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SUPERSEDING
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MILITARY SPECIFICATION

RETAINING COMPOUNDS, SINGLE COMPONENT, ANAEROBIC

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

1. SCOPE

1.1 Scope. This specification covers single-component, retaining compounds for assembling slip-fitted parts with varied clearances (see 6.4 and 6.15). The retaining compounds are for use as alternatives for press and shrink fits (see 6.1).

1.2 Classification. Retaining compounds covered by this specification shall be of the following types as specified (see 6.2 and 6.3):

Type I - Low viscosity (fast curing)
Type II - Medium viscosity (high temperature)
Type III - High viscosity (high strength)

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Director, US Army Materials and Mechanics Research Center, ATTN: DRXMR-SMS, Watertown, MA 02172 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

SPECIFICATIONS

FEDERAL

O-A-548 - Antifreeze/Coolant, Engine: Ethylene Glycol, Inhibited Concentrated.
TT-S-735 - Standard Test Fluids Hydrocarbon
TT-T-548 - Toluene: Technical
PPP-B-566 - Boxes, Folding Paper-board
PPP-B-601 - Boxes, Wood, Cleated - Plywood.
PPP-B-636 - Box, Shipping, Fiberboard
PPP-B-676 - Box, Setup.

MILITARY

MIL-L-2104 - Lubricating Oil, Internal - Combustion Engine, Tactical Service.
MIL-T-5624 - Turbine Fuel, Aviation Grades JP-4 and JP-5.
MIL-S-22473 - Sealing, Locking and Retaining Compounds; Single Component.

STANDARDS

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 - Marking for Shipment and Storage
MIL-STD-810 - Environmental Test Methods.
Method 508.2 - Fungus
MIL-STD-1188 - Commercial Packaging of Supplies and Equipment.

(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 Other publications. The following documents form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable..

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.
D 304 - Normal Butyl Alcohol (Butanol).
D 445 - Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity).
D 1310 - Flash Point of Liquids by Tag Open-Cup Apparatus.

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

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups using Federal Agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Preproduction sample. Before production is commenced and at regular intervals (see 4.3.1 and 4.3.2) a sample of the compound to be furnished shall be submitted for examination and tests. Approval of the preproduction sample by the procuring activity shall not relieve the contractor of his obligation to supply compound and containers that shall conform to the requirements of this specification. Any change or deviation in the formulation or method of manufacture from that of the preproduction sample shall be subject to the approval of the procuring activity.

3.2 Suitability for use with explosives. When applicable (see 6.2) suitability of the retaining compound for use with a particular explosive shall be as specified by the procuring activity. The procuring activity shall specify the Government laboratory to which the sample is to be sent for tests and the method of testing.

3.3 Unpolymerized compound.

3.3.1 Color. Unless otherwise specified (see 6.2) the unpolymerized compound shall be green in color when viewed in daylight (see 4.5).

3.3.1.1 Ultraviolet fluorescence. The compound shall be visible in ultraviolet illumination when tested as specified in 4.6.1.1.

3.3.2 Viscosity. The unpolymerized compound when tested as specified in 4.6.1.2 shall have a viscosity as follows:

Type I - 100 to 500 centipoises (0.1 to 0.5 Pascal - seconds)
Type II - 400 to 800 centipoises (0.4 to 0.8 Pascal - seconds)
Type III - 1500 to 2500 centipoises (1.5 to 2.5 Pascal - seconds)

3.3.3 Flash point. The unpolymerized compound shall have a flash point of not less than 200°F (93°C) when tested as specified in 4.6.1.3.

3.3.4 Solubility. The unpolymerized compound shall be soluble in trichloroethylene or a solution of trichloroethylene containing 5 percent by volume of acetone when tested as specified in 4.6.1.4.

3.3.5 Wetability. The unpolymerized compound shall wet steel, aluminum and brass when tested as specified in 4.6.1.5.

3.3.6 Corrosivity. The unpolymerized compound shall not be corrosive to steel, aluminum alloy or brass when tested as specified in 4.6.1.6.

3.3.7 Storage stability. The unpolymerized compound packaged in original bottles shall not show excessive deterioration when stored for 10 days at 120° ± 3°F (49° ± 1.7°C) and tested as specified in 4.6.1.7.

3.3.8 Toxicity. The retaining compound shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the procuring activity to the appropriate department medical service who will act as an advisor to the procuring activity (see 4.6.1.8).

