

MIL-C-85449
6 March 1981

MILITARY SPECIFICATION

CLAMP ASSEMBLY, SADDLE-TYPE, CUSHION, GENERAL SPECIFICATION FOR

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

1. SCOPE

1.1 Scope. This specification covers tube support saddle-type clamps. Tests and criteria noted do not indicate any specific areas of application or usage. Supplemental testing may be necessary to determine suitability for specific environments and applications.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

P-D-680	Dry Cleaning Solvent
QQ-P-35	Passivation Treatments for Corrosion-Resisting Steel
QQ-T-580	Tool Steel, Carbon and Carbon-Vanadium
PPP-B-576	Box, Wood, Cleated, Veneer, Paper Overlaid
PPP-B-585	Box, Wood, Wirebound

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: ENGINEERING SPECIFICATIONS AND STANDARDS DEPARTMENT (CODE 93), NAVAL AIR ENGINEERING CENTER, LAKEHURST, NJ 08733, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 5340

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SPECIFICATIONS (Continued)

FEDERAL

PPP-B-591 Box, Fiberboard, Wood-Cleated

PPP-B-601 Box, Wood, Cleated Plywood

PPP-B-621 Box, Wood, Nailed and Lock Corner

PPP-B-636 Box, Shipping, Fiberboard

PPP-B-640 Box, Fiberboard, Corrugated, Triple-Wall

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MIL-P-116 Preservation, Methods of

MIL-H-5606 Hydraulic Fluid, Petroleum Base, Aircraft, Missile and Ordnance

MIL-S-6721 Steel, Corrosion and Heat Resistant (Chemically Stabilize) Plate, Sheet and Strip

MIL-L-7808 Lubricating Oil, Aircraft Turbine Engine, Synthetic Base

MIL-T-9046 Titanium and Titanium Alloy, Sheet, Strip and Plate

MIL-P-22241 Plastic Sheet (and Film) Polytetrafluoroethylene (Tfe-fluorocarbon Resin)

MIL-C-85449/1 Clamp Assembly, Saddle-Type, Cushioned, NBR Rubber, 321 CRES, 275°F, Fuel Resistant, General Purpose

MIL-C-85449/2 Clamp Assembly, Saddle-Type, Cushioned, EPR Rubber, 321 CRES, 275°F, General Purpose

MIL-C-85449/3 Clamp Assembly, Saddle-Type, Cushioned, Silicone Fabric, Reinforced, 321 CRES, 500°F, General Purpose

MIL-H-83282 Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft

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STANDARDS

FEDERAL

FED-STD-48 Tolerances for Steel Wrought Products, and
for Centrifugally Cast Steel

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MIL-STD-105 Sampling Procedures and Tables for Inspection
Code

MIL-STD-129 Marking for Shipment and Storage

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring 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. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D3182	Rubber Materials Equipment, and Procedures for Mixing Standard Components and Preparing Standard Vulcanized Sheets
ASTM D395	Compression Set of Vulcanized Rubber, Test for
ASTM D412	Tension Testing of Vulcanized Rubber
ASTM D471	Change in Properties of Elastomeric Vulcanizates Resulting from Immersion in Liquids, Test for
ASTM D624	Test Resistance of Vulcanized Rubber, Test for
ASTM 1149	Rubber Deterioration - Surface Ozone Cracking in a Chamber, Test for
ASTM D2240	Indentation Hardness of Rubber and Plastics by Means of a Durometer, Test for

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

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AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B46.1

Surface Texture

(Application for copies should be addressed to the American Standards Institute, 1430 Broadway, New York, NY 10018.)

3. REQUIREMENTS

3.1 Specification sheets. The individual time requirements shall be as specified herein and in accordance with the applicable specification sheets. In the event of conflict between the requirements of this specification and the specification sheet, the requirements of the specification sheet shall govern.

3.2 Qualification. The clamps furnished under this specification shall be products which are qualified for listing on the applicable Qualified Products List at the time set for opening of bids (see 4.3 and 6.3).

3.2.1 The qualification required by this specification relates to qualification of the clamp only. It does not infer qualification of clamp installation techniques.

3.2.2 Any changes in the formulation or construction of the cushion material after qualification must be approved in writing by the qualifying agency. Non-compliance will result in removal from the Qualified Products List.

