

MBF2301

INSTALLATION AND INSPECTION

SPECIFICATION FOR

COMPOSI-LOK[®] 3 BLIND FASTENERS

(ALL MBF 2300 SERIES BLIND BOLTS)

REVISION:
"NR"

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MONOGRAM AEROSPACE FASTENERS

TABLE OF CONTENTS

SECTION		PAGE
1.0	SCOPE	3
2.0	DESCRIPTION	3
3.0	EQUIPMENT	3
4.0	GENERAL INFORMATION	3
5.0	DETAIL REQUIREMENTS	14
6.0	SELECTION OF GRIP LENGTH	16
7.0	DRIVING PROCEDURE	17
8.0	REMOVAL OF COMPOSI-LOK® 3	18
9.0	INSPECTION AFTER INSTALLATION	18

TABLES

1	MP 550 BF3 PNEUMATIC PISTOL	4
2	MRT 550 BF3 PNEUMATIC RIGHT ANGLE TORQUE RESPONSIVE TOOL	5
3	MRC 550 CLOSE QUARTER POWER TOOL	6
4	MRCR 250 CLOSE QUARTER RATCHET TOOL	7
5	MR 550 PNEUMATIC RIGHT ANGLE TOOL	8
6	MH75 HAND TOOL	9
7	MHC 75 HAND TOOL CLOSE QUARTER	10
8	FASTENER CLOSE QUARTER TOOLING CLEARANCE	11
9	RK5000 FASTENER REMOVAL KIT	12
10	TYPICAL MECHANICAL PROPERTIES	13
10A	BLIND SIDE PROTRUSION	13
11	FASTENER HOLE PREPARATION & INSTALLED DIMENSIONS	15
12	SEATING TORQUE	19

FIGURES

1	MP 550 BF3 PNEUMATIC PISTOL	4
2	MRT 550 BF3 PNEUMATIC RIGHT ANGLE TORQUE RESPONSIVE TOOL	5
3	MRC 550 CLOSE QUARTER POWER TOOL	6
4	MRCR 250 CLOSE QUARTER RATCHET TOOL	7
5	MR 550 PNEUMATIC RIGHT ANGLE TOOL	8
6	MH75 HAND TOOL	9
7	MHC 75 HAND TOOL CLOSE QUARTER	10
8	FASTENER CLOSE QUARTER TOOLING CLEARANCE	11
9	RK5000 FASTENER REMOVAL KIT	12
10	BLIND SIDE PROTRUSION	13
11	FASTENER HOLE PREPARATION & INSTALLED DIMENSIONS	15
12	GRIP GAUGE	16
13	TAPERED SHEET CONDITION	16
14	FLUSH HEAD HEIGHT	17
15	DESCRIPTION OF INSTALLATION	18



MONOGRAM AEROSPACE FASTENERS

1.0 SCOPE:

This specification outlines the installation and inspection requirements considered necessary to insure the proper performance of Composi-Lok[®] 3 Blind Fasteners. The installation tooling recommendations given herein are not applicable to fasteners which have an "A": suffix (automatic installation) after the grip dash number (e.g. MBF 2312-06-250A). Consult factory for details on "A": coded parts.

2.0 DESCRIPTION:

The Composi-Lok[®] 3 is a five-piece (5) blind fastener consisting of a threaded nut and screw, an expandable sleeve, an acetal insert and a disposable drive-nut. Composi-Lok[®] 3 is designed to eliminate secondary shaving operations by providing a flush break-off. It is available in a variety of head styles in 5/32" and 3/16" diameters with 1/4" through 3/8" to be developed as required. Refer to the "MBF" series product drawings for available sizes and types.

3.0 EQUIPMENT:

- 3.1 In order to insure the best results, only approved pneumatic and/or hand installation tools should be used. The current list of approved tools is noted in Figures 1 through 7 for the information of the user. These tools are available from:

Monogram Aerospace Fasteners
3423 South Garfield Avenue
Los Angeles, CA 90040

- 3.2 Removal tooling, developed specifically for Composi-Lok fasteners, is shown in Figure 9. Complete removal kits are also available. Contact Monogram Aerospace Fasteners at the above address.

