NOTICE
OF CANCELLATION

FF-B-588
NOTICE 1
December 31, 1996

FEDERAL SPECIFICATION

BOLT, TOGGLE: AND EXPANSION SLEEVE, SCREW

Federal Specification FF-B-588E, dated September 1, 1993 is hereby cancelled without replacement.

PREPARING ACTIVITY

GSA - FSS

FSC 5306

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FEDERAL SPECIFICATION

BOLT, TOGGLE: AND EXPANSION SLEEVE, SCREW

This Federal specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. Toggle bolts and screw expansion sleeves covered by this specification are self-contained anchoring devices with wings which automatically open or swing in place after being pushed through an open hole accessible from one side only. Plastic screw anchors are screw activated devices which expand inside a hollow wall and accept a sheet metal screw.

1.2 Classification.

1.2.1 Type, classes and styles. Toggle bolts, expansion sleeves, and anchors covered by this specification shall be of the following types, classes and styles as specified (see 6.2).

Type I - Spring-wing toggle bolts, with two-piece wings.
- Class A - Sheet metal winds.
  - Style 1 - Machine screw.
  - Style 2 - Continuous thread stud.
  - Style 3 - Eyebolt.
- Class B - Wire wings.
  - Style 1 - Machine screw.
  - Style 2 - Continuous thread stud.

Type II - Tumble-wing toggle bolts, with one-piece sheet metal wings.
- Class A - Pivoted bolts.
  - Style 1 - Machine screw.
  - Style 2 - Continuous thread stud.
  - Style 3 - Eyebolt.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data which may improve this document should be sent to: General Services Administration, Industrial Engineering Group, (7FXEI), 819 Taylor St., Fort Worth, TX 76102.

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Type III - Screw expansion sleeve, hollow wall type.
Class A - Regular.
Class B - Hammer drive.

Type IV - Plastic screw anchor.

Type V - Captive anchor toggle, with bolt.

2. APPLICABLE DOCUMENTS

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

Federal Specifications:

FF-N-836	-	Nut: Square, Hexagon, Cap, Slotted, Castellated, Clinch, Knurled, Welding and Single Ball Seat.
FF-S-92	-	Screws, Machine: Slotted, Cross-Recessed or Hexagon Head.
QQ-P-416	-	Plating, Cadmium (Electrodeposited).
PPP-H-1581	-	Hardware (Fasteners and Related Items), Packaging and Packing for Shipment and Storage of.

Federal Standards:

Fed. Std. No. 123	-	Marking for Domestic Shipment (Civil Agencies).
FED-STD-H28/2	-	Screw-Thread Standards for Federal Services, Section 2, Unified Inch Screw Threads-UN and UNR Threads Forms.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA.)

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks from established distribution points in their agencies.)

Military Specifications:

MIL-A-3816 - Abrasives and Abrasive Products, for Shipment and Storage, Packaging and Packing of.
MIL-C-81562 - Coatings, Cadmium, Tin-Cadmium and Zinc (Mechanically Deposited).

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer).

Other Publications: The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on the date of invitation for bids or request for proposal shall apply.

ASTM:

ASTM B 633 - Standard specification for Electrodeposited Coatings of Zinc on Iron and Steel.

(Copies of ASTM specifications are available from: ASTM, 1916 Race Street, Philadelphia, PA 19103)

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 the date of invitation for bids or request for proposal shall apply.

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

2.4 Figures. The figures contained in this specification are intended for reference purposes only and are not intended to limit specific product design.

3. REQUIREMENTS

3.1 Material. Unless otherwise specified (see 6.2), the material for toggle bolts, screws and square nuts shall be low carbon steel. The trunnion nut may be of die cast zinc at the manufacturer's option. The wings of Type I, Class B toggle bolts shall be made of carbon steel spring wire, annealed and heat treated after shaping, and the wing holders shall be made of carbon steel. The anchor sleeve for Type III shall be made of carbon steel. Type IV plastic screw anchors shall be made of polypropylene plastic or other plastic having sufficient strength and flexibility to meet the intended purpose and load requirements of Table VI.

3.2 Protective finish. Unless otherwise specified (see 6.2), toggle bolts and expansion sleeves, except wing groove springs, shall have one of the protective finishes specified herein.