3.4 Polymerized retaining compound.

3.4.1 Static shear strength after room temperature curing. The retaining compound after being cured at room temperature shall show a static shear strength in pounds per square inch when tested as specified in 4.6.2.1.3 as follows:

Type I - 2000 psi (minimum) (13.8 MPa)
Type II - 2000 psi (minimum) (13.8 MPa)
Type III - 3500 psi (minimum) (24.1 MPa)

3.4.2 Static shear strength after immersion in solvents. The static shear strength shall be not less than 1500 pounds per square inch (10.3 MPa) after immersion in distilled water, butyl alcohol, toluene, lubricating oil grade 10, hydrocarbon standard test fluid medium No. 6, JP-4 and JP-5 jet fuel, and ethylene glycol when tested as specified in 4.6.2.1.4.

3.4.3 Hot strength. The static shear strength after exposure to a temperature of 300 ± 3.6°F (149 ± 2°C) for a period of 120 ± 2 minutes and tested as specified in 4.6.2.1.5 shall be as follows:

Type I - 1000 psi (minimum) (6.89 MPa)
Type II - 1500 psi (minimum) (10.3 MPa)
Type III - 1000 psi (minimum) (6.89 MPa)

3.4.4 Heat aging. The minimum static shear strength of the compound when aged at 300 ± 3.6°F (149° ± 2°C) for 1000 ± 2 hours and tested as specified in 4.6.2.1.6 shall be as follows:

Type I - 1500 psi (minimum) (10.3 MPa)
Type II - 1800 psi (minimum) (12.4 MPa)
Type III - 1500 psi (minimum) (10.3 MPa)

3.4.5 Low temperature static shear strength. The minimum static shear strength of the retaining compound at -65° ± 2°F (-55.9° ± 1°C) when tested as specified in 4.6.2.1.7 shall be as follows:

Type I - 2000 psi (minimum) (13.8 MPa)
Type II - 2000 psi (minimum) (13.8 MPa)
Type III - 2500 psi (minimum) (17.2 MPa)

3.4.6 Static shear strength on primed surfaces. (For acceptance tests only for type II and type III (see 4.3.3)). When authorized by the procuring activity to expedite the static shear strength test for type II and type III the tests may be made on primed surfaces as specified in 4.6.2.1.8. The minimum static shear strength in pounds per square inch after 30 minutes of room temperature curing shall be as follows:

Type II - 1600 psi (minimum) (11.0 MPa)
Type III - 2000 psi (minimum) (13.8 MPa)

3.4.7 Fungus resistance. The polymerized compound shall not support the growth of fungus when tested as specified in 4.6.2.2.

3.5 Workmanship. The unpolymerized compound shall be smooth and homogeneous, free from lumps, caked materials, and particles of foreign matter.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Lot. For purposes of sampling, a lot shall consist of all retaining compound manufactured as one batch, and offered for inspection at one time.

4.3 Classification of tests. The tests for the retaining compound shall be classified as follows:

a. Preproduction tests (see 4.3.1).
b. Comparison tests (see 4.3.2).
c. Acceptance tests (see 4.3.3).

4.3.1 Preproduction tests. Preproduction tests shall consist of all tests of this specification.

4.3.2 Comparison tests. The procuring activity may require that the subsequent lots of compound be subjected to any or all preproduction tests at intervals of not less than once in 2 years or once in each 20 lots, whichever is more frequent. If a lot should fail a comparison test no further lots will be accepted until the contractor has presented sufficient evidence to show that the condition which caused the failure has been corrected.

4.3.3 Acceptance tests. Acceptance tests for the acceptance of individual lots shall consist of the following tests:

a. Viscosity (see 4.6.1.2)
b. Static shear strength after room temperature curing (see 4.6.2.1.3 for type I and 4.6.2.1.3 or 4.6.2.1.8 for type II and type III.

4.4 Sampling.

4.4.1 For examination. A random sample of filled containers shall be selected for examination in accordance with level I of MIL-STD-105.

4.4.2 For preproduction tests. A 250-cc sample of retaining compound shall be taken from each lot. All of the tests shall be performed on this sample except the storage stability tests. For the storage stability tests 5 representative bottles of compound shall be selected from each lot.

4.4.3 For acceptance tests. A 50-cc sample of retaining compound which is representative of the lot shall be selected for acceptance tests.

4.5 Examination. Sample units selected in accordance with 4.4.1 shall be examined for color (3.3.1 and 3.3.1.1), workmanship (3.5), and preparation for delivery (section 5) at the acceptable quality levels shown in table I.

