious Materials must be portland cement, or portland cement in combination with pozzolan or ground granulated blast furnace slag or silica fume conforming to appropriate specifications listed below. Restrict usage of cementitious materials in concrete that will have surfaces exposed in the completed structure so there is no change in color, source, or type of cementitious material.

### 2.2.1 Portland Cement

ASTM C150/C150M, Type I with a maximum 10 percent amount of tricalcium aluminate, and a maximum cement-alkali content of 0.80 percent Na<sub>2</sub>Oe (sodium oxide) equivalent. White portland cement must meet the above requirements except that it may be Type I, Type II or Type III .

### 2.2.2 Blended Cements

Conform blended cement to ASTM C595/C595M and ASTM C1157/C1157M, Type IP or IS, including the optional requirement for mortar expansion and consist of a mixture of ASTM C150/C150M Type I, or Type II cement and a complementary cementing material. The slag added to the Type IS blend must be ASTM C989/C989M ground granulated blast-furnace slag. The pozzolan added to the Type IP blend must be ASTM C618 Class F and must be interground with the cement clinker. Provide a manufacturer's statement that the amount of pozzolan in the finished cement will not vary more than plus or minus 5 mass percent of the finished cement from lot-to-lot or within a lot. Do not change the percentage and type of mineral admixture used in the blend from that submitted for the aggregate evaluation and mixture proportioning.

## 2.3 AGGREGATES

Test and evaluate fine and coarse aggregates for alkali-aggregate reactivity in accordance with ASTM C1260. Evaluate the fine and coarse aggregates separately and in combination, which matches the proposed mix design proportioning. All results of the separate and combination testing must have a measured expansion less than 0.10 (0.08) percent at 16 days after casting. Should the test data indicate an expansion of 0.10 (0.08) percent or greater, reject the aggregate(s) or perform additional testing using ASTM C1260 and ASTM C1567. Perform the additional testing using ASTM C1260 and ASTM C1567 using the low alkali portland cement in combination with ground granulated blast furnace (GGBF) slag, or Class F

fly ash. Use GGBF slag in the range of 40 to 50 percent of the total cementitious material by mass. Use Class F fly ash in the range of 25 to 40 percent of the total cementitious material by mass.

#### 2.3.1 Fine Aggregate

Conform to the quality and gradation requirements of ASTM C33/C33M.

#### 2.3.2 Coarse Aggregate

Conform to ASTM C33/C33M, Class 5S .

#### 2.3.3 Lightweight Aggregate

Provide lightweight fine and coarse aggregate conforming to the quality and gradation requirements of ASTM C330/C330M, size for coarse aggregate. Prewet and vacuum saturate lightweight aggregate in accordance with the Manufacturer's instructions unless otherwise specified. For pumped concrete, prewet sufficiently to ensure that slump loss through the pump line does not exceed 4 inches.

#### 2.3.4 Materials for Bonded Topping for Heavy Duty Floors

In addition to the requirements specified above, coarse aggregate used for this purpose must be a well graded, hard, sound diabase, trap rock, emery, granite or other natural or manufactured aggregate having equivalent hardness and wearing qualities and have a percentage of loss not to exceed 30 after 500 revolutions when tested in accordance with ASTM C131/C131M. Gradation of the aggregates when tested in accordance with ASTM C136/C136M as follows:

Coarse Aggregate	
Sieve Size	Cumulative Percent Cumulative Percent
3/4 inch	100
1/2 inch	50-100
3/8 inch	25-50
No. 4	0-15
No. 8	0-8

Fine Aggregate	
Sieve Size	Cumulative Percent
3/8 inch	100
No. 4	95-100
No. 8	65-80
No. 16	45-65
No. 30	25-45
No. 50	5-15
No. 100	0-5

## 2.4 CHEMICAL ADMIXTURES

When required or permitted, conform to the appropriate specification listed. Furnish admixtures in liquid form and of suitable concentration for easy, accurate control of dispensing.

### 2.4.1 Air-Entraining Admixture

ASTM C260/C260M and must consistently entrain the air content in the specified ranges under field conditions.

### 2.4.2 Accelerating Admixture

ASTM C494/C494M, Type C or E, except that calcium chloride or admixtures containing calcium chloride cannot be used.

### 2.4.3 Water-Reducing or Retarding Admixture

ASTM C494/C494M, Type A, B, or D, except that the 6-month and 1-year compressive strength tests are waived.

### 2.4.4 High-Range Water Reducer

ASTM C494/C494M, Type F or G, except that the 6-month and 1-year strength requirements are waived. Use the admixture only when approved in writing, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan and upon performance of separate mixture design studies.

### 2.4.5 Surface Retarder

ASTM C309. Submit sample of surface retarder material with manufacturer's instructions for application in conjunction with air-water cutting.

### 2.4.6 Expanding Admixture

Aluminum powder type expanding admixture conforming to ASTM C937.

### 2.4.7 Other Chemical Admixtures

Provide chemical admixtures for use in producing flowing concrete in compliance with ASTM C1017/C1017M, Type I or II. Use these admixtures only when approved in writing, such approval being contingent upon particular mixture control as described in the Contractor's Quality Control Plan and upon performance of separate mixture design studies.

