INCH-POUND

MIL-P-23469D(SH)
22 December 1992
SUPERSEDING
MIL-P-23469C(SH)
19 February 1988
(See 6.10)

MILITARY SPECIFICATION

PIN-RIVET, GROOVED AND COLLAR, GROOVED PIN-RIVET, SWAGE-LOCKED (LOCKPIN) GENERAL SPECIFICATION FOR

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers metal fasteners of the pull-tool type, each comprising a headed, grooved pin secured by a collar swaged into the grooves, and for installation without bucking more than manual restraint on the head.

1.2 Classification. Pin and collar shall be of the following types and classes as specified (see 6.2).

1.2.1 Pins.

Type I - Six locking grooves.
Type II - Multiple locking grooves.
Type III - Wide grip range, multiple locking grooves.

1.2.2 Collars.

Type I - Regular height.
Type II - Flanged.
Type III - Low-profile.
Type IV - Flanged (for use with type III pins).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, ATTN: SEA 05Q42, Naval Sea Systems Command, 2531 National Center Building 3, Washington, DC 20362-5160 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 5320

1.2.3 Materials.

Class 1 - Aluminum.
Class 2 - Corrosion-resistant steel.
Class 3 - Carbon steel.
Class 5 - High-strength carbon steel.

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 document 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 Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL
PPP-F-320 - Fiberboard, Corrugated and Solid, Sheet Stock (Container Grade) and Cut Shapes.
PPP-H-1581 - Hardware (Fasteners and Related Items), Packaging of.

MILITARY
MIL-L-19140 - Lumber and Plywood, Fire Retardant Treated.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, BLDG. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

(See supplement 1 for list of associated specifications.)

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
A 29 - Standard Specification for Steel Bars, Carbon and Alloy, Hot-Wrought and Cold-Finished, General Requirements for.
A 276 - Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
A 380 - Standard Practice for Cleaning and Descaling Stainless Steel Parts, Equipment, and Systems. (DoD adopted)
B 211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod and Wire.
B 580 - Specification for Anodic Oxide Coatings on Aluminum. (DoD adopted)
B 633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel. (DoD adopted)

ASTM (Continued)

B 695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.

E 8 - Standard Methods of Tension Testing of Metallic Materials. (DoD adopted)

E 527 - Standard Practice for Numbering Metals and Alloys (UNS). (DoD adopted)

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

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

J 123 - Surface Discontinuities on Bolts, Screws, and Studs, Recommended Practice.

J 1086 - Numbering Metals and Alloys, SAE and ASTM Recommended Practice (ASTM E 527).

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

(Non-Government 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 document and the references cited herein (except for related associated detail specifications, specification sheets or MS standards), 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 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

3.2 Materials.

3.2.1 Pin and collar materials. The materials used shall be such as to produce pins and collars in accordance with the requirements of this specification and as specified in the applicable specification sheet. Pins and collars shall be of aluminum alloy (ALUM), corrosion-resistant steel (CRES) or carbon steel (C.S.) as listed in table I.

TABLE I. Material chemical composition requirements.

Pin and collar materials 1/	Class	Unified numbering system designation
ALUM 6061	1	A96061
CRES XM7	2	S30430
CRES 304		S30400
CRES 305		S30500
CRES 384		S38400
CRES 430F		S43020
CRES 316		S31600
C.S. 1006 thru C.S. 1024	3	G10060 thru G10240
C.S. 1035 thru	5	G10350 thru G10450
C.S. 1045		G15410
C.S. 1541		G15410

1/ Chemical compositions of the materials listed shall meet the applicable requirements of ASTM B 211, A 276, or A 29.

3.2.2 Protective coating or treatment. Carbon and alloy steel pins and collars shall be coated in accordance with ASTM B 695, type 1, class 12, or ASTM B 633, type II Fe/Zn 13. Aluminum pins and collars shall be anodized in accordance with ASTM B 580, type D and corrosion-resistant steel pins shall be passivated in accordance with ASTM A 380.

3.2.3 Hazardous materials. Caution should be taken during any plating, cleaning, descaling, passivation or similar process. The contractor shall be responsible for the safe reutilization and disposal of all material generated by these processes.

TABLE II. Pin and collar identification.

Classification	Material	Types and classes	Identification
Pin	ALUM	Type I, class 1	Grip number, manufacturer's symbol
		Type II, class 1, Type III, class 1	Manufacturer's symbol
	CRES	Type I, class 2	Triangle, grip number and manufacturer's symbol
		Type II, class 2	Triangle and manufacturer's symbol
	C.S.	Type I, class 3	Grip number and manufacturer's symbol
		Type I, class 5	Grip number, 3 radial bars 120 degrees apart and manufacturer's symbol
		Type II, class 5	3 radial bars 120 degrees apart and manufacturer's symbol
		Type III, class 3	Manufacturer's symbol 1/
Collar	ALUM	Type I, II, III and IV, class 1	Manufacturer's symbol
	CRES	Type I, II, and III, class 2	Triangle and manufacturer's symbol
	C.S.	Type I, II, III and IV, class 3	Manufacturer's symbol
		Type I and II, class 5	Manufacturer's symbol and 3 radial bars 120 degrees apart

1/ ID on 1/4 inch diameter, type III, truss head pins is not required.

3.2.4 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and may be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.3 Material identification marking. Pins and collars of aluminum alloy, corrosion-resistant steel, or carbon steel shall be marked as specified in table II.

3.4 Surface finish. Surface finish shall be as specified in the applicable specification sheet (see 3.1).

3.4.1 Lubricant treatment. Aluminum collars shall be coated with a paraffin base wax. Steel collars shall be coated with a hydrogenated sperm oil derivative or equivalent. Pins shall be supplied without lubricant.

3.5 Style, dimensions, and form. Pins and collars shall be of the style, dimensions, and form as specified in the applicable specification sheet (see 3.1).

3.6 Maximum loads. The load to failure of pin and collar assemblies (tensile) and pins without collars (shear) shall meet or exceed the minimum requirements in table III.

Caution: The load requirements in table III are for production testing and should not be used for design.
Preloads are established by tooling used to install the pins and collars.

TABLE III. Pin and collar strength.