4.6 Test methods. Samples of retaining compound shall be selected in accordance with 4.4.2 or 4.4.3 as applicable. Except as otherwise specified herein, all tests shall be made at a temperature of not less than 70°F (21°C) nor more than 77°F (25°C) without treatment or preconditioning of the compound. Tests shall be made in accordance with the referenced paragraphs of table II.

4.6.1 Unpolymerized compound.

4.6.1.1 Ultraviolet fluorescence. The unpolymerized compound when applied to metal surfaces shall glow under ultraviolet illumination (see 6.7).

4.6.1.2 Viscosity. The viscosity shall be determined as specified in ASTM D-445. Conversion to centipoise shall be made by multiplying the centistokes by the density of the compound. The testing temperature shall be 77°F ± 1°F.(25 ± 0.5°C)

4.6.1.3 Flash point. The flash point shall be determined with a Tag Open-Cup flashpoint tester as specified in ASTM D-1310.

4.6.1.4 Solubility. One cubic centimeter of the retaining compound shall be placed in 10 cubic centimeters of trichloroethylene; or in 10 cubic centimeters of solution of trichloroethylene containing 5 percent by volume of acetone. After shaking the mix thoroughly, the solution shall be examined under transmitted light. The solution shall be clear and free from precipitate.

4.6.1.5 Wettability. Sheets of steel, aluminum, and brass shall be degreased and cleaned by rubbing with fine emery paper, and then polished with steel wool. A few drops of the compound shall be applied to the surface of each of the metals. The compound shall be considered wettable if it can be spread over the surface of the metals instead of remaining in small drops.

4.6.1.6 Corrosivity. The compound applied to steel, aluminum, and brass surfaces as specified in 4.6.1.5 shall be allowed to stand for 24 hours at room temperature. The compound shall be removed by wiping with a cloth wet with water or trichloroethylene, and the surfaces examined for etching. Anything more than a superficial discoloration shall be considered evidence of corrosivity.

4.6.1.7 Storage stability. Seven bottles of each size container shall be conditioned for 10 days at 120° ± 3°F (49° ± 1.7°C). After cooling the compound to room temperature, the viscosity (see 4.6.1.2) and static shear strength after room-temperature curing (as specified) in 4.6.2.1.3) shall be determined. An increase in viscosity in excess of 50 percent or failure of the compound to meet the static shear strength requirements given in 3.4.1 shall be unacceptable.

TABLE I. Methods of examination

Material	AQL Percent	Classification of defect	Defect	Method of Inspection
		Critical	None defined	
Retaining compound	2.5	Major 101	Wrong color	Visual 1/
(see 3.3.1 and 3.5)	2.5	Major 102	Not smooth and homogenous	Visual
		Major 103	Lumps or caked material	Visual
		Major 104	Foreign particles	Visual 1/
Bottles of compound	2.5	Major 105	Improper size	Visual
(see 5.1.1.1 or		Major 106	Improper size	Visual
5.1.2.1		Major 107	Improper closure or leakage	Visual
		Major 108	Improper fill 2/	Approved scale 3/
Intermediate package	2.5	Major 109	Wrong size	Visual
(see 5.1.1.2 and		Major 110	Wrong type	Visual
5.1.1.3 or 5.1.2.2		Major 111	Improper closure	Visual
and 5.3		Major 112	Improper marking	Visual
		Major 113	Missing or improper instruction sheet	Visual
Boxes open (see 5.2)	2.5	Major 114	Improper type	Visual
		Major 115	Improper size	Visual
		Major 116	Not properly packed	Visual
Boxes closed (see	2.5	Major 117	Improper closing	Visual
5.2 and 5.3		Major 118	Lack of, or improper strapping	Visual
		Major 119	Improper marking	Visual
		Major 120	Excessive weight	Approved scale 3/

1/ The color shall be determined by dipping an edge of white paper into the material.

2/ A properly filled bottle shall be weighed and the weight used as a standard for determining the fill of other bottles.

3/ Approved by procuring activity.

TABLE II Test methods

Test	Requirement paragraph	Test paragraph	Number of determinations
Unpolymerized Compound			
Ultraviolet	3.3.1.1	4.6.1.1	3
* Viscosity	3.3.2	4.6.1.2	1/
Flash point	3.3.3	4.6.1.3	1
Solubility	3.3.4	4.6.1.4	1
Wettability	3.3.5	4.6.1.5	1
Corrosivity	3.3.6	4.6.1.6	1
Storage stability	3.3.7	4.6.1.7	7
Toxicity	3.3.8	4.6.1.8	1
Polymerized Compound			
* Static shear strength after room-temperature curing	3.4.1	4.6.2.1.3	5 2/
Static shear strength after immersion in solvents	3.4.2	4.6.2.1.4	5 for each test fluid
Hot strength	3.4.3	4.6.2.1.5	5 2/
Heat aging	3.4.4	4.6.2.1.6	5 2/
Low-temperature static shear strength	3.4.5	4.6.2.1.7	5 2/
Fungus resistance	3.4.7	4.6.2.2	5 2/

*Acceptance tests.

