

INCH-POUND

MIL-H-8788C  
 14 July 1989  
 SUPERSEDING  
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## MILITARY SPECIFICATION

## HOSE, HYDRAULIC, HIGH PRESSURE

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

## 1. SCOPE

1.1 Scope. This specification covers one type of hose for use in high-pressure hydraulic systems.

1.2 Sizes. Hoses are of any length (see 6.2) and of the following inside diameters (IDs).

Size code	ID (inch)	Size code	ID (inch)
04	0.218	10	0.562
05	0.281	12	0.687
06	0.343	16	0.875
08	0.437		

1.3 Specification part number. The specification part number is definitive and formatted to identify each item covered by this specification (see 3.9 and 6.2). The specification part number is formatted by selecting from the requirement options available in this specification and as shown below.

Definitive specification part number

M8788-XX-XX X

Specification number \_\_\_\_\_

Hose size code (see 1.2) \_\_\_\_\_

Length in whole inches (see 3.7.2 &amp; 6.2) \_\_\_\_\_

Length in 0.188 inch increments (see 3.7.2) \_\_\_\_\_

Example: M8788-04-104, .218 ID hose, 10.5 in. in length. For bulk hose the reference number: B8788-04, a bulk length of .218 ID hose.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Engineering Division, San Antonio ALC/MMDEDM, Kelly AFB TX 78241-5000 by using the self addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 4720

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## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specification and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

## SPECIFICATIONS

## Federal

NN-P-530	Plywood, Flat Panel
PPP-B-601	Boxes, Wood, Cleated-Plywood
PPP-B-636	Box, Shipping, Fiberboard
PPP-B-1055	Barrier Material, Waterproof, Flexible
PPP-T-60	Tape, Packaging, Waterproof

## Military

DOD-D-1000	Drawings, Engineering and Associated List.
MIL-C-5501	Caps and Plugs, Protective Dust and Moisture Seal
MIL-F-8789	Fitting End, Attachable Hydraulic, High Pressure Hose
MIL-H-5606	Hydraulic Fluid, Petroleum Base, Aircraft, Missile, and Ordnance
MIL-H-8790	Hose Assemblies, Rubber, Hydraulic, High Pressure (3,000 psi)
MIL-L-6082	Lubricating Oil, Aircraft Reciprocating Engine (Piston)
MIL-L-10547	Liners, Case and Sheet, Overwrap; Water-vaporproof or Waterproof, Flexible

## STANDARDS

## Federal

FED-STD-595	Colors
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## Military

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-147	Palletized Unit Loads
MIL-STD-889	Dissimilar Metals
MIL-STD-970	Standards and Specifications, Order of Precedence for the Selection of
MIL-STD-1523	Age Controls of Age-Sensitive Elastomeric Material
MIL-STD-2073-1A	DoD Material Procedures for Development and Application of Packaging Requirements

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(Copies of specifications and standards required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Non-Government publications. The following documents form a part of this specification 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 cited in the solicitation (see 6.2).

## AMERICAN SOCIETY FOR TESTING AND MATERIAL (ASTM)

ASTM D-3951      Packaging, Commercial

(Application for copies should be addressed to the American Society for Testing and Material, 1916 Race Street, Philadelphia, PA 19103.)

## SOCIETY OF AUTOMOTIVE ENGINEERS, INC (SAE)

ARP-603              Impulse Testing of Hydraulic Hose, Tubing, and Fitting Assemblies

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

## 3. REQUIREMENTS

3.1 Qualification. Hose furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable Qualified Products List (QPL) at the time set for opening of bids (see 4.4 and 6.3).

3.2 Selection of specifications and standards. Selection of specifications and standards for material, parts, and Government certification and approval of processes and equipment which are not specifically designated herein and which are necessary for the execution of this specification, shall be selected in accordance with MIL-STD-970.

3.3 Materials. Materials shall be as specified herein. However, when a definitive material has not been specified, a material shall be chosen of the quality used for the purpose in standard commercial practice. Materials shall be free from all defects and imperfections that might otherwise affect the serviceability of the finished product.

