N62604.AR.000018
NCBC GULFPORT
5090.3a

# CONSTRUCTION SPECIFICATION AND CONTRACT REQUIREMENTS FOR DE-DRUMMING BUILDING NCBC GULFPORT MS

1/9/1975

U S NAVY

DEC 74

NOTICE:
Bids will be opened at 2:00 p.m.
9 January 1975, at the Office of the
Assistant Officer in Charge of Construction
Bldg. 1, Naval Constn. Battalion Center
Gulfport, Mississippi

**NAVFAC**
**SPECIFICATION**
**NO. 06-75-5105**

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CONSTRUCT DE-DRUMMING BUILDING

at the

NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

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Appropriation: NIF

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A priority rating of DO-C2 will apply to this contract upon award.

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N O T I C E

All inquiries concerning any phase of this specification, prior to bid opening, shall be made to the Assistant Officer in Charge of Construction, Building 1, Naval Construction Battalion Center, Gulfport, Mississippi 39501; Telephone (601) 864-6220, Extension 792. The Government specifications and forms mentioned, other information necessary, and non-Government publications may be examined on application to the Assistant Officer in Charge of Construction, Building 1, Naval Construction Battalion Center, Gulfport, Mississippi 39501.

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N62467-75-C-5105

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DIVISION 1. GENERAL REQUIREMENTS

Section 1A. General Paragraphs.

1A.1 General intention. It is the declared and acknowledged intention and meaning to provide and secure a prefabricated metal structure with concrete floor, exterior and interior electrical and miscellaneous mechanical complete and ready for use.

1A.2 General description. Construct concrete slab with drain troughs and furnish and erect prefabricated metal structure consisting of framing system and roof panels. Construct power line and provide exterior and interior electrical and mechanical system.

1A.3 Location. The work shall be located at the Naval Construction Battalion Center, Gulfport, Mississippi, approximately as shown. The exact location will be indicated by the Officer in Charge of Construction.

1A.4 Commencement, prosecution, and completion of work. The contractor will be required to commence work under the contract within 10 calendar days after the date of receipt by him of notice to proceed, to prosecute said work diligently, and to complete the entire work ready for use not later than 30 March 1975. The time stated for completion shall include final cleanup of the premises.

1A.5 Liquidated damages. In case of failure on the part of the contractor to complete the work within the time fixed in the contract or extensions thereof, the contractor shall pay to the Government as liquidated damages pursuant to Clause 5 of Standard Form 23A and Clause 80 of NAVFAC 4-4330/5 (6-72) the sum of $100.00 for each day of delay. If this contract is preceded by a "Notice of Award" with the prescribed bond forms attached, the contractor shall execute the bonds and promptly return same to the OICC within 15 calendar days from the date of the "Notice of Award".

1A.6 Drawing accompanying specification. The following drawing accompanies this specification and is a part thereof. Drawing is the property of the Government and shall not be used for any purpose other than that contemplated by the specification.

| NAVFAC Drawing No. | Title |
|---|---|
| 5,000,250 | Construct De-Drumming Building, Sheet 1 of 4 |
| 5,000,251 | Construct De-Drumming Building, Sheet 2 of 4 |
| 5,000,252 | Construct De-Drumming Building, Sheet 3 of 4 |
| 5,000,253 | Construct De-Drumming Building, Sheet 4 of 4 |

1A.7 Factory inspection. (See Clause 10 of U.S. Standard Form 23A). Factory inspection by the Government shall apply specifically, but not necessarily exclusively, to the following material:

Factory inspection by the Government of other material and equipment for which tests at the place of manufacture are required may be waived at the option of the Government, provided notarized copies of factory test reports are furnished that show compliance with the specifications requirements. Factory inspection will not be required for lumber provided it is grade-marked and trademarked by the association under whose rules it is graded, or provided it is accompanied by certificates of inspection issued by the association under whose rules it is graded or by another inspection agency that is satisfactory to the Officer in Charge.

1A.8 Samples. As soon as practicable and before installation, the contractor shall submit for approval and in accordance with Clause 91 of NAVFAC 4-4330/5 (6-72), samples of the following and of such other material and equipment specifically required by other sections hereinafter:

1A.9 Drawings required of the contractor -

1A.9.1 Shop Drawings. Before commencing the fabrication or installation of any of this work, the contractor shall submit for and receive approval of, and in accordance with Clause 53 of NAVFAC 4-4330/5 (6-72), such drawings as may be required.

1A.9.2 Record Drawings. The contractor will not be required to prepare record drawings, however, to enable the Government to prepare record drawings, the Contractor shall deliver to the OICC two complete sets of marked prints of the contract drawings indicating construction deviations from the contract drawings. These marked prints shall be included in the package of final documentation submitted as a part of completion of the contract.

1A.10 Schedule of Prices. A Schedule of Prices shall be furnished in accordance with Clause 85 of NAVFAC 4-4330/5 (6-72).

1A.11 Contractor's invoice and contract performance statement. Requests for payment and performance statement shall be submitted in accordance with Clause 86 of NAVFAC 4-4330/5 (6-72).

1A.12 Security requirements shall be in accordance with Clause 82 of NAVFAC 4-4330/5 (6-72).

1A.13 Progress charts and equipment delivery schedule.

1A.13.1 Progress charts. The contractor shall, within 15 days after receipt of notice of award, prepare and submit to the Officer in Charge for approval, a practicable construction schedule in accordance with Clause 62 of NAVFAC 4-4330/5 (6-72) except as modified herein. The schedule shall be in the form of a progress chart on Form 6ND-SOEASTDOCKS-4355-1.

1A.13.2 Equipment delivery schedule. The contractor shall, within 21 days after date of award, submit to the Officer in Charge for approval, a schedule showing the procurement plans for materials, plant and equipment. The data shall be submitted in the format prescribed by the Officer in Charge and shall include but not be limited to the following information:

a. Description.
b. Date of purchase order.
c. Promised shipping date.
d. Name of manufacturer or supplier.
e. Date delivery is expected.
f. Date material or equipment is required according to current progress schedule or network.

The contractor shall update the equipment delivery schedule at monthly intervals or at intervals directed by the Officer in Charge; the schedule shall reflect any changes. The contractor shall also submit copies of purchase orders and confirmation of delivery dates as directed.

1A.13.3 Network system. Optionally, the contractor may use the "CPM" (Critical Path Method), the "PERT" (Program Evaluation and Reporting Technique), or, subject to approval of the Officer in Charge, some other system which will give similar and equal information and control to that provided by the named systems, in lieu of the progress charts specified above.

1A.14 Salvage Clause 55 of NAVFAC 4-4330/5 (6-72) is hereby cancelled. All existing materials and equipment which are required to be removed or disconnected in order to perform the work, but are not indicated or specified for reuse in the new work, or for Government salvage, shall become the property of the contractor and shall be removed from Government property.

1A.15 Technical publications. The contractor shall furnish installation, operation, and maintenance manuals for all mechanical equipment as follows:

1A.15.1 Operating instructions for the principal plant mechanical components, for use by operating personnel, shall be provided. They shall be laminated between thermoplastic sheets and affixed where directed. The instructions shall describe the function of the equipment, its most economical operation, start-up and shut-down procedures, procedures to follow in the event of failure, normal maintenance practices, and caution and warning notices.

1A.15.2 Maintenance and operation manual, five copies, shall be provided. The manual shall be bound between hard covers and shall contain, but not be limited to, installation and operating instructions, maintenance procedures, illustrations, drawings, detailed descriptions, tests, adjustments, safety precautions, and parts list.

1A.15.3 Parts list, giving part numbers and prices for the equipment furnished, shall be submitted to the Officer in Charge as soon as practicable after the award of the contract, but not later than the time of delivery of equipment.

1A.15.4 Delivery. Technical publications, including operating instructions, maintenance and operations manuals and parts lists, shall be delivered to the Officer in Charge prior to final acceptance of the project.

1A.16 Safety requirements. A copy of the Department of the Army Corps of Engineers, "General Requirements", referenced in Clause 41 of NAVFAC 4-4330/5 (6-72), may be examined at the office where bids are being received. (Copies of this publication may be obtained upon application, accompanied by money order, coupon, or cash to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20401). Prior to commencement of the work, the contractor shall meet in conference with representatives of the Officer in Charge to discuss and develop mutual understandings relative to administration of the safety program.

1A.17 Warranty periods. In addition to the contract requirements for warranty of items provided under this contract, the contractor shall furnish the full warranty which is standard with the manufacturer and/or supplier. In no case shall the warranty period be less than one year.

1A.18 In accordance with Clause 63 of NAVFAC 4330/5 (Rev 6/72), prior to commencement of work the successful bidder shall furnish the OICC a description of the work to be performed by his own forces and the percentage of the total work which this represents.

SECTION 1B. ADDITIONAL GENERAL PARAGRAPHS (18 January 1974)

1B.1 Form of Contract - The contract will be executed on Standard Form 23 (Jan 1961) Construction Contract and will include Standard Form 23A (Oct 1969) General Provisions (Construction Contract), NAVFAC 4330/5 (REV. 6/72) Additional General Provisions (Construction Contract), and NAVFAC 4330/41 (6-72) Labor Standards Provisions (Construction Contract).

1B.2 Modifications to Standard Form 23A (Oct 1969), General Provisions, are as follows:

1B.2.1. Delete Clause 21 in its entirety and substitute the following in lieu thereof:

21. EQUAL OPPORTUNITY (1972 AUG)

During the performance of this contract, the Contractor agrees as follows:

(1) The Contractor will not discriminate against any employees or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include but not be limited to the following: Employment, upgrading, demotion, or transfer, recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this nondiscrimination clause.

(2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(3) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the agency Contracting Officer, advising the labor union or workers' representative of the contractor's commitments under this Equal Opportunity clause and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, and by the rules, regulations, and orders of the Secretary of Labor or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.

(6) In the event of the Contractor's noncompliance with the Equal Opportunity clause of this contract or with any of said rules, regulations, or orders, this contract may be cancelled, terminated or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Contractor will include the provisions of Paragraph (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, as amended by Executive Order 11375 of October 13, 1967, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

1B.3 Modifications to NAVFAC 4330/5 (6-72), Additional General Paragraphs, are as follows:

1B.3.1. Delete Clause 28 in its entirety and substitute the following:

28. TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (1973 APR)

(a) The performance of work under this contract may be terminated by the Government in accordance with this clause in whole, or from time to time in part, whenever the Contracting Officer shall determine that such termination is in the best interest of the Government. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work under the contract is terminated, and the date upon which such termination becomes effective.

(b) After receipt of a Notice of Termination, and except as otherwise directed by the Contracting Officer, the Contractor shall:

(i) stop work under the contract on the date and to the extent specified in the Notice of Termination;

(ii) place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of such portion of the work under the contract as is not terminated;

(iii) terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination;

(iv) assign to the Government, in the manner, at the times, and to the extent directed by the Contracting Officer, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the Government shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

(v) settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Contracting Officer, to the extent he may require, which approval or ratification shall be final for all the purposes of this clause;

(vi) transfer title and deliver to the Government, in the manner, at the times, and to the extent, if any, directed by the Contracting Officer, (A) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced as a part of, or acquired in connection with the performance of, the work terminated by the Notice of Termination, and (B) the completed or partially completed plans, drawings, information, and other property which, if the contract had been completed, would have been required to be furnished to the Government.

(vii) use his best efforts to sell, in the manner, at the times, to the extent, and at the price or prices directed or authorized by the Contracting Officer, any property of the types referred to in (vi) above; provided, however, that the Contractor (A) shall not be required to extend credit to any purchaser, and (B) may acquire any such property under the conditions prescribed by and at a price or prices approved by the Contracting Officer; and provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Government to the Contractor under this contract or shall otherwise be credited to the price or cost of the work covered by this contract or paid in such other manner as the Contracting Officer may direct;

(viii) complete performance of such part of the work as shall not have been terminated by the Notice of Termination; and

(f) Costs claimed, agreed to, or determined pursuant to (c), (d), and (e) hereof shall be in accordance with Section XV of the Armed Services Procurement Regulation as in effect on the date of this contract.

(g) The Contractor shall have the right of appeal, under the clause of this contract, entitled "Disputes", from any determination made by the Contracting Officer under paragraph (c) or (e) above, except that if the Contractor has failed to submit his claim within the time provided in paragraph (c) above and has failed to request extension of such time, he shall have no such right of appeal. In any case where the Contracting Officer has made a determination of the amount due under paragraph (c) or (e) above, the Government shall pay to the Contractor the following: (i) if there is no right of appeal hereunder or if no timely appeal has been taken the amount so determined by the Contracting Officer, or (ii) if an appeal has been taken, the amount finally determined on such appeal.

(h) In arriving at the amount due the Contractor under this clause there shall be deduced (i) all unliquidated advance or other payments on account theretofore made to the Contractor, applicable to the terminated portion of this contract, (ii) any claim which the Government may have against the Contractor in connection with this contract, and (iii) the agreed price for, or the proceeds of sale of, any materials, or other things acquired by the Contractor or sold, pursuant to the provisions of this clause, and not otherwise recovered by or credited to the Government.

(i) If the termination hereunder be partial, prior to the settlement of the terminated portion of this contract, the Contractor may file with the Contracting Officer a request in writing for an equitable adjustment of the price or prices specified in the contract relating to the continued portion of the contract (the portion not terminated by the Notice of Termination), and such equitable adjustment as may be agreed upon shall be made in such price or prices.

(j) The Government may from time to time, under such terms and conditions as it may prescribe, make partial payments and payments on account against costs incurred by the Contractor in connection with the terminated portion of this contract whenever in the opinion of the Contracting Officer the aggregate of such payments shall be within the amount to which the Contractor will be entitled hereunder. If the total of such payments is in excess of the amount finally agreed or determined to be due under this clause, such excess shall be payable by the Contractor to the Government upon demand, together with interest computed at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41, 85 STAT 97 for the Renegotiation Board, for the period from the date such excess payment is received by the Contractor to the date on which such excess is

repaid to the Government; provided, however, that no interest shall be charged with respect to any such excess payment attributable to a reduction in the Contractor's claim by reason of retention or other disposition of termination inventory until ten days after the date of such retention or disposition, or such later date as determined by the Contracting Officer by reason of the circumstances.

(k) Unless otherwise provided for in this contract, or by applicable statute, the Contractor shall--from the effective date of termination unless the expiration of three years after final settlement under this contract--preserve and make available to the Government at all reasonable times at the office of the Contractor but without charge to the Government, all his books, records, documents and other evidence bearing on the costs and expenses of the Contractor under this contract and relating to the work terminated hereunder, or, to the extent approved by the Contracting Officer, photographs, microphotographs, or other authentic reproductions thereof.

1B.3.2. Delete Clause 45 in its entirety and substitute the following:

45. PAYMENT OF INTEREST ON CONTRACTORS' CLAIMS (1972 MAY)

(a) If an appeal is filed by the Contractor from a final decision of the Contracting Officer under the DISPUTES clause of this contract, denying a claim arising under the contract, simple interest on the amount of the claim finally determined owed by the Government shall be payable to the Contractor. Such interest shall be at the rate established by the Secretary of the Treasury pursuant to Public Law 92-41; 85 STAT 97 for the Renegotiation Board, from the date the Contractor furnishes to the Contracting Officer his written appeal pursuant to the DISPUTES clause of this contract, to the date of (i) a final judgment by a court of competent jurisdiction, or (ii) mailing to the Contractor of a supplemental agreement for execution either confirming completed negotiations between the parties or carrying out a decision of a Board of Contract Appeals.

(b) Notwithstanding (a) above, (i) interest shall be applied only from the date payment was due, if such date is later than the filing of appeal; and (ii) interest shall not be paid for any period of time that the Contracting Officer determines the Contractor has unduly delayed in pursuing his remedies before a Board of Contract Appeals or a court of competent jurisdiction.

1B.3.3 Delete Clause 49 in its entirety and substitute the following:

49. INTEREST (1972 MAY)

Notwithstanding any other provisions of this contract, unless paid within thirty (30) days, all amounts that become payable by the Contractor to the Government under this contract (net of any applicable tax credit under the Internal Revenue Code) shall bear interest from the date due until paid and shall be subject to adjustments as provided by Part 6 of Appendix E of the Armed Services Procurement Regulation, as in effect on the date of this contract. The interest rate per annum shall be the interest rate in effect which has been established by the Secretary of the Treasury pursuant to Public Law 92-41; 85 STAT 97 for the Renegotiation Board, as of the date the amount becomes due as herein provided. Amounts shall be due on the earliest one of (i) the date fixed pursuant to this contract; (ii) the date of the first written demand for payment, consistent with this contract, including demand consequent upon default termination; (iii) the date of transmittal by the Government to the Contractor of a proposed supplemental agreement to confirm completed negotiations fixing the amount; or (iv) if this contract provides for revision of prices, the date of written notice to the Contractor stating the amount of refund payable in connection with a pricing proposal or in connection with a negotiated pricing agreement not confirmed by contract supplement.

