

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Reformat into six section format and technical changes throughout. Add proof pressure testing and suggested sources of supply.	2 March 2020	Abdo Abdouni



Prepared in accordance with ASME Y14.100

Selected Item Drawing

REV STATUS OF PAGES	REV	A	A	A	A	A	A									
	PAGE	1	2	3	4	5	6									
PMIC N/A		PREPARED BY William Carpenter						DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990								
Original date of drawing 6 August 2019		CHECKED BY Brandon Vermilye						TITLE ELBOW, FLARED TUBE, FLANGED, SWIVEL, 90 DEGREE PRODUCT VERIFICATION								
		APPROVED BY Abdonasser Abdouni														
		SIZE A		CAGE CODE 037Z3				DWG. NO.				19002				
		REV A				PAGE 1				OF 6						

1. SCOPE: This drawing covers the inspection requirements for MS20762 elbows supplied to this drawing for various weapon systems platforms shall be inspected for the minimum wall thickness specified in MS20762.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION

MS20762 - Elbow, Flared Tube, Flanged, Swivel, 90 Degree

(Copies of this document are available online at <https://quicksearch.dla.mil>.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

ASME INTERNATIONAL

ASME Y14.100 - Engineering Drawing and Related Documentation Practices
ASME E165/E165M - Standard Practice for Liquid Penetrant Testing for General Industry

(Copies of this document are available online at <https://www.asme.org>.)

ASTM INTERNATIONAL

ASTM A732/A732M - Standard Specification for Castings, Investment, Carbon and Low Alloy Steel for General Application, and Cobalt Alloy for High Strength at Elevated Temperatures

(Copies of these documents are available online at <https://www.astm.org>.)

2.4 Order of precedence. The individual item requirements shall be in accordance with MS20762 and as specified herein. In case of conflict between this drawing and MS20762, the latter shall govern. Nothing in this document however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS:

3.1 DSCC requirements drawing. The individual requirements shall be in accordance with the MS20762.

3.2 Design, construction, and physical dimensions. The design, construction, physical dimensions, and marking shall be in accordance with MS20762.

3.3 Forged or cast parts testing. Parts that are forged or cast shall be inspected to verify the inner wall thickness of MS20762 for each individual dash number and material type, see 3.3.2.

DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A	CAGE CODE 037Z3	DWG NO. DRAFT 19002
		REV A	PAGE 2

3.3.1 CT scanning. The CT scanning requirement is prior to any sampling being instituted, and that the thickness requirement is all around (i.e. point measurements may be insufficient to detect non-conformances).

3.3.2 Wall thickness verification for new manufacturer's. For Manufacturers, not currently listed as a source on this drawing, for a particular PIN on MS20762, the following details shall apply:

- a. -10 and -12 size parts only. Parts shall be 100 percent inspected. Manufacturers that are machining the inside radius shall inspect 100 percent of the elbows using a CT scanner or destructive analysis to verify the wall thickness of the elbow. After twenty five (25) elbows have been manufactured and CT scanned and/or analyzed, with no failures the manufacturer shall forward the test report(s) to the address below. See 4.4.1 for detailed sampling plan.
- b. -16 and above size parts. Manufacturers that are machining the inside radius shall inspect five (5) elbows using a CT scanner or destructive analysis to verify the wall thickness of the elbow. After five (5) elbows have been manufactured and CT scanned and/or analyzed, with no failures the manufacturer shall forward the test report(s) to the address below. See 4.4.1 for detailed sampling plan.
- c. Parts that are cast and require no additional inside machining to achieve the inside radius, shall be CT scanned and/or destructive analysis two on (2) parts to verify wall thickness, after 2 (two) parts have been manufactured with no reported failures the manufacture shall forward the CT or destructive test report results to the address below. Parts shall also be tested in accordance with 3.4. If the parts require internal machining, to achieve the inside radius, then the requirements of 3.3.2 (a) shall apply.

Destructive testing may be used in conjunction with CT scanning, to obtain test report results.

Send test reports to: DLA Land and Maritime, Columbus, Attn: VAI, P.O. Box 3990, Columbus, Ohio, 43218-3990 or email: to FluidFlow@dla.mil.

3.4 Performance requirements.

3.4.1 Additional inspection for casted elbows. Parts that fail this inspection shall not be delivered as part of the contract or purchase order. Test reports shall be made available upon request for review.

3.4.1.1 Steel casted elbows. Steel casted elbows shall be magnetic particle or radiography inspected in accordance with ASTM A732/A732M and with the manufacturer's in-house quality inspection practice.

3.4.1.2 Aluminum casted elbows. Aluminum casted elbows shall be liquid penetrate inspected in accordance with ASME E165 using the manufacturer's in-house quality inspection practice.