3.3.1 Metals. Metals selected for construction of the reinforcement shall be corrosion resistant or treated to resist corrosion caused by exposure to hydraulic fluids, fuels, salt spray, or atmospheric and environmental conditions as may be encountered in storage or normal service.

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3.3.2 Dissimilar metals. Dissimilar metals as defined by MIL-STD-889 shall not be used in intimate contact with each other unless protected against electrolytic corrosion.

3.3.3 Recycled, reclaimed, and virgin materials. Recycled or reclaimed material may be used in lieu of virgin material provided that all the requirements of this specification are met and the material does not jeopardize the quality or life of the finished product.

3.4 Design and construction. The design and construction of the hose shall be such that when assembled with end fittings, the resulting assemblies shall conform to the requirements of MIL-H-8790. The construction of the hose shall meet all the requirements of this specification and retain the specified end fittings without slipping or leaking when tested as specified herein.

3.4.1 Components. The hose shall consist of a seamless compounded inner tube, reinforcement, and cover.

3.4.1.1 Inner tube. The inner tube shall consist of an oil resistant compound of seamless construction, smooth bore, and uniform gage.

3.4.1.2 Reinforcement. The reinforcement shall consist of wire braids as specified in figure 1, braided uniformly in such a manner as to meet the other requirements of this specification.

3.4.1.3 Cover. The cover shall consist of an abrasion and oil-resistant chloroprene polymer suitably compounded to meet the requirements of this specification. A suitable friction ply or braid may be used over the reinforcement.

3.4.2 Concentricity. The wire reinforcement shall be concentric with the inside bore of the hose within  $\emptyset.030$  inch Full Indicator Movement (FIM) for size 8 and smaller. Sizes larger than the size 8 shall be within  $\emptyset.035$  inch FIM. The outer surface shall be concentric with the inside bore to within  $\emptyset.035$  inch FIM on sizes 6 and smaller,  $\emptyset.040$  inch FIM on sizes 8 and 10, and  $\emptyset.050$  inch FIM on sizes 12 and 16.

3.5 Hose end fittings. Hose end fittings for tests specified herein shall conform to the requirements of MIL-F-8789.

3.6 Performance.

3.6.1 Hose performance. The hose shall conform to the performance requirements specified in table I and section 4, when subjected to the following tests.

3.6.1.1 Hose proof pressure. The hose shall be capable of withstanding the applicable hydraulic proof pressure shown in table I (see 4.6.2).

3.6.1.2 Elongation and contraction. The hose, when subjected to the operating pressure, shall not change in length more than +1/2 percent or -2 1/2 percent for sizes 4 and 5 or  $\pm 2$  percent for size 6 and larger (see 4.6.3).

3.6.1.3 Hose burst pressure. The hose in unaged condition shall not burst when subjected to the applicable burst pressure shown in table I (see 4.6.4).

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TABLE I. Performance characteristics.

Hose Size Code	Maximum Operating Pressure (psi)	Proof Pressure (min) (psi)	Burst Pressure (min psi) (Rm temp)	Impulse (operating) pressure (psi)	Bend radius inside in (min)	Test Assy length in inches per MIL-H-8790
04	5,000	8,000	16,000	3,000	3.000	16.0
05	4,000	7,000	14,000	3,000	3.375	18.0
06	4,000	7,000	14,000	3,000	5.000	21.0
08	3,500	7,000	14,000	3,000	5.750	24.0
10	3,000	6,000	12,000	3,000	6.500	30.0
12	3,000	6,000	12,000	3,000	7.750	33.0
16	3,000	5,000	10,000	3,000	9.625	24.0

3.6.1.4 Diameter reduction. The hose inside diameter shall not decrease to less than 90 percent of the applicable minimum inside diameter specified in figure 1 (see 4.6.5).

3.6.2 Hose assembly performance. The hose, assembled with applicable end fittings shall conform to the performance requirements specified in table I and section 4, when subjected to the following tests.