Pin and collar combination		Minimum shear and tensile strengths (pounds) 1/							
		6061 Aluminum (class 1)		CRES (Class 2)		Carbon steel (Class 3)		Carbon steel high-strength (class 5)	
Nominal pin size (inches)	Collar height	Shear	Tensile	Shear	Tensile	Shear	Tensile	Shear	Tensile
3/16 type I type III	Regular or flanged	775	530	2000	1455	1725 2050	1650 2250	2430	2200
3/16 type I	Low	775	300	2000	1000	1725	825		
1/4 type I type III	Regular or flanged	1375	975	3550	2750	3050 2650	3000 3500	4300	3700
1/4 type I	Low			3550	1250	3050	1500		
5/16 type I type III	Regular or flanged	2125	1550	5525	4250	4725 4500	4600 5800	6700	6000
5/16 type I	Low	2125	775	5525	2000	4725	2300		
3/8 type I type III	Regular or flanged	3050	2400	7950	6100	6825 6450	6500 8600	9600	9300
3/8 type I	Low	3050	1200	7950	3100	6825	3250		
1/2 type II type III	Regular or flanged	5300	2/4900	13900	17050	7500	12000	14400	17050
1/2 type II	Low								
5/8 type II type III	Regular or flanged	8300	7670	21000	27100	11600	19000	22500	27100
5/8 type II	Low								

See footnotes at end of table.

TABLE III. Pin and collar strength - Continued.

Pin and collar combination		Minimum shear and tensile strengths (pounds) 1/							
		6061 Aluminum (class 1)		CRES (Class 2)		Carbon steel (Class 3)		Carbon steel high-strength (class 5)	
Nominal pin size (inches)	Collar height	Shear	Tensile	Shear	Tensile	Shear	Tensile	Shear	Tensile
3/4 type II type III	Regular or flanged	11900	11040	30300	40100	17000	27600	32400	40100
3/4 type II	Low								
7/8 type II	Regular or flanged							43400	55450
1 type II	Regular or flanged							56500	72700

1/ Strengths based on pin and collar combinations of the same material class.
2/ This pin and collar combination may not be an acceptable substitute for the same combination shown in revision B of this specification which had a specified tensile strength of 5000 pounds.

3.7 Assembly dimensions. The pin and collar assemblies for tensile testing shall conform to the dimensional requirements of figure 1.

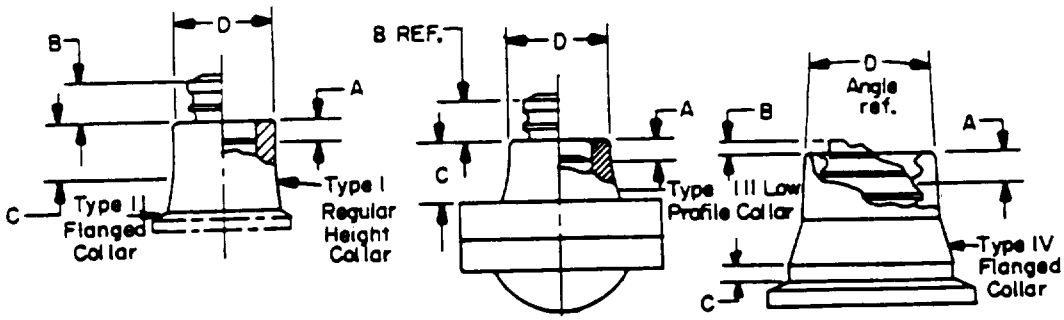
3.8 Workmanship. The pins and collars shall conform to high grade fastener manufacturing practices. Swage-locking pins shall not contain imperfections which equal or exceed the limitations specified in 3.8.1 through 3.8.3 and 3.8.4 for collars. Defect definitions are given in SAE J 123.

3.8.1 Cracks. Swage-locking pins shall be free of cracks in any direction and location.

3.8.2 Seams and bursts. Swage-locking pins may possess longitudinal seams and bursts which do not exceed the tolerances specified on figure 2. Seams up to the depths indicated which have been rolled beneath the annular rings or grooves shall not be cause for rejection.

3.8.3 Head-to-shank junction. Only longitudinal seams of the depth permitted on figure 2 shall be allowed for the head to shank junction. Slight tool marks or undercuts shall be allowed, provided they flare into the shank with no sharp V-notch grooves, gouges or corners.

3.8.4 Defects on swage-locking collars. Swage-locking collars shall have no burrs, chamfers, and flash, which exceed the limits specified on figure 3.



Installed with type I pin

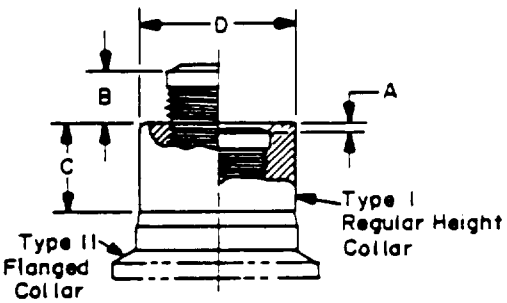
Nom size	A Ref Max grip	B Ref Min grip	C Min	D Dia max
3/16	5/64	1/8	11/64	.276
1/4	5/64	5/32	1/4	.364
5/16	9/64	7/32	9/32	.454
3/8	1/8	9/32	11/32	.552

Installed with type I pin

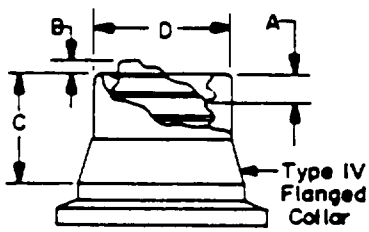
Nom size	A Ref Max grip	B Ref Min grip	C Max	D Dia max
3/16	1/64	13/64	11/64	.276
1/4	1/32	17/64	7/32	.364
5/16	1/16	11/32	19/64	.454
3/8	5/64	7/16	21/64	.552

Installed with type III pin

Nom size	A Ref max	B Ref max	C Max	D Ref
3/16	1/16	1/32	.050	5°
1/4	1/8	1/32	.100	6° 30'
5/16	3/16	9/64	.100	6° 30'
3/8	1/4	11/64	.100	6° 30'



Nom dia	A max	B max	C min	D max
1/2	1/16	3/8	17/64	0.729
5/8	1/16	3/8	29/64	0.910
3/4	1/16	3/8	29/64	1.106
7/8	1/16	3/8	1/2	1.270
1	1/16	3/8	19/32	1.465