3.2.1 Cadmium plating. Cadmium, plating shall be in accordance with Type II, Class 3 of QQ-P-416 or MIL-C-81562. When specified (see 6.2), Cadmium plating shall be in accordance with Type III, Class 3 of QQ-P-416 or MIL-C-81562.

3.2.2 Zinc coating. Unless otherwise specified (see 6.2), zinc coating shall be in accordance with MIL-C-81562 or Type III, classification Fe/Zn 5 of ASTM B633.

3.3 Type I - Spring-wing toggle bolts, with two-piece wings.

3.3.1 Class A, sheet-metal wings (figures 1, 2, and 3).

3.3.1.1 Wings. Wings shall be of two sheet-metal parts of "U" or channel shape. The wings shall be pivoted either on trunnion nuts or pins and shall be held normally in open position by a spring or.springs placed inside the wing groove.

3.3.1.2 Pivots.

3.3.1.2.1 Styles 1 and 2. Wing pivots shall be integral with the trunnion nuts use with the machine screw or threaded stud. The nut shall engage not less than two full threads of its screw or stud except in toggle bolts where the wing parts close on the bolt and lock it while being tightened, in which case one full thread engagement is permissible. The trunnion nuts shall be inserted only in place with the pivots passed through the eyes in the wings.

3.3.1.2.2 Style 3. Wing pivots shall be of a cylindrical pin shape, straight or with reduced end diameters. The pivot pins may be either riveted, spun or only inserted in place, at the manufacturer's option.

3.3.1.3 Bolts.

3.3.1.3.1 Style 1. Machine screws shall be threaded within a distance of not more than the diameter of the screw from the head.

3.3.1.3.2 Style 2. Continuous thread studs shall be threaded their full length and fitted with square nuts, unless otherwise specified (see 6-2).

3.3.1.3.3 Style 3. Eyebolts shall be of the flattened, pierced and closed eye type with a continuous thread up to within two diameters of the flattened end. The eyebolts shall be fitted with square nuts, unless otherwise specified (see 6.2).

3.3.2 Class B, wire wings (figures 4 and 5).

3.3.2.1 Wings. Wings shall be of two oblong wire loops made of carbon steel spring wire. The ends of these loops shall be bent to a shape that fits securely and resiliently into cam slots in the wing holders.

3.3.2.2 Wing holders. Wing holders shall be of carbon steel stock drawn into shallow cup shape with two rounded ears cylindrically bent and located opposite each other. The cups shall have a centrally pierced, flanged and threaded opening and serve as nuts far the bolts. Each ear shall have two cam slots for the wire loop ends. The slots shall permit resilient bending of wire loops towards the bolt stem and their automatic opening when the toggle bolt is set in place.

3.3.2.3 Bolts. For applicable construction requirements see 3.3.1.3.1 and 3.3.1.3.2.

3.4 Type II - Tumble-wing toggle bolts, with one-piece wings.

3.4.1 Class A, pivoted bolts (figures 6, 7, and 8).

3.4.1.1 Wings. Wings shall be of a single piece of sheet metal bent to a "U" or channel shape.

3.4.1.2 Pivots. Pivots shall be integral with the trunnion nuts when used with machine screws and threaded studs and shall be of pin type when used with eyebolts. These pivots shall be assembled with the wings in the manner specified in 3.3.1.2.

3.4.1.2.1 Pivots shall be located off center of gravity of the wings so that the wings and bolts are normally in,a cross position. A spring may be included in the pivot assembly to assure cross position of the wing in relation to the bolt.

3.4.1.3 Bolts. For applicable construction requirements see 3.3.1.3.1, 3.3..1.3.2 and 3.3.1.3.3.

3.5 Type III - Screw expansion sleeve. This anchor shall consist of two major parts, an expansion sleeve and a machine screw. The sleeve shall be of steel construction of sufficient thickness to provide rigidity and adequate holding power to the entire unit. It shall be threaded at one end, and the opposite end shall have a flanged collar with a suitably sized hole that allows the screw to pass to the threaded section.

3.5.1 Class A, regular (figure 9).

3.5.1.2 Flanged collar. The diameter of the unthreaded flange (collar) shall be not less than 0.19 inch larger than the diameter of the sleeve at the point (neck) where it is formed or secured by welding. The collar shall have two prongs that grip into the surface of the wall material and prevent the sleeve from turning when the screw is tightened.