3.3 Materials. Clamp band material and cushioning material shall be as specified on the applicable specification sheet.

3.4 Design and construction. The design and construction of the clamp shall be as specified herein and in accordance with the applicable specification sheets.

3.4.1 Dimensions and tolerances. Dimensions and tolerances shall be as specified on the applicable specification sheet.

3.5 Performance. Clamp cushions, clamp bands and clamp assemblies shall perform satisfactorily when subjected to the applicable tests specified in this specification, and the applicable specification sheets.

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3.5.1 Clamp cushion performance.

3.5.1.1 Physical properties. When tested in accordance with 4.5.3.1, cushion material must meet the physical property requirements specified in the applicable specification sheet.

3.5.1.2 Compression set. When required by the specification sheet and when tested in accordance with 4.5.3.2, the average compression set value of three cushion material specimens shall not exceed 70%.

3.5.1.3 Flammability. When required by the specification sheet and when tested in accordance with 4.5.3.3, the cushion material on the samples shall exhibit no drippings and shall meet the flame time and burn length requirements or burn rate as specified on the applicable specification sheet. The cushion material shall self extinguish or not exceed the burn rate as specified on the applicable specification sheet.

3.5.1.4 Titanium compatibility. When tested in accordance with 4.5.3.4, there shall be no evidence of cracking or pitting of the titanium tubing when observed with a 5 to 10 power magnifying glass.

3.5.2 Clamp assembly performance.

3.5.2.1 Vibration. When tested in accordance with 4.5.4.1, no clamp shall exhibit any evidence of cushion separation or other deterioration. There shall be no cracking or separation of metal components. The Transmissibility Ratio shall be recorded.

3.5.2.2 Ozone resistance. (When specified on applicable specification sheet). When tested in accordance with 4.5.4.2, no clamp shall exhibit any evidence of cracking visible to the unaided eye, or distortion of the cushion material.

3.5.2.3 Thermal shock. When tested in accordance with 4.5.4.3, the clamps shall exhibit no evidence of cracking, tackiness, or degradation of the cushion material

3.6 Finish. All surfaces shall be free from burrs and sharp edges. The inside edges of the clamp band shall be provided with a radius to eliminate sharp edges.

3.7 Identification of product.

3.7.1 Marking. Clamp marking shall be as indicated on the applicable specification sheet.

3.7.2 Part numbering and drawing numbering. The manufacturer's basic part number and drawing number shall be the same.

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3.8 Workmanship. Workmanship shall be of a sufficiently high grade to insure that clamps are of uniform quality and free from burrs, slivers, sharp edges, or other defects which would affect their service, and shall be uniform in appearance without any mold flash.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own facilities 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 Classification of tests. The testing and inspection of clamps shall be classified as follows:

- (a) Qualification tests (4.3).
- (b) Quality conformance inspection (4.4).

4.3 Qualification tests.

4.3.1 Samples. Samples for qualification tests of clamps shall consist of the following number of clamps of each specification sheet to be qualified.

Size	-10	-12	-16	-20	-24	-28	-32	-36	-48
Quantity	17	12	22	12	12	6	6	6	11

In addition 18 clamp cushion material slabs conforming to ASTM 3182 for each type cushion material to be tested shall be provided. Fabric reinforced cushion materials for qualification must be supplied both with and without the fabric reinforcement molded into the slabs (18 slabs of each). The weave direction of the fabric reinforcement shall be identified.

4.3.2 Tests. The qualification tests shall consist of the test specified under 4.5, conducted on applicable specimens, in the order specified in Table I.

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4.3.3 Qualification retention. The retention of qualification shall consist of certification by the manufacturer to demonstrate compliance of the qualified clamp with the requirements of this specification. Certification shall be signed by a responsible official of management, attesting that the listed product(s) is still available from the listed plant, can be produced under the same conditions as originally qualified; i.e., same process, materials, construction, design, manufacturer's part number, or designation; and meets the requirements of the current issue of the specification. Certification shall be conducted at intervals not exceeding 2 years.

