



State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER
07120820

PAGE
1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
ALAN CUMMINGS
304-558-2402

VENDOR

*621152258 304-842-0367
JAMATT INC
RT 1 351 CLEMANS RD
FLEMINGTON WV 26347

SHIP TO

DIVISION OF HIGHWAYS
DISTRICT SEVEN
STORAGE YARD
1205 US HWY 19 SOUTH
WESTON, WV
26452 **304-269-0475**

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
02/02/2012				

BID OPENING DATE: **02/29/2012** BID OPENING TIME **01:30PM**

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	LB		570-76	SEE COST SHEET	\$ 38,402.27 \$ 38,379.47
<p>STRUCTURAL STEEL</p> <p>THE WEST VIRGINIA STATE PURCHASING DIVISION FOR THE AGENCY, THE WEST VIRGINIA DIVISION OF HIGHWAYS, IS SOLICITING BIDS TO PROVIDE THE AGENCY WITH STRUCTURAL STEEL FOR THE CROOKED FORK SUPERSTRUCTURE REPLACEMENT PROJECT NO. S321-20-3.18, INCLUDING SHIPMENT TO THE DISTRICT 7 STORAGE YARD LOCATED ON 1205 US HWY 19 SOUTH, WESTON, WV 26452 PER THE ATTACHED SPECIFICATIONS.</p> <p>TECHNICAL QUESTIONS CONCERNING THIS SOLICITATION MUST BE SUBMITTED IN WRITING TO ALAN CUMMINGS IN THE WEST VIRGINIA STATE PURCHASING DIVISION VIA FAX AT 304-558-4115 OR VIA EMAIL AT ALAN.W.CUMMINGS@WV.GOV.</p> <p>DEADLINE FOR TECHNICAL QUESTIONS IS 02/15/12 AT THE CLOSE OF BUSINESS.</p> <p>ANY TECHNICAL QUESTIONS RECEIVED WILL BE ANSWERED BY FORMAL ADDENDUM TO BE ISSUED BY THE PURCHASING DIVISION AFTER THE DEADLINE HAS LAPSED.</p> <p>BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THE STATE MAY DEEM THE CONTRACT NULL AND VOID, AND TERMINATE SUCH CONTRACT WITHOUT FURTHER ORDER.</p> <p>PREFERENCE FOR USE OF DOMESTIC STEEL PRODUCTS</p>						

RECEIVED
 2012 FEB 27 PM 2:58
 WV PURCHASING DIVISION

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE <i>James C. Washington</i>	TELEPHONE 304-842-0367	DATE 02/24/2012
TITLE PRESIDENT	FEIN 20-1894398	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

GENERAL TERMS & CONDITIONS REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)

1. Awards will be made in the best interest of the State of West Virginia.
2. The State may accept or reject in part, or in whole, any bid.
3. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required \$125 fee.
4. All services performed or goods delivered under State Purchase Order/Contracts are to be continued for the term of the Purchase Order/Contracts, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods this Purchase Order/Contract becomes void and of no effect after June 30.
5. Payment may only be made after the delivery and acceptance of goods or services.
6. Interest may be paid for late payment in accordance with the *West Virginia Code*.
7. Vendor preference will be granted upon written request in accordance with the *West Virginia Code*.
8. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
9. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.
10. The laws of the State of West Virginia and the *Legislative Rules* of the Purchasing Division shall govern the purchasing process.
11. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.
12. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, the State may deem this contract null and void, and terminate such contract without further order.
13. **HIPAA BUSINESS ASSOCIATE ADDENDUM:** The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, is available online at www.state.wv.us/admin/purchase/vrc/hipaa.html and is hereby made part of the agreement provided that the Agency meets the definition of a Cover Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.
14. **CONFIDENTIALITY:** The vendor agrees that he or she will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/noticeConfidentiality.pdf>.
15. **LICENSING:** Vendors must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, and the West Virginia Insurance Commission. The vendor must provide all necessary releases to obtain information to enable the director or spending unit to verify that the vendor is licensed and in good standing with the above entities.
16. **ANTITRUST:** In submitting a bid to any agency for the State of West Virginia, the bidder offers and agrees that if the bid is accepted the bidder will convey, sell, assign or transfer to the State of West Virginia all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to the bidder.

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, or person or entity submitting a bid for the same material, supplies, equipment or services and is in all respects fair and without collusion or fraud. I further certify that I am authorized to sign the certification on behalf of the bidder or this bid.

INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division. Complete all sections of the quotation form.
2. Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.
3. Unit prices shall prevail in case of discrepancy. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.
4. All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications: Department of Administration, Purchasing Division, 2019 Washington Street East, P.O. Box 50130, Charleston, WV 25305-0130
5. Communication during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited (W.Va. C.S.R. §148-1-6.6).



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02/02/2012				
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LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
1.				EXCEPT WHEN AUTHORIZED BY THE DIRECTOR OF THE PURCHASING DIVISION PURSUANT TO SUBSECTION 2 BELOW, NO CONTRACTOR MAY USE OR SUPPLY STEEL PRODUCTS FOR A STATE CONTRACT PROJECT OTHER THAN THOSE STEEL PRODUCTS MADE IN THE UNITED STATES. AS USED USED IN THIS CONTRACT, A. "STATE CONTRACT PROJECT" MEANS ANY ERECTION OR CONSTRUCTION OF, OR ANY ADDITION TO, ALTERATION OF OR OTHER IMPROVEMENT TO ANY BUILDING OR STRUCTURE, INCLUDING, BUT NOT LIMITED TO, ROADS OR HIGHWAYS, OR THE INSTALLATION OF ANY HEATIN OR COOLING OR VENTILATING PLANTS OR OTHER EQUIPMENT, OR THE SUPPLY OF AND MATERIALS FOR SUCH PROJECTS, PURSUANT TO A CONTRACT WITH THE STATE OF WEST VIRGINIA FOR WHICH BIDS WERE SOLICITED ON OR AFTER JUNE 6, 2001. B. "STEEL PRODUCTS" MEANS PRODUCTS ROLLED, FORMED, SHAPED, DRAWN, EXTRUDED, FORGED, CAST, FABRICATED OR OTHERWISE SIMILARLY PROCESSED, OR PROCESSED BY A COMBINATION OF TWO OR MORE OF SUCH OPERATIONS, FROM STEEL MADE BY THE OPEN HEARTH, BASIC OXYGEN, ELECTRIC FURNACE, BESSEMER OR OTHER STEEL MAKING PROCESS. C. "UNITED STATES" MEANS THE UNITED STATES OF AMERICA AND INCLUDES ALL TERRITORY, CONTINENTAL OR INSULAR, SUBJECT TO THE JURISDICTION OF THE UNITED STATES.		
2.				THE DIRECTOR OF THE PURCHASING DIVISION MAY, IN WRITING, AUTHORIZE THE USE OF FOREIGN STEEL PRODUCTS IF: A. THE COST FOR EACH CONTRACT ITEM USED DOES NOT		

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				<p>EXCEED ONE TENTH OF ONE PERCENT (.1%) OF THE TOTAL CONTRACT COST OR TWO THOUSAND FIVE HUNDRED DOLLARS (2,500.00), WHICHEVER IS GREATER. FOR THE PURPOSES OF THIS SECTION, THE COST IS THE VALUE OF THE STEEL PRODUCT AS DELIVERED TO THE PROJECT OR,</p> <p>B. THE DIRECTOR OF THE PURCHASING DIVISION DETERMINES THAT SPECIFIED STEEL MATERIALS ARE NOT PRODUCED IN THE UNITED STATES IN SUFFICIENT QUANTITY OR OTHERWISE ARE NOT REASONABLY AVAILABLE TO MEET CONTRACT REQUIREMENTS.</p> <p>3. A CONTRACTOR WHO USES STEEL PRODUCTS IN VIOLATION OF THIS SECTION MAY BE SUBJECT TO CIVIL PENALTIES PURSUANT TO WV CODE SECTION 5A-3-56.</p>		
				REV. 10/01/01		
				EXHIBIT 10		
				REQUISITION NO.: 07120820..		
				ADDENDUM ACKNOWLEDGEMENT		
				I HEREBY ACKNOWLEDGE RECEIPT OF THE FOLLOWING CHECKED ADDENDUM(S) AND HAVE MADE THE NECESSARY REVISIONS TO MY PROPOSAL, PLANS AND/OR SPECIFICATION, ETC.		
				ADDENDUM NO.'S:		
				NO. 1		
				NO. 2		

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LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
NO. 3					
NO. 4					
NO. 5					
<p>I UNDERSTAND THAT FAILURE TO CONFIRM THE RECEIPT OF THE ADDENDUM(S) MAY BE CAUSE FOR REJECTION OF BIDS.</p> <p>VENDOR MUST CLEARLY UNDERSTAND THAT ANY VERBAL REPRESENTATION MADE OR ASSUMED TO BE MADE DURING ANY ORAL DISCUSSION HELD BETWEEN VENDOR'S REPRESENTATIVES AND ANY STATE PERSONNEL IS NOT BINDING. ONLY THE INFORMATION ISSUED IN WRITING AND ADDED TO THE SPECIFICATIONS BY AN OFFICIAL ADDENDUM IS BINDING.</p> <p>.....<i>Jenna S. Matkney</i>..... SIGNATURE</p> <p>.....JAMATT, INC..... COMPANY</p> <p>.....02/24/2012..... DATE</p> <p>NOTE: THIS ADDENDUM ACKNOWLEDGEMENT SHOULD BE SUBMITTED WITH THE BID.</p> <p>REV. 09/21/2009</p> <p>NOTICE</p> <p>A SIGNED BID MUST BE SUBMITTED TO:</p>						

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				DEPARTMENT OF ADMINISTRATION PURCHASING DIVISION BUILDING 15 2019 WASHINGTON STREET, EAST CHARLESTON, WV 25305-0130		
				THE BID SHOULD CONTAIN THIS INFORMATION ON THE FACE OF THE ENVELOPE OR THE BID MAY NOT BE CONSIDERED:		
				SEALED BID		
				BUYER: ALAN CUMMINGS - FILE 33		
				RFQ. NO.: 07120820		
				BID OPENING DATE: 2/29/2012		
				BID OPENING TIME: 1:30 P.M.		
				PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY TO CONTACT YOU REGARDING YOUR BID:		
				----- <i>304-842-2634</i> -----		
				CONTACT PERSON (PLEASE PRINT CLEARLY):		
				----- <i>JIM MATTHEWS</i> -----		
				ANY INDIVIDUAL SIGNING THIS BID IS CERTIFYING THAT: (1) HE OR SHE IS AUTHORIZED BY THE BIDDER TO EXECUTE		

SIGNATURE			TELEPHONE		DATE
TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE			

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<p>THE BID OR ANY DOCUMENTS RELATED THERETO ON BEHALF OF THE BIDDER, (2) THAT HE OR SHE IS AUTHORIZED TO BIND THE BIDDER IN A CONTRACTUAL RELATIONSHIP, AND (3) THAT THE BIDDER HAS PROPERLY REGISTERED WITH ANY STATE AGENCIES THAT MAY REQUIRE REGISTRATION.</p>						
<p>***** THIS IS THE END OF RFQ 07120820 ***** TOTAL:</p>						
						<p># 3840227 <i>Q.M.</i> # 38,379.47</p>

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TITLE _____ FEIN _____ ADDRESS CHANGES TO BE NOTED ABOVE

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Specifications

Purpose: To provide materials for Crooked Fork Superstructure Replacement Project.#S321-20-3.18

1.0 DEFINITIONS

- A. The "Agency" shall be defined as the West Virginia Division of Highways
- B. The "Vendor" shall be defined as the successful bidder.
- C. The "Contract" shall be defined as the binding agreement that is entered into between the State of West Virginia and the Vendor to provide the services as herein specified.
- D. "Release Order" shall be defined as order placed against the Contract by the Agency.
- E. Mandatory Requirements: The terms "must", "will", "shall", "minimum", "maximum", or "is/are required" identify a mandatory item or factor. Decisions regarding compliance with any mandatory requirements shall be at the sole discretion of the State.

2.0 SCOPE OF WORK

The successful Vendor shall provide structural steel AASHTO M270 grade 50 and provide for delivery to District 7 storage yard located in Weston, WV.