3.5.1.3 Sleeve. The sleeve shall be node of one or not more than three pieces of steel. If made of more than one piece, all parts shall be securely welded to form an integral sleeve.

3.5.1.3.1 The threaded end of the sleeve shall have a device such as an inverted deformed steel washer (nut) not less than 0.03 inch thick; or the sides of the sleeve at the end shall be properly formed and threaded for at least 0.25 inch. The threaded end of the sleeve shall have a minimum of three threads.

3.5.1.3.2 If the threaded end of the sleeve is of the steel washer or nut type, the end of the screw shall extend not less than 0.06 inch beyond the threaded end of the sleeve before expansion. The threaded screw length on other types shall be at least as long as the sleeve.

3.5.1.3.3 If the collar and threaded washer are not a continuation of the body, they shall be rigidly secured to the ends by at least two adequate spot welds approximately 180 deg apart. The collar or nut may have a flat or slightly concave surface.

3.5.1.3.4 A device which prevents the prongs on the collar or the sleeve from turning when being turned in soft material shall be furnished, when specified (see 6.2).

3.5.1.4 Fiber washer. A fiber washer may be provided between the head of the screw and the collar to reduce friction and permit easy and effective operations of the anchor.

3.5.2 Class B, hammer drive (figure 10). This anchor shall conform with all requirements of Class A except that it shall have a sharp point and shall be suitable for being driven into a hollow gypsum wall.

3.6 Type IV, plastic screw anchor (figure 11). This anchor shall consist of a molded plastic body designed to accept a #8 to #12 pan head sheet metal screw. The plastic body shall be designed so that when installed, the diameter of the portion of the anchor body within the interior wall side is expanded to prevent removal. The plastic body shall incorporate a molded flange and shall have molded fins on the neck or other features to prevent the anchor body from turning when the sheet metal screw is tightened. When installed, the visible portion of the anchor shall be essentially flush with the wall (flange shall be not more than 1/32 inch thick). Any tool or device necessary to expand the installed anchor other than the intended sheet metal screw shall be furnished with each basic unit of issue quantity supplied.

3.7 Type V, captive toggle with bolt (figure 12). This anchor shall consist of a one piece metal wing and separate bolt. This device shall be designed so that when installed, the wing is held in position on the inside of a hollow wall prior to installation and after removal of the bolt. The device depicted in figure 12 is intended to be representative, but not restrictive. Other designs which serve the intended purpose and conform with stated requirements are acceptable.

3.7.1 Bolts. For applicable construction requirements see 3.3.1.3.1 and 3.3.1.3.2.

3.7.2 Wings. Wings shall be of a single piece of sheet metal bent to a "U" or channel shape and threaded to accept the appropriate bolt.

3.8 Dimensions. Toggle bolts, screw expansion sleeves, and plastic screw anchors shall conform with the dimensions specified in the applicable Table.

3.8.1 Threads. Threads shall be UNC series, class 2A or 2B in accordance with FED-STD-H28/2, except the threaded portion of the toggle head may be threaded oversize at the manufacturer's option (see 6.2). For external threads with additive finish, the maximum diameters of class 2A may be exceeded by the amount of the allowance; i.e., the class 2A maximum diameters apply to an uncoated (or plated) part or to a part before coating (or plating), whereas the basic diameters (class 2A maximum diameters plus the, allowance) apply to a part after coating or plating.

3.8.2 Machine screw heads. The dimensions of machine screw heads shall be in accordance with figure 1, type I, style 1s, 2s, 3s, 7s or figure 2, type III, style 2c, 3c, or 9c of FF-S-92. The head styles of machine screws shall be as specified (see 6.2).

3.8.3 Nuts. The nuts for style 2 and 3 toggle bolts shall be in accordance with FF-N-836, as specified (see 6.2). The square nuts shall conform to type I, style 3.

3.9 Marking. The wings and the wire-wing holders in toggle bolts and the screw expansion sleeves shall be marked in a plain and permanent manner with the manufacturer's name or trademark of such known character that the source of manufacture may be readily determined.

3.10 Regulatory requirements. In accordance-with section 23.403 of the Federal Acquisition Regulations, the Government's policy is to acquire items composed of the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition without adversely affecting performance requirements or exposing suppliers' employees to undue hazards from the recovered materials. 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 are allowed under this specification unless otherwise specified.