1/ Duplicate determinations shall agree within the tolerances specified in the test method.

2/ Results shall be reported as the average of the 5 determinations.

4.6.1.7.1 Certification of compliance. Pending the results of the storage stability test the procuring activity may accept a certificate of compliance. The certificate shall state that the retaining compound meets the storage stability requirements of 3.3.7 and shall be signed by a responsible agent of the certifying organization and shall be accompanied by evidence of this agent's authority to bind his principal.

4.6.1.8 Toxicity. The supplier shall furnish the toxicological data and formulations required to evaluate the safety of the material for the proposed use.

4.6.2 Polymerized compound.

4.6.2.1 Static shear strength.

4.6.2.1.1 Preparation of specimens. (see 6.14) Each specimen shall be comprised of a pin .449 ± .001 inch (11.4 ± 0.025mm) in diameter and a slip collar .501 ± .001 inch (12.7 ± 0.025mm) inside diameter finished to no more than 32 micro inches (0.81mm) with .002 ± .001 inch (0.05 ± 0.025mm) diametral clearance between the pin and collar (see figure 1). The pin and collar shall be made of steel conforming to UNS designation G11170 or G12130 of ASTMA 108. All pins and collars shall be vapor degreased, stored in an atmosphere of low humidity and kept clean. The specimens shall not be primed except for the test of 4.6.2.1.8. To start a test sufficient compound shall be applied to the pin to cover completely an area the width of the collar. The collar shall then be slipped onto the pin and remain over the retaining compound.

4.6.2.1.2 Static shear strength test. After the test specimens have been aged and treated as specified in 3.4.1 or 3.4.2 the static shear strength shall then be determined by either Method A or Method B (see 6.6) as follows:

Method A. The pin and collar assembly shall be placed in a laboratory test press (see figure 1) so that the collar rests on the hollow support cylinder while one end of the pin is held against the fixed plate. The moving platen and support cylinder shall advance approximately .001 inch (0.025mm) per second so as to force the retaining compound to be broken when the collar starts to move along the pin. The maximum breakaway load shall be recorded by a gage that indicates the load in pounds. The quotient of the maximum breakaway load divided by the bond area in square inches (square millimetres) shall be the static shear strength.

Method B. The end of the pin (see figure 2) shall be clamped in a vise and the collar turned slowly with a torque indicating wrench. The maximum breakaway torque shall be recorded and the static shear strength computed in PSi(MPa) of bonded area.

4.6.2.1.3 Static shear strength after room temperature curing. Specimens prepared as specified in 4.6.2.1.1 shall be aged at 70° to 77°F (21-25°C) for durations as follows:

Type I - 1 to 1-1/4 hours
Type II - 24 to 26 hours
Type III - 24 to 26 hours

After aging, static shear strength of the specimens shall be determined as specified in 4.6.2.1.2.

4.6.2.1.4 Static shear strength after immersion. The coated assemblies prepared in accordance with 4.6.2.1.1 shall be allowed to age in air at 70° to 77°F (21-25°C) for 24 to 26 hours. After aging, 5 specimens shall be immersed for 168 hours at 188° ± 5°F (87° ± 3°C) (in a flask equipped with a reflux condenser) in each of the test fluids conforming to specifications as follows:

	Liquid	Application Specification
a.	Distilled water	
b.	Butyl alchol normal	ASTM D304
c.	Toluene	T-T-548
d.	Lubricating Oil (grade 10)	MIL-L-2104
e.	Hydrocarbon standard test fluid medium No. 6	TT-5-735
f.	JP-4 jet fuel	MIL-T-5624
g.	JP-5 jet fuel	MIL-T-5624
h.	Ethylene glycol	O-A-548

Immediately upon removal of the test specimens from the test fluids, the static shear strength shall be determined in accordance with 4.6.2.1.2.

