

INCH-POUND

MIL-DTL-18182F  
4 December 2002  
SUPERSEDING  
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29 MARCH 1991

## DETAIL SPECIFICATION

### UNION, PIPE, FORGED STEEL, THREADED, WATER-OIL-GAS (2,000, 3,000, AND 6,000 LB/IN<sup>2</sup>)

This specification is approved for use by all Departments  
and Agencies of the Department of Defense.

#### 1 SCOPE

1.1 Scope. This specification covers forged steel threaded pipe unions having ground joint union seats adaptable for severe conditions.

#### 1.2 Classification.

1.2.1 Class, style, size, and finish. The class, style, size, and surface finish of a union may be as follows:

##### 1.2.1.1 Class.

Class 1 - 2,000 lb/in<sup>2</sup> (cold non-shock water, oil, gas) available in styles A and B only.

Class 2 - 3,000 lb/in<sup>2</sup> (cold non-shock water, oil, gas) available in styles A and B with UN and ACME thread coupling nut.

Class 3 - 6,000 lb/in<sup>2</sup> (cold non-shock water, oil, gas) available in style A only.

##### 1.2.1.2 Style.

Style A - Ends, threaded female

Style B - Ends, threaded, one end male, other end female (classes 1 and 2 only)

1.2.1.3 Nominal sizes (inches). 0.125, 0.25, 0.375, 0.50, 0.75, 1.00, 1.25, 1.50, 2.00, 2.50, and 3.00.

1.2.1.4 Surface finish. The union may be coated or uncoated (see 3.13).

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be of use in improving this document should be addressed to: Defense Logistics Agency, Defense Supply Center, Columbus (DSCC-VAI), P.O. Box 3990, Columbus, OH 43216-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 4730

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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## 2.0 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 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents which are current on the date of the solicitation (see 6.2).

## AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ASME/ANSI B1.20.1	-	Pipe Threads, General Purpose (Inch).
ASME/ANSI B36.10M	-	Welded and Seamless Wrought Steel Pipe.

(Application for copies should be addressed to the American National Standards Institute, 25 West 43<sup>rd</sup> Street, 4<sup>th</sup> Fl., New York, NY 20036).

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM-A105/A105M	-	Forgings, Carbon Steel, for Piping Components.
ASTM-A153/A153M	-	Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
ASTM-A181/A181M	-	Forged or Rolled Steel Pipe Flanges, Forged Fittings, and Valves and Parts for General Service.

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania, 19428-2959).

## MANUFACTURERS STANDARDIZATION SOCIETY (MSS) OF THE VALVE AND FITTINGS INDUSTRY

MSS SP-25	-	Standard Marking System for Valves, Fittings, Flanges, and Unions.
MSS SP-83	-	Class 3000 Carbon Steel Pipe Unions Socket-Welding and Threaded.

(Application for copies should be addressed to the Manufacturers Standardization Society of the Valve and Fittings Industry Inc., 127 Park Street, N.I., Vienna, VA 22180).

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services).

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification takes precedence. Nothing in this specification, however, supercedes applicable laws and regulations unless a specific exemption has been obtained.

## 3.0 REQUIREMENTS

3.1 Description. The union shall consist of a thread-piece provided with a female union seat, a nut-piece provided with a male union seat, and a union coupling nut. Union seats shall be of the ground joint type. The style A union shall be threaded with American Standard taper pipe threads (NPT) female at both

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ends. The style B union shall be threaded with NPT male on one end and female on the other, and shall be applicable only to class 1 and class 2 unions.

3.2 Manufacture. Unions shall either be hot-formed, cold-formed or machined from wrought bars. Swaged-end unions manufactured by swaging or upsetting pipe ends do not meet the requirements of this specification.

3.3 Materials. Materials used shall be free from defects, which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials that have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this specification.

3.3.1 Carbon steel. The unions shall be manufactured from carbon steel conforming to ASTM-A181/A181M, Class 70, or ASTM-A105/A105M.