Caution should be taken during any coating or plating process. The contractor is responsible for the safe reutilization and disposal of all material generated by the coating or plating process in accordance with all applicable laws and regulations.

3.11 Workmanship. Toggle bolts and screw expansion sleeves shall be free from scale, rust, burrs, fine, seams, unprotected spots and other defects which may affect their durability or serviceability. Plastic screw anchors shall be well formed, free of flash or areas of material so thin as to result in material separation when threading of sheet metal screws.

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 that supplies and services conform to prescribed requirements.

4.2 Inspection provisions.

4.2.1 Lot. A lot shall consist of all toggle bolts, expansion sleeves or plastic screw anchors of the same type, class, style, material, finish, size and head style produced under essentially like conditions and offered for acceptance at any one time.

4.2.2 Sampling.

4.2.1 Sampling for examination. A random sample of bolts, expansion sleeves or plastic screw anchors shall be taken from each lot in accordance with MIL-STD-105, inspection Level S-2. The Acceptable Quality Level (AQL) shall be as specified in Table I.

4.2.2.2 Sampling for test. A random sample of bolts, expansion sleeves or plastic screw anchors shall be taken from each lot in accordance with MIL-STD-105, Inspection Level S-2. The AQL shall be 6.5 percent detective.

4.2.2.3 Sampling for packaging and packing. Sampling for examination and test of preservation, packaging, packing and marking shall be in accordance with PPP-H-1581.

4.2.2.4 Sampling for protective finishes. Sampling for test of protective finishes shall be in accordance with the applicable specification of 3.2.

4.3 Examination. Each item taken as specified in 4.2.2.1 shall be examined to verify conformance with this specification. Examination shall be conducted in accordance with Table I. Any item containing one or more defects shall be rejected, and if the number of defective items exceeds the acceptance number for the sample, the lot represented by the sample shall be rejected.

TABLE I. Classification of defects

Categories	Defects	Inspection Method
Critical	None defined	
Major	AQL = 2.5 percent defective	
101	Material not as specified (3.1)	Visual
102	Type, class and style not as specified (1.2.1).	Visual
103	Threads not as specified (3.7.1)	SIE[1]
104	Spring comes out when toggle is compressed (3.3).	SIE
105	Protective finish missing or incomplete (3.2).	Visual
Minor	AQL = 4.0 percent defective	
201	Screw length, not as specified (3-7).	SIE
202	Other dimensions, not as specified (3-7).	SIE
203	Device to prevent turning in soft material missing (3.51.3.4 & 3.6)	Visual
204	Type of nut or machine screw head not as specified (3.7.2 and 3.7-3).	Visual
205	Marking (3.8).	Visual
206	Workmanship (3.9).	Visual

[1] SIE = Standard Inspection Equipment

4.3.1 Packaging and packing. Examination and test of preservation, packaging and marking shall be in accordance with PPP-H-1581.

4.4 Tests.

4.4.1 Proof load. Samples taken as specified in 4.2.2.2 shall be inserted through a hole in a steel plate. The hole diameter in the steel plate shall be the applicable hole diameter as specified in Table II, III, IV, or V. The toggle bolt shall be centered in the hole and subjected to a proof load, as specified in the applicable Table, in an Axial direction. The toggle bolt, expansion sleeve, or screw anchor shall not be removable or show evidence of failure.

4.4.2 Protective finish. Test of protective finishes shall be in accordance with the applicable specifications of 3.2.

5. PREPARATION FOR DELIVERY

5.1 Preservation, packaging and packing. Preservation and packaging shall be Level A or C and packing shall be Level A, B or C in accordance with PPP-H-1581. The level of protection shall be as specified in 6.2.

5.2 Marking.

5.2.1 Civil agencies. In addition to marking required by the contract or order, packages and shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.2.2 Military activities. In addition to markings required by the contract or order, packages and shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. Toggle bolts and screw expansion sleeves are screw fasteners intended for use in hollow walls or partitions made of gypsum, metal, plaster, tile, etc., where the hole is accessible from only one side.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

(a) Title, number and date of this specification.
(b) Type, class, style and size (1.2.1 and Tables I through V), Type II, Class A toggle bolts are not always available, see 6.4 for replacement information. Type 111, Class B and Type IV fasteners were added in this revision.
(c) Material and finish (3-1 and 3-2).
(d) Type of nut required, if other than square (3.3.1.3.2, 3.3.1.3.3, and 3.7.3).
(e) When a device to prevent sleeve from turning in soft material is required (3.5.3).
(f) Type of machine screw head (3.6.2).
(g) Selection of applicable level of packaging and packing (5.1).
(h) Marking, if required (5.2).