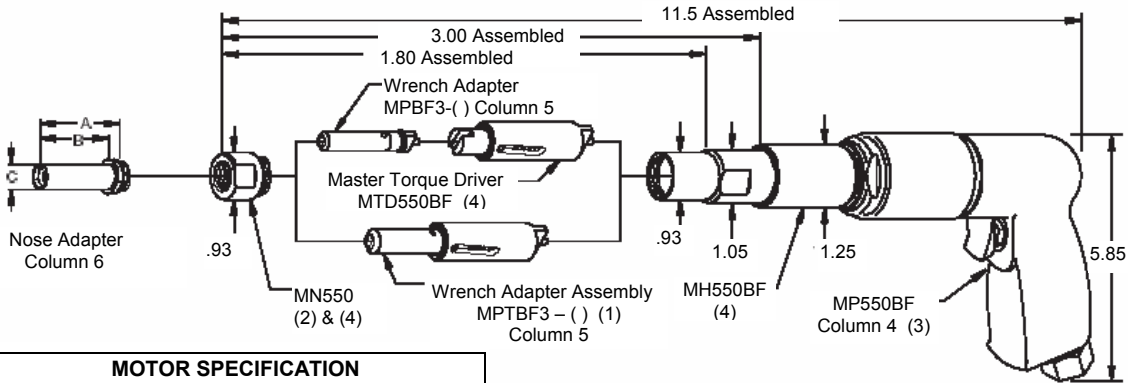
4.0 GENERAL INFORMATION:

- 4.1 These fasteners must be used within the grip range limits specified by the manufacturer in order to insure proper performance. In the event that a borderline grip condition exists, it is recommended that the maximum grip condition be favored, (i.e. a 0.250 reading uses a -250 grip part). This practice will help assure optimum performance in the event not all sheet gap has been removed.
- 4.2 The blind sleeve may be driven against a 7° maximum sloping surface (see Figure 13 and Par. 6.2).
- 4.3 It is required that only the approved tools listed in Paragraph 3 of this specification be used for the installation of these fasteners.
- 4.4 Composi-Lok[®]3 should not be used in cocked hole applications, (see Paragraph 5.1.1).



MONOGRAM AEROSPACE FASTENERS

FIGURE 1
MP 550 BF3 PNEUMATIC PISTOL



MOTOR SPECIFICATION	
Operating Pressure:	90 PSIA
(Min)	
Torque Output:	380 In-Lbs
Motor Speed:	300 RPM
Air Consumption at Free Speed:	22 CFM
Horse Power:	4.3
Weight:	4 Lbs
Work Space Needed:	Portable

TABLE 1

1	2	3	4	5	6	7	8	9
BASIC DIA	TYPICAL COMPOSI-LOK® 3 PART NO.	COMPLETE PNEUMATIC TOOL ASSEMBLY (5)	PNEUMATIC MOTOR ASSEMBLY	WRENCH ADAPTER (TURNS SCREW) (5)	NOSE ADAPTER (HOLDS NUT)	A REF	B REF	C REF
5/32	-5-()	MP550BF3-5AA	MP550BF (3)	MPBF3-05	MPPBF-08	1.81	1.70	0.56
3/16	-6-()	MP550BF3-6AA		MPBF3-06				
7/32	-7-()	MP550BF3-7AA		MPBF3-07				
1/4	-8-()	MP550BF3-8AA		MPBF3-08				
9/32	-9-()	MP550BF3-10AA		MPTBF3-10 (1)	MPP-12 (2)	1.48	1.36	0.75
5/16	-10	MP550BF3-12AA		MPTBF3-12 (1)				
11/32 (3)	-11()							
3/8	-12 ()							

(1)Combination wrench adapter and master torque driver – requires removal of master torque driver (MTD 550 BF) supplied with the tool.

