

FF-S-325

INTERIM AMENDMENT-3 (GSA-FSS)

July 16, 1965

Superseding

Interim Amendment-2 (GSA-FSS)

September 28, 1964

INTERIM AMENDMENT-3  
TO  
FEDERAL SPECIFICATION

SHIELD, EXPANSION; NAIL EXPANSION; AND NAIL, DRIVE SCREW  
(DEVICES, ANCHORING, MASONRY)

This Interim Amendment was developed by the General Services Administration, Federal Supply Service, Washington, D.C. 20406, based upon currently available technical information. It is recommended that Federal agencies use it in procurement and forward recommendations for changes to the preparing activity at the address shown above.

The General Services Administration has authorized Federal agencies to use this Interim Amendment as a valid exception to Federal Specification FF-S-325, dated September 10, 1957.

Page 1, paragraph 1.2.1, under "GROUP II", revise Type 3 to read:

"Type 3 - Tubular expansion shield anchors.

Class 1 - Single slit shield anchors with internally threaded cone expanders. (fig. 13).

Class 2 - Multiple slit shield anchors with internally threaded cone expanders. (fig. 14).

Class 3 - Multiple slit shield anchors with cone expander integral with stud. (table IX.A).

Pages 1 and 2, paragraph 1.2.1: At the end of "GROUP II" add the following:

Type 4 - Externally threaded wedge expansion bolt anchors

Class 1 - Externally threaded expansion bolt anchors (split ring or separate wedge pairs) (fig. 14A).

Class 2 - Externally threaded wedge expansion bolt anchor (fig. 14B).

Type 5 - Externally threaded cam expansion bolt anchor (fig. 14C).

Under "GROUP V, type 2" add:

Class 4 - Nylon nail anchors (fig. 25A).

At the end of "GROUP VII", add:

"GROUP VIII - Anchors, expansion (non-drilling) (see 3.2.8).

Type 1 - Expansion anchors, internally threaded, with external slits and single cone expanders (fig. 28).

Type 2 - Expansion anchors, externally threaded, with external slits and single cone expander (fig. 29).

Page 2, paragraph 1.3, after the word "inclusive" add "and XVIII.

Page 2, paragraph 2.1, under "MILITARY SPECIFICATIONS:" add:

"MIL-P-20693 - Plastic Molding Material, Polyamide Nylon, Rigid

Page 10, paragraph 3.2.2.3.1 Construction: Substitute the following paragraph heading for "Construction" :

"Classes 1 and 2 single slit and multiple slit shield anchors with internally threaded cone expanders."

Page 10: Revise paragraph numbers as follows: Change 3.2.2.3.2 to read 3.2.2.3.1.2.

Page 11: Revise paragraph numbers as follows:

Change 3.2.2.3.3 to read 3.2.2.3.1.3

Change 3.2.2.3.4 to read 3.2.2.3.1.4

Change 3.2.2.3.5 to read 3.2.2.3.1.5

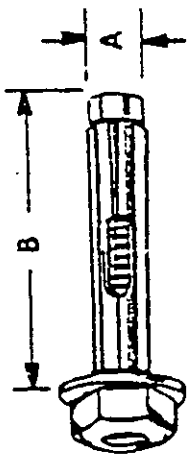
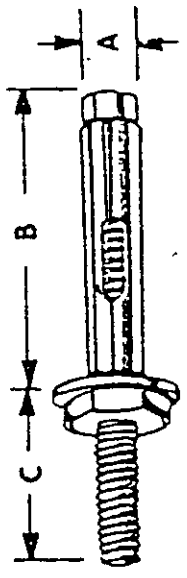
Change 3.2.2.3.6 to read 3.2.2.3.1.6

Page 11, paragraphs 3.2.2.3.1.5, 3.2.2.3.1.6 (formerly 3.2.2.3.5, 3.2.2.3.6): Add the following: "classes 1 and 2" before "tubular" in these two paragraphs.

Page 11, add the following after paragraph 3.2.2.3.1.6 (formerly 3.2.2.3.6) and table IX:

"3.2.2.3.2 Class 3 multiple slit shield anchor with cone expander integral with the stud. This anchor is shown in table IX.A. As the nut is tightened, the tapered end of the externally threaded member causes the end of the sleeve to expand thus wedging the anchor in the drilled hole. The dimensional requirements are shown in table IX.A. The anchors shall withstand the pulling proof test loads specified in table IX.B, when set in concrete (4.3.2), in accordance with the recommendations of the manufacturer."