6.3 Civil agency procurement. When level B packaging is required for civil agency procurement, the level A requirements of 5.1 will apply.

6.4 Supersession. Type II, Class B - Loop nested bolts (machine screw) have been deleted from this specification. Type II, Class A - Tumble-wing bolts, with one-piece sheet metal wings have become nonstandard and are not generally available. For Type II, Class B replacement use Type 1, Class A or B, Style I - Spring-wing toggle bolts, or Type V captive anchors having the same nominal size, thread and length. For Type II, Class A replacement use Type I, Class A or B toggle bolts in the same style, nominal size, thread and length.

6.5 Part Number. Toggle bolts, Screw expansion sleeves, and plastic screw anchors covered by this specification shall be identified by a part number configuration consisting of identification of the general specification number, type, class (if applicable), style (if applicable) and size. An example of the part number configuration is shown below. This part numbering system is intended for identification and cross-indexing of the item within the Federal cataloging system. Part numbers are not required to be placed on the product or container.

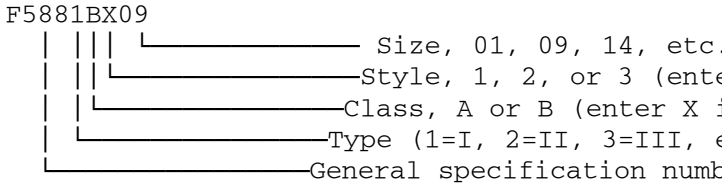

TABLE II. Type I, class A, Sheet metal wing toggle bolts[1]

SIZE NO.	BOLT		WINGS		HOLE DIA		PROOF LOAD LBS MIN[2]
	NOM. SIZE & THREADS	LENGTH +/-.12	SPREAD MIN	METAL THICKNESS MIN	NOM	MAX	
-1	.138-32	2.00	.75	.024	.38	.50	175
-2	.138-32	3.00	.75	.024	.38	.50	175
-3	.138-32	4.00	.75	.024	.38	.50	175
-4	.190-24	3.00	1.50	.028	.50	.62	350
-5	.190-24	4.00	1.50	.028	.50	.62	350
-6	.190-24	6.00	1.50	.028	.50	.62	350
-7	.250-20	3.00	1.75	.035	.62	.75	600
-8	.250-20	4.00	1.75	.035	.62	.75	600
-9	.250-20	6.00	1.75	.035	.62	.75	600
-10	.3125-18	4.00	2.00	.042	.88	1.00	900
-11	.3125-18	6.00	2.00	.042	.88	1.00	900
-12	.375-16	4.00	2.25	.047	.88	1.00	1100
-13	.375-16	6.00	2.25	.047	.88	1.00	1100
-14	.500-13	4.00	3.50	.062	1.12	1.25	1500
-15	.500-13	6.00	3.50	.062	1.12	1.25	1500

NOTE: [1] All dimensions are in inches.
[2] Safe working load is approximately 1/4 of proof load.

TABLE III. Type 1, class B, wire wing toggle bolts[1]

SIZE NO.	BOLT		WINGS		HOLE DIA		PROOF LOAD LBS MIN[2]
	NOM. SIZE & THREADS	LENGTH +/-.12	SPREAD MIN	METAL THICKNESS MIN	NOM	MAX	
-1	.138-32	2.00	1.25	.060	.38	.50	175
-2	.138-32	3.00	1.25	.060	.38	.50	175
-3	.138-32	4.00	1.25	.060	.38	.50	175
-4	.190-24	3.00	1.75	.070	.50	.62	350
-5	.190-24	4.00	1.75	.070	.50	.62	350
-6	.190-24	6.00	1.75	.070	.50	.62	350
-7	.250-20	3.00	2.00	.089	.62	.75	600
-8	.250-20	4.00	2.00	.089	.62	.75	600

TABLE III. Type I, class B, wire wing toggle bolts[1] (CONTINUED)