2.1 Technical Requirements:

- 2.1.1: **8,600** lb. W shape structural steel AASHTO M270 grade 50.
6 pieces W-18 x 50 x 28' 8", w/15° R.F.S. miter (see plans drawing for detailed milling dimensions).
- 2.1.2: **1,838** lb. Structural steel plate AASHTO M270 grade 50.
2 pieces 2" x 9" x 15' 0"
- 2.1.3: **681** lb. Structural steel plate AASHTO M270 grade 50.
2 pieces 1" x 5" x 20' 0"
- 2.1.4: **1,496** lb. Angle shape structural steel AASHTO M270 grade 50.
2 pieces 8" x 4" x 1", 19' 0" long

- 2.1.5: **660** lb. Diaphragm assemblies
15 pieces
- 2.1.6: **350** lb. Straight splice plate assembly
6 pieces
- 2.1.7: **232** lb. Angled splice plate assembly
4 pieces
- 2.1.8: **857** lb. Straight post assembly
8 pieces
- 2.1.9: **855** lb. Angled post assembly
8 pieces
- 2.1.10: **18** ea. Exterior high strength bolt w/ nut and washer
 $\frac{3}{4}$ " x 2"
- 2.1.11: **36** ea. Interior high strength bolt w/ nut and washer
 $\frac{3}{4}$ " x 2 $\frac{1}{4}$ "
- 2.1.12: **120** ea. Dome head bolt w/ nut and washer
1" x 14"
- 2.1.13: **24** ea. Dome head bolt w/ nut and malleable iron washer
 $\frac{3}{4}$ " x 30"
- 2.1.14: **64** ea. Dome head bolt w/ nut and washer
 $\frac{3}{4}$ " x 10"
- 2.1.15: **180** ea. Deck nailing clips
For 2" x 6" timber with 9/16" slot

Notes:

All structural shapes, bearing plates, post assemblies, diaphragm assemblies, splice plate assemblies, nailing clips, and any other material for Crooked Fork Superstructure Replacement, Project # S321-20-3.18 are to be fabricated as shown on the attached plans in accordance with WVDOH Standard Specifications, Nov. 2010 Section 615. (Refer to www.transportation.wv.gov for electronic copy of these specifications) After fabrication, all steel must be galvanized according to ASTM 123 and ASTM 153 (see attachment). All cutting, drilling, welding, and galvanizing shown on the plans shall be included in this price. Foreign steel will not be accepted. No additional freight will be paid by the WVDOH. All lab reports must accompany the shipping ticket.

3.0 FREIGHT AND DELIVERY

3.1 Freight

3.1.1 All shipments are to be FOB Destination.

3.1.2 The Vendor shall be responsible for including freight charges in quote.

3.2 Delivery

3.2.1 Deliveries shall be made to the WVDOT location:

West Virginia Division of Highways
1205 US Highway 19 South
Weston, WV 26452
Attn: Bryan Henry
Phone: (304) 269-0439

4.0 PAYMENT

4.1 Payment

4.1.1 The Vendor must supply an itemized invoice upon completion of delivery.

4.1.2 Freight charges must be included in the quote.

5.0 AWARD

5.1 Award of this order will be made to the single lowest responsible bidder meeting specifications and not split.



Designation: A 123/A 123M – 09

Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products¹

This standard is issued under the fixed designation A 123/A 123M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This specification covers the requirements for zinc coating (galvanizing) by the hot-dip process on iron and steel products made from rolled pressed and forged shapes, castings, plates, bars, and strips.

1.2 This specification covers both unfabricated products and fabricated products, for example, assembled steel products, structural steel fabrications, large tubes already bent or welded before galvanizing, and wire work fabricated from uncoated steel wire. This specification also covers steel forgings and iron castings incorporated into pieces fabricated before galvanizing or which are too large to be centrifuged (or otherwise handled to remove excess galvanizing bath metal).

NOTE 1—This specification covers those products previously addressed in Specifications A 123-78 and A 386-78.

1.3 This specification does not apply to wire, pipe, tube, or steel sheet which is galvanized on specialized or continuous lines, or to steel less than 22 gage (0.0299 in.) [0.76 mm] thick.

1.4 The galvanizing of hardware items that are to be centrifuged or otherwise handled to remove excess zinc (such as bolts and similar threaded fasteners, castings and rolled, pressed and forged items) shall be in accordance with Specification A 153/A 153M.

1.5 Fabricated reinforcing steel bar assemblies are covered by the present specification. The galvanizing of separate reinforcing steel bars shall be in accordance with Specification A 767/A 767M.

1.6 This specification is applicable to orders in either inch-pound units (as A 123) or SI units (as A 123M). Inch-pound units and SI units are not necessarily exact equivalents. Within the text of this specification and where appropriate, SI units are shown in parentheses. Each system shall be used independently of the other without combining values in any way. In the case of orders in SI units, all testing and inspection shall be done using the metric equivalent of the test or

inspection method as appropriate. In the case of orders in SI units, such shall be stated to the galvanizer when the order is placed.

2. Referenced Documents

2.1 ASTM Standards:²

- A 47/A 47M Specification for Ferritic Malleable Iron Castings
- A 90/A 90M Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
- A 143/A 143M Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
- A 153/A 153M Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- A 384/A 384M Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies
- A 385 Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
- A 767/A 767M Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
- A 780 Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- A 902 Terminology Relating to Metallic Coated Steel Products
- B 6 Specification for Zinc
- B 487 Test Method for Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of Cross Section
- B 602 Test Method for Attribute Sampling of Metallic and Inorganic Coatings
- B 960 Specification for Prime Western Grade-Recycled (PWG-R) Zinc
- E 376 Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Examination Methods

¹ This specification is under the jurisdiction of ASTM Committee A05 on Metallic-Coated Iron and Steel Products and is the direct responsibility of Subcommittee A05.13 on Structural Shapes and Hardware Specifications.

Current edition approved May 1, 2009. Published May 2009. Originally approved in 1928. Last previous edition approved in 2008 as A 123/A 123M - 08.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3. Terminology (See Fig. 1)

3.1 Definitions:

3.1.1 The following terms and definitions are specific to this specification. Terminology A 902 contains other terms and definitions relating to metallic-coated steel products.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 average coating thickness, *n*—the average of three specimen coating thicknesses.

3.2.2 black, *adj*—denotes the condition of not galvanized or otherwise coated. For purposes of this specification the word

“black” does not refer to the color or condition of surface, or to a surface deposit or contamination.

3.2.3 coating thickness grade, *n*—the numerical value from Table 1 at the intersection of a material category and a thickness range.

3.2.4 gross dross inclusions, *n*—the iron/zinc intermetallics present in a galvanized coating in a form other than finely dispersed pimples.

3.2.4.1 Discussion—These inclusions would create an exposed steel spot if they were removed from the coating. These

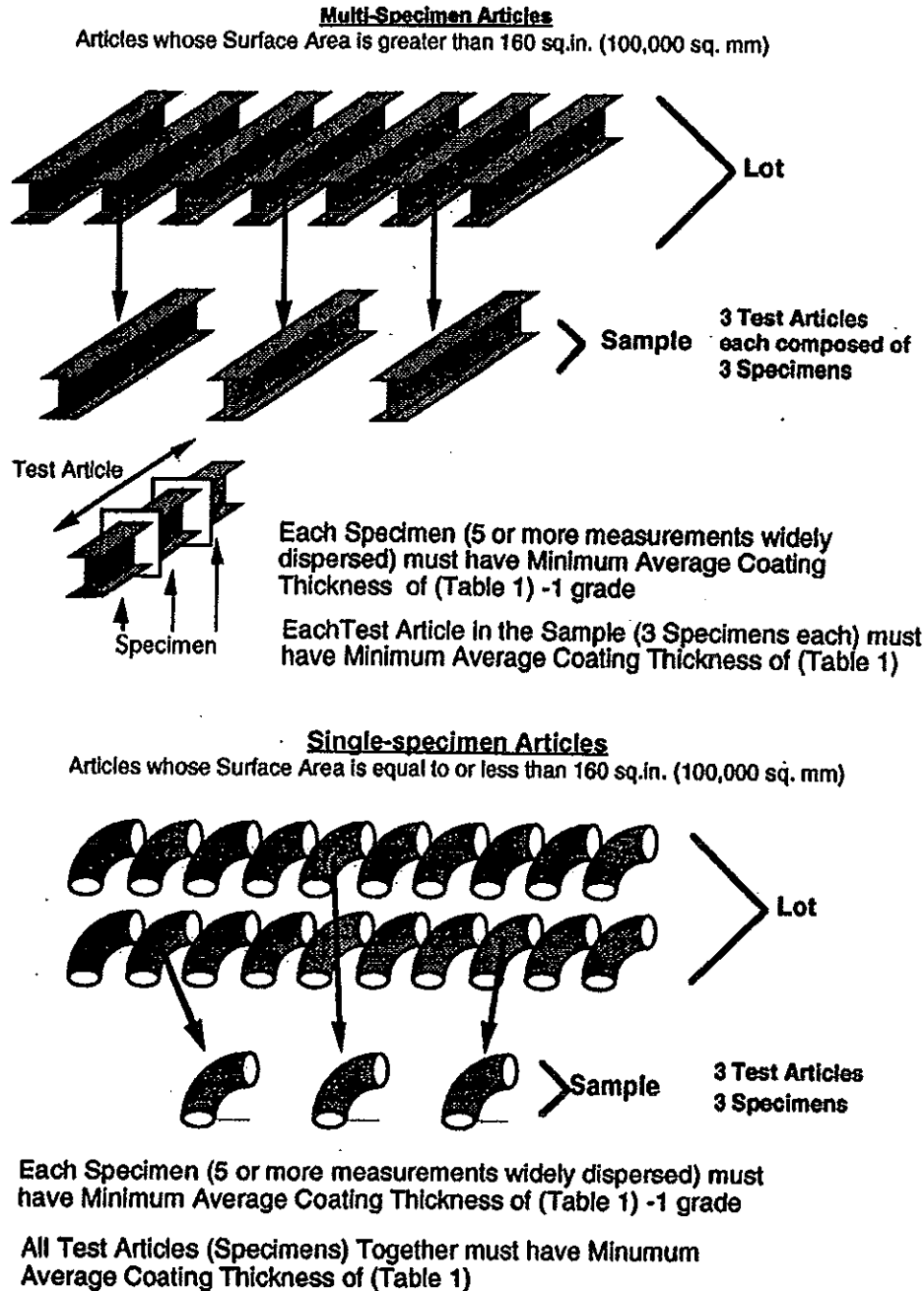



FIG. 1 Single- and Multi-Specimen Articles


A 123/A 123M – 09
TABLE 1 Minimum Average Coating Thickness Grade by Material Category

Material Category	All Specimens Tested Steel Thickness Range (Measured), in. (mm)				
	<1/16 (<1.6)	1/16 to <1/8 (1.6 to <3.2)	1/8 to 3/16 (3.2 to 4.8)	>3/16 to <1/4 (>4.8 to <6.4)	≥1/4 (≥6.4)
Structural Shapes and Plate	45	65	75	85	100
Strip and Bar	45	65	75	85	100
Pipe and Tubing	45	45	75	75	75
Wire	35	50	60	65	80
Reinforcing Bar	100

inclusions are raised surfaces and are easily knocked off through contact with lifting straps or chains, tools, fixtures, or other galvanized parts.

3.2.5 *material category, n*—the general class or type of material or process of manufacture, or both, that nominally describes a unit of product, or from which a unit of product is made. For example, bar grating belongs to the category “strip,” handrail belongs to the category “pipe,” etc.

3.2.6 *multi-specimen article, n*—a unit of product whose surface area is greater than 160 in.² [100 000 mm²]. For thickness testing purposes, articles whose surface area is greater than 160 in.² are subdivided into three continuous local sections, nominally equal in surface area, each of which constitutes a specimen. In the case of any such local section containing more than one material category or steel thickness range as delineated in Table 1, that section will contain more than one specimen (see Fig. 1).

3.2.7 *sample, n*—a collection of individual units of product from a single lot selected in accordance with Section 7, and intended to represent that lot for acceptance. If a sample is taken as representing the lot for acceptance, the sample shall be taken at random from the lot without regard to the perceived quality or appearance of any individual unit in the lot being sampled. The sample consists of one or more test articles.

3.2.8 *single-specimen article, n*—a unit of product whose surface area is equal to or less than 160 in.² [100 000 mm²] or that is centrifuged or otherwise similarly handled in the galvanizing process to remove excess galvanizing bath metal (free zinc). For thickness testing purposes, the entire surface area of each unit of product constitutes a specimen. In the case of any such article containing more than one material category or steel thickness range as delineated in Table 1, that article will contain more than one specimen (see Fig. 1).

3.2.9 *specimen, n*—the surface of an individual test article or a portion of a test article, upon which thickness measurements are to be performed, which is a member of a lot, or a member of a sample representing that lot. For magnetic thickness measurements, specimen excludes any area of the surface which is subject to processes (such as flame cutting, machining, threading, etc.) that can be expected to result in surface conditions not representative of the general surface condition of the test article, or is disqualified by the measurement method. The minimum average coating thickness grade for any specimen shall be one coating grade below that required for the appropriate material category and thickness in Table 1. For a unit of product whose surface area is equal to or less than 160 in.² [100 000 mm²], the entire surface area of each test article constitutes a specimen. In the case of an article

containing more than one material category or steel thickness range as delineated in Table 1, that article will contain more than one specimen, as appropriate (see Fig. 1).