3.4 Standard commercial product. Each union of the same classification shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification, but which are a part of the manufacturer's standard commercial product, shall be included in the unions being furnished. Standard commercial product is a product, which has been sold or is currently being offered for sale on the commercial market through advertisement, manufacturer's catalogs, or brochures, and represents the latest production model.

3.5 Identical items. All unions of the same classification, furnished under any specific contract, shall be physically and mechanically identical. This requirement includes parts, assemblies, components, and accessories.

3.6 Design. The design of the unions shall be in accordance with the manufacturer's standard product and Class 2 unions shall be in compliance with paragraphs 8 and 10 of MSS SP-83.

3.7 Size. The size of the union shall be the nominal pipe size of the pipe with which it is intended for use. The size required shall be as specified (see 6.2), in accordance with the following nominal pipe size range for each class of union:

Class 1 – 0.125 through 3 inches.

Class 2 – 0.125 through 3 inches.

Class 3 – 0.250 through 2 inches.

3.8 Union joint. Unions shall be furnished with either a ball-to-ball or ball-to-cone joint.

3.8.1 Seats. Union joint seats shall be integral or inserted.

3.8.1.1 Integral seats. Integral seats shall be machined directly in the parent metal of the union end pieces.

3.8.1.2 Inserted seats. Inserted seats may be either single or double. Single-insert seats shall consist of a seat ring secured to the union thread-piece and machined to the contour of the female seat to form a bearing surface for the male joint surface of the nut-piece. Double-insert seats shall consist of separate seat rings secured to each end piece. Insert seat rings shall be secured to the applicable end piece in such a manner as to become an integral part of the union.

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3.8.1.2.1 Insert material. Insert seats, when used, shall be any of the listed materials for the union pressure specified (see 6.2):

- 2,000 lb/in<sup>2</sup> - Bronze or stainless steel.
- 3,000 lb/in<sup>2</sup> - Bronze, molybdenum steel or stainless steel.
- 6,000 lb/in<sup>2</sup> - Stainless steel.

3.8.2 Contact surfaces. The surfaces of all unions subjected to contact pressure in tightening shall be grounded or machined to ensure proper and leakproof seating.

3.9 Pressure. The unions shall be capable of withstanding a hydrostatic test pressure equal to 1.5 times the specified (see 6.2) rating pressure without impairing the serviceability of the union.

3.10 Union coupling nut.

3.10.1 Union coupling nut threads. Union coupling nut threads shall be the manufacturer's commercial standard except, if specified (see 6.2), 3,000 lb/in<sup>2</sup> rated unions shall have modified ACME threads (see 6.4).

3.10.2 Coupling nut. The union coupling nut shall have parallel-sided polygon flats except the 3,000 lb/in<sup>2</sup> unions with modified ACME threads may have hammer (handle bar) style coupling nuts. When the union is closed, not less than four full threads shall be engaged by the nut.

3.10.3 Tensile breaking strength. The tensile breaking strengths of the unions shall be not less than those listed in table I.

TABLE I. Minimum tensile strength of unions.

Size (inches)	Minimum ultimate breaking loads (pounds)				
	Style A			Style B	
	Class 1	Class 2	Class 3	Class 1	Class 2
0.125	4,000	6,000	-	2,400	3,600
0.25	6,000	8,500	12,000	3,400	5,200
0.375	8,000	11,500	16,000	4,900	7,900
0.5	10,000	14,000	20,000	6,700	10,500
0.75	14,000	20,000	28,000	9,500	15,000
1	18,000	26,000	36,000	13,000	21,500
1.25	23,000	33,500	46,000	19,000	31,800
1.5	28,000	41,500	56,000	23,000	39,400
2	40,000	50,000	80,000	32,500	55,000
2.5	55,000	75,000	-	48,500	75,000
3	75,000	80,000	-	68,000	80,000

3.11 Ends.

3.11.1 Pipe connection. Threads for the end connections shall be in accordance with ASME/ANSI B1.20.1, NPT designation. Wall thickness shall be in accordance with the dimensional requirements of ASME/ANSI B36.10M for the pipe identification required (see table II).