4.6.2.1.5 Hot strength. Specimens shall be prepared as specified in 4.6.2.1.1. The specimens shall be aged 24 to 26 hours at 70 to 77°F (21 to 25°). The specimens shall then be heated in an oven for 120 ± 2 minutes. the heating temperature shall be 300 ± 3.6°F (149 ± 2°C). Within 30 seconds after removal of the specimens from the oven the static shear strength test shall be made as specified in 4.6.2.1.2.

4.6.2.1.6 Heat aging. Specimens shall be prepared as specified in 4.6.2.1.1 and aged for 240 ± 5 minutes at 70 to 77°F. (21 to 25°C) the assemblies shall then be aged in air in an oven at 300° ± 10°F. (149° ± 5.5°C) for 1000 ± 5 hours. The specimens shall be cooled to room temperature, and the static shear strength determined in accordance with 4.6.2.1.2.

4.6.2.1.7 Low temperature static shear strength. Specimens prepared as specified in 4.6.2.1.1 and aged for 240 ± 5 minutes at 70 to 77°F (21 to 25°C) shall be placed in a container having a temperature of -65° ± 2°F (-54° ± 1°C) and conditioned at this temperature for 120 ± 5 minutes. The specimens shall then be taken out of the container and tested within 30 seconds for static shear strength in accordance with 4.6.2.1.2.

4.6.2.1.8 Static shear strength on primed surfaces. (For acceptance tests or type II and type III compounds only (see 3.4.6)), prepare the specimens as specified in 4.6.2.1.1 except that grade T primer of MIL-S-22473 shall be applied before the retaining compound is applied. The primer shall be applied by dipping the fastener components therein and allowing them to dry in air. The specimens shall be aged for 30 to 35 minutes at 70° to 77°F (21 to 25°C) and tested for static shear strength as specified in 4.6.2.1.2.

4.6.2.2 Fungus resistance. Compounds polymerized in accordance with the directions of the manufacturer shall be tested for fungus resistance in accordance with Method 508.2 of MIL-E-5272.

5. PREPARATION FOR DELIVERY

5.1 Preservation. Preservation shall be level A or C as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Bottles. Unless otherwise specified, the compound shall be furnished in 50-cc (1-2/3 fluid ounces), or 250-cc (8 fluid ounces) and for Type I only in 10-cc (1/3 fluid ounce) plastic squeeze bottles, as specified (see 6.2). Bottles of 10-cc and 50-cc capacity shall be fitted with dispenser nozzles and suitable closure caps with knurlings or facets for easy opening. The bottles shall neither affect nor be affected by the product during extended storage.

5.1.1.2 Intermediate packaging. Bottles of the same size of retaining compound shall be packaged in snug fitting boxes conforming to either PPP-B-566 or PPP-B-676 at the option of the contractor. Quantity and arrangement shall be in accordance with commercial practice. Box closures shall be as specified in the box specification.

5.1.1.3 Instructions. A label shall be furnished with each bottle or an instruction sheet shall be furnished with each intermediate package that shall contain as a minimum information on the following:

a. Method of application.
b. Shelf life, if limited.
c. Types of surfaces on which the compound will and will not produce a satisfactory seal or lock.

Method. The instruction sheet shall be submitted to the Government for approval. No change shall be made in the instruction sheet without the permission of the procuring activity.

5.1.2 Commercial.

5.1.2.1 Retaining compound. Retaining compound bottles in the size and quantities specified (see 6.2) and with the type of dispenser specified (see 6.5) shall be packaged in accordance with the contractors commercial practice.

5.1.2.2 Instructions. Instructions shall be in accordance with 5.1.1.3. When no labels are provided and intermediate packaging is not a requirment of the procuring activity, contract, purchase order, invitation for bids, etc., one instruction sheet shall be provided for every 12 or less, units of compound within each separate container.

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

5.2.1 Level A. Bottles, preserved as specified (see 5.1), shall be packed in boxes conforming to PPP-B-601, overseas type, style 1. Weight of contents shall not exceed 200 pounds (91 kg).

5.2.2 Level B. Bottles, preserved as specified (see 5.1) shall be packed in fiberboard boxes conforming to PPP-B-636, class weather resistant. Weight of contents shall not exceed the limits specified by the box specifications.

5.2.3 Commercial. Packing shall be in accordance with MIL-STD-1188.

5.3 Marking. In addition to any special marking required by the contract or order or herein, interior packages and exterior shipping containers for levels A and B shall be marked in accordance with MIL-STD-129 and shall include date of manufacture. Marking for commercial packages shall be in accordance with MIL-STD-1188.