## 2.5 WATER

Provide water complying with the requirements of ASTM C1602/C1602M. Provide potable water for mixing, free of injurious amounts of oil, acid, salt, or alkali. Submit test report showing water complies with ASTM C1602/C1602M.

## 2.6 NONSHRINK GROUT

Provide nonshrink grout conforming to ASTM C1107/C1107M, and a commercial formulation suitable for the proposed application.

## 2.7 NONSLIP SURFACING MATERIAL

Provide nonslip surfacing material consisting of 55 percent, minimum, aluminum oxide or silicon-dioxide abrasive ceramically bonded together to form a homogeneous material sufficiently porous to provide a good bond with portland cement paste; or factory-graded emery aggregate consisting of not less than 45 percent aluminum oxide and 25 percent ferric oxide. Use well graded aggregate from particles retained on the No. 30 sieve to particles passing the No. 8 sieve.

## 2.8 FLOOR HARDENER

Provide a colorless aqueous solution containing zinc silicofluoride, magnesium silicofluoride, or sodium silicofluoride. These silicofluorides can be used individually or in combination. Proprietary hardeners may be used if approved in writing by the Contracting Officer.

## 2.9 PERIMETER INSULATION

Polystyrene conforming to ASTM C578, Type II; polyurethane conforming to ASTM C591, Type II; or cellular glass conforming to ASTM C552, Type I or IV.

# PART 3 EXECUTION

## 3.1 PREPARATION FOR PLACING

Before commencing concrete placement, perform the following: Clean surfaces to receive concrete, free from frost, ice, mud, and water. Place, clean, coat, and support forms. Place, clean, tie, and support reinforcing steel. Transporting and conveying equipment is in-place, ready for use, clean, and free of hardened concrete and foreign material. Equipment for consolidating concrete is at the placing site and in proper working order. Equipment and material for curing and for protecting concrete from weather or mechanical damage is at the placing site, in proper working condition and in sufficient amount for the entire placement. When hot, windy conditions during concreting appear probable, equipment and material is at the placing site to provide windbreaks, shading, fogging, or other action to prevent plastic shrinkage cracking or other damaging drying of the concrete.

### 3.1.1 Foundations

#### 3.1.1.1 Concrete on Earth Foundations

Earth (subgrade, base, or subbase courses) surfaces upon which concrete is to be placed is clean, damp, and free from debris, frost, ice, and standing or running water. Prior to placement of concrete, the foundation must be well drained, satisfactorily graded and uniformly compacted.

#### 3.1.1.2 Preparation of Rock

Rock surfaces upon which concrete is to be placed is free from oil, standing or running water, ice, mud, drummy rock, coating, debris, and loose, semidetached or unsound fragments. Clean joints in rock to a satisfactory depth, as determined by the Contracting Officer, and to firm rock on the sides. Immediately before the concrete is placed, thoroughly clean rock surfaces by the use of air-water jets or sandblasting as specified below for Previously Placed Concrete. Keep rock surfaces

continuously moist for at least 24 hours immediately prior to placing concrete thereon. Cover all horizontal and approximately horizontal surfaces, immediately before the concrete is placed, with a layer of mortar proportioned similar to that in the concrete mixture. Place concrete before the mortar stiffens.

#### 3.1.1.3 Excavated Surfaces in Lieu of Forms

Concrete may be placed directly against the soil provided the earth or rock has been carefully trimmed, is uniform and stable. Place the concrete without becoming contaminated by loose material, and outlined within the specified tolerances.

#### 3.1.2 Embedded Items

Before placement of concrete, determine that all embedded items are firmly and securely fastened in place as indicated on the drawings, or required. Conduit and other embedded items must be clean and free of oil and other foreign matter such as loose coatings or rust, paint, and scale. The embedding of wood in concrete is permitted only when specifically authorized or directed. Temporarily fill voids in sleeves, inserts, and anchor slots with readily removable materials to prevent the entry of concrete into voids. Do not weld on embedded metals within 12 inches of the surface of the concrete. Do not tack weld on or to embedded items.

### 3.2 CONCRETE PRODUCTION

#### 3.2.1 General Requirements

Batch and mix concrete onsite or furnish from a ready-mixed concrete plant. Batch, mix, and transport ready-mixed concrete in accordance with ASTM C94/C94M, except as otherwise specified. Truck mixers, agitators, and nonagitating transporting units must comply with NRMCA TMMB 100. Ready-mix plant equipment and facilities must be certified in accordance with NRMCA QC 3. Furnish approved batch tickets for each load of ready-mixed concrete. Conform site-mixed concrete to the following subparagraphs.

#### 3.2.2 Batching Plant

Locate the batching plant offsite close to the project. Conform the batching plant to the requirements of NRMCA CPMB 100 and as specified; however, rating plates attached to batch plant equipment are not required.