1B.3.4 Delete last sentence of clause 63, PERFORMANCE OF WORK BY CONTRACTOR (1965 JAN).

1B.3.5 Delete Clause 66 in its entirety and insert the following in lieu thereof:

66. VALUE ENGINEERING INCENTIVE (1974 APR)

(a) Application. This clause applies to a Contractor developed and documented Value Engineering Change Proposal (VECP) which:

(i) requires a change to this contract to implement the VECP; and

(ii) reduces the contract price without impairing essential function or characteristics, provided that it is not based solely on a change in deliverable end item quantities.

(b) Documentation. As a minimum, the following information shall be submitted by the contractor with each VECP:

(i) a description of the difference between the existing contract requirement and the proposed change, and the comparative advantages and disadvantages of each; justification where function or characteristics of a work item is being altered; and the effect of the change on the performance of the end item;

(ii) an analysis and itemization of the requirements of the contract which must be changed if the VECP is accepted and a recommendation as to how to make each such change (e.g., a suggested specification revision);

(iii) a separate detailed cost estimate for both the existing contract requirement and the proposed change to provide an estimate of the reduction in costs, if any, that will result from acceptance of the VECP, taking into account the costs of development and implementation by the Contractor (including any amount attributable to subcontracts in accordance with paragraph (f) below;

(iv) a prediction of any effects the proposed change would have on related costs to the Military Department such as Government furnished property costs, and costs of maintenance and operation;

(v) a statement of the time by which a change order adopting the VECP must be issued so as to obtain the maximum cost reduction during the remainder of this contract, noting any effect on the contract completion time or delivery schedule; and

(vi) identification of any previous submission of the VECP, including the dates submitted, the agencies involved, the numbers of the Government contracts involved, and the previous actions by the Government, if known.

(c) Submission. To expedite a determination, VECPs shall be submitted to the Resident Engineer at the worksite with a copy to the Contracting Officer. Proposals shall be processed expeditiously however, the Government shall not be liable for any delay in acting upon any proposal submitted pursuant to this clause. The Contractor has the right to withdraw, in whole or in part, any VECP at any time prior to acceptance by the Government.

(d) Acceptance. The Contracting Officer may accept, in whole or in part, by contract modification any VECP submitted pursuant to this clause. The Contracting Officer may accept the VECP even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a contract modification applies a VECP to this contract, the Contractor shall remain obligated to perform in accordance with this contract. Contract modifications made pursuant to this clause will so state. The decision of the Contracting Officer as to the acceptance of any VECP under this contract shall be final and shall not be subject to the "Disputes" clause of this contract.

(e) Sharing. If a VECP submitted by the Contractor pursuant to this clause is accepted, the contract price shall be adjusted without regard to profit in accordance with the following provisions:

(i) Definition:

(A) Instant contract savings to the Contractor (ICS) are the estimated reduction in the Contractor's cost of performance resulting from the acceptance of the VECP. The proposed cost reduction includes estimated allowable Contractor development and implementation costs (CC). The Contractor's development and implementation costs include any subcontractor development and implementation costs (see (f) below). For purposes of this clause, Contractor development costs are those costs incurred after the Contractor has identified a specific VE project and prior to acceptance and implementation by the Government.

(B) Government Costs (GC) are those DOD costs which directly result from development and implementation of the VECP, such as test and evaluation of the VECP.

(ii) Calculations and Actions. Multiply ICS by 45% and GC by 55%. Add these two results, e.g., (.45 ICS + .55 GC) and subtract from the contract price.

(f) Subcontracts. The Contractor shall include appropriate VE arrangements in any subcontract of $50,000 or greater, and may include such arrangements in contracts of lesser value. To compute any adjustment in the contract price under paragraph (e) above, the Contractor's cost of development and implementation of a VECP which is accepted under this contract shall include any development and implementation costs of a subcontractor, and any VE incentive payments to a subcontractor, which clearly pertain to such VECP. However, no such payment or accrual to a subcontractor will be permitted, either as a part of the Contractor's development or implementation costs or otherwise, to reduce the Government's share.

(g) Data. The Contractor may restrict the Government's right to use any sheet of a VECP or of the supporting data, submitted pursuant to this clause, in accordance with the terms of the following legend if it is marked on such sheet:

"This data furnished pursuant to the Value Engineering Incentive clause of contract _____ shall not be disclosed outside the Government, or duplicated, used or disclosed, in whole or in part, for any purpose other than to evaluate a VECP submitted under said clause. This restriction does not limit the Government's right to use information contained in this data if it is or has been obtained, or is otherwise available, from the Contractor or from another source, without limitations. If such a VECP is accepted by the Government under said contract after the use of this data in such an evaluation, the Government shall have

the right to duplicate, use, and disclose any data reasonably necessary to the full utilization of such VECP as accepted, in any manner and for any purpose whatsoever, and have others so do."

In the event of acceptance of a VECP, the Contractor hereby grants to the Government all rights to use, duplicate or disclose, in whole or in part, in any manner and for any purpose whatsoever, and to have or permit others to do so, any data reasonably necessary to fully utilize such VECP.

1B.3.6. Add the following clause:

97. Environmental Litigation

(a) If the performance of all or any part of the work is suspended, delayed, or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation, as defined below, and such order is based solely on acts or omissions of the U.S. Government, such suspension, delay, or interruption shall be considered as if ordered by the Contracting Officer in the administration of this contract under the terms of the "Suspension of Work" clause of this contract. The period of such suspension, delay, or interruption shall be considered unreasonable, and an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) as provided in that clause, subject to all the provisions thereof.

(b) The term "environmental litigation", as used herein, means a lawsuit alleging that the U.S. Government has not duly considered, either substantively or procedurally, the effect of the work on the environment.

1B.3.7. Add the following clause:

98. MILITARY SECURITY REQUIREMENTS (1971 APR)

(a) The provisions of this clause shall apply to the extent that this contract involves access to information classified "Confidential", "Secret", or "Top Secret".

(b) The Contractor shall comply with (i) the Security Agreement (DD Form 441), including the attached Department of Defense Industrial Security Manual for Safeguarding Classified Information (DOD 5220.22-M); and (ii) any revisions thereto, notice of which has been furnished to the Contractor.

(c) If, subsequent to the date of this contract, the security classification or security requirements under this contract are changed by the Government as provided in this clause and the security costs or time required for delivery under this contract are thereby increased or decreased, the contract price, delivery schedule, or both and any other provisions of the contract that may be affected shall be subject to an equitable adjustment by reason of such increased or decreased costs. Any equitable adjustment shall be accomplished in the same manner as if such changes were directed under the "Changes" clause of this contract.

(d) The Contractor agrees to insert in all subcontracts hereunder which involve access to classified information provisions which shall conform substantially to the language of this clause, including this paragraph (d) but excluding the last sentence of paragraph (c) of this clause.

1B.4 Modifications to NAVFAC 4330/41 (6-72), Labor Standards Provisions (Construction Contract), are as follows:

1B.4.1. Delete Clause 9 in its entirety and substitute the following:

9. LISTING OF EMPLOYMENT OPENINGS (1973 SEP)

(This clause is applicable pursuant to 41 CFR 50-250 if this contract is for $2,500 or more)

(a) The Contractor, to provide special emphasis to the employment of qualified disabled veterans and veterans of the Vietnam era, agrees that all suitable employment openings of the Contractor which exist at the time of the execution of this contract and those which occur during the performance of this contract, including those not generated by this contract and including those occurring at an establishment of the Contractor other than the one wherein the contract is being performed but excluding those of independently operated corporate affiliates, shall be offered for listing at the appropriate office of the State employment service system wherein the opening occurs and to provide reports to such office regarding employment openings and hires as may be required.

(b) Listing of employment openings with the employment service system pursuant to this clause shall be made at least concurrently with the use of any other recruitment service or effort and shall involve the normal obligations which attach to the placing of a bona fide job order, including the acceptance of referrals of veterans and non-veterans. Listing of employment openings does not require the hiring of any particular job applicant or from any particular group of job applicants referred by the employment service system. Nothing contained herein is intended to relieve the Contractor from any requirements in any Executive Order or regulation regarding nondiscrimination in employment.

(c) (1) Reports required shall include, but not be limited to, periodic reports which shall be filed at least quarterly with the appropriate local State employment service office or, where the Contractor has more than one establishment in a State, with the central office of that State employment service. Such reports shall indicate for each establishment (i) the number of individuals who were hired during the reporting period (ii) the number of those hired who were disabled veterans, and (iii) the number of those hired who were non-disabled veterans of the Vietnam era. The Contractor shall maintain copies of the reports submitted until the expiration of one year after final payment under the contract, during which time they shall be made available, upon request, for examination by any authorized representatives of the Contracting Officer or the Secretary of Labor.

(2) Whenever the Contractor becomes contractually bound to the listing provisions of this clause, he shall advise the employment service system in each state wherein he has establishments, of the name and location of each such establishment in the State. As long as the Contractor is contractually bound to these provisions and has so advised

the State employment service system, there is no need to advise the State system of subsequent contracts. The Contractor may advise the State system when he is no longer bound by this contract clause.

(3) If the contract is for less than $10,000 or if it is with a State or local government, the procedures set forth in subparagraphs (1) and (2) of this paragraph (c) are not required.

(d) This clause does not apply to the listing of employment openings which occur and are filled outside the 50 States, the District of Columbia, Guam, Puerto Rico, and the Virgin Islands.

(e) This clause does not apply to openings which the Contractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement. This exclusion does not apply to a particular opening once an employer decides to consider applicants outside of his own organization of employer-union arrangements for that opening.

(f) As used in this clause:

(1) "All suitable employment openings" includes, but is not limited to, openings which occur in the following job categories: production and nonproduction; plant and office; laborers and mechanics; supervisory and nonsupervisory; technical; and executive, administrative, and professional openings which are compensated on a basis of less than $18,000 per year. This term includes full-time employment, temporary employment of more than three (3) days' duration, and part-time employment.

(2) "Appropriate office of the State employment service system" means the local office of the Federal-State national system of public employment offices with assigned responsibility for serving the area of the establishment where the employment opening is to be filled, including the District of Columbia, Guam, Puerto Rico, and the Virgin Islands.

(3) "Openings which the Contractor proposes to fill from within his own organization" means employment openings for which no consideration will be given to persons outside the Contractor's organization (including any affiliates, subsidiaries, and the parent companies), and includes any openings which the Contractor proposes to fill from regularly established "recall" and "rehire" lists.

(4) "Openings which the Contractor proposes to fill from within his own organization or to fill pursuant to a customary and traditional employer-union hiring arrangement" means employment openings for which no consideration will be given to persons outside of a special hiring arrangement, including openings which the Contractor proposes to fill from union hiring halls, which is part of the customary and traditional employment relationship existing between the Contractor and representatives of his employees.

(5) "Disabled veteran" means a person entitled to disability compensation under laws administered by the Veterans Administration for disability rated at thirty percent (30%) or more, or a person whose discharge or release from active duty was for a disability incurred or aggravated in line of duty.

(6) "Veteran of the Vietnam era" means a person who was discharged or released within the 48 months preceding his application for employment covered under this part and who (i) served on active duty for a period of more than 180 days, any part of which occurred after August 5, 1964, and was discharged or released therefrom with other than a dishonorable discharge, or (ii) was discharged or released from active duty for service-connected disability if any part of such duty was performed after August 5, 1964.

(g) The Contractor agrees to place this clause (excluding this paragraph (g)) in any subcontract directly under this contract provided, such subcontract is for $2,500 or more. (Subcontracts for personal services are exempted from this requirement.)

(h) Failure of the Contractor to comply with the requirements of this clause may result in termination for default of the contract concerned.

1B.5 SPECIFICATIONS AND STANDARDS (6-72)

(a) Specifications and standards shall be in accordance with Clause 81 of NAVFAC 4330/5 (6-72). Unless specified otherwise in this specification, the following requirements included in the referenced specifications are modified as follows:

Radio interference suppression--not required.
Fungus control--not required for materials or equipment packaging.
Identification or nameplate--manufacturer's standard acceptable.
Technical publications--manufacturer's standard acceptable.
Production test model--in lieu of tests performed on a production test model, such tests, if required at the manufacturer's plant shall be performed on the equipment being furnished under this specification.

(b) Availability of specifications, standards and descriptions. Specifications, standards and descriptions cited in this solicitation are available as follows:

(1) Unclassified Federal, Military and Other Specifications and Standards, (Excluding Commercial), and Data Item Descriptions. Submit request on DD Form 1425 (Specifications and Standards Requisition) to:

Commanding Officer
U. S. Naval Publications and Forms Center
5801 Tabor Avenue
Philadelphia, Pennsylvania 19120

The Department of Defense Index of Specifications and Standards (DODISS), and the Department of Defense Index of Data Item Descriptions (TD-3) may be ordered on the DD Form 1425. When requesting a specification or standard, the request shall indicate the title, number, date and any applicable amendment thereto by number and date. When requesting a data item description, the request shall cite the applicable data

item number set forth in the solicitation. When DD form 1425 is not available, the request may be submitted in letter form, giving the same information as listed above, and the solicitation or contract number involved. Such requests may also be made to the activity by telegram or telephone (Area Code 215, 697-3321), in case of urgency.

(2) Commercial Specifications, standards and descriptions are not available from Government sources. They may be obtained from the publishers.

(3) Departmental Publications referenced in this contract are not available from the Naval Forms and Publication Center. These publications are preceeded by the terms "NAVFAC", "TB or TM", and "AIR FORCE, AFM, AFP or AFR". When required, "NAVFAC" Publications may be purchased at nominal cost from the Naval Publications and Printing Office, Navy Yard, Washington, D.C. Emergency requests require endorsement by the Contracting Officer and should be addressed to the office issuing this specification. When received, the request will be endorsed and forwarded to appropriate sources for shipment to the contractor.

1B.6 Performance and Payment Bonds executed on Standard Form 25 and 25-A respectively, will be required. The Performance Bond shall specifically provide coverage for taxes imposed by the United States which are collected, deducted, or withheld from wages paid by the Contractor in carrying out the contract with respect to which such bond is furnished.

1B.7 Definition. Where "Bureau", "Bureau of Yards and Docks", "NAVFAC", or words or phrases of similar import appear in this specification, on the drawings, or in documents referenced by the specification or the drawings, it shall be understood to mean "the Naval Facilities Engineering Command".

1B.8 Electromagnetic Interference Suppression. This paragraph shall apply only if electromagnetic interference suppression is specified in the Section entitled, "General Paragraphs".

1B.8.1 Electric motors shall comply with standard MIL-STD-461 relative to radiated and conducted electromagnetic interference. Test for electromagnetic interference will not be required for motors that are identical physically and electrically to those that have previously met the requirements of standard MIL-STD-461. Electromagnetic interference suppression and tests will not be required for electric motors without commutation or slip-rings having not more than one starting contact and operated at 3600 revolutions per minute or less.

1B.8.2 Contractor's construction equipment. Equipment used by the Contractor shall comply with Specification MIL-I-16165 for internal combustion engines and Standard MIL-STD-461 for other devices capable of producing radiated or conducted interference.

1B.8.3 Tests for electromagnetic interference suppression shall be conducted on the equipment described hereinbefore. All testing equipment; instruments; personnel for making the tests; the test location, which shall be reasonably free from radiated and conducted interference; and other necessary facilities shall be furnished by the Contractor. Tests shall be in accordance with Standards MIL-STD-461 and MIL-STD-462.

1B.9 Employment of Ocean-going Vessels (Nov. 1963).

(a) If ocean transportation is required after the date of award of this contract to bring any supplies, materials or equipment to the construction site from the United States either for use in performance of or for incorporation in the work called for by this contract, United States-flag vessels shall be employed in such transportation to the extent such vessels are available at fair and reasonable rates for United States-flag vessels. The contractor shall not make any shipment exceeding ten measurement tons (400 cubic feet) by other than a United States-flag vessel without notifying the contracting officer that United States-flag vessels are not available at fair and reasonable rates for such vessels and obtaining his permission to ship in other vessels. If such permission is granted, the contract price shall be equitably adjusted to reflect the difference in cost.

(b) The contractor shall include the substance of this clause, including this paragraph (b), in each subcontract or purchase order hereinunder which may involve the ocean transportation of construction supplies, material or equipment from the United States.

1B.10 Certificate of current cost or pricing data. (This paragraph is to be used when certification of cost or pricing data is required in accordance with ASPR 3-807.3). The Contractor shall submit to the Officer in Charge of Construction a certificate in the form set forth below as soon as practicable after agreement is reached on the contract price:

CERTIFICATE OF CURRENT COST OR PRICING DATA

This is to certify that, to the best of my knowledge and belief cost or pricing data as defined in ASPR 3-807.3(h) submitted, either actually or by specific identification in writing (see ASPR 3-807.3(i), to the Contracting Officer or his representative in support of_____ _____* are accurate, complete, and current as of _____**.