Installed with type II pin

Nom size	A* Ref max	B Ref max	C Min	D Max
1/2	1/8	3/8	13/32	.733
5/8	1/8	3/8	5/8	.916
3/4	1/8	3/8	21/32	1.110
7/8	1/8	3/8	3/4	1.282
1	1/8	3/8	7/8	1.465

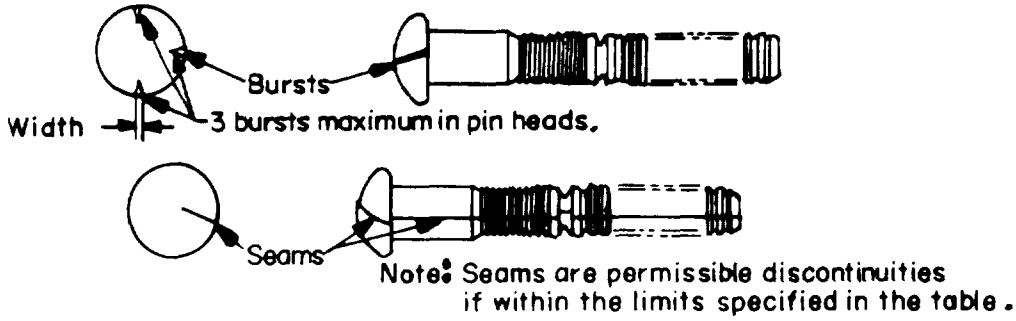
Installed with type III pin

Nom size	**A Ref max	B Ref max	C Min	D Max
1/2	5/16	3/32	.500	.670
5/8	7/16	1/8	.625	.845
3/4	1/2	1/8	.750	1.016

Note: Dimension A for all configurations is an approximation and is furnished to augment inspection by witness mark. Full mechanical values are assumed when witness marks are "two-max". Measurement of depression A and projection B should be considered reference, cosmetic, information.

FIGURE 1. Dimensional requirements for installed fasteners.

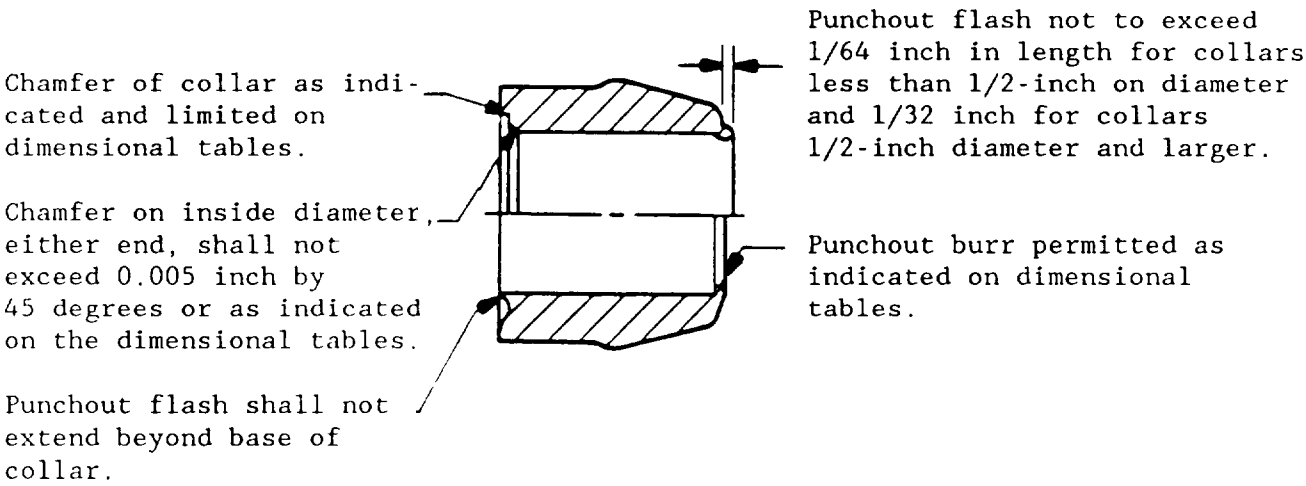
Typical bursts and shear burst.



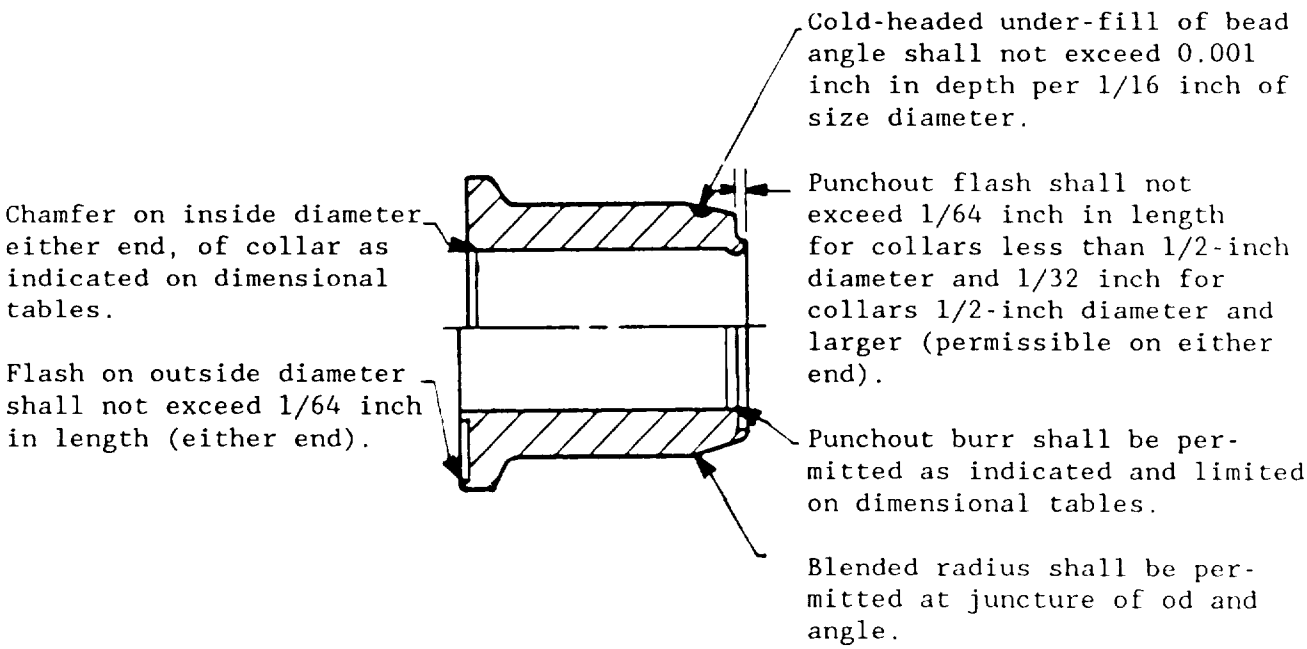
Nom pin dia	Maximum head burst width	Max seam	
		width	depth
0.187	0.029	0.005	0.007
.250	.033	.005	.008
.312	.056	.006	.009
.375	.039	.006	.010
.500	.045	.010	.012
.625	.051	.010	.013
.750	.058	.010	.023
.875	.064	.010	.026
1.000	.070	.010	.030
1.125	.076	.010	.034

Note: All dimensions are in inches. Typical bursts and seams are shown above.