#### 3.2.3 Batching Equipment

Use semiautomatic or automatic batching controls as defined in NRMCA CPMB 100. Provide a semiautomatic batching system with interlocks such that the discharge device cannot be actuated until the indicated material is within the applicable tolerance. Equip the batching system with accurate recorder or recorders that meet the requirements of NRMCA CPMB 100. Record the weight of water and admixtures if batched by weight. Provide separate bins or compartments for each size group of aggregate and type of cementitious material, to prevent intermingling at any time. Weigh aggregates either in separate weigh batchers with individual scales or, provided the smallest size is batched first, cumulatively in one weigh batcher on one scale. Do not weigh aggregate in the same batcher with cementitious material. If both portland cement and other cementitious material are used, they may be batched cumulatively, provided that the portland cement is batched first, except always batch

silica fume separately. Water may be measured by weight or volume. Do not weigh or measure water cumulatively with another ingredient. Interlock filling and discharging valves for the water metering or batching system so that the discharge valve cannot be opened before the filling valve is fully closed. Piping for water and for admixtures must be free from leaks and valved to prevent backflow or siphoning. Furnish admixtures as a liquid of suitable concentration for easy control of dispensing. Provide an adjustable, accurate, mechanical device for measuring and dispensing each admixture. Interlock each admixture dispenser with the batching and discharging operation of the water so that each admixture is separately batched and individually discharged automatically in a manner to obtain uniform distribution throughout the water as it is added to the batch in the specified mixing period. . Different admixtures cannot be combined prior to introduction in water and are not allowed to intermingle until in contact with the cement. Provide admixture dispensers with devices to detect and indicate flow during dispensing or have a means for visual observation. Arrange the plant so as to facilitate the inspection of all operations at all times. Provide suitable facilities for obtaining representative samples of aggregates from each bin or compartment, and for sampling and calibrating the dispensing of cementitious material, water, and admixtures. Clearly mark filling ports for cementitious materials bins or silos with a permanent sign stating the contents.

#### 3.2.4 Scales

Conform the weighing equipment to the applicable requirements of CPMB Concrete Plant Standard, and of NIST HB 44, except that the accuracy must be plus or minus 0.2 percent of scale capacity. Provide standard test weights and any other auxiliary equipment required for checking the operating performance of each scale or other measuring devices. Perform the tests at the specified frequency in the presence of a Government inspector. Arrange the weighing equipment so that the plant operator can conveniently observe all dials or indicators.

#### 3.2.5 Batching Tolerances

##### a. Tolerances with Weighing Equipment

MATERIAL	PERCENT OF REQUIRED WEIGHT
Cementitious materials	0 to plus 2
Aggregate	plus or minus 2
Water	plus or minus 1
Chemical admixture	0 to plus 6

##### b. Tolerances with Volumetric Equipment - For volumetric batching equipment used for water and admixtures, the following tolerances apply to the required volume of material being batched:

MATERIAL	PERCENT OF REQUIRED MATERIAL
Water	plus or minus 1
Chemical admixture	0 to plus 6

### 3.2.6 Moisture Control

Provide a plant capable of ready adjustment to compensate for the varying moisture content of the aggregates and to change the weights of the materials being batched.

### 3.2.7 Concrete Mixers

Use stationary mixers or truck mixers capable of combining the materials into a uniform mixture and of discharging this mixture without segregation. Do not charge the mixers in excess of the capacity recommended by the manufacturer. Operate the mixers at the drum or mixing blade speed designated by the manufacturer. Maintain the mixers in satisfactory operating condition, and keep the mixer drums free of hardened concrete. Should any mixer at any time produce unsatisfactory results, promptly discontinue its use until it is repaired.

### 3.2.8 Stationary Mixers

Drum-type mixers of tilting, nontilting, horizontal-shaft, or vertical-shaft type, or pug mill type provided with an acceptable device to lock the discharge mechanism until the required mixing time has elapsed. Conform the mixing time and uniformity to all the requirements in ASTM C94/C94M applicable to central-mixed concrete.

### 3.2.9 Truck Mixers

Conform truck mixers, the mixing of concrete therein, and concrete uniformity to the requirements of ASTM C94/C94M. A truck mixer may be used either for complete mixing (transit-mixed) or to finish the partial mixing done in a stationary mixer (shrink-mixed). Equip each truck with two counters from which it is possible to determine the number of revolutions at mixing speed and the number of revolutions at agitating speed. Or, if approved, mark the number of revolutions on the batch tickets. Do not add water at the placing site unless specifically approved; and in no case can it exceed the specified w/c. Inject any such water at the base of the mixer, not at the discharge end.

## 3.3 CONCRETE PRODUCTION, SMALL PROJECTS

Use batch-type equipment for producing concrete. Batch, mix and transport ready-mixed concrete in accordance with ASTM C94/C94M, except as otherwise specified. Use truck mixers, agitators, and nonagitating transporting units in compliance with NRMCA TMMB 100. Ready-mix plant equipment and facilities must be certified in accordance with NRMCA QC 3. Furnish approved batch tickets for each load of ready-mixed concrete. Produce site-mixed concrete in accordance with ACI 301, with plant conforming to NRMCA CPMB 100.



### 3.4 LIGHTWEIGHT AGGREGATE CONCRETE

In addition to the requirements specified for normal weight concrete, conform lightweight aggregate concrete to the following. Base the batching and mixing cycle on written recommendations from the aggregate supplier furnished by the Contractor. Unless otherwise directed, charge the mixer with approximately 2/3 of the total mixing water and all of the aggregate. Mix this for at least 1.5 minutes in a stationary mixer or 15 revolutions at mixing speed in a truck mixer. Add and continue mixing the remaining ingredients as specified for normal weight concrete. Do not vibrate lightweight aggregate concrete to the extent that large particles of aggregate float to the surface. During finishing, do not work lightweight aggregate concrete to the extent that mortar is driven down and lightweight coarse aggregate appears at the surface. Lightweight aggregate concrete to be pumped must have a cement content of at least 564 lb/cu. yd.