(day) (month) (year)

Firm_____

Name_____

Title_____

_____***

(Date of Execution)

---

*Describe the proposal, quotation, request for price adjustment or other submission involved, giving appropriate identifying number (e.g., RFP No._____).

**This date shall be the date when the price negotiations were concluded and the contract price was agreed to. The responsibility of the contractor is not limited by the personal knowledge of the contractor's negotiator if the contractor had information reasonably available (see ASPR 3-807.5(a)) at the time of agreement, showing that the negotiated price is not based on accurate, complete, and current data.

***This date should be as close as practicable to the date when the price negotiations were concluded and the contract price was agreed to.

1B.11 Contracts for work in the State of Texas.

All bidders are advised that on work performed inside the five foot line of building construction, the building construction wage schedule shall apply. Outside the five foot line, prevailing area practice will determine which schedule shall be applicable. The provisions of this sub-paragraph (1B.9) shall be applicable only when multiple wage schedules are attached hereto.

1B.12 Clause 26 of NAVFAC 4330/5 (6-72) is amended by adding the following paragraph for work accomplished in the State of Texas:

(h) TEXAS LIMITED SALES, EXCISE AND USE TAX.

(1) This contract is a construction contract which contains separate amounts applicable to the performance of the services and furnishing of materials as defined in Article 20.01 (T) (2), Title 122A, Revised Civil Statutes of Texas.

(2) The Contractor has or shall obtain a Limited Sales, Excise or Use Tax Permit as provided by Texas law.

(3) If the Contractor awards any subcontract of $10,000 or more under this contract, such subcontract (or subcontracts) shall contain separate amounts applicable to the performance of services and the furnishing of materials.

(4) Notwithstanding any other provisions of this contract, the contract price does not include any amount for Texas Limited Sales, Excise of Use Tax on materials to be incorporated by the contractor (or subcontractor whose subcontract is prepared in accordance with (3) above into the structure or improvement to real estate. The Government agrees to furnish to the contractor appropriate tax exemption certificate or certificates.

1B.12.1 The low bidder shall provide a statement, within five calendar days from the date of bid opening, setting forth the dollar amount of materials to be incorporated into the structure(s), or improvement(s) upon real estate included in his bid for each bid item. The price for materials shall not be less than the actual cost of such materials.

1B.13 Licenses and Permits for Work, Structures and Discharges Involving Navigable Waters:

(a) Attention is invited to Clause 12 of Standard Form 23A which places responsibility on the contractor to obtain all necessary licenses and permits and to comply with all applicable Federal, State and Municipal laws, codes and regulations in connection with prosecution of work under this contract. Except as provided in (c) below, and without limited the generality of the said Clause 12, the requirement of the latter shall specifically include the responsibility of the contractor to obtain any and all licenses and permits for work and structures in navigable waters and for the discharge directly or by way of storm drains or other outfalls of any pollutants or deposits into streams, lakes and other navigable waters. Also, without limiting the generality of said Clause 12, the requirement therein contained for

compliance with all Federal, State and Municipal laws, codes and regulations shall specifically include such laws, codes and regulations governing work and structures in navigable waters and the matter of water pollution.

(b) During the performance of work under this contract, the contractor shall notify the Officer in Charge of Construction not less than sixty (60) calendar days in advance of any and all work involving navigable waters of discharges or deposits that may reasonably be expected to enter streams, lakes or other navigable waters.

(c) To the extent it is noted elsewhere in the specifications, the OICC will obtain certain of the necessary licenses and permits for work to be performed in, over or across navigable waters and for discharges or deposits into navigable waters. In such cases, the contractor shall be relieved of the responsibility under Clause 12 and (a) above for obtaining these specific licenses or permits. Provided, however, a time extension may be granted but no adjustment in contract price shall be made for any suspension, delay or interruption of work resulting from the failure of any Federal, State or Local Governmental body to issue licenses or permits in a timely manner.

(d) The Contractor shall, without additional expense to the Government bear, all costs incurred in connection with, or as a result of, compliance with Federal, State and Municipal laws, codes and regulations, and compliance with the terms and conditions of any and all licenses and permits obtained under Clause 12 and this clause.

1B.14 Preference for Domestic Specialty Metals (1972 Nov)

(a) The contractor agrees that any specialty metals (as hereinafter defined) furnished by it or purchased by it for direct incorporation in any article delivered to the Government under this contract shall have been melted in the United States, its possessions, or Puerto Rico, provided that this clause shall have no effect to the extent that the Secretary or his designee determines, as to any such articles, that a satisfactory quality and sufficient quantity cannot be procured as and when needed at United States market prices.

(b) For the purpose of this clause, the term "specialty metals" means:

(i) steels, where the maximum alloy content exceeds one or more of the following limited: manganese, 1.65 percent; silicon, 0.60 percent; or copper, 0.60 percent or which contains more than 0.25 percent of any of the following elements; aluminum, chromium, cobalt, columbium, molybdenum, nickel, titanium, tungsten, or vanadium;

(ii) metal alloys consisting of nickel, iron-nickel and cobalt base alloys containing a total of other alloying metals (except iron) in excess of 10 percent;

(iii) titanium and titanium alloy; or

(iv) zirconium and zirconium base alloys.

Section 1C. Bids.

1C.1 Instructions to bidders. U. S. Standard Form 22 and NAVFAC 4330/37 (6-72) shall be observed in the preparation of bids. Envelopes containing bids must be sealed, marked, and addressed as follows:

| BID FOR: | TO: |
|---|---|
| Construct De-Drumming Bldg. | Asst. Officer in Charge of Construction<br>Building 1, Room 210 |
| Specification 06-75-5105 | Naval Construction Battalion Center<br>Gulfport, Mississippi 39501 |

1C.2 Bid guaranty will be required as stipulated in Standard Form 22 and NAVFAC 4330/37 (6-72).

1C.3 Item of bids. Bids shall be submitted, IN DUPLICATE, on U. S. Standard Form 21, Bid Form, and in accordance with U. S. Standard Form 22 and NAVFAC 4330/37 (6-72) upon the following item:

Bid Item 1: Price for the entire work, complete in accordance with the drawing and specification.

1C.4 Telegraphic modifications of bids in accordance with Standard Form 22 may be made. Two signed copies of the telegram in a sealed envelope marked "Copies of telegraphic modification for Bid for Construct De-Drumming Building, Specification No. 06-75-5105", should be forwarded immediately to the office to which the written bids were submitted.

1C.4.1 Paragraphs 7 and 8 of Standard Form 22 (October 1969 Edition), Instructions to Bidders, are deleted and the following substituted therefor:

LATE BIDS, MODIFICATIONS OF BIDS OR WITHDRAWAL OF BIDS (1973 SEP)

(a) Any bid received at the office designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and either:

(i) it was sent by registered or certified mail not later than the fifth calendar day prior to the date specified for the receipt of bids (e.g., a bid submitted in response to a solicitation requiring receipt of bids by the 20th of the month must have been mailed by the 15th or earlier); or,

(ii) it was sent by mail (or telegram if authorized) and it is determined by the Government that the late receipt was due solely to mishandling by the Government after receipt at the Government installation.

(b) Any modification or withdrawal of bid is subject to the same conditions as in a. above. A bid may also be withdrawn in person by a bidder or his authorized representative, provided his identity is made known and he signs a receipt for the bid, but only if the withdrawal is made prior to the exact time set for receipt of bids.

(c) The only acceptable evidence to establish:

(i) The date of mailing of a late bid, modification or withdrawal sent either by registered or certified mail is the U. S. Postal Service postmark on the wrapper or on the original receipt from the U. S. Postal Service. If neither postmark shows a legible date, the bid, modification or withdrawal shall be deemed to have been mailed late. (The term "postmark" means a printed, stamped, or otherwise placed impression that is readily identifiable without further action as having been supplied and affixed on the date of mailing by employees of the U. S. Postal Service.)

(ii) The time of receipt at the Government installation is the time/date stamp of such installation on the bid wrapper or other documentary evidence of receipt maintained by the installation.

(d) Notwithstanding the above, a late modification of an otherwise successful bid which makes its terms more favorable to the Government will be considered at any time it is received and may be accepted.

**1C.5 <u>Reference to amendment(s)</u>. Each bidder shall refer in his bid to all amendments to this specification; failure to do so may constitute an informality in the bid.**

Naval Construction Battalion Center
Gulfport, Mississippi
9 December 1974

**R. B. BELL, JR., LCDR, CEC, USN**
**Assistant Officer in Charge**
**of Construction**

DIVISION 2. SITE WORK

Section 2A. Earthwork.

2A.1 Applicable documents. See Clause 81 of NAVFAC 4330/5 (Rev. 6/72). The following specifications and standards of the issues referred to in this section and listed below, including the addenda, amendments, and errata listed, form a part of this specification to the extent required by the references thereto.

2A.1.1 American Society for Testing and Materials (ASTM) 1916 Race Street, Philadelphia, Pennsylvania 19103:

| | |
|---|---|
| D1556-64 (1968) | Density of soil in place by the sand-cone method. |
| D1557-70 | Moisture-density relations of soils using 10-lb. rammer and 18-inch drop. |

2A.2 Excavations.

2A.2.1 Removal. The soil cement shall be removed completely and deposited in the designated area. Excavation for slab shall be along straight lines. Care shall be exercised during removal to prevent damage to the existing stablized soil cement that is to remain.

2A.2.2 Excavations, general. Excavations shall be of dimensions and depths as indicated and as necessary to accommodate the work. Excavations shall be kept free from water while construction therein is in progress, except as otherwise specified. All excavated earth shall be spoiled in area designated on contract drawing. In the event it is necessary to remove unsuitable material to a depth greater than specified, the Contracting Officer shall be notified and an adjustment in the contract price will be made in accordance with the contract. Excavations carried below the depths indicated, without specific directions shall, except as otherwise specified, be refilled to the proper grade with bank run gravel as specified hereinafter and compacted thoroughly. All additional work of this nature shall be at the contractor's expense.

2A.2.3 Excavations for structures. In excavations for footings carried below the depths indicated without specific directions from the Contracting Officer, the concrete shall be extended to the bottom of the excavations; all additional work of this nature shall be at the contractor's expense.

2A.2.4 Subgrade proportion. All roots and other organic material shall be removed to minimum depth of four inches. Surplus material shall be removed from the Station. The subgrade shall then be compacted with a vibratory compactor to 95% maximum density.

2A.3 Backfill against new concrete work shall be done only when directed by the Officer in Charge of Construction. The backfill material shall be approved by the Officer in Charge of Construction. The backfill shall be placed to approximately 3 inches of the top of the concrete and shall be sloped to drain water away from the building.

2A.4 Tests shall be made by the Government in accordance with the specified American Society for Testing and Materials standard.

2A.4.1 Density tests shall be in accordance with Method D of Standard D1557-70.

2A.4.2 In-place density tests shall be in accordance with Standard D1556-64.

DIVISION 3. CONCRETE

Section 3A. Concrete construction.

3A.1 Applicable documents. See Clause 81 of NAVFAC (REV 6/72). The following specifications and standards of the issues referred to in this section and listed below, including the addenda, amendments, and errata listed, form a part of this specification to the extent required by the references thereto.

3A.1.1 Federal specifications.

| | |
|---|---|
| SS-C-192g(3) | Cement, portland. |
| SS-S-156 | Sealer; cold-application emulsion type, for joints in concrete. |

3A.1.2 Military specifications.

| | |
|---|---|
| MIL-B-19235A | Bonding compound, concrete. |

3A.1.3 American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103.

| | |
|---|---|
| A185-69 | Welded steel wire fabric for concrete reinforcement. |
| A617-68 | Axle steel bars for concrete reinforcement. |
| C33-69 | Concrete aggregates. |
| C260-69 | Air entrained admixtures for concrete. |
| C309-58(1966) | Liquid membrane-forming compounds for curing concrete. |
| D1751-65 | Preformed expansion joint filler for concrete paving and structural construction. |

3A.2 Materials.

3A.2.1 Cement shall be Type III conforming to specification SS-C-192g(2).

3A.2.2 Water for mixing shall be potable.

3A.2.3 Fine aggregate shall be sand conforming to ASTM specification C33-69.

3A.2.4 Coarse aggregate shall conform to ASTM specification C33-69. Maximum size of aggregate shall be 1 inch.

3A.2.5 Air-entraining admixtures shall conform to ASTM specification C260-69.

3A.2.6 Concrete shall be air-entrained and shall be apportioned by weighing as follows:

| Class of concrete (figures denote size of coarse aggregate in inches) | Estimated 7 day compressive strength, (pounds per square inch) | Cement factor bags (94 pounds) of cement per cubic yard of concrete, freshly mixed | Maximum water per bay (94 pounds) of cement (gallons) | Fine aggregate range in percent of total aggregate by weight | Approximate weights of saturated surface-dry aggregates per bag (94 pounds) of cement | |
|---|---|---|---|---|---|---|
| | | | | | Fine aggregate (lbs.) | Coarse Aggregate (lbs.) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| E-1 | 3,000 | 6.30 | 5.25 | 33-41 | 174 | 297 |

3A.2.7 Reinforcement. Welded steel wire fabric shall be in accordance with ASTM specification A185-69. Reinforcement shall be in accordance with ASTM A617-68.

3A.2.8 Expansion joint filler shall be preformed filler conforming to ASTM D1751-65.

3A.2.9 Joint sealing material shall conform to specification SS-S-156.

3A.2.10 Forms shall be plywood or steel. Plywood forms shall be not less than 5/8 inch thick concrete form plywood. Steel forms shall be free from irregularities, dents, and sags.

3A.2.11 Curing compound shall be liquid membrane-forming compound conforming to Type I of ASTM specification C309-58.

3A.2.12 Polyethylene sheeting shall be white and shall have a nominal thickness of .004 inches.

3A.2.13 Bonding compound shall conform to specification MIL-B-19235A.

3A.3 Construction.

3A.3.1 Cast-in-place concrete shall be ready-mixed concrete delivered and mixed by truck from an extablished operating central plant. Mixers shall be charged with a ribbon fed mixture of aggregates and cement or, in the absence

of facilities for ribbon feeding, the aggregates shall be charged before the cement. When mixing is begun during or immediately after charging, a portion of the mixing water not in excess of what is required to produce the minimum acceptable slump, shall be added ahead of, or with, the other ingredients. Total mixing shall be for not less than 50 nor more than 100 revolutions of the drum, the slump shall be tested and additional water shall be added if necessary to produce the required slump; if additional water is necessary, mixing shall be continued for at least 20 revolutions after the water is added. Mixing speed shall be not more than 16 rpm for open-top mixers. Additional mixing, if any, shall be at the speed designated by the manufacturer of the equipment as agitating speed. Each batch of concrete delivered at the job site shall be accompanied by a time slip issued at the batching plant, bearing the time of departure therefrom and the signature of the inspector.

3A.3.1.1 Concrete topping. Where new concrete is placed over existing concrete, the existing concrete shall be removed to expose sound aggregate. All dust, dirt and grease shall be removed and a bonding adhesive shall be applied before placing the new concrete.

3A.3.2 Forms.

3A.3.2.1 General requirements. All concrete shall be formed unless otherwise specified. Forms shall be true to line and grade within the allowable tolerances specified for finishes and shall be mortar-tight. Snap ties shall be used for all form work. All exposed joints, edges, and external corners shall be rounded 1/2 inch unless specified otherwise in project specifications.

3A.3.2.2 Coating. Before placing the concrete, the contact surfaces of forms shall be coated with nonstaining mineral oil or an approved non-staining form coating compound. All excess coating shall be removed by wiping with cloths. Reused forms shall have their contact surfaces cleaned thoroughly; those which may have been coated shall have an additional application of the coating.

3A.3.3 Placing reinforcement.

3A.3.3.1 General requirements. All reinforcement bars, hanger bars, wire fabric, and other reinforcing materials shall be provided as indicated on the project drawings or required by the project specification, together with all necessary wire ties, chairs, spacers, and other necessary devices to install and secure the reinforcing. All reinforcement, when placed, shall be free from loose flaky rust and scale, oil, grease, clay and other coatings and foreign substances that would reduce or destroy the bond. Reinforcement which has bends not shown on project drawings or approved shop drawings, or which is reduced in section by rusting, shall not be used.

3A.3.3.2 Placing. Reinforcements shall be spaced properly and supported by concrete or metal chairs. Proper inspection shall be conducted to assure that no metal reinforcement, chairs, or supports are exposed after concrete is in place.

3A.3.4 Conveying and placing concrete.

3A.3.4.1 Conveying of concrete. Concrete shall be conveyed from the mixer to the forms as rapidly as practicable by approved methods which will not cause segregation or loss of ingredients. It shall be deposited as nearly as practicable in its final position in the forms. At any point in conveying, the free vertical drop of the concrete shall not exceed 3 feet. Chuting will be permitted only where the concrete is deposited into a hopper before it is placed in the forms. Conveying equipment shall be cleaned thoroughly before each run. All concrete shall be deposited as soon as practicable after the forms and the reinforcement have been inspected and approved. Concrete which has segregated in conveying shall be removed and disposed of as directed.