3.2.10 *specimen coating thickness, n*—the average thickness from no less than five test measurements on a specimen, when each measurement location is selected to provide the widest dispersion (in all applicable directions) of locations for the steel category of the test article within the confines of the specimen volume.

3.2.11 *test article, n*—an individual unit of product that is a member of the sample and that is examined for conformance to a part of this specification.

4. Ordering Information

4.1 Orders for coatings provided under this specification shall include the following:

4.1.1 Quantity (number of pieces to be galvanized) and total weight.

4.1.2 Description (type and size of products) and weight.

4.1.3 ASTM specification designation and year of issue.

4.1.4 Material identification (see 5.1) and surface condition or contamination.

4.1.5 Sampling plan, if different from 7.3.

4.1.6 Special test requirements (see 8.1).

4.1.7 Special requirements (special stacking, heavier coating weight, etc.).

4.1.8 Tagging or piece identification method.

5. Materials and Manufacture

5.1 *Steel or Iron*—The specification, grade, or designation and type and degree of surface contamination of the iron or steel in articles to be galvanized shall be supplied by the purchaser to the hot-dip galvanizer prior to galvanizing.

NOTE 2—The presence in steels and weld metal, in certain percentages, of some elements such as silicon, carbon, and phosphorus tends to accelerate the growth of the zinc-iron alloy layer so that the coating may have a matte finish with little or no outer zinc layer. The galvanizer has only limited control over this condition. The mass, shape, and amount of cold working of the product being galvanized may also affect this condition. Practice A 385 provides guidance on steel selection and discusses the effects of various elements in steel compositions (for example, silicon), that influence coating weight and appearance.

5.2 *Fabrication*—The design and fabrication of the product to be galvanized are the responsibilities of the designer and the fabricator. Practices A 143, A 384, and A 385 provide guidance for steel fabrication for optimum hot dip galvanizing and shall be complied with in both design and fabrication. Consultation

between the designer, fabricator, and galvanizer at appropriate stages in the design and fabrication process will reduce future problems.

5.3 Castings—The composition and heat treatment of iron and steel castings shall conform to specifications designated by the purchaser. Some types of castings have been known to show potential problems with predisposition to being embrittled during the normal thermal cycle of hot-dip galvanizing. It is the responsibility of the purchaser to heat treat or otherwise allow for the possibility of such embrittling phenomena. The requirements for malleable iron castings to be galvanized shall be as stated in Specification A 47.

5.4 Zinc—The zinc used in the galvanizing bath shall conform to Specification B 6, or Specification B 960, or both. If a zinc alloy is used as the primary feed to the galvanizing bath, then the base material used to make that alloy shall conform to Specification B 6, or Specification B 960, or both.

5.5 Bath Composition—The molten metal in the working volume of the galvanizing bath shall contain not less than an average value of 98.0 % zinc by weight.

NOTE 3—The galvanizer may choose to add trace amounts of certain elements (for example, aluminum, nickel, and tin) to the zinc bath to help in the processing of certain reactive steels or to enhance the cosmetic appearance of the finished product. The use of these trace elements is permitted provided that the bulk chemistry of the galvanizing bath is at least 98.0 % zinc by weight. The elements can be added to the galvanizing bath as part of a pre-alloyed zinc feed, or they can be added to the bath by the galvanizer using a master feed alloy.

6. Coating Properties

6.1 Coating Thickness—The average thickness of coating for all specimens tested shall conform to the requirements of Table 1 for the categories and thicknesses of the material being galvanized. Minimum average thickness of coating for any individual specimen is one coating grade less than that required in Table 1. Where products consisting of various material thicknesses or categories are galvanized, the coating thickness grades for each thickness range and material category of material shall be as shown in Table 1. In the case of orders in SI units, the values in Table 1, shall be applicable as metric units in micrometres. In the case of orders in inch-pound units, the measured value shall be converted to coating grade units by the use of Table 2. The specification of coating thicknesses heavier than those required by Table 1 shall be subject to mutual agreement between the galvanizer and the purchaser.

(Fig. 2 is a graphic representation of the sampling and specimen delineation steps, and Fig. 3 is a graphic representation of the coating thickness inspection steps.)

6.1.1 For articles whose surface area is greater than 160 in.² [100 000 mm²] (multi-specimen articles), each test article in the sample must meet the appropriate minimum average coating thickness grade requirements of Table 1, and each specimen coating thickness grade comprising that overall average for each test article shall average not less than one coating grade below that required in Table 1.

6.1.2 For articles whose surface area is equal to or less than 160 in.² [100 000 mm²] (single-specimen articles), the average of all test articles in the sample must meet the appropriate minimum average coating thickness grade requirements of Table 1, and for each test article, its specimen coating thickness shall be not less than one coating grade below that required in Table 1.

6.1.3 No individual measurement, or cluster of measurements at the same general location, on a test specimen shall be cause for rejection under the coating thickness requirements of this specification provided that when those measurements are averaged with the other dispersed measurements to determine the specimen coating thickness grade for that specimen, the requirements of 6.1.1 or 6.1.2, as appropriate are met.

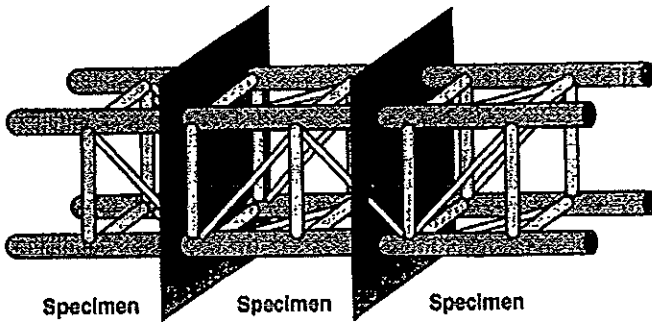
NOTE 4—The coating thickness grades in Table 1 represent the minimum value obtainable with a high level of confidence for the ranges typically found in each material category. While most coating thicknesses will be in excess of those values, some materials in each category may be less reactive (for example, because of chemistry or surface condition) than other materials of the steel category spectrum. Therefore, some articles may have a coating grade at or close to the minimum requirement shown in Table 1. In such cases, the precision and accuracy of the coating thickness measuring technique should be taken into consideration when rejecting such articles for coating thickness below that required by this specification. Purchasers desiring a guarantee of heavier coatings than the minimum thicknesses shown herein should use the special requirements (see 4.1.6) to specify coating thickness grades higher than those shown in Table 1. In addition, the purchaser should anticipate the need for test batches or extra preparation steps, or both, such as blasting before galvanizing or other methods, to attempt to reach the higher requirements with consistency. Some higher-than-standard thicknesses may be impractical or unattainable.

6.2 Finish—The coating shall be continuous (except as provided below), and as reasonably smooth and uniform in thickness as the weight, size, shape of the item, and necessary handling of the item during the dipping and draining operations

TABLE 2 Coating Thickness Grade^A

Coating Grade	mils	oz/ft ²	µm	g/m ²
35	1.4	0.8	35	245
45	1.8	1.0	45	320
50	2.0	1.2	50	355
55	2.2	1.3	55	390
60	2.4	1.4	60	425
65	2.6	1.5	65	460
75	3.0	1.7	75	530
80	3.1	1.9	80	565
85	3.3	2.0	85	600
100	3.9	2.3	100	705

^A The values in micrometres (µm) are based on the Coating Grade. The other values are based on conversions using the following formulas: mils = µm × 0.03937; oz/ft² = µm × 0.02316; g/m² = µm × 7.067.



NOTE 1—Each specimen comprises nominally one third of the total surface area of the article. A minimum of five measurements should be made within the volume of each specimen, as widely dispersed within that volume as is practical, so as to represent as much as possible, the general coating thickness within that specimen volume.

FIG. 2 Articles Made of Many Components

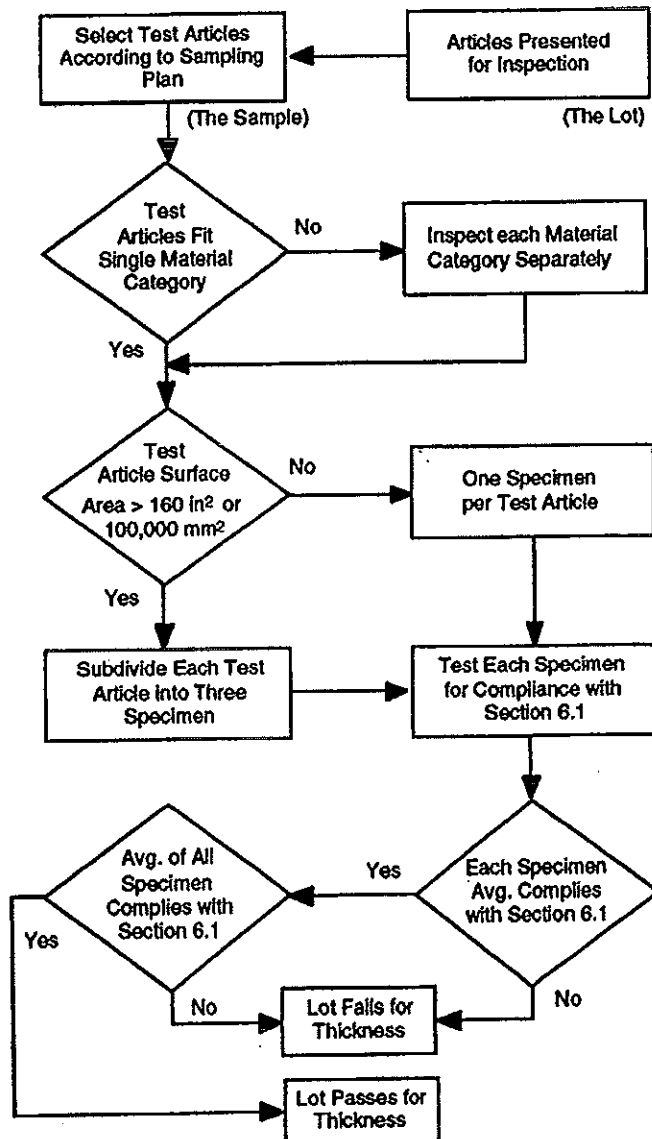


FIG. 3 Coating Thickness Inspection Steps

at the galvanizing kettle will permit. Except for local excess coating thickness which would interfere with the use of the product, or make it dangerous to handle (edge tears or spikes), rejection for nonuniform coating shall be made only for plainly visible excess coating not related to design factors such as holes, joints, or special drainage problems (see Note 6). Since surface smoothness is a relative term, minor roughness that does not interfere with the intended use of the product, or roughness that is related to the as-received (un-galvanized) surface condition, steel chemistry, or steel reactivity to zinc shall not be grounds for rejection (see Note 7). Surface conditions related to deficiencies related to design, detailing, or fabrication as addressed by Practice A 385 shall not be grounds for rejection. The zinc coating on threaded components of articles galvanized under this specification shall conform to that required in Specification A 153/A 153M. Surfaces that remain uncoated after galvanizing shall be renovated in accordance with the methods in Practice A 780 unless directed by the purchaser to leave the uncoated areas untreated for subsequent renovation by the purchaser.

6.2.1 Each area subject to renovation shall be 1 in. [25 mm] or less in its narrowest dimension.

6.2.2 The total area subject to renovation on each article shall be no more than 1/2 of 1 % of the accessible surface area to be coated on that article, or 36 in.² per short ton [256 cm² per metric ton] of piece weight, whichever is less.

NOTE 5—Inaccessible surface areas are those which cannot be reached for appropriate surface preparation and application of repair materials as described in Practice A 780. Such inaccessible areas, for example, would be the internal surfaces of certain tanks, poles, pipes, tubes, and so forth.

6.2.3 The thickness of renovation shall be that required by the thickness grade for the appropriate material category and thickness range in Table 1 in accordance with the requirements of 6.1, except that for renovation using zinc paints, the thickness of renovation shall be 50 % higher than that required by Table 1, but not greater than 4.0 mils.

6.2.4 When areas requiring renovation exceed the criteria previously provided, or are inaccessible for repair, the coating shall be rejected.

NOTE 6—The requirements for the finish of a galvanized product address themselves to a visual type of inspection. They do not address the matter of measured coating thickness variations that can be encountered because of different steels or different thicknesses of a given steel being used in an assembly.

NOTE 7—Items which are prepared for galvanizing by abrasive cleaning will generally develop a thicker coating with a moderately rougher surface.

6.3 *Threaded Components in Assemblies*—The zinc coating on external threads shall not be subjected to a cutting, rolling, or finishing tool operation, unless specifically authorized by the purchaser. Internal threads are not prohibited from being tapped or retapped after galvanizing. Coatings shall conform to the requirements of Specification A 153/A 153M.