### 3.5 FIBER REINFORCED CONCRETE

Provide fiber reinforced concrete conforming to ASTM C1116/C1116M and as follows. Use a minimum of 1.5 pounds of fibers per cubic yard of concrete. Add fibers at the batch plant. Provide the services of a qualified technical representative to instruct the concrete supplier in proper batching and mixing of materials.

### 3.6 TRANSPORTING CONCRETE TO PROJECT SITE

Transport concrete to the placing site in truck mixers, agitators, or by approved conveyors. Nonagitating equipment, other than pumps, cannot be used for transporting lightweight aggregate concrete.

### 3.7 PLACING CONCRETE

Discharge mixed concrete within 1.5 hours or before the mixer drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the cement and aggregates. When the concrete temperature exceeds 85 degrees F, reduce the time to 45 minutes. Place concrete within 15 minutes after it has been discharged from the transporting unit. Handle concrete from mixer or transporting unit to forms in a continuous manner until the approved unit of operation is completed. Provide adequate scaffolding, ramps and walkways so that personnel and equipment are not supported by in-place reinforcement. Placing will not be permitted when the sun, heat, wind, or limitations of facilities prevent proper consolidation, finishing and curing. Provide sufficient placing capacity so that concrete can be kept free of cold joints.

#### 3.7.1 Depositing Concrete

Deposit concrete in accordance with ACI 301 Section 5 and ACI 304.2R.

#### 3.7.2 Consolidation

Immediately after placing, consolidate each layer of concrete in accordance with ACI 301 Section 5 and ACI 309R.

#### 3.7.3 Cold Weather Requirements

Perform cold weather concreting in accordance with ACI 306.1. Use special protection measures, approved by the Contracting Officer, if freezing temperatures are anticipated before the expiration of the specified curing

period. The ambient temperature of the air where concrete is to be placed and the temperature of surfaces to receive concrete must be not less than 40 degrees F. The temperature of the concrete when placed must be not less than 50 degrees F nor more than 75 degrees F. Heat the mixing water or aggregates to regulate the concrete placing temperature. Materials entering the mixer must be free from ice, snow, or frozen lumps. Do not incorporate salt, chemicals or other materials in the concrete to prevent freezing. Upon written approval, an accelerating admixture conforming to ASTM C494/C494M, Type C or E may be used, provided it contains no calcium chloride. Do not use calcium chloride.

#### 3.7.4 Hot Weather Requirements

When job-site conditions are present or anticipated that accelerate the rate of moisture loss or rate of cement hydration of freshly mixed concrete, including an ambient temperature of 80 degrees F or higher, and an evaporation rate that exceeds  $0.2 \text{ lb/ft}^2/\text{h}$ , conform concrete work to all requirements of ACI 305.1.

#### 3.7.5 Prevention of Plastic Shrinkage Cracking

During hot weather with low humidity, and particularly with appreciable wind, as well as interior placements when space heaters produce low humidity, be alert to the tendency for plastic shrinkage cracks to develop and institute measures to prevent this. Take particular care if plastic shrinkage cracking is potentially imminent and especially if it has developed during a previous placement. Conform with the requirement of ACI 305.1. In addition further protect the concrete placement by erecting shades and windbreaks and by applying fog sprays of water, sprinkling, ponding or wet covering. Fill plastic shrinkage cracks that occur by injection of epoxy resin as directed, after the concrete hardens. Never trowel over plastic shrinkage cracks or fill with slurry.

#### 3.7.6 Placing Concrete in Congested Areas

Use special care to ensure complete filling of the forms, elimination of all voids, and complete consolidation of the concrete when placing concrete in areas congested with reinforcing bars, embedded items, waterstops and other tight spacing. Use an appropriate concrete mixture, with the nominal maximum size of aggregate (NMSA) meeting the specified criteria when evaluated for the congested area. Use vibrators with heads of a size appropriate for the clearances available, and closely supervise the consolidation operation to ensure complete and thorough consolidation at all points. Where necessary, alternate splices of reinforcing bars to reduce congestion. Where two mats of closely spaced reinforcing are required, place the bars in each mat in matching alignment to reduce congestion. Reinforcing bars may be temporarily crowded to one side during concrete placement provided they are returned to exact required location before concrete placement and consolidation are completed.

#### 3.7.7 Placing Flowable Concrete

If a plasticizing admixture conforming to ASTM C1017/C1017M is used or if a Type F or G high range water reducing admixture is permitted to increase the slump, the concrete must meet all requirements of paragraph SYSTEM DESCRIPTION. Use extreme care in conveying and placing the concrete to avoid segregation. No relaxation of requirements to accommodate flowable concrete will be permitted.

### 3.8 EXTERIOR SLAB AND RELATED ITEMS

#### 3.8.1 Concrete Pads

Construct pits and trenches as indicated. Place bottoms and walls monolithically or provide waterstops as approved.