6. NOTES

6.1 Intended use. Retaining compounds may be employed to reduce machining costs by replacing shrink fits, keys, set screws, splines, and knurles. Typical applications are:

a. Electric motor rotors on shafts.
b. Gears.
c. Pulleys.
d. Sleeves.
e. Oil seals in housings.
f. Fans and impellers.
g. Drill bushings in jigs and fixtures.
h. Pins and dowels.
i. Sintered-metal oil-impregnated bearings.
j. Bearing inner rings.
k. Bushings and journal bearings.

Because of high shear strength retaining compounds may also be used on threaded connections where engagement is very limited. Typical applications are:

a. Jam nuts.
b. Threads in thin walled castings.
c. Threads in pierced sheet metal sections.
d. Sheet metal screws, by bonding their heads to the sheet metal.
e. Studs where maximum hold is desired.

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number and date of this specification.
b. Type of retaining compound required (see 1.2).
c. Quantity of retaining compound required.
d. Size of bottles required (see 5.1.1.1).
e. Color, if other than as specified in 3.3.1
f. Whether the compound must be suitable for use with explosives (see 3.2).
g. Selection of applicable levels of packaging and packing (see 5.1 and 5.2).
h. When level C packaging is required, specify type of dispenser (see 6.3).
i. Special marking if required (see 5.3).

6.3 Classification of types.

6.3.1 Type I. Type I is the regular materials specified under superseded MIL-R-46082(MR). This compound has the advantage of low viscosity and fast curing on active surfaces.

6.3.2 Type II. Type II is a hot strength retaining compound. It is of medium viscosity and medium strength capable of maintaining a high shear strength at elevated temperatures. It would be applicable where temperatures up to 300°F (149°C) would be encountered. The compound combines excellent heat aging qualities with its hot strength, insuring longer life at elevated temperatures.

6.3.3 Type III. Type III is a strong retaining compound. It is of high viscosity, high strength and combines high flexibility with high tensile strength. This compound would be applicable where cyclic loading and shock loading must be endured.

6.4 Clearances. The normal clearance filling ability of the retaining compounds is as follows: Type I -.004 inch, (0.102mm) type II -.008 inch (0.203mm), and type III -.015 inch (0.381mm). For optimum strength and cure, the clearance should not exceed .002 inch (0.051mm).

6.5 Bottles. The retaining compound is usually bottled in accordance with 5.1.1.1.

6.6 Removal of excess compound. Excess compound spilled during application may be wiped off with a cloth moistened with trichloroethylene. However, compound which has set is insoluble and can be removed by wire brushing, or in the case of threaded fasteners running the nut off and on until the old compound has worn away.

6.7 Ultraviolet fluorescence. Fluorescence under ultraviolet illumination required in 3.3.1.1 is essential to facilitate detection of retaining compound when assemblies of disassembled parts are inspected.

6.8 Axial-torsional shear strength relationship. Tests have shown that the axial static shear strength (push-out force) of the pin is the same as the torsional static shear strength (breaking torque) between the pin and collar.

6.9 Application to fastener components prior to assembly. Surfaces to be joined should be wetted with the retaining compound by brushing, dipping, or tumbling, etc. Where brushing is employed, a camel-hair brush is recommended. Use of the applicator nozzle furnished with each container is also recommended. There is no advantage in using more of the compound than the surface will retain, use approximately 1-cc per 50 square inches (0.032 square metres).

6.10 Application. Clean parts of the common metals will require no particular surface treatments. Where the metals have had preservative treatments or contain greases and oils, the usual degreasing (solvent) operations will be sufficient. For additional holding power the surfaces can be roughened or an alternate machining method adopted such as turning in lieu of grinding.

6.11 Handling. Containers used in handling the retaining compounds should be washed before the compounds harden by using a degreasing solvent. Hardened compounds can be removed from containers by prolonged soaking in hot caustic soda, rinsing, and then wire brushing. The compounds may soften some plastics or damage organic finishes, particularly lacquers. Hence prior to painting, excess compound shall be removed from parts, either by wiping or degreasing while the compound is still liquid.

6.12 Storage to prevent contamination and polymerization. The storage life of the compound is dependent upon maintaining air over the surface of the compound and upon keeping the compound clean. Therefore, the manufacturer's recommendations relative to storage should be strictly followed. In no case should parts be dipped into the compound while it is in the storage container as this will result in severe contamination and destroy the usefulness of the compound in a very short time.