3A.3.4.2 Placing. Concrete shall be placed before initial set. All concrete equipment and methods shall be subject to approval by the Officer in Charge of Construction. Concrete placement will not be permitted when weather conditions prevent proper placement and consolidation. Before placing concrete on porous subgrades, they shall be dampened as directed. Forms shall be cleansed of dirt, construction debris, snow, and ice. Concrete shall be worked around reinforcement and embedded fixtures and into corners and angles of the forms, care being taken to avoid overworking which may result in segregation. Water which accumulates on the surface of the concrete during placing shall be removed by absorption with porous materials in a manner that prevents removal of cement.

3A.3.4.3 Vibration. All concrete shall be compacted with high frequency, internal, mechanical vibrating equipment supplemented by hand spading and tamping. Vibrators shall be designed to operate with vibratory element submerged in the concrete, and shall have a frequency of not less than 6,000 impulses per minute when submerged. The vibrating equipment shall be at all times adequate in number of units and power of each unit to consolidate the concrete properly. Vibration of forms and reinforcement shall not be employed except when authorized specifically. Vibrators shall not be used to transport the concrete in the forms. Vibration shall be discontinued when the concrete has been compacted thoroughly and ceases to decrease in volume.

3A.3.5 Curing concrete. The entire exposed surface shall be wetted thoroughly with a fine spray of water and then covered with polyethylene sheeting. Sheets shall be laid directly on the concrete surface and overlapped 12 inches when a continuous sheet is not used. The curing medium shall be not less than 18 inches wider than the concrete surface to be cured, and shall be securely weighted down by placing a bank of moist earth on the edges just outside the forms and over the transverse laps to form closed joints. Sheets shall be satisfactorily repaired or replaced if torn or otherwise damaged during curing. The curing medium shall remain on the concrete surface to be cured for not less than 7 days.

3A.3.6 Removal of forms and protection. Forms shall be removed in a manner which will prevent damage to the concrete. Forms shall not be removed without approval of the Officer in Charge of Construction.

3A.3.7 Surface finishes.

3A.3.7.1 Against forms. All fins and other projections shall be removed carefully, and all abrupt irregularities shall be leveled. Surface pits having a dimension greater than 1/8 inch shall be filled with cement mortar.

3A.3.7.2 Not against forms. Surface finishes not against forms shall have a steel trowel.

3A.4 Inspection. Concrete shall be placed only in the presence of a Government Inspector and ample notice shall be given the Officer in Charge of Construction before placing the concrete.

3A.5 Tests. Certification shall be required for all concrete provided, certifying that the concrete conforms to this specification. Samples and/or materials for inspection and test shall be furnished by the contractor at no additional cost to the Government.

DIVISION 5. METALS

Section 5A. Miscellaneous Metals.

5A.1 Applicable documents. See Clause 81 of NAVFAC 4330/5 (REV. 6/72). The following specifications and standards of the issues referred to in this section and listed below, including the addenda, amendments, and errata listed, form a part of this specification to the extent required by the references thereto.

5A.1.1 Federal specification.

| | |
|---|---|
| WW-P-404D | Pipe, steel (seamless and welded, black and zinc coated (galvanized). |

5A.1.2 Military specification.

| | |
|---|---|
| MIL-Z-17871A | Zinc coating (hot-dip galvanizing). |

5A.1.3 American Society for Testing Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103.

| | |
|---|---|
| A36-69 | Structural steel. |

5A.1.4 American Welding Society (AWS), 2501 Northwest 7th Street, Miami, Florida 33125.

| | |
|---|---|
| D1.0-69 | Code for welding in building construction. |

5A.2 Materials.

5A.2.1 Structural steel. The indicated angles and plates shall conform to ASTM specification A36-69.

5A.3 Construction.

5A.3.1 Welding shall be in accordance with AWS Standard D1.0-69.

5A.3.2 Angles shall be fabricated and installed as indicated.

DIVISION 13. SPECIAL CONSTRUCTION

Section 13A. Prefabricated metal structure.

13A.1 Applicable documents. See Clause 81 of NAVFAC 4330/5 (REV 6/72). The following specifications and standards of the issues referred to in this section and listed below, including the addenda, amendments, and errata listed, form a part of this specification to the extent required by the references thereto.

13A.1.1 Federal specifications.

| | |
|---|---|
| QQ-S-775D | Steel sheets, carbon, zinc coated. |
| TT-P-645 | Primer, paint, zinc-chromate, alkyd type. |

13A.1.2 Military specifications.

| | |
|---|---|
| MIL-C-18969B | Calking compounds, metal seam and wood seam. |
| MIL-P-6883A | Paint, blended-type, coal-tar-pitch base, bituminous. |
| MIL-P-15328C#1 | Primer (wash) pretreatment, blue. |

13A.1.3 American Institute of Steel Construction (AISC), 101 Park Avenue, New York, New York 10017.

Manual of Steel Construction (7th edition).

13A.1.4 American Iron and Steel Institute (AISI), 150 East 42nd Street, New York, New York 11017.

Light gage cold-formed steel design manual.

13A.1.5 Metal Building Manufacturer's Association (MBMA), 2130 Keith Building, Cleveland, Ohio 44115.

Recommended design practices manual.

13A.1.6 American Society for Testing and Materials (ASTM), 1916 Race Street, Phildelphia, Pennsylvania 19103.

| | |
|---|---|
| E84-70 | Surface burning characteristics Building materials. |

13A.2 Requirements.

13A.2.1 General. The prefabricated metal structure consisting of roof and frame system shall be the product of a manufacturer who is regularly engaged in the manufacture of prefabricated metal buildings or framing systems. The structure shall have clear spans and shall be the rigid frame type.

13A.2.2 Assembly and disassembly. The size of the prefabricated components and the necessary field connections required for erection shall be such as will permit easy assembly and disassembly by means of the roof manufacturer's standard fasteners and construction tools. Components of the metal structure shall be fabricated in such manner that once assembled, they may be disassembled, repackaged, and reassembled with a minimum amount of labor and maximum salvageability. A minimum of five percent excess over the required amount of nuts, bolts, screws, washers; and other required fasteners shall be provided with the structure.

13A.2.3 Storage and protection. Prefabricated components, sheets, panels, and other manufactured items shall be delivered, stored, handled, and erected in such a manner that they will not be damaged or deformed. Materials stored on the site before erection shall be stacked on platforms or pallets and covered with tarpaulins or other suitable weather-tight covering. All metal sheets or panels shall be stored so that water which might have accumulated during transit or storage will drain off; the sheets or panels shall not be stored in contact with materials that might cause staining. Upon arrival on the job site, the sheets or panels shall be inspected; if found wet, the moisture shall be removed and the sheets or panels shall be re-stacked and protected until used.

13A.2.4 Design requirements. The design of the prefabricated metal structure shall be in accordance with the Metal Building Manufacturers Associations' "Recommended Design Practices Manual." The contractor shall submit for approval the engineering design calculations and stress diagrams of all structural or load-bearing components. The vertical live loads, in addition to the applicable dead loads, shall be not less than 40 psf, applied on the horizontal projection of the roof structure. The wind load on the roof shall be 30 psf proportioned and applied as horizontal and uplift velocity pressures. The maximum deflection in roofing or roof panels shall not exceed 1/180th of the span.

13A.3 Materials and components.

13A.3.1 Steel framework shall be in accordance with the Manual of Steel Construction of the American Institute of Steel Construction. Steel framing less than 3/16 inch thick shall be in accordance with the American Iron and Steel Institute's Light gage cold-formed steel design manual. Prefabricated sections of the framework shall be designed to assure easy packing, shipping, erection, dismantling, repacking, and re-erection, and shall be assembled in a manner which will assure the maximum strength and rigidity.

13A.3.2 Roofing panels shall be zinc-coated steel conforming to the requirements of specification QQ-S-775D, Class D and shall have a factory applied, baked-on enamel finish of approved color. The panels shall be either (1) the deep corrugated type, or (2) the panel type. The deep corrugated type shall have corrugations, V-beams, ribs, channels, or other similar configurations not less than 1 inch deep spaced not to exceed 12 inches on centers or not less than 3/4 inch deep spaced not to exceed 6 inches on centers. The panel type

shall have either (1) interlocking ribs not less than 3 inches deep spaced not greater than 16 inches apart, or (2) configurations not less than 1-1/2 inches deep spaced not greater than 12 inches apart.

13A.3.3 Fasteners for securing sheets. Fasteners for attachment to structural supports and fasteners for attachment to adjoining sheet shall be as approved, and in accordance with the manufacturer's recommendation. Unless specified otherwise herein, the fasteners shall be either self-tapping screws, bolts, and nuts, self-locking rivets, self-locking bolts, end-welded studs, bolted or riveted studs, or step rivets held by aluminum straps. Other types of fasteners of the roof manufacturer's standard type may be used if prior approval is obtained. The fastening system shall be designed to withstand the loads specified hereinbefore. Fasteners shall be stainless steel or cadmium-plated steel. All fasteners, with the exception of those having integral Hex washer head shall have polymerized chloroprene washers.

13A.3.4 Sheet metal accessories. Zinc-coated steel accessories shall be provided. Zinc-coating for all sheet steel accessories shall conform to specification QQ-S-775D, Class d.

13A.3.4.1 Caps. Ridge caps, miscellaneous flashings, and miscellaneous sheet metal accessories, unless specified otherwise, shall be formed from the same material and gage as the roof covering. Miscellaneous framing members may be standard structural steel shapes, or they may be formed from steel not lighter than 16 gage.

13A.3.4.2 Gutters shall be provided on both sides of the roof. The gutters shall be compatible with the building and a minimum of 5" high. They shall be provided complete with mitered corners, end pieces, and any special pieces that may be required. The gutters shall be formed in sections not less than 8 feet in length. The ends of each length shall be joined with riveted and soldered joints or riveted and sealed joints, except that expansion-type slip joints, shall be provided at the center of the runs, unless specified otherwise. Gutters shall be installed below the slope line of roof, so that snow and ice can slide clear. They shall be sturdily supported on hangers of an approved type, spaced not to exceed 36 inches on centers. Hangers and fastenings shall be constructed of metal compatible with the gutters.

13A.3.4.3 Downspouts shall be provided complete including elbows and offsets. End joints shall telescope not less than 1-1/2 inches, and longitudinal joints shall be locked. Gutter outlets shall be provided with copper, bronze, or aluminum wire ball strainers of a standard type. Downspouts shall be fastened to the structure at top, bottom, and mid-point with approved type leader straps. Straps shall be formed from metal compatible with the downspouts.

13A.3.5 Miscellaneous accessories.

13A.3.5.1 Joint sealing material. All side and end laps shall be sealed with Type II, Class B ribbon form sealant equal to or exceeding the performance characteristics of specification MIL-C-18969B. Minimum sizes of ribbons shall be 3/32 inch by 1/2 inch for rectangular areas and 1/4 inch diameter for circular areas. Bituminous type sealing materials shall not be used with painted sheets and panels.

13A.3.5.2 Shop painting. All ferrous metal work, except zinc-coated work and factory applied finishes shall be (1) cleaned of all dirt, rust, scale, loose particles, grease, oil, and other deleterious substances, (2) given a coat of pretreatment primer conforming to specification MIL-P-15328 applied to a dry film thickness of 0.3 to 0.5 mil or chemically treated with a phosphoric type cleaner, and (3) then be given one coat of an approved rust-inhibiting primer paint of the type standard with the metal building manufacturer.

13A.3.5.3 Dissimilar materials. Where aluminum surfaces come in contact with ferrous metal or other incompatible metals, the aluminum surfaces shall be kept from direct contact by one of the following methods.

(a) Painting the incompatible metal with a coating of heavy-bodied bituminous paint conforming to specification MIL-P-6883;

(b) Painting the incompatible metal with a prime coat of zinc-chromate primer conforming to specification TT-P-645, followed by one or two coats of aluminum metal-and-masonry paint, or other suitable protective coating, excluding those containing lead pigmentation;

(c) An approved nonabsorptive gasket;

(d) An approved calking placed between the aluminum and the incompatible metal.

If drainage from incompatible metal passes over aluminum, the incompatible metal shall be painted by method (a) or method(b). Aluminum surfaces in contact with concrete or masonry materials shall be painted by method (a). Green or wet wood, or wood treated with incompatible wood preservatives, shall be painted by method (a) or shall be given two coats of aluminum paint.

13A.4 Erection. Defects or errors in the fabrication of roof components shall be corrected by the contractor in an approved manner. Defects or errors in fabrication of components, which cannot be corrected in an approved manner, shall be replaced by nondefective members at no additional cost to the Government. All framing elements shall be accurately spaced to assure the proper fitting of prefabricated roof coverings.

13A.4.1 Rigid frames and column bases shall be set accurately, using a non-shrinking grouting mortar to obtain uniform bearing on the concrete and and to maintain a level base line elevation. Grouting mortar shall be a mixture of one part of blended portland cement, to two parts of well graded fine aggregate, and enough water to provide a maximum water cement ratio of 0.50. The blended portland cement shall be a mixture of cement with 1/4 ounce of aluminum powder to each sack of cement. Surfaces to receive the mortar shall be clean and moistened thoroughly immediately before placement of mortar. Exposed surfaces of mortar shall be water cured with wet burlap for 7 days.

13A.4.2 Roof construction. All roofing sheets or panels shall be applied with the corrugations, ribs, channels, or other configurations parallel to the slope of the roof. All side laps shall be laid away from the prevailing wind, and all side and end laps shall be sealed with the joint sealing materials specified hereinbefore. The roof shall be flashed and sealed at the ridge. The placement of flashing, and sealing material shall be accomplished in an approved manner that will assure complete weather-tightness. The use of various types of roof covering in relation to roof slopes shall be as follows:

Minimum End Laps (Inches)

| Deep | Panel |
|---|---|
| 10 | 8 |

Minimum side laps for roof covering shall be as follows:

| Roof covering | Minimum side laps |
|---|---|
| Deep corrugated type | One full corrugation or configuration |
| Panel type | One full configuration or interlocking rib |

13A.5 Quality assurance provisions.

13A.5.1 Samples. One sample of each proposed type of roofing material, fastener, hardware item, and miscellaneous accessory shall be submitted and approved.

13A.5.2 Shop drawings, erection diagrams, and/or instruction manuals including details of foundation layout, structural framework, structural connections, roofing, fastening system, sealing of joints, and other details or diagrams as necessary to augment erection instructions shall be supplied. Shop drawings shall be submitted and approved before prefabricated components are delivered to the site. Erection diagrams and/or instruction manuals will not be required for roof erected by the contractor.

DIVISION 15. MECHANICAL

Section 15A. Oil Handling System.

15A.1 Scope. The work includes providing material and labor to install a Herbicide Distribution System, and a diesel oil distributing system as indicated on the contract drawings, complete and ready for use.

15A.1.1 Application documents. The following publications of the issues listed below but referred to thereafter by basic designation only, form a part of this specification to the extent required by references thereto.

15A.1.2 Federal specifications.

| | |
|---|---|
| WW-V-51D & Int AM 1 | Valve, bronze; angle, check, and globe, 125-, 150-, and 200- pound, screwed, or flanged for solder (for land use). |
| WW-V-54C & Int AM 2 | Valve, gate, bronze (125, 150, and 200 pound, screwed, flanged, soldered, for land use). |
| WW-V-58B | Valve, gate, cast iron; 125 and 250 pound, screwed and flanged (for land use). |
| WW-H-171D | Hangers and supports, pipe. |
| GG-T-321C & AM 1 | Thermometers, self-indicating, liquid-in glass, for machinery and piping systems. |
| WW-P-406 D | Pipe, steel, seamless and welded (for ordinary use). |
| WW-P-521F | Pipe fittings, flange fittings and flanges, ferrous and steel, (screwed and butt-welded), 150 pound. |
| WW-U-531C | Unions, pipe, steel or malleable iron, threaded connection. |

15A.1.3 Military specifications.

| | |
|---|---|
| MIL-A-907D | Antiseize compound, high temperature. |
| MIL-T-5544B | Thread compound, antisieze, graphite-petrolatum. |
| MIL-P-15147C & AM 1 & Int AM 3 (YD) | Primer and enamel, coal tar. |
| MIL-S-16293F | Strainer, sediment, pipeline, water, air, gas, oil or steam. |

| | |
|---|---|
| MIL-T-22361 & AM 1 | Thread compound, antiseize, zinc, dust-petrolatum. |

15A.1.4 American National Standards Institute (ANSI) Publications.

| | |
|---|---|
| B16.5-1968 (B16.5A-1971, B16.5B-1971) | Steel pipe flanges and flanged fittings. |
| B31.1-1973 | Power piping with addenda B31.1D-1971, B31.1B-1971, B31.1C-1972, and B31.1D-1972. |

15A.1.5 American Society of Mechanical Engineers (ASME) Publications.