### 3.9 TESTING AND INSPECTION FOR CQC

Perform the inspection and tests described below and, based upon the results of these inspections and tests, take the action required. Submit certified copies of laboratory test reports, including mill tests and all other test data, for portland cement, blended cement, pozzolan, ground granulated blast furnace slag, silica fume, aggregate, admixtures, and curing compound proposed for use on this project.

- a. When, in the opinion of the Contracting Officer, the concreting operation is out of control, cease concrete placement and correct the operation.
- b. The laboratory performing the tests must be onsite and conform with ASTM C1077. Materials may be subjected to check testing by the Government from samples obtained at the manufacturer, at transfer points, or at the project site.
- c. The Government will inspect the laboratory, equipment, and test procedures prior to start of concreting operations and at least once.

#### 3.9.1 Grading and Corrective Action

##### 3.9.1.1 Fine Aggregate

At least once during each shift when the concrete plant is operating, there must be one sieve analysis and fineness modulus determination in accordance with ASTM C136/C136M and COE CRD-C 104 for the fine aggregate or for each fine aggregate if it is batched in more than one size or classification. Select the location at which samples are taken as the most advantageous for control. However, the Contractor is responsible for delivering fine aggregate to the mixer within specification limits. When the amount passing on any sieve is outside the specification limits, immediately resample and retest the fine aggregate. If there is another failure on any sieve, immediately report the failure to the Contracting Officer, stop concreting, and take immediate steps to correct the grading.

##### 3.9.1.2 Coarse Aggregate

At least once during each shift in which the concrete plant is operating, there must be a sieve analysis in accordance with ASTM C136/C136M for each size of coarse aggregate. Select the location at which samples are taken as the most advantageous for control. However, the Contractor is responsible for delivering the aggregate to the mixer within specification limits. A test record of samples of aggregate taken at the same locations must show the results of the current test as well as the average results of the five most recent tests including the current test. Limits may be adopted for control coarser than the specification limits for samples taken other than as delivered to the mixer to allow for degradation during handling. When the amount passing any sieve is outside the specification limits, immediately resample and retest the coarse aggregate. If the second sample fails on any sieve, report that failure to the Contracting

Officer. Where two consecutive averages of 5 tests are outside specification limits, the operation is be considered out of control and must be reported to the Contracting Officer. Stop concreting and take immediate steps to correct the grading.

### 3.9.2 Quality of Aggregates

Thirty days prior to the start of concrete placement, perform all tests for aggregate quality required by ASTM C33/C33M. In addition, after the start of concrete placement, perform tests for aggregate quality at least every three months, and when the source of aggregate or aggregate quality changes. Take samples for testing after the start of concrete placement immediately prior to entering the concrete mixer.

### 3.9.3 Scales, Batching and Recording

Check the accuracy of the scales by test weights prior to start of concrete operations and at least once every three months. Also conduct such tests as directed whenever there are variations in properties of the fresh concrete that could result from batching errors. Once a week check the accuracy of each batching and recording device during a weighing operation by noting and recording the required weight, recorded weight, and the actual weight batched. At the same time, test and ensure that the devices for dispensing admixtures are operating properly and accurately. When either the weighing accuracy or batching accuracy does not comply with specification requirements, do not operate the plant until necessary adjustments or repairs have been made. Immediately correct discrepancies in recording accuracies.

### 3.9.4 Batch-Plant Control

Continuously control the measurement of concrete materials, including cementitious materials, each size of aggregate, water, and admixtures. Adjust the aggregate weights and amount of added water as necessary to compensate for free moisture in the aggregates. Adjust the amount of air-entraining agent to control air content within specified limits. Prepare a report indicating type and source of cement used, type and source of pozzolan or slag used, amount and source of admixtures used, aggregate source, the required aggregate and water weights per cubic yard amount of water as free moisture in each size of aggregate, and the batch aggregate and water weights per cubic yard for each class of concrete batched during each day's plant operation.

### 3.9.5 Concrete Mixture

#### 3.9.5.1 Air Content Testing

Perform air content tests when test specimens are fabricated. In addition, make at least two tests for air content on randomly selected batches of each separate concrete mixture produced during each 8-hour period of concrete production. Perform additional tests when excessive variation in workability is reported by the placing foreman or Government inspector. Conduct tests in accordance with ASTM C231/C231M for normal weight concrete and ASTM C173/C173M for lightweight concrete.

#### 3.9.5.2 Slump Testing

In addition to slump tests which are made when test specimens are fabricated during concrete placement/discharge, make at least four slump

tests on randomly selected batches in accordance with ASTM C143/C143M for each separate concrete mixture produced during each 8-hour or less period of concrete production each day. Also, make additional tests when excessive variation in workability is reported by the placing foreman or Government inspector.

**Slump Corrective Action** Whenever points on the control charts for slump reach the upper warning limit, make an adjustment immediately in the batch weights of water and fine aggregate. The adjustments are to be made so that the total water content does not exceed that amount allowed by the maximum w/c ratio specified, based on aggregates which are in a saturated surface dry condition. When a single slump reaches the upper or lower action limit, deliver no further concrete to the placing site until proper adjustments have been made. Immediately after each adjustment, make another test to verify the correctness of the adjustment. Whenever two consecutive individual slump tests, made during a period when there was no adjustment of batch weights, produce a point on the control chart for range at or above the upper action limit, halt the concreting operation immediately, and take appropriate steps to bring the slump under control. Make additional slump tests as directed.