6.4 *Appearance*—Upon shipment from the galvanizing facility, galvanized articles shall be free from uncoated areas, blisters, flux deposits, and gross cross inclusions. Lumps, projections, globules, or heavy deposits of zinc which will interfere with the intended use of the material will not be

permitted. Plain holes of 1/2-in. [12.5-mm] diameter or more shall be clean and reasonably free from excess zinc. Marks in the zinc coating caused by tongs or other items used in handling the article during the galvanizing operation shall not be cause for rejection unless such marks have exposed the base metal and the bare metal areas exceed allowable maximums from 6.2.1 and 6.2.2. The pieces shall be handled so that after galvanizing they will not freeze together on cooling.

NOTE 8—Depending upon product design or material thickness, or both, filming or excess zinc buildup in plain holes of less than 1/2-in. [12.5-mm] diameter may occur that requires additional work to make the holes usable as intended.

6.5 Adherence—The zinc coating shall withstand handling consistent with the nature and thickness of the coating and the normal use of the article, without peeling or flaking.

NOTE 9—Although some material may be formed after galvanizing, in general the zinc coating on the articles covered by this specification is too heavy to permit severe bending without damaging the coating.

7. Sampling

7.1 Sampling of each lot shall be performed for conformance with the requirements of this specification.

7.2 A lot is a unit of production or shipment from which a sample is taken for testing. Unless otherwise agreed upon between the galvanizer and the purchaser, or established within this specification, the lot shall be as follows: For testing at a galvanizer's facility, a lot is one or more articles of the same type and size comprising a single order or a single delivery load, whichever is the smaller, or any number of articles identified as a lot by the galvanizer, when these have been galvanized within a single production shift and in the same bath. For test by the purchaser after delivery, the lot consists of the single order or the single delivery load, whichever is the smaller, unless the lot identity, established in accordance with the above, is maintained and clearly indicated in the shipment by the galvanizer.

7.3 The method of selection and number of test specimens shall be agreed upon between the galvanizer and the purchaser. Otherwise, the test specimens shall be selected at random from each lot. In this case, the minimum number of specimens from each lot shall be as follows:

Number of Pieces in Lot	Number of Specimens
3 or less	all
4 to 500	3
501 to 1 200	5
1 201 to 3 200	8
3 201 to 10 000	13
10 001 and over	20

NOTE 10—Where a number of identical items are to be galvanized, a statistical sampling plan may be desired. Such a plan is contained in Test Method B 602 which addresses sampling procedures for the inspection of electrodeposited metallic coatings and related finishes. If Test Method B 602 is used, the level of sampling shall be agreed upon between the galvanizer and the purchaser at the time the coating order is placed.

7.4 A test specimen which fails to conform to a requirement of this specification shall not be used to determine the conformance to other requirements.

8. Test Methods

8.1 Test Requirements—The following tests shall be conducted to ensure that the zinc coating is being furnished in accordance with this specification. The specifying of tests for adhesion and embrittlement shall be subject to mutual agreement between the galvanizer and purchaser. Visual inspection of the coating shall be made for compliance with the requirements.

8.2 Thickness of Coating Test—The thickness of coating is determined by one or more of the three methods described as follows.

8.2.1 Magnetic Thickness Measurements—The thickness of the coating shall be determined by magnetic thickness gage measurements in accordance with Practice E 376 unless the methods described in 8.2.2, 8.2.3, or 8.2.4 are used. For each specimen (as described in 3.2.9) five or more measurements shall be made at points widely dispersed throughout the volume occupied by the specimen so as to represent as much as practical, the entire surface area of the test specimen. The average of the five or more measurements thus made for each specimen is the specimen coating thickness.

8.2.1.1 For articles whose surface area is greater than 160 in.² [100 000 mm²] (multi-specimen articles as described in 3.2.6), the average of the three specimen coating thickness grades comprising each test article is the average coating thickness for that test article. A specimen must be evaluated for each steel category and material thickness within the requirements for each specimen of the test article.

8.2.1.2 For articles whose surface area is equal to or less than 160 in.² [100 000 mm²] (single-specimen articles as described in 3.2.8), the average of all specimen coating thickness grades is the average coating thickness for the sample.

8.2.1.3 In the case of threaded components, the thickness of coating shall be made on a portion of the article that does not include any threads.

8.2.1.4 The use of magnetic measurement methods is appropriate for larger articles, and is appropriate for smaller articles when there is sufficient flat surface area for the probe tip to sit flat on the surface using Practice E 376.

8.2.2 Stripping Method—The average weight of coating shall be determined by stripping a test article, a specimen removed from a test article, or group of test articles in the case of very small items such as nails, etc., in accordance with Test Method A 90/A 90M unless the methods described in 8.2.1, 8.2.3, or 8.2.4 are used. The weight of coating per unit area thus determined is converted to equivalent coating thickness values in accordance with Table 2 (rounding up or down as appropriate). The thickness of coating thus obtained is the test article coating thickness, or in the case of a specimen removed from a test article, is the specimen average coating thickness.

8.2.2.1 The stripping method is a destructive test and is appropriate for single specimen articles, but is not practical for multi-specimen articles.

8.2.3 Weighing Before and After Galvanizing—The average weight of coating shall be determined by weighing articles before and after galvanizing, subtracting the first weight from the second and dividing the result by the surface area unless the

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methods described in 8.2.1, 8.2.2, or 8.2.4 are used. The first weight shall be determined after pickling and drying and the second after cooling to ambient temperature. The weight of coating per unit area thus determined is converted to equivalent coating thickness values according to Table 2 (rounding up or down as appropriate). The thickness of coating thus obtained is the test article coating thickness.

8.2.3.1 The weighing before and after method is appropriate for single-specimen articles, but is not practical for multi-specimen articles.

NOTE 11—Both the stripping method and the weighing before and after method do not take into account the weight of iron reacted from the article that is incorporated into the coating. Thus, the methods may underestimate coating weight (and therefore the calculated thickness) by up to 10 %. The accuracy of both methods will be influenced by the accuracy to which the surface area of the articles tested can be determined.

8.2.4 *Microscopy*—The thickness of coating shall be determined by cross-sectional and optical measurement in accordance with Test Method B 487 unless the methods described in 8.2.1, 8.2.2, or 8.2.3 are used. The thickness thus determined is a point value. No less than five such measurements shall be made at locations on the test article which are as widely dispersed as practical, so as to be representative of the whole surface of the test article. The average of no less than five such measurements is the specimen coating thickness.

8.2.4.1 The microscopy method is a destructive test and is appropriate for single-specimen articles, but is not practical for multi-specimen articles.

8.2.5 *Referee Method*—In the event of a dispute over thickness of coating measurements, the dispute shall be resolved as follows:

8.2.5.1 For multi-specimen articles, a new sample shall be taken randomly from the lot of material, which has twice the number of test articles as the sample which failed to conform to this specification. If the lot size is such that the sample size cannot be doubled, then the sample size shall be as previous, but the number of widely dispersed sites at which measurements were made shall be doubled, and these sites will constitute the new sample. This new sample shall be measured using magnetic thickness gages which have been calibrated for accuracy against reference material thickness standards. If the lot is found to be nonconforming by the new sample, the galvanizer has the right to sort the lot for conforming articles by individual test, to re-galvanize non-conforming articles, or to renovate the nonconforming articles in accordance with 6.2.

8.2.5.2 For single-specimen articles, a new sample shall be taken randomly from the lot of material, which has twice the number of test articles as the sample which failed to conform to this specification. The test method for the new sample shall be selected by mutual agreement between the purchaser and galvanizer. If the lot is found to be nonconforming by the new sample, the galvanizer has the right to sort the lot for conforming articles by individual test, to re-galvanize non-conforming articles, or to renovate the nonconforming articles in accordance with 6.2.

8.3 *Adhesion*—Determine adhesion of the zinc coating to the surface of the base metal by cutting or prying with the point of a stout knife, applied with considerable pressure in a manner

tending to remove a portion of the coating. The adhesion shall be considered inadequate if the coating flakes off in the form of a layer of the coating so as to expose the base metal in advance of the knife point. Do not use testing carried out at edges or corners (points of lowest coating adhesion) to determine adhesion of the coating. Likewise, do not use removal of small particles of the coating by paring or whittling to determine failure.

8.4 *Embrittlement*—Test for embrittlement shall be made in accordance with Practice A 143. These tests shall not be required unless strong evidence of embrittlement is present.

9. Inspection, Rejection, and Retest

9.1 *Inspection by the Galvanizer*—It is the responsibility of the galvanizer to ensure compliance with this specification. This shall be achieved by an in-plant inspection program designed to maintain the coating thickness, finish, and appearance within the requirements of this specification unless the inspection is performed in accordance with 9.2.

9.2 *Inspection By the Purchaser*—The purchaser shall accept or reject material by inspection either through the galvanizer's inspector, the purchaser's inspector, or an independent inspector. The inspector representing the purchaser shall have access at all times to those areas of the galvanizer's facility which concern the application of the zinc coating to the material ordered while work on the contract of the purchaser is being performed. The galvanizer shall afford the inspector all reasonable facilities to satisfy him that the zinc coating is being furnished in accordance with this specification.

9.3 *Location*—The material shall be inspected at the galvanizer's plant prior to shipment. However, by agreement the purchaser is not prohibited from making tests which govern the acceptance or rejection of the materials in his own laboratory or elsewhere.


9.4 *Reinspection*—When inspection of materials to determine conformity with the visual requirements of 6.2 warrants rejection of a lot, the galvanizer is not prohibited from sorting the lot and submit it once again for acceptance after he has removed any nonconforming articles and replaced them with conforming articles.

9.5 The sampling plan that was used when the lot was first inspected shall be used for resampling of a sorted lot. By mutual agreement, the galvanizer is not prohibited from submitting the lot remaining after sorting and removing nonconforming articles without replacement of the nonconforming articles. In such case, the now-smaller lot shall be treated as a new lot for purposes of inspection and acceptance.

9.6 Materials that have been rejected for reasons other than embrittlement are not prohibited from being stripped and regalvanized and again submitted for inspection and test at which time they shall conform to the requirements of this specification.

10. Certification

10.1 When specified in the purchase order or contract, the purchaser shall be furnished certification that samples representing each lot have been either tested or inspected as directed by this specification and the requirements have been met.

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When specified in the purchase order or contract, a report of the test results shall be furnished.

11. Keywords

11.1 coatings—zinc; galvanized coatings; steel products—metallic coated; zinc coatings—steel products

SUMMARY OF CHANGES

Committee A05 has identified the location of selected changes to this standard since the last issue (A 123/A 123M - 08) that may impact the use of this standard. (May 1, 2009)

(I) Revised 5.4 to add new zinc standard B 960.

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

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Designation: A 153/A 153M - 09

American Association State Highway
and Transportation Officials Standard
AASHTO No. M232

Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware¹

This standard is issued under the fixed designation A 153/A 153M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This specification covers zinc coatings applied by the hot-dip process on iron and steel hardware. The hot-dip galvanizing process consists of parts being immersed in molten zinc for a sufficient time to allow a metallurgical reaction between iron from the steel surface and the molten zinc, resulting in the formation of Zn/Fe alloy layers bonding the coating to the steel surface.

1.2 This specification is intended to be applicable to hardware items that are centrifuged or otherwise handled to remove excess galvanizing bath metal (free zinc). Coating thickness grade requirements reflect this.

1.3 This specification is applicable to orders in either inch-pound units (as A 153) or in SI units (as A 153M). Inch-pound units and SI units are not necessarily exact equivalents. Within the text of this specification and where appropriate, SI units are shown in brackets. Each system shall be used independently of the other without combining values in any way. In the case of orders in SI units, all testing and inspection shall be done using the metric equivalent of the test or inspection method as appropriate. In the case of orders in SI units, such shall be stated to the galvanizer when the order is placed.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

¹This specification is under the jurisdiction of ASTM Committee A05 on Metallic-Coated Iron and Steel Products and is the direct responsibility of Subcommittee A05.13 on Structural Shapes and Hardware Specifications.

Current edition approved May 1, 2009. Published May 2009. Originally approved in 1933. Last previous edition approved in 2005 as A 153/A 153M - 05.

2. Referenced Documents


2.1 ASTM Standards:²

- A 90/A 90M Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
- A 143/A 143M Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
- A 780 Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
- A 902 Terminology Relating to Metallic Coated Steel Products
- B 6 Specification for Zinc
- B 487 Test Method for Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of Cross Section
- B 960 Specification for Prime Western Grade-Recycled (PWG-R) Zinc
- E 376 Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Examination Methods
- F 1470 Practice for Fastener Sampling for Specified Mechanical Properties and Performance Inspection
- F 1789 Terminology for F16 Mechanical Fasteners

3. Terminology

3.1 Definitions:

²For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.


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3.1.1 The following terms and definitions are specific to this specification. Terminology A 902 contains other terms and definitions relating to metallic-coated steel products. Terminology F 1789 contains other terms and definitions relating to mechanical fasteners.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *average coating thickness, n*—the average of the specimen coating thickness values for the samples in an inspection lot.