ASME Boiler and pressure code

Section IX - Welding qualifications - 1971

15A.1.6 American Society for Testing and Materials (ASTM) Publications.

| | |
|---|---|
| A53-72A | Welded and seamless steel pipe. |
| A72-68 | Welded wrought-iron pipe. |
| A120-71 | Black and hot-dipped zinc-coated (galvanized) welded and seamless steel pipe. |
| A126-1971 | Gray iron castings for valves, flanges and pipe fittings. |

15A.1.7 National Fire Protection Association (NFPA) Publications.

| | |
|---|---|
| NFPA No. 30-1969 | Flammable and combustible liquid code. |
| NFPA No. 31-1968 | Installation of oil burning equipment. |

15A.2 General.

15A.2.1 Description. The work includes all diesel oil piping, herbicide piping, fittings, valves, gages, and other material and labor for a complete and ready for use system.

15A.2.2 General requirements. General requirements include those specified in Section 1A, General Paragraphs.

15A.3 Piping and accessories.

15A.3.1 Aboveground piping accessories. Oil piping for aboveground shall be standard weight black steel pipe conforming to ASTM A120, or Grade A standard weight black steel pipe conforming to ASTM A53. Fittings shall be steel in accordance with ANSI B16.9 and B16.28. Unions shall conform to WW-U-531 and shall be of the type required to be compatible to adjacent piping.

15A.3.2 Pipe supports. Hangers, supports and anchors shall conform to WW-H-171. All piping shall be carried on adjustable hangers or properly leveled supports and suitable springs; sway bracing and vibration dampers shall be provided where necessary. Anchors shall be of steel. Beam clamps, hanger pipe clamps, and other similar parts shall be malleable iron. Bases and rollers shall be of steel or cast-iron. Brackets shall be of cast-iron or steel.

15A.3.3 Valves.

15A.3.3.1 Check valves. Check valves shall conform to WW-V-51, lift check or swing check, 125 psi. All check valves shall be provided with renewable composition disks or shall have metallic disk of regrinding type.

15A.3.3.2 Gate valves. Gate valves 1-1/2 inches or less shall conform to WW-V-54, wedge disc, nonrising stem type, 125 pound class. Gate valves 2 inches and over shall conform to WW-V-58, 200 psi class. Quick opening gate valves shall be the type indicated on the contract drawings.

15A.3.3.3 Solendid valves shall be of the type shown on the contract drawings, one way, 120V, electrically opened and spring closed, operatable in any position.

15A.3.4 Strainers. Strainers for oil shall be of the single basket type, with inlet and outlet connections on the same horizontal center line. The body shall be of cast iron or fabricated steel. The basket shall be of series 300 stainless steel, and be readily removable by removal of the body top; the perforations shall be small enough to prevent passage of any solids which might interfere with proper functioning of valves or burners. The open area of the basket shall be not less than 4 times the area of the inlet and outlet piping. With each filter, a spare basket shall be supplied.

15A.4 Installation.

15A.4.1 General installation requirement for oil piping. All oil piping shall be free from traps and shall drain toward the tank or equipment as indicated. All piping shall be installed in out-of-the-way or unimportant places. Piping shall be installed in the concrete trenches and fastened by approved methods. Installation of oil piping and equipment in buildings shall conform to NFPA National Board of Fire Underwriters pamphlet 31 "Installation of Oil Burning Equipment", except as indicated or specified herein.

15A.4.2 Screwed joints in piping. For making up screwed joints, cylinder oil and graphite or graphite pipe-joint compound conforming to MIL-T-5544 shall be used, and shall be applied to the male threads only. The use of red or white

lead and zinc compound conforming to MIL-T-22361 may be used. Piping shall be free from fins and burrs. Pipe ends shall be reamed or filed out to size of bore, and all chips shall be removed. Screwed flanges shall be attached by screwing the pipe through the flange, and the pipe and flange shall be refaced accurately.

15A.5 Field inspection and tests.

15A.5.1 Inspection. All materials and equipment shall be subject to inspection at the installation site by the Contracting Officer. Work rejected because of defects or nonconformance with plans and specifications shall be replaced or corrected by the Contractor as directed, at no additional cost to the Government.

15A.5.2 Tests. All tests and all materials and equipment necessary for tests shall be furnished by the Contractor.

15A.5.2.1 Piping. Oil piping shall be subjected to a leakage test employing oil as the test medium at 1-1/2 times its maximum operating pressure, for a period of four hours.

DIVISION 16. ELECTRICAL

Section 16A. Exterior Electrical System.

16A.1 Scope. The work includes providing all material, labor, equipment, wiring and accessories for all new work and alterations to exterior electrical primary and secondary distribution systems, complete.

16A.2 Applicable documents. The following specifications and standards of the issues listed and referred to in this section (including the addenda, amendments, and errata listed) form a part of this specification to the extent required by the references thereto. (See paragraph entitled "Specifications and Standards" in Section 1 for additional information.)

16A.2.1 Federal Specifications.

| | |
|---|---|
| W-T-631C | Transformers, power, distribution. |
| QQ-W-343 | Wire, electrical and non-electrical copper (uninsulated). |
| TT-W-571g(1) | Wood preservation: treating practices. |
| W-C-586 | Conduit outlets and entrance caps, electrical: cast-metal-for shore use. |

16A.2.2 Military specifications.

| | |
|---|---|
| MIL-H-55053 | Hardware, pole line with supplement. |

16A.2.3 National Bureau of Standards Handbook.

| | |
|---|---|
| H-30 | National Electrical Safety Code. |

16A.2.4 American Standard Association.

| | |
|---|---|
| C29.1-1961 | Test methods for electrical power insulators. |
| C29.2-1962 | Wet-process porcelain insulators (suspension type). |
| C29.3-1961 | Wet-process porcelain insulators (spool type). |
| C29.4-1961 | Wet-process porcelain insulators (strain type). |
| C29.5-1961 | Wet-process porcelain insulators (low and medium-voltage pin type). |

| | |
|---|---|
| C29.6-1961 | Wet-process porcelain insulators (high voltage pin type). |
| C29.7-1961 | Wet-process porcelain insulators (high voltage line-post type). |
| C57.12.00-1965 | General requirements (for transformers). |
| O5.1-1963 | Wood poles, specifications and dimensions for. |

16A.2.5 National Electrical Manufacturers Association.

| | |
|---|---|
| LA1-1964 | Lightning arresters. |
| TR1-1962 | Transformer, regulators and reactors. |
| SG2-1963 | High-voltage fuses (distribution cutouts, fuse links, power fuses and current limiting reactors). |
| WC3 | Rubber-insulated wire and cable for the transmission and distribution of electrical energy. |

16A.2.6 American Society for Testing and Materials.

| | |
|---|---|
| A123-65 | Zinc (hot galvanized) coatings on product fabricated from rolled, pressed and forged steel shapes, plates, bars, and strip. |
| A153-65 | Zinc coating (hot dip) on iron and steel hardware. |

16A.2.7 Underwriter's Laboratories, Inc. Standards.

| | |
|---|---|
| 467 | Grounding and bonding equipment. |

16A.3 Requirements.

16A.3.1 General. The work includes providing all wiring, transformers, disconnect switches, lightning arresters, fuses, insulators, hardware, wood poles, guys, ground rods, and all other equipment and accessories indicated, specified and necessary for a complete and satisfactory operable system ready for use. The work also includes removal of poles, primary and secondary conductors, transformers, insulators, hardware, switches, lightning arresters, guys, and other equipment indicated or specified that are obstructing the new and modified complete system.

16A.3.1.1 Installation shall conform to the requirements of specification Handbook H-30 of the U. S. Department of Commerce, National Bureau of Standards. The contract drawings indicate the extent and general arrangement. If any departures from the contract drawings are deemed necessary by the Contractor, details of such departures and reasons therefor shall be submitted as soon as practicable to the Contracting Officer.

16A.3.1.2 Maintenance of electric service. Interference with electrical service shall be the minimum practicable. The Contractor shall obtain the approval of the Officer in Charge 7 days in advance for all service interruptions and shall schedule the work so that the number of service interruptions will be the minimum.

16A.3.1.3 Nameplates. Each major component of equipment shall have as a minimum the manufacturer's name, address and catalog or style number on a nameplate securely attached to the item of equipment. Nameplates for switches, transformers shall conform to NEMA standards.

16A.3.1.4 Prevention of corrosion. All metallic materials shall be protected against corrosion. Transformer bases shall be given rust-inhibiting treatment and standard finish by manufacturer. Aluminum shall not be used in contact with earth, and, where connected to dissimilar metal, shall be protected by approved fittings and treatment. All ferrous metals such as anchors, bolts, braces, boxes, bodies, clamps, fittings, guards, nuts, pins, rods, shims, thimbles, washers, and miscellaneous parts not of corrosion-resistant steel, shall be hot-dip galvanized in accordance with ASTM A 123 or A 153, except where other equivalent protective treatment is specifically approved in writing by the Officer in Charge.

16A.3.2 Standard products. Unless otherwise indicated in writing by the Officer in Charge, the materials to be furnished under this specification shall be the standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design that complies with the specifications requirements.

16A.3.3 Material list. As soon as practicable, and before starting installation of any materials or equipment the contractor shall submit to the Contracting Officer for approval a complete list, in triplicate, of materials and equipment to be incorporated in the work. This list shall include manufacturer's style or catalog numbers, cuts, or such other descriptive data as may be required. No consideration will be given by the Contracting Officer to partial lists submitted from time to time. Approval of proposed materials will be based on mnaufacturer's published data; approval of materials and equipment will be tentative subject to submission of complete shop drawings indicating compliance with the contract documents.

16A.3.4 Shop drawings. Before installation of any items, the contractor shall submit complete shop drawings and such other descriptive data as the Contracting Officer may require to demonstrate compliance with the contract documents. Shop drawings shall be submitted for the following items: Pole mounted switches, transformers, and such other items as the Contracting Officer may direct. If departures from the contract drawings are deemed necessary by the contractor, details of such departures, including changes in related portions of the project and the reasons therefor, shall be submitted wtih the shop drawings. Approved departures shall be made at no additional cost to the Government.

16A.3.5 Workmanship. Materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer to conform with the contract documents. The installation shall be accomplished by workman skilled in this type of work.

16A.3.6 Poles. Wood poles shall be creosoted pressure treated southern pine, and shall conform to ASA Standard Specification and Dimensions for Wood Poles No. 05.1. Poles shall be the length and class indicated, except that longer poles shall be provided where necessary to maintain the minimum vertical clearances required by the Nationsl Electrical Safety Code after final unloaded sagging. All clearances specified by the Nationsl Electrical Safety Code shall be maintained. Footnote reductions to tables shall not apply and clearances shall not be reduced except where authorized in writing by the Officer in Charge. Poles shall be turned smooth full length, and shall be roofed, gained, and bored prior to pressure treatment. Sweeps and short crocks of poles in line shall not exceed 50 percent of the maximum permitted by the applicable American Standard.

16A.3.6.1 Storage and handling of poles. Poles held in storage for more than 2 weeks shall be stored in accordance with American Standards. The handling of poles shall be in accordance with American Standards except that pointed tools capable of producing indentations more than 1 inch in depth shall not be used.

16A.3.6.2 Pole setting. Minimum pole setting depth shall be as shown on drawings. Poles in straight runs shall be in a straight line. Curved poles shall be placed with the curvature in line with the lead. Poles shall be set to maintain as even a grade as practicable. When the average ground run is level, consecutive poles shall not vary more than 3 feet in height, except as otherwise noted on drawings. If it becomes necessary to shorten a pole, a piece shall be sawed off the top end. If poles are shortened after treatment, the shortened end of the poles shall be given an application of hot preservative. Holes shall be dug large enough to permit the proper use of tampers to the full depth of the hole. Earth shall be thrown in to the hole in 6 inch maximum layers, then thoroughly tamped before the next layer is thrown in. Surplus earth shall be placed around the pole in a conical shape and packed tightly to drain water away from the pole.

16A.3.6.3 Protection of pole tops. All new poles installed shall be capped at the top with metal, a minimum of 22 gage galvanized steel or aluminum.

16A.3.7 Crossarms shall be close grain creosoted treated, crossarm grade southern pine. The vertical and longitudinal strength of crossarms and the climbing space and wire clearances of crossarms shall conform to the National Electrical Safety Code. Crossarms shall be straight and free of twists to within 1/10 inch per foot of length. Bend or twist shall be in one direction only. Crossarms shall be machined, chamfered, trimmed and bored for all pins and bolts required before pressure treatment. Crossarms shall be set at right angles to line for straight runs. Double crossarms shall be provided at dead ends, at angles, and corners, at all locations indicated by details on drawings, and elsewhere as required to provide adequate vertical and longitudinal strength. Double crossarms shall be securely held in position by means of 5/8 inch double-arming bolts. Each double-arming bolt shall be equipped with four nuts and four square washers. Crossarms shall be bolted to poles with 5/8 inch through-bolts with square washers at each end. Bolts shall extend not less than 1/8 inch nor more than 2 inches beyond the nut.

16A.3.8 Preservatives and methods of treatment for all poles, crossarms and mounting timbers shall be in accordance with Federal Specifications TT-W-571; the retention of preservative and penetration shall be not less than the minimum specified therein. Treatment shall be by the pressure process.

16A.3.9 Crossarm braces shall be provided on all crossarms and shall be constructed of "apitong" wood, 6 pounds per square inch pressure penta-treated with steel fittings at both ends. Wood cross section, 7/8 inch x 1-7/8 inch, with overall length of 38 inches. Braces shall be bolted to arms with 3/8 inch carriage bolts with round basher between bolthead and crossarm, and secured to poles with 1/2 by 4 inch lag screws after crossarms are levelled and alined.

16A.3.10 Pins. Pins shall be zinc-coated forged steel, 5/8 inch diameter, with top of 1 inch lead thread not less than 6 inches above cross arm. Shoulder shall not be less than 2 inch diameter, designed to distribute load uniformly to the crossarm. Shank shall be not less than 5/8 inch diameter by 5-3/4 inch length, equipped with 2-inch square washer, nut, and locknut, and shall project not less than 1/8 inch nor more than 2 inches beyond locknut. Broadbase corner pins, of drop forged welded steel or malleable iron, shall be used for turning small angles where indicated by details on drawings. All parts shall be hot dipped galvanized.

16A.3.11 Insulators for use on primary distribution system shall conform to the American Standards Nos. C29.2, C29.4, C29.5, C29.6 or C29.7, as applicable for the installation with testing in accordance with ASA Standard C29.1.

Suspension-type insulators shall be used on the primary system at corners and angles, for suspended buses, at dead ends, at locations indicated by details on drawings, and wherever else pins do not provide adequate strength. Pin insulators used on voltages in excess of 6,000 phase-to-phase shall be radio-free or linepost type. Mechanical strength of suspension and strain insulators shall exceed the ultimate strength of the conductor or guy attached thereto. Insulators for various uses shall have ratings not lower than the classes indicated in table 1:

Table 1

Minimum Rating of Insulators in Terms of Class

| Service | Pin | Suspension | Guy Strain |
|---|---|---|---|
| 5000 V. and below | 53-3 | 52-2 | 54-1 |
| 5,001-25,000 V | 53-5 | 1 x 52-1 | 54-4 |

16A.3.11.1 Spool insulators shall conform to American Standard C29.5. For secondaries, insulators shall be not smaller than class 53-2. For #4/0 and larger conductors, class 53-4 shall be used.

16A.3.12 Guys shall be provided at the location, with leads and strengths indicated on the drawings, and elsewhere as required wherever conductor tensions are not balanced, as at angles, corners, dead ends, and in conformity with the National Electrical Safety Code H30. Where a single guy will not provide the required strength, two or more guys shall be provided. Three-bolt or offset type guy clamps or approved guy grips shall be provided at each guy terminal. Guy porcelain strain insulators class 54-4, 6-3/4 inch long shall be provided in down guys where indicated on drawings. Where indicated by details on drawings, provide guy fiberglass strain insulator 15,000 pounds ultimate strength with clevis fittings on both ends (one with roller); use insulator with 54 inch insulated length in all locations except otherwise noted on drawings. Anchors shall be of the screw type. All guy anchors and attachments shall provide a strength exceeding the required guy strength. Thimbles or thimble eyes shall be provided on all anchor rod and eye-bolt attachments to protect the strand. An approved half round steel guy protector, not less than 8 feet long, shall be provided at the anchor of each guy, securely clamped to the guy or anchor at bottom and top. When field conditions prevent the indicated guy lead, anchors shall be placed in a location approved by the Officer in Charge, and the guy strength increased by the ratio of the sine of the lead angle indicated to the sine of the lead angle provided, except that the lead angle shall be not less than 15 degrees. Guy strand shall be 7-strand, class C, zinc-coated steel, high-strength grade, diameter not less than indicated on drawings.

16A.3.13 Primary line conductors and shield conductors shall be bare aluminum conductors steel reinforced, No. 1/0 ACSR code name "Raven". Conductors larger than No. 2 American Wire gage, shall be stranded. Splices under tension shall be mechanically and electrically secure with a strength not less than the conductor. Splice materials, sleeves, fittings, and connectors shall be noncorrosive and shall not adversely affect the conductor with which they are used. Conductors shall be tied to insulators in an approved manner. Tie wires for ACSR conductor, shall be armored at all supports with preform aluminum alloy armored rods, sizes as recommended by the manufacturer.