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TABLE II. Pipe identification corresponding to union class for determination of wall thickness.

Union Class Pipe Identification	
Class 1 Standard	STD (schedule No. 40)
Class 2 Extra strong	XS (Schedule No. 80)
Class 3 Double extra strong	XXS (No schedule Number)

3.11.2 Female threaded ends. The female threaded ends shall have a wall thickness of metal (between the thread root of the female pipe thread and either the cylindrical surface described by the outside diameter or the minimum dimension across the flats of the outer surface) not less than 87.5 percent of the nominal wall thickness for the pipe identification on which the union will be used (see table II).

3.11.3 Male threaded ends. The wall thickness on male threaded ends, before the threads are cut, shall be not less than the nominal wall thickness of pipe corresponding to the class of the union as listed in table II.

3.11.4 Wrench purchase. Each union end-piece shall be provided with an external wrench grip surface of sufficient length to permit adequate wrench purchase. The wrench grip shall either be a parallel-sided polygon or round with lugs.

3.12 Inside diameter. The inside diameter (bore) of the union shall be no smaller than the ID of ASME/ANSI B36.10M welded and seamless steel pipe for the pipe identification, which corresponds to the required union class.

3.13 Surface finish. Unions shall be uncoated unless coated as specified (see 6.2).

3.13.1 Uncoated. Coupling threads may be plated for the purpose of thread lubrication. Inorganic chemical surface treatments, such as rust inhibitors, will not disqualify uncoated unions as such.

3.13.2 Coated. Coated unions shall have zinc coating. The hot-dip process, in accordance with ASTM A153/A153M, shall apply the zinc coating before machining the threads or by the electroplating process either before or after machining.

3.14 Marking. The unions shall be stamped or otherwise permanently marked as specified in MSS SP-25.

3.15 Workmanship. The quality of workmanship shall be such as to produce material that is in accordance with the requirements of this specification. Unions shall be free from blemishes, burrs, forging cracks, and all other visible defects.

#### 4. VERIFICATION

4.1 Requirements cross-reference matrix. Table III provides a cross-reference matrix of section 3 requirements tested or verified in the paragraphs below.

TABLE III. Requirements cross-reference matrix.

Requirement	Verification	Requirement	Verification
3.1	4.2.2	3.9	4.3.2
3.2	4.2.2	3.10.1	4.2.2
3.3	4.2.2	3.10.2	4.2.2
3.3.1	4.2.2	3.10.3	4.3.3

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TABLE III. Requirements cross-reference matrix - Continued.

Requirement	Verification	Requirement	Verification
3.4	4.2.2	3.11.1	4.2.2
3.5	4.2.2	3.11.2	4.2.2
3.6	4.2.2	3.11.3	4.2.2
3.7	4.2.2	3.11.4	4.2.2
3.8	4.2.2	3.12	4.2.2
3.8.1	4.2.2	3.13	4.2.2
3.8.1.1	4.2.2	3.13.1	4.2.2
3.8.1.2	4.2.2	3.13.2	4.2.2
3.8.1.2.1	4.2.2	3.14	4.2.2
3.8.2	4.2.2	3.15	4.2.2

4.2 Classification of inspections. The inspection requirements specified herein are classified as conformance inspection (see 4.2.1).

4.2.1 Conformance inspection. Conformance inspection shall be performed on the unions selected in accordance with 4.2.1.1.1. This inspection shall include the visual and dimensional inspection of 4.2.2, and the tests of 4.3. Conformance inspection (see 6.2) shall be performed at a laboratory acceptable to the Government on sample units produced with equipment and procedures normally used in production. Unions supplied under the contract or purchase order shall be manufactured the same way as the sample tested and found satisfactory except for the changes previously approved by the Government.