3.6.2.1 Hose assembly burst pressure. The hose assembly in unaged condition shall be capable of withstanding the applicable burst pressure specified in table I within 24 hours after assembly of the end fittings to the hose (see 4.6.6).

3.6.2.2 Low temperature flexibility. The hose assemblies shall be capable of withstanding the applicable proof pressure specified in table I when subjected to the applicable low temperature flexibility test (see 4.6.7).

3.6.2.3 Hydraulic fluid impulse. Hose assemblies of the length specified in table I shall conform to the impulse cycle tests specified in table II (see 4.6.8).

3.6.2.4 Leakage. Hose assemblies shall conform to the leakage test requirements after being subjected to the required pressures (see 4.6.9).

3.6.2.5 Coupling. Hose assemblies subjected to impulse testing shall be tested for bulging of the inner tube and conform to this requirement (see 4.6.10).

### 3.7 Dimensions.

3.7.1 Hose diameter. The inside and outside diameters of the hose and the outside diameter of the reinforcing braids shall be as specified in figure 1.

3.7.2 Hose lengths. Unless otherwise specified (see 6.2), bulk hose shall be furnished in lengths greater than 20 feet, except that on such orders, up to 10 percent may be furnished in random lengths from 10 to 20 feet, and an additional 10 percent may be furnished in random length from 3 to 10 feet. When hose is ordered in specified lengths, a tolerance of  $\pm 1$  percent of the length shall be allowed.

3.8 Age. Hose shall meet the age requirements as specified in MIL-STD-1523 (see 6.4).

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3.9 Identification of product. The hose, after qualification, shall be marked in yellow, color 13538, FED-STD-595, specification part number (see 1.3), year and quarter of cure date (example: 921 is year 1992, 1st quarter), CAGE Code or name of manufacturer. This marking shall be repeated every twelve inches or less along the entire length of the hose.

3.10 Interchangeability. All parts having the same manufactures part or identification number shall be functionally and dimensionally interchangeable. Any changes in these parts shall be governed by changes requiring new part or identification numbers as provided for in DOD-D-1000.

3.11 Anti-counterfeiting protection. When it has been determined that the item is susceptible to be counterfeited by either alteration, duplication, or simulation, the product shall be protected in such a manner as to allow it to be traced to the true manufacturer and authenticated as their product. The manner of this protection shall be proprietary to the true manufacturer and released only to the final procuring activities quality assurance department by secure means.

3.12 Workmanship. The hose shall be of the quality necessary to produce a product that is uniform in size, having no broken or spliced reinforcing wires, nor shall any reinforcing wires be omitted in any length of hose, be free from cracks, cuts, and other material defects. The hose shall be cleaned, free of dirt, foreign materials, or mandrel lubricants as is consistent with commercial manufacturing practice. Surface irregularities such as mold marks, or laps shall not be cause for rejection.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. 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.

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

- a. Qualification inspection (see 4.4).

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b. Quality conformance inspection (see 4.5).

4.3 Inspection conditions. Where hose assemblies are required for performance testing, the hose shall be assembled with the end fittings specified in 3.5 and selected from those listed on the applicable QPL. Test assemblies may be equipped with different approved fittings on each end in order to reduce the number of test samples. For qualification tests only, all approved end fittings shall be used. All other inspections conditions shall be as specified.

4.3.1 Preparation of samples.

4.3.1.1 Oil aging. MIL-H-5606 oil shall be used to oil age test samples that require oil aging, the fluid and hose samples shall be put into a nonpressurized, closed type container or a reflux type condenser to prevent distillation of the volatile matter in the fluid. A batch of fluid shall not be used for more than 10 aging tests. In each case, the volume of oil used shall be sufficient to completely cover the hose. The hose shall be immersed in hydraulic oil for seven (7) days at a temperature of  $158 \pm 2^\circ$  F. All air must be excluded from the bore of the tube during this aging test.