3.2.2 *bare spots, n*—uncoated areas on the surface of the steel part that contain no measurable zinc coating.

3.2.3 *dross inclusions, n*—the iron/zinc intermetallics present in a galvanized coating in a form other than the layer growth of the coating.

3.2.4 *individual measurement, n*—the reading from a magnetic thickness gauge of a single coating spot thickness, or the microscopic reading of a coating thickness as seen in an optical microscope at one spot.

3.2.5 *inspection lot, n*—the quantity of identical parts cleaned, fluxed and galvanized together at one time in an appropriate container that is being submitted for acceptance as a group.

3.2.6 *malleable casting, n*—a steel article that has been subjected to a prolonged anneal to decarburize or graphitize the part to remove as much of the carbon as possible or to convert the carbon to graphite, which permits plastic deformation in compression without rupture.

3.2.7 *sample, n*—a collection of individual units of product from a single inspection lot selected in accordance with Section 6 and intended to represent that inspection lot for acceptance.

3.2.8 *specimen, n*—an individual test article upon which thickness measurements or weight determinations are performed.

3.2.9 *specimen coating thickness, n*—the average thickness from no less than five test measurements on a specimen, when each measurement location is selected to provide the widest dispersion (in all applicable directions) of locations within the specimen volume.

3.2.10 *threaded areas, n*—the sections of a steel part that have threads formed before hot-dip galvanizing.

4. Materials and Manufacture

4.1 *Steel or Iron*—Ferrous articles to be hot-dip zinc coated shall conform to specifications designated by the purchaser.

4.2 *Zinc*—The zinc used for the coating shall conform to Specification B 6, or Specification B 960, or both, and shall be at least equal to the grade designated as "Prime Western."

4.2.1 If a zinc alloy is used as the primary feed for the galvanizing bath, then the base material used to make that alloy shall conform to Specification B 6 or Specification B 960, or both.

4.2.2 The molten metal in the working volume of the galvanizing bath shall contain not less than an average value of 98.0 % zinc by weight [mass].

NOTE 1—The galvanizer may choose to add trace amounts of certain elements (for example, aluminum, nickel, bismuth, or tin) to the zinc bath to help in the processing of certain reactive steels or to enhance the cosmetic appearance of the finished product. The elements can be added to the galvanizing bath as a master feed alloy, or they can be added to the bath by the galvanizer as individual feeds.

4.3 *Minimum Coating Weight [Mass] or Minimum Coating Thickness*—The minimum coating weight [mass] or the minimum coating thickness shall conform to the requirements prescribed in Table 1 for the material category and thickness of material in which the article belongs.


4.4 *Threaded Articles*—The zinc coating on threads shall not be subjected to a cutting, rolling, or finishing-tool operation, unless specifically authorized by the purchaser. In order to meet overtapping allowances, tapping the threads of nuts or tapped holes after galvanizing is not prohibited.

4.5 *Touch-up and Repair*—Bare spots that are found on parts after galvanizing shall be renovated by use of the methods found in Practice A 780 if the following criteria are met. The bare spots shall have an area totalling not more than 1 % of the surface area to be coated excluding threaded areas of the piece and the bare spots shall not include any threaded areas of the

TABLE 1 Thickness or Weight [Mass] of Zinc Coating for Various Classes of Material

NOTE 1—Length of the piece, stated in Classes B-1, B-2, and B-3, refers to the finished dimension of the piece after fabrication.

Class of Material	Weight [Mass] of Zinc Coating, oz/ft ² [g/m ²] of Surface, Minimum		Coating Thickness, mils [microns], Minimum	
	Average of Specimens Tested	Any Individual Specimen	Average of Specimens Tested	Any Individual Specimen
Class A—Castings—Malleable Iron, Steel	2.00 [610]	1.80 [550]	3.4 [86]	3.1 [79]
Class B—Rolled, pressed, and forged articles (except those which would be included under Classes C and D):				
B-1— $\frac{3}{16}$ in. [4.76 mm] and over in thickness and over 15 in. [381 mm] in length	2.00 [610]	1.80 [550]	3.4 [86]	3.1 [79]
B-2—under $\frac{3}{16}$ in. [4.76 mm] in thickness and over 15 in. [381 mm] in length	1.50 [458]	1.25 [381]	2.6 [66]	2.1 [53]
B-3—any thickness and 15 in. [381 mm] and under in length	1.30 [397]	1.10 [336]	2.2 [56]	1.9 [48]
Class C—Fasteners over $\frac{3}{16}$ in. [9.52 mm] in diameter and similar articles. Washers $\frac{3}{16}$ in. and $\frac{1}{4}$ in. [4.76 and 6.35 mm] in thickness	1.25 [381]	1.00 [305]	2.1 [53]	1.7 [43]
Class D—Fasteners $\frac{3}{16}$ in. [9.52 mm] and under in diameter, rivets, nails and similar articles. Washers under $\frac{3}{16}$ in. [4.76 mm] in thickness	1.00 [305]	0.85 [259]	1.7 [43]	1.4 [36]


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piece. The thickness of the repair shall be equal to the surrounding galvanized coating except for repairs made by paints containing zinc dust in which case the thickness of the repair shall be 50 % greater than the thickness of the galvanized coating required for the class of material, but shall not be greater than 4.0 mils [100 μ m]. Repair thickness measurements shall be made in accordance with Practice A 780. The galvanizer shall make repairs unless directed by the purchaser to deliver items unrepaired for subsequent renovation by the purchaser.

5. Workmanship, Finish, and Appearance

5.1 The zinc-coated articles shall be free from uncoated areas, blisters, flux deposits, dross inclusions, and other types of projections that would interfere with the intended use of the articles, or other defects not consistent with good galvanizing practice.

5.2 The zinc coating shall be smooth and reasonably uniform in thickness.

NOTE 2—Smoothness of surface is a relative term. Minor roughness that does not interfere with the intended use of the part, or roughness that is related to the as-received (ungalvanized) surface condition of the part, shall not be grounds for rejection.

NOTE 3—Since this specification is applicable to items that are centrifuged or otherwise handled to remove excess bath metal (see 1.2), irregular coating distribution is not normally encountered. Drainage problems, which manifest themselves as local excess coating thickness that would interfere with function or as edge tears or spikes that present a safety hazard because of their sharpness, are grounds for rejection under the terms of 5.1.

5.3 Embrittlement is a potential condition of steel that is cold-worked, depending on such factors as the steel type (strength level, aging characteristics), thickness, degree of cold work, and galvanizing process. The galvanizer, the designer and the fabricator shall take precautions against embrittlement. The precautions to fabricate properly and prepare the material for galvanizing to prevent embrittlement are described in Practice A 143/A 143M.

NOTE 4—Low service temperatures increase the risk of brittle failure of all plain carbon steels including those which have been galvanized. This temperature embrittling effect varies with type of steel. The expected service temperature should thus be taken into account when selecting steels for galvanizing.

5.4 Malleable castings shall be of such composition as will preclude the possibility that they become embrittled by the galvanizing process, or they shall be either cooled from the anneal, or subsequently heat-treated so as to immunize them against embrittlement.

5.5 The zinc coating shall adhere tenaciously to the surface of the base metal.

5.6 If the galvanized material covered by this specification is bent or otherwise fabricated to the degree that causes the zinc coatings to stretch or compress beyond the limit of elasticity, any cracking or flaking of the coating resulting from the bending or fabricating shall not be cause for rejection.

6. Sampling

6.1 Test specimens shall be selected at random from each inspection lot.

6.2 The method of selection and sample size shall be agreed upon between the galvanizer and the purchaser. Otherwise, the sample size selected from each lot shall be as follows:

Number of Pieces in Lot	Sample Size
3 or less	all
4 to 500	3
501 to 1200	5
1201 to 3200	8
3201 to 10 000	13
10 001 and over	20

6.3 A specimen that fails to conform to a requirement of this specification shall not be used to determine the conformance to other requirements.

6.4 The method of sampling for fasteners that are required to meet the standards of the Fastener Quality Act is described in Guide F 1470. Sample quantities and definitions of terminology are included in the referenced specification.

7. Test Methods

7.1 Tests shall be made to ensure that the zinc coating is being furnished in accordance with this specification and as specified for the following:

7.1.1 Minimum coating weight [mass] or minimum coating thickness in 4.3.

7.1.2 Finish and appearance in 5.1 and 5.2.

7.1.3 Embrittlement in 5.3 and 5.4.

7.1.4 Adherence in 5.5.

7.2 *Average Weight [Mass] of Coating:*

7.2.1 The average weight [mass] of the zinc coating shall be determined by weighing specimens after pickling and drying and again after galvanizing unless the method described in 7.2.2 is used. The number of specimens that are used to determine the average of an inspection lot shall be derived from Section 6.

NOTE 5—This method does not take into account the weight [mass] of iron reacted from the article that is incorporated into the coating. It will thus underestimate coating weight [mass] by up to approximately 10 %. Base metal reactivity will affect the extent of underestimation.

7.2.2 In the case of materials inspected after galvanizing, the average weight [mass] of coating shall be determined by stripping the number of specimens derived in Section 6 in accordance with Test Method A 90/A 90M, and averaging the results of the individual specimens, unless the method described in 7.2.1 is used.

7.3 *Average Thickness of Coating:*

7.3.1 In the case of fasteners such as bolts, nuts, and screws, the determination of the thickness of coating shall be made on a portion of the article that does not include any threads.

7.3.2 The average thickness of coating shall be determined by magnetic thickness gage in accordance with Practice E 376 unless the method described in 7.3.3 is used. The thickness shall be measured on at least five widely separated spots on a specimen. No individual spot measurement shall be cause for rejection. If an individual spot does not provide a coating thickness reading, this spot must be repaired in accordance with 4.5. The five or more individual coating thickness measurements on a specimen must be averaged to determine the specimen average coating thickness. The average coating thickness for the inspection lot is determined by averaging the

specimen average coating thickness values for the number of specimens derived from Section 6.

7.3.3 The thickness of coating shall be determined by cross section and optical measurement in accordance with Test Method B 487, unless the method described in 7.3.2 is used. The thickness thus determined is a point value. No less than five such measurements shall be made at locations on the specimen, which are as widely dispersed as practical, so as to be representative of the whole surface of the specimen. The average of no less than five such measurements is the specimen average coating thickness. The average coating thickness for the inspection lot is determined by averaging the specimen average coating thickness values for the number of specimens derived from Section 6.

7.4 *Finish and Appearance*—The test for finish and appearance shall be conducted through visual inspection without additional magnification.

7.5 *Embrittlement*—Hardware that is susceptible to embrittlement shall be tested in accordance with Practice A 143/A 143M. The tests shall be performed through agreement between the galvanizer and the purchaser.

7.6 *Adherence*—Determine adherence of the zinc coating to the surface of the base metal by cutting or prying with the point of a stout knife, applied with considerable pressure in a manner tending to remove a portion of the coating. The adherence shall be considered inadequate if the coating delaminates in the form of a layer of skin so as to expose the base metal in advance of the knife point. Do not use testing carried out at edges or corners (points of lowest coating adherence) to determine adherence of coating. Likewise, do not use removal of small particles of the coating by paring or whittling to determine failure.

8. Inspection

8.1 The inspector representing the purchaser shall have access at all times while work on the contract of the purchaser is being performed, to those areas of the manufacturer's work which concern the application of the zinc coating to the material ordered. The manufacturer shall afford the inspector all reasonable facilities to satisfy him that the zinc coating is being furnished in accordance with this specification. All inspection and tests shall be made at the place of manufacture

prior to shipments, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

9. Rejection and Retest

9.1 For all galvanized articles except those fasteners that must meet the requirements of the Fastener Quality Act, the following sections are used to determine rejection and retesting.

9.2 When partial inspection of materials to determine conformity with visual requirements of Section 5 warrants rejection of a lot, the galvanizer is not prohibited from sorting the lot and submitting it once again for inspection.

9.3 The number of specimens in a sample of a lot permitted to fail to conformance tests shall be agreed upon between the galvanizer and the purchaser.

9.4 If a set of test specimens fails to conform to the requirements of this specification, two additional sets shall be tested, both of which shall conform to the requirements in every respect, or the lot of material represented by the specimens shall be rejected.

9.5 Materials that have been rejected for reasons other than embrittlement are not prohibited from being stripped, regalvanized, and resubmitted for test and inspection. They shall then conform to the requirements of this specification.

10. Packaging

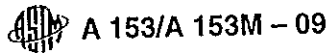
10.1 The supplier shall employ such methods of packaging zinc-coated articles as shall be required to ensure their receipt by the purchaser in satisfactory condition, with the use to be made of the article being taken into consideration.