(2)Larger male thread on nose adapter. Requires removal of aluminum nut (MN 550) supplied with the tool.

(3)See Motor Breakdown section of Tooling Catalog for spare parts and assembly.

(4)Included with MP550BF pneumatic motor assembly (column 5).

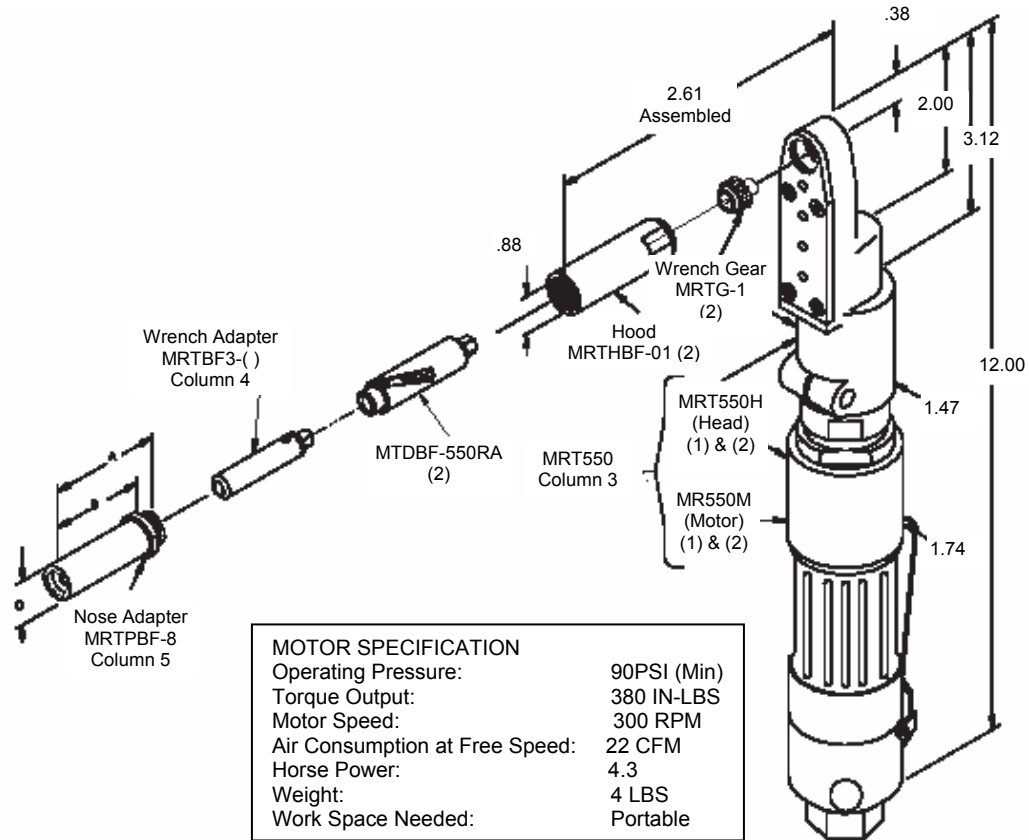
(5)MPBF3 series Composi-Lok® 3 wrench adapters are not interchangeable with other Composi-Lok series wrench adapters.

The complete pneumatic assembly (column 3) includes the pneumatic motor assembly (column 4), the appropriate wrench adapter (column 5) and the appropriate nose adapter (column 6).



MONOGRAM AEROSPACE FASTENERS

FIGURE 2
MRT550BF3 PNEUMATIC RIGHT ANGLE TORQUE RESPONSIVE TOOL



MOTOR SPECIFICATION	
Operating Pressure:	90PSI (Min)
Torque Output:	380 IN-LBS
Motor Speed:	300 RPM
Air Consumption at Free Speed:	22 CFM
Horse Power:	4.3
Weight:	4 LBS
Work Space Needed:	Portable