6.13 Primers for inert surfaces. Cleaner primers for use with the retaining compounds of this specification are available under MIL-S-22473. The primer may be applied to parts as a priming rinse prior to assembly with the compound. Its function is to increase the speed of cure, while at the same time serving as a mild degreasing solvent. Surfaces such as zinc, cadmium, gold platings passivated stainless steel and thermosetting plastic parts require the use of a primer in order to meet the curing rate requirement of 3.4.1. Primers may be used on other metals to reduce curing time. Primers are usually supplied as a 1 to 5 percent solution in a degreasing solvent such as trichloroethylene into which the parts are dipped and allowed to drain and dry before application of the compound. The primer solution may be used repeatedly until too dirty to degrease efficiently. Parts thus treated with either grade N primer or grade T primer may be expected to keep their activation not to exceed 30 days storage after treatment.

6.14 Collars and pins specified in 4.6.2.1.1 can be produced in most machine shops or they may be purchased from Loctite Corporation, 705 North Mountain Road, Newington, Connecticut 06111.

6.15 Definition. Anaerobic compounds: compounds that harden or set in the absence of air.

6.16 Metric equivalents, Figure 2. The metric equivalents of the dimension given in figure 2 are as shown in table III.

Table III. Metrick equivalents for figure 2

INCH	MILLIMETER
0.001	0.025
.002	.050
.499	12.67
.501	12.73
1	25.4
2	51
7/16	11.1

Custodian:

Army - MR
Navy - AS

Preparing activity:

Army - MR

Review Activities:

Army - MI,CR, ER, MD
Navy - SH

Project No. 8030-0497

User activities:

Army - ME

(KBWP# ID-0368A/DISK 0030A. FOR AMMRC USE ONLY)