SIZE NO.	BOLT		WINGS		HOLE DIA		PROOF LOAD LBS MIN[2]
	NOM. SIZE & THREADS	LENGTH +/-.12	SPREAD MIN	METAL THICKNESS MIN	NOM	MAX	
-1	.250-20	6.00	2.00	.089	.62	.75	600
-10	.3125-16	4.00	2.00	.089	.75	.88	900
-11	.3125-18	6.00	2.00	.089	.75	.88	900
-12	.375-16	4.00	2.50	.103	.88	1.00	1100
-13	.375-16	6.00	2.50	.103	.88	1.00	1100
-14	.500-13	4.00	2.62	.103	1.12	1.25	1250
-15	.500-13	6.00	2.62	.103	1.12	1.25	1250

NOTE: [1] All dimensions are in inches.
[2] Safe working load is approximately 1/4 of proof load.

TABLE IV. Type II, classes-A, tumble wing toggle bolts[1]

SIZE NO.	BOLT		WINGS		HOLE DIA		PROOF LOAD LBS MIN[2]
	NOM. SIZE & THREADS	LENGTH +/-.12	SPREAD MIN	METAL THICKNESS MIN	NOM	MAX	
-1	.138-32	2.00	1.25	.028	.38	.50	110
-2	.138-32	3.00	1.25	.028	.38	.50	110
-3	.138-32	4.00	1.25	.028	.38	.50	110
-4	.190-24	3.00	1.88	.041	.50	.62	250
-5	.190-24	4.00	1.88	.041	.50	.62	250
-6	.190-24	6.00	1.88	.041	.50	.62	250
-7	.250-20	3.00	2.25	.047	.62	.75	400
-8	.250-20	4.00	2.25	.047	.62	.75	400
-9	.250-20	6.00	2.25	.047	.62	.75	400
-10	.3125-18	4.00	2.50	.050	.88	1.00	600
-11	.3125-18	6.00	2.50	.050	.88	1.00	600
-12	.375-16	4.00	2.62	.060	.88	1.00	700
-13	.375-16	6.00	2.62	.060	.88	1.00	700
-14	.500-13	4.00	3.25	.062	1.12	1.25	850
-15	.500-13	6.00	3.25	.062	1.12	1.25	850

NOTE: [1] All dimensions are in inches.
[2] Safe working load is approximately 1/4 of proof load.

TABLE V. Type III, Classes A and B screw expansion sleeve[1]

SIZE NO.	SCREW SIZE & THREADS	EFFECTIVE WALL THICKNESS RANGE	SCREW LENGTH +/-.12	ANCHOR LENGTH +/-.12	HOLE SIZE	PROOF LOAD LBS MIN[2]
-1	.138-32	.12 THRU .62	1.50	1.25	.31	50
-2	.138-32	.62 THRU 1.25	2.00	1.75	.31	80
-3	.164-32	.62 THRU 1.25	3.00	2.75	.38	100
-4	.190-24	.62 THRU 1.25	2.75	2.50	.44	150
-5	.250-20	.12 THRU .62	2.25	2.00	.50	200
-6	.250-20	1.25 THRU 1.75	3.50	3.25	.50	250

NOTE: [1] All dimensions are in inches.
[2] Safe working load is approximately 1/4 of proof load.

TABLE VI. Type IV, Plastic screw anchor[1]

SIZE NO.	SCREW SIZE	EFFECTIVE WALL THICKNESS RANGE	HOLE SIZE	PROOF LOAD LBS[2] MIN
-1	#8 to #12	.125 THROUGH .250	.31	50
-2	#8 to #12	.350 THROUGH .400	.31	50
-3	#8 to #12	.450 THROUGH .550	.31	50
-4	#8 to #12	.575 THROUGH .675	.31	50
-5	#8 to #12	1.000 THROUGH 1.250	.31	50

NOTE: [1] All dimensions are in inches.
[2] Safe working load is approximately 1/4 of proof load.