#### 3.9.5.3 Temperature

Measure the temperature of the concrete when compressive strength specimens are fabricated in accordance with ASTM C1064/C1064M. Report the temperature along with the compressive strength data.

#### 3.9.5.4 Strength Specimens

Perform on at least one set of test specimens, for compressive strength as appropriate, on each different concrete mixture placed during the day for each 500 cubic yards or portion thereof of that concrete mixture placed each day. Perform on additional sets of test specimens, as directed by the Contracting Officer, when the mixture proportions are changed or when low strengths have been detected. Develop a truly random (not haphazard) sampling plan for approval by the Contracting Officer prior to the start of construction. Show in the plan that sampling is done in a completely random and unbiased manner.

- a. A set of test specimens for concrete with a 28-day specified strength in accordance with paragraph STRENGTH REQUIREMENTS in PART 2 consists of five specimens, two to be tested at 7 days, two at 28 days, and one cylinder held in reserve.
- b. A strength test is the average of the strengths of at least two 6 inch by 12 inch cylinders or at least three 4 inch by 8 inch cylinders made for the same sample of concrete.
- c. Mold and cure test specimens in accordance with ASTM C31/C31M, and test in accordance with ASTM C39/C39M for test cylinders. Immediately report results of all strength tests to the Contracting Officer.
- d. Maintain quality control charts for individual strength "tests", ("test" as defined in paragraph STRENGTH REQUIREMENTS) moving average of last 3 "tests" for strength, and moving average for range for the last 3 "tests" for each mixture. Provide charts similar to those found in ACI 214R.

### 3.9.6 Inspection Before Placing

Inspect foundations, construction joints, forms, and embedded items in sufficient time prior to each concrete placement in order to certify to the Contracting Officer that they are ready to receive concrete. Report the results of each inspection in writing.

### 3.9.7 Placing

The placing foreman must supervise placing operations, determine that the correct quality of concrete or grout is placed in each location as specified and as directed by the Contracting Officer, and be responsible for measuring and recording concrete temperatures and ambient temperature hourly during placing operations, weather conditions, time of placement, volume placed, and method of placement. The placing foreman must not permit batching and placing to begin until it has been verified that an adequate number of vibrators in working order and with competent operators are available. Do not continue placing if any pile of concrete is inadequately consolidated. If any batch of concrete fails to meet the temperature requirements, take immediate steps to improve temperature controls.

### 3.9.8 Cold-Weather Protection

At least once each shift and once per day on non-work days, inspect all areas subject to cold-weather protection. Note any deficiencies, correct, and report.

### 3.9.9 Reports

Report all results of tests or inspections conducted, informally as they are completed and in writing daily. Prepare a weekly report for the updating of control charts covering the entire period from the start of the construction season through the current week. During periods of cold-weather protection, prepare daily reports of pertinent temperatures. These requirements do not relieve the Contractor of the obligation to report certain failures immediately as required in preceding paragraphs. Confirm such reports of failures and the action taken in writing in the routine reports. The Contracting Officer has the right to examine all contractor quality control records.

## 3.10 REPAIR, REHABILITATION AND REMOVAL

Before the Government accepts the structure and final payment is made, inspect the structure for cracks, damage and substandard concrete placements that may adversely affect the service life of the structure. Submit a report documenting these defects, which includes recommendations for repair, removal and/or remediation to the Contracting Officer for approval before any corrective work is accomplished.

### 3.10.1 Crack Repair

Prior to final acceptance, document and repair all cracks in excess of 0.02 inches wide. Submit the proposed method and materials to repair the cracks to the Contracting Officer for approval. Address the amount of movement expected in the crack due to temperature changes and loading.

### 3.10.2 Repair of Weak Surfaces

Weak surfaces are defined as mortar-rich, rain-damaged, uncured, or containing exposed voids or deleterious materials. Diamond grind concrete surfaces with weak surfaces less than 1/4 inch thick to remove the weak surface. Remove and replace surfaces containing weak surfaces greater than 1/4 inch thick, or mitigate in a manner acceptable to the Contracting Officer.

### 3.10.3 Failure of Quality Assurance Test Results

Do not proceed with proposed mitigation efforts to restore the service life until approved by the Contracting Officer.

-- End of Section --

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## DIVISION 26 - ELECTRICAL

## SECTION 26 13 01

## PAD-MOUNTED DEAD-FRONT AIR INSULATED SWITCHGEAR

08/13

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## SECTION 26 13 01

PAD-MOUNTED DEAD-FRONT AIR INSULATED SWITCHGEAR  
08/13

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

## ASTM INTERNATIONAL (ASTM)

- |            |  |
|------------|--|
| ASTM A167  | (2011) Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip |
| ASTM D1535 | (2014; R 2018) Standard Practice for Specifying Color by the Munsell System                                  |

## INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

- |                |   |
|----------------|---|
| IEEE 386       | (2016) Separable Insulated Connector Systems for Power Distribution Systems Rated 2.5 kV through 35 kV  |
| IEEE C2        | (2017; Errata 1-2 2017; INT 1 2017) National Electrical Safety Code   |
| IEEE C37.74    | (2014) Standard Requirements for Subsurface, Vault, and Pad-Mounted Load-Interrupter Switchgear and Fused Load-Interrupter Switchgear for Alternating Current Systems Up to 38 kV |
| IEEE C57.12.29 | (2014) Standard for Pad-Mounted Equipment - Enclosure Integrity for Coastal Environments  |

## INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)

- |          |   |
|----------|---|
| NETA ATS | (2017; Errata 2017) Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems |
|----------|---|

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- |         |   |
|---------|---|
| NFPA 70 | (2017; ERTA 1-2 2017; TIA 17-1; TIA 17-2; TIA 17-3; TIA 17-4; TIA 17-5; TIA 17-6; TIA 17-7; TIA 17-8; TIA 17-9; TIA 17-10; TIA 17-11; TIA 17-12; TIA 17-13; TIA 17-14; TIA 17-15; TIA 17-16; TIA 17-17 ) National Electrical Code |
|---------|---|

NFPA 70B

(2019) Recommended Practice for Electrical  
Equipment Maintenance

UNDERWRITERS LABORATORIES (UL)

UL 467

(2013; Reprint Jun 2017) UL Standard for  
Safety Grounding and Bonding Equipment

## 1.2 DEFINITIONS

### 1.2.1 Switched Way

A switched way is considered a three-phase circuit entrance to the bus through a switch.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. Submit the following in accordance with Section 01 33 00.

### SD-02 Shop Drawings

Switchgear Drawings; G

### SD-03 Product Data

Air Insulated Pad-mounted Switchgear; G

Insulated High-Voltage Connectors; G

Include data and manufacturer's information on switches and each component, device, and accessory provided with the equipment.

### SD-06 Test Reports

Acceptance Checks and Tests; G

Submit reports, including acceptance criteria and limits for each test in accordance with NETA ATS "Test Values".

### SD-09 Manufacturer's Field Reports

Switchgear design and production tests; G

### SD-10 Operation and Maintenance Data

Air Insulated Pad-Mounted Switchgear Operation and Maintenance,  
Data Package 5; G

## 1.4 QUALITY ASSURANCE

### 1.4.1 Switchgear Drawings

Furnish drawings that include, but are not limited to, the following:

- a. Overall dimensions, weights, plan view, and front view
- b. Ratings

c. Single-line diagram.

## 1.5 MAINTENANCE

### 1.5.1 Air Insulated Pad-mounted Switchgear Operation and Maintenance Data

Submit Operation and Maintenance Manuals.

## PART 2 PRODUCTS

### 2.1 AIR INSULATED PAD-MOUNTED SWITCHGEAR

IEEE C37.74

#### 2.1.1 Ratings and Test Requirements

Provide switchgear with a nominal voltage rating of 15 kV and the following corresponding ratings:

Rated Maximum Voltage, kV	17
Rated Withstand Impulse Voltage, kV BIL	95
Continuous and Load Interrupting Current, A	600
Short-Circuit Current, kA rms Sym	22.4
Power Fuses, Amperes, Maximum Interrupting, kA rms Sym	As specified in project drawings

Provide switched ways rated for the required continuous and load interrupting current.

#### 2.1.2 Switchgear Construction

Provide switchgear with the following construction and configuration:

- a. Switch contacts and cable entrance terminations contained in an enclosed, steel compartment.
- b. Configured with load interrupting and fused switched ways as indicated.
- c. Accessible terminations suitable for cables entering from below.
- d. Switch contact positions for switched ways visible through viewing windows in the switchgear termination compartment.
- e. Each switched way with two position switch; Open, Closed and provisions for grounding.

##### 2.1.2.1 Pad-mounting Provisions

Provide enclosed switchgear suitable for installation on a concrete pad, including the following:

- a. Fabricate switchgear enclosure and enclosure base of ASTM A167 type 304 or 304L stainless steel.
- b. Enclosure base includes any part of the switchgear enclosure that is within 3 inches of concrete pad.
- c. Paint enclosure including base ASTM D1535 Munsell 7GY3.29/1.5 green .
- d. Comply with IEEE C57.12.29 for the paint coating system regardless of equipment material.

#### 2.1.3 Load Interrupting Switched Ways

Provide the following for load interrupter switched ways:

- a. Three-pole group operated switching.
- b. Interrupter switches operated by means of an externally accessible switch-operating hub.
- c. Switch-operating hub located within a recessed stainless steel pocket mounted on the side of the pad-mounted gear enclosure.
- d. Padlockable stainless steel access cover and hood on the switch-operating-hub pocket to protect the padlock shackle from tampering.
- e. Stops on the switch-operating hub to prevent overtravel.
- f. Labels in the switch-operating-hub pocket to indicate switch position.
- g. Folding switch-operating handle for each interrupter switch.

#### 2.1.4 Fused Ways

Provide the following:

- a. Fuse mountings enclosed in an inner steel compartment.
- b. Each fuse mounting installed as an integral part of a fuse handling mechanism that does not allow access to the fuse until the elbow for that fuse has been disconnected and a mechanical interlock to the fuse-access panel has been actuated.
- c. The opening into the component compartment covered by the fuse-access panel in both the open and closed positions to prevent access to high voltage.
- d. Blown-fuse indicators for fused ways visible through viewing windows in the termination compartment.

