



**US Army Corps  
of Engineers®**  
Huntington District

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# **Specifications for**

## **FABRICATION OF STOPLOG UNITS**

**B. EVERETT JORDAN DAM,  
CHATHAM, NORTH CAROLINA.**

**Certified Final Documents - RTA**

**DEPARTMENT OF THE ARMY  
HUNTINGTON DISTRICT, CORPS OF ENGINEERS  
HUNTINGTON, WEST VIRGINIA**

**November 2022**

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BEJ01

**BIDDING SCHEDULE**

<b>ITEM NO.</b>	<b>DESCRIPTION</b>	<b>ESTIMATED QUANTITY</b>	<b>UNIT</b>	<b>UNIT PRICE</b>	<b>ESTIMATED AMOUNT</b>
1	Fabrication of Two (2) Stoplog Units	1	Job	Sum	\$ _____
2	Final "As-built" Documents	1	Job	Sum	\$ _____
3	Shipment and Delivery	1	Job	Sum	\$ _____
<b>Total (Items 1 thru 3)</b>					<b>\$ _____</b>

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## GENERAL REQUIREMENTS

## PART 1 GENERAL

## 1.1 SUMMARY

This section covers general requirements applicable to the performance of the work under this delivery order. These requirements are in addition to those specified in other sections of the delivery order.

## 1.2 REFERENCES

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

## AMERICAN WELDING SOCIETY (AWS)

AWS D1.5M/D1.5 (2020; Errata 1 2022) Bridge Welding Code

## ASTM INTERNATIONAL (ASTM)

ASTM A709/A709M (2021) Standard Specification for Structural Steel for Bridges

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-01 Prefabrication Submittals

List of Employees; G|MCX  
Investigation Package for Contractor and Subcontractor Employees;  
G|MCX  
Production Schedule; G|MCX

Production schedule shall be submitted for approval.

Updated Progress Chart; G|MCX

Updated progress charts shall be submitted monthly for approval.

## SD-07 Certificates

Contractor Quality Control Plan (CQC); G|MCX

The Contractor shall submit a written quality control plan for approval in accordance with Paragraph INSPECTIONS AND ACCEPTANCE OF WORK.

#### 1.4 SCOPE

The work covered by this specification consists of the fabrication, assembly, and delivery of two (2) stoplog units as specified and shown on the drawings. The stoplog units shall be a complete welded steel structures with fabrication and assembly performed in a fabrication shop. The Contractor will be required to commence work under this contract within ten (10) calendar days after the day of receipt by them of the Notice of Award, to prosecute said work diligently. The stoplog unit has a total damming surface of 4 feet 8 inches , and 24 feet 6 inches in width. The stoplog unit consist of lifting lugs, perimeter J-bulb and/or block rubber seals, and steel wheels/shaft.

FCM are shown on the Contract Drawings and include all attachments and connections to these members as defined in AWS D1.5M/D1.5. All materials to be welded must be ASTM A709/A709M, killed steel, grade as specified or shown on the drawings. Use Grade 50 steel unless otherwise shown or specified. Mill repairs of base metal are prohibited. Unless otherwise indicated or specified, meet toughness requirements for fracture critical members in tension in accordance with ASTM A709/A709M for Zone 2. All materials used for the construction of fracture critical components must meet the applicable requirements of ASTM A709/A709M for fracture critical components. Welding for fracture critical members must meet all requirements of AWS D1.5M/D1.5 AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause.

This Contract shall meet the requirements per Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES. Delivery shall be made as described in these specifications.

Individuals that work for the Contractor, or whom are hired by the Contractor, that will require access to the B. Everett Jordan project will need to meet the security requirements and AT/OPSEC requirements contained in these specifications. This shall include the delivery truck personnel and the Contractor's representative(s) that will perform the final inspection once the stoplog unit has been delivered to the projects.

#### 1.5 DOCUMENT SECURITY

Contractors working for and on USACE projects shall provide the appropriate physical security for all related items as detailed/prescribed in AR 380-5, dated 29 September 2000.

##### 1.5.1 Controlled Unclassified Information (CUI)

Controlled Unclassified Information (CUI): The unauthorized disclosure of the information contained in the attached documents is forbidden to protect the Government's interest in compliance with DoD Directive 5143.01 and DoD Manual 5200.01, and as follows:

- a. During working hours, steps will be taken to minimize the risk of access by unauthorized personnel, such as not reading, discussing, or leaving CUI information unattended where unauthorized personnel are present. After working hours, CUI information will be stored in unlocked containers, desks, or cabinets if the government or government-contract building provides security for continuous monitoring of access. If building security is not provided, the information will be stored in locked desks, file cabinets, bookcases, locked rooms, or similarly secured areas. The concept of a controlled

environment means there is sufficient internal security measures in place to prevent or detect unauthorized access to CUI. For DoD, an open storage environment meets these requirements.

b. CUI information and material may be transmitted via first class mail, parcel post, or, bulk shipments. When practical, CUI information may be transmitted electronically (e.g., data, website, or e-mail), via approved secure communications systems or systems utilizing other protective measures such as Public Key Infrastructure or transport layer security (e.g., https). Avoid wireless telephone transmission of CUI when other options are available. CUI transmission via facsimile machine is permitted; however, the sender is responsible for determining whether appropriate protection will be available at the receiving location before transmission (e.g., facsimile machine attended by a person authorized to receive CUI; facsimile machine located in a controlled government environment).

c. Record and non-record copies of CUI documents will be disposed of in accordance with Chapter 33 of Title 44, U.S.C. and the DoD Components' records management directives. When destroying CUI, including in electronic form, agencies must do so in a manner making it unreadable, indecipherable, and irrecoverable. If the law, regulation, or government-wide policy specifies a method of destruction, agencies must use the method prescribed.

d. Record and non-record CUI documents may be destroyed by means approved for destroying classified information or by any other means making it unreadable, indecipherable, and unrecoverable the original information such as those identified in NIST SP 800-88 and in accordance with Section 2002.14 of Title 32, CFR.

## 1.6 SECURITY REQUIREMENTS

All Contractors and subcontractor employee(s) working on this contract who require access in and/or around any Wilmington District facilities shall receive authorization to be on site at these facilities based upon a favorable background investigation in accordance with "Homeland Security Presidential Directive 12: Policy for a Common Identification Standard for Federal Employees and Contractors" (HSPD 12). The Wilmington District Security Management Office shall submit contractor(s) personal information to complete the basic background investigation in order to make a recommendation to the Contracting Office of an employee's suitability for work on Government property. The Procuring Contracting Officer (PCO) has the right to deny any contractor or subcontractor employee from working on the contract based upon the results of the background investigation provided by the Wilmington District Security Management Office. The Government, Contractor, and subcontractors shall not permit any employee(s) access to drawings, blueprints, records, photos, sites, or projects until the Wilmington District Security Management Office has completed an Operations Security (OPSEC) review of such items and determined they can be released.

### 1.6.1 For All Contracts 1-Year and Subsequent Option Years:

Contractors shall submit a complete investigation packet for each contractor and subcontractor employee to the Wilmington District Security Management office within 10 working days after award of any contract, or prior to the individual being permitted unescorted access in or on District facilities.

The Contractor must also provide the following: (1) Name of the Contract Specialist with whom he/she is working, (2) Project Name, (3) Contract Number (4) Task Order Number when applicable, and (5) Security Information sheet on each employee working on site must be submitted directly to the Wilmington District Security Office.

The Contractor must provide a full legal name, complete SSN#, Date of Birth, Place of Birth (City and State) and Driver's license number if available. It is the Contractor's responsibility to ensure the above information is accurate and legible, otherwise delays may occur.

Contractors shall have background checks completed for their employees annually in the case of Contracts with option periods. For instance, if the employee was cleared in May of 2018, they shall be cleared again in May of 2019. It is the Contractor's responsibility to ensure that each employee's security is up to date. Failure to comply may lead to possible removal from the project/jobsite.

The Contractor must ensure if new employees are brought in to work on an existing Contract with the U.S. Army Corps of Engineers (USACE), they must process the employee through the Wilmington District USACE Security Management Office for background purposes.

#### 1.6.2 For Contractors Requiring DOD Common Access Cards (CAC)

The documents listed below are required:

SF 85, Questionnaire for Non-Sensitive Positions (see <http://www.opm.gov/forms/> to print form). FD 258, Contractor Fingerprint Card (one card for digital prints, two for ink prints) (NOTE: a trained/qualified individual must take prints, ORI block on the FD 258 must be USOPM000Z) (Contractor Fingerprint Cards (FD-258) may be obtained by Contracting Division by contacting the Wilmington District Security Management Office).

Contractor shall report any changes in personnel, or at any time conditions change at least 5 working days prior to individual(s) need to have access to the site. The Contractor shall provide the same information as listed above for all new employees.

Following submission of paperwork, the Wilmington District Security Management Office will conduct an initial criminal check based upon the information provided. If there are no issues, the Wilmington District Security Management Office will make recommendations to the PCO or their Designated Representative. The Wilmington District Security Management Office cannot give approval due to unfavorable report(s). The Wilmington District Security Management Office shall coordinate with Office of Counsel and will jointly make recommendations to the PCO and/or the Designated Representative should a background investigation come back with derogatory information. The PCO will make the determination whether to allow the Contractor personnel to work on the site based on Security and Office of Counsel recommendations, and the PCO will advise the Contractor of the decision.

#### 1.6.3 Foreign Nationals

The Contractor shall provide the package listed above, as well as additional materials noted below for all Foreign Nationals. The

Contractor is to expect additional time in the approval process for all Foreign Nationals due to the level of review and elevation of the review to Headquarters staff to complete. All Foreign Nationals must comply with the following paragraph:

In accordance with Engineering Regulation 380-1-18, "Technology Transfer, Disclosure of Information and Contacts with Foreign Representatives" dated 1 August 1996, Section 4, all foreign nationals who work on Corps of Engineers' contracts shall be approved by the Headquarters US Army Corps of Engineers (HQ USACE) Foreign Disclosure Officer before beginning work on this contract; this regulation includes subcontractor employees. The Contractor shall submit to the Security Management Office, the names of all foreign nationals proposed for performance under this contract, along with documentation to verify legal admittance into the United States. Such documentation shall include at least one of the following: a U.S. passport, Certificate of U.S. Citizenship (INS Form N-560 or N-561), Certificate of Naturalization (INS Form N-550 or N-570), Alien Registration Card with photograph (INS Form I-151 or I-551), Employment Authorization Card (INS Form I-688A), etc.

In order to assure forms are properly completed, and to minimize time delays, the Contractor is encouraged to work closely with the Wilmington District Security Management Office. The Government will return for correction incomplete forms, illegible forms, etc. which will delay the contractor / subcontractor from beginning work.

Security requirements are subject to change in accordance with HSPD-12, Office of Personnel Management, regulation or policy changes, etc. The Government shall add any changes to security requirements by modification to the contract.

The Contractor shall contact the Wilmington District Security Management Office by phone, letter, or email at the following numbers/addresses:

CESAW-SL  
69 Darlington Avenue  
Wilmington, NC 28403

Mark A. Simms, phone (910) 251-4809;  
Email: Mark.A.Simms@usace.army.mil

## 1.7 AT/OPSEC REQUIREMENTS

### 1.7.1 General Security Requirements and Guidance

The security requirements described below apply to all contract personnel (including employees of the prime Contractor ("Contractor") and all subcontractor employees) supporting the performance requirements of this contract. The Contractor is responsible for compliance within these security requirements. Questions regarding security matters shall be addressed to the designated Government representative (e.g., Contracting Officer Representative (COR), Requiring Activity (RA) representative, or Contracting Officer (if a COR or other RA representative is not appointed)). Contract personnel are critical to the overall security and safety of US Army Corps of Engineers (USACE) installations, facilities and activities, and security awareness training contributes to those efforts. The Department of Defense (DoD) and Army security training specified below, if applicable, are performance requirements; all applicable contract personnel shall complete initial training within 30 calendar days

of contract award or the date new contract personnel begin performance on the contract. Within five business days from the completion of training, the Contractor shall provide written documentation (e.g., email or memorandum) to the Government Representative. The documentation shall include the names of the contract personnel trained and which training they completed; the Contractor shall maintain training records as part of their contract files and be prepared to provide copies of training certificates to the Government representative. Contractor personnel and vehicles are subject to search when entering federal installations. Additionally, all contract personnel shall comply with Force Protection Condition (FPCON) measures, Random Antiterrorism Measures (commonly referred to as "RAMs"), and Health Protection Condition (HPCON) measures. The Contractor is responsible for meeting performance requirements during elevated FPCON and/or HPCON levels in accordance with applicable RA plans and procedures--this includes identifying mission essential and non-mission essential personnel. In addition to the changes otherwise authorized by the changes clause of this contract, should the FPCON or HPCON levels at any individual facility or installation change, the Government may implement security changes that affect contract personnel. The Contractor shall ensure all contract personnel are aware of their security responsibilities, including any site-specific requirements identified in local policies or procedures.

#### 1.7.2 Antiterrorism (AT) Level 1 Training

All contract personnel requiring routine access to Army installations, facilities, and controlled access areas, or requiring network access shall complete initial and annual refresher AT Level 1 awareness training. Online AT Level 1 awareness training is available at <https://jko.jten.mil/> (website subject to change).

#### 1.7.3 Suspicious Activity Reporting Training

All contract personnel shall receive initial and annual refresher training from the RA representative on the local suspicious activity reporting program. This locally developed training provides contract personnel with general information on suspicious behavior, and guidance on reporting suspicious activity to the project manager, security representative or law enforcement entity.

#### 1.7.4 Pre-Screen Candidates Using E-Verify Program

Contractors shall comply with the requirements set forth in FAR clause 52.222-54 Employment Eligibility Verification and FAR Subpart 22.18 in using the E-Verify Program (<https://www.e-verify.gov/>) (website subject to change) to meet the contract employment eligibility requirements. Contractors are encouraged to cooperate with Federal and State agencies responsible for enforcing labor requirements to include eligibility for employment under United States immigration laws in accordance with FAR 22.102-1(i). An initial list of verified/eligible candidates shall be provided to the COR no later than three business days after the initial contract award. When contracts are with individuals, the individuals will be required to complete a form I-9, Employment Eligibility Verification, and submit it to the Contracting Officer to become part of the official file.

### 1.8 RECORDKEEPING AND REPORTING

The Contractor shall maintain a roster of all background investigation

requests. The roster shall be maintained and available for inspection by the Contracting Officer upon request. A copy will also be provided to the Contracting Officer on a monthly basis. At a minimum, the roster shall include the following information:

Full Name of Employee Employer  
 Date Phase I Background Check Requested Date of Phase I  
 Approval/Disapproval  
 Date Phase II Background Investigation Requested Date of Phase II  
 Approval/Disapproval  
 Date Foreign National/Recent U.S. Citizen Check Requested  
 Date Foreign National/Recent U.S. Citizen Check Approval/Disapproval

Other information may also be included on the roster. However, the Contractor is responsible for protecting all sensitive personal information such as social security numbers, birth dates, etc.

#### 1.9 DRAWINGS

The Drawings reflect the work to be performed under this delivery order. In accordance with these Contract Specifications, the Contractor shall check all drawings immediately upon receipt, and verify the figures, dimensions, and the representation of the work, and shall promptly notify the Contracting Officer or their authorized representative of any discrepancies. Any omissions from the drawings or misdescription of details of the work which are manifestly necessary to carry out the intent of the drawings, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of work.

#### 1.10 INSPECTIONS AND ACCEPTANCE OF WORK

Items furnished under this delivery order shall be inspected in accordance with Section 35 20 16.53 EMERGENCY BULKHEAD. The Contracting Officer or their authorized representative shall be the individual(s) solely authorized to reject materials, disapprove or approve any work in progress, or order or direct any revision or change to the plans and specifications as presently shown and stated.

#### 1.11 CONTRACTOR QUALITY CONTROL

The Contractor shall be responsible for quality control and shall establish and maintain an effective quality control system in accordance with all applicable specification sections. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the requirements of this contract. The system shall cover all fabrication, painting and delivery operations.

#### 1.12 CONTRACT MODIFICATIONS (Change Orders)

Modifications shall be made in accordance with FAR 52.212-4).

#### 1.13 SAFETY

Safety shall be the responsibility of the Contractor. Comply with the provisions of SPECIAL CONTRACT REQUIREMENTS Section of the specifications.

#### 1.14 PERMITS, LICENSES, FEES AND TAXES

The Contractor shall ascertain the extent of, and pay for all necessary

permits, licenses, fees, and taxes.

#### 1.15 PROJECT CONFERENCES

Comply with the provisions of SPECIAL CONTRACT REQUIREMENTS Section of the specifications.

#### 1.16 REFERENCE STANDARDS

Comply with the individual technical specifications sections and with Section 01 42 00 SOURCES FOR REFERENCE PUBLICATIONS.

#### 1.17 FABRICATION PHOTOGRAPHS

Comply with Section 01 38 10.00 10 PROGRESS PHOTOGRAPHS of the specifications.

### PART 2 PRODUCTS

#### 2.1 PRODUCTS AND PARTS OF STANDARD MANUFACTURE

All materials, supplies and articles furnished so as to be incorporated into the work under this contract shall, whenever so specified and otherwise practicable, be standard products of recognized reputable manufacturers. All products specified by "similar or equal to" a particular brand name are for descriptive purposes only and are not to imply that the product is available from only that source.

### PART 3 EXECUTION

#### 3.1 COMBINED PRODUCTION SCHEDULE AND PROGRESS CHART

The Contractor shall, within fifteen (15) days after receipt of Notice of Award, submit a proposed schedule showing how the Contractor proposes to perform the work, the dates on which he will start the several salient features, including procurement of materials, fabrication, assembly, testing, cost breakdown and the contemplated dates for completion and shipment. The schedule shall be in the form of a bar graph of suitable scale to indicate appropriately the percentage of work scheduled for completion at any time on the salient features as well as the completion of all work. The Contractor shall enter on the graph the actual progress at the end of each month, and shall immediately deliver a copy to the Contracting Officer or their authorized representative. These updated progress charts reflecting actual progress will be considered "Production Progress Reports" as used in SPECIAL CONTRACT REQUIREMENTS Section.

#### 3.2 SEQUENCE OF WORK

The work shall be prosecuted in such order of precedence as best suits the Contractor's fabrication schedule. The Contractor shall perform the work in a diligent, effective manner, and shall schedule his operations in such a manner that the work is completed on time.

#### 3.3 RECORD "AS-BUILT" DOCUMENTS

The preparation, updating, and submittal of "as-built" documents shall comply with Section 01 78 00 CLOSEOUT SUBMITTALS.

### 3.4 RECORDS AND REPORTS

All records, test reports and similar documentation produced in connection with quality control operations shall be promptly submitted to the Contracting Officer or their authorized representative as required by the specifications.