4.3.1.2 Air aging. Air aged samples shall be kept in air at a temperature of  $158 \pm 2^\circ$  F for seven (7) days.

4.4 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the Government qualifying activity (see 6.3), on sample items produced with equipment and procedures normally used in production. Qualification inspection samples shall be subjected to and pass all of the tests of this specification as described under test methods (see 4.6).

4.4.1 Sample. Qualification test samples shall consist of lengths totaling not less than 50 feet of each size on which qualification is desired. Samples shall be identified as required and forwarded to the activity responsible for qualification designated in the letter of authorization from that activity (see 6.3).

4.4.2 Retention of qualification. To retain qualification, the manufacturer shall forward a report at twelve (12) month intervals to the qualifying activity (see 6.3). Each qualified source shall contact the qualifying activity for the initial reporting date and what the report shall consist of.

4.5 Quality conformance inspections.

4.5.1 Individual inspections. All hose submitted for acceptance shall be subjected to the tests for hose proof pressure as described under test methods of this specification. Hose and components shall be visually inspected during each phase of construction for conformance to the detailed construction requirements and to insure that there are no imperfect spots in the length (that is, blemishes or other imperfections in inner tubes, faulty reinforcing wire, improper braiding in each layer of braids, et cetera). Imperfect sections must be noted, as found, for removal from the length of hose before shipment of the length represented. In addition, this hose shall be subjected to examination of product, as described under test methods (see 4.6).

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4.5.2 Periodic inspections.

4.5.2.1 Sampling condition 1. The number of samples specified herein or by the contracting activity (see 6.2), selected at random from each lot of 5,000 feet or less, of each size, shall be subjected to the following tests as described under test methods (see 4.6).

- a. Examination of product (see 4.6.1).
- b. Hose proof pressure (see 4.6.2).
- c. Hose elongation and contraction (see 4.6.3).
- d. Hose burst pressure (see 4.6.4).
- e. Hose reduction in diameter (see 4.6.5).

4.5.2.2 Sampling condition 2. The number of samples specified herein or by the contracting activity (see 6.2), selected at random from each lot of 10,000 feet or less, of each size, shall be subjected to the following tests as described under tests methods (see 4.6).

- a. Examination of product (see 4.6.1).
- b. Hose reduction in diameter (see 4.6.5).
- c. Hose assembly burst pressure (see 4.6.6).
- d. Hose assembly low temperature flexing (see 4.6.7).
- e. Hose assembly hydraulic fluid impulse (see 4.6.8).
- f. Hose assembly leakage (see 4.6.9).
- g. Hose coupling (see 4.6.10).

4.5.3 Noncompliance. If a sample fails to pass the inspection, the manufacturer shall notify the qualifying activity and the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on all units of the product which can be corrected and which were manufactured with essentially the same materials and processes, and which are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the qualifying activity has been taken. After corrective action has been taken the inspections shall be repeated on additional sample units (all tests and examinations, or the test which the original sample failed, at the option of the qualifying activity). Complete inspections may be reinstated; however, final acceptance and shipment shall be withheld until the inspections have shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure shall be furnished to the cognizant inspection activity and the qualifying activity.

4.5.3.1 Disposition of sample. Samples which have been subjected to the qualification inspection shall not be delivered to the Government on contract or purchase



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order unless a specific exception has been granted by the cognizant procuring activity.

#### 4.6 Test methods and inspections.

4.6.1 Examination of product. Hose shall be carefully examined to determine conformance with this specification with respect to materials, marking, and workmanship.

4.6.2 Hose proof pressure. Each sample length of hose shall be subjected to the applicable hydraulic proof pressure of table I. The test may be made with water or MIL-H-5606 hydraulic fluid. Pressure shall be held not less than 30 seconds and not more than five (5) minutes. Each length of hose shall withstand the hydraulic proof pressure given in table I without indication of imperfections or leakage. All hose shall be thoroughly blown out after testing. Any failure of a test sample constitutes a failure of the entire lot.