FIGURE 2. Burst and seam acceptance criteria.



Beaded collars



Flanged collars

FIGURE 3. Acceptable chamfer, flash and burrs.

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 shall 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 the 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 Inspection lot. For the purpose of examination and tests, a lot shall consist of pins or collars of one type and class (material), same coating and nominal size and length, from the same production run and offered for examination at one time.

4.3 Quality conformance inspection. Quality conformance inspection shall consist of the inspections and tests shown in table IV. Quality conformance inspection shall be performed on every lot of pins or collars acquired under this specification (see 6.3).

TABLE IV. Quality conformance inspections and tests.

Inspection or test	Requirement	Test	Sampling plan code letter
Visual	3.1, 3.3, 3.8	4.4	B
Dimensional	3.1, 3.5, 3.7	4.4	B
Material	3.2	1/	1/
Protective coating test	3.2.1	4.7	1 per lot
Tensile and pushout test	3.6	4.5	C
Shear test	3.6	4.6	C

1/ Material certifications or material test results shall be maintained to establish identity and traceability of materials used for each lot of pins or collars.

4.3.1 Sampling for quality conformance inspection. As a minimum, the contractor shall randomly select a sample quantity from each lot of completed pin or collars in accordance with tables IV and V and inspect them in accordance with 4.3. Sample size depends on the sampling plan code letter shown in table IV. If one or more defects are found in any sample, the entire lot shall be rejected. The contractor has the option of screening 100 percent of the lot for the defective characteristics or providing a new lot which shall be inspected in accordance with the sampling plan contained herein. The contractor shall maintain for a period of three years after contract completion, records of inspections, tests, and any resulting rejections.

TABLE V. Sample size for quality conformance inspections and tests.

	Sample size	
Lot size	Sampling plan code letter B	Sampling plan code letter C
2 to 8	3	2
9 to 15	3	2
16 to 25	3	2
26 to 50	5	3
51 to 90	6	4
91 to 150	7	5
151 to 280	10	6
281 to 500	11	7
501 to 1200	15	8
1201 to 3200	18	9
3201 to 10,000	22	9
10,001 to 35,000	29	9
35,001 to 150,000	29	9

4.4 Inspection. Visual examination shall consist of examination for conformance with 3.3 and 3.8. Dimensional examination shall consist of conformance to 3.1, 3.5, 3.7, and table VI with the applicable specification sheets. Testing for strength shall conform to 3.6, 4.5, and 4.6.

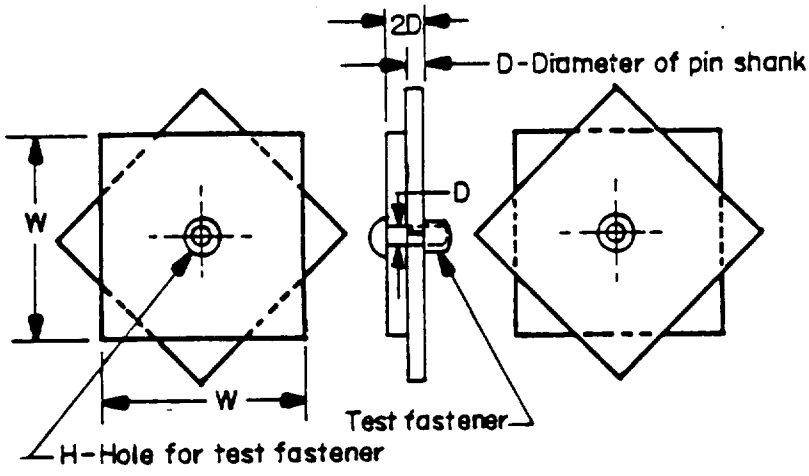
TABLE VI. Toleranced dimensions.

Component	Dimensions
Pins	Body diameter
	Shank diameter
	Maximum length, (exclusive of head height)
	Grip length
	Straightness and concentricity
Collars	Inside diameter
	Outside diameter
	Collar length

4.5 Tensile strength. The tensile load to failure of pin rivet assemblies shall be determined using the fixture shown on figures 4, 5, and 6 based on the minimum rated grip of the pin being tested. Tests shall be in accordance with ASTM E 8, except that the rate of loading shall not exceed 2,500 pounds per minute.

4.5.1 Fasteners having a grip length less than twice the shank diameter (2D) shall be tested by the push-out method shown on figure 6. Fasteners having a grip length 2D or greater shall be tested by either the push-out method (see figure 6) or tensile method shown on figures 4 and 5. In the event of a conflict between the results of the two tests, the tensile test method shall govern.

4.6 Shear strength . The shear load to failure of pins shall be determined using the fixture shown on figure 7.



D	H +0.003 -0.000	W (inches)
Pin size (inch)	Drill size (inch)	
3/16	No. 9 (0.196)	
1/4	Letter G (.261)	
5/16	Letter P (.323)	
3/8	Letter W (.386)	2
1/2	17/32 (.531)	
5/8	21/32 (.656)	
3/4	25/32 (.781)	
7/8	29/32 (.906)	3
1	1-1/32 (1.031)	

Material:
Test fixture shall be fabricated from heat treated alloy steel having a Rockwell hardness of from RC46 to RC50.

FIGURE 4. Assembly of test plates before attaching to jig tensile test fixture.