TABLE VII. Type V, captive anchor with bolt[1]

SIZE NO.	BOLT		WINGS		HOLE DIA		PROOF LOAD LBS MIN[2]
	NOM. SIZE & THREADS	LENGTH +/-.12	SPREAD MIN	METAL THICKNESS MIN	NOM	MAX	
-1	.136-32	2.00	1.25	.024	.38	.50	175
-2	.138-32	3.00	1.25	.024	.38	.50	175
-3	.138-32	4.00	1.25	.024	.38	.50	175
-4	.190-24	3.00	1.88	.028	.50	.62	350
-5	.190-24	4.00	1.88	.028	.50	.62	350
-6	.190-24	6.00	1.88	.028	.50	.62	350
-7	.250-20	3.00	2.25	.035	.62	.75	600
-8	.250-20	4.00	2.25	.035	.62	.75	600
-9	.250-20	6.00	2.25	.035	.62	.75	600
-10	.3125-18	4.00	2.25	.042	.88	1.00	900
-11	.3125-18	6.00	2.50	.042	.68	1.00	900
-12	.375-16	4.00	2.62	.047	.88	1.00	1100
-13	.375-16	6.00	2.62	.047	.88	1.00	1100
-14	.500-13	4.00	3.25	.062	1.12	1.25	1500
-15	.500-13	6.00	3.25	.062	1.12	1.25	1500

NOTE: [1] All dimensions are in inches.
[2] Safe working load is approximately 1/4 of proof load.