4.3.4 Identification of test samples. Samples for each dash number shall be separately packaged and forwarded to the agency responsible for qualification (see 6.3) designated in the letter or authorization. Samples shall be plainly identified by securely attached durable tags marked with the following information:

Sample for qualification test
Specification MIL-C-85449
CLAMP ASSEMBLY, SADDLE-TYPE, CUSHION
Specification sheet part number
Manufacturer's part number
Name of Manufacturer/Manufacturer's FSCM number
Submitted (date) under authorization (reference letter
authorizing the test)

TABLE I. Qualification Tests.

CLAMP CUSHION			
EXAMINATION OR TEST	REQUIREMENT	TEST	NUMBER OF SAMPLES
Physical Properties	3.5.1.1	4.5.3.1	(See 4.3.1)
Compression Set	3.5.1.2	4.5.3.2	
Flammability	3.5.1.3	4.5.3.3	
Titanium Compatibility	3.5.1.4	4.5.3.4	
CLAMP ASSEMBLY			
EXAMINATION OR TEST	REQUIREMENT	TEST	NUMBER OF SAMPLES
Examination of Product	3.4	4.5.2	58
Vibration	3.5.2.1	4.5.4.1	-
Ozone Resistance *	3.5.2.2	4.5.4.2	5 (See 4.3.1)
Thermal Shock	3.5.2.3	4.5.4.3	5 (See 4.3.1)

*When specified on applicable specification sheet

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4.3.5 Test report. The contractor shall furnish the agency responsible for qualification with a certified test report, in duplicate, showing quantitative results for tests required by this specification. The report shall designate the specification sheet part number of the clamps submitted. The report shall also include the manufacturer's drawing specifying the dimensions of the clamp, and the manufacturer of the cushion material.

4.4 Quality conformance inspection. Quality conformance inspection shall consist of the tests and inspections specified in Table II, conducted in accordance with 4.4.2. The Quality Conformance Test Report shall be in accordance with 6.2.1.

4.4.1 Inspection lot. An inspection lot shall consist of clamps for a particular size, and material produced under essentially the same manufacturing conditions and presented for inspection at the same time.

4.4.2 Sampling. A random sample shall be selected from each inspection lot in accordance with MIL-STD-105. The inspection level and Acceptable Quality Level (AQL) shall be as specified in Table II. Cushion material test specimens must be cut from clamp cushions and shall be of sufficient size to be tested in accordance with the applicable test methods of the applicable specification sheet. Tensile and elongation cushion material test specimens may be cut from larger size clamp cushions of the same inspection lot, and shall be provided by the manufacturer.

TABLE II. Quality Conformance Tests.

EXAMINATIONS AND TESTS	REQUIREMENT	TEST	INSPECTION LEVEL	AQL
Examination of Product	3.4	4.5.2	I	(see Table III)
Cushion Tensile	3.5.1.1	4.5.3.1	S1	1.0
Cushion Elongation	3.5.1.1	4.5.3.1	S1	1.0
*Ozone Resistance	3.5.2.2	4.5.4.2	S1	1.0

*This test may be waived by procuring activity (see 6.2.d).

4.5 Test methods.

4.5.1 Test conditions.

4.5.1.1 Environment. Unless otherwise specified, all testing shall be done at room temperature (60°F - 90°F).

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4.5.1.2 Tolerances. Unless otherwise specified test temperature tolerance shall be $\pm 5^{\circ}\text{F}$ and test time tolerance shall be $\pm 1\%$ of the total test time.

4.5.2 Examination of product. Clamps shall be carefully examined to determine compliance with the requirements of this specification and applicable specification sheets with respect to material, workmanship, configuration, marking, and dimensions as specified in 3.4. Any variation beyond the dimensions, plus allowable tolerances, shall be classified as major or minor as indicated in Table III.

TABLE III. Classification of Defects.

TEST	MIL-STD-105, Inspection Level I AQL (Percent defective)	
	Major	Minor
Examination of Product	1.0	4.0
(a) Dimensions (See Applicable Specification Sheet)		
1. Clamp Cushion		
a. Material Thickness	X	
b. Inside Width		X
c. Color (See Applicable Specification Sheet)		X
2. Clamp Band		
a. Material Thickness	X	
b. Width		X
c. Bolt Hole Diameters	X	
3. Clamp Assembly		
a. Saddle Diameter "D"	X	
b. Centerline of Saddle to Centerline of Bolt Holes $\frac{E}{2}$		X
c. Centerline of Bolt Hole to Centerline of Bolt Hole "E"	X	
(b) Workmanship and Marking		X

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4.5.3 Clamp cushion tests.