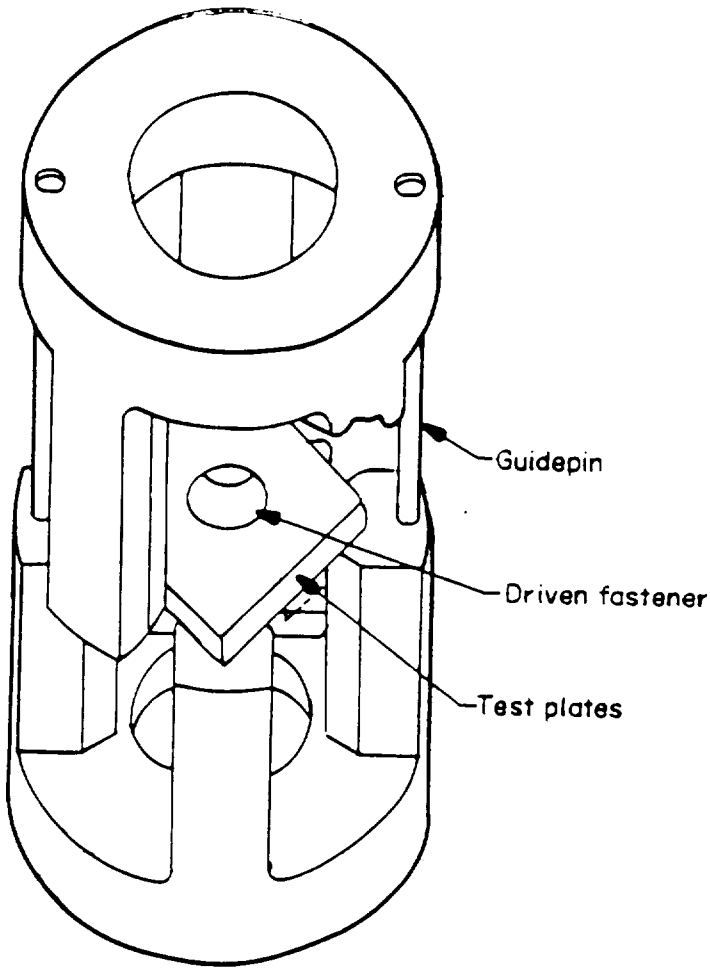


FIGURE 5. Tensile fixture.

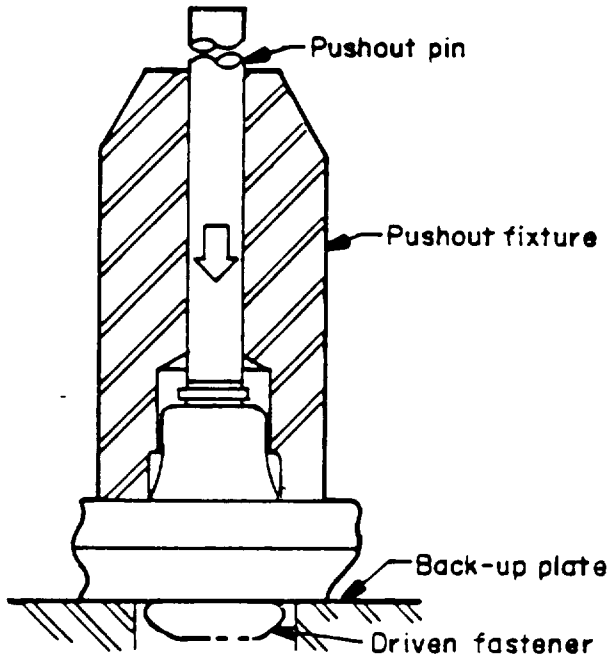


FIGURE 6. Push-out tensile test fixture.

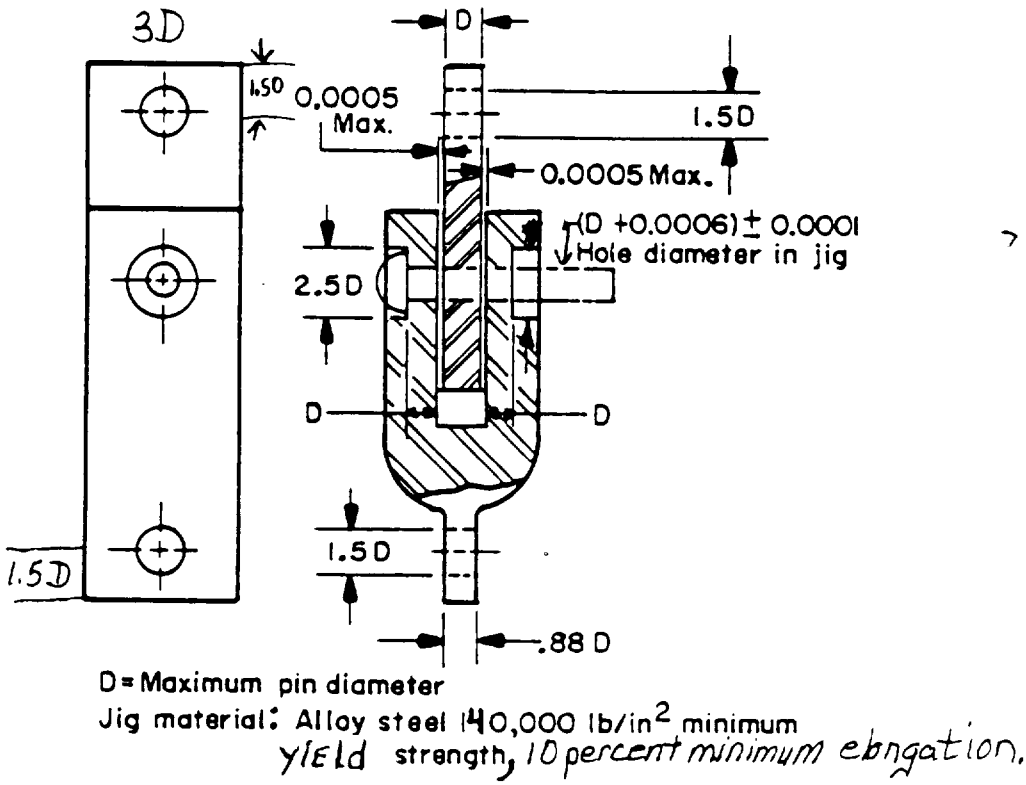


FIGURE 7. Shear test fixture.

4.7 Protective coating tests. Testing shall consist of the examinations specified in the applicable specification (see 3.2.1).

