

MIL-P-20691C  
16 March 1987  
SUPERSEDING  
MIL-P-20691B  
December 1978

## MILITARY SPECIFICATION

### PLUG, EXPANSION

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

#### 1. SCOPE

1.1 Scope. This specification covers the requirements and inspections for one type of expansion plug specified herein as "plug".

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents.

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

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Tank-Automotive Command, ATTN: AMSTA-GDS, Warren, MI 48397-5000, 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 5340

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SPECIFICATIONS  
FEDERAL

- |           |                              |
|-----------|------------------------------|
| PPP-B-566 | - Box, Folding, Paperboard.  |
| PPP-B-636 | - Box, Shipping, Fiberboard. |
| PPP-B-676 | - Box, Setup.                |

## MILITARY

- |           |                                       |
|-----------|---------------------------------------|
| MIL-P-116 | - Preservation-Packaging, Methods of. |
|-----------|---------------------------------------|

STANDARDS  
MILITARY

- |               |  |
|---------------|--|
| MIL-STD-105   | - Sampling Procedures and Tables for Inspection by Attributes. |
| MIL-STD-129   | - Marking for Shipment and Storage.                            |
| MIL-STD-45662 | - Calibration Systems Requirements.                            |
| MS35648       | - Plug, Expansion: Plain.                                      |

(Copies of specifications, standards, handbooks, drawings, publications, and other Government documents required by the contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- |          |   |
|----------|---|
| ASTM E18 | - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials, Test Method for. |
|----------|---|

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

(Nongovernment standards and other publications are normally available from the organizations which prepare or which 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 specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

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## 3. REQUIREMENTS

3.1 First article. Unless otherwise specified (see 6.2), the contractor shall furnish the first completed plug which shall be subjected to first article inspection (see 4.4 and 6.3). First article inspection samples, properly marked with identifying information shall be representative of the unit to be furnished to the Government. All subsequent plugs delivered to the Government shall conform to these samples in all of their pertinent physical and performance attributes.

3.2 Materials. Materials shall be as specified in MS35648 (see 4.8.1).

3.2.1 Hardness. Hardness shall be as specified in MS35648 (see 4.8.1 and 4.8.3).

3.3 Design and construction. Plugs shall meet the design and construction requirements of MS35648 (see 4.8.1 and 4.8.2).

3.4 Marking. Marking shall be in accordance with MS35648 (see 4.8.1 and 4.8.2).

3.5 Workmanship. Plugs shall be free of dirt, oil, or other foreign material, except as required for preservation (see 5.1). Workmanship shall be of a quality which shall assure a product free of burrs, rust, loose scale, splits, cracks, or other defects which affect serviceability. Plugs shall have a clean, sharp edge on the concave side (see 4.8.2).

## 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order (see 6.2), the contractor is responsible for the performance of all inspection requirements 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 or witness any of the inspections set forth in the specification where such inspections are deemed necessary to assure 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 assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

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4.1.2 Inspection equipment. Unless otherwise specified in the contract (see 6.2), the contractor is responsible for the provision and maintenance of all inspection equipment necessary to assure that supplies and services conform to contract requirements. Inspection equipment must be capable of repetitive measurements to an accuracy of 10 percent of the measurement tolerance. Calibration of inspection equipment shall be in accordance with MIL-STD-45662.

4.2 Classification of inspection:

- a. First article inspection (see 4.4).
- b. Quality conformance inspections (see 4.5).
  1. Examination (see 4.5.2).
  2. Tests (see 4.5.3).
- c. Control test (see 4.6).

4.3 Inspection conditions. Unless otherwise specified (see 6.2), all inspections shall be conducted under the following conditions:

- a. Air temperature  $23 \pm 10^{\circ}\text{C}$
- b. Barometric pressure  $725 \pm 50$  millimeter (mm) mercury (Hg)  
- 75
- c. Relative humidity  $50 \pm 30$  percent

4.4 First article inspection. Unless otherwise specified (see 6.2), the Government shall select sample units produced under the production contract (see 6.2) for first article inspection. First article samples shall be inspected as specified in table I. Approval of the first article sample by the Government shall not relieve the contractor of his obligation to supply plugs that are fully representative of those inspected as a first article sample. Any changes or deviation of the production units from the first article sample shall be subject to the approval of the contracting officer.