TABLE IX.A - Group II, type - ass 3 anchor dimensions.

		PROJECTING SLEEVE			PROJECTING THREAD		
							
Anchor size, A (Min. hole diameter required)	Thread nominal size and threads per inch UNC series	Anchor length, B	Min hole depth	For fastening material thicknesses up to	Anchor length, B (min. hole depth)	Thread projection above sleeve, C	
in.		in.	in.	in.	in.	in.	
.25 (1/4)	10-24 or .190-24	{ 1.375 2.25 }	1 1	{ .375 1.25 }	1.375	1	
.3125 (5/16)	1/4-20 or .250-20	{ 1.5 2.5 }	1 1	{ .5 1.5 }	1.5	1	
.375 (3/8)	5/16-18 or .3125-18	{ 1.875 3 }	1.25 1.25	{ .625 1.75 }	1.875	1	
.5 (1/2)	3/8-16 or .375-16	{ 2.25 3 }	1.5 1.5	{ .75 1.5 }	2.25	1	
.625 (5/8)	1/2-13 or .500-13	{ 2.25 4 6 }	2 2 2	{ .25 2 4 }	2	2	
.75 (3/4)	5/8-11 or .625-11	{ 2.5 4 5.75 }	2 2 2	{ .5 2 3.75 }			

Other head styles than shown above are acceptable.

TABLE IX.B.- Group II, type 3, class 3 anchor; proof test loads and installation information

Anchor size and drill diameter	Min. anchor depth for max. holding power	Min. edge distance and anchor spacing	Max. hole diameter for maximum holding power	Proof <sup>a/</sup> test load
in.	in.	in.	in.	lbs
.25 (1/4)	1	1.25	.287	.900
.3125 (5/16)	1	1.75	.349	1200
.375 (3/8)	1.25	2.5	.412	1600
.5 (1/2)	1.5	4	.565	2800
.625 (5/8)	2	6	.690	4200
.75 (3/4)	2	8	.815	5600

<sup>a/</sup> Recommended safe working load is one-fourth proof test load.

Page 11, add the following paragraphs (3.2.2.4 and 3.2.2.5), figures and tables:

"3.2.2.4 Type 4, externally threaded expansion bolt anchors and externally threaded wedge expansion bolt anchor. (Fig. 14A and 14B). Unless otherwise specified (see 6.2), the material shall be at the option of the manufacturer. The anchors shall withstand the pulling proof test loads as specified in table IX.C, when set in concrete (see 4.3.2), in accordance with the recommendations of the manufacturer."

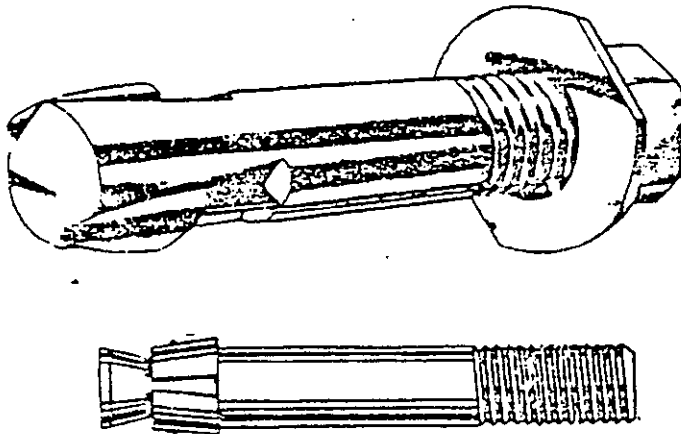


Fig. 14A, Group II, type 4, class 1 (design optional) externally threaded expansion bolt anchor (split ring or separate wedge pairs).