4.6.3 Elongation and contraction. Two (2) hose samples when subjected to 3,000 pounds per square inch (psi) hydraulic operating pressure shall not change in length more than the following amounts: Sizes 4 and 5, +1/2 or -2 1/2 percent; size 6 and larger,  $\pm 2$  percent. These samples may be used for the burst test. Any failure of a test sample constitutes a failure of the entire lot.

4.6.4 Hose burst pressure. Two (2) hose samples in unaged condition, 18 inches in length, and not cut from the same sample length of hose, shall be subjected to the applicable burst pressure of table I. The test fluid shall be water or MIL-H-5606 hydraulic fluid. The rate of pressure rise shall be 25,000  $\pm 0/-10,000$  psi, per minute until the burst pressure is reached. Premature failure of a sample hose within the specified burst pressure constitutes a failure of the entire lot.

4.6.5 Diameter reduction. Two (2) 6-inch samples shall be oil aged and measured at each end at least .500 inch inside the hose from the end. The ID of the hose shall not decrease to less than 90 percent of the applicable minimum ID specified in figure 1. Failure of this inspection condition constitutes a failure of the entire lot.

4.6.6 Hose assembly burst pressure. Two (2) unaged assemblies of the length specified in table I, not cut from the same sample length of hose, shall be subjected to the applicable burst pressure of table I within 24 hours after assembly of the end fittings to the hose. The test fluid shall be water or MIL-H-5606 hydraulic fluid. The rate of pressure rise shall be 25,000  $\pm 0/-10,000$  psi, per minute until the burst pressure is reached. During this test the hose assembly shall be fastened at one end to the pressure source, the hose shall be extended straight, and the free end shall not be restrained in any way. The hose shall not burst, the end fittings shall not blow off nor loosen, and there shall be no leakage from the hose or end fitting below the burst pressure specified. Premature failure of these test conditions constitutes a failure of the entire lot. The actual pressure at which the samples burst or pressure and other failure mode shall be recorded.

4.6.7 Low temperature flexibility. Two (2) hose assemblies of the length specified in table I shall be used for this test. One (1) length shall be unaged and the other shall be oil aged. Both assemblies shall be filled with MIL-H-5606 hydraulic

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oil and then placed in a cold chamber, the temperature of which can be controlled to  $-65 \pm 2^\circ\text{F}$  for a period of 24 hours. After the required period of time and while still at the specified temperature, the samples shall each be flexed through  $180^\circ$  degrees to the bend radius specified in table I at each extreme of travel, for one cycle, the rate of cycling being one cycle in four (4) seconds. A typical setup for this test is indicated in figure 2. The hose shall be proof tested after removal from the cold chamber and upon completion of the flex test. Any leakage through the hose shall constitute a failure of the hose and the entire lot. Size 16 hose may be tested at  $-40^\circ\text{F}$  in lieu of  $-65^\circ\text{F}$ .

4.6.8 Hydraulic fluid impulse. Four (4) hose assemblies of the lengths specified in table I shall be subjected to the impulse test outlined herein. Two samples shall be air aged, the other two (2) shall be oil aged. All assemblies shall be subjected to the applicable proof pressure test both before and after aging and prior to the impulse. These assemblies shall be connected to manifolds installed in a testing machine which will produce dynamic pressure impulses in the inlet manifold of the magnitudes, frequency, and number of cycles per ARP-603 and in table II. Electronic measuring devices shall be used to measure and indicate the impulse pressures. Size 16 hose only shall be tested without surge peaks and in a straight position; one end may be free. The test fluid shall conform to MIL-H-5606 except that up to 25 percent of oil conforming to MIL-L-6082 may be added to the test fluid and shall be held at a temperature of  $120 \pm 20^\circ\text{F}$  measured at the manifold. Leakage, bursting, or fitting blowoff shall constitute failure of the entire lot.

TABLE II. Impulse cycles.