4.8 Rejected lots. Prior to resubmitting a rejected lot for examination, the contractor shall rework or reinspect the lot for the deficiencies noted and remove all non-conforming pieces. Samples shall be selected from the resubmitted lots in accordance with 4.3 as applicable. The samples shall be inspected for the deficiency for which rejection was originally made.

4.9 Inspection of packaging. Sample packages and the inspection of the packaging (preservation, packing and marking) for shipment, stowage and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition.)

5.1 Packaging. Fasteners (pins and collars) shall be preserved level A, B, or commercial (level C), packed level A, B, or commercial (level C) as specified (see 6.2), and marked including bar coding and other ordering data options required in accordance with PPP-H-1581. In addition, for Navy acquisitions, the following applies:

(a) Navy fire-retardant requirements.

(1) Lumber and plywood. Unless otherwise specified (see 6.2), all lumber and plywood including laminated veneer material used in shipping container and pallet construction, members, blocking, bracing, and reinforcing shall be fire-retardant treated material conforming to MIL-L-19140 as follows:

Level A and B - Type II - weather resistant.
Category I - general use.
Level C - Type I - non-weather resistant.
Category I - general use.

(2) Fiberboard. Unless otherwise specified (see 6.2), fiberboard used in the construction of interior (unit and intermediate) and exterior fiberboard boxes including interior packaging forms shall conform to the class-domestic/fire retardant or class-weather resistant/fire retardant materials requirements as specified (see 6.2), of PPP-F-320 and amendments thereto.

(3) Cushioning and wrapping materials. The use of excelsior, newspaper, shredded paper (all types), and similar hydroscopic or non-neutral materials and all types of loose fill materials for packaging (preservation and packing) applications such as cushioning, fill, stuffing and dunnage is prohibited. Materials selected for cushioning and wrapping shall have properties (characteristics) for resistance to fire (see 6.8). Cushioning or wrapping materials, as applicable, shall be provided to prevent item and package damage and to prevent free movement of the container contents.

6. NOTES

6.1 Intended use. Swage-locking pins and collars provide permanent, uniform high shear and tensile strength fastening for structural joints in hull structure, shipboard superstructure, ordnance, launchers, vehicles, ground support equipment, building assembly and structural steel erection, of which the following are typical examples:

(a) Superstructure connections, deckhouse attachment, joiner doors, lockers, ladders, vents, air ducts, and general shipboard maintenance.
(b) Structure fastenings: gunwale angles, shear strake, crack arrestors, bilge strakes, bilge keel, deck straps, bulwarks, access plates, smoke stacks.
(c) Gun shields, davits, life boats, loading and landing equipment, missile and rocket launcher equipment.
(d) Storage tanks, structural steel erection, prefab building assembly, and industrial cranes.

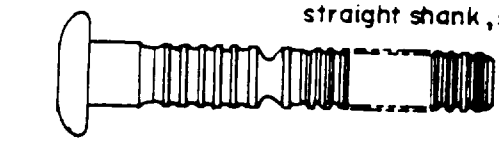
6.1.1 Type selection. Types of pins and collars should be selected to effect proper joining and sealing by the use of suitable head contour in relation to the application, (see figure 8 for pin and collar detail). Fasteners conforming to this specification are intended to pull joint surfaces together to minimize gaps.

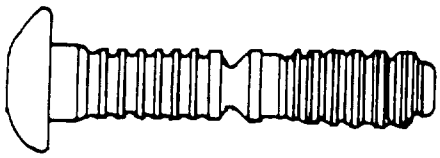
6.1.2 Standardization. Where strength permits, carbon-steel type III, wide grip range pins (which were not covered in MIL-P-23469B) are preferred for new design because of their wider grip range over carbon steel type I pins. Type III pins have superior tensile strength to type I pins in all sizes, but inferior shear strength for 1/4 inch through 3/8 inch nominal diameters.

6.1.3 Specification coverage. This specification does not cover all the styles and sizes of codified swage-locking pins and collars commercially available. It is intended to cover only those styles, classes, and sizes which, are suitable for shipboard applications.

Pins. Type I.

MIL-P-23469/2 Pin, swage-locking, brazier head, straight shank, six locking grooves.



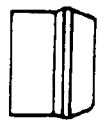


Seven locking grooves applicable to 5/16 inch nominal diameters of MIL-P-23469/5 and /6 also.

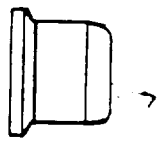
MIL-P-23469/5 Pin, swage-locking, truss head, straight shank, six locking grooves.

MIL-P-23469/6 Pin, swage-locking, flat 90 degree countersunk head, straight shank, six locking grooves.

Type I. Regular height.



Type II. Flanged.

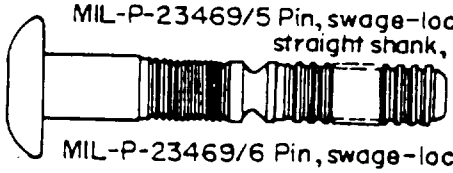


Type III. Low profile.

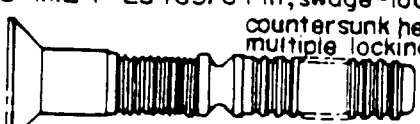
Pins. Type II.

MIL-P-23469/4 Pin, swage-locking, round head, straight shank, multiple locking grooves.

MIL-P-23469/5 Pin, swage-locking, truss head, straight shank, multiple locking grooves.

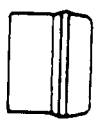


MIL-P-23469/6 Pin, swage-locking, flat 90 degree countersunk head, straight shank, multiple locking grooves.

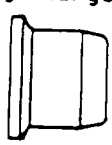


MIL-P-23469/7 Pin, swage-locking, oval 60 degree countersunk head, with tapered shank section, multiple locking grooves.

Type I. Regular height.



Type II. Flanged.

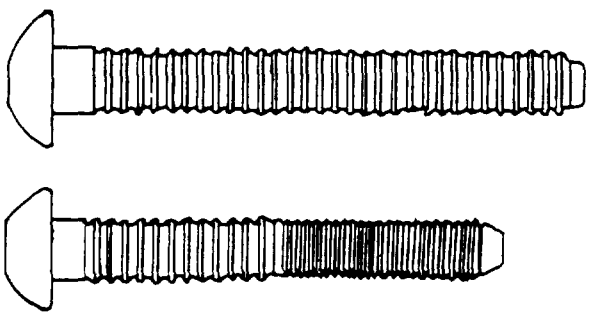


Type III. Low profile.