### 3.5 DELIVERY

The stoplog units to be furnished under this contract shall be delivered by truck to B. Everett Jordan Dam at 2080 Jordan Dam Access Road Chatham, North Carolina 27559-0144. The stoplog units shall be delivered as one completely welded gate unit. All appurtenant seals, bearing bars, and guide bars shall be attached to the gate for delivery. Upon delivery to B. Everett Jordan Dam, the Contractor and Contracting Officer or their authorized representative shall perform a joint inspection of the stoplog unit prior to off-loading. The Contractor shall document any additional damages that may have occurred during shipment of the stoplog units. After this inspection is completed, the Contractor shall off load the stoplog units from Contractor's truck using a method that has been approved by the Contracting Officer. The Contractor shall notify the Contracting Officer or their authorized representative at least 48 hours prior to the approximate time of delivery. The Contractor shall be responsible for the repair of any damages that occur during shipment of the stoplog units to the Government. All damages shall be corrected to the satisfaction of the Contracting Officer or their authorized representative at the Contractor's expense.

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## SUBMITTAL PROCEDURES

## PART 1 GENERAL

The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections.

Units of weights and measures used on all submittals are to be the same as those used in the contract drawings.

Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

Contractor's Quality Control (CQC) System Manager to check and approve all items prior to submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; certifications; warranties; and other such required submittals.

Submittals requiring Government approval are to be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

## 1.1 DEFINITIONS

## 1.1.1 Submittal Descriptions (SD)

Submittal requirements are specified in the technical sections. Submittals are identified by Submittal Description (SD) numbers and titles as follows:

## SD-02 Shop Drawings

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

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

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

## SD-03 Product Data

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

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

#### SD-06 Test Reports

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

Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for the project before shipment to jobsite.

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

Investigation reports.

Daily logs and checklists.

Final acceptance test and operational test procedure.

#### SD-07 Certificates

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

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

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

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

Factory test reports.

#### 1.1.2 Approving Authority

Approving Authority shall be the Contracting Officer.

#### 1.1.3 Work

As used in this section, on- and off-site fabrication required by contract

documents, including labor necessary to produce submittals, fabrication, materials, products, equipment, and systems incorporated or to be incorporated in such fabrication.

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with this section.

### SD-01 Preconstruction Submittals

Submittal Register; G|MCX

## 1.3 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

### 1.3.1 Government Approved

Government approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer.

### 1.3.2 Information Only

Submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

## 1.4 PREPARATION

### 1.4.1 Transmittal Form

Use the attached sample transmittal form (ENG Form 4025) for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. Properly complete this form by filling out all the heading blank spaces and identifying each item submitted. Exercise special care to ensure proper listing of the specification paragraph and sheet number of the contract drawings pertinent to the data submitted for each item.

### 1.4.2 Electronic File Format

Provide submittals other than material samples in both hard copy (paper) and electronic formats. The electronic submittal file must be compiled as a single, complete document, to include the Transmittal Form described in Paragraph TRANSMITTAL FORM. The electronic submittal file must be named specifically according to its contents (e.g. 01 45 00.00-1.2\_Quality Control Plan.pdf).

Electronic files must be of sufficient quality that all information is legible. Electronic format shall be in Adobe.PDF format, unless otherwise specified or directed by the Contracting Officer's Representative (COR). Whenever possible, PDF files shall be generated from original documents so that the text included in the PDF file is both searchable and can be

copied. If documents are scanned, Optical Character Resolution (OCR) routines are required. Files exceeding 30 pages shall be indexed and bookmarked to allow efficient navigation of the file. When required, the electronic file must include a valid electronic signature, or scan of a signature.

Email electronic submittal documents fewer than 10MB to an email address as directed by the Contracting Officer. Electronic documents over 10MB shall be provided on a CD/DVD, or through an electronic file sharing system such as the AMRDEC SAFE Web Application located at the following website:

<https://safe.amrdec.army.mil/safe/>

Provide hard copies of submittals as specified in this or other specification sections. Up to six (6) additional hard copies of any submittal may be requested from the Contractor at the discretion of the Contracting Officer, at no additional cost to the Government.

#### 1.5 INFORMATION ONLY SUBMITTALS

Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

#### 1.6 VARIATIONS / SUBSTITUTION REQUESTS

Variations from contract requirements require Government approval and will be considered where advantageous to Government.

##### 1.6.1 Considering Variations

Discussion with Contracting Officer prior to submission, will help ensure functional and quality requirements are met and minimize rejections and re-submittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

Specifically point out variations from contract requirements in transmittal letters. The Government reserves the right to override and reject any submittals previously approved if the Contractor fails to have pointed out variations from the specifications in respective transmittal letters.

Failure to point out deviations may result in the Government requiring rejection and removal of such work at no additional cost to the Government.

##### 1.6.2 Proposing Variations

When proposing variation, deliver written request to the Contracting Officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to Government. If lower

cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

Check the column "variation" of ENG Form 4025 for submittals which include proposed deviations requested by the Contractor. Set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

#### 1.6.3 Warranting That Variations Are Compatible

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

#### 1.6.4 Review Schedule Is Modified

In addition to normal submittal review period, a period of ten (10) working days will be allowed for consideration by the Government of submittals with variations.

### 1.7 SUBMITTAL REGISTER

Attached at the end of this section is one set of ENG Form 4288 listing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. The Contractor shall prepare and maintain the submittal register, as the work progresses. Do not change data which is output in columns (c), (d), (e), and (f) as delivered by Government; retain data which is output in columns (a), (g), (h), and (i) as approved. The Contractor shall maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Government will be included on the submittals returned by the Government to the Contractor.

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

Column (d): Lists each submittal description (SD No. and type, e.g. SD-02 Shop Drawings) required in each specification section.

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

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

#### 1.7.1 Use of Submittal Register

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

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

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

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

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

#### 1.7.2 Contractor Use of Submittal Register

Update the following fields in the Government-furnished submittal register program with each submittal throughout contract.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

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

Column (l) List date of submittal transmission.

Column (q) List date approval received.

#### 1.7.3 Approving Authority Use of Submittal Register

Update the following fields in the Government-furnished submittal register program.

Column (b) Transmittal Number: Contractor assigned list of consecutive numbers.

Column (l) List date of submittal receipt.

Column (m) through (p) List Date related to review actions.

Column (q) List date returned to Contractor.

#### 1.7.4 Contractor Action Code and Action Code

Entries for columns (j) and (o), are to be used are as follows (others may be prescribed by Transmittal Form):

A - Approved as submitted

B - Approved, except as noted on drawings

C - Approved, except as noted on drawings. Refer to attached sheet resubmission required.

D - Will be returned by separate correspondence.

E - Disapproved (See attached)

F - Receipt acknowledge.

FX - Receipt acknowledged, does not comply as noted with contract requirements.

G - Other (specify)

#### 1.7.5 Copies Delivered to the Government

Deliver one copy of submittal register updated by Contractor to Government with each invoice request.

#### 1.8 SUBMITTAL PROCEDURES

Submittals shall be made as follows:

##### 1.8.1 Procedures

a. Four (4) copies of submittals shall be submitted to:

US Army Corps of Engineers  
ATTN: US Army Corps of Engineers  
ATTN: CELRH-DSMMCX-GE  
502 8th street  
Huntington, WV. 25701

Transmit each item under the attached sample transmittal form ENG 4025.

b. After the Government's review of submittal, revise and resubmit as required, identifying changes made since previous submittal.

c. Update schedule every thirty (30) calendar days and submit.

d. Distribute copies of review submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

e. Correspondence shall be sequentially numbered throughout the duration of the contract.

f. A copy of all submittals and correspondence developed under this contract shall be delivered to Huntington District in PDF (Adobe Acrobat) format at appropriate submittal times, e.g., project completion, with each submittal as required in the Schedule of Work, etc. The electronic digital data and files shall be provided on CD-ROM or via email, as directed by the Contracting Officer. The electronic digital media shall be in a format which can be read and processed by the Huntington District.

##### 1.8.2 Shop Drawings

Reproduced contract drawings submitted as shop drawings will not be acceptable. Shop drawings maximum size (cut edges) shall be 30 by 42 inches. All prints submitted shall have a clear space 3 by 4 inches in size, in the lower right hand corner just above the title in which the Contracting Officer or his authorized representative may indicate the action taken. When blueprints are submitted the space shall be white. All final shop drawings shall be of reproducible quality.

### 1.8.3 Technical Data and Manufacturer's Literature

Where materials are stocked with the manufacturer, catalog data, including specifications and full descriptive matter, may be submitted as shop drawings. When catalog data includes non-applicable data, the applicable data shall be clearly designated and identified by item number, item name, and name of manufacturer.

### 1.9 SCHEDULING

Schedule and submit concurrently submittals covering component items forming a system or items that are interrelated. Include certifications to be submitted with the pertinent drawings at the same time. A minimum of thirty (30) calendar days (exclusive of mailing time) shall be allowed and shown on the register for review and approval. No delay damages or time extensions will be allowed for time lost in late submittals.

- a. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Adequate time (a minimum of thirty (30) calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval. Allow for potential resubmittal of requirements.
- b. Submittals called for by the contract documents will be listed on the register. If a submittal is called for but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the contract documents but which have been omitted from the register or marked "N/A".
- c. Re-submit register and annotate monthly by the Contractor with actual submission and approval dates. When all items on the register have been fully approved, no further re-submittal is required.
- d. Carefully control procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

### 1.10 GOVERNMENT APPROVING AUTHORITY

When approving authority is Contracting Officer, the Government will:

- a. Note date on which submittal was received.
- b. Review submittals for approval within scheduling period specified and only for conformance with project design concepts and compliance with contract documents.

Upon completion of review of submittals requiring Government approval, stamp and date approved submittals. Two (2) copies of the approved submittal will be retained by the Contracting Officer and two (2) copies of the submittal will be returned to the Contractor. If the Government performs a conformance review of other Designer of Record approved submittals, the submittals will be so identified and returned, as described above.

### 1.11 DISAPPROVED SUBMITTALS

Contractor shall make corrections required by the Contracting Officer. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications; notice as required under the clause entitled, "CHANGES" is to be given to the Contracting Officer. Contractor is responsible for the dimensions and design of connection details and construction of work. Failure to point out deviations may result in the Government requiring rejection and removal of such work at the Contractor's expense.

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

### 1.12 APPROVED SUBMITTALS

The Contracting Officer's approval or acceptance of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing and other information are satisfactory. Approval or acceptance shall not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for the satisfactory construction of all work. After submittals have been approved or accepted by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

### 1.13 APPROVED SAMPLES

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

Match the approved samples for materials and equipment incorporated in the work. If requested, approved samples, including those which may be damaged in testing, will be returned to the Contractor, at his expense, upon completion of the contract. Samples not approved will also be returned to the Contractor at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make of that material. Government reserves the right to disapprove any material or equipment which previously has proved unsatisfactory in service.

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

Approval of the Contractor's samples by the Contracting Officer does not

relieve the Contractor of his responsibilities under the contract.

1.14 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

1.15 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements is to be similar to the following:

<p>CONTRACTOR</p> <p>(Firm Name)</p> <p>_____ Approved</p> <p>_____ Approved with corrections as noted on submittal data and/or attached sheets(s)</p> <p>SIGNATURE: _____</p> <p>TITLE: _____</p> <p>DATE: _____</p>
---

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

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# SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

Fabrication of Stoplog Units at B. Everett Jordan Dam

CONTRACTOR

A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	D E S C R I P T I O N I T E M S U B M I T T E D	P A R A G R A P H	G O V T C L A S S I F I C A T I O N	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY			M A I L E D T O C O N T R / D A T E R C D F R M A P P R A U T H	R E M A R K S	
						S U B M I T	A P P R O V A L N E E D E D B Y	M A T E R I A L N E E D E D B Y	A C T I O N C O D E	D A T E O F A C T I O N	D A T E F W D T O A P P R A U T H / D A T E R C D F R O M C O N T R	D A T E F W D T O O T H E R R E V I E W E R	D A T E R C D F R O M O T H R E V I E W E R	A C T I O N C O D E			D A T E O F A C T I O N
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	01 11 01		SD-01 Preconstruction Submittals														
			List of Employees		G MCX												
			Investigation Package for Contractor and Subcontractor Employees		G MCX												
			Production Schedule		G MCX												
			Updated Progress Chart		G MCX												
			SD-07 Certificates														
			Contractor Quality Control Plan (CQC)		G MCX												
	01 33 00		SD-01 Preconstruction Submittals														
			Submittal Register	1.7	G MCX												
	01 38 10.00 10		SD-03 Product Data														
			Thumbnail Hard Copy Prints of Progress Images	3.1	G MCX												
			Glossy Prints of Selected Official Progress Images	3.1	G MCX												
			Electronic Copy of Selected Official Progress Images	3.1	G MCX												
			Electronic Copy of All Other Progress Images	3.1	G MCX												
	01 78 00		SD-02 Shop Drawings														
			As-Built Drawings	1.2.1	G MCX												
			SD-03 Product Data														
			As-Built Record of Equipment and Materials	1.2.2													

# SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

Fabrication of Stoplog Units at B. Everett Jordan Dam

CONTRACTOR

A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	D E S C R I P T I O N I T E M S U B M I T T E D	P A R A G R A P H	G O V T C L A S S I F I C A T I O N	CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY			M A I L E D T O C O N T R / D A T E R C D F R M A P P R A U T H	R E M A R K S	
						S U B M I T	A P P R O V A L N E E D E D B Y	M A T E R I A L N E E D E D B Y	A C T I O N C O D E	D A T E O F A C T I O N	D A T E F W D T O O T H E R R E V I E W E R	D A T E F W D T O A P P R A U T H /	D A T E R C D F R O M C O N T R	D A T E F W D T O O T H R E V I E W E R			D A T E R C D F R O M O T H R E V I E W E R
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	01 78 00		Data Book		G MCX												
	05 59 20		SD-01 Preconstruction Submittals														
			Shop Drawings	1.4.5	G MCX												
			Welding Procedure Specifications (WPS)	1.2.3	G MCX												
			Fracture Control Plan (FCP)	1.2.4.1	G MCX												
			Weld Tracking Log Template	1.2.1	G MCX												
			Weld Tracking Log	1.2.2	G MCX												
			Qualification of Welders and Welding Operators	1.4.1	G MCX												
			Inspector Qualifications	1.4.2	G MCX												
			Qualification of Structural Steel Fabricator	1.4.3	G MCX												
			NDT Inspector Certification	2.2.3.2.1	G MCX												
			Welding Repairs - Non-Fracture Critical Members	2.2.7	G MCX												
			Welding Repairs - Fracture Critical Members	2.2.7	G MCX												
			Performance Qualification Records	2.1.4.2	G MCX												
			Ultrasonic Written Procedure	2.2.3.2.4	G MCX												
			SD-02 Shop Drawings Assembly	2.1.2	G MCX												
			Delivery/Shipping Plan	1.5	G MCX												
			Erection Drawings	1.4.6	G MCX												
			SD-03 Product Data														

# SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION

Fabrication of Stoplog Units at B. Everett Jordan Dam

CONTRACTOR

A C T I V I T Y N O	T R A N S M I T T A L N O	S P E C S E C T	D E S C R I P T I O N I T E M S U B M I T T E D	P A R A G R A P H	G O V T C L A S S I F I C A T I O N	C O N T R A C T O R S C H E D U L E D A T E S			C O N T R A C T O R A C T I O N			A P P R O V I N G A U T H O R I T Y			M A I L E D T O C O N T R / D A T E R C D F R M A P P R A U T H	R E M A R K S	
						S U B M I T	A P P R O V A L N E E D E D B Y	M A T E R I A L N E E D E D B Y	A C T I O N C O D E	D A T E O F A C T I O N	D A T E F W D T O O T H E R R E V I E W E R	D A T E R C D F R O M C O N T R A U T H	A C T I O N C O D E	D A T E O F A C T I O N			D A T E F W D T O O T H E R R E V I E W E R
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
	05 59 20		Materials Disposition Record	2.1.3	G MCX												
			Anti-Galling Compound	3.1.1	G MCX												
			SD-06 Test Reports	2.2	G MCX												
			Certified Test Reports	1.4	G MCX												
			Witness Points	2.1.5.2	G MCX												
			Repair of Mislocated or Misdrilled Holes														
			Schedule of Random Testing	2.2.4.2	G MCX												
			Manufacturer Certified Test Reports	2.1.5.3	G MCX												
			Distributor Certified Test Reports	2.1.5.3	G MCX												
			SD-07 Certificates														
			Work Plan	1.2	G MCX												
			SD-09 Manufacturer's Field Reports														
			Control Dimensions	2.2.8	G MCX												
	09 97 02		SD-04 Samples		G MCX												
			Specification and Proprietary Paints		G MCX												
			Thinners		G MCX												
			SD-06 Test Reports		G MCX												
			Inspection and Operation Records		G MCX												
			SD-07 Certificates		G MCX												
			Qualified Painting Contractor		G MCX												





## INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.
2. Each Transmittal shall be numbered consecutively. The Transmittal Number typically includes two parts separated by a dash (-). The first part is the specification section number. The second part is a sequential number for the submittals under that spec section. If the Transmittal is a resubmittal, then add a decimal point to the end of the original Transmittal Number and begin numbering the resubmittal packages sequentially after the decimal.
3. The "Item No." for each entry on this form will be the same "Item No." as indicated on ENG FORM 4288-R.
4. Submittals requiring expeditious handling will be submitted on a separate ENG Form 4025-R.
5. Items transmitted on each transmittal form will be from the same specification section. Do not combine submittal information from different specification sections in a single transmittal.
6. If the data submitted are intentionally in variance with the contract requirements, indicate a variation in column h, and enter a statement in the Remarks block describing the detailed reason for the variation.
7. ENG Form 4025-R is self-transmitting - a letter of transmittal is not required.
8. When submittal items are transmitted, indicate the "Submittal Type" (SD-01 through SD-11) in column c of Section I.  
 Submittal types are the following:  
 SD-01 - Preconstruction    SD-02 - Shop Drawings    SD-03 - Product Data    SD-04 - Samples    SD-05 - Design Data    SD-06 - Test Reports  
 SD-07 - Certificates    SD-08 - Manufacturer's Instructions    SD-09 - Manufacturer's Field Reports    SD-10 - O&M Data    SD-11 - Closeout
9. For each submittal item, the Contractor will assign Submittal Action Codes in column g of Section I. The U.S. Army Corps of Engineers approving authority will assign Submittal Action Codes in column i of Section I. The Submittal Action Codes are:  
 A -- Approved as submitted.    F -- Receipt acknowledged.  
 B -- Approved, except as noted on drawings. Resubmission not required.    X -- Receipt acknowledged, does not comply with contract requirements, as noted.  
 C -- Approved, except as noted on drawings. Refer to attached comments.    G -- Other action required (Specify)  
     Resubmission required.    K -- Government concurs with intermediate design. (For D-B contracts)  
 D -- Will be returned by separate correspondence.    R -- Design submittal is acceptable for release for construction. (For D-B contracts)  
 E -- Disapproved. Refer to attached comments.
10. Approval of items does not relieve the contractor from complying with all the requirements of the contract.