Size Code	Minimum impulse cycles	Minimum average impulse cycles <sub>1</sub>	Maximum impulse cycles <sub>2</sub> that can be used to compute average
04	100,000	-	-
05	100,000	-	-
06	100,000	-	-
08	75,000	100,000	150,000
10	50,000	75,000	100,000
12	35,000	50,000	70,000
16	45,000	55,000	75,000

1 - Average of four test assemblies

2 - When test assemblies impulse cycles are averaged, the maximum cycles that can be used to compute the average shall not exceed the figure given in this column.

4.6.9 Leakage. Two (2) unaged hose assemblies shall be used for this test. Using MIL-H-5606 hydraulic oil, the hose assemblies shall be subjected to 70 percent of the minimum burst value shown in table I and held for a period of five (5) minutes, reduced to 0 pressure, and again raised to 70 percent of the minimum burst pressure for a second five (5) minute period. The outer cover adjacent to the fitting shall be carefully checked during this period for any leakage of the test fluid. Any leakage from the end fitting shall constitute failure of the test. For qualification tests, the assembly length shall conform to table I. For sampling tests, the length shall be a minimum of 12 inches.

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4.6.10 Coupling. Hose assemblies used for the impulse testing shall be checked for bulging of the inner tube. The measurement shall be taken on aged assemblies with a ball-end type gage. The diameter of the ball shall be  $0.001 +0/-0.001$  inch under minimum bulge diameter specified in figure 1. The weight of each gage in ounces shall equal the dash number of the size hose for which designed. In making the measurement, the gage shall be placed inside the end of the hose assembly at the bulge gage inspection point shown in figure 1 without lubrication and without pushing or forcing it through. The gage shall fall through the section at the end of the fitting insert in the hose under its own weight. Failure of any sample shall constitute failure of the entire lot.

4.7 Inspection of packaging. Except when industrial packaging is specified, the sampling and inspection of the preservation and interior package marking shall be in accordance with groups A and B quality conformance inspection requirements of MIL-P-2073-1A or ASTM D-3951 as applicable. The sampling and inspection of the packing and marking for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification shown in section 5 and the marking requirements of MIL-STD-129. The inspection of industrial packaging shall be as specified in the contract (see 6.2).

## 5. PACKAGING

5.1 Preservation and packaging. Preservation and packaging shall be level A or Commercial as specified (see 6.2). Hose with or without fittings shall be sealed with caps or plugs conforming to MIL-C-5501.

5.1.1 Level A.

5.1.1.1 Cleaning. Hose shall be cleaned as specified in 3.12.

5.1.1.2 Lengths up to 12 feet. All hose in 12 foot lengths or shorter shall be packaged in straight lengths. Straight lengths of hose identical in size and length shall be taped together to form a bundle using two (2) turns of tape at least  $0.750$  inch wide conforming to PPP-T-60. The tape shall be applied to the bundle at both ends of hose three (3) feet long or shorter. For hose over three (3) feet in length the following minimum number of ties shall be used:

<u>Length of hose in feet</u>	<u>Number of ties</u>
Over 3, up to and including 5	3
Over 5, up to and including 8	4
Over 8, up to and including 12	5

5.1.1.3 Lengths over 12 feet. Hose over 12 feet in length may be coiled provided the inside diameter of the coil is not less than three (3) times the bending radii shown in table I. The coiled hose shall be taped in a minimum of three (3) places using two turns of tape at least  $0.750$  inch wide conforming to PPP-T-60.

5.1.2 Commercial. Hose with or without fittings shall be cleaned (see 3.12) and sealed with caps or plugs to prevent the entrance of foreign matter and packaged in a manner to prevent deterioration and physical damage during shipment from the supply source to the first receiving activity. This level shall be preserved and

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packaged in accordance with ASTM D-3951 or conform to the suppliers normal commercial practice provided the latter meets the requirements of this level.

5.2 Packing. Packing shall be level A, B, C, or Commercial as specified (see 6.2).

5.2.1 Level A. Hose packaged as specified in 5.1.1 or 5.1.2 shall be packed in overseas exterior type containers conforming to PPP-B-601. Plywood, when used shall conform to NN-P-530, groups C-D, exterior type. The gross weight shall not exceed the weight limitations of the applicable container specification. Containers conforming to PPP-B-601 shall be provided with a case liner made of material conforming to PPP-B-1055, fabricated and sealed in accordance with MIL-L-10547. Closure and strapping shall be in accordance with the appendix of the applicable container specification.