FIGURE 8. Typical fasteners.

Pins, Type III.

MIL-P-23469/3 Pin, swage-locking, widegrip range, multiple locking grooves.



MIL-P-23469/1 Collars, swage-locking.

Type IV. Flanged.

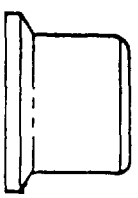


FIGURE 8. Typical fasteners - Continued.

6.2 Acquisition requirements. Acquisition documents must specify the following:

(a) Title, number, and date of this specification.
(b) Title, number, and date of the applicable specification sheet.
(c) Type, diameter, grip length and class of pin or type, diameter, and class of collar (see applicable specification sheet and 1.2).
(d) Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
(e) Quantity expressed in terms of pieces of each item.
(f) Level of preservation, packing and marking required (see 5.1).
(g) If fire-retardant requirements are not required (see 5.1).

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DoD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

Reference Paragraph	DID Number	DID Title	Suggested Tailoring
4.3	UDI-A-23264	Certification data/report	----

The above DID's were those cleared as of the date of this specification. The current issue of DoD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.4 Cross reference. The fastener classifications given in this specification are equivalent to commercial designations in manufacturer's standards for "Lockbolts" and are listed in table VII. Collars customarily used with the pins are listed to the right of each group of pins.

TABLE VII. Cross reference of swage-locking pin and collar classification.

Pin			Collar		
MIL-P-23469	MIL-P-23469D	Commercial designation 1/ 2/	MIL-P-23469	MIL-P-23469D	Commercial designation
Class BF	M23469/2 type I class 1	C6LB-F			
Class RF	M23469/5 type I class 1	C6LT-F	Class 1	M23469/1 type I class 1	LC-I
			Class 3-1	M23469/1 type II class 1	3LC-T
Class 90F	M23469/6 type I class 1	C6L90-F			
Class BU	M23469/2 type I class 2	C6LB-U			
Class RU	M23469/5 type I class 2	C6LT-U	Class 2-U	M23469/1 type I class 2	2LC-2CU
			Class 3-U	M23469/1 type II class 2	3LC-2CU
Class 90U	M23469/6 type I class 2	C6L90-U	Class 8-U	M23469/1 type III class 2	8LC-2CU
	M23469/3 type III class 3	HGPB-R			
	M23469/3 type III class 3	HGPT-R		M23469/1 type IV class 3	HGC-R
	M23469/3 type III class 3	HGP90-R			
	M23469/3 type III class 3	HGP98T-R			
Class BRG	M23469/2 type I class 3	C6LB-R	Class 2-RG	M23469/1 type I class 3	2LC-R
			Class 3-RG	M23469/1 type II class 5	3LC-2R
	M23469/5 type I class 3	C6LT-R	Class 8-RG	M23469/1 type III class 3	8LC-2R
Class 90RG	M23469/6 type I class 3	C6L90-R			
Class 12 0BRG	M23469/2 type I class 5	C120LB-R	Class 2-120RG	M23469/1 type I class 5	2LC120-R
Class 12 0TRG	M23469/5 type I class 5	C120LT-R	Class 3-120RG	M23469/1 type II class 5	3LC120-R
Class 12 090RG	M23469/6 type I class 5				
	M23469/4 type II class 1	C50LR-F		M23469/1 type I class 1	LC-1
	M23469/5 type II class 1	C50LT-F		M23469/1 type II class 1	3LC-1
	M23469/6 type II class 1	C50L90-F			
	M23469/7 type II class 1	C50L60-F			
	M23469/4 type II class 2	C50LR-U		M23469/1 type I class 2	LC-2CU
	M23469/5 type II class 2	C50LT-U		M23469/1 type II class 2	3LC-2CU
	M23469/6 type II class 2	C50L90-U		M23469/1 type III class 2	8LC-2CU
	M23469/7 type II class 2	C50L60-U			

See footnotes at end of table.

TABLE VII. Cross reference of swage-locking pin and collar classification - Continued.

Pin				Collar		
MIL-P-23469	MIL-P-23469D	Commercial designation 1/ 2/		MIL-P-23469	MIL-P-23469D	Commercial designation
Class 60R	Discontinued use--- class 50L60-R			Class RG	M23469/1 type I class 3	LC-2R
					M23469/1 type II class 5	3LC-2R
Class 50R	M23469/4 type II class 5	C50LR-BR			M23469/1 type III class 3	8LC-2R
	M23469/5 type II class 5	C50LT-BR				
	M23469/6 type II class 5	C50L90-BR				
Class 50L60R	M23469/7 type II class 5	C50L60-BR				
					M23469/1 type IV class 1	MGC-F

1/ C6L 100 percent interchangeable with CLP.
2/ HGP not 100 percent interchangeable with C6L and CLP.

6.6 Engineering data.

6.6.1 Clamping force. Table VIII lists the values for the clamping force of installed types I, II, III and IV, aluminum alloy, corrosion-resistant steel, carbon steel, and carbon steel high strength fasteners. Clamping force is established by installation and inspection in a Skidmore-Wilhelm or equivalent tension tester.

TABLE VIII. Minimum clamping force in pounds for ALUM, CRES, and C.S.

Nominal size (inch)	ALUM 1/ 5/	CRES 2/	C.S. 3/ 5/	C.S. high strength
3/16	(550) 350	1025	(1025) 1025	1200
1/4	(950) 620	1805	(1805) 1805	2300
5/16	(1500) 965	2810	(2810) 2810	4200
3/8	(2400) 1380	4020	(4020) 4020	5980
1/2	4400	12050	(6500) 12050	4/
5/8	6900	19200	(10200) 19200	
3/4	9950	28400	(15000) 28400	
7/8			39250	
1			51500	

1/ As installed with regular or flanged aluminum collar.
2/ As installed with regular or flanged CRES collar.
3/ As installed with regular or flanged C.S. collar.
4/ Comparable to ASTM A 325 high strength bolts in 1/2 through 1 inch diameter.
5/ Figures in parentheses apply to type III fasteners.