11. Certification

11.1 When specified in the purchase order or contract, the purchaser shall be furnished certification that samples representing each inspection lot have been either tested or inspected as directed by this specification and the requirements have been met. When specified in the purchase order or contract, a report of the test results shall be furnished.

12. Keywords

12.1 coatings, zinc; galvanized coatings; steel hardware, zinc coated; steel products, metallic coated; zinc coatings, steel products



A 153/A 153M - 09

SUMMARY OF CHANGES

Committee A05 has identified the location of selected changes to this standard since the last issue, A 153/A 153M - 05, that may impact the use of this standard. (May 1, 2009)

(J) Revised 4.2 and 4.2.1 to add new zinc standard B 960.

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

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JAMATT INC.
 Route 1, 351 Clemans Road
 Flemington, WV 26347
 304-842-0367

Cost Sheet
 RFQ#: 07-12-0820

Flemington, WV
 304-842-0367

Item Number	Quantity	Unit of Measure	Description	Unit Price	Extended Amount
1	8,600	lbs	W-18x50 Beams 6 pieces - 28'8" long w/ 15° miter	2 ²⁸	\$ 19,608 ⁰⁰
2	1,838	lbs	Structural steel plate 2 pieces - 2" x 9" x 15'0"	2 ²⁸	\$ 4,190 ⁶⁴
3	681	lbs	Structural steel plate 2 pieces 1" x 5" x 20'0"	2 ²⁸	\$ 1,552 ⁶⁸
4	1,496	lbs	Angle shape structural steel 2 pieces 8" x 4" x 1", 19'0" long	2 ²⁸	\$ 3,410 ⁸⁸
5	660	lbs	Diaphragm assemblies 15 pieces	2 ²⁸	\$ 1,504 ⁸⁰
6	350	lbs	Straight splice plate assembly 6 pieces	2 ²⁸	\$ 798 ⁰⁰
7	232	lbs	Angled splice plate assembly 4 pieces	2 ²⁸	\$ 528 ⁹⁶
8	857	lbs	Straight post assembly 8 pieces	1 ⁰³	\$ 882 ⁷¹
9	855	lbs	Angled post assembly 8 pieces	1 ¹²	\$ 957 ⁶⁰
10	18	ea	Exterior high strength bolt w/ nut and washer. 3/4" x 2"	2 ⁰⁰	\$ 36 ⁰⁰
11	36	ea	Interior high strength bolt w/ nut and washer. 3/4" x 2 1/4"	2 ⁰⁰	\$ 72 ⁰⁰
12	120	ea	Dome head bolt w/ nut and washer 1" x 14"	20 ⁰⁰	\$ 2,400 ⁰⁰
13	24	ea	Dome head bolt w/ nut and malleable iron washer. 3/4" x 30"	25 ⁰⁰	\$ 600 ⁰⁰

14	64	ea	Dome head bolt w/ nut and washer 3/4" x 10"	15 ⁰⁰	\$	960 ⁰⁰
15	180	ea	Deck nailing clips for 2" x 6" timber with 9/16" slot.	5 ⁰⁰	\$	900 ⁰⁰
			total		\$	38,402 ²⁷

JAMATT INC.
 Route 1, 351 Clemans Road
 Flemington, WV 26347
 304-842-0367

State of West Virginia VENDOR PREFERENCE CERTIFICATE

Certification and application* is hereby made for Preference in accordance with *West Virginia Code*, §5A-3-37. (Does not apply to construction contracts). *West Virginia Code*, §5A-3-37, provides an opportunity for qualifying vendors to request (at the time of bid) preference for their residency status. Such preference is an evaluation method only and will be applied only to the cost bid in accordance with the *West Virginia Code*. This certificate for application is to be used to request such preference. The Purchasing Division will make the determination of the Resident Vendor Preference, if applicable.

1. **Application is made for 2.5% resident vendor preference for the reason checked:**
 Bidder is an individual resident vendor and has resided continuously in West Virginia for four (4) years immediately preceding the date of this certification; or,
 Bidder is a partnership, association or corporation resident vendor and has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or 80% of the ownership interest of Bidder is held by another individual, partnership, association or corporation resident vendor who has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or,
 Bidder is a nonresident vendor which has an affiliate or subsidiary which employs a minimum of one hundred state residents and which has maintained its headquarters or principal place of business within West Virginia continuously for the four (4) years immediately preceding the date of this certification; or,
2. **Application is made for 2.5% resident vendor preference for the reason checked:**
 Bidder is a resident vendor who certifies that, during the life of the contract, on average at least 75% of the employees working on the project being bid are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; or,
3. **Application is made for 2.5% resident vendor preference for the reason checked:**
 Bidder is a nonresident vendor employing a minimum of one hundred state residents or is a nonresident vendor with an affiliate or subsidiary which maintains its headquarters or principal place of business within West Virginia employing a minimum of one hundred state residents who certifies that, during the life of the contract, on average at least 75% of the employees or Bidder's affiliate's or subsidiary's employees are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; or,
4. **Application is made for 5% resident vendor preference for the reason checked:**
 Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; or,
5. **Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:**
 Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; or,
6. **Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:**
 Bidder is a resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard, if, for purposes of producing or distributing the commodities or completing the project which is the subject of the vendor's bid and continuously over the entire term of the project, on average at least seventy-five percent of the vendor's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years.

Bidder understands if the Secretary of Revenue determines that a Bidder receiving preference has failed to continue to meet the requirements for such preference, the Secretary may order the Director of Purchasing to: (a) reject the bid; or (b) assess a penalty against such Bidder in an amount not to exceed 5% of the bid amount and that such penalty will be paid to the contracting agency or deducted from any unpaid balance on the contract or purchase order.

By submission of this certificate, Bidder agrees to disclose any reasonably requested information to the Purchasing Division and authorizes the Department of Revenue to disclose to the Director of Purchasing appropriate information verifying that Bidder has paid the required business taxes, provided that such information does not contain the amounts of taxes paid nor any other information deemed by the Tax Commissioner to be confidential.

Under penalty of law for false swearing (*West Virginia Code*, §61-5-3), Bidder hereby certifies that this certificate is true and accurate in all respects; and that if a contract is issued to Bidder and if anything contained within this certificate changes during the term of the contract, Bidder will notify the Purchasing Division in writing immediately.

Bidder: JAMATT, INC.

Signed: James P. Mathers

Date: 02/24/2012

Title: PRESIDENT

*Check any combination of preference consideration(s) indicated above, which you are entitled to receive.

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

West Virginia Code §5A-3-10a states: No contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and the debt owed is an amount greater than one thousand dollars in the aggregate.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Debtor" means any individual, corporation, partnership, association, limited liability company or any other form or business association owing a debt to the state or any of its political subdivisions. "Political subdivision" means any county commission; municipality; county board of education; any instrumentality established by a county or municipality; any separate corporation or instrumentality established by one or more counties or municipalities, as permitted by law; or any public body charged by law with the performance of a government function or whose jurisdiction is coextensive with one or more counties or municipalities. "Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceeds five percent of the total contract amount.

EXCEPTION: The prohibition of this section does not apply where a vendor has contested any tax administered pursuant to chapter eleven of this code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

Under penalty of law for false swearing (*West Virginia Code* §61-5-3), it is hereby certified that the vendor affirms and acknowledges the information in this affidavit and is in compliance with the requirements as stated.

WITNESS THE FOLLOWING SIGNATURE

Vendor's Name: JAMATT, INC.

Authorized Signature: Jam A. Mattingly Date: 02/24/2012

State of WEST VIRGINIA

County of TAYLOR, to-wit:

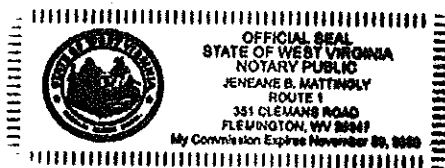
Taken, subscribed, and sworn to before me this 24th day of FEBRUARY, 2012.

My Commission expires NOVEMBER 29, 2020.

AFFIX SEAL HERE

NOTARY PUBLIC

Jeneane B. Mattingly



Please use this document for technical questions, posing in a question format

Please refer to the section your question is in reference to.

Technical questions for RFQ# _____

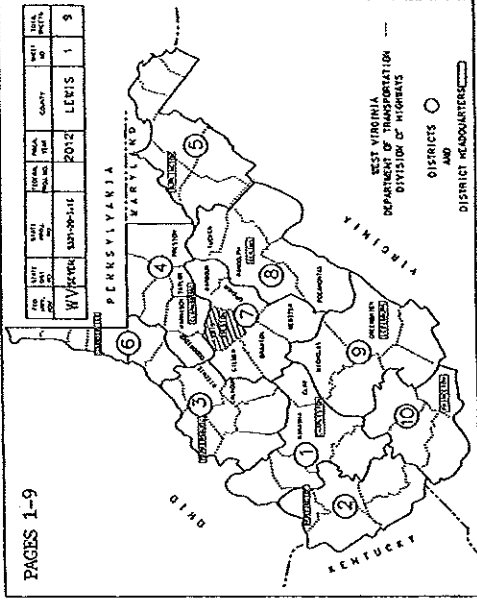
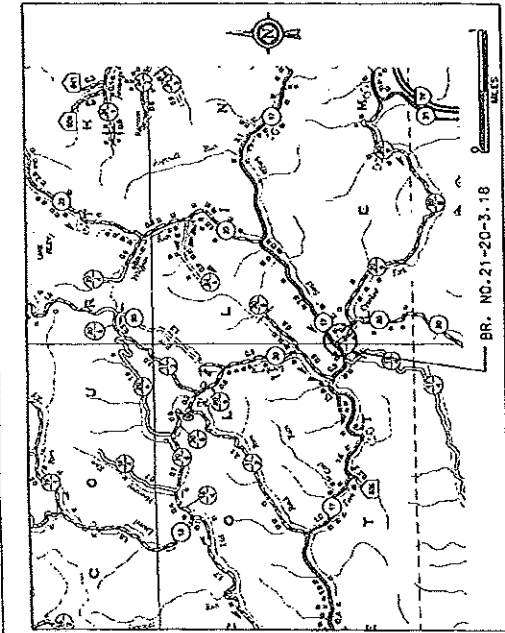
Vendor Name: _____

Questions:

07120820

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS CONSTRUCTION PLANS OF CROOKED FORK SUPERSTRUCTURE REPLACEMENT STATE PROJECT NO. S321-20-3.18 C.R. 20 (SLS) COURT HOUSE DISTRICT LEWIS COUNTY

TOTAL LENGTH = 104.00 L.F. = 0.020 MI.



UTILITIES ENCOUNTERED:

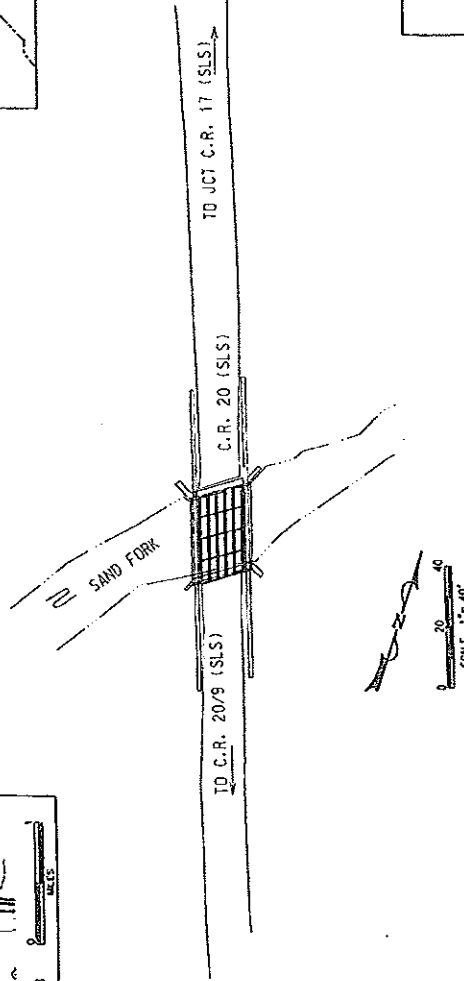
MON POWER & FIRST ENERGY COMPANY
FRONTIER OF WV

CONVENTIONAL SIGNS

- STATE LINE
- COUNTY LINE
- CORPORATION LINE
- PROPERTY LINE
- EXISTING FENCE
- DITCH
- GRAVEL
- POSSIBLE GRAVEL
- EXISTING GRAVEL
- RAILROAD
- GAS LINE
- WATER LINE
- TELEPHONE LINE
- ELECTRIC LINE
- TELETYPE POLE
- POWER POLE
- COMBINED POWER AND TELEPHONE POLE
- TREE
- SARBO
- RIGHT OF WAY MARKER

TYPE OF CONSTRUCTION

BRIDGE REPLACEMENT
BR. NO. 21-20-3.18
(8040.1)



NOTE:

STANDARD DETAIL BOOK VOLUME 1, DATED JAN. 1, 2000
& VOLUME 11 DATED JAN. 1, 1994, SHALL APPLY TO THIS
PROJECT.