4.5.3.1 Physical properties tests. Tests shall be conducted in accordance with the test methods shown in Table II of the applicable specification sheet. Cushion material samples shall meet the requirements specified in 3.5.1.1.

4.5.3.2 Compression set test. Three cushion material test samples shall be air aged at the temperature specified on the applicable specification sheet for 70 hours and tested in accordance with ASTM D395 Method "B". The test specimen shall have no fabric reinforcing material. Cushion material samples shall meet the requirements specified in 3.5.1.2.

4.5.3.3 Flammability test.

4.5.3.3.1 Vertical burn test. Three test clamps of size (-16) shall be unbent until flat (strap section) and conditioned at $70^{\circ} \pm 5^{\circ}\text{F}$ at $50 \pm 5\%$ relative humidity for 24 hours. The specimens shall be removed, one at a time, from the conditioning environment and immediately subjected to a bunsen burner with a nominal 3/8 inch I.D. tube, previously adjusted to give a flame of 1-1/2 inches in height. The minimum flame temperature measured by a calibrated thermocouple pyrometer in the center of the flame shall be at least 1550°F . The specimen shall be held securely in a vertical position such that the lower edge of the rubber cushion is 3/4 inch above the top edge of the burner. The flame must be applied to the centerline of the lower edge of the cushion for 12 seconds and then removed. All testing shall be performed in a draft free environment. The flame times (seconds) and burn lengths (tenths of inch) shall be measured, recorded, averaged, and shall meet the requirements specified in 3.5.1.3.

4.5.3.3.2 Horizontal burn test. Three test clamps of size (-48) shall be unbent until flat (strap section) and conditioned at $70^{\circ} \pm 5^{\circ}\text{F}$ at $50 \pm 5\%$ relative humidity for 24 hours. The specimens shall be removed one at a time from the conditioning environment and immediately subjected to a bunsen burner with a nominal 3/8 inch I.D. tube, previously adjusted to give a flame of 1-1/2 inches in height. The minimum flame temperature measured by a calibrated thermocouple pyrometer in the center of the flame shall be at least 1550°F . The specimen shall be held securely in a horizontal position such that the end of the rubber cushion is 3/4 inch above the top of the burner and on the center line of the burner. The flame shall be applied for 15 seconds and then removed. All testing shall be performed in a draft free environment. The flame times (seconds) and burn lengths (tenths of inch) shall be measured, recorded, averaged, and shall meet the requirements specified in 3.5.1.3. A minimum of 10 inches of the specimen shall be used for timing purposes, approximately 1-1/2 inches shall burn before the burning front reaches the timing zone, and the average burn rate shall be recorded and meet the requirements specified in 3.5.1.3.

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4.5.3.4 Titanium compatibility test. Mount five -10 clamps on a piece of titanium alloy tubing (Ti-3AL-2.5V cold work and stress relieved 5/8 x .032 wall) with no spacer between the feet. The tube shall be filled with hydraulic fluid, exposed to the clamp maximum rated service temperature for 12 days. Pressure shall be maintained at 3000 psi during the 12 day exposure. The test apparatus shall be removed and placed in an atmosphere of 158°F and 95% relative humidity for 20 days. Performance requirements shall be as specified in 3.5.1.4.