SECTION TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

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PROGRESS PHOTOGRAPHS

PART 1 GENERAL

- 1.1 SUMMARY
- 1.2 GENERAL REQUIREMENTS
  - 1.2.1 Description
- 1.3 SUBMITTALS

PART 2 PRODUCTS

- 2.1 CONTRACTOR-FURNISHED EQUIPMENT
  - 2.1.1 Digital Camera
  - 2.1.2 Digital Photographs
  - 2.1.3 Prints

PART 3 EXECUTION

- 3.1 PHOTOGRAPHY

-- End of Section Table of Contents --

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## PROGRESS PHOTOGRAPHS

## PART 1 GENERAL

## 1.1 SUMMARY

The work under this section includes furnishing progress photographs, consisting of digital photographs showing the progress of the fabrication operations throughout the contract period. The digital photographs shall be furnished in both electronic and print (hard copy) form.

## 1.2 GENERAL REQUIREMENTS

## 1.2.1 Description

The Contractor shall, during the progress of the project, furnish the Contracting Officer progress photographs to depict progress of fabrication, throughout the life of contract. The photographs shall be taken using digital photography equipment furnished by the Contractor. Electronic copies of approved photographs shall be furnished on compact disk, or other storage media as approved by the Contracting Officer. Prints of images shall be printed using the commercial RA4 process (inkjet prints will not be acceptable). It is required that the prints are professionally processed so the quality will meet or exceed that of the same size print made with a film camera. Prints must be shipped flat to the Contracting Officer's representative. Progress photographs shall be provided for unrestricted use by the Government.

## 1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-03 Product Data

Thumbnail Hard Copy Prints of Progress Images; G|MCX  
Glossy Prints of Selected Official Progress Images; G|MCX  
Electronic Copy of Selected Official Progress Images; G|MCX  
Electronic Copy of All Other Progress Images; G|MCX

Copies of digital progress images in electronic form and print form shall be submitted monthly for approval in accordance with Paragraph PHOTOGRAPHY. Progress images shall be submitted in a timely manner as coordinated with the Contracting Officer or their authorized representative.

## PART 2 PRODUCTS

## 2.1 CONTRACTOR-FURNISHED EQUIPMENT

The Contractor shall be responsible for furnishing all photographic

equipment to perform the work specified by the section. If the camera becomes unusable for three (3) days or more due to defects in materials or workmanship, the Contractor shall be responsible for furnishing a temporary replacement for the period it is out of service. The Contractor shall furnish the camera equipment within fourteen (14) days after receipt of award.

#### 2.1.1 Digital Camera

The Contractor shall use a minimum of one digital camera for his use to take the official progress photos for this contract. Progress photos shall include progress during all phases of fabrication. The digital camera shall conform to the following minimum requirements. The camera shall have a CCD resolution no less than 5.0 million pixels per image (2592 by 1944) which will provide enough detail to print an 8 inch by 10 inch photo-realistic photograph. The camera shall also have picture overlay capability, which allows the user to overlay the time and the date over the digital image.

The camera shall come with software that allows the user to download the images onto an IBM-compatible personal computer running Windows 7 or higher, and allow the images to be saved in one of the following graphic formats: JPG (Joint Photographic Experts Group), TIFF (Tagged Image File Format) or BMP (Windows Bitmap).

#### 2.1.2 Digital Photographs

Digital Photographs shall provide enough detail to print an 8" by 10" photo-realistic photograph. The Contractor shall furnish, in Adobe PDF format, a document with each month's photographs which lists the following identifying information for each photographic image:

Name and Location of project Contract number  
Contractor (and subcontractor if applicable) Date taken  
File Name  
Orientation of view and brief description of work depicted

Each photograph shall be sequentially numbered. The identifying data shall be placed in the document accompanying the photographs. No identifying data, except the date stamp, shall appear on the electronic digital photographs. Electronic images shall be recorded with a minimum of 24 bit color and no reduction in actual picture size.

#### 2.1.3 Prints

a. Prints shall be printed using the commercial RA4 process with a minimum of 300 pixels per inch (PPI).

b. Full Color; four (4) prints of each image.

c. Premium weight and quality archival grade photographic paper.

d. Glossy Finish

e. Size: 8" by 10" full frame. Each print shall be sleeved in archival mounting pages for insertion in 3-ring binders (archival mounting pages supplied by the Contractor on an as-needed basis).

f. Identify each print with a self-adhesive label on the back, showing the name of project, Contract and delivery order number,

orientation of view, and a brief description of the scene being depicted.

### PART 3 EXECUTION

#### 3.1 PHOTOGRAPHY

The Contractor shall, during the progress of the work, furnish the Contracting Officer digitally produced progress photographs to depict the progress of the work both on-site and off-site at fabrication facilities. All progress images shall be taken at the camera's highest resolution. In coordination with the Contracting Officer, one set of progress photographs per month shall be taken over the full duration of this contract. Thumbnail Hard Copy Prints of Progress Images, minimum size of 160 x 160 pixels, shall be submitted to the Contracting Officer for approval between the first and fifth day of each month. The Contracting Officer will select from the thumbnail views ten (10) views to become official progress images. The selected official progress images shall be printed in color using the commercial RA4 process on glossy photographic paper in 8 inch by 10 inch format and submitted for approval. Glossy Prints of Selected Official Progress Images, and Electronic Copy of Selected Official Progress Images shall be furnished within ten (10) days of approval of the thumbnail images. Electronic copies shall be furnished on compact disk (CD-ROM) with file of required photographic information. Electronic Copy of All Other Progress Images (those not selected) shall be furnished on separate compact disk with file of required photographic information. At least thirty (30) digital photographs shall be taken continuously throughout each month in which work is in progress. Unless otherwise directed by the Contracting Officer, photographs will not be required for periods of time in which work is not being performed. Additional sets of photographs shall be taken as directed by the Contracting Officer. Enough digital photographs shall be taken to adequately depict each phase of the work and shall show progress made during those phases and at the completion of the project. Digital photographs shall show work accomplished since the previous photographs. Progress photographs shall be submitted as specified herein and in Paragraph SUBMITTALS. Four (4) prints of each official progress image shall be furnished to the Contracting Officer by the time stipulated above.

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## SOURCES FOR REFERENCE PUBLICATIONS

## PART 1 GENERAL

## 1.1 REFERENCES

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

## 1.2 ORDERING INFORMATION

The addresses of the standards publishing organizations whose documents are referenced in other sections of these specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the specifications with numbers which were not assigned by the standards producing organization should be ordered from the source by title rather than by number.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)  
One East Wacker Drive, Suite 700  
Chicago, IL 60601-1802  
Ph: 312-670-2400  
Fax: 312-670-5403  
Publications: 800-644-2400  
E-mail: [pubs@aisc.org](mailto:pubs@aisc.org)  
Internet: <http://www.aisc.org>

AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)  
1711 Arlingate Lane  
P.O. Box 28518  
Columbus, OH 43228-0518  
Ph: 800-222-2768; 614-274-6003  
Fax: 614-274-6899  
E-mail: [webmaster@asnt.org](mailto:webmaster@asnt.org)  
Internet: <http://www.asnt.org>

AMERICAN WELDING SOCIETY (AWS)  
550 N.W. LeJeune Road  
Miami, FL 33126  
Ph: 800-443-9353 - 305-443-9353  
Fax: 305-443-7559  
E-mail: [info@aws.org](mailto:info@aws.org) or [customerservice@awspubs.com](mailto:customerservice@awspubs.com)  
Internet: <http://www.aws.org>

ASTM INTERNATIONAL (ASTM)  
100 Barr Harbor Drive, P.O. Box C700  
West Conshohocken, PA 19428-2959  
Ph: 610-832-9585

Fax: 610-832-9555  
E-mail: [service@astm.org](mailto:service@astm.org)  
Internet: <http://www.astm.org>

RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC)  
E-Mail: [clarson@lejeunebolt.com](mailto:clarson@lejeunebolt.com)  
Internet: <http://www.boltcouncil.org>

U.S. ARMY CORPS OF ENGINEERS (USACE)  
Order CRD-C DOCUMENTS from:  
Headquarters Points of contact  
441 G Street NW  
Washington, DC 20314-1000  
Ph: 202-761-0011  
E-mail: [hq-publicaffairs@usace.army.mil](mailto:hq-publicaffairs@usace.army.mil)  
Internet: <http://www.wes.army.mil/SL/MTC/handbook.htm>  
Order Other Documents from:  
USACE Publications Depot  
Attn: CEHEC-IM-PD  
2803 52nd Avenue  
Hyattsville, MD 20781-1102  
Ph: 301-394-0081  
Fax: 301-394-0084  
E-mail: [pubs-army@usace.army.mil](mailto:pubs-army@usace.army.mil)  
Internet: <http://www.usace.army.mil/publications>  
or <http://www.hnd.usace.army.mil/techinfo/engpubs.htm>

U.S. GENERAL SERVICES ADMINISTRATION (GSA)  
General Services Administration  
1800 F Street, NW  
Washington, DC 20405  
Ph: 202-501-0800  
Internet: [www.GSA.gov](http://www.GSA.gov)  
Obtain documents from:  
Acquisition Streamlining and Standardization Information System  
(ASSIST)  
Department of Defense Single Stock Point (DODSSP)  
Document Automation and Production Service (DAPS)  
Building 4/D  
700 Robbins Avenue  
Philadelphia, PA 19111-5094  
Ph: 215-697-6396 - for account/password issues  
Internet: <http://assist.daps.dla.mil/online/start/>; account  
registration required

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not used

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## CLOSEOUT SUBMITTALS

## PART 1 GENERAL

## 1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-02 Shop Drawings

## As-Built Drawings; G|MCX

Drawings showing final as-built conditions of the project. The manually prepared drawings shall consist of the approved marked working as-built prints.

## SD-03 Product Data

## As-Built Record of Equipment and Materials

Two copies of the record listing the as-built materials and equipment incorporated into the fabrication of the project.

## Data Book; G|MCX

## 1.2 PROJECT RECORD DOCUMENTS

## 1.2.1 As-Built Drawings

This paragraph covers as-built drawings complete, as a requirement of the contract. The terms "drawings," "contract drawings," "drawing files," "working as-built drawings" and "final as-built drawings" refer to contract drawings which are revised to be used for final as-built drawings.

## 1.2.1.1 Government Furnished Materials

Three (3) sets of drawings revised to reflect all amendments will be provided by the Government at the pre-fabrication conference.

## 1.2.1.2 Working As-Built and Final As-Built Drawings

The Contractor shall revise two (2) sets of paper drawings by red-line process to show the as-built conditions during the prosecution of the project. These working as-built marked drawings shall be kept current on a weekly basis and at least one set shall be available on the jobsite at all times. Changes from the contract plans which are made in the work or additional information which might be uncovered in the course of fabrication shall be accurately and neatly recorded as they occur by means of details and notes. Final as-built drawings shall be prepared after all fabrication activities have been completed. If the Contractor fails to maintain the working and final as-built drawings as specified herein, the

Contracting Officer will deduct from the contract total representing the estimated cost of maintaining the as-built drawings. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of updated drawings. The working and final as-built drawings shall show, but shall not be limited to, the following information:

a. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, assembly, etc.

b. Changes or modifications which result from the final inspection.

c. Where contract drawings or specifications present options, only the option selected for fabrication shall be shown on the final as-built prints.

d. Modifications (change order price shall include the Contractor's cost to change working and final as-built drawings to reflect modifications) and compliance with the following procedures.

- (1) Directions in the modification for posting descriptive changes shall be followed.
- (2) A Modification Circle shall be placed at the location of each deletion.
- (3) For new details or sections which are added to a drawing, a Modification Circle shall be placed by the detail or section title.
- (4) For minor changes, a Modification Circle shall be placed by the area changed on the drawing (each location).
- (5) For major changes to a drawing, a Modification Circle shall be placed by the title of the affected plan, section, or detail at each location.
- (6) For changes to schedules or drawings, a Modification Circle shall be placed either by the schedule heading or by the change in the schedule.
- (7) The Modification Circle size shall be 1/2-inch diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

#### 1.2.1.3 Drawing Preparation

The as-built drawings shall be modified as may be necessary to correctly show the features of the project as it has been fabricated by bringing the contract set into agreement with approved working as-built prints, and adding such additional drawings as may be necessary. These working as-built marked prints shall be neat, legible and accurate. These drawings are part of the permanent records of this project and shall be returned to the Contracting Officer after approval by the Government. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at no expense to the Government.

#### 1.2.1.4 Final As-Built Drawings

Only personnel proficient in the preparation of manually prepared drawings shall be employed to make corrections to the contract drawings. Using the third set of Government furnished drawings, final as-built drawings shall be red-line mark-ups of the original plans created from the working as-built drawings in office setting. Thus being a much neater version of the working set. Additions and corrections to the contract drawings shall be neat, clean and legible, and shall be done to the same level of detail as the original drawings. All corrections/ dimensions shall be shown in red ink on the original drawings. Corrections, changes, additions, and deletions required shall meet these standards.

a. When final revisions have been completed, each drawing shall be lettered or stamped with the words "RECORD DRAWING AS-BUILT" followed by the name of the Contractor in letters at least 3/16-inch high. Original contract drawings shall be marked either "As-Built" drawings denoting no revisions on the sheet or "Revised As-Built" denoting one or more revisions. All original contract drawings shall be dated in the revision block.

b. The Contractor shall submit a color copy draft set of Final As-built Drawings for review and approval within fifteen (15) calendar days following the completion of fabrication activities. Within thirty (30) calendar days of receipt of the Final As-built Drawings, the Government will return one set annotated with any necessary corrections. Within fourteen (14) calendar days the Contractor shall revise the drawings accordingly at no extra cost and submit two final sets to the Government. Approval and acceptance of the Final As-built Drawings shall be accomplished before final payment is made to the Contractor.

#### 1.2.2 As-Built Record of Equipment and Materials

The Contractor shall furnish three copies of preliminary record of equipment and materials used on the project fifteen (15) calendar days prior to final inspection. This preliminary submittal will be reviewed and returned fifteen (15) calendar days after final inspection with Government comments. Three sets of final record of equipment and materials shall be submitted thirty (30) calendar days after final inspection, two hard copies and one (1) additional copy on CD-ROM. The designations shall be keyed to the related area depicted on the contract drawings. The record shall list the following data:

##### RECORD OF DESIGNATED EQUIPMENT AND MATERIALS DATA

Description	Specification Section	Manufacturer and Catalog, Model, and Serial Number	Composition and Size	Where Used
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#### 1.2.3 Data Book

The Contractor shall compile and maintain a "Data Book" throughout the duration of the contract. One data book shall be provided for the Piedmont Dam bulkhead and one data book shall be provided for the Pleasant Hill bulkhead. The "Data Book" shall consist of copies of all Requests for Information (RFI's) with Government responses, copy of Contractor's AISI

Quality Certification, Fracture Control Plan (FCP), Welding Procedure Specifications (WPS's), Procedure Qualification Records (PQR's), Qualifications of Welders and Welding Operators, Inspector Qualifications, Distortion and Shrinkage Control Plan, Weld Tracking Log, Non-Destructive Examination Reports, Welding Repairs (both FCM's and Non-FCM's), Painting Contractor Qualifications, documentation of Government Approval of Vinyl Paint and Thinner Samples, Paint Reports, Material Orders, Mill Certification Reports and Manufacturer's Certification Letter's. The "Data Book" shall be neatly prepared with tabs separating each specific item identified above and a Table of Contents identifying which tab corresponds to which item. The in-progress "Data Book" shall be available to the Government to review during shop inspections of the project.

a. When final revisions have been completed, The Contractor shall prepare a "Certificate of Conformance" on their company letterhead certifying that: 1) all materials and workmanship included in the project were detailed, manufactured, tested, inspected and documented as specified in the contract requirements; and 2) the requirements of applicable codes, standards, specifications and drawings have been complied with and that all required quality assurance documentation verify conformance to the contract documents have been submitted. The "Certificate of Conformance" shall be signed by the Contractor's Quality Control System Manager.

b. The Contractor shall submit a draft copy of Final "Data Book" for review and approval within fifteen (15) calendar days following the completion of fabrication activities. Within thirty (30) calendar days of receipt of the Final "Data Book", the Government will return one copy annotated with any necessary corrections. Within fourteen (14) calendar days the Contractor shall revise the "Data Book" accordingly at no extra cost and submit the Final Copy of the Final "Data Book" including the "Certificate of Conformance" to the Government. Approval and acceptance of the Final "Data Book" shall be accomplished before final payment is made to the Contractor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

Not Used

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## SECTION 05 59 20

## FABRICATION OF HYDRAULIC STEEL STRUCTURES

## PART 1 GENERAL

## 1.1 REFERENCES

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

## AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 303	(2016) Code of Standard Practice for Steel Buildings and Bridges
AISC 325	(2017) Steel Construction Manual
AISC 326	(2009) Detailing for Steel Construction
AISC 360	(2016) Specification for Structural Steel Buildings

## AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)

ANSI/ASNT CP-189	(2020) ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel
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## AMERICAN WELDING SOCIETY (AWS)

AWS D1.5M/D1.5	(2020; Errata 1 2022) Bridge Welding Code
AWS QC1	(2016) Specification for AWS Certification of Welding Inspectors

## ASTM INTERNATIONAL (ASTM)

ASTM A563	(2015) Standard Specification for Carbon and Alloy Steel Nuts
ASTM A709/A709M	(2021) Standard Specification for Structural Steel for Bridges
ASTM E165/E165M	(2018) Standard Practice for Liquid Penetrant Examination for General Industry
ASTM E709	(2021) Standard Guide for Magnetic Particle Testing
ASTM F436/F436M	(2019) Standard Specification for Hardened Steel Washers Inch and Metric Dimensions
ASTM F3125/F3125M	(2019) Standard Specification for High Strength Structural Bolts and Assemblies,

Steel and Alloy Steel, Heat Treated, Inch  
Dimensions 120 ksi and 150 ksi Minimum  
Tensile Strength, and Metric Dimensions  
830 MPa and 1040 MPa Minimum Tensile  
Strength

RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC)

RCSC A348 (2020) RCSC Specification for Structural  
Joints Using High-strength Bolts

U.S. ARMY CORPS OF ENGINEERS (USACE)

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

1.2 SYSTEM DESCRIPTION

Submit a detailed Work Plan for fabrication, including descriptions of shop facilities, equipment, number of personnel, and related information prior to the Prefabrication Conference, and procedures for safe conduct of the work, careful removal and disposition of materials, protection of property that is to remain undisturbed, and coordination with other work in progress. Include in the procedures a detailed description of the methods and equipment to be used for each operation, and the sequence of operations in accordance with EM 385-1-1 for all work that occurs on federal property. Include the recommended measuring system for ensuring dimensional tolerances in the Work Plan. Perform the fabrication of the following listed structures under this contract in accordance to this section of the specifications:

1. Stoplog Units

- a. Material with welds will not be accepted unless the welding is specified or indicated on the drawings or otherwise approved. Do not begin welding until welding procedures, inspectors, nondestructive testing personnel, welders, welding operators, and tackers have been qualified and approved. Each Contractor performing welding must maintain records of the test results obtained in welding procedure, and welder, welding operator, and tacker performance qualifications.
- b. As it is used in these specifications, "The Engineer" refers to the District Engineer of record. The AWS D1.5M/D1.5 definition of "The Engineer" as specified in AWS D1.5M/D1.5 Application Clause refers to the District Engineer of record in lieu of the state bridge engineer as specified in the Application Clause of AWS D1.5M/D1.5.
- c. Schedule a Prefabrication Conference as soon as possible after Notice to Proceed and prior to any fabrication. Include the Prime Contractor, Fabricator, the Fabricator's primary QC representative, the Contracting Officer, and the Engineer of Record for the structure or structures being fabricated in the Prefabrication Conference, at a minimum. Hold the Prefabrication Conference at either the Fabrication Facilities or a similar location as deemed appropriate.