4.2.1.1 Inspection lot. An inspection lot shall consist of all unions of the same class, style and produced under essentially the same conditions and offered for inspection at one time.

4.2.1.1.1 Sample. Unless otherwise specified (see 6.2) the sample shall consist of that number of randomly selected units of product specified in table IV.

TABLE IV. Inspection sample.

Production lot size	Sample size
1	1
2 to 8	2
9 to 15	3
16 to 25	5
26 to 50	8
51 to 90	13
91 to 150	20
151 to 280	32
281 to 500	50
501 to 1,200	80
1,201 to 3,200	125
3,201 to 10,000	200
10,001 to 35,000	315

4.2.2 Visual and dimensional Inspection. Each union, selected in accordance with 4.2.1.1.1, shall be inspected to verify that the design, construction, physical characteristics, size, class, style, correct inserts, smooth bearing surfaces, finish, marking, and workmanship are in accordance with the requirements denoted in Section 3 of this specification. This element of inspection shall encompass all visual inspections and dimensional measurements including correct threads, within tolerance, and adequate

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wrench surface. No deviation from items being identical as specified in 3.5 will be acceptable without prior written approval of the contracting officer.

4.3 Tests. Each union selected in accordance with 4.2.1.1.1 shall be tested to determine compliance with the requirements of this specification. Tests shall be conducted as specified in 4.3.1 through 4.3.3.

4.3.1 Air pressure test. The unions shall be tested for leaks, under water or light oil, with air at 100 lb/in<sup>2</sup> minimum pressure. Any leaks shall be cause for rejection. No copper or rusting solution, cement or welding will be permitted.

4.3.2 Hydrostatic test. The unions shall be subjected to hydrostatic pressure and fitness for use determined by satisfying all the requirements contained in section 3 and verified in section 4.

4.3.3 Tension test. Unless otherwise specified (see 6.2), the unions shall be subjected to tension load. This test shall be conducted by inserting solid bars corresponding to the outside diameter of the pipe, threaded and screwed into each female threaded end of the union; and by screwing male threaded ends into a suitable tapped block which is arranged for anchorage in the testing machine.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2 and 6.8). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department or Defense Agency automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Unions covered by this specification are suitable for use on systems involving high pressure saturated or superheated steam, hot or cold water, hot or cold non-corrosive oil, gas, air, or other fluids.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2).
- c. Part or Identifying Number (PIN) required (see 6.3 and 6.8).
- d. If insert seats should be used (see 3.8.1.2.1).
- e. If tension test is other than specified (see 4.3.3).
- f. Level of preservation and level of packing required (see 5.1).
- g. Conformance inspection data retention requirements (see 4.2.1).
- h. Sampling plan and tests, if other than as specified (see 4.2.1.1.1).

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6.3 Part or Identifying number (PIN). The PIN to be used for unions acquired to this specification may be created as follows:

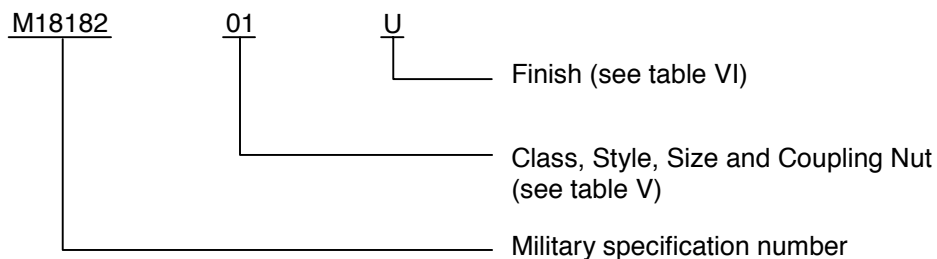


TABLE V. Class, style, size, and coupling nut threads to PIN code number.