6.6.2 Figure 9 shows a typical non-dimensional interaction curve for a multiple locking groove, carbon steel fastener.

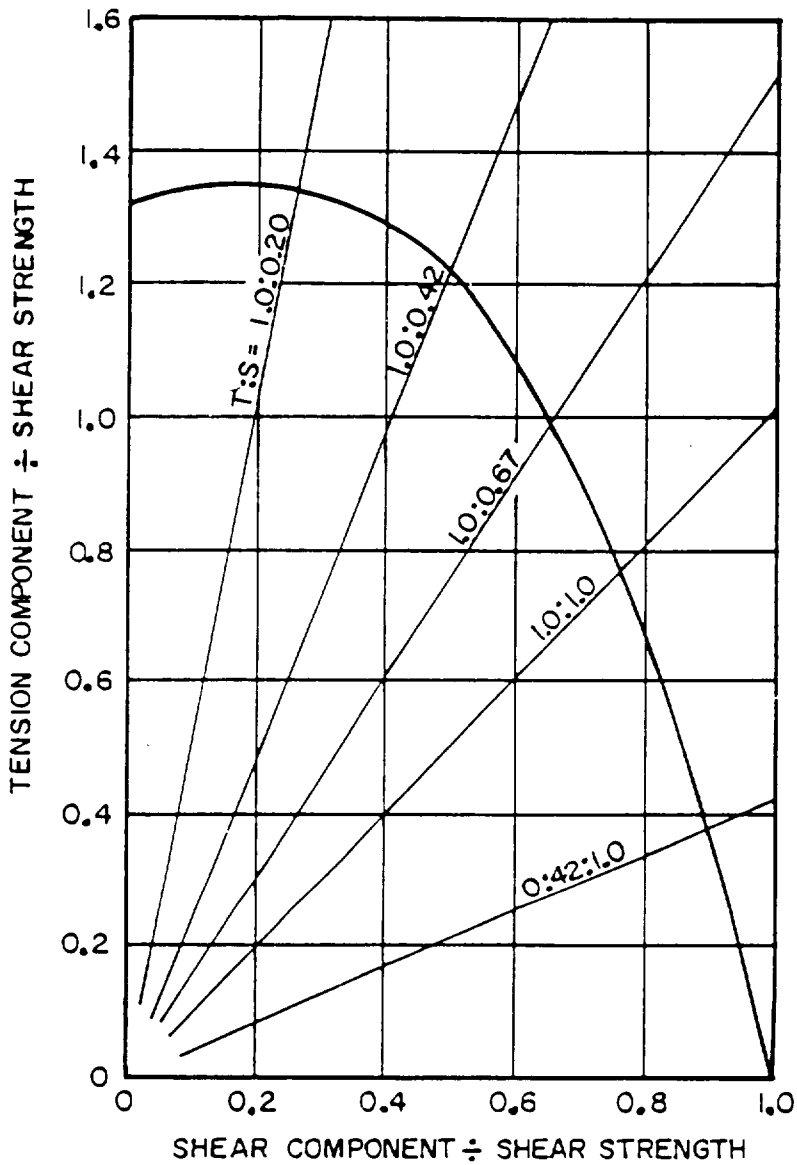


FIGURE 9. Typical non-dimensional interaction curve for type II multiple locking groove pins with type I, class 3 and 4 collars.

6.7 Patent notice. The Government does not have a royalty-free license under the following patents, owned by the Huck Manufacturing Company, subsidiary of Federal-Mogul Corporation, for the benefit of manufacturers of the items called for in this specification and related detailed specification sheets, either for the Government or for use in equipment to be delivered to the Government:

Patent number	Expiration date
4,208,943	June 24, 1997
4,342,529	August 3, 1999

6.8 Cushioning and wrapping materials (see 5.1(a)(3). Materials having properties for resistance to fire and acceptable for use within interior (unit and intermediate) packs and shipping containers for Navy acquisitions are:

Material	Specification
Paper, Kraft, Treated (Fire Resistant)	A-A-1894
Paper, Kraft, Wrapping	UU-P-268, Type II, Grade C or D
Fiberboard	PPP-F-320, Class-Domestic weather-resistant/Fire-retardant
Plastic Film, Flexible, Cellular	PPP-C-795, Class 3 - Fire retardant
Polystyrene Expanded, Resilient	PPP-850, Grade SE
Plastic, Open Cell, Cushioning	PPP-C-1842, Type I, Style B
Bound Fiber	PPP-C-1120, Class A, Grade I, Type optional
Rubber, Latex Foam	MIL-R-5001, Grade A
Rubber, Cellular	MIL-R-6130, Grade A
Fibrous Glass	MIL-C-17435
Polyurethane Foam	MIL-P-19644, Type II
Rubber, Cellular, Synthetic	MIL-R-20092, Class 5
Polyurethane Foam	MIL-P-26514
Cushioning, Resilient Type, General	MIL-C-26861
Polyurethane Foam Flexible, Open Cell	MIL-F-81334
Foam-In-Place Packaging Materials: General Specification For	MIL-F-83671
Foam, Combustion, Retardant, for Cushioning Supply Items Aboard Navy Ships	MIL-F-87090(SA)

6.9 Subject term (key word) listing.

Headed
Metal fasteners
Pull joint surfaces
Tensile strength fastening

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

Preparing activity:
Navy - SH
(Project 5320-N026-09)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
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I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
	MIL-P-23469D(SH)	92-12-22

3. DOCUMENT TITLE: PIN-RIVET, GROOVED AND COLLAR, GROOVED PIN-RIVET, SWAGE-LOCKED (LOCKPIN) GENERAL SPECIFICATION FOR

4. NATURE OF CHANGE (*Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.*)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (*Last, First, Middle Initial*)	b. ORGANIZATION	
c. ADDRESS (*Include Zip Code*)	d. TELEPHONE (*Include Area Code*) (1) Commercial (2) AUTOVON (*If applicable*)	7. DATE SUBMITTED (*YYMMDD*)

8. PREPARING ACTIVITY

a. NAME	b. TELEPHONE (*Include Area Code*)
Technical Point of Contact (TPOC): Mr. John Forney (SEA 05M2) PLEASE ADDRESS ALL CORRESPONDENCE AS FOLLOWS:	(1) Commercial: TPOC: (703) 602-0143 (2) AUTOVON: 8-332-0143
c. ADDRESS (*Include Zip Code*) Commander SEA 05Q42 Naval Sea Systems Command 2531 National Center, Bldg 3 Washington, DC 20362-5160	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340