1.2.1 Weld Tracking Log Template

Submit for approval a weld tracking log template, a minimum of 30 days prior to commencement of fabrication, to identify all necessary components

to be addressed in the tracking of all welds for the structures in question. A weld tracking log will be developed and maintained as described in the following paragraphs.

#### 1.2.2 Weld Tracking Log

Submit a log capable of individually identifying and tracking every weld on the project. Member identification must follow the numbering scheme shown on the shop drawings. Include in the log the member to be welded, member type (FCM and Non-FCM), type of weld including temporary and tack welds, welding position, applicable WPS reference, AWS joint preparation designation, name or stamping designation of welder, welding operator or tacker, date and time of completion of welding and/or tacking, name and date of CWI visual inspection, NDT testing performed, including the type of inspection, date(s) of inspection, inspector name, and the acceptance criteria used, description of defects found and reason for non-compliance, corrective action taken, or whether the weld is acceptable. Weld identification on the shop drawing must match weld tracking log identification. Bind together a completed log for each structure and submit two copies to the Contracting Officer immediately upon completion of the fabrication of each structure. Furnish draft copies of NDT testing to the Contracting Officer upon request and have a copy available on the shop floor during any inspection.

#### 1.2.3 Welding Procedure Specifications (WPS)

Submit a Welding Procedure Specification (WPS), with supporting Procedure Qualification Records and supporting test documentation on forms similar or equivalent to the sample forms in AWS D1.5M/D1.5 for each weld, including prequalified welds, in accordance with paragraph Welded Connections approved before fabrication is commenced. Individually identify each Welding Procedure Specification and reference it on the shop drawings. In case of conflict between this specification and AWS D1.5M/D1.5 as applicable, this specification governs. The following items are not considered ancillary items as defined in AWS D1.5M/D1.5 Welding Processes Clause and are subjected to the same level of inspection required for primary welds under AWS D1.5M/D1.5:

##### a. Stoplog Units

#### 1.2.4 Fracture Critical Members (FCM)

FCM are shown on the Contract Drawings and include all attachments and connections to these members as defined in AWS D1.5M/D1.5. All materials to be welded must be ASTM A709/A709M, killed steel, grade as specified or shown on the drawings. Use Grade 50 steel unless otherwise shown or specified. Mill repairs of base metal are prohibited. Unless otherwise indicated or specified, meet toughness requirements for fracture critical members in tension in accordance with ASTM A709/A709M for Zone 2. All materials used for the construction of fracture critical components must meet the applicable requirements of ASTM A709/A709M for fracture critical components. Welding for fracture critical members must meet all requirements of AWS D1.5M/D1.5 AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause.

##### 1.2.4.1 Fracture Control Plan (FCP)

Submit a Fracture Control Plan (FCP) for welding on all Fracture Critical Members (FCM) in accordance with AWS D1.5M/D1.5, AASHTO/AWS Fracture

Control Plan (FCP) for Nonredundant Members Clause. Submit welding Procedures, qualifications, and certifications showing compliance with FCP requirements.

#### 1.2.4.2 Repair Welding

Classify repair welds as "critical repairs" or "non-critical repairs" for all repair welding. Unless specified otherwise, follow the minimum provisions for repair procedures. Repair procedures must be qualified and approved and subject to the same QA/QC inspection requirements as other welds. Follow minimum preheat requirements, as defined in AWS D1.5M/D1.5 AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause, for repair welding. Consider all weld repairs to fracture critical members critical welds in accordance with AWS D1.5M/D1.5 AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause and must be approved by the Engineer of Record.

#### 1.3 SUBMITTALS

Government approval is required for submittals with a "G" classification. Submittals not having a "G" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

##### SD-01 Preconstruction Submittals

- Shop Drawings; G|MCX
- Welding Procedure Specifications (WPS); G|MCX
- Fracture Control Plan (FCP); G|MCX
- Weld Tracking Log Template; G|MCX
- Weld Tracking Log; G|MCX
- Qualification of Welders and Welding Operators; G|MCX
- Inspector Qualifications; G|MCX
- Qualification of Structural Steel Fabricator; G|MCX
- NDT Inspector Certification; G|MCX
- Welding Repairs - Non-Fracture Critical Members; G|MCX
- Welding Repairs - Fracture Critical Members; G|MCX
- Performance Qualification Records; G|MCX
- Ultrasonic Written Procedure; G|MCX

##### SD-02 Shop Drawings

- Assembly; G|MCX
- Delivery/Shipping Plan; G|MCX
- Erection Drawings; G|MCX

##### SD-03 Product Data

- Materials Disposition Record
- Anti-Galling Compound; G|MCX

##### SD-06 Test Reports

- Certified Test Reports; G|MCX
- Witness Points
- Repair of Mislocated or Misdriilled Holes; G|MCX
- Schedule of Random Testing; G|MCX
- Manufacturer Certified Test Reports; G|MCX

Distributor Certified Test Reports; G|MCX

SD-07 Certificates

Work Plan; G|MCX

SD-09 Manufacturer's Field Reports

Control Dimensions; G|MCX

#### 1.4 QUALITY ASSURANCE

Establish Witness Points for the Initial QA Inspection, Intermediate QA Inspections, and Final Inspection as follows and submit a record of all witness points. Start the Initial QA Inspection after the Government has determined that there is substantial completion of components that comprise a reasonable sampling of each significant FCM and non-FCM details. Determine the extent of completion and details and the date of the Initial QA Inspection by the Government at the Prefabrication Conference after discussion with the Contractor. At that time, produce a detailed schedule showing the progression of work and completion of components. This schedule will be updated weekly and provided by e-mail to the Contracting Officer. Give the Contracting Officer two weeks notice prior to the predetermined date for the Initial QA Inspection, including adjustments for changes in schedule. Intermediate QA Inspections will be conducted on an as needed basis and at the discretion of the Government. All QA inspections will follow AWS D1.5M/D1.5. Provide unpainted components for each QA NDT and Visual Inspection. At these stages of construction, give the Contracting Officer three working days to inspect the structure. Do not begin the QA Inspection period until a minimum period of 72 hours after any welding. After the Contracting Officer and the Engineer of Record has inspected the structure, make any changes required to the structure as directed by the Contracting Officer before proceeding with any additional welding. Proceed with the construction until the next witness point is reached, unless it is waived in writing by the Contracting Officer. Each structure fabricated is subject to a Final Fabrication Inspection prior to painting. Conduct a Final Fabrication Inspection after the first structure is completed. Schedule and coordinate with the Contracting Officer and the Engineer of Record final fabrication inspections of additional structures. Give the Contracting Officer a minimum notice of two weeks prior to the Final Fabrication Inspection.

##### 1.4.1 Qualification of Welders and Welding Operators

Submit welder, welding operator and tacker qualification certification for each welder, welding operator or tack welder for approval before fabrication is commenced in accordance with paragraph Welded Connections. An AWS Certified Welding Inspector (CWI) meeting the specified qualifications must approve all welder qualifications. Limit welders, welding operators, and tack welders to welding procedures for which they are certified. Prepare, weld, and test welds in accordance with the requirements of AWS D1.5M/D1.5. Before assigning any welder, welding operator, or tacker to work under this contract, submit the names and certification that each individual is qualified as specified. State the type of welding and positions for which the welder, welding operator, or tacker is qualified, the code and procedure under which the individual is qualified, the date qualified, and the name of the firm and person certifying the qualification tests on the certification. Keep the

certification current for the duration of the contract. Submit welder and welding operator qualification test records on forms similar or equivalent to the sample forms in AWS D1.5M/D1.5. All welders must be qualified in accordance with the Qualification Clause of AWS D1.5M/D1.5. Welders performing fracture critical welds must meet the additional requirements of the AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause of AWS D1.5M/D1.5. Verify all qualifications are current prior to commencing any work. Submit a log for each welder showing that he/she is current in the process and procedures being proposed for this work.

#### 1.4.2 Inspector Qualifications

All inspectors, performing structural steel visual inspection in accordance with these specifications, must be qualified and certified in conformance with AWS QC1. Provide an AWS Certified Welding Inspector (CWI) as the primary point of contact for quality control of welding. Designate one individual as having primary responsibility for all quality control in accordance with AWS D1.5M/D1.5 Inspection Clause when several CWI and NDT technicians are working. Do not use non-certified inspectors and certified associate weld inspectors (CAWI) for inspection under these specifications. All personnel who perform NDT must be qualified in accordance with: ANSI/ASNT CP-189 NDT Level II or III. Provide supervision by personnel possessing a Level III ASNT NDT certification for all personnel performing NDT, in accordance with AWS D1.5M/D1.5 Inspection Clause and the AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause. Submit copies of certificates showing evidence of qualifications or certifications for welding inspectors and NDT personnel.

#### 1.4.3 Qualification of Structural Steel Fabricator

The fabricating plant and fabricator must be certified under the AISC (American Institute of Steel Construction) Quality Certification Program, and must be designated an AISC Certified Plant, Category CBR: Major Bridge Fabrication, IBR: Certified Bridge Fabricator - Intermediate, ABR: Certified Bridge Fabricator - HYDA: Certified Metal Hydraulic Fabricator with a Fracture Control Endorsement (FCE) at time of bid and for the duration of the contract. The fabricator or fabrication plant must possess five 5 years documented experience on projects of similar scope. Similar scope means projects of similar size and similar amounts of welding and detail types. Submit copies of the AISC certificate indicating that the fabrication plant meets the specified structural steelwork category and documented experience.

#### 1.4.4 Testing by the Government

Material component parts may be subjected to any form of nondestructive testing, as directed by the Contracting Officer. This may include any test that will thoroughly investigate the part in question. The cost of such investigation will be borne by the Government. Replace and retest all defects that are cause for rejection and rejected materials or parts at the Contractor's expense. The government reserves the right to perform quality assurance at any point during fabrication.

#### 1.4.5 Shop Drawings

Prepare all shop drawings in accordance with AISC 303, AISC 326, AISC 360, and AISC 325. Return elements of fabricated items inadvertently omitted on contract drawings to the Engineer of Record for detailing unless they are to be detailed by the fabricator and so indicated on the shop

drawings. Cloud any and all details developed by the fabricator on the shop drawings for separate approval by the Engineer of Record. Any items designed by the Contractor must be prepared and sealed by a Registered Professional Engineer. All splices must be approved by the Engineer of Record. Make all splices with complete joint penetration groove welds. Identify all field welds on the shop drawings. Provide a unique identifier to permit tracking on the weld tracking log for each weld, both shop and field welds. Prior to performing any fabrication of the HSS structures listed in paragraph System Description above, submit complete, detailed shop drawings for approval. Show complete details of materials, tolerances, connections, and proposed welding sequences on the shop drawings. Include catalog cuts, templates, fabrication and assembly details, and type, grade, and class of materials, as appropriate in the shop drawings. Identify all FCM, including attachments that meet the FCM definition, on the shop drawings as well as all temporary and tack welds. Identify each member following the numbering scheme shown on the drawings. Provide a table containing a list of all members and a reference to each material certificate and test report that applies to that member. Identify weld procedures and NDE required for each weld on shop drawings. Cloud any and all splices in the shop drawings for engineer approval.

#### 1.4.6 Erection Drawings

Submit erection drawings showing complete information necessary for the erection of each component part of the HSS. Include the following:

- a. Dimensions for alignment and elevations of each member.
- b. Location of members and attachments by match-marking of piece numbers.
- c. Type and location of each field connection.
- d. Detail of each field connection or typical connection.
- e. Anchor bolts and setting plans.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

Notify the Contracting Officer at least 28 days in advance of delivery of the structures. Shipping of the structures are at the Contractor's expense. Delivery of the stoplog unit shall be to B. Everett Jordan Dam at 2080 Jordan Dam Access Road, Moncure, North Carolina 27559-0144, unless otherwise directed by the Contracting Officer or his authorized representative. Arrange the structures on the delivery vehicles such that no damage occurs during shipping. Direct all sling lifting lugs up. Submit a Delivery/Shipping Plan showing orientation and locations of structures on the delivery vehicles prior to shipment for Government approval. Submit drawings providing descriptions of methods of delivering the completed structural units, including details for support during shipment to prevent distortion or other damages, methods of unloading the structures, and orientation and location of the structure on transport equipment. Protect structural steel members and packaged materials from corrosion and deterioration. Store material in a dry area. Support materials stored outdoors above ground surfaces on wood runners and protect with acceptable effective and durable covers.

#### 1.6 FIELD MEASUREMENTS

Consider all field conditions that affect the details and tolerances of the HSS. Contractor is responsible for accuracy and layout of work and must make necessary field measurements prior to preparation of shop drawings for the HSS.

## PART 2 PRODUCTS

### 2.1 FABRICATION

#### 2.1.1 Structural Fabrication

Material must be straight before being laid off or worked. Perform straightening by methods that will not impair the metal. Material will be rejected for sharp kinks or bends. Material with welds will not be accepted except where welding is definitely specified, indicated or otherwise approved. Use approved dies, press brakes or bending rolls to make bends. Take precautions to avoid overheating the metal where heating is required and allow it to cool in a manner that will not impair the original properties of the metal. Obtain approval prior to flame cutting material, other than structural steel, indicated on detail drawings. Accurately shear material and neatly finish all portions of the work. Provide square and true corners unless otherwise shown. Fillet re-entrant cuts to a minimum radius of 1 inch in accordance with AWS D1.5M/D1.5 Workmanship Clause unless otherwise indicated or approved. Provide finished members free of twists, bends and open joints.

##### 2.1.1.1 Dimensional Tolerances for Structural Work

- a. Measure dimensions by an approved measuring system. Submit the measuring system for approval with the work plan (i.e. calibrated steel tape of approximately the same temperature as the material being measured). The overall dimensions of an assembled structural unit must be within the tolerances indicated on the drawings or as specified for the item of work. Where tolerances are not specified in other sections of these specifications or shown, a variation of 1/32 inch is permissible in the overall length of component members with both ends milled and component members without milled ends must not deviate from the dimensions shown by not more than 1/16 inch for members 30 feet or less in length and by not more than 1/8 inch for members over 30 feet in length.
- b. Structure dimensions indicated are based on a structure temperature of 70 degrees F. Perform dimensional adjustments to compensate for actual temperature variations during construction.

##### 2.1.1.2 Structural Steel Fabrication

Structural steel may be cut by mechanically guided or hand-guided torches, provided an accurate profile with a surface that is smooth and free from cracks and notches is obtained. Prepare surfaces and edges in accordance with AWS D1.5M/D1.5, Workmanship Clause. Hand-guided cuts must be chipped, ground or machined to sound metal.

##### 2.1.2 Assembly

Submit Assembly Drawings indicating the sequence of fabrication and assembly and provide details for connecting the adjoining fabricated components in the shop. Identify assembly details in the required order of assembly and details of witness points as described in these specifications.

### 2.1.3 Materials Disposition Record

Submit three copies of all purchase and mill orders, shop orders for materials and work orders, including all new orders placed by Contractors and old orders extended for each supplier. Furnish, at the time of submittal of shop drawings, a list designating the material to be used for each item. Where mill tests are required, purchase orders must contain the test site address and the name of the testing agency. Furnish a shipping bill or memorandum of each shipment of finished pieces or members to the project site, giving the designation mark and weight of each piece, the number of pieces, the total weight, and if shipped by rail in carload lots, the car initial and number. Submit material records before the beginning of fabrication. Additional requirements for this submittal are listed below.

### 2.1.4 Welded Connections

#### 2.1.4.1 Welding Procedure

- a. Perform welding in accordance with the applicable provisions of AWS D1.5M/D1.5. Prior to the start of production welding, submit a complete schedule of welding procedures for a typical structure that conforms to the requirements specified in the provisions of AWS D1.5M/D1.5. Provide detailed procedure specifications and tables or diagrams showing the procedures to be used for each required joint in the schedule.
- b. Submit a Welding Procedure Specification (WPS) for each weld to be made. Submit Welding Procedure Specifications and Procedure Qualification Records (PQR) for approval before fabrication is commenced. Submit for approval copies of the Welding Procedure Specification and the results of the procedure qualification test for each type of welding which requires procedure qualification. Submit the WPS and PQR with the shop drawings. Prepare and qualify each WPS in accordance with the applicable provisions of AWS D1.5M/D1.5. Show types and locations of welds designated or specified to receive nondestructive examination and identify the weld as FCM when applicable in the welding procedure. A WPS is always required, even if the procedure is considered prequalified in accordance with AWS D1.5M/D1.5. Clearly identify each procedure as being either prequalified or qualified by tests. If a PQR is developed, a representative of the Government must witness the test plate welding and the specimen testing. At a minimum PQR shall be required for the ASCE 60 pound rail connection to the ASTM A709/A709M 1/2 inch end plate. Approval of any procedure, however, will not relieve the Contractor of the responsibility for producing a finished structure meeting all requirements of these specifications. Make copies of the WPS available for reference to the welders, welding operators and tack welders. An AWS CWI meeting the specified qualifications or welding engineer must approve all WPS's and PQR's.