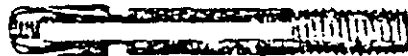


Figure 14B - Group II, type 4, class 2, externally threaded wedge expansion bolt anchor

Table IX.C - Group II, type 4 (classes 1 and 2) anchor

Shank diameter	Nominal hole dimensions			Recommended minimum imbedment	Anchor length	Tensile <sup>a/</sup> proof test load
		Depth (class 1) (fig. 14A)	Depth (class 2) (fig. 14B)			
in.	in.	in.	in.	in.	in.	lbs.
0.25(1/4)	0.25	1.125 1.25 1.375	1.375 1.5 1.625	1. 1.125 1.25	1.25 1.75 2.75, 3	1350 1450 1500
.3125(5/16)	.3125	1.125 1.25 1.375	1.375 1.5 1.625	1. 1.25 1.25	1.5 2. 3.	1800 1900 1900
.375(3/8)	.375	1.375 1.5 1.75	1.625 1.75 2.	1.125 1.25 1.5	1.5 2. 2.75, 3.5, 5, 6	3000 3200 3589
.5(1/2)	.5	1.75 2.25 2.5	2.125 2.625 2.875	1.5 2. 2.25	2. 2.75 3.5, 5, 6, 7	3700 4200 5065
.625(5/8)	.625	2.375 3.375 3.875	2.625 3.625 4.125	2. 3. 3.5	3.5 4.5 5, 5.5, 6, 7	6940 9560 10192
.75(3/4)	.75	3.375 3.875	3.75 4.25	3. 3.5	4. 5, 6, 7, 10	10900 17194
.875(7/8)	.875	5.	5.25	4.5	6.	19000
1.	1.	6.	6.5	5.5	8, 10, 12	22500
1.25	1.25	7.5	9.	7.	12.	37000
1.5	1.5	8.5	10.	8.	12.	52000

a/ Recommended safe working load is one-fourth proof test load.

"3.2.2.5 Type 5, (fig. 14C), externally threaded cam expansion bolt anchors. Unless otherwise specified (see 6.2), the material shall be at the option of the manufacturer. The anchor shall withstand the pulling proof test loads in accordance with table IX.D, when set in concrete (see 4.3.2)

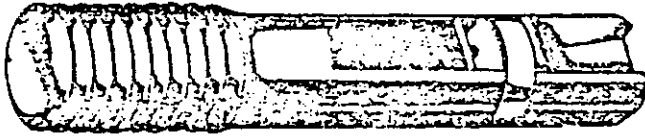


Figure 14C - Externally threaded cam expansion bolt anchor

Table IX.D - Type 5 anchors

Shank diameter	Hole diameter	Recommended minimum imbedment	anchor length	Tensile proof test load <sup>a/</sup>
in.	in.	in.	in.	lbs.
25 (1/4)	0.25	2.00	2.25	1,200
0.375 (3/8)	0.375	2.50	3.00 4.50	1,890
0.500 (1/2)	0.500	3.00	3.50 5.00	3,720
0.625 (5/8)	0.625	3.750	4.50 6.00	4,650
0.750 (3/4)	0.750	4.00	5.00 7.00	5,580
1.00	1.00	6.00	8.00 16.00	8,200

<sup>a/</sup> Recommended safe working load is one-fourth proof test load.

Page 15, paragraph 3.2.5.2: Delete the fourth sentence and substitute the following:

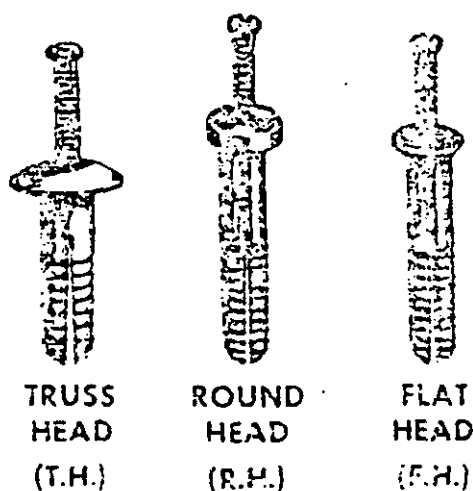
"The anchors shall be either of aluminum, steel, zinc or nylon, as specified (see 6.4)".

Page 16, add the following paragraphs, figure and table:

"3.2.5.2.8 Class 4, nylon, nail anchors (see fig. 25A and table XIV.A). These anchors shall consist of a nylon anchor body into which a threaded steel nail is driven for anchoring. The anchor body shall be made of composition B, nylon in accordance with MIL-P-20693 or equivalent material. In view of the specialized nature of the threaded nails, they shall be supplied with the anchor body. The threaded nails shall have a slotted pan head, threads with rounded crests, and pinch tapered points.