TABLE 2

1	2	3	4	5	6	7	8	9
BASIC DIA	TYPICAL COMPOSI-LOK® 3 PART NO.	PNEUMATIC MOTOR ASSEMBLY	WRENCH ADAPTER (TURNS SCREW) (3)	NOSE ADAPTER (HOLDS NUT)	A REF.	B REF.	C REF.	COMPLETE PNEUMATIC TOOL ASSEMBLY
5/32	-5-()	MRT550BF	MRTBF3-5	MRTPBF-08	1.80	1.68	0.56	MRT550BF3-5AA
3/16	-6-()		MRTBF3-6					MRT550BF3-6AA
7/32	-7-()		MRTBF3-7					MRT550BF3-7AA
1/4	-8-()		MRTBF3-8					MRT550BF3-8AA

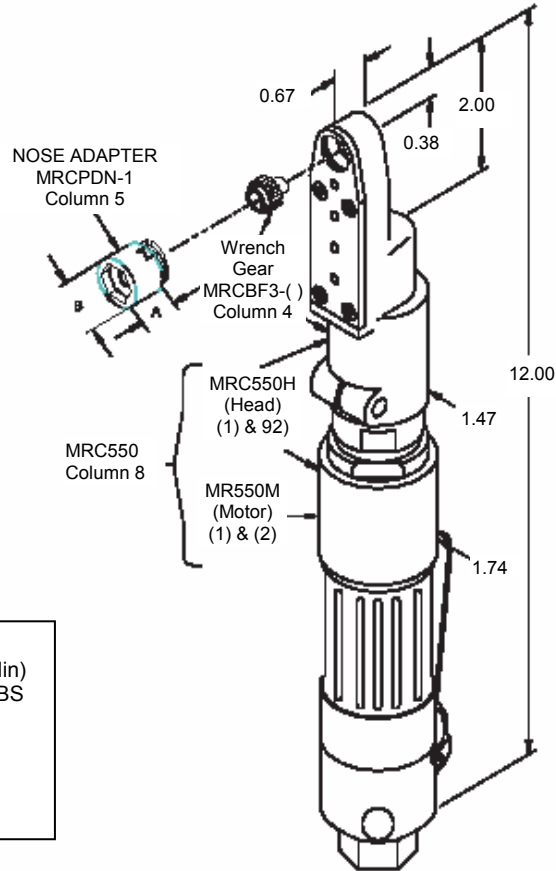
- (1) See motor breakdown section of Tooling Catalog for spare parts list and assembly.
- (2) Included with MRT550BF pneumatic motor assembly (Column 3).
- (3) MRTBF3 series Composi-Lok® 3 wrench adapters are not interchangeable with other Composi-Lok series wrench adapters.

The complete pneumatic assembly (column 9) includes the pneumatic motor assembly (column 3), the appropriate wrench adapter (column 4) and the appropriate nose adapter (column 5).



MONOGRAM AEROSPACE FASTENERS

FIGURE 3
MRC 550 PNEUMATIC CLOSE QUARTER POWER TOOL



MOTOR SPECIFICATION	
Operating Pressure:	90PSI (Min)
Torque Output:	380 IN-LBS
Motor Speed:	300 RPM
Air Consumption at Free Speed:	22 CFM
Horse Power:	4.3
Weight:	4 LBS
Work Space Needed:	Portable

TABLE 3

1	2	3	4	5	6	7	8
BASIC DIA	TYPICAL COMPOSI-LOK® 3 PART NO.	PNEUMATIC MOTOR ASSEMBLY	WRENCH ADAPTER (TURNS SCREW) (3)	NOSE ADAPTER (HOLDS NUT)	A REF.	B REF.	COMPLETE PNEUMATIC TOOL ASSEMBLY
5/32	-5-()	MBF 2310 2312 2313 2315 2334	MRCBF3-05	MRCPDN-01	.44	.69	MRC550BF3-5AA
3/16	-6-()		MRCBF3-06				MRC550BF3-6AA
7/32	-7-()		MRCBF3-07	MRCPDN-02	.55	.69	MRC550BF3-7AA
1/4	-8-()		MRC-08				MRC550BF3-8AA