4.5.4 Clamp assembly tests.

4.5.4.1 Vibration and transmissibility test. Three clamps of each size to be tested (-10, -12, -16, -20, -24) shall be mounted on a mandrel conforming to 4.5.4.1.1 with spacing and dimensions as specified in Table IV, and as shown in Figure 1. The assembly shall be installed on a mounting block and shaker table as shown in Figure 1. Clamps shall be mounted flat on the mounting block with 10-32 UNF-3A bolts (160 KSI or higher strength). A washer (AN960C10) shall be used beneath the head of the mounting bolt with rounded edge against the clamp foot. An input measuring accelerometer shall be mounted on the test fixture mounting block adjacent to but not touching the center clamp. A second output measuring accelerometer shall be mounted on the test mandrel adjacent to but not touching the center clamp. A resonance search shall be performed at an approximate constant sine wave of $+2g$'s acceleration (in the horizontal axis of vibration, see Figure 1) from 50 cps to 500 cps, using a logarithmic sweep rate of 5 minutes per cycle, where a cycle shall consist of a sweep from 50 cps to 500 cps to 50 cps. Both accelerometers shall be continuously recorded. Each resonance frequency peak shall be observed and recorded. The transmissibility ratio ($TR = g$'s output accelerometer/ g 's input accelerometer) shall be calculated for each resonance peak and recorded. The clamps and mandrels shall then be dwelled at the most severe resonance peak for 30 minutes at a constant sine wave vibration of $+10 g$'s acceleration. All clamps shall meet the requirements specified in 3.5.2.1. The vibration test shall be repeated with 3 new clamps of the same size as specified. Upon completion of vibration test, each clamp shall be examined for any excessive wear of the cushion distortion or failure of the band and base.

4.5.4.1.1 Test mandrels. All test mandrels unless otherwise specified shall be tool steel drill rod in accordance with QQ-T-580. All dimensions unless otherwise specified shall be as specified in Table IV with surface finishes of 32 microinches maximum. Spacing A and B shall be as shown in Figure 1.

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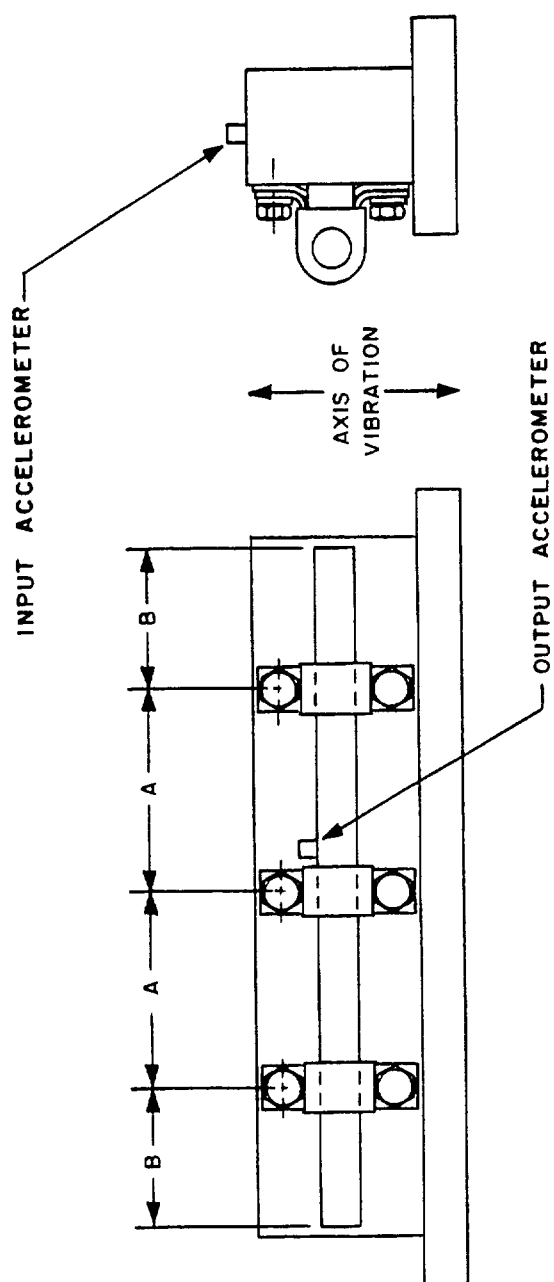


Figure 1. Vibration Fixture

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TABLE IV.