INDEX TO SHEETS

NO.	DESCRIPTION
1	TITLE SHEET
2	GENERAL NOTES
3	EXISTING ELEVATION, VISE AND REE SECTION, EXISTING OF BENCHMARKS AND SLOPE OF WORK.
4	PROJECT PLAN VIEWS AND SURVEY CONTROL POINTS.
5	STEEL LAYOUT, VISE SECTION, SUPERSTRUCTURE & BRIDGE PILE DETAILS.
6-8	PILE CAP AND GIRD DETAILS.
9	WALING PATTERN AND MAIL CLIP DETAILS.

STANDARD SHEETS

NO.	DATE
BR-2A	8-93

DESIGN DESIGNATION

A.D.T. (2009) 80
A.D.T. (2028) 104

D.H.V.
D.
T.
V.

SIGNED: _____ RESPONSIBLE CHARGE ENGINEER

DATE: _____

RECOMMENDED: _____ PROJECT ENGINEER

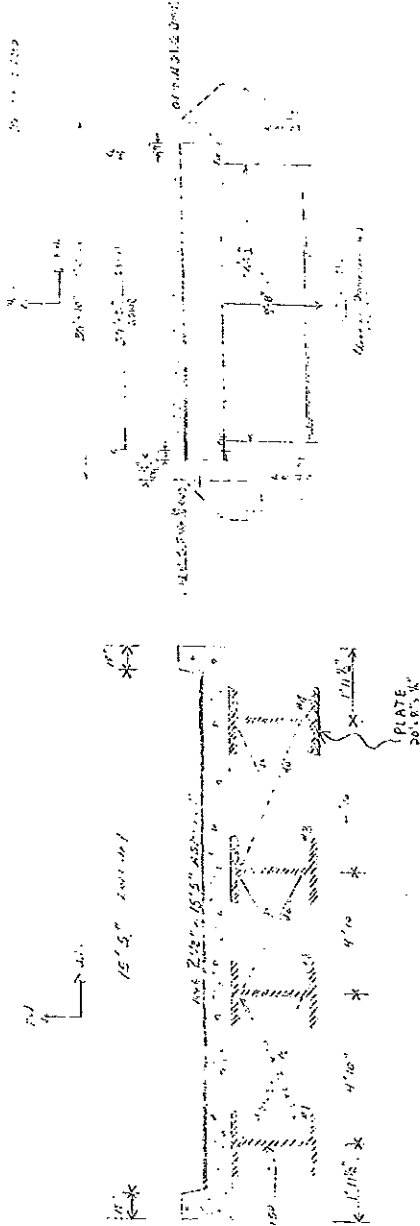
RECOMMENDED FOR APPROVAL: _____ STATE INSPECTOR ENGINEER

APPROVED: _____ COMMISSIONER OF HIGHWAYS

IF ANY CERTIFY THAT THIS IS A CORRECT COPY OF THE PLANS OF PROJECT S321-20-3.18

EXECUTIVE SECRETARY

PROJECT NUMBERS		WV	COUNTY	SHEET	OF
FEDERAL	STATE	DISTRICT	LEWIS	3	9
S321-20-3-1B		SEVEN			



EXISTING DECK SECTION
NO SCALE

EXISTING ELEVATION VIEW
NO SCALE

ESTIMATE OF QUANTITIES		
PROJECT NO. S321-20-3-1B FOR INFORMATION ONLY		
DESCRIPTION	UNITS	QUANTITY
DECK TIMBER	EA	759
WALLS	LB	100
WALKING CLIPS	EA	100
BEARING PLATES	EA	100
WADSWORTH PLATES	EA	100
WADSWORTH ANGLE	EA	100
STRINGERS W/ 15' R.F.S. HITER	EA	100
4\"/>		

* - ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A572 GRADE 50 AND SHALL BE HOT DIPPED GALVANIZED. GALVANIZING SHALL CONFORM TO ASTM A123 EXCEPT BOLTS AND NUTS WHICH SHALL CONFORM TO ASTM A153.

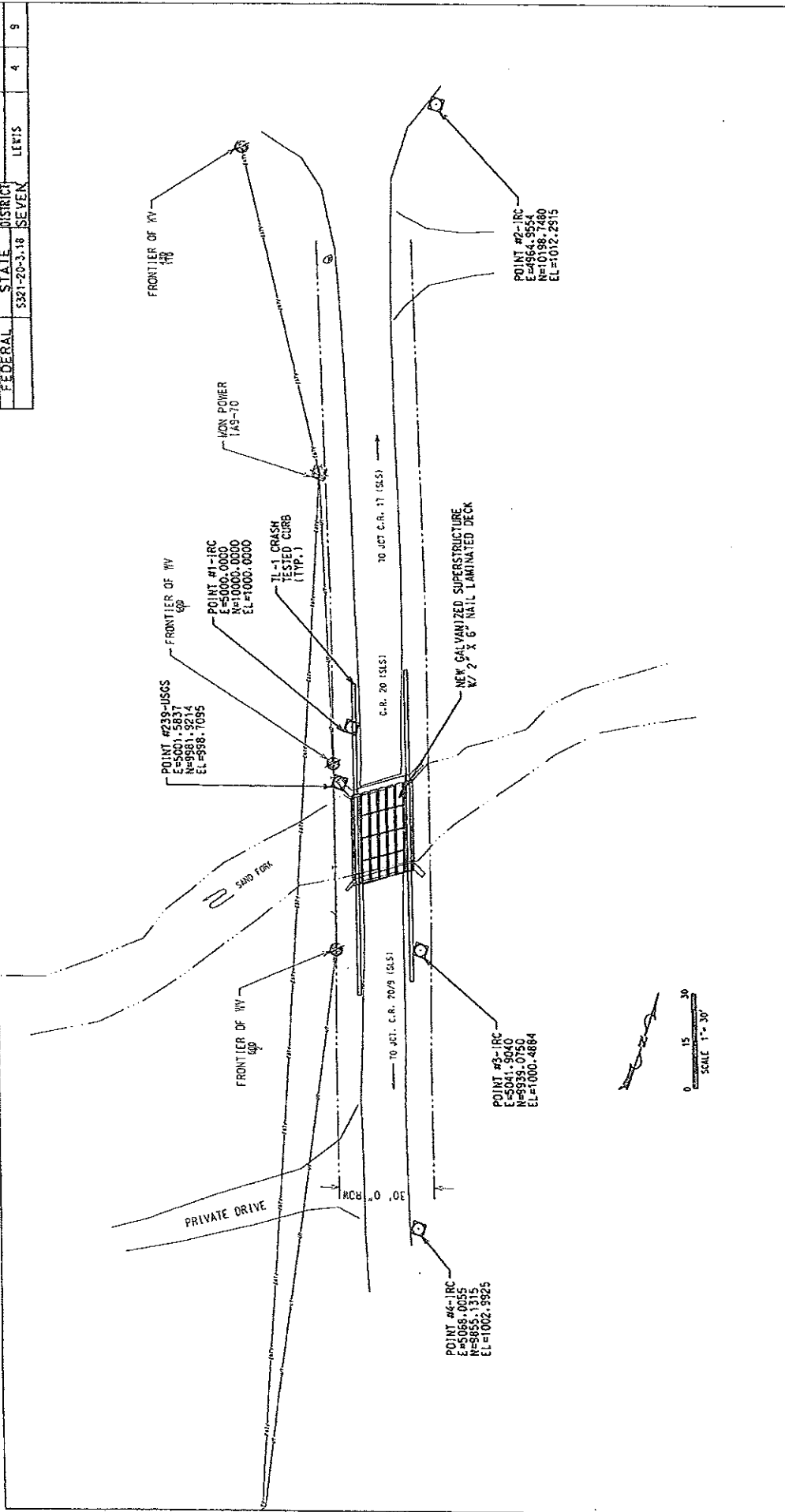
SCOPE OF WORK

1. CLOSE EXISTING STRUCTURE TO TRAFFIC.
2. REMOVE EXISTING SUPERSTRUCTURE, 1' 0" DEEP.
3. DRILL CAPS AND GRABT OPEN BOLTS AND INSTALL NUTS.
4. PLACE BEARING PLATES OVER BEARING PLATES.
5. WELD STRINGERS AND BEARING PLATES.
6. INSTALL 2" X 6" NAIL FINISHED DECK.
7. INSTALL TL-1 GLULAM CURB SYSTEM.
8. PAVE STRUCTURE TO TRAFFIC.
9. OPEN SITE DRESS, SEED, & MULCH ALL DISTURBED AREAS.
10. OPEN SITE DRESS, SEED, & MULCH ALL DISTURBED AREAS.
11. SITE DRESS, SEED, & MULCH ALL DISTURBED AREAS.

WEST VIRGINIA DEPT. OF TRANSPORTATION	
DIVISION OF HIGHWAYS	
DISTRICT SEVEN	
CONSTRUCTION PLANS OF	
CHOCKED FORK SUPERSTRUCTURE REPLACEMENT	
ON C.R. 20 (S.C.S.)	
OVER SAND FORK	
LEWIS COUNTY	
REVISIONS DATE BY	
1. 08-11	
2. 08-11	
3. 08-11	
4. 08-11	
5. 08-11	
6. 08-11	
7. 08-11	
8. 08-11	
9. 08-11	
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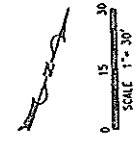
EXISTING ELEVATION AND END VIEWS OF
ESTIMATE OF QUANTITIES & SCOPE OF
WORK,
SHEET 3 OF 9
21-20-3-1B
(6040.1)

PROJECT NUMBERS		WV DISTRICT		COUNTY		SHEET		OF	
FEDERAL		STATE		LEWIS		4		9	
S321-20-3-18		SEVEN							

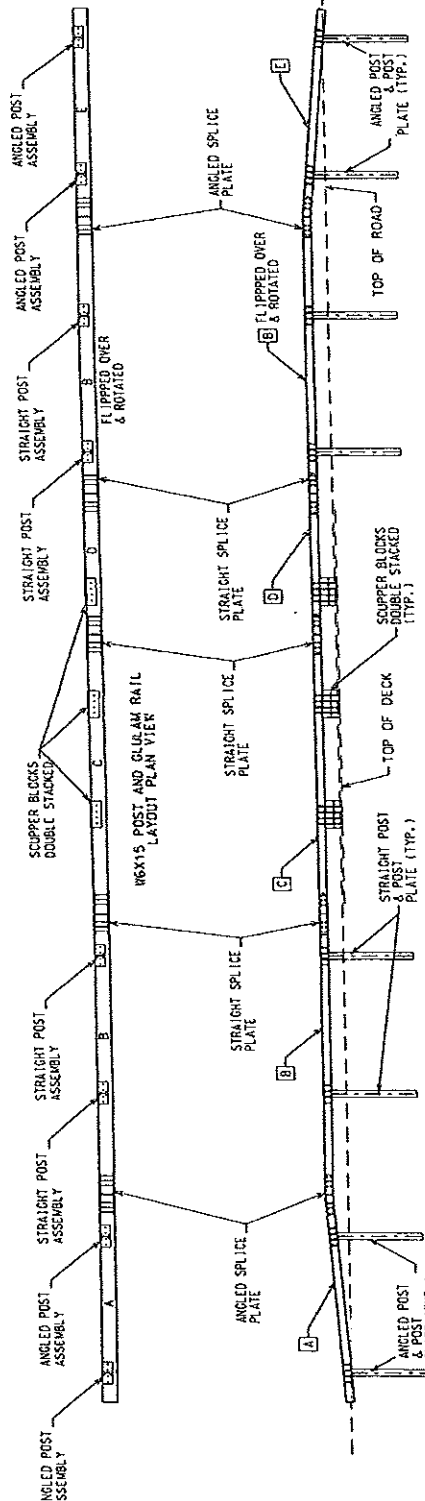


WEST VIRGINIA DEPT. OF TRANSPORTATION		DIVISION OF HIGHWAYS		DISTRICT SEVEN	
CONSTRUCTION PLANS OF					
CROOKED FORK R-BEAM					
SUPERSTRUCTURE REPLACEMENT					
ON C.R. 20 (SLS)					
OVER SAND FORK					
LEWIS COUNTY					
PROJECT PLAN YEAR AND SURVEY				SHEET 4 OF 9	
CONTROL POINTS				21-20-3-18	
				(110071)	