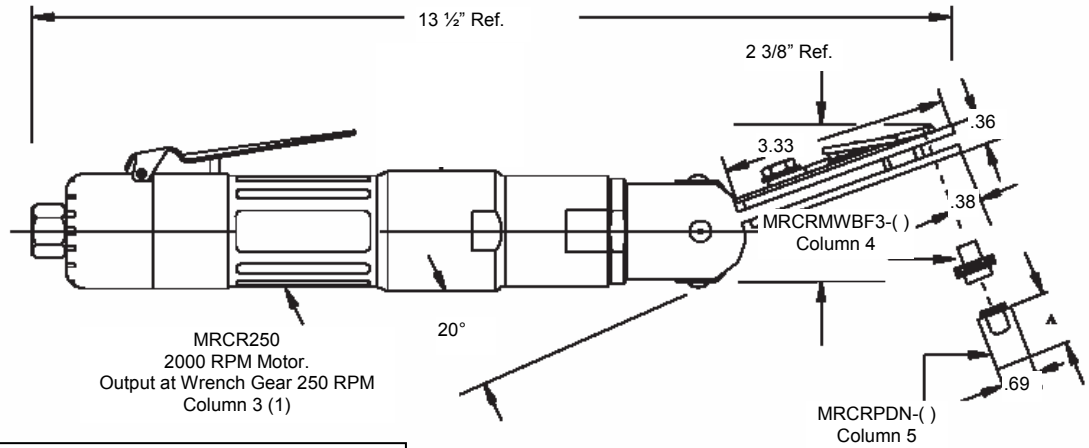
- (1) See Motor Breakdown section of the Tooling Catalog for spare parts list and assembly.
- (2) Included with MRC550 pneumatic motor assembly (column 3).
- (3) MRCBF3 series Composi-Lok® 3 wrench adapters are not interchangeable with other Composi-Lok series wrench adapters.

The complete pneumatic assembly (column 8) includes the pneumatic motor assembly (column 3), the appropriate wrench adapter (column 4) and the appropriate nose adapter (column 5).



MONOGRAM AEROSPACE FASTENERS

FIGURE 4
MRCR 250 CLOSE QUARTER RATCHET TOOL



MOTOR SPECIFICATION	
Operating Pressure:	90PSI
(Min)	
Torque Output:	80 IN-LBS
Motor Speed:	250 RPM
Air Consumption at Free Speed:	22 CFM
Horse Power:	4.3
Weight:	4 LBS
Work Space Needed:	Portable

TABLE 4

1	2	3	4	5	6	7
BASIC DIA	TYPICAL COMPOSI-LOK® 3 PART NO.	PNEUMATIC MOTOR	WRENCH ADAPTER (TURNS SCREW) (2)	NOSE ADAPTER (HOLDS NUT)	A REF.	COMPLETE PNEUMATIC TOOL ASSEMBLY
5/32	-5-()	MRCR250	MRCRMWBF3-05	MRCRPN-01	.69	MRCR250BF3-5AA
3/16	-6-()		MRCRMWBF3-06			MRCR250BF3-6AA
7/32	-7-()		MRCRMWBF3-07	MRCRPN-02	.81	MRCR250BF3-7AA
1/4	-8-()		MRCRMWBF3-08			MRCR250BF3-8AA

- (1) See Motor Breakdown section of the Tooling Manual for spare parts list and assembly.
- (2) MRCRMWBF3 series Composi-Lok® 3 wrench adapters are not interchangeable with other Composi-Lok series wrench adapters.

The complete pneumatic assembly (column 7) includes the pneumatic motor (column 3), the appropriate wrench adapter (column 4) and the appropriate nose adapter (column 5).