CLAMP SIZE	MANDREL		CLAMP SPACING (see Figure 1)	
	DIA. \pm .001	LENGTH \pm .015	A \pm .06	B \pm .06
-10	.625	25.0	10.0	2.5
-12	.750	29.0	12.0	2.5
-16	1.000	29.0	12.0	2.5
-20	1.250	22.5	8.5	2.75
-24	1.500	22.5	8.5	2.75

4.5.4.2 Ozone resistance test. (When specified on applicable specification sheet) Five test clamps of size (-10) shall be disassembled and the strap cushions, tightly spiraled around a 1/8 inch drill rod conforming to QQ-T-580. The ends of the cushion shall be securely fastened to the rod. The cushions and rod shall be conditioned for 70 hours at 212°F and then immersed in an ozone environment of 600 PPHM concentration for 6 hours at 125°F. Unless otherwise specified, tests shall be conducted in accordance with ASTM 1149. Clamps shall meet the requirements specified in 3.5.2.2.

4.5.4.2.1 Ozone resistance test (Quality conformance only). This test shall be conducted on clamps having cushions that are made from base materials that are prone to ozone attack. See specification sheet for an ozone resistance requirement. The ozone resistance test conducted for qualification testing (see 4.5.4.2) shall be conducted for quality conformance testing except that where clamps larger than size (-10) are being tested. The larger cushions shall be removed from the clamp band, cut to the length of the -10 size cushion and tested. This test may be waived by the procuring activity if the procurement order is less than 5000 total parts.

4.5.4.3 Thermal shock test. Five test clamps of size (-16) shall be mounted on a test mandrel conforming to 4.5.4.1.1. The mandrel with clamps installed shall be exposed to 5 cycles of 30 minutes exposure at -65°F, 15 minutes rest at room temperature, followed by 30 minutes exposure at the maximum rated service temperature (see applicable specification sheet).

5. PACKAGING

5.1 Preservation and packaging. The clamps shall be preserved and packaged in accordance with commercial methods unless Level A or Level B is specified (see 6.2). The strap and saddle of each clamp assembly shall be held together by a temporary snap fastener.

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5.1.1 Level A. Clamps shall be preserved and packaged in accordance with Method III of MIL-P-116. Unless otherwise specified, clamps of one size, type and class shall be packaged in multiples of 10, with a maximum of 100 per package. Unit containers shall conform to W5s or W5c of PPP-B-636. Box closure shall be in accordance with the appendix to the applicable box specifications.

5.1.2 Level B. Unit containers shall conform to W5s or W5c of PPP-B-636.

5.1.3 Commercial. Preservation and packaging shall be sufficient to afford physical protection against damage during shipment and handling from the supply source to the Government using activity for immediate use.

5.2 Packing. The clamps shall be packed in accordance with commercial methods unless Level A or B is specified (see 6.2).

5.2.1 Levels A and B. Clamps packaged as described in 5.1 shall be packed in boxes conforming to any one of the following specifications for the level specified.

<u>Specification</u>	<u>Type of Class</u>	
	<u>Level A</u>	<u>Level B</u>
PPP-B-576	-	Class 2
PPP-B-585	Class 2 or 3	Class 1
PPP-B-591	-	Class 2
PPP-B-601	Overseas	Domestic
PPP-B-621	Class 2	Class 1
PPP-B-636	-	Weather Resistant
PPP-B-640	-	Class 2

Boxes shall be closed, strapped or banded in accordance with the applicable box specification or appendix thereto for level specified. Gross weight of wood, wood cleated, and triple wall boxes shall not exceed 200 pounds. Gross weight of PPP-B-636 boxes shall not exceed the weight limitation of the box specification.

5.2.2 Commercial. Clamps packaged as specified in 5.1 shall be packed in a manner to insure carrier acceptance and safe delivery at destinations. Containers shall conform to the rules and regulations applicable to the mode of transportation.

5.3 Marking. Marking of the interior packages and exterior shipping containers shall be in accordance with MIL-STD-129, except for commercial packaging.

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6. NOTES

6.1 Intended use. The clamps are intended for use in general clamping of fluid and electrical systems and rigid tubing as specified in the applicable specification sheet. It is to be noted that 4.5.4.1 requires vibration tests only up to the -24 size clamp. Large clamps used in high vibration areas, should be subjected to additional testing.

6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number, and date of this specification.

(b) Specification sheet part numbers. (See MIL-C-85449 Supplement 1).

(c) Applicable levels of preservation, packaging, and packing. (See Section 5.) (Level A, B or commercial shall be specified.)

(d) On orders less than 5000 total parts of a single size, waiver of Quality Conformance Ozone Test. (See 4.5.4.2.1.)