REVISIONS MADE BY:	DATE:
DESIGNED BY:	06-11
DRAWN BY:	06-11
CHECKED BY:	09-11
APPROVED BY:	09-11

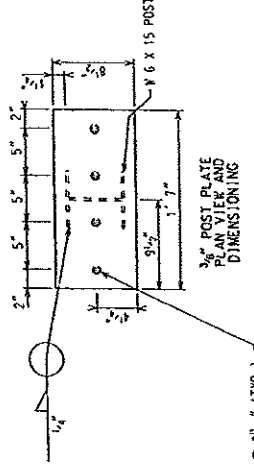
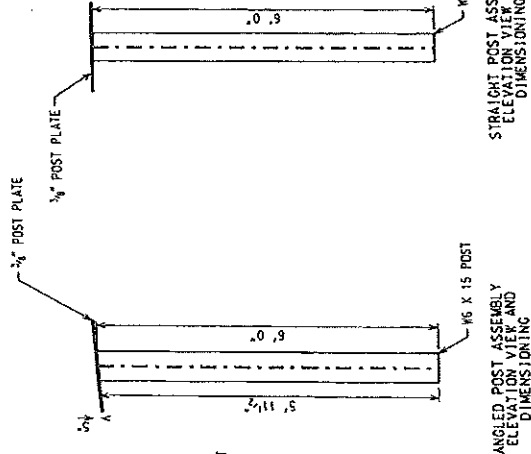
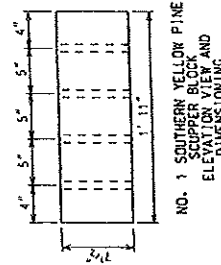
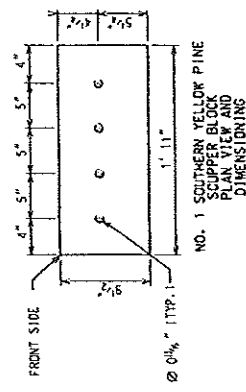


PROJECT NUMBERS	RV DISTRICT	COUNTY	SHEET	OF
FEDERAL	STATE	LEWIS	6	9
S321-20-3-18		SEVEN		



16X15 POST AND GLULAM RAIL LAYOUT ELEVATION VIEW

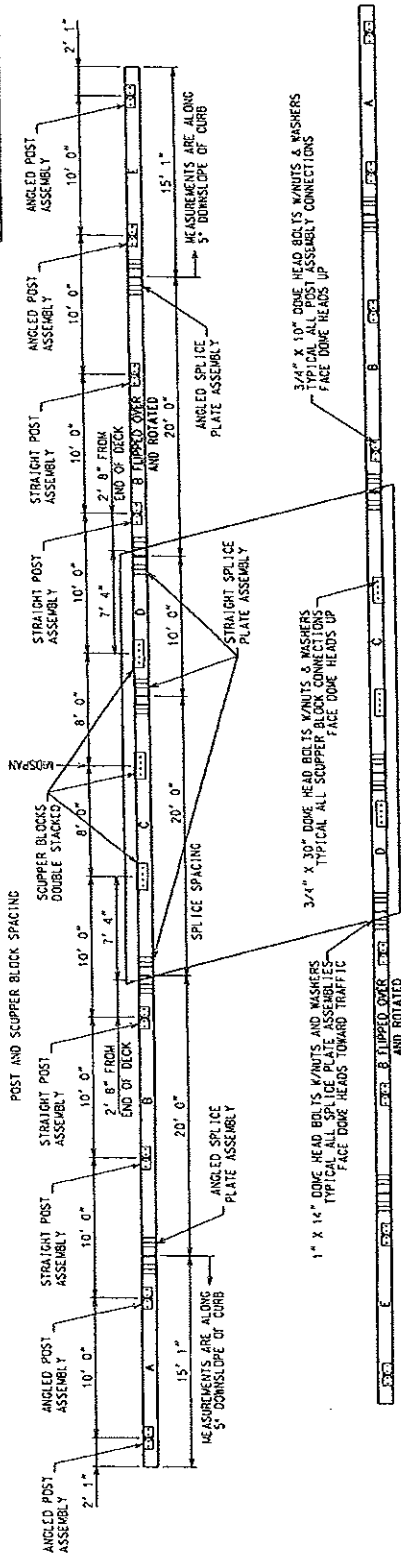
NOTE: SEE THIS SHEET FOR POST AND POST PLATE DETAILS. SEE 7 & 8 OF 9 FOR GLULAM DIMENSIONING AND SPLICE PLATE DETAILS.



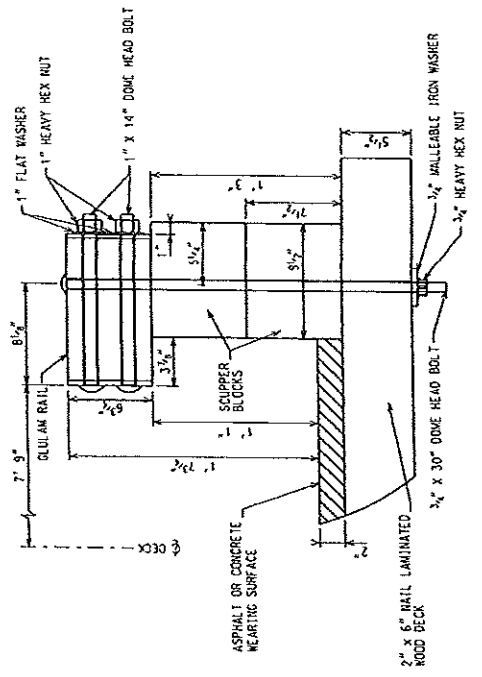
Notes: (1) Treated with Pentachlorophenol - 0.6 lb/2cu. ft.
(2) No. 1 Grade Douglas Fir may also be used for Scupper Blocks.

WEST VIRGINIA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS DISTRICT SEVEN	
CONSTRUCTION PLANS OF CROOKED FORK SUPERSTRUCTURE REPLACEMENT ON C.R. 20 (SLS) OVER SAND FORK LEWIS COUNTY	
REVISIONS DATE BY	11-1-11
DESIGNED BY	11-1-11
CHECKED BY	11-1-11
SCALE	AS SHOWN
DATE	11-1-11
PROJECT NO.	SR-10-21-20-3-18
SHEET NO.	6 OF 9
GLULAM RAIL LAYOUT DETAILS (REV. 11)	

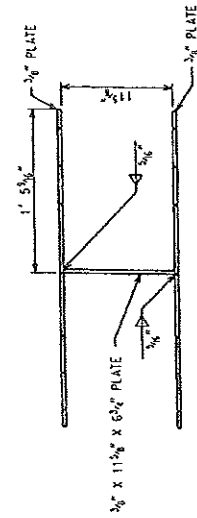
PROJECT NUMBERS	RV COUNTY	SHEET	OF
FEDERAL	LEWIS	7	9
STATE	DISTRICT		
S201-20-3-18	SEVEN		



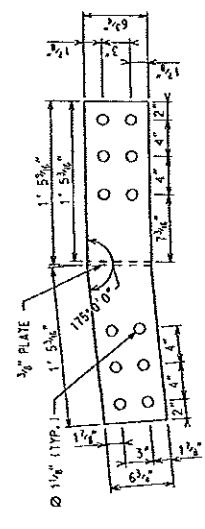
WG15 POST, SPLICE PLATE, AND SCUPPER
BLOCK PLAN LAYOUT AND DIMENSIONING
(NO SCALE)



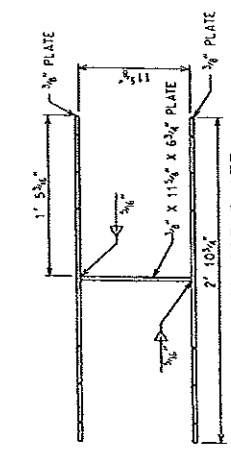
TIMBER BRIDGE RAIL
CROSS SECTION



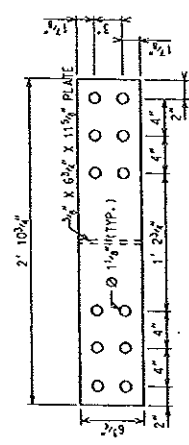
ANGLED SPLICE PLATE
ASSEMBLY PLAN VIEW
(NO SCALE)



ANGLED SPLICE PLATE
ASSEMBLY ELEVATION VIEW
(NO SCALE)



STRAIGHT SPLICE PLATE
ASSEMBLY PLAN VIEW
(NO SCALE)

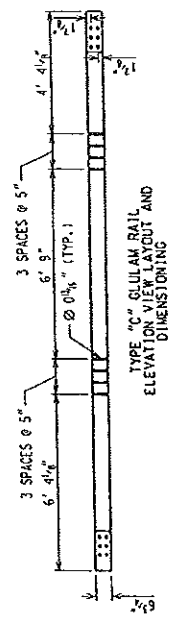
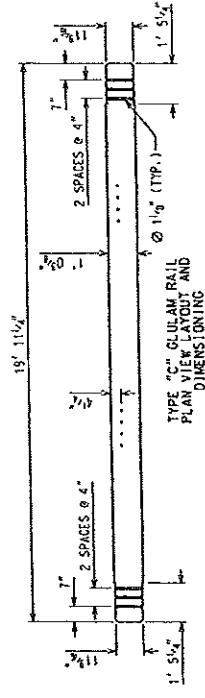
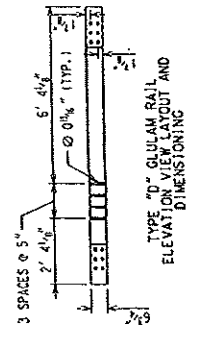
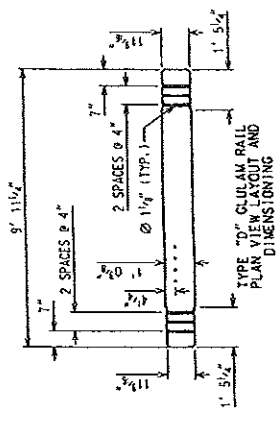
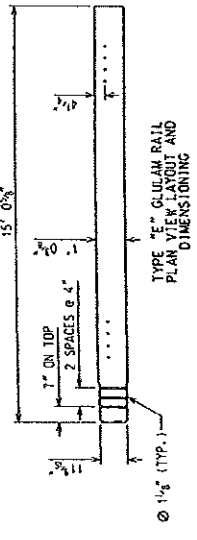
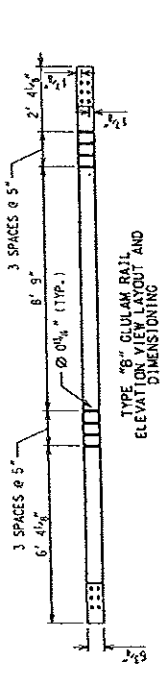
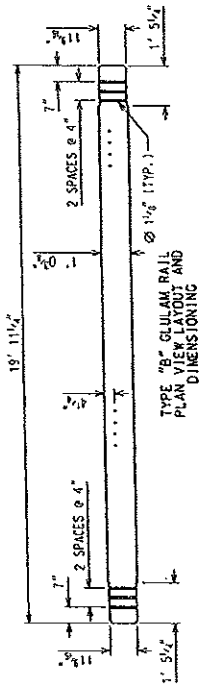


STRAIGHT SPLICE PLATE
ASSEMBLY ELEVATION VIEW
(NO SCALE)

WEST VIRGINIA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS DISTRICT SEVEN	
CONSTRUCTION PLANS OF CROOKED FORK SUPERSTRUCTURE REPLACEMENT ON C.R. 20 (LSLS) OVER SAND FORK LEWIS COUNTY	
REVISIONS DATE BY	11-11
DESIGNED BY	11-11
CHECKED BY	11-11
APPROVED BY	11-11
SCALE	AS SHOWN
SHEET	7 OF 9
BRIDGE NO.	20-3-18
DATE	1960-11

PROJECT NUMBERS	WV	COUNTY	SHEET
FEDERAL	STATE	DISTRICT	OF
5321-20-3-18	SEVEN	LEWIS	8
			9

- NOTES:
- (1) GLULAM RAIL SHALL BE 6 3/4" X 12 3/4" COMBINATION #48 SOUTHERN YELLOW PINE.
 - (2) END RAIL SECTIONS ARE MITERED 5° ON SPLICE PLATE END.
 - (3) ALL SECTIONS SHALL BE TREATED WITH PENTACHLOROPHENOL WITH HEAVY OIL - 0.5 LBS./100. FT.
 - (4) COMBINATION #2 DOUGLAS FIR 6 3/4" X 12" MAY BE SUBSTITUTED FOR COMBINATION #48 SOUTHERN YELLOW PINE.
 - (5) ALL RAIL ENDS CUT TO ACCEPT SPLICE PLATE SHALL BE CHAMFERED 1" X 1/4".



WEST VIRGINIA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS DISTRICT SEVEN	
CONSTRUCTION PLANS OF CROOKED FORK SUPERSTRUCTURE REPLACEMENT ON C.R. 20 (SLS.) OVER SAND FORK LEWIS COUNTY	
REVISED DATE BY DESIGNED BY DATE DRAWN BY DATE CHECKED BY DATE APPROVED BY DATE	SHEET 8 OF 9 DWG NO. 21-20-3-18 1800-11