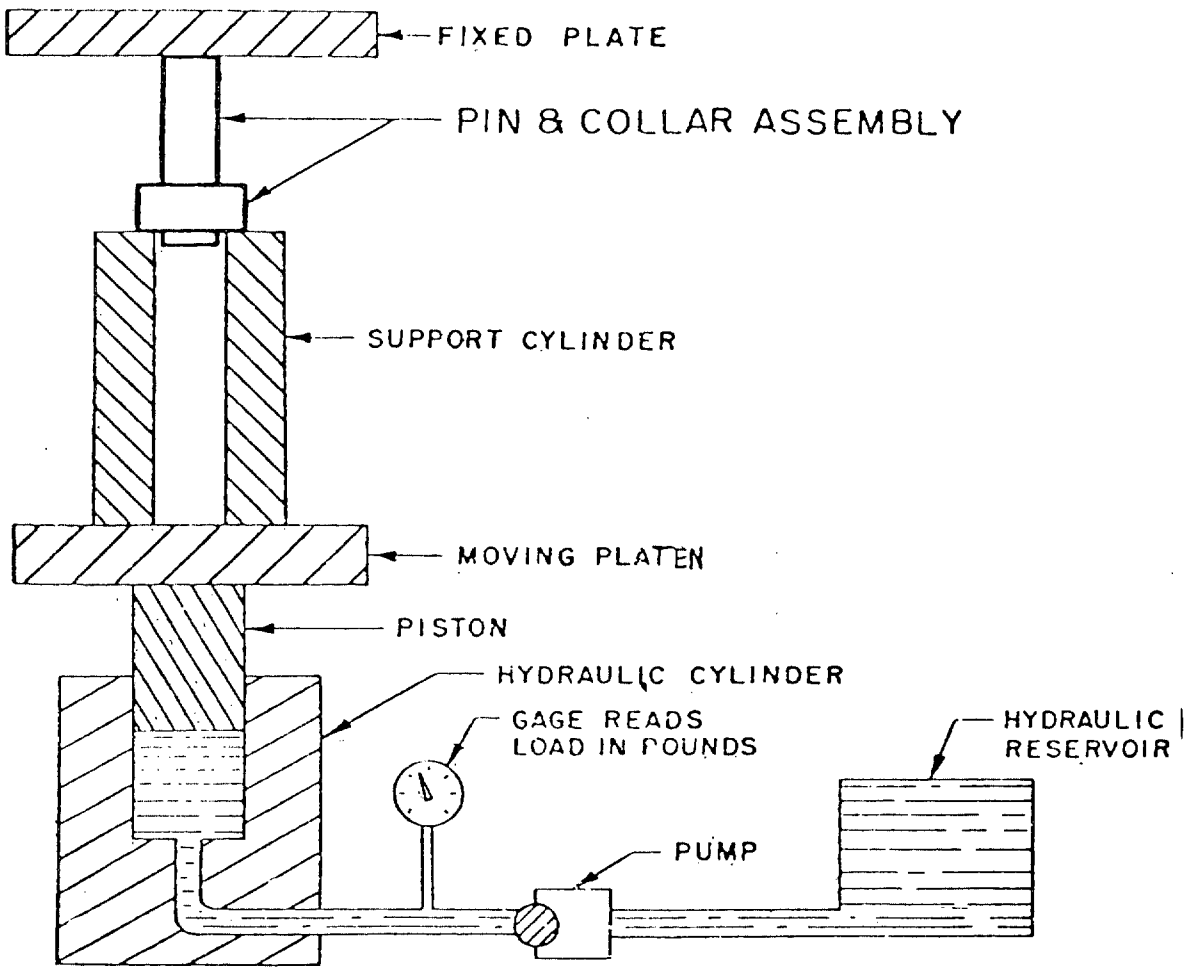

FIGURE 1. *Assembly for static shear strength test.*

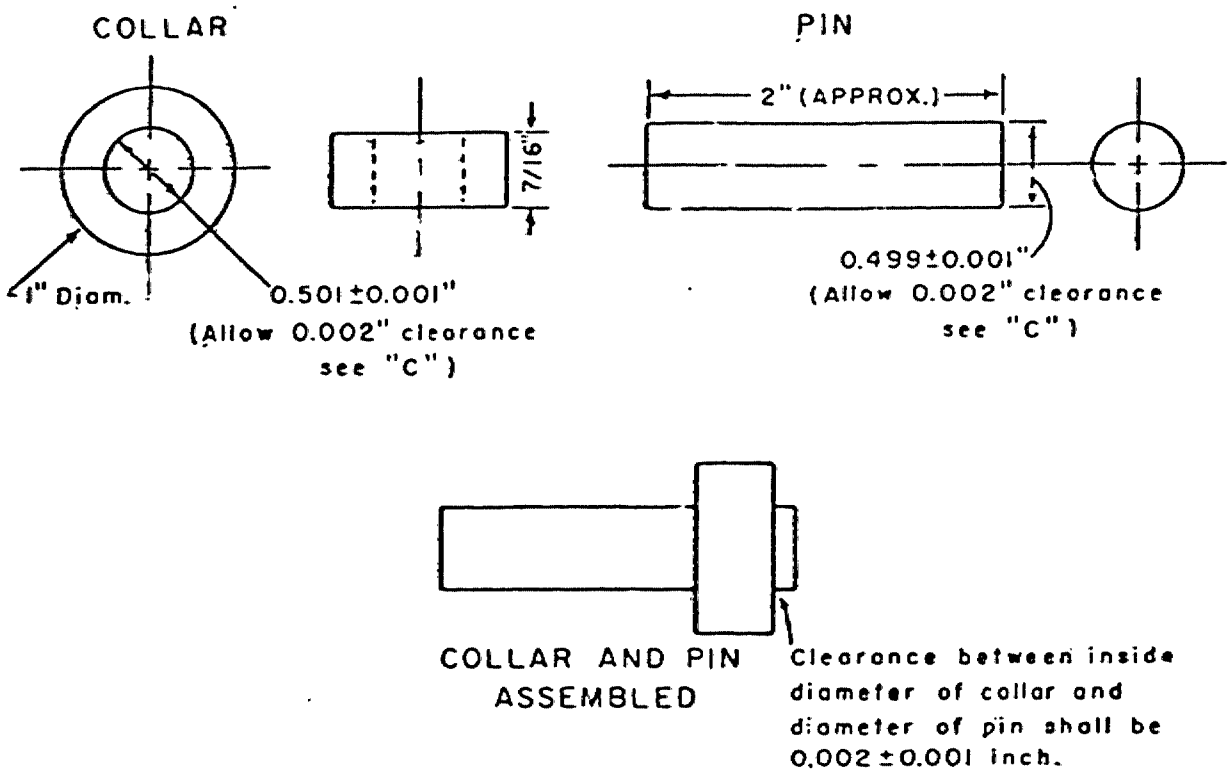

FIGURE 2.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-R-46082B	RETAINING COMPOUNDS, SINGLE COMPONENT, ANAEROBIC

3a. NAME OF SUBMITTING ORGANIZATION

b. ADDRESS *(Street, City, State, ZIP Code)*

4. TYPE OF ORGANIZATION *(Mark one)*

- ☐ VENDOR
- ☐ USER
- ☐ MANUFACTURER
- ☐ 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)*

DD FORM 82 MAR 1426

PREVIOUS EDITION IS OBSOLETE.