6.2.1 Contract data requirements. Items of deliverable data required by this specification are cited in the following paragraphs:

<u>Paragraph</u>	<u>Data Requirements</u>	<u>Applicable DID</u>
4.4	Quality Conformance Test Report	DI-R-4026

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List 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 products that they propose to offer to the Federal Government tested for qualification, in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The agency responsible for the Qualified Products List is the Naval Air Systems Command, Attn: AIR-53031C, Department of the Navy, Washington, DC 20360; however, information pertaining to qualification of products may be obtained from the Commanding Officer, Naval Air Development Center (Code 6061), Warminster, PA 18974.

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Custodians:

Navy - AS
Air Force - 99
Army - AV

Preparing activity:

Navy - AS
(Project No. 5340-1266)

Review activities:

Air Force - 11
DLA - IS

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MIL-C-85449
AMENDMENT 1
22 February 1985

MILITARY SPECIFICATION
CLAMP ASSEMBLY, SADDLE-TYPE, CUSHION, GENERAL
SPECIFICATION FOR

This amendment forms a part of Military Specification MIL-C-85449, dated 6 March 1981, and is approved for use by all Departments and Agencies of the Department of Defense.

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Paragraphs "3.5.1.2 and 3.5.1.3", delete and substitute the following:

"3.5.1.2 Compression set. The average compression set value of three cushion material specimens shall not exceed the value specified in the applicable specification sheet (see 4.5.3.2)."

"3.5.1.3 Flammability. The cushion material shall be tested for flammability in accordance with the applicable specification sheet and as specified herein (see 4.5.3.3)."

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Paragraphs "4.5.3.2, 4.5.3.3, 4.5.3.3.1 and 4.5.3.3.2," delete and substitute the following:

"4.5.3.2 Compression set test. Three cushion material test samples shall be air aged at the temperature specified on the applicable specification sheet for 70 hours and tested in accordance with ASTM D395 Method "B". Cushion material samples shall meet the requirements specified in the applicable specification sheet (see 3.5.1.2)."

"4.5.3.3 Flammability test. The flammability tests shall be performed as specified below. The flame source shall be a Bunsen Burner or similar burner having a nominal tube internal diameter of 3/8 inch. The burner shall be adjusted to provide a 1-1/2 inch high flame of blue intensity. Verify flame temperature to be a minimum of 1550°F, at the center of the flame, with the use of a thermocouple."

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"4.5.3.3.1 Preconditioning. All specimens shall be preconditioned at $70^{\circ} \pm 5^{\circ}\text{F}$ and 50 ± 5 percent relative humidity for a period of 24 hours prior to testing. Clamps used for vertical burn test shall be uncurled until straight (strap section) before being placed in the preconditioning chamber. The cushion shall not be removed from the clamp band."

"4.5.3.3.2 Vertical burn test. Three size dash 16 clamps shall be used for the vertical burn test (see 4.5.3.3.1). Remove the specimens one at a time from the preconditioning chamber immediately before performing test. Slide the cushion to one end of the clamp band. Position the specimen in the vertical position with the centerline of the cushion material $3/4$ inch above the top edge of the burner tube. Apply flame for 12 seconds and then remove. Testing shall be performed in a draft free environment. The average burn time of the three samples after removal of flame shall not exceed 15 seconds. The average burn length shall be less than the length of one of the specimens (cushion). Drippings from the burning specimens shall not continue to flame for more than 5 seconds after falling (see Figure 2)."

"4.5.3.3.3 Horizontal burn test. Three specimens fabricated in accordance with ASTM D3182 shall be used for the horizontal burn test. The specimens shall be removed one at a time from the preconditioning chamber and positioned so that the centerline of the edge being burned shall be $3/4$ inch above the top edge of the burner tube. The flame shall be applied for 15 seconds and then removed. Permit a minimum of 1-1/2 inches to burn to calculate the burn rate. The burn rate shall not exceed 2-1/2 inches per minute. Record burn rate (see Figure 2)."