TABLE I. Classification of inspections.

Title	Requirement	Inspection	First article	Quality conformance		Control
				Examination	Tests	
Materials and construction	3.2 thru 3.4	4.8.1	X			
Defects (see table II)	3.3, 3.4 and 3.5	4.8.2	X	X		X
Hardness	3.2.1	4.8.3	X		X	X

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4.4.1 First article inspection failure. Test item deficiencies during, or as a result of, the first article test shall be cause for rejection of the items until evidence has been provided by the contractor that corrective action has been taken to eliminate the deficiency. Any deficiency found during, or as a result of, the first article test shall be evidence that all items already produced prior to completion of the first article test are similarly deficient unless contrary evidence satisfactory to the contracting officer is furnished by the contractor. Such deficiencies on all items shall be corrected by the contractor. The Government shall not accept products until first article testing is completed to the satisfaction of the Government.

4.5 Quality conformance inspection.4.5.1 Sampling.

4.5.1.1 Lot formation. An inspection lot shall consist of all the plugs of one type and part number, from an identifiable production period, from one manufacturer, made from the same "heat" of steel and submitted at one time for acceptance.

4.5.1.2 Sampling for examination. Samples for quality conformance examination shall be selected in accordance with general inspection level II of MIL-STD-105.

4.5.1.3 Sampling for hardness test. Samples for the hardness test shall consist of three plugs per lot, selected at random.

4.5.2 Examination.

4.5.2.1 Acceptable quality level. Each sample selected in accordance with 4.5.1.2 shall be examined to determine conformance to the following acceptable quality levels (AQL).

<u>Classification</u>	<u>AQL</u>
Major	2.5
Minor	6.5

4.5.2.2 Classification of defects. For examination purposes, defects shall be classified as listed in table II.

TABLE II. Classification of defects.

<u>Category</u>	<u>Defect</u>	<u>Method of examination</u>
Critical	None	
<u>Major</u>	<u>AQL 2.5% Defective</u>	
101	Incorrect diameter (see 3.3).	SIE $\frac{1}{1}$
102	Incorrect thickness (see 3.3).	SIE $\frac{1}{1}$
103	Marred or dull edge on concave side (see 3.5).	Visual

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TABLE II. Classification of defects - Continued.

Category	Defect	Method of examination
<u>Minor</u>	<u>AQL 6.5% Defective</u>	
201	Incorrect curvature (sphericity) (see 3.3).	Template
202	Sides parallel (see 3.3).	Square
203	Incorrect angle of edge (see 3.3).	Protractor
204	Coating of dirt, oil or other foreign substance.	Visual
205	Pits, rust, loose scale, scrapes, splits, cracks (see 3.5).	Visual
206	Improper marking (see 3.4).	Visual

1/ SIE = Standard Inspection Equipment.

4.5.3 Test. Samples selected in accordance with 4.5.1.3 shall be subjected to the hardness test specified in table I.

4.6 Control test. One plug per month shall be subjected to the control tests specified in table I.

4.7 Failure. Failure of any plug to pass any of the specified quality conformance or control tests shall be cause for the Government to refuse acceptance of the production quantity represented, until action taken by the contractor to correct defects and prevent recurrence has been approved by the Government.

#### 4.8 Methods of inspection.

4.8.1 Materials and construction. Conformance to 3.2 through 3.4 shall be determined by inspection of contractor records providing proof or certification that design, construction, processing, and materials conform to requirements. Applicable records shall include drawings, specifications, design data, receiving inspection records, processing and quality control standards, vendor catalogs and certifications, industry standards, test reports, and rating data.

4.8.2 Defects. Conformance to 3.3 through 3.5 shall be determined by examination for the defects listed in table II. Examination shall be visual, tactile, or by measurement with standard inspection equipment.