Nominal Pipe size (inches)	Class 1		Class 2				Class 3
			Style A		Style B		Style A
	Style A	Style B	UN thread coupling nut	ACME thread coupling nut	UN thread coupling nut	ACME thread coupling nut	
0.125	01	12	23	34	45	56	67
0.25	02	13	24	35	46	57	68
0.375	03	14	25	36	47	58	69
0.5	04	15	26	37	48	59	70
0.75	05	16	27	38	49	60	71
1	06	17	28	39	50	61	72
1.25	07	18	29	40	51	62	73
1.5	08	19	30	41	52	63	74
2	09	20	31	42	53	64	75
2.5	10	21	32	43	54	65	--
3	11	22	33	44	55	66	--

TABLE VI. Surface finish to code letter.

Surface finish	PIN code letter
Uncoated (3.13.1)	U
Coated (3.13.2)	C

The example above is a 2,000 lb/in<sup>2</sup>, 0.125 inch union which has female threads on both ends and is uncoated.

6.4 Modified ACME coupling nut threads. Modified ACME threads are used on application where a quick make and break joint is desired (see 3.10.1).

6.5 Contract data requirements. When this specification is used in a procurement which incorporates a DD Form 1423 and invokes the provisions of Data Requirements of the DoD Federal Acquisition Regulation (FAR) paragraph 252.227-7031, the data requirements should be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the Contract Data



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Requirements List (DD Form 1423) incorporated into the contract. When the provisions of FAR 252.227-7031 are not invoked, the data should be delivered in accordance with the contract requirements.

6.6 Subject term (key word) listing.

adaptable  
coupling  
ends  
joint  
seat

6.7 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue, due to the extent of the changes.

6.8 Packaging. Because of the risk of damage to threads and closely controlled dimensions, MIL-V-3 and National Motor Freight Classification rules were used in the past to specify requirements for the preservation, packing, unitization, and marking of forged steel pipe unions for storage and domestic and overseas shipments. The contract or order should levy the requirement for packaging and preservation to protect against damage to parts manufactured and supplied to this specification.

6.9 Marking. In the past, MIL-STD-129 was used for marking of packages and containers and should be specified in the contract if storage and shipment within the military distribution system is anticipated.

CONCLUDING MATERIAL

Custodians:

Army – AT  
Navy – AS  
Air Force – 99  
DLA – CC

Preparing Activity:

DLA – CC

(Project 4730-2185)

Review activities:

Army – CE  
Navy – MC, SA  
Air Force – 71

## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

### INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

<b>I RECOMMEND A CHANGE:</b>	<b>1. DOCUMENT NUMBER</b> <b>MIL-DTL-18182F</b>	<b>2. DOCUMENT DATE (YYMMDD)</b> 021204
<b>3. DOCUMENT TITLE</b> <b>UNION, PIPE, FORGED STEEL, THREADED, WATER-OIL-GAS (2,000, 3,000, and 6,000 LB/IN<sup>2</sup>)</b>		
<b>4. NATURE OF CHANGE</b> <i>(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)</i>		
<b>5. REASON FOR RECOMMENDATION</b>		
<b>6. SUBMITTER</b>		
<b>a. NAME</b> <i>(Last, First, Middle Initial)</i>		<b>b. ORGANIZATION</b>
<b>c. ADDRESS</b> <i>(Include zip code)</i>	<b>d. TELEPHONE</b> <i>(Include Area Code)</i> (1) Commercial (2) DSN <i>(if applicable)</i>	<b>7. DATE SUBMITTED</b> (YYMMDD)
<b>8. PREPARING ACTIVITY</b>		
<b>a. NAME</b> Defense Logistics Agency Defense Supply Center, Columbus (DSCC-VAI)		<b>b. TELEPHONE</b> <i>(Include Area Code)</i> (1) Commercial (614) 692-0538 (2) DSN 850-0538
<b>c. ADDRESS</b> <i>(Include Zip Code)</i> P.O. Box 3990 Columbus, Ohio 43216-5000		<b>IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:</b> Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, Virginia 22060-6621 Telephone (703) 767-6888 DSN 427-6888