5.2.2 Level B. Hose packaged as specified in 5.1.1 and 5.1.2 shall be packed in domestic exterior type containers conforming to PPP-B-601 or class weather resistant containers conforming to PPP-B-636. The gross weight shall not exceed the weight limitations of the applicable container specification. Closure and strapping shall be in accordance with the appendix of the applicable container specification.

5.2.3 Level C. The packaged hose shall conform to the requirements of MIL-STD-2073-1A for this level.

5.2.4 Commercial. Packing that will afford adequate protection against damage during direct shipment at the lowest rate from the supply source to the first receiving activity for immediate use, shall be packed in accordance with the applicable requirements of ASTM D-3951 or shall conform to carrier rules and regulations and may be the suppliers commercial practice provided the latter meets the requirements of this level.

5.3 Exterior containers. Exterior containers shall be of minimum tare and cube consistent with the protection level required and shall contain equal quantities of identical hose to the greatest extent possible (see 5.2).

5.4 Palletization. When unitized loads, commensurate with the level of packing are specified in the contract or purchase order, they shall be palletized in accordance with MIL-STD-147. Palletized loads shall be uniform in size and quantities to the greatest extent possible. If the container is of a size which does not conform to any of the pallet patterns specified in MIL-STD-147, the pallet pattern used shall first be approved by the contracting officer.

5.5 Marking. In addition to any marking required by the contract or purchase order, each unit pack, interior and exterior containers, and unitized loads shall be marked in accordance with MIL-STD-129 or ASTM D-3951 as applicable, with a minimum of the specification part number, size, cure date, and manufacturer identification.

5.5.1 Anti-counterfeit marking. When an item has been deemed to be susceptible to counterfeiting, each item shall be marked in such a manner as to provide the contracting activity with an authentication and traceability track to the true manufacturer. The method in which this is done shall be proprietary to the true manufacturer and provided to the quality assurance office of the contracting activity by secure means.

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5.6 Packaging inspection. The inspection of these packaging requirements shall be in accordance with 4.7.

## 6. NOTES

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

6.1 Intended use. The bulk hose covered by this specification is intended for use in hydraulic systems, when used in hose assemblies conforming to MIL-H-8790 and Government fabricated hose assemblies at operating pressures not to exceed 3,000 psi.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Specification part number for size required (see 1.3).
- c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1).
- d. Quantity and lengths of hose to be furnished (see 3.7.2).
- e. Number of samples to be furnished (see 4.3, 4.4, & 4.5).
- f. Levels of packing, preservation, packaging, and marking required (see 5).
- g. When palletized loads are required (see 5.4).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List QPL-8788 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the product that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is: The Engineering Division, SA-ALC/MMIFE, Kelly AFB TX 78241 and information pertaining to qualification of products may be obtained from that activity.

6.4 Definition. For purposes of defining various types of defects or terminology which is referred to in this specification, the following definition will apply:

Age - Inasmuch as hose is dated by quarters of the year and year, it is necessary to judge their age in terms of time after the quarter and year of manufacture. Hose manufactured during the first quarter of any year will not become one quarter old until the end of the second quarter of that year.

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6.5 Subject term (key word) listing.