3.4.2 Proof pressure testing. If specified by the Part or Identifying Number (PIN) after machining and the porosity test in accordance with MS20762 all elbows shall be proof pressure tested. -12, and -16 size elbows shall be subjected to 1500 psi proof pressure and -20 and above size elbows shall be proof pressure tested to 500 psi. All elbows shall be capable of withstanding proof pressure for a period of 1 minute without permanent distortion, failure, or leakage. Parts that fail this inspection shall not be delivered as part of the contract or purchase order.

NOTE: Not applicable to -10 size parts due to the reduced wall thickness.

WARNING: Water or another liquid suitable for the fitting under test shall be used as the test medium. The use of air and other gaseous materials as testing media should be avoided because of the risk to operators. It is essential that when a liquid is used as the test medium, that all air is expelled from all the hose and test pieces because of the risk of injury to the operator due to the sudden expansion of trapped air released when the test sample or hose connected to it may burst.

DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A	CAGE CODE 037Z3	DWG NO. DRAFT 19002
		REV A	PAGE 3

3.5 Quality assurance requirements. MS20762 elbows furnished under this drawing shall have been subjected to, and passed all the requirements, tests, and inspections detailed herein including quality conformance inspections.

3.6 Test reports. Test reports shall be made available upon request for review.

3.7 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source (see 6.4).

4. VERIFICATION

4.1 Classification of inspection. The inspections specified herein are classified as follows:

- a. Qualification inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 Qualification inspection. Qualification inspection for elbows specified herein shall not be required.

4.3 Conformance inspection. Conformance inspection shall be performed on sample units produced with equipment and procedures normally used in production. Manufacturers shall keep lot records for 3 years (minimum), monitor for compliance to the prescribed procedures, and observe that satisfactory manufacturing conditions and records on lots are maintained for these elbows. The records, including as a minimum, an attributes summary of all quality conformance inspections conducted on each lot(s), shall be available to review by customers at all times.

4.3.1 Responsibility for compliance. All items shall meet all requirements specified herein and MS20762. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.3.2 Inspection lot. An inspection lot shall consist of all elbows, of the same Part or Identifying Number (PIN) manufactured under identical conditions and assigned an identifying lot number for use, technical, manufacturing, production, and supply purposes.

4.3.3 Acceptance of verification testing. Upon acceptance of the initial number of elbows, the manufacturer may use methods and sampling as defined in the 'Inspection of product for delivery' section.

4.3.4 Failures. One or more failures shall be cause for refusal of the lot and not to be listed as an approved supplier.

4.4 Inspection of product for delivery. Parts shall meet the requirements of MS20762 and additional inspection of product for delivery shall be the manufacturer's in-house inspection for wall thickness. In case of dispute CT scanning or destructive analysis shall be the referee method of inspection. Parts shall also be visually inspected for marking requirements as specified in MS20762.

4.4.1 Sampling plan of product for delivery for forged parts. Once a Manufacturer has inspected 25 forge pieces applicable to -10 and -12 sizes only, or 5 for sizes -16 and larger and passed the CT scan and or destructive analysis and the manufacturer's repeatability has been established, after which a Sampling Plan of destructive testing shall be in effect.

- a. Inspection lot of orders up to 99 elbows. The sampling plan for orders up to 99 pieces shall have the first 2 elbows manufactured and last 2 elbows manufactured tested destructively.

DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A	CAGE CODE 037Z3	DWG NO. DRAFT 19002
		REV A	PAGE 4

- b. Inspection lot of orders 100 elbows and up. The sampling plan for orders over 100 pieces the test samples shall be the first 2 elbows produced, 1 sample in the middle, and 2 samples at end of the production run. These shall be destructively tested.

4.4.1.1 Failures of product for delivery forged parts. One failure shall will require the entire lot to be CT scanned for the wall thickness requirement or destroyed. The manufacturer shall perform 100 percent inspection until 50 units have passed without a single failure. Once 50 consecutive units have passed inspection, the manufacture may at that time resort back to the sampling plan of product for delivery for forged parts, see 4.4.1. Parts that pass CT inspection shall be marked as specified in MS20762 and subsequently may be shipped on the contract or purchase order.

4.4.1.2 Sampling plan for casted parts. Once a Manufacturer has inspected 2 pieces and passed the CT scan and or destructive analysis and the manufacturer's repeatability has been established, after which a Sampling Plan of destructive testing shall be in effect.

- a. Inspection lot of orders up to 99 elbows. The sampling plan for orders up to 99 pieces shall have the first one (1) manufactured and last one (1) elbow manufactured tested destructively.
- b. Inspection lot of orders 100 elbows and up. The sampling plan for orders over 100 pieces the test samples shall be the first elbow produced, one (1) sample in the middle, and one (1) sample at end of the production run. These shall be destructively tested.