4.8.3 Hardness tests. To determine conformance to 3.2.1, tests for hardness shall be performed in accordance with ASTM E18.

## 5. PACKAGING

### 5.1 For Army use.

5.1.1 Preservation, packaging, packing, and marking. Preservation, packaging, packing, and marking for the desired level shall be in accordance with the applicable packaging standard or packaging data sheet specified by the procuring authority (see 6.2).

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## 5.2 Other activities.

5.2.1 Preservation-packaging. Preservation-packaging shall be level A or commercial, as specified (see 6.2).

5.2.1.1 Level A. Unless otherwise specified (see 6.2), expansion plugs shall be preserved and packaged in accordance with method I of MIL-P-116. The preservative compound shall conform to type P-2. Quantity per unit package shall be as specified by the procuring activity.

5.2.1.1.1 Intermediate packaging. Expansion plugs preserved-packaged as specified in 5.2.1.1 shall be intermediate packaged in containers conforming to PPP-B-566 or PPP-B-676. The weight of intermediate packages shall not exceed 10 pounds.

5.2.1.2 Commercial. Plugs shall be preserved and packaged in a manner which will afford adequate protection against corrosion and physical damage during shipment from the supply source to the first receiving activity.

5.2.2 Packing. Packing shall be level A, B, or commercial, as specified (see 6.2).

5.2.2.1 Level A. Expansion plugs, preserved and packaged as specified in 5.2.1, shall be packed in fiberboard containers conforming to PPP-B-636, class weather resistant. The gross weight of each shipping container shall be limited to the special requirements of PPP-B-636. Container closure, sealing, and strapping shall be in accordance with the appendix to PPP-B-636.

5.2.2.2 Level B. Level B shall be the same as level A, except fiberboard shipping containers shall conform to PPP-B-636, class domestic.

5.2.2.3 Commercial. Expansion plugs, packaged as specified in 5.2.1.2, shall be packed in a manner to ensure adequate protection against damage during shipment and handling. Containers shall conform to the rules and regulations applicable to the mode of transportation.

5.3 Marking. In addition to any special marking (see 6.2) required by the contract or order, unit packages, intermediate packages, and exterior shipping containers shall be marked in accordance with MIL-STD-129.

## 6. NOTES

6.1 Intended use. Expansion plugs procured under this specification are intended for closing core holes in castings and other similar openings.

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number, and date of this specification.
- b. If first article examination is not required (see 3.1).
- c. If responsibility for inspection is other than specified (see 4.1).
- d. If responsibility for inspection equipment is other than specified (see 4.1.2).



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- e. If inspection conditions are other than specified (see 4.3).
- f. Selection of applicable level of preservation, packaging and packing (see 5.1.1, 5.2.1, and 5.2.2).
- g. If special marking is required (see 5.3).

6.3 First article. When a first article is required, it shall be tested and approved under the appropriate provisions of FAR 52.209-4. The contracting officer shall include specific instructions in all acquisition instruments regarding arrangements for examination, tests, and acquisition of the first article (see 3.1).

6.4 Recycled materials. The use of recycled materials which meet the requirements of the applicable material specifications without jeopardizing the intended use of the item shall be encouraged (see 3.2).

6.5 Subject term (key word) listing.

Plug, expansion  
Expansion plug

6.6 Changes from previous issue. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodian:  
Army - AT  
Navy - AS  
AF - 99

Preparing activity:  
Army - AT

(Project 5340-1731)

Review activities:  
DSA - IS  
AF - 82

User activities:  
Army - AV, ME, AR  
Navy - MC



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**NOTE:** This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification 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.

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## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER MIL-P-20691 C		2. DOCUMENT TITLE PLUG, EXPANSION	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one)	
b. ADDRESS (Street, City, State, ZIP Code)		<input type="checkbox"/> VENDOR	
		<input type="checkbox"/> USER	
		<input type="checkbox"/> MANUFACTURER	
		<input type="checkbox"/> OTHER (Specify): _____	
5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		b. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional		8. DATE OF SUBMISSION (YYMMDD)	