All dead ends shall be made with approved clamps designed for the purpose, with a strength not less than the conductor. Care shall be taken in handling and stringing of conductors to guard against cuts, scratches, and kinks. Conductors shall not be drawn over rough or rocky ground, nor around sharp bends. When drawn by machine power, conductors shall be drawn from the mounted reel through approved stringing sheaves in approximately straight lines and clear of all obstructions. Where lines pass through trees, ll trees shall be trimmed at least 8 feet clear of primary lines and 4 feet clear of secondaries below and horizontally, and no branch shall overhang the horizontal clearance. A climbing space at least 48 inches square shall be provided. Rapidly growing species shall be trimmed at least 12 feet below the primary line and 6 feet below secondaries. Where indicated, trees shall be completely removed. Initial stringing sags and tensions shall be as indicated, or in accordance with approved tables for the conductor furnished by the contractor, provided indicated clearances are maintained.

16A.3.14 Miscellaneous conductors shall be of an approved type specifically intended for the application. Miscellaneous conductors shall be pulled in by hand except as approved otherwise. Care shall be taken to avoid abrasions, sharp bends, cuts, kinks, or any possibility of damage to the insulation or conductors. Bend radius shall at no time be less than IPCEA recommendations. Where run on structures or vertically on poles, cables shall be protected by rigid conduit secured at intervals not exceeding 5 feet, and within 12 inches each side of any bend or termination. All connectors, supports, clamps, and ties shall be designed for the particular purpose, shall be of the proper material and size, and installed strictly in accordance with approved methods. Connectors shall be solderless pressure type. All connections of insulated conductors shall be smoothly taped to provide a waterproof insulation equivalent to the original. Drip loops shall be formed on conductors at all entrances to buildings, cabinets, or conduits. Conductors shall be of the size indicated on the drawings but not smaller than No. 8 AWG.

16A.3.15 New service-drop conductors and secondary spans shall be neutral-supported secondary and service drop cables, type N-SD, 90 degree C., polyethelene or cross-linked polyethelene insulated. Service drops shall consist of three insulated aluminum conductors and one ACSR composite neutral messenger. Conductor sizes indicated on drawings are based on aluminum. Sizes No. 4 AWG and larger shall be stranded.

16A.3.15.1 Connections to secondary pole. Where new or reused service drop conductors are shown on drawings, service drops shall be attached to secondary pole approximately at the point indicated on the drawings, and shall be connected to the building service-entrance conductors. Drip loops shall be formed in all conductors. Ungrounded connections shall be insulated with approved tape. Where neutral-supported service-drop cable is used, a single spool insulator or porcelain wireholder shall be attached to the pole in a manner to withstand a pull of 1,000 pounds.

16A.3.16 Pole-line hardware shall be hot-dip-galvanized (except that anchor rods of the copper-molten welded-to-steel type with nonferrous corrosion-resistant fittings may be used). Suitable washers shall be installed under bolt heads and nuts on wood surfaces. Washers used on through-bolts and double-arming bolts shall be approximately 2-1/4 inches square and 3/16 inch thick. The diameter of holes in washers shall be the correct standard size for the bolts on which the washers are used. Washers for use under the heads of carriage bolts shall be of the proper size to fit over the square shank of the bolt. Eye-bolt, bolt eyes, eyenuts, strain-load plates, lag screws, guy clamps, fasteners, hooks, shims and clevises shall be used wherever required to adequately support and protect the poles, crossarms, guy wires, and insulators.

16A.3.17 Lightning arresters shall be of the valve type and shall be provided at all aerial-to-underground connections and at other locations indicated on drawings. Arrester ratings and classification shall be as described by NEMA LA 1. Arresters shall be equipped with suitable mounting brackets for the applicable method of mounting. Arresters shall be connected by means of a soft-drawn-copper conductor, not smaller than No. 6 AWG, to a copper clad steel ground rod not less than 3/4 inch in diameter, 10 feet in length. See "Grounding".

16A.3.18 Grounding. The shield wire, neutral conductors, cable messengers, and non-current-carrying parts of equipment shall be grounded. Ground conductor shall be soft-drawn copper, having a current capacity of at least 20 percent of that of the largest conductor to which it is connected but not smaller than No. 6 AWG. Ground conductor shall be connected to a copper clad steel ground rod not less than 3/4 inch in diameter and 10 feet long. The ground rod shall be driven at least 10 feet into the ground approximately 3 feet out from the base of the pole. After installation is completed, the top of the ground rod shall be approximately 1 foot below finished grade. The total ground resistance shall not exceed 10 ohms. Where this condition cannot be obtained with one rod driven 10 feet in the ground, additional rods shall be installed until the required ground resistance is obtained, except that not more than a total of four-10 foot ground rods will be required for each location. Ground resistance shall be measured in normally dry conditions, not less than 48 hours after rainfall. The ground conductor shall be protected by half-round plastic or fiber molding from the ground line to a point at least 8 feet above the ground line, throughout the communication space and at all other locations indicated on the drawings. The molding shall be stapled to the pole at intervals not exceeding 2 feet, with one staple not more than 3 inches from each

end. Single-point serrated staples of a type suitable for use with the plastic or fiber molding shall be used for stapling molding to the pole. Where not covered by molding, the conductor shall be stapled to the pole at intervals not exceeding 2 feet. All connections shall be made with solderless connectors or by the molded fusion-welding process. Where the ground wire is connected to aluminum conductors, specially treated or line connectors suitable for this purpose shall be utilized. Resistance at each ground location shall measured separately before bonding to ground conductor.

16A.3.19 Hot line clamps. Compression bail clamps with aluminum alloy compression fitting and No. 4 copper bail shall be installed on main line conductors for attachment of hot line clamps. Hot line clamps shall be general purpose type with bronze body. Hot line clamps shall be used at top of poles, at transformer stations, and at all other locations shown on drawings.

16A.3.20 Transformers shall conform to Federal Specification W-T-631c and National Electric Manufacturers' Association Standard TR1-1962. Transformers shall be of the type I mineral-oil insulated or type II nonburning-liquid-insulated, in accordance with transformer schedule on drawings, two-winding type, and in accordance with the requirements hereinafter stated. Transformer shall be suitable in every respect for outdoor installation and rated as indicated. Transformers shall be products of a manufacturer who has produced units of the same type, rating, and voltage as required for this project, within the 2 year period preceding the date of the invitation for bids, which have operated satisfactorily for at least 1 year prior to date of invitation for bids. Evidence showing such production and satisfactory performance and proved reliability of the product shall be promptly submitted to the Officer in Charge upon request therefor. All transformers shall be provided with rated KVA-NEMA standard taps. Where taps are not required under the NEMA standards, transformers shall have four 2-1/2 percent rated KVA high voltage taps below rated primary voltage. All transformers shall have two cover-type high-voltage bushings. The high-voltage winding of each transformer rated 167 KVA and smaller, 2,400 volts through 25,000 volts, shall be given a production-line-impulse test. The production-line-impulse test and detection means shall meet the following minimum requirements: (a) one full-wave test at American standard wave shape and at a voltage magnitude not less than that specified for the specific voltage class in American Standard C57.12, table 12.02.110a, column 7 for distribution levels; and (b) detection shall be made by observation of an oscilloscope or by means of automatic electronic circuits, provided sufficient data are available on essentially duplicate transformers to show that the circuits are sufficiently sensitive to detect impulse failures within the windings. In lieu of the preceding tests, the contractor may elect a substitute standard impulse test procedure in accordance with American Standard C57.12-06.215 using detection methods as given in American Standard C57.12-92.600; however, if this election is made, tests shall be conducted on one transformer of each group of six or less transformers of the same rating being furnished under this contract. Prior to final acceptance of the transformers by the Officer in Charge the contractor shall submit for approval the manufacturer's or a recognized independent testing laboratory's test reports in duplicate, similar to those

covered in NEMA Standard TR 1, and as required above. Transformer tank shall have a standard gray finish. Transformer installations shall include one primary fuse cutout and one lightning arrester for each ungrounded phase conductor. All accessories for each installation shall conform to the applicable NEMA standards and shall be suitable in every respect for the intended service. Each transformer shall have its KVA rating conspicuously displayed on its tank. Transformer voltage shall be 14.4/24.9 Y primary to 120/208 Y secondary.

16A.3.21 25KV fused cutout shall be open type, extra heavy duty, load break, 14.4/24.9 KV, 100 amp. continuous, 16,000 A.I.C. asmmetrical, with expendable cap, Westinghouse 3076625A03, or equal, with standard EEI-NEMA mounting bracket. Furnish one spare cap with each cutout.

16A.3.22 Coordination with Public Works. The contractor shall coordinate the work in the vicinity of existing distribution system with Public Works utility crews and shall make arrangements with Public Works for any power outages required.

16A.3.23 Tests.

16A.3.24.1 Operating test. After the installation has been completed, and at such time as the Officer in Charge may direct, the contractor shall conduct an operating test for approval. The equipment shall be demonstrated to operate in accordance with the requirements of this section of the specifications. The test shall be performed in the presence of the Officer in Charge. The contractor shall furnish the necessary instruments and personnel required for the test, and the Government will furnish the necessary electric power.

16A.3.24.2 Ground-resistance measurements of each ground rod shall be taken and certified by the contractor to the Contracting Officer. The contractor shall submit in writing to the Officer in Charge upon completion of the project, the measured ground resistance of each ground rod and grounding system, indicating the location of the rod and grounding system, as well as the resistance and soil conditions at the time the measurements were made. When the building water service is used as a ground or part of the grounding system, ground-resistance measurements shall also be made of this connection. Ground-resistance measurements shall be made in normally dry weather, not less than 24 hours after rainfall, and with the ground under test isolated from other grounds.

16A.3.25 Guarantee. The following equipment furnished under this section of the specification shall be guaranteed for a period of 1 year from the date of acceptance thereof, either for beneficial use or final acceptance, whichever is earlier, against defective materials, design, and workmanship:

Cable and wire

Lightning arresters

Transformers

Fuse cutouts

Single-pole unfused interrupter switches

Three-pole, double break, fused interrupter switches

Upon receipt of notice from the Government of failure of any part of the guaranteed equipment during the guaranty period, new replacement part or parts shall be furnished and installed promptly at no additional cost to the Government.

SECTION 16B INTERIOR WIRING SYSTEMS

16B1 Scope: The work includes providing all material, labor, equipment and wiring for all new work to interior electrical system complete and ready for use.

16B1.1 Applicable Documents: The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by references thereto:

16B1.2 Federal Specifications:

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| J-C-30A | Cable and Wire, Electrical (Power, Fixed Installation). |
| J-C-145B | Cable, Power, Electrical and Wire, Electrical, (Weather-resistant). |
| L-C-530B | Coating, Pipe, Thermoplastic Resin or Thermosetting Epoxy. |
| L=P-390B | Plastic Molding Material, Polyethylene, Low and Medium Density. |
| L-T-0075 & Am 1 | Tape, Pipe-Coating; Pressure-Sensitive, Polyethylene. |
| W-C-375A & Int Am 4 | Circuit Breaker, Molded Case, Branch-Circuit and Service. |
| W-C-581B & Int Am 1 | Conduit and Fittings; Nonmetallic, Rigid, (Bituminized Homogeneous Fiber). |
| W-C-582 | Conduit, Raceway, Metal and Fitting, Surface. |
| W-C-583B | Conduit Box and Outlet Fittings, Floor (for Rigid Steel Conduit and Electric-Metallic-Tubing Steel). |
| W-C-586A & AM 3 | Conduit Outlet and Entrance Cap, Electrical, Cast Metal, for Shore Use. |
| W-C-00596C | Connector, Plug, Electrical; Connector, Receptacle, Electrical. |
| W-F-406B & Int Am 1 | Fittings for Cable, Power, Electrical and Conduit, Metal, Flexible. |
| W-F-408B | Fittings for Conduit, Metal, Rigid, (Thick-wall and Thin-wall (EMT) Type). |
| W-J-800C & Am 1 | Junction Box, Extension, Junction Box, Cover, Junction Box, (Steel, Cadmium or Zinc-coated). |

| | |
|---|---|
| W-P-115A & Am 2 | Panel, Power Distribution. |
| W-P-455A & AM 3 | Plate, Wall Electrical. |
| W-S-610B & Int Am 1 | Splice, Conductor. |
| W-S-865C & Int Am 2 | Switch, Box (Enclosed), Surface-mounted. |
| W-S-00896D | Switch, Toggle. |
| CC-M-636 | Motors, Alternating-current, (Fractional Horsepower). |
| CC-M-641D | Motors, Alternating Current, (Integral horsepower, 200 HP and Smaller). |
| HH-I-00510C | Insulation Tape, Electrical, Friction. |
| HH-I-553 & Int Am 2 | Insulation Tape, Electrical, (Rubber, Natural and Synthetic). |
| HH-I-595B | Insulation Tape, Electrical, Pressure-sensitive Adhesive, Plastic, for Low Temperature Application. |
| QQ-W-343D | Wire, Electrical and Nonelectrical, Copper (Uninsulated). |
| WW-C-540C & Am 1 | Conduit, Metal, Rigid, (Electrical, Aluminum). |
| WW-C-563 | Conduit, Metal, Rigid, and Bend and Elbow, Electrical Conduit, Thin-wall Type (EMT). |
| WW-C-566B | Conduit, Metal, Flexible. |
| WW-C-581D | Conduit, Metal, Rigid, and Coupling, Elbow, and Nipple, Electric Conduit, Zinc-coated. |

16B1.3 Military Specifications:

| | |
|---|---|
| MIL-P-1514/C & Am 1 | Primer and Enamel, Coal Tar. |

16B1.4 U. S. Department of Commerce, National Bureau of Standards Publication:

Handbook H30 National Electrical Safety Code 1948.

16B1.5 National Electrical Manufacturers Association (NEMA) Publications:

| | |
|---|---|
| ICS-1970 | Industrial Controls and Systems. |
| FU 1-1966 | Low-voltage Cartridge Fuses. |
| MG-1-1967 | Motors and Generators. |
| WD 1-1965 | General-purpose wiring Devices. |

16B1.6 National Fire Protection Association (NEPA) Publication:

| | |
|---|---|
| 70-1973 | National Electrical Code. |

16B1.7 Underwriters' Laboratories, Inc., (UL) Publications:

| | |
|---|---|
| 5 | Surface Metal Raceways and Fittings. |
| 50 | Cabinets and Boxes, Nov. 1963; Including Revisions Through October 1969. |
| 57 | Electric Lighting Fixtures, May 1969; Including Revision Through October 1969. |
| 467 | Grounding and Bonding Equipment; July 1967. |
| 514 | Outlet Boxes and Fittings; August 1969. |
| 651 | Rigid Nonmetallic Conduit; September 1965. |
| 869 | Service Equipment, Sept. 1951, Including Revisions Through July 1970. |

16B2 Requirements

16B2.1 General. The work includes providing wiring, conduit, light fixtures, receptacles, and all materials and labor for a complete and operative system.

16B3 Submittals:

16B3.1 Materials and Equipment Schedules: As soon as practicable after notice to proceed, a complete list of materials and equipment to be incorporated in the work shall be submitted to and approved by the contracting officer before work is started. List shall include catalog numbers, cuts, diagrams, and such other descriptive data as may be required. No consideration will be given to partial lists submitted from time to time. Approval of materials will be based on manufacturer's

published ratings. Materials and equipment listed that are not in accordance with the specification requirements will be rejected.

16B3.2 Samples: Samples, in duplicate, of the following items shall be submitted to and approved by the contracting officer before work is started:

Light fixtures, Panels, Wiring, Conduit, Switches, and Receptacles.

16B3.3 Shop Drawings: Shop drawings or catalog cuts for the following items shall be submitted to and approved by the contracting officer before work is started:

Equipment installation, and panel diagrams or schematics.

16B3.4 Certified Laboratory Test Reports: Before delivery of materials, certified copies in triplicate of the reports of all tests required in referenced publications shall be submitted to and approved by the contracting officer. The testing shall have been performed by an approved independent laboratory acceptable to the Contracting Officer, within one year of submittal of reports for approval. Test reports on previously tested material shall be accompanied by notarized certificates from the manufacturer certifying that the previously tested material is of the same type, quality, manufacture, and make as that proposed to be supplied.

16B.4 Materials and Equipment: Materials and equipment shall conform to the requirments of the specifications and publications listed hereinafter.

16B.4.1 Conduit, Conduit Boxes, Fittings and Supports: These items shall conform to the following:

16B.4.1.1 Zinc-coated Rigid Steel Conduit: Specification WW-C-581.

16B.4.1.2 Flexible Metal Conduit: Specification WW-C-566.

16B.4.1.3 Fittings for Rigid Metal and Electrical Metallic Tubing: Specification W-F-408.