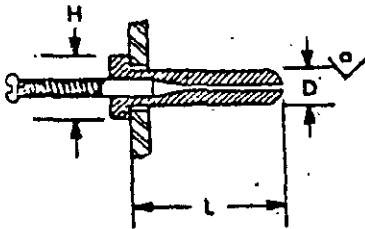
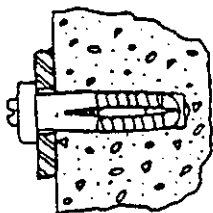
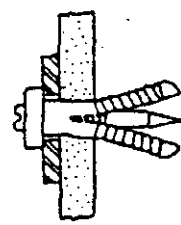
The nails shall be made of No. 1039 steel or equivalent and shall have a hardness of Rockwell C44 to 50. The nails shall be coated with a minimum 1.2 mil. (0.0012 inch) bright zinc coating followed by a chromate conversion coating. (The coating thickness shall be checked on the unthreaded shank.) The nails shall withstand a 200-hour salt spray test in accordance with method 811.1 of Fed. Test Method Std. No. 151."

"3.2.5.2.8.1 The dimensions and head styles for nylon anchors shall be as specified in table XIV.A. When set in concrete (see 4.3.2), in accordance with the recommendations of the manufacturer, the anchors shall withstand the proof test loads specified in table XIV.A."



(Other head styles than shown are acceptable)  
FIGURE 25A-Group V, type 2, class 4-nylon, nail anchors

TABLE XIV.A, Group V, type 2, class 4 nylon, nail anchor (fig. 25A)

			 SOLID MATERIAL INSTALLATION		 HOLLOW MATERIAL INSTALLATION	
Anchor Body Size		Head Style (See fig 25A)	Head Diameter, <sup>b/</sup> H	Tensile proof test load	Tensile <sup>b/</sup> proof test load	
Diameter, D <sup>a/</sup> in.	Length, L in.					
0.1875(3/16)	1	R.H.	0.375	283	178	
.1875	1.5	R.H.	.375	335	193	
.1875	1	F.H.	.375	283	178	
.1875	1.5	F.H.	.375	335	193	
.1875	1	T.H.	.5	283	178	
.1875	.75	F.H.	.312	283	178	
.25	1	R.H.	.4375(7/16)	261	155	
.25	1.5	R.H.	.4375	320	188	
.25	.75	F.H.	.4375	194	132	
.25	1	F.H.	.4375	261	155	
.25	1.5	F.H.	.4375	320	188	
.25	1	T.H.	.5625(9/16)	261	155	
.25	.75	T.H.	.5625	236	130	

<sup>a/</sup>The "D" dimension is also the size of drill to be used in the installation of the anchor.

<sup>b/</sup>Recommended safe working load is one-fourth proof test load.



Page 18, add the following paragraphs, figures and table:

"3.2.8 Group VIII, anchors, expansion (non-drilling) .

3.2.8.1 Construction and material . These internally or externally threaded anchors shall consist of an expansion element and a single cone expander both of carbon or alloy steel at the manufacturer's option.

3.2.8.1.1 Type 1 . Internally threaded tubular expansion anchors shall have an externally slit expansion element and a single cone expander (see fig.28 and table XVIII).

3.2.8.1.2 Type 2 . Externally threaded steel stud bolt anchors shall have an integral externally slit expansion element and a single-cone expander (see fig. 29 and table XVIII).

3.2.8.2 Threads (see 3.1.2.1) . Type 1 expansion anchor threads shall end in a manner which will prevent the machine bolt from coming in contact with the cone expander at any time.

3.2.8.3 Dimensional requirements . The dimensions of the non-drilling expansion anchors shall conform to those in table XVIII for bolt sizes.

3.2.8.4 Holding power requirements . The non-drilling expansion anchors shall withstand pulling proof test loads, as specified in table XVIII when set in concrete in accordance with the manufacturer's recommendations (see 4.3.2)."