##### 2.1.4.1 Fuses

Provide fuses in accordance with the following:

- a. Fuse ratings as indicated.
- b. Helically coiled fuses if rated 10 amperes or larger.

- c. Solid-material power fuses capable of detecting and interrupting all faults under all realistic conditions of circuitry, with line-to-line or line-to-ground voltage across the fuse, and capable of handling the full range of transient recovery voltage severity associated with these faults.
- d. All arcing accompanying operation of the fuse contained within the fuse, and all arc products and gases evolved effectively contained within the exhaust control device during fuse operation.
- e. Fusible elements nonaging and nondamagable with melting time-current characteristics that are permanently accurate to within a maximum tolerance of 10% in terms of current.
- f. Equipped with a blown-fuse indicator that provides visible evidence of fuse operation while installed in the fuse mounting.

#### 2.1.5 Dead-Front High-Voltage Bushings

IEEE 386. 15 kV, 95 kV BIL. Provide 600 ampere one-piece deadbreak apparatus bushings for each switched way.

- a. Parking stands: Provide a parking stand near each dead-front bushing.

#### 2.2 Insulated High-Voltage Connectors

IEEE 386. Provide corresponding connector for each switched way; provide connectors with a grounding eye and test point.

- a. 600 Ampere deadbreak connector ratings: Voltage: 15 kV, 95 kV BIL. Short time rating: 25,000 rms symmetrical amperes.

#### 2.3 Grounding Provisions

Provide a ground-connection pad in each termination compartment.

#### 2.4 Fault Indicators

Provide fault indicator mounting provisions with viewing window in each switch compartment.

#### 2.5 SOURCE QUALITY CONTROL

##### 2.5.1 Switchgear Design and Production Tests

Furnish reports which include results of design and production tests performed according to IEEE C37.74. Perform production tests by the manufacturer on each switchgear assembly to ensure that design performance is maintained in production.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

Conform to IEEE C2, NFPA 70, and to the requirements specified herein.

### 3.2 GROUNDING

NFPA 70 and IEEE C2.

#### 3.2.1 Switchgear Grounding

Connect #4/0 bare copper conductor ground loop, not less than 24 inches below grade, to the upper end of the ground rods by exothermic welds or compression connectors. Provide #4/0 bare copper conductors connecting the switchgear grounding provisions to two different ground rods.

#### 3.2.2 Connections

Make joints in grounding conductors and ground loop by exothermic weld or compression connector.

#### 3.2.3 Grounding and Bonding Equipment

UL 467, except as indicated or specified otherwise.

### 3.3 FOUNDATION FOR EQUIPMENT AND ASSEMBLIES

Mount switch on existing concrete slab. Extensions to existing concrete slabs shall include the following:

- c. Extend slab to 2 feet 8 inches (from switch to concrete edge) of size at least 12 inches thick, reinforced with a AQ50 mesh, placed uniformly 4 inches from the top of the slab.
- d. Place Slab on a 6 inch thick, well-compacted gravel base.
- e. Install top of concrete slab approximately 4 inches above finished grade. Provide edges above grade 1/2 inch chamfer.

### 3.4 FIELD QUALITY CONTROL

#### 3.4.1 Performance of Acceptance Checks and Tests

Perform in accordance with the manufacturer's recommendations, NFPA 70B, NETA ATS and referenced ANSI standards.

Include the following visual and mechanical inspections and electrical tests, performed in accordance with NETA ATS.

##### 3.4.1.1 Switchgear

###### a. Visual and Mechanical Inspection

- (1) Compare equipment nameplate information with specifications and approved shop drawings.
- (2) Inspect physical and mechanical condition.
- (3) Check for proper anchorage, alignment, required area clearances, and grounding.
- (4) Perform mechanical operator tests in accordance with manufacturer's instructions.

- (5) Inspect all indicating devices for proper operation.

b. Electrical Tests

- (1) Perform contact-resistance tests.
- (2) Perform insulation-resistance tests.
- (3) Perform an over-potential test on each switched way pole with the switched way in the open position in accordance with the manufacturer's instructions.

3.4.1.2 Grounding System

a. Visual and Mechanical Inspection

Inspect ground system for compliance with contract plans and specifications.

b. Electrical Tests

Perform ground impedance measurements utilizing the fall-of-potential method. On systems consisting of interconnected ground rods, perform tests after interconnections are complete. On systems consisting of a single ground rod perform tests before any wire is connected. Take measurements in normally dry weather, not less than 48 hours after rainfall. Use a portable ground testing megger in accordance with manufacturer's instructions to test each ground or group of grounds. Use an instrument equipped with a meter reading directly in ohms or fractions thereof to indicate the ground value of the ground rod or grounding systems under test.

Submit the measured ground resistance of each ground rod and grounding system, indicating the location of the rod and grounding system. Include the test method and test setup (i.e., pin location) used to determine ground resistance and soil conditions at the time the measurements were made.

3.4.2 Follow-Up Verification

Upon completion of acceptance checks and tests, show by demonstration in service that devices are in good operating condition and properly performing the intended function. Perform each item not less than three times to demonstrate its function. As an exception to requirements stated elsewhere in the contract, notify the Contracting Officer 5 working days in advance of the dates and times for checks and tests.

-- End of Section --