16B.4.1.4 Fittings for Electrical Power Cable and Flexible Metal Conduit: Specification W-F-406

16B.4.1.5 Cast Metal Conduit Outlet Bodies: Specification W-C-586.

16B.4.1.6 Junction Boxes, Extensions and Covers: Specification W-J-800.

16B.4.1.7 Floor Conduit Boxes: Specification W-C-583.

16B4.2 Conduit Coatings:

16B4.2.1 Plastic: Specification L-P-390.

16B4.2.2 Epoxy Resin: Specification L-C-530, type II.

16B4.2.3 Coal Tar Primer and Enamel: Specification MIL-P-15147.

16B4.2.4 Pressure-sensitive Plastic Tape: Specification L-T-0075.

16B4.3 Wire, Cable, Splices and Terminations:

16B4.3.1 Insulated Conductors: Specification J-C-30.

16B4.3.2 Weather-Resistant Cable and Wire: Specification J-C-145.

16B4.3.3 Bare Wire: Specification QQ-W-343.

16B4.3.4 Conductor Splices: Specification W-S-610.

16B4.3.5 Friction Tape: Specification HH_I-510.

16B4.3.6 Rubber Tape: Specification HH-I-553.

16B4.3.7 Plastic Tape: Specification HH-I-595

16B4.4. Switches, Outlets and Covers:

16B4.4.1 Toggle Switches: Specification W-C-00596.

16B4.4.2 Receptacles: Federal Specification W-C-00596.

16B4.4.3 Switch and Receptacle Covers: Specification W-P-455.

16B4.5 Service Entrance Equipment: Underwriters' Laboratories Standard No. 869, and Specification W-S-865 as applicable.

16B4.6 Panel Boards and Circuit Breakers:

16B4.6.1 Circuit Breakers: Specification W-C-375.

16B4.7 Disconnect Switches: Specification W-S-865

16B4.8 Motors: NEMA Standard Pub. No. MG-1.

16B4.9 Motor Controls: NEMA Standard No. ICS.

16B4.10 Grounding and Bonding: Underwriters' Laboratories Standard No. 467.

16B4.11 Fuses: NEMA Standard No. FU-1, and Specification W-F-791.

16B.5 Installation:

16B5.1 Electrical Installation: Electrical installation shall conform to the National Electrical Safety Code, the National Electrical Code and to the requirements specified herein. All equipment and materials shall be new (unless indicated or specified otherwise). The Contractor shall submit proof, if requested by the Contracting Officer, that the materials, appliances, equipment or devices that he furnishes and installs under this contract, meet the requirements of the Underwriter's Laboratories, Inc., as regards fire and casualty hazards. The label of, or listing by, the Underwriters' Laboratories, Inc., will be accepted as conforming with this requirement. In lieu of the label or listing, the Constractor may submit independent proof satisfactory to the Contracting Officer that the materials, appliances or devices conform to the published standards, including methods of test, of the Underwriter's Laboratories, Inc.

16B5.2 Conduit Installations: Conduit installation shall be made with rigid metal conduit and fittings, and flexible metallic conduit, liquid tight. Aluminum conduit shall not be installed underground or encased in concrete and shall not be used with brass or bronze fittings. Electrical metallic tubing shall not be installed underground,encased in concrete or used in outdoor work. Rigid metal conduit installed underground shall be encased in concrete or covered with a protective coating.

NOTE: The contract drawings shall indicate the desired routing of all conduits and location of outlets.

16B5.2.1 Exposed conduit shall be installed parallel with or at right angles to the building walls and ceiling and shall be supported by pipe straps, wall brackets, hangers or ceiling trapeze. Fastenings shall be by wood screws or screw type nails to wood; by toggle bolts on hallow masonry units: by concrete inserts, or expansion bolts on concrete or brick; by machine screws, welded threaded studs, or spring-tension clamps on steel work. Threaded studs driven in by a powder charge and provided with lock washers and nuts may be used in lieu of expansion bolts or machine or wood screws. Threaded C-clamps may be used on rigid steel conduit only. Conduits or pipe straps shall not be welded to steel structures. The load applied to fasteners shall not exceed 1/4 of the proof test load. Fasteners attached to concrete ceiling shall be vibration and shock resistant. Holes cut to a depth of more than 1-1/2 inches in reinforced concrete beams or to a depth of more than 3/4=inch in concrete joints shall not cut the main reinforcing bars. Holes not used shall be filled. In partitions of light steel construction, sheet-metal screws shall be used. In suspending-ceiling construction, conduit shall be run above the ceiling and only lighting system branch circuit conduits shall be fastened to the ceiling supports. Spring steel fasteners may be used for lighting branch circuit conduit supports in suspended ceiling in dry locations. Conduits shall be fastened to all sheetmetal boxes and cabinets with two locknuts where required by the National Electrical code, where insulated bushings are used and where bushings cannot be brought into firm contact with the box. Locknuts shall be the type with sharp edges for digging into the wall of metal enclosures.

Bushings shall be installed on the ends of all conduits and shall be of the insulating type where required by the National Electrical Code. Exposed risers in wire shafts of multistory buildings shall be supported by U-clamp hangers at each floor level and at intervals not to exceed 10 feet. Fittings for steel conduit and electrical metallic tubing shall be iron or steel only. Fittings for aluminum conduit shall be iron, steel, or aluminum alloy containing not more than 0.40 percent copper.

16B5.2.2 Conduit installed in concrete floor slabs shall be located so as not to affect the structural strength of the slabs. Conduit shall be installed within the middle one-third of the concrete slab except where necessary to not disturb the reinforcement. Outside diameter of conduit shall not exceed one-third of the concrete slab except where necessary to not disturb the reinforcement. Outside diameter of conduit shall not exceed one-third of the slab thickness and conduits shall be spaced not closer than three diameters except at cabinet locations. Curved portions of bends shall not be visible above the finish slab. Slab thickness shall be increased as necessary to provide a minimum of one inch cover over conduit. Where embedded conduits cross expansion joints, suitable water tight expansion fittings and bonding jumpers shall be provided. Conduit larger than one inch trade size shall be parallel with or at right angles to the main reinforcement; when at right angles to the reinforcement, the conduit shall be close to one of the supports of the slab.

16B5.2.3 Conduits installed in contact with earth shall be rigid steel. Rigid steel conduits shall be encased in concrete or field coated with asphaltum or shall have a factory-applied coating with minimum thickness not less than the following:

| | |
|---|---|
| Low-density or Medium-density Plastic | 0.020-inch |
| Epoxy Resin | 0.008-inch |
| Coal-tar Enamel | 0.063-inch |

Zinc coating may be omitted from steel conduit which has a factory applied epoxy resin coating. Field made joints, fittings, abrasions, imperfections shall be coated with material equivalent to the above.

16B5.2.4 Changes in direction or runs shall be made with symmetrical bends or cast-metal fittings. Field-made bends and offsets shall be made with a hickey or conduit-bending machine. Crushed or deformed conduits shall not be installed. Trapped conduits in damp or wet locations shall be avoided. Plaster, dirt or trash shall be prevented from lodging in conduits, boxes, fittings and equipment during construction. Clogged conduits shall be freed of all obstructions.

16B5.2.5 Empty conduit in which wire is to be installed by others shall have pull wires installed. The pull wire shall be no. 14 AWG zinc-coated steel, or of plastic having not less than 200-pound tensile strength.

Not less than 12 inches of slack shall be left at each end of the pull wire.

16B.5.2.6 Surface mounted metal conduit shall be type I or type III. Type III shall be complete with integral receptacles spaced as shown on drawing. Receptacles shall be 1-pole, 2-wire, grounding type rated at 30 amperes, 125 volts. Wire shall be No. 12 AWG, copper conductor. Raceways shall be bonded to branch circuit supply conduits.

16B.5.3 Service into Buildings;

NOTE: The contract drawings shall indicate the desired routing of all conduits and location of outlets.

16B5.3.1 Underground conduit for service feeders shall be rigid steel from the service equipment to a point five feet beyond the building and projections thereof. The underground portion of the conduit shall be encased in a concrete envelope having a wall thickness of not less than three inches or as specified in Paragraph 16B5.2.3 and shall be buried not less than 18 inches. Where a conduit enters through a concrete floor, the curved portion shall not be visible above the finished floor and the entire conduit below the floor slab shall be encased in a concrete envelope having a wall thickness of not less than three inches or as specified in Paragraph 16B5.2.3. Where underground service connections enter a building above the ground floor, a suitable pull box shall be installed.

16B5.3.2 Rigid metal conduit for overhead service shall be installed from the service entrace equipment to the service entrance fittings (pull boxes) outside of the building.

16B5.4 Boxes, Outlets and Supports:

NOTE: The contract drawings shall indicate the desired routing of all conduits and location of outlets.

16B5.4.1 Boxes shall be provided in the wiring or raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures. Boxes for metallic raceways shall be of the cast-metal hub type when located in normally wet locations, when surface mounted on outside of exterior surfaces, in hazardous areas, and when installed exposed up to 7 feet above interior floors and walkways. Boxes in other locations shall be sheet steel except that aluminum boxes may be used with aluminum conduit, and nonmetallic boxes may be used with non-metallic wiring system. Each box shall have the volume required by the National Electrical Code for the number of conductors enclosed in the box. Boxes for mounting lighting fixtures shall be not less than 4 inches except that smaller boxes may be installed as required by fixture configuration, as approved. Boxes installed for concealed wiring shall be provided with suitable extension rings or plaster covers, as required. Boxes for use in masonry-block or tile walls shall be square-cornered tile-type, or standard boxes having square-cornered tile-type,covers. Cas-metal boxes installed in wet locations and boxes installed flush with the outside of exterior surfaces shall be gasketed. Separate boxes shall

be provided for flush or recessed fixtures when required by the fixture terminal operating temperature, and fixtures shall be readily removable for access to the boxes unless ceiling access panels are provided. Boxes and pendants for surface-mounted fixtures or suspended ceilings shall be supported independently of the ceiling supports, or adequate provisions shall be made for distributing the load over the ceiling support members in an approved manner. Boxes and supports shall be fastened to wood with wood screws or screw-type nails of equal holding strength, with bolts and expansion shields on concrete or brick, with toggle bolts on hollow masonry units, and with machine screws or welded studs on steel work. Threaded studs driven in by powder charge and provided with lockwashers and nuts, or nail-type nylon anchors, may be used in lieu of wood screws, expansion shields, or machine screws. In open overhead spaces, cast boxes threaded to raceways need not be separately supported except where used for fixture support; cast metal boxes having threadless connectors and sheet metal boxes shall be supported directly from the building structure or by bar hangers. Where bar hangers are used, the bar shall be attached to raceways on opposite sides of the box and the raceway shall be supported with an approved type fastener not more than 24 inches from the box. Penetration into reinforced-concrete members shall avoid cutting any reinforcing steel.

16B5.4.2 Boxes for use with raceway systems shall not be less than 1-1/2 inches deep except where shallowever boxes required by structural conditions are approved. Boxes for other than lighting-fixture outlets shall be not less than 4 inches square except that 4 inch by 2 inch boxes may be used where only one raceway enters the outlet.

16B5.4.3 Pull boxes of not less than the minimum size required by the National Electrical Code shall be constructed of code-gage aluminum or galvanized sheet steel except where cast=metal boxes are required in locations specified above. Boxes shall be furnished with screw-fastened covers. Where several feeders pass through a common pull box, the feeders shall be tagged to indicate clearly the electrical characteristics, circuit number, and panel designation.

16B5.4.4 Conduits stubbed up through concrete floors for connections to free standing equipment shall be provided with a short elbow and an adjustable brass top or coupling of brass or bronze threaded inside for plugs, set flush with the finished floor. Wiring shall be extended in rigid threaded conduit to equipment, except that where erquired, flexible conduit may be used 6 inches above the floor. Screwdriver-operated threaded flush plugs shall be installed in conduits from which no equipment connections are made.

16B5.5 Device Plates: Device plates of the on-piece type shall be provided for all outlets and fittings to suit the devices installed. Plates on unfinished wall and on fittings shall be of zinc-coated sheet or cast metal having round or beveled edges. Screws shall be of metal with countersunk heads, in a color to match the finish of the plate. Plates

shall be installed with all four edges in continuous contact with finished wall surfaces without the use of mats or similar devices. Plaster fillings will not be permitted. Plates shall be installed with an alinement tolerance of 1/16 inch. The use of sectional type device plates will not be permitted. Plates installed in wet locations shall gasketed. Device plates for telephone and intercommunication outlets shall have a 3/8 inch bushed opening in center.

16B.5.6 Receptacles.

16B.5.6.1 Single and duplex receptacles shall be rated (as indicated) (1-pole, 3-wire, (grounding), 30 Ampere, 120 volts.) Bodies shall be ivory molded phenolic compound supported on a metal mounting strap. Receptacles shall be side and back-wired with screw type terminals. Exposed metal parts shall be corrosion resistant. The grounded pole shall be connected to the mounting strap.

16B.5.6.2 Weatherproof receptacles shall be mounted in a cast metal box with a gasketed, weatherproof, cast-metal cover plate and a cap over each receptacle opening. The cap(s) shall be permanently attached to the receptacle cover plate by a short length of bead chain or shall be provided with a spring-hinged flap.

16B.5.7 Toggle switches. Toggle switches shall be totally enclosed with bodies of molded compound and a mounting strap. Handles shall be ivory. Wiring terminals shall be of the screw type, back or side wired. Switches shall be rated quiet type, AC only, 30 ampere, 120 volt. Switches shall be single pole as indicated.

16B.5.8 Wire and cables.

NOTE: The contract drawings shall indicate the wire and size and insulation.

16B.5.8.1 Conductors No. 6 AWG and smaller shall be copper. Conductors No. 4 AWG and large shall be either copper or aluminum. Conductor and conduit sizes indicated are for copper conductors. If aluminum conductors are used the conductors shall have the equivalent copper conductor current carrying capacity and the conduit sizes shall be increased to provide the maximum conduit fill in accordance with the Nationsl Electrical Code.

16B.5.8.2 Power and lighting wires and cables in conduit shall be type THW. In damp or wet locations as defined by the National Electrical Code, wires and cables shall be type THW. Minimum conductor size shall be No. 12 AWG.

16B.5.8.3 Service entrance cable shall be type SE for overhead service entrance and type USE for underground service entrance.

16B.5.8.4 All secondary servcie, feeder, branch and control circuit conductors shall be color coded. Conductor identification shall be provided within each enclosure where a tap, splice or termination is made. Conductor identification shall be by color-coded insulated conductors, plastic-coated self-sticking printed markers, colored nylon cable ties and plates, or heat shrink type sleeves. Control circuit terminations shall be properly identified.

16B.5.8.5 Splices shall be in accessible locations. Splices in wires No. 10 AWG and smaller shall be made with an insulated pressure type connector. Splices for wires No. 8 AWG and larger shall be made with a solderless connector and shall be covered with an insulation material equivalent to the conductor insulation. Connections involving aluminum conductors shall utilize approved type fittings and joint compound.

16B. 5.9 Service entrance equipment. Service entrance equipment shall be complete with molded case circuit breaker main disconnect, and branch circuit molded case circuit breakers. The equipment shall be rated at 120/208 volts AC, 400 amperes, solid neutral.

16B.5.10 Disconnect equipment for motors shall be 120/208 volts, 30 amperes, enclosures shall be hinged, surface mounted, raintight construction.

16B.5.11 Panelboards.

16B.5.11.1 Load center panelboards shall be type I, class 2. Single pole breakers shall be full module size, two poles shall not be installed in a single module. Multipole circuit breakers shall be of the common-trip type having a single operating handle and for 50 ampere or less may consist of single-pole circuit breakers permanently assembled at the factory into a multipole unit. Enclosures shall be of the raintight construction.

16B.5.11.2 Panelboards shall be mounted so the height of the top operating handle will not exceed 78 inches from the ground. Three keys shall be furnished for each cabinet lock. All panelboard locks included in a project shall be keyed alike. Fusible panelboards of the multipole type may have doors over individual circuits and trim over wiring gutters only provided each circuit is arranged for locking in the open and closed positions and each branch circuit has an individual identification card in a cardholder with a clear plastic covering. Nameplates shall be as indicated. Directories shall be typed to indicate load service by each circuit and mounted in a holder behind protecting covering.

16B.5.12 Fuses.

16B.5.12.1 A complete set of fuses for all switches shall be furnished. Time-current characteristics curves of fuses serving motors or connected in series with circuit breakers or other circuit protective devices shall be coordinated for proper operation. Fuses shall have a voltage rating (s) not less than the circuit voltage(s). One complete set of spare fuses in the manufacturer's cartons shall be delivered to the Contracting Officer.

16B.5.13 Grounding and bonding. All exposed non-current-carrying metallic parts of electrical equipment, metallic race way systems, and neutral conductor of wiring systems shall be grounded. The ground connection shall be made at the main service equipment and shall be made to driven rods on the exterior of the building.