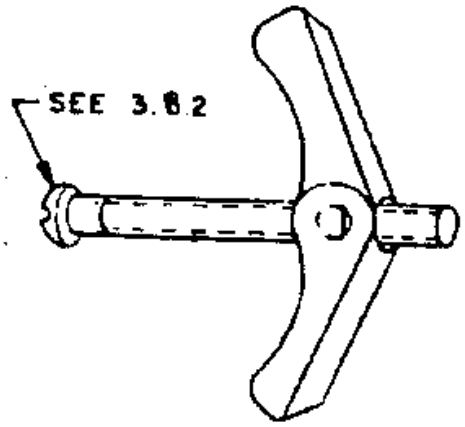

FIGURE 1
TYPE I, CLASS A
STYLE 1 - MACHINE SCREW

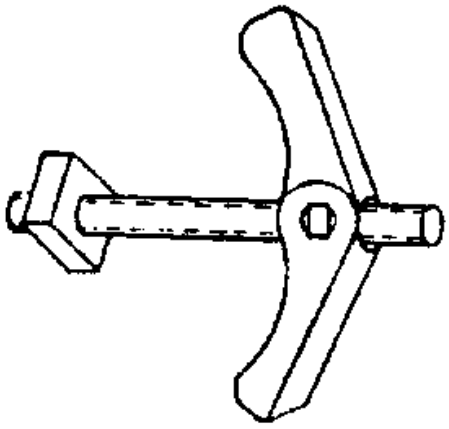

FIGURE 2
TYPE I, CLASS A
STYLE 2 - CONTINUOUS THREAD STUD

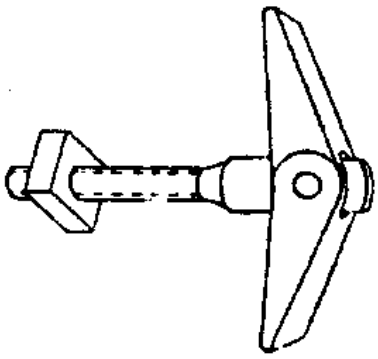

FIGURE 3
TYPE I, CLASS A
STYLE 3 - EYEBOLT

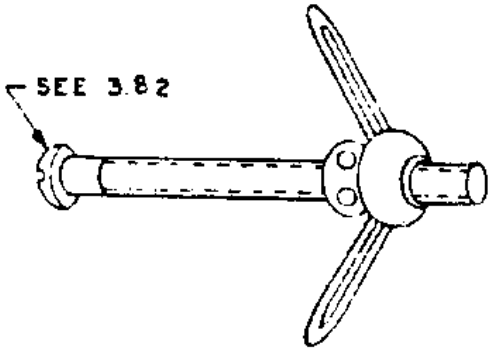

FIGURE 4
TYPE I, CLASS B
STYLE 1 - MACHINE SCREW

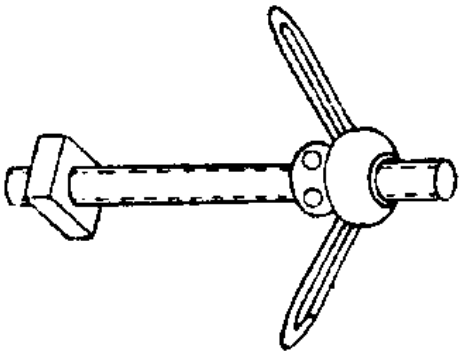

FIGURE 5
TYPE I, CLASS B
STYLE 2 - CONTINUOUS
THREAD STUD

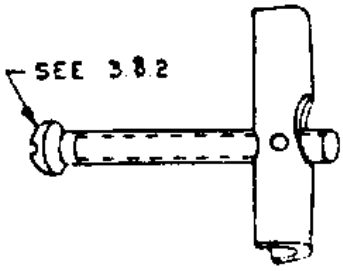

FIGURE 6
TYPE II, CLASS A
STYLE 1 - MACHINE SCREW

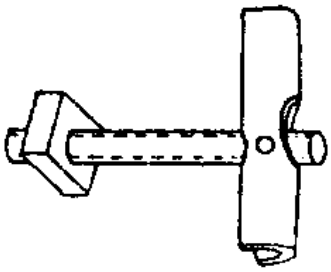

FIGURE 7
TYPE II, CLASS A
STYLE 2 - CONTINUOUS
THREAD STUD

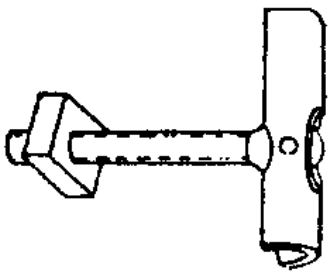

FIGURE 8
TYPE II, CLASS A
STYLE 3 - EYEBOLT

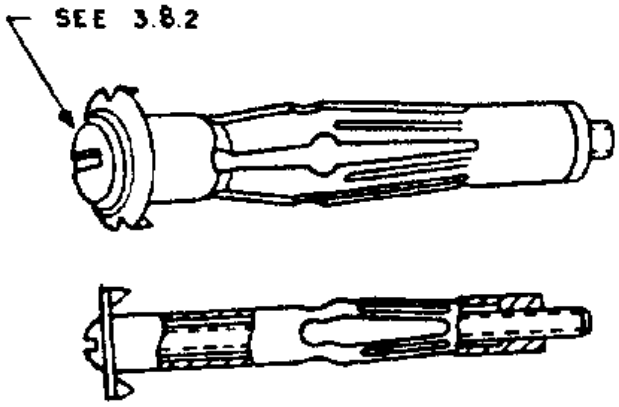

FIGURE 9
TYPE III, CLASS A
REGULAR SCREW
EXPANSION SLEEVE

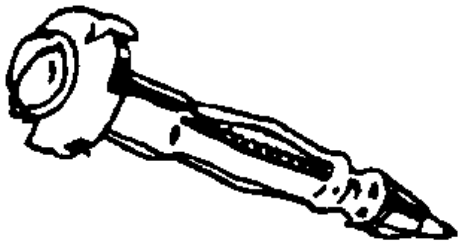

FIGURE 10
TYPE III, CLASS B
HAMMER DRIVE SCREW
EXPANSION SLEEVE

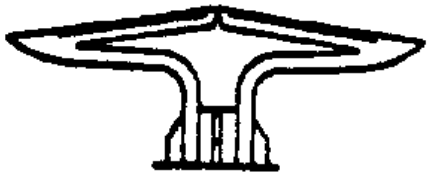

FIGURE 11
TYPE IV
PLASTIC SCREW ANCHOR

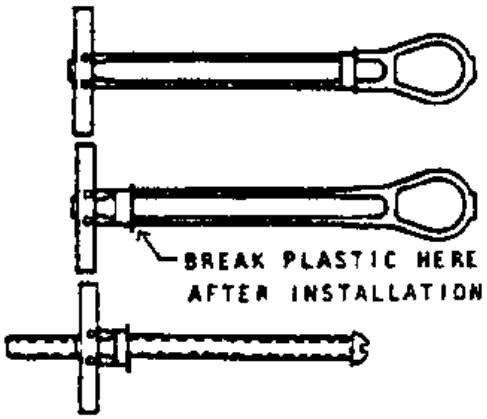

FIGURE 12
TYPE V
CAPTIVE ANCHOR W/BOLT

Military custodians:

Army - AR

Review activities:

DLA - IS

User activities:

Navy - YD, MC

Preparing Activity:

GSA - FSS (7FXE)

Military custodians:

Army - AR

Review activities:

DLA - IS

User activities:
Navy - YD, MC

Preparing Activity:

GSA - FSS (7FXE)