#### 2.1.4.2 Welder Performance Qualification of Welders and Welding Operators

Qualify and requalify welding operators, welders, and tack welders if necessary for the particular type of work to be done. Perform qualification in accordance with AWS D1.5M/D1.5. Before assigning any welder, welding operator, or tacker to work under this contract, submit the names and certification that each individual is qualified as specified. State the type of welding and positions for which the welder,

welding operator, or tacker is qualified, the code and procedure under which the individual is qualified, and the date qualified on the certification. The company employing the welder must certify by signature that the welder has passed all code required testing and meets the requirements for certification. Submit copies of the Performance Qualification records for approval before fabrication is commenced. The welder and welding operators may have to repeat the qualifying tests when, in the opinion of the Contracting Officer, the work indicates a reasonable doubt as to proficiency. In such cases, the welder must be recertified, as above, after successfully passing the retest; otherwise, he/she must be disqualified until successfully passing a retest. The period of effectiveness for all welder and welding operator performance qualifications must be in accordance with AWS D1.5M/D1.5. All welders performing the work must keep the certification current for the duration of the contract. All expenses are borne by the Contractor in connection with qualification and requalification.

#### 2.1.4.3 Welding Process

Perform welding of structural steel in accordance with applicable provisions of AWS D1.5M/D1.5 by an electric arc welding process using a method which excludes the atmosphere from the molten metal for all welds. Minimize residual stresses, distortion and shrinkage during welding.

#### 2.1.4.4 Welding Technique

##### 2.1.4.4.1 Filler Metal

The electrode, electrode-flux combination and grade of weld metal must conform to the appropriate AWS specification for the base metal and welding process being used or must be as shown where a specific choice of AWS specification allowable is required. Follow the requirements of AWS D1.5M/D1.5 for matching filler metal. Include the AWS designation of the electrodes to be used in the schedule of welding procedures. Use only low hydrogen electrodes for manual shielded metal-arc welding regardless of the thickness of the steel. Maintain low moisture of low hydrogen electrodes using a controlled temperature storage oven at the job site as prescribed by AWS D1.5M/D1.5, AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause. Power controlled temperature storage ovens at all times. Subject FCAW filler metal to the storage and handling requirements defined in AWS D1.5M/D1.5 AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause. Do not combine filler metals and processes in the same joint or weld.

##### 2.1.4.4.2 Preheat and Interpass Temperature

Perform preheating as required by the applicable provisions of AWS D1.5M/D1.5 for all welds except that the temperature of the base metal must be at least 70 degrees F. Preheat fracture critical welds in accordance with M 270M/M 270 (A709/A709M) Gr. 250 (36), 345 (50), 345S (50S) Minimum Preheat and Interpass Temperatures Table and the PQR/WPS. Slowly and uniformly heat the weldments that are required to be preheated by approved means to the prescribed temperature, hold at that temperature until the welding is completed, and then permit the weldments to cool slowly as required and in accordance with the approved WPS in order to prevent cracking or distortion.

#### 2.1.4.5 Workmanship

Perform welding in accordance with AWS D1.5M/D1.5, Workmanship Clause for all welds and other applicable requirements of these specifications.

##### 2.1.4.5.1 Preparation of Base Metal

Prior to welding, inspect surfaces to be welded to assure compliance with the applicable Clauses of AWS D1.5M/D1.5.

##### 2.1.4.5.2 Tack and Temporary Welds

Make tack and temporary welds required for fabrication and erection in accordance with AWS D1.5M/D1.5 under the controlled conditions prescribed herein for permanent work. Tack welds that are to be incorporated into the permanent work are subject to the same quality requirements as the permanent welds. Clean and fuse such tack welds thoroughly with the permanent welds. Multiple-pass tack welds must have cascaded ends. Remove defective tack welds before permanent welding. Make all welds using low-hydrogen welding electrodes and with welders qualified for permanent work as specified elsewhere in these specifications. Preheat as required by AWS D1.5M/D1.5 for permanent tack welds except that the minimum temperature must be 70 degrees F in any case, regardless of electrode used. All tack welds which will be incorporated into the final weldment must be a maximum of 1/8 inch with a minimum length of 1 inch long spaced at a maximum of 6 inch on center. In making temporary welds, arc strikes must not be struck in other than the weld joints. Remove each temporary weld as required by AWS D1.5M/D1.5, Workmanship Clause. Grind out and fill all arc strikes struck outside the weld zone, and inspect in accordance with AWS D1.5M/D1.5.

##### 2.1.4.5.3 Weld Access Holes

Provide weld access hole as shown on contract drawings. Show all required weld access holes on shop drawings. Notify the Contracting Officer for the approval of weld access hole additions if the oversite of intersecting out-of-plane welds is encountered. Payment for the addition of weld access holes not shown on contract drawings or shop drawings will be the Contractor's responsibility.

##### 2.1.4.5.4 Weld Backing Removal

Remove all steel weld backing material from welded joints prior to testing.

#### 2.1.5 Bolted Connections

Install all high strength connections to a tension not less than that given below for ASTM F3125/F3125M Grade A325M A325 Bolts. Use turn-of-nut method, direct tension indicator, calibrated wrench, or alternative design bolt methods for tightening. The installation and verification of all bolted assemblies must follow the requirements of RCSC A348.

5/8 inch	19 kips
3/4 inch	28 kips

7/8 inch	39 kips
1 inch	51 kips
1-1/8 inch	56 kips
1-1/4 inch	81 kips
1-3/8 inch	97 kips
1-1/2 inch	118 kips

Tighten all other connections to the snug-tight condition. The snug-tight condition is defined as the tightness attained by either a few impacts of an impact wrench or the full effort of a worker with an ordinary spud wrench that brings the plies into firm contact. Perform snugging in a systematic manner starting at the most rigid part of the joint and working to the outside of the connection or the free edges. Install all bolts in a connection to a snug tight condition prior to pretensioning. Perform pretensioning in the same order as snug-tightening.

#### 2.1.5.1 Bolts, Nuts, and Washers

Provide bolts, nuts and washers of the type specified or indicated. Use ASTM A563 nuts with high strength bolts. Equip all nuts with washers. Where the use of high strength bolts is specified or indicated the materials, workmanship and installation must conform to the applicable provisions of ASTM F3125/F3125M and RCSC Specifications for Structural Joints using Grade A325 or Grade A490 Bolts. Use ASTM F436/F436M washers with high strength bolts.

#### 2.1.5.2 Bolt Holes

Accurately locate bolt holes so that they are smooth, perpendicular to the member and cylindrical.

- a. Drill or subdrill and ream holes for regular bolts in the shop not more than 1/16 inch larger than the diameter of the bolt.
- b. Match-ream or drill holes for high strength fitted bolts. Remove burrs resulting from reaming. The threads of bolts must be excluded from the shear plane. Provide the body diameter of holes and bolts with the tolerances specified on the drawings.
- c. The provisions of AWS D1.5M/D1.5 Workmanship Clause allowing misdrilled holes do not apply. Repair all misdrilled holes as directed by the Engineer. Submit repair of mislocated or misdrilled holes to the Government for approval.

#### 2.1.5.3 Rotational Capacity Tests

The manufacturer or distributor must perform rotational-capacity tests in accordance with ASTM F3125/F3125M on all black or galvanized (after galvanizing) bolt, nut, and washer assemblies prior to shipping. The Contractor is responsible for assuring the rotational-capacity testing is performed by either the manufacturer or distributor prior to shipping.

Submit Manufacturer Certified Test Reports and Distributor Certified Test Reports.

#### 2.1.6 Miscellaneous Provisions

##### 2.1.6.1 Weldments

Portions of the structure include thick weldments where locked in thermal stresses may make final dimensions unstable. Sequence the work and perform post weld heat treatment in accordance with the qualified WPS such that final machining achieves stable specified dimensions and tolerances.

##### 2.1.6.2 Drain Holes

Locate drain holes as shown on the drawings, unless otherwise noted. Drill drain holes. Flame cutting of holes will not be permitted.

##### 2.1.6.3 Seal Welds

Seal welds are required to maintain water tightness. Show and make all seal welds as indicated on the shop drawings. Make seal welds, when called for on the drawings, the minimum size fillet weld as required in AWS D1.5M/D1.5. In addition, seal welds may require weld wrapping around reentrant corners that is specifically prohibited in AWS D1.5M/D1.5. All seal welds on fracture critical members are subject to the minimum preheat requirements of AWS D1.5M/D1.5 Clause 12 as applicable. Subject all seal welds to the same testing requirements required for a fillet weld made to any fracture critical member according to AWS D1.5M/D1.5 AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause.

##### 2.1.7 Shop Assembly

Perform fabrication and assembly in an indoor, climate controlled shop. Closely check each item to ensure that all necessary clearances have been provided and that binding does not occur in any moving part. All shop testing for assembly must be witnessed by the Government Representative. Immediately remedy disclosed errors or defects without cost to the Government.

##### 2.1.8 Seals

Provide each stoplog unit with bulb seals, steel bearing blocks, and bearing seals as indicated. Provide the surfaces of finished splices that are smooth and free of irregularities. Match-drill bolt holes in the rubber seals with the seal support and clamping bars, as applicable; to insure proper fit and spacing between holes of the completed seal assembly. Match finish seal support and clamping bars to conform to the configurations shown on the drawings. Install the seals and blocks after painting has been completed.

#### 2.2 CERTIFIED TEST REPORTS

Submit reports of tests, inspections, and verifications of all materials used under this contract approved by the Government before incorporation into the structure.

##### 2.2.1 General

Have required material tests and analyses performed at the Contractor's

expense, to demonstrate that materials are in conformity with the specifications. Tests, inspections, and verifications must conform to the requirements of the particular sections of these specifications for the respective items of work unless otherwise specified or authorized. Conduct tests in the presence of the Contracting Officer. Furnish specimens and samples for additional independent tests and analyses upon request by the Contracting Officer.

#### 2.2.2 Nondestructive Testing

When doubt exists as to the soundness of any material part, such part may be subjected to any form of nondestructive testing determined by the Contracting Officer. The cost of such investigation will be borne by the Government. Any defects will be cause for rejection and rejected parts must be replaced and retested by the same test method that located the defect at the Contractor's expense.

#### 2.2.3 Inspection of Structural Steel Welding

Maintain an approved inspection system and perform required inspections. Inspect welding to determine conformance with the requirements of AWS D1.5M/D1.5 and the approved welding procedures and provisions stated in other sections of these specifications. Clean and carefully visually examine all completed welds for insufficient leg sizes, cracks, undercutting, overlap, excessive convexity or reinforcement and other surface defects to ensure compliance with the requirements of AWS D1.5M/D1.5, Inspection Clause and the additional requirements of AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause for the Fracture Control Plan. In addition, the Government may choose to hire a third party inspector to perform verification of this work. The Government's third party inspection will occur at various times throughout the duration of fabrication. The Contractor will be advised that third party inspection must be coordinated with the Contracting Officer, and the Contractor for all verification inspections selected by the Government.

##### 2.2.3.1 Visual Examination

Prior to any welding, a certified weld inspector (CWI) supplied by the Contractor must visually inspect and document on the weld tracking log the preparation of material for welding at each weld or joint in order to assure compliance with AWS D1.5M/D1.5 and approved WPS. The CWI must also perform visual inspection on all completed welds throughout the welding process to assure compliance with AWS D1.5M/D1.5 and approved WPS. Clean all completed welds free of oxide, flux, scale, paint spatter, or other foreign matter before inspection. Document all non-destructive testing on the weld tracking log.

##### 2.2.3.2 Nondestructive Examination

Perform the nondestructive examination of welds as specified or described on the drawings or as listed in the following paragraphs. Document all non-destructive testing on the weld tracking log.

###### 2.2.3.2.1 Testing Agency

Perform the nondestructive examination of welds and the evaluation of examination tests as to the acceptability of the welds by a testing agency adequately equipped and competent to perform such services or by the Contractor using suitable equipment and qualified personnel. In either

case written approval of the examination procedures is required and the examination tests must be made in the presence of the Contracting Officer. The evaluation of examination tests are subject to the approval of, and all records become the property of, the Government. Qualify and certify Certified Weld Inspectors (CWI) in accordance with the provisions of AWS QC1 and the CWI must be familiar with AWS D1.5M/D1.5 fracture critical member inspection as required in AWS D1.5M/D1.5 AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause. The laboratory and all personnel performing nondestructive testing must be qualified as specified. Only individuals qualified for NDT Level II or Level III may perform nondestructive testing. The Level III NDT inspector who supervises all NDT must possess a currently valid American Society for Nondestructive Testing (ASNT) Level III certificate for each of the processes for which they are qualified. Include copies of the NDT inspector certifications, including the ASNT certificate of Level III NDT Technician that certified the Level II Technicians in the submittals.

#### 2.2.3.2.2 Examination Procedure and Extent

Perform all nondestructive testing in accordance with AWS D1.5M/D1.5, Inspection Clause or AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause, as applicable. Perform testing as defined in the following paragraph.

#### 2.2.3.2.3 Acceptability of Welds

Welds will be unacceptable if shown to have defects prohibited by AWS D1.5M/D1.5.

#### 2.2.3.2.4 Examination Procedures

Perform examination procedures to the following requirements:

##### 2.2.3.2.4.1 Ultrasonic Testing (UT)

Perform ultrasonic testing of welds in accordance with the provisions of AWS D1.5M/D1.5. Make a record of each weld tested. Variations in ultrasonic testing procedures, equipment, and acceptance standards not included in Clause 8 of AWS D1.5M/D1.5 may be used with the approval of the Engineer. Such variations include curved scanning surfaces, other thicknesses, weld geometries, transducer sizes, frequencies, couplant, painted surfaces, testing techniques, etc. Record all approved variations in the inspection records. Perform all UT in conformance with a ultrasonic written procedure which contains a minimum of the following information regarding the UT method and examination techniques:

- a. The types of weld joint configurations to be examined
- b. Acceptance criteria for the types of weld joints to be examined
- c. Type of UT equipment (manufacturer, model number, serial number)
- d. Type of transducer, including frequency, size, shape, angle and type of wedge
- e. Scanning surface preparation and couplant requirements
- f. Type of calibration test block(s) with the appropriate reference reflectors

- g. Method of calibration and calibration interval
- h. Method for examining for laminations prior to weld evaluation
- i. Weld root index marking and other preliminary weld marking methods
- j. Scanning pattern and sensitivity requirements
- k. Methods for determining discontinuity location height, length and amplitude level
- l. Method of verifying the accuracy of the completed examination. This verification may be by re-UT by others (audits), other NDE methods, macroetch specimen, gouging or other visual techniques as may be approved by the Engineer.
- m. Documentation requirements for examinations, including any verifications performed
- n. Documentation retention requirements

#### 2.2.3.2.4.2 Radiographic Testing (RT)

Perform, evaluate and report radiographic testing in accordance with the applicable requirements of AWS D1.5M/D1.5.

#### 2.2.3.2.4.3 Magnetic Particle Inspection (MT)

Perform magnetic particle inspection of welds in accordance with the provisions of ASTM E709 and AWS D1.5M/D1.5, Inspection Clause and AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause where applicable. Requirements of AWS D1.5M/D1.5 Inspection Clause do not apply to these specifications, such that secondary members are subject to MT sampling as required. MT by the prod method is prohibited.

#### 2.2.3.2.4.4 Dye Penetrant Inspection (PT)

Perform dye penetrant inspection (PT) of welds in accordance with the applicable provisions of ASTM E165/E165M.

### 2.2.4 Welds to be Subject to Nondestructive Examination

#### 2.2.4.1 Structural Steel Non-Fracture Critical Members

Complete Joint Penetration Groove Welds. Inspect welds in conformance with AWS D1.5M/D1.5, Inspection Clause. Perform testing with a representative sample of welds and weld types from all welders and each of the processes each welder used. Spread testing throughout the project. Test 50 percent of all Complete joint penetration groove welds on non-fracture critical members.

#### 2.2.4.2 Structural Steel Non-Fracture Critical Member Fillet Welds and Partial Penetration Groove Welds

Randomly select a minimum of 50 percent, unless stated otherwise, of all fillet welds and partial penetration welds for examination by magnetic particle and or dye penetrant testing procedures described previously. The random testing includes a representative sample of welds and weld

types from all welders and each of the processes each welder used. Spread the random testing throughout the project. Develop and submit a schedule of random testing for approval prior to fabrication.

#### 2.2.4.3 Structural Steel Fracture Critical Member Welds

Test all welds on FCM in accordance with AWS D1.5M/D1.5, AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause. Subject 100 percent of all fracture critical complete joint penetration groove welds on fracture critical members to ultrasonic testing. Inspect all fracture critical welds to the tension criteria of the AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause of AWS D1.5M/D1.5. Perform all testing of fracture critical welds to the tension acceptance criteria of Inspection Clause. Inspect all partial joint penetration groove welds and fillet welds on fracture critical members with 100 percent MT in addition to visual inspection. Remove weld backing from all fracture critical welds prior to all NDE unless the weld backing member is permanent. The UT report for all groove welds must include non-rejectable indications with defect severity ratings within 5 db of being rejectable and must be fully recorded as to indication, rating, size, and location. In accordance with AWS D1.5M/D1.5 AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause, record all discontinuities found by UT.

#### 2.2.5 Test Coupons

The Government reserves the right to require the Contractor to remove coupons from completed work when doubt as to soundness cannot be resolved by nondestructive examination. Repair all replaced members with complete joint penetration groove welds. Submit proposed repair work for approval before commencing work. Develop a plan to reduce residual stress in all repaired weldments. The expense for removing and testing coupons, xrepairing cut members and the nondestructive examination of repairs will be borne by the Government. If the coupons fail testing, repair costs as well as sampling costs, will be borne by the Contractor.

#### 2.2.6 Supplemental Examination

When the soundness of any weld is suspected of being deficient, due to faulty welding or stresses that might occur during shipment or erection, the Government reserves the right to perform nondestructive supplemental examinations before final acceptance. The cost of such inspection will be borne by the Government. If welds are found to be defective, repair of the defective work and cost of the reinspection will be borne by the Contractor.

#### 2.2.7 Structural Steel Welding Repairs

Defective welds in the structural steel should be defined as critical repairs or non-critical repairs and must be repaired in accordance with AWS D1.5M/D1.5, Workmanship Clause for non-FCM and AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause for FCM. Make separate submittals for Welding Repairs - Non-Fracture Critical Members and Welding Repairs - Fracture Critical Members. Submit welding repair plans for steel and for fracture critical welds, approved prior to making repairs. Address weld repairs within the weld as well as weld repairs for base metal defects in the welding repair plan. All weld repairs to fracture critical members are considered critical welds in accordance with AWS D1.5M/D1.5 AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members Clause and must be approved by the Contracting Officer. Weld

repairs to mill defects in the base metal, repair of cracks, or a revised design to compensate for deficiencies require approval from the Government. The Contractor may prepare procedures and specifications for the repair of anticipated routine problems and submit them for approval before fabrication begins. Critical weld repairs require a WPS specific to the weld repair. Remove defective weld metal to sound metal by use of air carbon-arc gouging or by mechanical methods. Oxygen gouging for purposes of weld repair is not permitted. Thoroughly clean metal surfaces before welding. Inadequate removal of welds that damages the base metal are subject to replacement of the base metal, or compensation for the deficiency in a manner approved by the Contracting Officer. Retest repaired welds by the same methods used in the original inspection. Except for the repair of members cut to remove test coupons and found to have acceptable welds, costs of repairs and retesting are borne by the Contractor.