MONOGRAM AEROSPACE FASTENERS

FIGURE 5
MR 550 PNEUMATIC RIGHT ANGLE TOOL

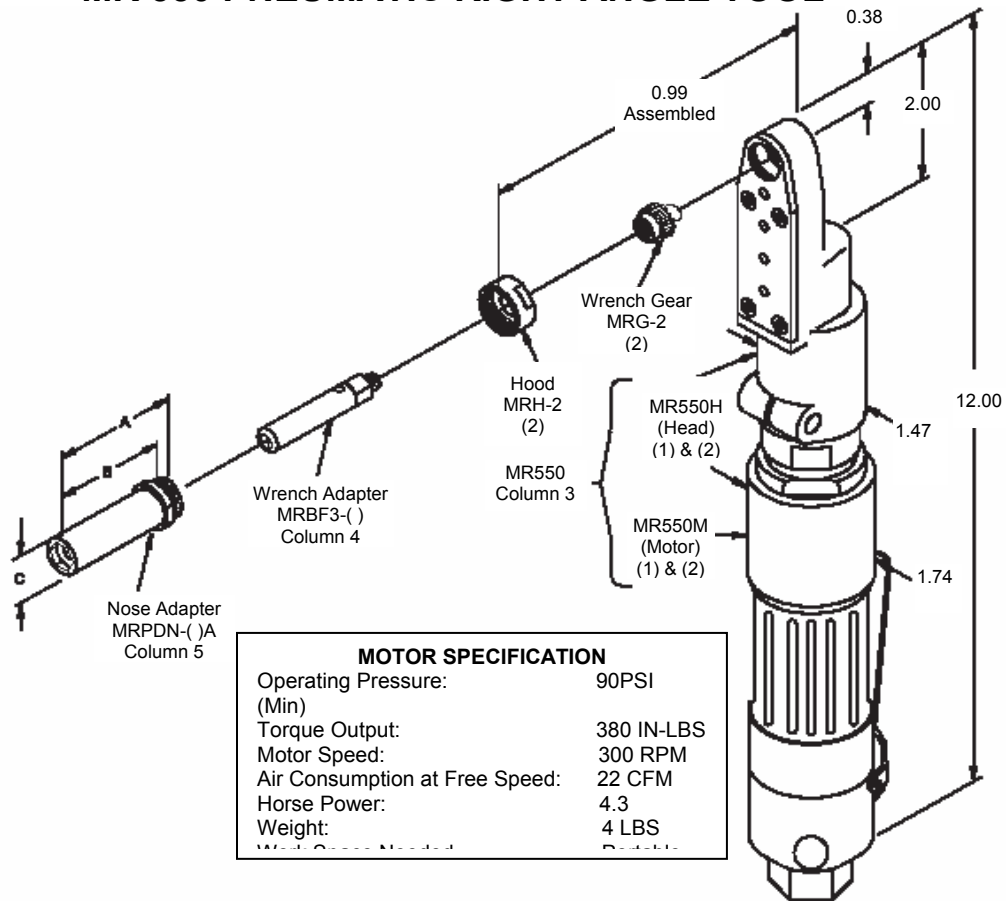


TABLE 5

1	2	3	4	5	6	7	8	9
BASIC DIA	TYPICAL COMPOSI-LOK® 3 PART NO.	PNEUMATIC MOTOR ASSEMBLY	WRENCH ADAPTER (TURNS SCREW) (3)	NOSE ADAPTER (HOLDS NUT)	A REF.	B REF.	C REF.	COMPLETE PNEUMATIC TOOL ASSEMBLY
5/32	-5(-)	MR550	MRBF3-05	MRPDN-01A	1.63	1.51	0.56	MR550BF3-5AA
3/16	-6(-)		MRBF3-06					MR550BF3-6AA
7/32	-7(-)		MRBF3-07	MRPDN-02A	1.77	1.65	0.56	MR550BF3-7AA
1/4	-8(-)		MRBF3-08					MR550BF3-8AA

- (1) See Motor Breakdown section of the Tooling Catalog for spare parts and assembly.
- (2) Included with MR550 pneumatic motor assembly (column 3).
- (3) MRBF3 series Composi-Lok® 3 wrench adapters are not interchangeable with other Composi-Lok series wrench adapters.