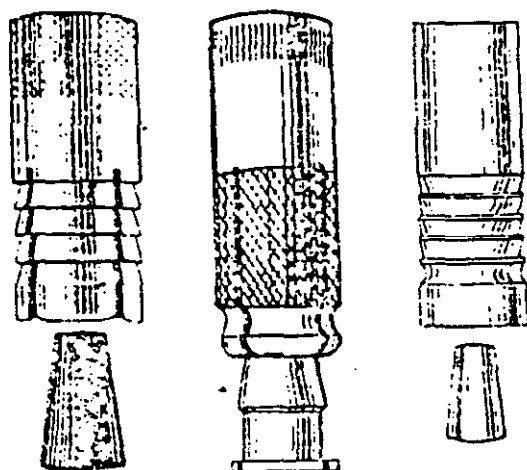


Figure 23 - Group VIII, Type 1, Expansion anchors, internally threaded

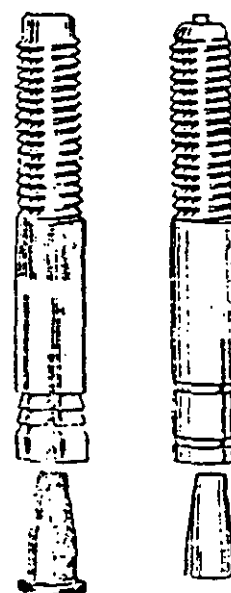


Figure 29 - Group VIII, Type 2 Expansion anchors, externally threaded

Table XVIII - Group VIII, Types 1 and 2  
(Figs. 28 and 29)

(Figs. 20 and 21)

Type 1 Anchors					Type 2 Anchors				
Bolt Size	Outside Diameter (Minimum)	Height (Minimum)	Minimum Depth of Thread	Proof Test Load <sup>1</sup>	Outside Diameter (Minimum)	Stud Height Above Concrete	Thread Length	Imbedment in Concrete (Minimum)	Proof Test Load <sup>2</sup>
Diameter	Inches	Inches	Inches	Pounds	Inches	Inches	Inches	Inches	Pounds
1/4	7/16	1 1/8	3/8	1,600	1/4			1	1,200
5/16	15/32	1 1/8	3/8	1,800	5/16			1 1/8	1,800
3/8	9/16	1 7/16	7/16	2,500	3/8			1 1/4	2,200
1/2	1 1/16	1 15/16	1 1/16	3,700	1/2			1 1/2	3,500
5/8	27/32	2 3/4	7/8	5,100	5/8			2	4,500
3/4	1	3	1 1/8	7,100	3/4			2 1/2	6,000

<sup>a</sup>/Recommended safe working load is one-fourth proof test load.

Page 19, paragraph 4.3.2, first sentence: Delete period and add ", and XVIII"

Page 20, paragraph 5.3.1.1: Delete and substitute the following:

"5.3.1.1 Level A. The packaging of anchor devices shall be in setup boxes conforming to type I in PPP-B-676 or in folding cartons conforming to style III, type B, class a, in PPP-B-566.

Page 20, Delete paragraph 5.3.1.2 and add new paragraph as follows:

"5.3.1.2 Level B. Anchor devices shall be packaged in accordance with 5.3.1.1. Expansion shields made of steel subject to rust shall be coated with a commercial type antirust compound."

Page 20, add new paragraph 5.3.1.3 as follows:

"5.3.1.3 Level C. (domestic shipments (immediate use)). Commercial packaging is acceptable."

Page 20, paragraph 5.4.1: Delete and substitute the following: "5.4.1 Level A. "

Page 20, delete paragraph 5.4.2 and substitute new paragraph as follows:

"5.4.2 Level B. Unit packages shall be packed in a fiberboard box conforming to PPP-B-636, class-domestic."

Page 20, add new paragraph 5.4.3 as follows:

"5.4.3 Level C. (domestic shipments (immediate use)). The packaged anchoring devices shall be packed for shipment in a manner to permit their acceptance by common carriers for transportation at the lowest applicable rate by the carrier, and to afford maximum protection from normal hazards of transportation."

Page 20, delete paragraphs 5.5.1, 5.5.2 and 5.5.2.1 and substitute the following new paragraphs:

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

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

Page 21, paragraph 6.1 - Add the following at the end of paragraph:

"Nylon nail anchors however, are included."

Page 22, paragraph 6.4: Change to read as follows:

"6.4 Ordering data. Purchasers should exercise any desired options offered herein and procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Name of the anchoring device.
- (c) Group, type, style (see 1.2 and 1.2.1).
- (d) Size
- (e) Material (see 3.1.1).
- (f) Screws or bolts, diameter, length, head or nut shape.
- (g) Finish required (see 3.1.3).
- (h) Level of packaging and packing required (see 5.3 and 5.4).
- (i) Marking required (see 5.5)".

Page 22, Delete "Notice."

Page 23, change "MILITARY INTERESTS" as follows: Army - WC; Navy - DOCKS;  
Air Force - 69