#### 2.2.8 Control Dimensions

After fabrication of each structure, but prior to painting, record and submit on the "control dimensions" chart provided, the actual dimensions indicated on drawing S-102. Verify control dimensions prior to witness points defined under the schedule of witness points so that they may be verified during inspection and prior to either final assembly, painting, or installation of the structure. Verify and document all control dimensions prior to shipping the structure.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

##### 3.1.1 Cleaning

Thoroughly clean all parts to be installed. Remove packing compounds, rust, dirt, grit and other foreign matter. Clean holes and grooves for lubrication. Examine enclosed chambers or passages to make sure that they are free from damaging materials. Where units or items are shipped as assemblies they will be inspected prior to installation. Disassembly, cleaning and lubrication will not be required except where necessary to place the assembly in a clean and properly lubricated condition. Do not use pipe wrenches, cold chisels or other tools likely to cause damage to the surfaces of rods, nuts or other parts for assembling and tightening parts. Tighten non-Structural bolts and screws firmly and uniformly but care must be taken not to overstress the threads. Place a half nut first when it is used for locking followed by the full nut. Lubricate threads of all bolts except high strength bolts, nuts and screws with an approved lubricant before assembly. Coat threads of corrosion-resisting steel bolts and nuts with an approved anti-galling compound. Driving and drifting bolts or keys will not be permitted.

##### 3.1.2 Alignment and Setting

Each machinery component or structural unit attached to structures fabricated according to this specification must be accurately aligned by the use of steel shims or other approved methods so that no binding in any moving parts or distortion of any member occurs before it is fastened in place. The alignment of all parts with respect to each other must be true within the respective tolerances required. Shims are to remain with the final installation where called for on the drawings. Apply anti seize compound to laying surfaces where parts are press-fit.

### 3.2 PROTECTION OF FINISHED WORK

Thoroughly clean machined surfaces of foreign matter. Protect all finished surfaces by suitable means. Oil and wrap with moisture resistant paper unassembled pins and bolts or protect by other approved means. Wash finished surfaces of ferrous metals to be in bolted contact with an approved rust inhibitor and coated with an approved rust resisting compound for temporary protection during fabrication, shipping and storage periods.

### 3.3 PAINTING

Paint all exposed surfaces of the structure as specified in Section 09 97 02: PAINTING - HYDRAULIC STRUCTURES. Grind all edges of plate prior to coating. Perform grinding of plate edges before paint preparation in order to remove hardness as a result of flame cutting. Brake and grind all square edges and holes other than bolt holes to a 1/16 inch radius prior to painting.

### 3.4 PAYMENT

#### 3.4.1 Stoplog Unit

Payment will be made at the Contract Line item price for "Fabrication of Two (2) Stoplog Units." This payment shall be full compensation for the materials and fabrication of the Stoplog Units.

-- End of Section --

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## 09 97 02

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## PAINTING: HYDRAULIC STRUCTURES

## PART 1 GENERAL

## 1.1 REFERENCES

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

## ASTM INTERNATIONAL (ASTM)

ASTM D153	(1984; R 2014) Specific Gravity of Pigments
ASTM D281	(2012; R 2016) Standard Test Method for Oil Absorption of Pigments by Spatula Rub-Out
ASTM D520	(2000; R 2011) Zinc Dust Pigment
ASTM D561	(1982; R 2014) Carbon Black Pigment for Paint
ASTM D740	(2011) Methyl Ethyl Ketone
ASTM D841	(2013) Nitration Grade Toluene
ASTM D1045	(2014) Sampling and Testing Plasticizers Used in Plastics
ASTM D1152	(2006; R 2012) Methanol (Methyl Alcohol)
ASTM D1153	(2012) Methyl Isobutyl Ketone
ASTM D1186	(1993) Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base
ASTM D1200	(2010; R 2014) Viscosity by Ford Viscosity Cup
ASTM D1210	(2005; R 2014) Fineness of Dispersion of Pigment-Vehicle Systems by Hegman-Type Gage
ASTM D2917	(2007; R 2013) Methyl Isoamyl Ketone
ASTM D3721	(2005; R 2011) Synthetic Red Iron Oxide Pigment
ASTM D4417	(2014) Field Measurement of Surface Profile of Blast Cleaned Steel
ASTM E1347	(2006; R 2011) Color and Color Difference Measurement by Tristimulus (Filter) Colorimetry

## U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FED-STD-595

(Rev C; Notice 1) Colors Used in  
Government Procurement

## SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC QP 1

(2012; E 2012) Standard Procedure for  
Evaluating Painting Contractors (Field  
Application to Complex Industrial  
Structures)

SSPC SP 1

(2015) Solvent Cleaning

SSPC SP 5/NACE No. 1

(2007) White Metal Blast Cleaning

SSPC QP 1

(2012; E 2012) Standard Procedure for  
Evaluating Painting Contractors (Field  
Application to Complex Industrial  
Structures)

SSPC QP 3

(2010) Standard Procedure for Evaluating  
Qualifications of Shop Painting Applicators

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-04 Samples

## Specification and Proprietary Paints; G|MCX

The Contractor shall submit samples of all special paint formula, Military, Master Painter Institute, Commercial Item Description, and SSPC paints. For products that are specified to be applied in accordance with the manufacturer's recommendations the Contractor shall submit the paint producers product data sheet or other written instructions for those products.

## Thinners; G|MCX

Samples shall be submitted of the thinners which are those solvents used to reduce the viscosity of the paint.

## SD-06 Test Reports

## Inspection and Operation Records; G|MCX

Documentation of inspections and operations performed shall be performed daily. The documentation shall be submitted after the paint operations have been completed.

## SD-07 Certificates

#### Qualified Painting Contractor; G|MCX

The Contractor shall submit a copy of their current SSPC QP 1 or SSPC QP 3 certification.

#### Qualified Coating Thickness Gages; G|MCX

Documentation of manufacturer's certification shall be submitted for all coating thickness gages.

### 1.3 QUALIFICATIONS

Qualifications and experience shall comply with the following.

#### 1.3.1 Qualified Painting Contractor

The Contractor shall be a certified SSPC QP 1 or SSPC QP 3 Painting Contractor.

#### 1.3.2 Qualified Paint Applicator

Documentation of certification shall be submitted for all paint applicators. Prior to the initiation of any work all paint applicators shall be tested and certified as meeting the requirements of the qualified paint applicator. Certification shall be administered by the Government approved independent third party Test Agency. Applicators failing the certification test shall not be permitted to apply any paint on the project.

##### 1.3.2.1 Test Plate

The test plate shall consist of a 6 feet by 6 feet steel plate with a 3/8-inch minimum thickness. The test plate shall have at least six bolts, three with bolt heads exposed and three with threads exposed, a 12-inch wide flange and a 6-inch diameter pipe each 18 inches long welded perpendicular to the test panel and a 6-inch deep T-beam with sealed ends welded horizontal across the test panel one foot up from the bottom all within the area to be painted on one side. Bolts shall be 1 inch minimum diameter.

##### 1.3.2.2 Certification Test Procedure

Certification testing of paint applicators shall be conducted at the job site in coordination with the Contracting Officer or his authorized representative. The Contractor shall supply the fabricated test plates to be used for the tests and shall provide crane service, rigging, and any other work necessary to provide accessibility for the certification testing and inspection. In preparation, the Contractor shall clean and prepare the test plates in accordance with the requirements as specified here in. Abrasive blasting shall be performed with the blast media as specified here in. The paints to be applied shall be the Contractor supplied materials and shall be those previously tested and approved as specified here in. Paints shall be applied as specified here in. The painter being tested shall mix and thin the paints to be used in the test and shall set up and adjust the application equipment for use. Each painter shall apply each of the types of paint comprising the specified system. The test plate shall be painted in a near vertical position.

### 1.3.2.3 Certification Criteria

The paint applicator shall be evaluated based on the conformance of the applied paint system to the requirements of the specifications. Deficiencies in the coatings, improper mixing or improper application methods are basis for failure. The Test Agency shall be the sole judge as to the acceptability of each paint applicators performance.

### 1.3.2.4 Quality Control Manual

Before the start of work, the fabricator is to supply a Quality Control Manual (QCM) to the Government for approval. The QCM will clearly address differences between the Quality Management System (QMS) and with these Specifications. These Specifications will govern between any discrepancies. The QCM will include, at a minimum, the following items in addition to the requirements outlined in the joint AISC 420/SSPC QP 3 Quality Management System Standard for Coatings Application:

- a. Inspection plan.
- b. Method for verification of accuracy of inspection measuring and test equipment.
- c. Nonconformance control procedures.
- d. Corrective action procedures.
- e. Coating defect repair procedures.
- f. Handling, storage and delivery of product and materials

### 1.3.3 Coating Thickness Gage Qualification

Documentation of certification shall be submitted for all coating thickness gages. Magnetic flux thickness gages as described in ASTM D1186 shall be used to make all coating thickness measurements on ferrous metal substrates. Gages shall have an accuracy of +/- 3 percent or better. Gages to be used on the job shall be certified by the manufacturer as meeting these requirements.

### 1.4 PRE-TESTED VINYL PAINTS

The manufacturers listed below may have vinyl paints in stock that have been previously tested and approved by the Government in accordance with the requirement of this delivery order. If the Contractor chooses to utilize these pre-tested vinyl paints for use in this delivery order in lieu of submitting liquid paint samples for testing, the Contractor shall contact Brooke Divan, (217) 373-3364 and request a copy of the test results of the specific batch of paint be sent to the Contracting Officer or their authorized representative.

#### Manufacturer

Sherwin-Williams  
101 Prospect Ave., NW  
Cleveland, OH 44115-1075  
1-800-4-SHERWIN  
<http://www.sherwin-williams.com>

BLP Mobile Paint Manufacturing Co.  
4775 Hamilton Boulevard  
Theodore, Alabama 36582  
(251) 443-6110  
Fax: (251) 408-0410  
<http://www.blpmobilepaint.com>

#### 1.5 SAMPLING AND TESTING

The Contractor shall allow at least 45 calendar days for sampling and testing. Sampling may be at the jobsite or source of supply. The Contractor shall notify the Contracting Officer when the paints and thinners are available for sampling. Sampling of each batch shall be witnessed by the Contracting Officer unless otherwise specified or directed. A 1-quart sample of paint and thinner shall be submitted for each batch proposed for use. The sample shall be labeled to indicate formula or specification number and nomenclature, batch number, batch quantity, color, date made, and applicable project contract number. Testing will be performed by the Government. Costs for retesting rejected material will be deducted from payments to the Contractor at the rate of \$475.00 dollars for each paint sample retested and \$325.00 dollars for each thinner retested.

#### 1.6 PAINT PACKAGING, DELIVERY, AND STORAGE

Paints shall be processed and packaged to ensure that within a period of one year from date of manufacture, they will not gel, liver, or thicken deleteriously, or form gas in the closed container. Paints, unless otherwise specified or permitted, shall be packaged in standard containers not larger than 5 gallons, with removable friction or lug-type covers. Containers for vinyl-type paints shall be lined with a coating resistant to solvents in the formulations and capable of effectively isolating the paint from contact with the metal container. Each container of paint or separately packaged component thereof shall be labeled to indicate the purchaser's order number, date of manufacture, manufacturer's batch number, quantity, color, component identification and designated name, and formula or specification number of the paint together with special labeling instructions, when specified. Paint shall be delivered to the job in unbroken containers. Paints that can be harmed by exposure to cold weather shall be stored in ventilated, heated shelters. All paints shall be stored under cover from the elements and in locations free from sparks and flames.

### PART 2 PRODUCTS

#### 2.1 SPECIAL PAINT FORMULAS

Special paints shall have the composition as indicated in the formulas listed herein. Where so specified, certain components of a paint formulation shall be packaged in separate containers for mixing on the job. If not specified or otherwise prescribed, the color shall be that naturally obtained from the required pigmentation.

#### 2.2 PAINT FORMULATIONS

Special paint formulas shall comply with the following:

2.2.1 Formula V-766e, Vinyl-Type White (or Gray) Impacted Immersion Coating

INGREDIENTS	PERCENT BY MASS
Vinyl Resin, Type 3	5.6
Vinyl Resin, Type 4	11.6
Titanium Dioxide and (for Gray)	
Carbon Black	13.0
Diisodecyl Phthalate	2.9
Methyl Isobutyl Ketone	32.0
Toluene	34.7
Ortho-Phosphoric Acid	0.2
	100.0

a. The dispersion of pigment shall be accomplished by means of pebble mills or other approved methods to produce a fineness of grind (ASTM D1210) of not less than 7 on the Hegman scale. Grinding in steel-lined or steel-ball mills will not be permitted. No grinding aids, antissettling agents, or any other materials except those shown in the formula will be permitted. The paint shall show the proper proportions of specified materials when analyzed by chromatographic and/or spectrophotometric methods. The ortho-phosphoric acid shall be measured accurately and diluted with at least four parts of ketone to one part of acid and it shall be slowly incorporated into the finished paint with constant and thorough agitation.

b. The viscosity of the paint shall be between 60 and 90 seconds using ASTM D1200 and a No. 4 Ford cup. This shall be verified by the Contractor.

c. The white and gray paints shall be furnished in the volume ratio designated by the purchaser. The gray paint shall contain no pigments other than those specified. Enough carbon black shall be included to produce a dry paint film having a reflectance of 20-24 (ASTM E1347). The resulting gray color shall approximate color 26231 of FED-STD-595.

2.2.2 Formula VZ-108d, Vinyl-Type Zinc-Rich Impacted Immersion Coating

INGREDIENTS	PERCENT BY WEIGHT	POUNDS	GALLONS
COMPONENT A			
Vinyl Resin, Type 3	16.6	109.2	9.65
Methyl Isobutyl Ketone	80.6	528.9	79.30
Suspending Agent E	0.7	4.6	0.28
Suspending Agent F	0.4	2.7	0.19
Methanol	0.5	3.3	0.50
Synthetic Iron Oxide (Red)	1.2	7.9	0.19
	100.0	656.6	90.11
COMPONENT B			
Silane B	100.0	4.1	0.47
COMPONENT C			
Zinc Dust	100.0	550.0	9.42

INGREDIENTS	PERCENT BY WEIGHT	POUNDS	GALLONS
			100.00 (mixed paint)

a. The iron oxide and suspending agents shall be dispersed into the vehicle (Component A) to a fineness of grind of not less than 4 on the Hegman scale (ASTM D1210). Grinding in steel-lined containers or using steel-grinding media shall not be permitted. The sole purpose of the iron oxide pigment is to produce a contrasting color. A red iron oxide-type 3 vinyl resin vehicle paste may be used in place of dry iron oxide provided compensating adjustment are made in the additions of Type 3 resin and methyl isobutyl ketone. The finished product with zinc dust added shall produce a paint which has a red tone upon drying and a reflectance of not more than 16 (ASTM E1347).

b. VZ-108d paint shall be supplied as a kit. Each kit shall consist of 4.5 gallons (33.1 pounds) of Component A in a 5-gallon lug closure type pail, 27.5 pounds of zinc dust (Component C) packaged in a 1-gallon plastic pail, and 3 fluid ounces of silane (Component B) packaged in a glass bottle of suitable size having a polyethylene lined cap. The bottle of silane shall be placed on the zinc dust in the 1-gallon pail. In addition to standard labeling requirements, each container of each component shall be properly identified as to component type and each container label of Component A shall carry the following: MIXING AND APPLICATION INSTRUCTIONS: WARNING - THIS PAINT WILL NOT ADHERE TO STEEL SURFACES UNLESS COMPONENT B IS ADDED. Remove the 3 ounces of bottled Component B (silane) from the Component C (zinc dust) container and add to the base paint Component A) with thorough stirring. Then sift the zinc dust into the base paint while it is being vigorously agitated with a power-driven stirrer and continue the stirring until the zinc dust has been dispersed. The mixed paint shall at some point be strained through a 30-60 mesh screen to prevent zinc dust slugs from reaching the spray gun nozzle. The paint shall be stirred continuously during application at a rate that will prevent settling. If spraying is interrupted for longer than 15 minutes, the entire length of the hose shall be whipped vigorously to redisperse the zinc. If the spraying is to be interrupted for more than 1 hour, the hose shall be emptied by blowing the paint back into the paint pot. Thinning will not normally be required when ambient temperatures are below about 80 degrees F, but when the ambient and steel temperatures are higher, methyl isoamyl ketone (MIAK) or methyl isobutyl ketone (MIBK) should be used. If paint is kept covered at all times, its pot life will be about 8 calendar days.

2.3 INGREDIENTS FOR SPECIAL PAINT FORMULAS

The following ingredient materials and thinners apply only to those special paints whose formulas are shown above in detail.

2.3.1 Pigments and Suspending Agents

2.3.1.1 Carbon Black

Carbon black shall conform to ASTM D561, Type I or II.

#### 2.3.1.2 Zinc Dust

Zinc dust pigment shall conform to ASTM D520, Type II.

#### 2.3.1.3 Iron Oxide

Iron oxide, (Dry) synthetic (red), shall conform to ASTM D3721. In addition, the pigment shall have a maximum oil absorption of 24 and a specific gravity of 4.90 to 5.20 when tested in accordance with ASTM D281 and ASTM D153, Method A, respectively. When the pigment is dispersed into specified vinyl paint formulation, the paint shall have color approximating FED-STD-595 color 10076 (dark red paint), and shall show no evidence of incompatibility or reaction between pigment and other components after 6 months storage.

#### 2.3.1.4 Titanium Dioxide

Titanium dioxide in vinyl paint Formula V-766e shall be one of the following: Kronos 2160 or 2101, Kronos, Inc.; Ti-Pure 960, E.I. Dupont DeNemours and Co., Inc.

#### 2.3.1.5 Suspending Agent E

Suspending Agent E shall be a light cream colored finely divided powder having a specific gravity of 2 to 2.3. It shall be an organic derivative of magnesium aluminum silicate mineral capable of minimizing the tendency of zinc dust to settle hard without increasing the viscosity of the paint appreciably. MPA-14, produced by RHEOX, Inc., has these properties.