4.4.2 Failures of product for delivery casted parts. One failure shall will require the entire lot to be CT scanned for the wall thickness requirement or destroyed. The manufacturer shall perform 100 percent inspection in accordance with 3.3.2.b until 5 units have passed without a single failure. The manufacture may at that time resort back to the sampling plan of product for delivery for casted parts, see 4.4.1.2. Parts that pass CT inspection shall be marked as specified in MS20762 and subsequently may be shipped on the contract or purchase order.

4.5 Certification as an approved source of supply. In order to be listed as an approved source of supply for MS20762 elbows, a manufacturer shall:

- a. Agree to make available to DLA Land and Maritime-VAI, upon request, all pertinent test data on the subject part indicating compliance to the tests outlined in table I.
- b. Provide to DLA Land and Maritime-VAI, or its designated agent, upon request, free of charge and without obligation, a current production sample from its production line, of the quantity of units required of the types specified.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

6.1 Intended use. MS20762 elbows conforming to this drawing are intended for use when military specifications do not exist and qualified military elbows that will perform the required function are not available for OEM application.

6.2 Acquisition requirements. The acquisition document should specify the following:

- a. Complete PIN, see MS20762.

DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A	CAGE CODE 037Z3	DWG NO. DRAFT 19002
		REV A	PAGE 5

- b. Requirements for delivery of one copy of the quality conformance inspection data pertinent to the elbow inspection lot to be supplied with each shipment by the connector manufacturer, if applicable.
- c. Requirements for certificate of compliance, if applicable.
- d. Requirements for notification of change of product or process to contracting activity, if applicable.
- e. Packaging requirements.

6.3 Comments. Comments on this drawing should be directed to DLA Land and Maritime (L&M) - VAI, Post Office Box 3990, Columbus, Ohio 43218-3990. Comments may be submitted by email to FluidFlow@dla.mil.

6.4 Submission of certificate of compliance. The certificate of compliance submitted to DSCC-VAI, prior to listing as an approved source of supply, shall state that the manufacturer's product meets the requirements of the applicable DSCC requirements drawings and stated herein.

6.5 Examples of failures. See figures 1 and 2 for examples of failures of the wall thickness requirement.

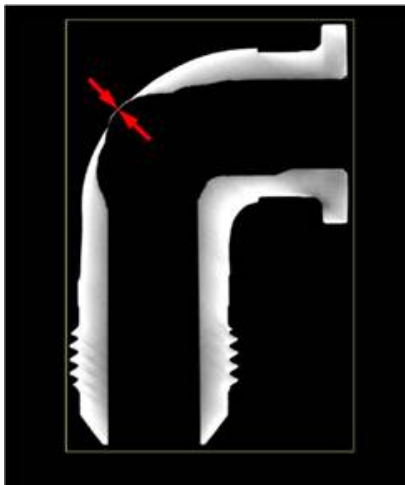


Figure 1. CT scan outside radius failure.

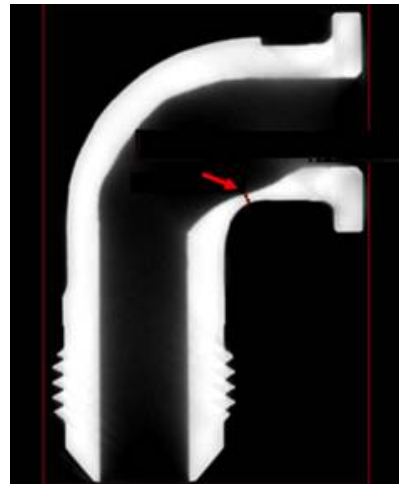


Figure 2. CT scan inside radius failure.

MANUFACTURER ELIGIBILITY AND CERTIFICATE OF COMPLIANCE

IDENTIFICATION OF THE APPROVED SOURCES OF SUPPLY HEREON IS NOT TO BE CONSTRUED AS A GUARANTEE OF PRESENT OR CONTINUED AVAILABILITY OF AS A SOURCE OF SUPPLY FOR THE ITEM DESCRIBED ON THE DRAWING.

DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990	SIZE A	CAGE CODE 037Z3	DWG NO. DRAFT 19002
		REV A	PAGE 6

Suggested Sources of Supply. Suggested Sources of Supply are listed herein. Additional sources will be added as they become available. The vendors listed herein have the capability to manufacture MS27062 elbows to the contents of this drawing.

Vendor CAGE <u>number</u>	Vendor name <u>and address</u>
0E6N4	Avalon Precision Casting Company 15583 Brookpark Road Cleveland, OH 44124-1618
59680	B&E Manufacturing Company 12151 Monarch Street Garden Grove, CA 92841-2927
13899	Hydro Fitting Manufacturing Corporation 733 E Edna Place Covina, CA 91723-1409
58255	Kovatch Castings Inc. 3743 Tab Drive Uniontown, OH 44685-9563

**DLA LAND AND MARITIME
COLUMBUS, OHIO 43218-3990**

SIZE
A

CAGE CODE

037Z3

REV

A

DWG NO. **DRAFT**

19002

PAGE

7