Hydraulic hose  
High pressure  
3000 psi

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

Custodians:

Army - ME  
Navy - AS  
Air Force - 99

Review activity:

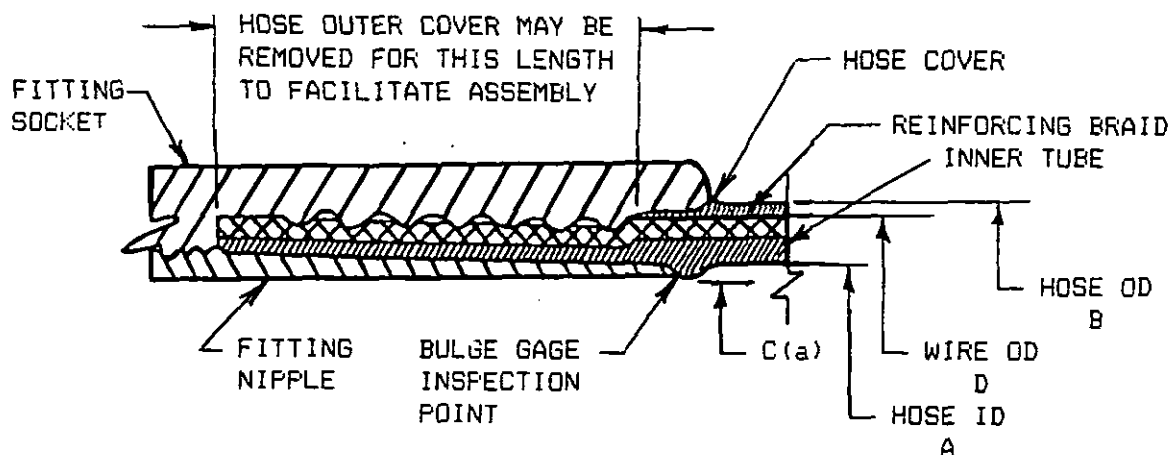
Army - AV, MI  
DLA - CS

Preparing activity:  
Air Force - 82

Agent activity:  
Air Force - 99

(Project 4720-0753)

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SIZE CODE	NOMINAL OD OF RIGID TUBE (Ref)	HOSE ID A	HOSE OD B	DIA MIN (a) C	REINFORCING WIRE OD D	NO. OF WIRE BRAIDS
-04	0.250	0.219+0.031 -0.007	0.625+0.031	0.146	0.484+0.016	2
-05	0.313	0.291+0.025 -0.007	0.703+0.031	0.177	0.547+0.016	2
-06	0.375	0.344+0.025 -0.007	0.766+0.031	0.271	0.640+0.023	2
-08	0.500	0.436+0.025 -0.007	0.859+0.031	0.365	0.734+0.023	2
-10	0.625	0.563+0.025 -0.007	1.013+0.031	0.455	0.859+0.031	2
-12	0.750	0.688+0.031 -0.010	1.219+0.031	0.563	1.047+0.031	2
-16	1.000	0.875+0.031 -0.010	1.500+0.047 -0.031	0.778	1.328+0.031	3

(a) C Diameter minimum, indicates both the minimum permissible bulge diameter of the inner tube and the minimum nipple ID of the fitting, when the fitting is assembled with the hose. When elbow fittings are used, the minimum ID through the elbow bend area may be .031 inch less than the values shown.

FIGURE 1. Hose details.

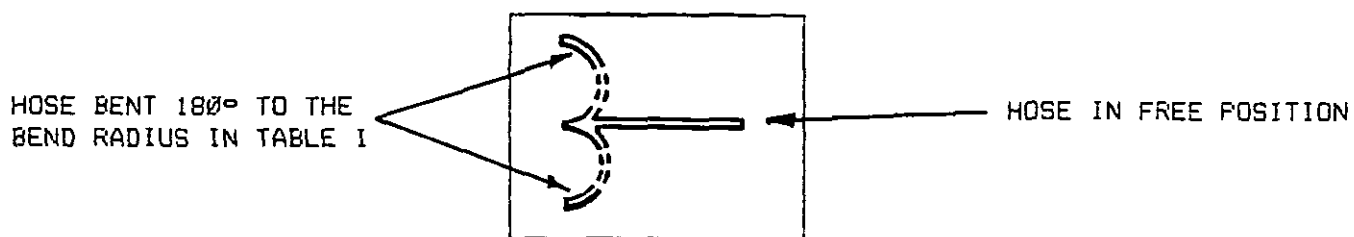


FIGURE 2. Cold bend test setup.