#### 2.3.1.6 Suspending Agent F

Suspending Agent F shall be a light cream colored finely divided powder having a specific gravity of approximately 1.8. It shall be an organic derivative of a special montmorillonite (trialkylaryl ammonium hectorite). Bentone 27, produced by RHEOX, Inc., has these properties.

### 2.3.2 Resins, Plasticizer, and Catalyst

#### 2.3.2.1 Diisodecyl Phthalate

Diisodecyl Phthalate shall have a purity of not less than 99.0 percent, shall contain not more than 0.1 percent water, and shall have an acid number (ASTM D1045) of not more than 0.10.

#### 2.3.2.2 Vinyl Resin, Type 3

Vinyl resin, Type 3, shall be a vinyl chloride-acetate copolymer of medium average molecular weight produced by a solution polymerization process and shall contain 85 to 88 percent vinyl chloride and 12 to 15 percent vinyl acetate by weight. The resin shall have film-forming properties and shall, in specified formulations, produce results equal to Vinylite resin VYHH, as manufactured by the Union Carbide Corporation.

#### 2.3.2.3 Vinyl Resin, Type 4

Vinyl resin, Type 4, shall be a copolymer of the vinyl chloride-acetate type produced by a solution polymerization process, shall contain (by weight) 1 percent interpolymerized dibasic acid, 84 to 87 percent vinyl chloride, and 12 to 15 percent vinyl acetate. The resin shall have

film-forming properties and shall, in the specified formulations, produce results equal to Vinylite resin VMCH, as manufactured by the Union Carbide Corporation.

#### 2.3.2.4 Ortho-phosphoric Acid

Ortho-phosphoric acid shall be a chemically pure 85-percent grade.

#### 2.3.3 Solvent and Thinners

##### 2.3.3.1 Methanol

Methanol (methyl alcohol) shall conform to ASTM D1152.

##### 2.3.3.2 Methyl Ethyl Ketone

Methyl ethyl ketone (MEK) shall conform to ASTM D740.

##### 2.3.3.3 Methyl Isobutyl Ketone

Methyl isobutyl ketone (MIBK) shall conform to ASTM D1153.

##### 2.3.3.4 Methyl Isoamyl Ketone

Methyl isoamyl ketone (MIAK) shall conform to ASTM D2917.

##### 2.3.3.5 Toluene

Toluene shall conform to ASTM D841.

#### 2.3.4 Silane B

Silane B for Formula VZ-108d shall be N-beta-(aminoethyl)-gamma-aminopropyltrimethoxy silane. Silane A-1120, produced by the C.K. Witco Corporation, and Silane Z-6020, produced by Dow Corning Corporation, are products of this type.

### 2.4 TESTING

#### 2.4.1 Chromatographic Analysis

Solvents in vinyl paints and thinners shall be subject to analysis by programmed temperature gas chromatographic methods and/or spectrophotometric methods, employing the same techniques that give reproducible results on prepared control samples known to meet the specifications. If the solvent being analyzed is of the type consisting primarily of a single chemical compound or a mixture of two or more such solvents, interpretation of the test results shall take cognizance of the degree of purity of the individual solvents as commercially produced for the paint industry.

#### 2.4.2 Vinyl Paints

Vinyl paints shall be subject to the following adhesion test. When V-766 formulations are tested, 5 to 7 mils (dry) shall be spray applied to mild steel panels. The steel panels shall be essentially free of oil or other contaminants that may interfere with coating adhesion. The test panels shall be dry blast cleaned to a White Metal grade which shall be in compliance with SSPC SP 5/NACE No. 1. The surface shall have an angular

profile of 2.0 to 2.5 mils as measured by ASTM D4417, Method C. When VZ-108 is tested, the coating shall be mixed in its proper proportions and then spray applied to a dry film thickness of 1.5 to 2.5 mils above the blast profile. The VZ-108 shall be top coated with a V-766 known to pass this test. In all cases, the complete system shall have a total dry film thickness of 5 to 7 mils above the blast profile. After being air dried for 2 hours at room temperature, the panel shall be dried in a vertical position for 16 hours at 120 degrees F. After cooling for 1 hour, the panel shall be immersed in tap water at 85 to 90 degrees F for 48 to 72 hours. Immediately upon removal, the panel shall be dried with soft cloth and examined for adhesion as follows: With a pocket knife or other suitable instrument, two parallel cuts at least 1 inch long shall be made 1/4- to 3/8-inch apart through the paint film to the steel surface. A third cut shall be made perpendicular to and passing through the end of the first two. With the tip of the knife blade, the film shall be loosened from the panel from the third cut between the parallel cuts for a distance of 1/8- to 1/4-inch. With the panel being held horizontally, the free end of the paint film shall be grasped between the thumb and forefinger and pulled vertically in an attempt to remove the film as a strip from between the first two cuts. The strip of paint film shall be removed at a rate of approximately 1/10-inch per second and shall be maintained in a vertical position during the process of removal. The adhesion is acceptable if the strip of paint breaks when pulled or if the strip elongates a minimum of 10 percent during its removal. Paints not intended to be self-priming shall exhibit no delamination from the primer.

### PART 3 EXECUTION

#### 3.1 CLEANING AND PREPARATION OF SURFACES TO BE PAINTED

##### 3.1.1 General Requirements

Surfaces to be painted shall be cleaned before applying paint or surface treatments. Deposits of grease or oil shall be removed in accordance with SSPC SP 1, prior to mechanical cleaning. Solvent cleaning shall be accomplished with mineral spirits or other low toxicity solvents having a flash point above 100 degrees F. Clean cloths and clean fluids shall be used to avoid leaving a thin film of greasy residue on the surfaces being cleaned. Items not to be prepared or coated shall be protected from damage by the surface preparation methods. Machinery shall be protected against entry of blast abrasive and dust into working parts. Cleaning and painting shall be so programmed that dust or other contaminants from the cleaning process do not fall on wet, newly painted surfaces, and surfaces not intended to be painted shall be suitably protected from the effects of cleaning and painting operations. Welding of, or in the vicinity of, previously painted surfaces shall be conducted in a manner to prevent weld spatter from striking the paint and to otherwise reduce coating damage to a minimum; paint damaged by welding operations shall be restored to original condition. Surfaces to be painted that will be inaccessible after fabrication, erection, or installation operations are completed shall be painted before they become inaccessible. All paint on the stoplog unit shall be vinyl paint system 5-A-Z except the walkway toe plate shall be painted with a "safety" yellow enamel paint.

##### 3.1.2 Ferrous Surfaces Subject to Severe Exposure

Ferrous surfaces subject to extended periods of immersion or as otherwise required shall be dry blast-cleaned to SSPC SP 5/NACE No. 1. The blast profile, unless otherwise specified, shall be 1.5 to 2.5 mils as measured

by ASTM D4417, Method C. Appropriate abrasive blast media shall be used to produce the desired surface profile and to give an angular anchor tooth pattern. If recycled blast media is used, an appropriate particle size distribution shall be maintained so that the specified profile is consistently obtained. Steel shot or other abrasives that do not produce an angular profile shall not be used. Weld spatter not dislodged by blasting shall be removed with impact or grinding tools and the areas reblasted prior to painting. Surfaces shall be dry at the time of blasting. Blast cleaning to SSPC SP 5/NACE No. 1 shall be done in the field and, unless otherwise specifically authorized, after final erection. Within 8 hours after cleaning, prior to the deposition of any detectable moisture, contaminants, or corrosion, all ferrous surfaces blast cleaned to SSPC SP 5/NACE No. 1 shall be cleaned of dust and abrasive particles by brush, vacuum cleaner, and/or blown down with clean, dry, compressed air, and given the first coat of paint. Upon written request by the Contractor, the Contracting Officer or his authorized representative may authorize mill or shop cleaning of assembled or partially assembled components specified to receive one of the vinyl-type paint systems. The surfaces, if shop blasted, shall be shop coated with the first and second coats of the specified paint system except that the epoxy zinc-rich primed surfaces shall receive an extra single spray coat of the zinc primer at the time field painting is started, as specified in the paint system instructions. The shop coating shall be maintained in good condition by cleaning and touching up of areas damaged during the fabrication period. If pinpoint or general rusting appears, surfaces shall be reblasted and repainted at no added cost to the Government. Prior to the field application of subsequent coats, soiled areas of the shop coating shall be thoroughly cleaned and all welds or other unpainted or damaged areas shall be cleaned and coated in a manner to make them equivalent to adjacent, undamaged paint surfaces.

### 3.2 PAINT APPLICATION

#### 3.2.1 General

The finished coating shall be free from holidays, pinholes, bubbles, runs, drops, ridges, waves, laps, excessive or unsightly brush marks, and variations in color, texture, and gloss. Application of initial or subsequent coatings shall not commence until the Contracting Officer or his authorized representative has verified that atmospheric conditions and the surfaces to be coated are satisfactory. Each paint coat shall be applied in a manner that will produce an even, continuous film of uniform thickness. Edges, corners, crevices, seams, joints, welds, rivets, corrosion pits, and other surface irregularities shall receive special attention to ensure that they receive an adequate thickness of paint. Spray equipment shall be equipped with traps and separators and where appropriate, mechanical agitators, pressure gauges, pressure regulators, and screens or filters. Air caps, nozzles, and needles shall be as recommended by the spray equipment manufacturer for the material being applied. Airless-type spray equipment may be used only on broad, flat, or otherwise simply configured surfaces, except that it may be employed for general painting if the spray gun is equipped with dual or adjustable tips of proper types and orifice sizes. Airless-type equipment shall not be used for the application of vinyl paints.

#### 3.2.2 Mixing and Thinning

Paints shall be thoroughly mixed, strained where necessary, and kept at a uniform composition and consistency during application. Paste or

dry-powder pigments specified to be added at the time of use shall, with the aid of powered stirrers, be incorporated into the vehicle or base paint in a manner that will produce a smooth, homogeneous mixture free of lumps and dry particles. Where necessary to suit conditions of the surface temperature, weather, and method of application, the paint may be thinned immediately prior to use. Thinning shall generally be limited to the addition of not more than 1 pint per gallon of the proper thinner; this general limitation shall not apply when more specific thinning instructions are provided. Paint that has been stored at low temperature, shall be brought up to at least 70 degrees F before being mixed and thinned, and its temperature in the spray tank or other working container shall not fall below 60 degrees F during the application. Paint that has deteriorated in any manner to a degree that it cannot be restored to essentially its original condition by customary field-mixing methods shall not be used and shall be removed from the project site. Paint and thinner that is more than 1 year old shall be resampled and resubmitted for testing to determine its suitability for application.

### 3.2.3 Atmospheric and Surface Conditions

Paint shall be applied only to surfaces that are above the dew point temperature and that are completely free of moisture as determined by sight and touch. Paint shall not be applied to surfaces upon which there is detectable frost or ice. Except as otherwise specified, the temperature of the surfaces to be painted and of air in contact therewith shall be not less than 45 degrees F during paint application nor shall paint be applied if the surfaces can be expected to drop to 32 degrees F or lower before the film has dried to a reasonably firm condition. During periods of inclement weather, painting may be continued by enclosing the surfaces and applying artificial heat, provided the minimum temperatures and surface dryness requirements prescribed previously are maintained. Paint shall not be applied to surfaces heated by direct sunlight or other sources to temperatures that will cause detrimental blistering, pinholing, or porosity of the film.

### 3.2.4 Time Between Surface Preparation and Painting

Surfaces that have been cleaned and/or otherwise prepared for painting shall be primed as soon as practicable after such preparation has been completed but, in any event, prior to any deterioration of the prepared surface.

### 3.2.5 Method of Paint Application

Unless otherwise specified, paint shall be applied by brush or spray to ferrous and nonferrous metal surfaces. Special attention shall be directed toward ensuring adequate coverage of edges, corners, crevices, pits, rivets, bolts, welds, and similar surface irregularities. Other methods of application to metal surfaces shall be subject to the specific approval of the Contracting Officer or his authorized representative. Paint on plaster, concrete, or other nonmetallic surfaces shall be applied by brush, roller, and/or spray.

### 3.2.6 Coverage and Film Thickness

Film thickness or spreading rates shall be as specified hereinafter. Where no spreading rate is specified, the paint shall be applied at a rate normal for the type of material being used. In any event, the combined coats of a

specified paint system shall completely hide base surface and the finish coats shall completely hide undercoats of dissimilar color.

#### 3.2.6.1 Measurement on Ferrous Metal

Where dry film thickness requirements are specified for coatings on ferrous surfaces, measurements shall be made with a gage qualified in accordance with Paragraph COATING THICKNESS GAGE QUALIFICATION. They shall be calibrated and used in accordance with ASTM D1186. They shall be calibrated using plastic shims with metal practically identical in composition and surface preparation to that being coated, and of substantially the same thickness (except that for measurements on metal thicker than 1/4-inch, the instrument may be calibrated on metal with a minimum thickness of 1/4-inch). Frequency of measurements shall be as recommended for field measurements by ASTM D1186 and reported as the mean for each spot determination. The instruments shall be calibrated or calibration verified prior to, during, and after each use.

#### 3.2.7 Progress of Painting Work

Where field painting on any type of surface has commenced, the complete painting operation, including priming and finishing coats, on that portion of the work shall be completed as soon as practicable, without prolonged delays. Sufficient time shall elapse between successive coats to permit them to dry properly for recoating, and this period shall be modified as necessary to suit adverse weather conditions. Paint shall be considered dry for recoating when it feels firm, does not deform or feel sticky under moderate pressure of the finger, and the application of another coat of paint does not cause film irregularities such as lifting or loss of adhesion of the undercoat. All coats of all painted surfaces shall be unscarred and completely integral at the time of application of succeeding coats. At the time of application of each successive coat, undercoats shall be cleaned of dust, grease, overspray, or foreign matter by means of airblast, solvent cleaning, or other suitable means. Cement and mortar deposits on painted steel surfaces, not satisfactorily removed by ordinary cleaning methods, shall be brush-off blast cleaned and completely repainted as required. Undercoats of high gloss shall, if necessary for establishment of good adhesion, be scuff sanded, solvent wiped, or otherwise treated prior to application of a succeeding coat. Field coats on metal shall be applied after erection except as otherwise specified and except for surfaces to be painted that will become inaccessible after erection.

#### 3.2.8 Contacting Surfaces

When ordinary bolted contact is to exist between surfaces of ferrous or other metal parts of substantially similar chemical composition, such surfaces will not be required to be painted, but any resulting crevices shall subsequently be filled or sealed with paint. Contacting metal surfaces formed by high-strength bolts in friction-type connections shall not be painted. Where a nonmetal surface is to be in bolted contact with a metal surface, the contacting surfaces of the metal shall be cleaned and given three coats of the specified primer. Unless otherwise specified, corrosion-resisting metal surfaces, including cladding therewith, shall not be painted.

#### 3.2.9 Drying Time Prior to Immersion

Minimum drying periods after final coat prior to immersion shall be: epoxy

systems at least 5 calendar days, and vinyl-type paint systems at least 3 calendar days. Minimum drying periods shall be increased twofold if the drying temperature is below 65 degrees F and/or if the immersion exposure involves considerable abrasion.

### 3.2.10 Protection of Painted Surfaces

Where shelter and/or heat are provided for painted surfaces during inclement weather, such protective measures shall be maintained until the paint film has dried and discontinuance of the measures is authorized. Items that have been painted shall not be handled, worked on, or otherwise disturbed until the paint coat is fully dry and hard. All metalwork coated in the shop or field prior to final erection shall be stored out of contact with the ground in a manner and location that will minimize the formation of water-holding pockets; soiling, contamination, and deterioration of the paint film, and damaged areas of paint on such metalwork shall be cleaned and touched up without delay. The first field coat of paint shall be applied within a reasonable period of time after the shop coat and in any event before weathering of the shop coat becomes extensive.

### 3.2.11 Vinyl Paints

#### 3.2.11.1 General

Vinyl paints shall be spray applied, except that areas inaccessible to spraying shall be brushed. All of the vinyl paints require thinning for spray application except the zinc-rich vinyl paint (Formula VZ 108d) which will normally require thinning only under certain weather conditions. Thinners for vinyl paints shall be as follows:

APPROXIMATE AMBIENT AIR TEMPERATURE  
(Degrees F)

Below 50	MEK
50 - 70	MIBK
Above 70	MIAK

The amount of thinner shall be varied to provide a wet spray and avoid deposition of particles that are semidry when they strike the surface. Vinyl paints shall not be applied when the temperature of the ambient air and receiving surfaces is less than 35 degrees F nor when the receiving surfaces are higher than 125 degrees F. Each spray coat of vinyl paint shall consist of a preliminary extra spray pass on edges, corners, interior angles, pits, seams, crevices, junctions of joining members, rivets, weld lines, and similar surface irregularities followed by an overall double spray coat. A double spray coat of vinyl-type paint shall consist of applying paint to a working area of not less than several hundred square feet (meters) in a single, half-lapped pass, followed after drying to at least a near tack-free condition by another spray pass applied at the same coverage rate and where practicable at right angles to the first. Rivets, bolts, and similar surface projections shall receive sprayed paint from every direction to ensure complete coverage of all faces. Pits, cracks, and crevices shall be filled with paint insofar as practicable, but in any event, all pit surfaces shall be thoroughly covered and all cracks and crevices shall be sealed off against the entrance of moisture. Fluid and atomization pressures shall be kept as low as practicable consistent with good spraying results. Unless otherwise specified, not more than 2.0 mils, average dry film thickness, of vinyl

paint shall be applied per double spray coat. Except where otherwise indicated, an undercoat of the vinyl-type paint may receive the next coat any time after the undercoat is tack-free and firm to the touch, provided that no speedup or delay in the recoating schedule shall cause film defects such as sags, runs, air bubbles, air craters, or poor intercoat adhesion. Neither the prime coat nor any other coat shall be walked upon or be subjected to any other abrading action until it has hardened sufficiently to resist mechanical damage.

#### 3.2.11.2 Vinyl Zinc-Rich Primer

Primer shall be field mixed combining components A, B, and C. Mixing shall be in accordance with label instructions. After mixing, the paint shall be kept covered at all times to avoid contamination and shall be applied within 8 calendar days after it is mixed. When the ambient and/or steel temperature is below about 80 degrees F, the paint will not normally require thinning; however, the paint shall at all times contain sufficient volatiles (thinners) to permit it to be satisfactorily atomized and to provide a wet spray and to avoid deposition of particles that are semidry when they reach the surface. The paint shall be stirred continuously during application at a rate that will prevent the zinc dust from settling. When spraying is resumed after any interruption of longer than 15 minutes, the entire length of the material hose shall be whipped vigorously until any settled zinc is redispersed. Long periods of permitting the paint to remain stagnant in the hose shall be avoided by emptying the hoses wherever the painting operation is to be suspended for more than 1 hour. The material (paint) hoses shall be kept as short as practicable, preferably not more than 50 feet in length. Equipment used for spraying this zinc primer shall not be used for spraying other vinyl-type paints without first being thoroughly cleaned, since many of the other paints will not tolerate zinc contamination; no type of hot spray shall be used. An average dry film thickness of up to 2.5 mils may be applied in one double-spray coat. Unless specifically authorized, not more than 8 calendar days shall elapse after application of a VZ-108d zinc-rich coat before it receives a succeeding coat.