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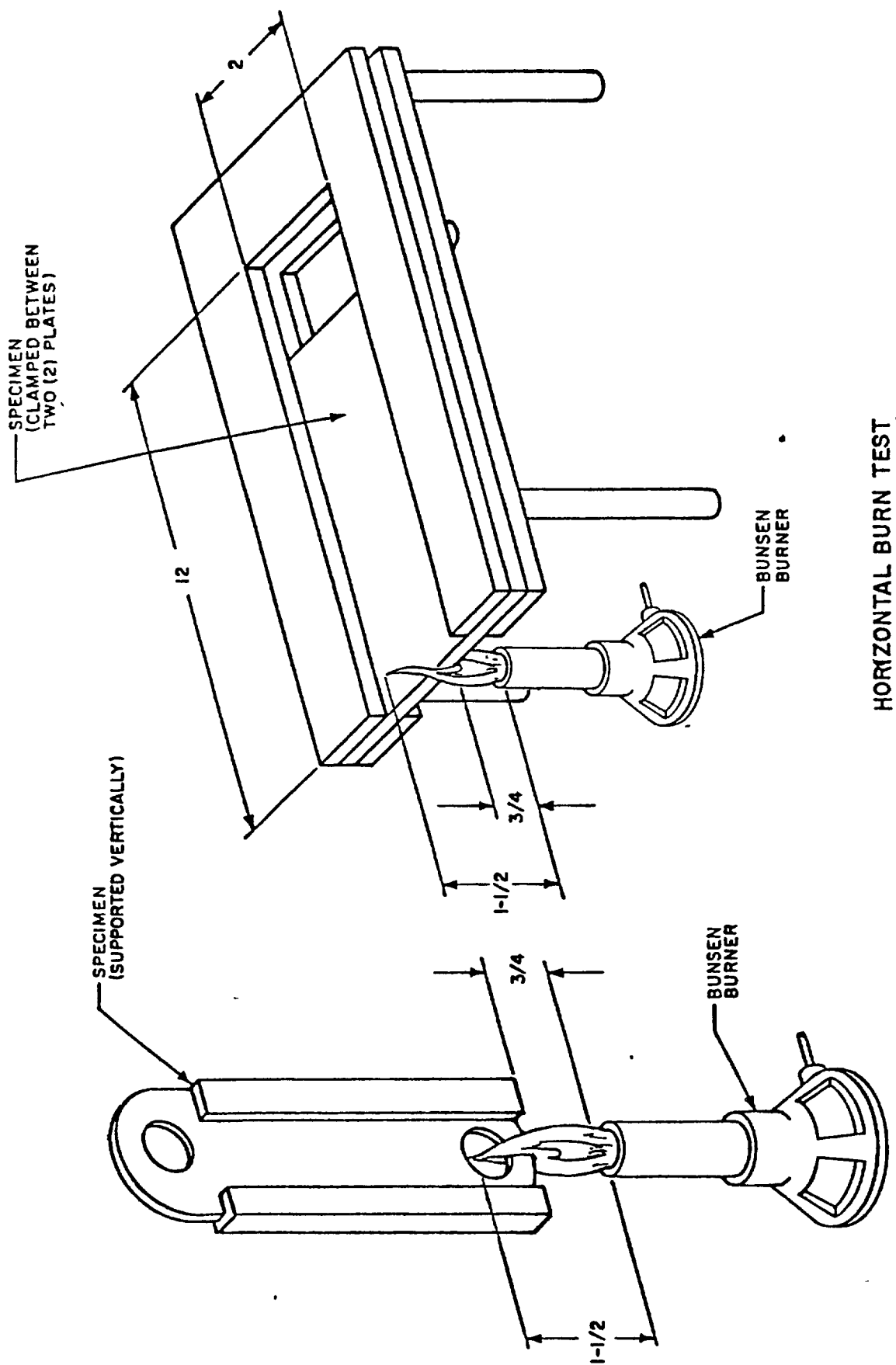
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HORIZONTAL BURN TEST

VERTICAL BURN TEST

FIGURE 2. Flammability test set-up (typical).

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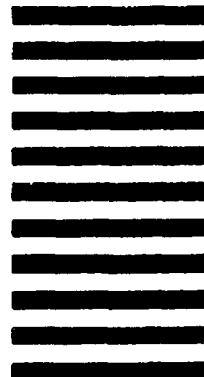
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