16B.5.13.1 Ground rods shall be copper or copper-clad not less than 3/4 inch in diameter, 10 feet long sectional type. Each ground rod shall be die stamped near the top with the name or trademark of the manufacturer and the length of the rod in feet. Ground rods shall be driven full length into the earth.

NOTE: If difficulties are encountered in obtaining the proper resistance, the Contracting Officer will make a decision on the number of ground rods to be used, based on local conditions and on the type and size of the electrical installation in the project. Copper clad steel rods will be specified for normal conditions, stainless steel rods will be required where electrolytic corrosion may be encountered.

16B.5.13.2 The maximum resistance to ground of a driven ground rod shall not exceed 25 ohms. Where the resistance obtained with one ground rod exceeds 25 ohms, dditional ground rods shall be installed not less than 6 feet on centers.

16B.5.14 Lighting fixtures. Lighting fixtures shall be as indicated. The details, shapes and dimensions are indicative of the general type desired but are not intended to restrict selection to fixtures of any particular manufacturer. Fixtures of similar designs and equipment light-distribution and brightness characteristics and of equal finish and quality will be acceptable if approved by the Contracting Officer. Metal parts of lighting fixtures shall be of corrosion resistant metal or shall be suitably finished to resist corrosion: metal portions of fixtures which will be visible after installation shall have a satin aluminum or similar finish. Lens frames shall be supported so as to avoid sagging and shall be readily removable or suitably hinged and latched. Removable frames shall have adequate means of retention for use when servicing. Plastic for lenses shall be heat-resistant methyl-methacrylate.

NOTE: The contract drawings shall include a detail and description of each type of light fixture required for the project. Descriptions shall include lamp type and wattage, mounting, finish, and lens requirements.

16B.5.14.1 Fluorescent lamps shall be the rapid start, cool white type unless otherwise indicated. Ballasts shall be class P unless otherwise indicated.

16B.5.14.2 Accessories for all lighting fixtures such as straps, mounting plates, nipples, or brackets shall be provided for proper installation.

16B.5.14.3 Incandescent fixtures shall be 120 V unless otherwise indicated.

16B.5.15 Equipment connections. All wiring for the connection of motors and control equipment as indicated on the electrical drawings shall be furnished and installed under this section of the specification. Except as otherwise specifically noted or specified, automatic-control wiring, signaling, and protective devices are not included in this section of the specifications but shall be furnished and installed under other sections of the specifications. Control wiring not shown on the electrical drawing shall be furnished under other sections of the specifications.

NOTE: The contract drawings shall indicate all required equipment connections.

16B.5.15.1 Government-furnished equipment installed under other sections of the specifications. Wiring shall be extended to the equipment, and proper connections made thereto.

16B.5.15.2 Flexible connections of short length shall be provided for equipment subject to vibration, noise transmission, or movement and for all motors. Liquid-tight flexible conduit shall be used in wet locations. A separate ground conductor shall be provided across all flexible connections.

16B.5.16 Repair of existing work. The work shall be carefully laid out in advance, and where cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, or other surfaces is necessary for the proper installation, support, or anchorage of the conduit, raceways, or other electrical work, this work shall be carefully done, and any damage to building, piping, or equipment shall be repaired by skilled mechanics of the trades involved, at no additional cost to the Government.

16B.6 Field tests and inspections.

NOTE: Additional test requirements shall be provided for equipment requiring running tests or tests coordinated with mechanical equipment.

16B.6.1 General. All defective material and workmanship disclosed as the result of the tests given herein shall be corrected at no cost to the Government. The contractor shall show by demonstration in service that all circuits and devices are in operating condition. Tests shall be such that each item of control equipment will function not less than five times. After completion of all work, an electrical circuit balance is to be made on the system by the contractor.

16B.6.2 Insulation resistance. Interior installations distributing systems, 600 volts and less, shall be tested for insulation resistance after all wiring is completed and connected ready for the attachment of fixtures and equipment, and again when fixtures and equipment are connected ready for use. Tests shall be made with an instrument capable of measuring accurately the resistance involved and having a voltage rating of 500 volts. Readings shall be taken after the voltage has been applied continuously for one minute. The insulation resistance between conductors and also between each conductor and ground shall be measured.

16B.6.3 Ground resistance tests. Ground resistance measurements of each ground rod shall be taken and certified by the contractor. Upon completion of the project, the contractor shall submit in writing to the contracting officer, the measured ground resistance of each ground rod grounding system, indicating the location of the rod and grounding system, as well as the resistant and soil conditions at the time the measurements were made. Ground resistance measurements shall be made in normally dry weather, not less than 48 hours after rainfall, and with the ground under test isolated from other ground.

16B.6.4 Tests and inspections. The Contracting Officer will conduct field inspections and witness all field tests specified in this section. The Contractor will perform all field tests, and provide all labor, equipment and incidentals required for testing, except that the Government will provide electric power required for field tests, if available.

SUPERSEDEAS DECISION Includes Mod. #1

AR-4041 P. 2

STATE: Mississippi
DECISION NUMBER: AR-4041

COUNTIES: Harrison, Hancock, Jackson & Pearl River
DATE: Date of Publication

Supersedes Decision No. AR-4032 in 39 FR 33161 dated September 13, 1974

DESCRIPTION OF WORK: Building construction (excluding single family homes and garden type apartments up to and including 4 stories), heavy, sewer, water & highway construction.

| BUILDING & HEAVY CONSTRUCTION | Basic Hourly Rates | Fringe Benefits Payments | | | |
|---|---|---|---|---|---|
| | | H & W | Pensions | Vacation | App. Tr. |
| Asbestos Workers (Pearl River County) | $7.25 | .40 | .90 | | |
| Asbestos Workers (Jackson, Hancock, and Harrison) | 8.60 | .395 | .75 | | .02 |
| Boilermakers | 7.13 | .40 | .70 | | .01 |
| Bricklayers: | | | | | |
| Bricklayers | 7.20 | | .15 | | |
| Stonemasons | 7.20 | | .15 | | |
| Marble Masons | 7.20 | | .15 | | |
| Terrazzo Workers | 7.10 | | .15 | | |
| Tile Setters | 7.10 | | .15 | | |
| Plasterers | 7.10 | | .15 | | |
| Blockmasons | 7.20 | | .15 | | |
| Caulkers & Pointers | 7.20 | | .15 | | |
| Cement Masons | 6.58 | | .15 | | |
| Carpenters: | | | | | |
| Carpenters | 7.00 | | | | |
| Soft Floor Layers | 7.00 | | | | |
| Millwrights | 7.32 | | | | |
| Electricians: | | | | | |
| Electricians | 7.80 | .25 | 1%+.20 | | 1/8% |
| Cable Splicers | 8.05 | .25 | 1%+.20 | | 1/8% |
| Elevator Constructors: | | | | | |
| Elevator Constructors | 6.39 | .345 | .23 | 2%+a+b | .015 |
| Helpers | 4.47 | .345 | .23 | 2%+a+b | .015 |
| Helpers (probationary) | 50%JR | | | | |
| Glaziers | 5.00 | | | | |
| Ironworkers: | | | | | |
| Structural, Ornamental, & Reinforcing | 8.13 | .50 | .30 | | |
| Laborers: | | | | | |
| Laborers | 4.35 | .10 | .10 | | |
| Asphalt Rakers, Mason Tenders, Mortar Mixers, Masonry Cleaners, Pipelayers (sewer, Power Saw Oper.) Pipe Wrapping, Power Post Hole Drillers, Railroad Men, Sand Blasting, and Vibrator-Jackhammer. | 4.50 | .10 | .10 | | |
| Lathers | 6.00 | | .10 | | .01 |
| Line Construction: | | | | | |
| Linemen | 7.80 | .25 | 1%+.20 | | 1/8% |
| Cable Splicers | 8.05 | .25 | 1%+.20 | | 1/8% |
| Groundmen: | | | | | |
| 1st 6 months | 3.40 | .25 | 1%+.20 | | 1/8% |
| Thereafter | 4.08 | .25 | 1%+.20 | | 1/8% |

| BUILDING & HEAVY CONSTRUCTION | Basic Hourly Rates | Fringe Benefits Payments | | | |
|---|---|---|---|---|---|
| | | H & W | Pensions | Vacation | App. Tr. |
| Painters (Jackson County): | | | | | |
| Commercial | | | | | |
| Brush | $5.83 | | | | .05 |
| Roller | 6.00 | | | | .05 |
| Spray | 6.68 | | | | .05 |
| Industrial | | | | | |
| Brush | 6.55 | | | | .05 |
| Spray & Sandblasting | 7.80 | | | | .05 |
| Painters (Hancock, Harrison, Pearl River): | | | | | |
| Commercial | | | | | |
| Brush & Roller | 5.30 | | | | .03 |
| Spray | 6.55 | | | | .03 |
| Structural Steel under 30' | | | | | |
| Brush & Roller | 5.55 | | | | .03 |
| Spray | 6.55 | | | | .03 |
| Piledrivermen | 8.00 | .30 | .30 | | |
| Piledrivermen on Creosote Material | 7.26 | .30 | .30 | | |
| Plumbers & Steamfitters | 7.70 | .26 | .20 | | .01 |
| Roofers: | | | | | |
| Roofers | 6.20 | | | | |
| Helpers | 4.40 | | | | |
| Kettlemen | 5.00 | | | | |
| Sheet Metal Workers | 7.315 | .25 | .40 | .25 | .10 |
| Sprinkler Fitters | 8.60 | .50 | .70 | | .08 |

PAID HOLIDAYS

A-New Year's Day B-Memorial Day C-Independence Day
D-Labor Day E-Thanksgiving Day F-Christmas Day

FOOTNOTES:

a. Holidays: A through F

b. Employer contributes 4% of regular hourly rate to Vacation Pay Credit for employee who has worked in business more than 5 years. Employer contributes 2% of regular hourly rate to Vacation Pay Credit for employee who has worked in business less than 5 years.

c. Holidays: Labor Day, Mardi Gras Day, provided the employee works at least one day out of the 3 workdays prior to the paid holiday, and the first workday after the paid holiday.

BUILDING AND HEAVY CONSTRUCTION

POWER EQUIPMENT OPERATORS:

| | Basic Hourly Rates | Fringe Benefits Payments | | | |
|---|---|---|---|---|---|
| | | H & W | Pensions | Vacation | App. Tr. |
| GROUP 1 | $7.75 | .25 | .25 | | |
| GROUP 2 | 6.80 | .25 | .25 | | |
| GROUP 3 | 6.55 | .25 | .25 | | |
| GROUP 4 | 6.00 | .25 | .25 | | |
| GROUP 5 | 5.45 | .25 | .25 | | |
| GROUP 6 | 5.45 | .25 | .25 | | |

GROUP 1:
Engineer - operating under air pressure

GROUP 2:
Mechanic

GROUP 3:
Air tugger (2 drum), asphalt plant, backhoe, blacksmith, boom tractor, bulldozer, central mixing plant, cherry picker, clamshell, crane, derrick, derrick boat, derrick car, dragline, dredge, elevating grader, excavator (power belt), fork lift, hoist (2 drum), locomotive engineer, marine engineer (chief), master pilot, mixermobile, motor patrol & similar type equipment, paver (21 C.F. or larger), piledriver, recharger, reaming greaser (1st), scoop (skimmer), scraper, shovel, trenching machine (over 16" bucket line width), tournapull, EW-10 & similar pulltype scrapers, truxcavator and similar endloaders, welder, welding machines or S/W pumps (2 to 6), well driller, well point pumps

GROUP 4:
Air tugger, asphalt spreader (bituminous distributor) asphalt spreader (bituminous mixer), backfilling machine, conveyor, drill (earth), finishing machine, fireman, heating plant, hoist, marine engineer (assistant), mixer, payloader, and similar endloaders, pilot, power generating plant, pump (concrete), roller, scoopmobile, tractor (with power take-off), trenching machine (16" or smaller bucket line width), tugboat, well driller (1st helper), winch truck

GROUP 5:
Air compressor, form grader, locomotive hostler, mechanic helper, oiler (truck crane), pump, roughneck, tractor (without attachments), welding machine

GROUP 6:
Batch scale, deckhand, motorboat (in or outboard), oiler, scowman



BUILDING AND HEAVY CONSTRUCTION

TRUCK DRIVERS:

| | Basic Hourly Rates | Fringe Benefits Payments | | | |
|---|---|---|---|---|---|
| | | H & W | Pensions | Vacation | App. Tr. |
| GROUP 1 | $5.04 | .28 | .25 | | |
| GROUP 2 | 5.51 | .28 | .25 | | |
| GROUP 3 | 6.55 | .28 | .25 | | |
| GROUP 4 | 7.12 | .28 | .25 | | |
| GROUP 5 | 5.04 | .28 | .25 | | |
| GROUP 6 | 4.41 | .28 | .25 | | |

GROUP 1:
Up to and including 1½ tons such as station wagons, jeeps, autos, pick-up trucks, motorcycles, bicycles, truck spotters, teamsters, team drivers

GROUP 2:
1½ tons up to but not including 5 tons such as dump trucks, flat beds, stake bodies, bus drivers, winch and "A" frame trucks

GROUP 3:
5 tons or 6 yards and over including heavy equipment such as pole trucks, miss or corning wagons, dumpsters, semi-drivers, agitators, ross carriers, dempsey dumps, euclid trucks, forklift truck in warehouses and similar equipment such as tractors, 10 wheelers, jeeps, or dump trucks or pick-up trucks pulling 2 or 4 wheel trailers hauling equipment

GROUP 4:
Truck and auto mechanics

GROUP 5:
Truck drivers' helpers, unloaders, unloading and handling creosote or coppertox material

GROUP 6:
Truck drivers' helpers

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SEWER, WATER, & HIGHWAY CONSTRUCTION

| | Basic Hourly Rates | Fringe Benefits Payments | | | |
|---|---|---|---|---|---|
| | | H & W | Pensions | Vacation | App. Tr. |
| Air Tool Operator | $2.00 | | | | |
| Asphalt Raker | 2.50 | | | | |
| Bricklayer | 4.25 | | | | |
| Carpenter | 3.50 | | | | |
| Cement Mason (Finisher) | 3.25 | | | | |
| Concrete Saw Operator | 3.65 | | | | |
| Electrician | 5.40 | | | | |
| Form Setter | 2.60 | | | | |
| Grade Checker | 2.25 | | | | |
| Ironworker, Reinforcing | 3.50 | | | | |
| Ironworker Helper, Reinforcing | 2.25 | | | | |
| Ironworker, Structural | 3.15 | | | | |
| Laborer, Unskilled | 2.00 | | | | |
| Mason Tender (Cement Mason Helper) | 2.50 | | | | |
| Painter (Structural Steel) | 3.75 | | | | |
| Pile driverman | 3.00 | | | | |
| Truck Driver | 2.00 | | | | |
| Tugboat Operator | 2.50 | | | | |
| Welder | 3.50 | | | | |
| Power Equipment Operators: | | | | | |
| "A" Frame Truck (winch) | 2.40 | | | | |
| Aggregate Spreader | 2.71 | | | | |
| Air Compressor | 2.60 | | | | |
| Asphalt Distributor Spreader | 2.60 | | | | |
| Asphalt Plant | 2.90 | | | | |
| Backhoe or Shovel Operator | 3.25 | | | | |
| Bulldozer Operator | 3.00 | | | | |
| Concrete Batch Plant | 3.25 | | | | |
| Concrete Finishing Machine | 3.00 | | | | |
| Concrete Paving Machine | 3.35 | | | | |
| Concrete Spreader Machine | 2.85 | | | | |
| Crane, Dragline | 3.50 | | | | |
| Crusher Feeder | 2.75 | | | | |
| Curing Machine | 2.80 | | | | |
| Earth Auger | 3.00 | | | | |
| Fireman | 3.00 | | | | |
| Guard Rail Post Driver | 2.50 | | | | |
| Joint Filler | 2.90 | | | | |
| Loader (all types) | 3.[illegible] | | | | |
| Mechanic | 3.40 | | | | |
| Mixer (all types) | 3.60 | | | | |
| Motor Patrol | 3.[illegible] | | | | |
| Mulcher | 2.90 | | | | |
| Oiler-Greaser | 2.40 | | | | |
| Pile Driver | 3.50 | | | | |
| Roller (self propelled) | 2.[illegible] | | | | |

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SEWER, WATER, & HIGHWAY CONSTRUCTION

| | Basic Hourly Rates | Fringe Benefits Payments | | | |
|---|---|---|---|---|---|
| | | H & W | Pensions | Vacation | App. Tr. |
| Power Equipment Operators (Cont'd) | | | | | |
| Pipelayers | $2.35 | | | | |
| Scales (all types) | 2.35 | | | | |
| Scraper | 3.00 | | | | |
| Striping Machine | 3.25 | | | | |
| Sub Grade Machine | 3.35 | | | | |
| Tractor (Track Type) | 2.25 | | | | |
| Tractor (Wheel Type) | 2.00 | | | | |
| Trenching Machine | 2.50 | | | | |