#### 3.2.11.3 Vinyl Paints

Vinyl Paint (V-766e) is a ready-mixed paint designed to be spray applied over a wide range of ambient temperatures by field thinning with the proper type and amount of thinner. For spray application, the paint shall be thinned as necessary up to approximately 25 percent (1 quart per gallon of base paint) with the appropriate thinner; when ambient and steel temperatures are above normal, up to 40-percent thinning may be necessary for satisfactory application.

### 3.3 PAINT SYSTEMS APPLICATION

The required paint systems and the surfaces to which they shall be applied are shown in this paragraph, and/or in the drawings. Supplementary information follows.

#### 3.3.1 Fabricated and Assembled Items

Items that have been fabricated and/or assembled into essentially their final form and that are customarily cleaned and painted in accordance with the manufacturer's standard practice will be exempted from equivalent surface preparation and painting requirements described herein, provided

that:

- a. Surfaces primed (only) in accordance with such standard practices are compatible with specified field-applied finish coats.
- b. Surfaces that have been primed and finish painted in accordance with the manufacturer's standard practice are of acceptable color and are capable of being satisfactorily touched up in the field.
- c. Items expressly designated herein to be cleaned and painted in a specified manner are not coated in accordance with the manufacturer's standard practice if different from that specified herein.

### 3.3.2 Surface Preparation

The method of surface preparation and pretreatment shown in the tabulation of paint systems is for identification purposes only. Cleaning and pretreatment of surfaces prior to painting shall be accomplished in accordance with detailed requirements previously described.

### 3.3.3 System No. 5-E-Z

Paint shall be spray applied to an average dry film thickness of a minimum of 7.0 mils for the completed system, and the thickness at any point shall not be less than 5.5 mils. The dry film thickness of the zinc-rich primer shall be approximately 2.5 mils. The specified film thickness shall be attained in any event, and any extra coats needed to attain the specified thickness shall be applied at no additional cost to the Government. Attaining the specified film thickness by applying fewer than the prescribed number of coats or spray passes will be acceptable provided heavier applications do not cause an increase in pinholes, bubbles, blisters, or voids in the dried film and also provided that not more than 2.0 mils (dry film thickness) per double spray coat nor more than 1.0 mil per single spray pass of nonzinc paint shall be applied at one time.

## 3.4 INSPECTION

The Contractor shall inspect, document, and report all work phases and operations on a daily basis. As a minimum the daily report shall contain the following:

- a. Inspections performed, including the area of the structure involved and the results of the inspection.
- b. Surface preparation operations performed, including the area of the structure involved, the mode of preparation, the kinds of solvent, abrasive, or power tools employed, and whether contract requirements were met.
- c. Thinning operations performed, including thinners used, batch numbers, and thinner/paint volume ratios.
- d. Application operations performed, including the area of the structure involved, mode of application employed, ambient temperature, substrate temperature, dew point, relative humidity, type of paint with batch numbers, elapsed time between surface preparation and application, elapsed time for recoat, condition of underlying coat, number of coats applied, and if specified, measured dry film thickness or spreading rate of each new coating.

## 3.5 PAINTING SCHEDULES

## SYSTEM NO. 5-E-Z

Items or surfaces to be coated: All exposed ferrous surfaces shall be painted except painting of nonferrous metals and corrosion resisting steel will not be required unless otherwise specified.

SURFACE PREPARATION	1st COAT	2nd COAT	3rd COAT	4th COAT
White metal blast cleaning SSPC SP 5/NACE No. 1 coat)	Vinyl zinc- rich VZ-108d (double spray coat)	Gray Vinyl V-766e (double spray coat)	White Vinyl V-766e (double spray coat)	Gray Vinyl V-766e (double spray

-- End of Section --

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## STOPLOG UNITS

## PART 1 GENERAL

## 1.1 REFERENCES

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

## AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

- ASME B18.2.2 (2022) Nuts for General Applications: Machine Screw Nuts, and Hex, Square, Hex Flange, and Coupling Nuts (Inch Series)
- ASME B18.21.1 (2009; R 2016) Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers (Inch Series)
- ASME B18.22M (1981; R 2017) Metric Plain Washers

## ASTM INTERNATIONAL (ASTM)

- ASTM A307 (2021) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
- ASTM A320/A320M (2021a) Standard Specification for Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service
- ASTM A574 (2021) Standard Specification for Alloy Steel Socket-Head Cap Screws
- ASTM D2240 (2015; E 2017) Standard Test Method for Rubber Property - Durometer Hardness
- ASTM D395 (2016; E 2017) Standard Test Methods for Rubber Property - Compression Set
- ASTM D412 (2016) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
- ASTM D413 (1998; R 2017) Standard Test Methods for Rubber Property - Adhesion to Flexible Substrate
- ASTM D471 (2016a) Standard Test Method for Rubber Property - Effect of Liquids
- ASTM D572 (2004; R 2019) Rubber Deterioration by Heat and Oxygen

ASTM F436

(2011) Hardened Steel Washers

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

### SD-02 Shop Drawings

Detail Drawings; G|MCX  
Installation Drawings; G|MCX

### SD-03 Product Data

Rubber Seals; G|MCX  
Bolting Hardware; G|MCX

### SD-06 Test Reports

Tests, Inspections, and Verifications  
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## 1.3 QUALIFICATION OF WELDERS AND WELDING OPERATORS

Qualification of welders and welding operators shall conform to the requirements of Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES.

## 1.4 DELIVERY, STORAGE, AND HANDLING

### 1.4.1 General

Perform delivery, handling, and storage of materials and fabricated items conforming to the requirements specified and in Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES.

### 1.4.2 Rubber Seals

Store rubber seals in a place which permits free circulation of air, maintains a temperature of 70 degrees F or less, and prevents the rubber from being exposed to the direct rays of the sun. Keep rubber seals free of oils, grease, and other materials which would deteriorate the rubber. Rubber seals shall not be distorted during handling.

## PART 2 PRODUCTS

### 2.1 MATERIALS

Submit system of identification which shows the disposition of specific lots of approved materials and fabricated items in the work before completion of the contract. Furnish materials orders, material lists and material shipping bills conforming with the requirements of Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES.

#### 2.1.1 Metals

Structural steel, stainless steel, and other metal materials used for

fabrication shall conform to the requirements as shown and as specified herein and in Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES.

## 2.1.2 Guide Blocks and Bearing Plates

### 2.1.2.1 General

Guide blocks shall meet the requirements of steel plates. The final cross section shall meet the dimensional requirements shown on the drawings. Lengths of composite plates and bolting patterns shall also be as shown on the drawings. The countersunk screw heads shall be recessed 1/8-inch below the surface of the blocks.

Bearing plates shall be bolted to the stoplog units using countersunk bolts recessed 1/8-inch below the plate surface. The final cross section shall meet the dimension requirements shown on the drawings. Lengths of bearing plates and bolting patterns shall also be as shown on the drawings. The bolt heads shall be recessed 1/8-inch below the surface of the blocks.

### 2.1.3 Rubber Seals

Rubber seals shall be fluorocarbon (Teflon) clad rubber seals of the mold type only. Rubber seals shall be compounded of natural rubber, synthetic polyisoprene or a blend of both and shall contain reinforcing carbon black, zinc oxide, accelerators, antioxidants, vulcanizing agents, and plasticizers.

#### 2.1.3.1 Physical Characteristics

Physical characteristics of the seals shall meet the following requirements:

PHYSICAL TEST	TEST VALUE	TEST METHOD SPECIFICATION
Tensile Strength	3,000 psi (min.)	ASTM D412
Elongation at Break	450 percent (min.)	ASTM D412
300 percent	900 psi (min.)	ASTM D412
Durometer Hardness (Shore Type A)	60 to 70	ASTM D2240
*Water Absorption	5 percent by weight (max.)	ASTM D471
Compression Set	30 percent (max.)	ASTM D395
Tensile Strength (after aging 48 hrs)	80 percent of tensile strength (min.)	ASTM D572

The "Water Absorption" test shall be performed with distilled water. The washed specimen shall be blotted dry with filter paper or other absorbent material and suspended by means of small glass rods in the oven at a temperature of 70 degrees C plus or minus 2 degrees for 22 hours plus or minus 1/4 hour. The specimen shall be removed, allowed to cool to room temperature in air, and weighed. The weight shall be recorded to the

nearest 1 mg as M subscript 1 (M subscript 1 is defined in ASTM D471). The immersion temperature shall be 70 degrees C plus or minus 1 degree and the duration of immersion shall be 166 hours.

#### 2.1.3.2 Fabrication of Rubber Seals

All corners shall be full-molded corners and shall be done so by the manufacturer.

Rubber seals shall have a fluorocarbon film vulcanized and bonded to the sealing surface of the bulb. The film shall be 0.060 inches thick Huntington Abrasion Resistant Fluorocarbon Film No. 4508, or equal, and shall have the following physical properties:

Tensile strength	2,000 psi (min.)
Elongation	250 percent (min.)

The outside surface of the bonded film shall be flush with the surface of the rubber seal and shall be free of adhering or bonded rubber. Strips and corner seals shall be molded in lengths suitable for obtaining the finish lengths shown and with sufficient excess length to provide test specimens for testing the adequacy of the adhesion bond between the film and bulb of the seal. At one end of each strip or corner seal to be tested, the fluorocarbon film shall be masked during bonding to prevent a bond for a length sufficient to hold the film securely during testing.

## 2.2 MANUFACTURED UNITS

Bolts, nuts, washers, screws and other manufactured units shall conform with the requirements as shown and as specified herein and in Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES.

### 2.2.1 Bolts, Nuts and Washers

Provide bolts, nuts, and washers of the material, grade, type, class, style and finish indicated or best suited for intended use.

a. Bolts and Nuts - ASTM A307, Grade A or ASTM A320/A320M, Austenitic Steel, B8M Class 1.

b. Nuts - ASME B18.2.2.

c. Washers

(1) Plain Washers - ASME B18.22M ASME B18.21.1, Type B.

(2) Lock Washer - ASME B18.21.1.

(3) Beveled Washer - ASTM F436

d. Countersunk Screws - ASTM A574 zinc plated.

### 2.2.2 Screws

Screws shall be of the type indicated on the contract drawings.

## 2.3 FABRICATION

### 2.3.1 Detail Drawings

Submit detail drawings, including fabrication drawings, shop assembly drawings, delivery drawings, and field installation drawings, conforming to the requirements specified and in Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES.

#### 2.3.1.1 Fabrication Drawings

Fabrication drawings shall show complete details of materials, tolerances, connections, and proposed welding sequences which clearly differentiate shop welds and field welds.

#### 2.3.1.2 Shop Assembly Drawings

Shop assembly drawings shall provide details for connecting the adjoining fabricated components in the shop to assure satisfactory field installation.

#### 2.3.1.3 Delivery Drawings

Delivery drawings shall provide descriptions of methods of delivering components to the site, including details for supporting fabricated components during shipping to prevent distortion or other damages.

### 2.3.2 Structural Fabrication

Structural fabrication shall conform to the requirements as shown and specified herein and in Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES. Dimensional tolerances shall be as specified and as shown. Splices shall occur only where shown.

#### 2.3.2.1 Welding

Welding of structural steel shall conform with the requirements specified in Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES. Welds shall be of the type shown and approved detail drawings.

#### 2.3.2.2 Bolted Connections

Bolted connections shall conform with the requirements specified herein and in Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES

#### 2.3.2.3 Miscellaneous Provisions

Miscellaneous provisions for fabrication shall conform with the requirements specified herein and in Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES.

### 2.3.3 Stoplog Unit

The stoplog unit shall be of single-component structural fabrication. The shall be shop fabricated and shall be provided complete with lifting lugs, seal assemblies, and other appurtenant items as required for installation and proper operation. Check the design center of gravity of the stoplog unit prior to fabrication and notify the Contracting Officer if an unreasonable amount of counter-weighting is

required to attain the center of gravity as designed. Surfaces of the stoplog unit framing elements to which skin plates are to be welded shall not vary from a true plane by more than 1/16-inch to provide uniform bearing. The outside surfaces of skin plates welded to framing elements shall not vary from a true plane by more than 1/16-inch. Splices in skin plates are not permitted for these stoplog unit. The overall width and height of the fabricated stoplog unit shall not vary from the respective dimensions shown by more than 1/16-inch. The stoplog unit shall be stress relieved prior to the attachment of seal assemblies and other appurtenant items.

#### 2.3.3.1 Stoplog Unit Seal Assembly

Seal assemblies shall consist of rubber seals, steel plates, and steel fasteners. Rubber seals shall be continuous over the full length. Seals shall be accurately fitted and drilled for proper installation. Bolt holes shall be drilled in the rubber seals by using prepared templates or the retainers plates as templates. Splices and corners in the seal assembly shall be fully molded, develop a minimum tensile strength of 50 percent of the unspliced seal, and occur only when required. The vulcanized splices between molded corners and straight lengths shall be located as specified or suggested by the supplier and approved by the Government. Splices shall be on a 45 degree bevel related to the "thickness" of the seal. The surfaces of finished splices shall be smooth and free of irregularities.

#### 2.3.4 Shop Assembly

Shop assembly requirements for the stoplog unit and appurtenant items shall be as shown and as specified and in Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES. The stoplog unit shall be assembled completely in the shop to assure satisfactory field installation. The matchmarking of unassembled components shall be carefully preserved until the components are assembled. Adequate support shall be provided during assembly to maintain components within 1/16-inch of actual installation planes. Mating surfaces and machined surfaces shall be coated with a rust preventive coating until assembled. Other connecting surfaces which are not required to be disassembled for shipment shall be thinly coated with an approved rust preventive coating before being joined. Shop assembled components shall be delivered assembled. Shop assembly work shall be performed in the presence of the Contracting Officer unless otherwise approved. The presence of the Contracting Officer will not relieve the Contractor of any responsibility under this contract.

##### 2.3.4.1 Stoplog Unit

Shop assembly of the stoplog unit shall be in the horizontal position with the skin side of the stoplog unit facing down. Shop assembly shall include the attachment of all accessories to the stoplog unit. The stoplog unit shall be lifted by the lifting brackets and inspected for balance about the center of gravity after being shop assembled. If the stoplog unit is out of plumb by more than 1/4-inch in the total length in a vertical plane in the upstream-downstream direction, or by more than 1/8-inch in the total width in a vertical plane perpendicular to the vertical plane in the upstream-downstream direction, it shall be balanced by counterweighting or some other method as approved at the Contractor's expense.

##### 2.3.4.2 Guide Blocks and Bearing Plates

Guide blocks and bearing plates shall be connected as shown on the

contract drawings. Guide blocks and bearing plates shall be accurately located on the stoplog unit in a true plane with each other both the upstream-downstream direction and vertical direction. The steel plate and/or the flange of vertical MC shape the guide blocks and bearing plates are connected to shall have the surface in contact with the guide blocks be flat to provide an even bearing surface.

2.3.4.3 Seal Assemblies

Seal assemblies shall be attached to the stoplog unit during shop assembly. The rubber seals of the assemblies shall be accurately fitted and drilled to match the seal spacer and clamping bars.

2.4 TESTS, INSPECTIONS, AND VERIFICATIONS

Submit certified material test reports with all material delivered to the site. Tests, inspections, and verifications for materials and fabricated items shall conform to the requirements specified and in Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES.

2.4.1 Testing of Rubber Seals

The fluorocarbon film of rubber seals shall be tested for adhesion bond in accordance with ASTM D413 using either the machine method or the deadweight method. A 25 mm 1 inch long piece of seal shall be cut from the end of the seal which has been masked and subjected to tension at an angle approximately 90 degrees to the rubber surface. There shall be no separation between the fluorocarbon film and the rubber when subjected to the following loads:

THICKNESS OF FLUOROCARBON FILM	MACHINE METHOD AT 2 INCHES PER MINUTE	DEADWEIGHT METHOD
0.060 in.	30 lbs per inch width	30 lbs per inch width

Failure of any specimen to meet the requirements of the test used will be cause for rejection of the piece from which the test specimen was taken.

2.4.2 Inspection

Shop assembled components shall be inspected for accurate fit and compliance with dimensional tolerances. Sealing, guiding, and connecting surfaces shall be inspected to determine if their planes are true, parallel, and in uniform contact with opposing surfaces.

PART 3 EXECUTION

3.1 FABRICATION

Fabrication shall conform with the requirements specified and in Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES. Stoplog unit and appurtenant items shall be assembled in strict accordance with the contract drawings, approved drawings, and shop match-markings. Bearing surfaces requiring lubrication shall be thoroughly cleaned and lubricated with an approved lubricant before assembly and installation.

### 3.1.1 Painting

Exposed parts of the stoplog unit and appurtenance components, except machined surfaces, corrosion-resistant surfaces, and other specified surfaces, shall be painted as specified in Section 09 97 02 PAINTING: HYDRAULIC STRUCTURES. All edges of plate shall be ground prior to coating. Grinding plate edges shall be accomplished before paint preparation in order to remove hardness as a result of flame cutting. All square edges and holes other than anchor bolt holes and pin holes shall be broken and ground to a 1/16-inch radius prior to painting.

### 3.2 SHOP ASSEMBLY AND TEST

#### 3.2.1 General

The stoplog unit will be examined first to determine whether or not the workmanship conforms to the specification requirements. The workmanship in the fabrication of the stoplog unit shall be such that the stoplog unit shall form a watertight barrier when lowered to the installed position. Failure to adhere to this criteria shall be cause for rejection.

Following the examination each stoplog unit shall be hung from its own lifting lugs to determine if the stoplog unit hangs plumb. The bulkhead may not be out of plumb by more than 1/16-inch.

#### 3.2.2 Acceptance

Upon successful completion of the field tests the work will be accepted.

### 3.3 PROTECTION OF FINISHED WORK

Protection of finished work shall conform to the requirements of Section 05 59 20 FABRICATION OF HYDRAULIC STEEL STRUCTURES.

### 3.4 FINAL EXAMINATION AND ACCEPTANCE

When all the work for the stoplog unit specified under this contract have been completed and the stoplog unit has been delivered f.o.b destination, the Contracting Officer or their approved representative will make a thorough examination of the stoplog unit to assure that no damage occurred during shipment. Additional examination and acceptance criteria as found in these contract specifications are applicable to final examination and acceptance.

-- End of Section --