The complete pneumatic assembly (column 9) includes the pneumatic motor assembly (column 3), the appropriate wrench adapter (column 4) and the appropriate nose adapter (column 5).



MONOGRAM AEROSPACE FASTENERS

**FIGURE 6
MH75 HAND TOOL**

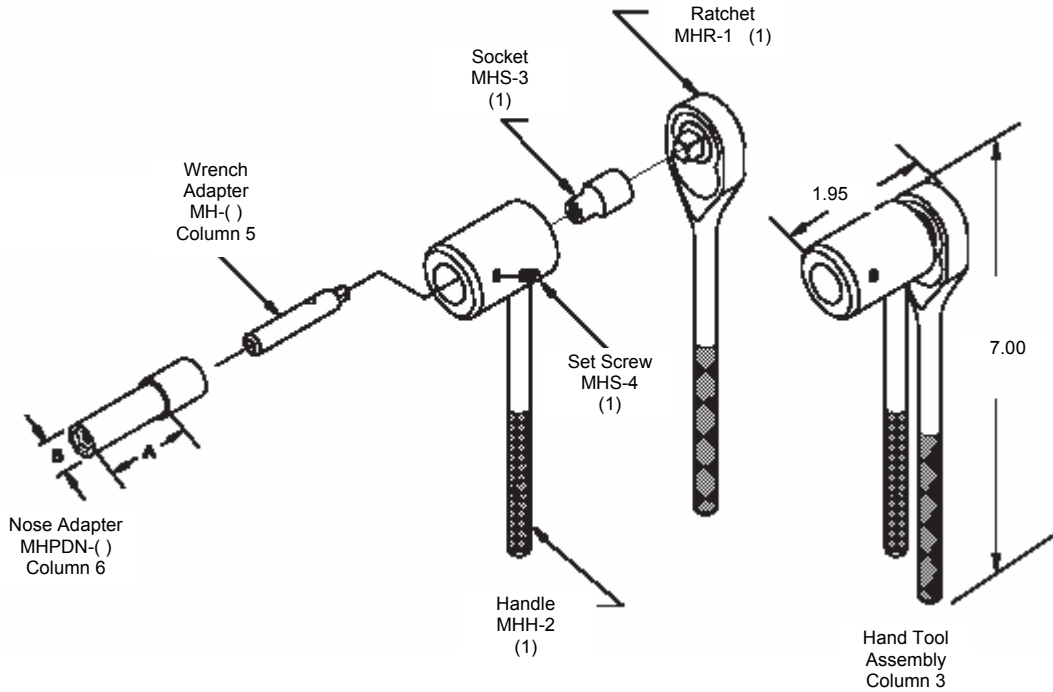


TABLE 6

1		2	3	4	5	6	8	9
BASIC DIA		TYPICAL COMPOSI-LOK® 3 PART NO.	HAND TOOL ASSEMBLY	COMPLETE HAND TOOL ASSEMBLY	WRENCH ADAPTER (TURNS SCREW) (2)	NOSE ADAPTER (HOLDS NUT)	A Ref.	B Ref.
5/32	-5-()	MBF 2310 2312 2313 2315 2334	MH75	MH75BF3-5AA	MHBF3-05	MHPDN-01	1.51	.56
3/16	-6-()			MH75BF3-6AA	MHBF3-06			
7/32	-7-()			MH75BF3-7AA	MHBF3-07	MHPDN-02	1.65	.56
1/4	-8-()			MH75DN-8AA	MH-08			
9/32 & 5/16	-9-() -10()			MH75DN-10AA	MH-10	MHPDN-03	1.82	.75
11/32 & 3/8	-11() -12-()			MH75DN-12AA	MH-12			

(1) Included with MH75 hand tool assembly (column 3).

(2) MHBF3 series Composi-Lok® 3 wrench adapters are not interchangeable with other Composi-Lok series wrench adapters.



MONOGRAM AEROSPACE FASTENERS

**FIGURE 7
MHC75 CLOSE QUARTER HAND TOOL**

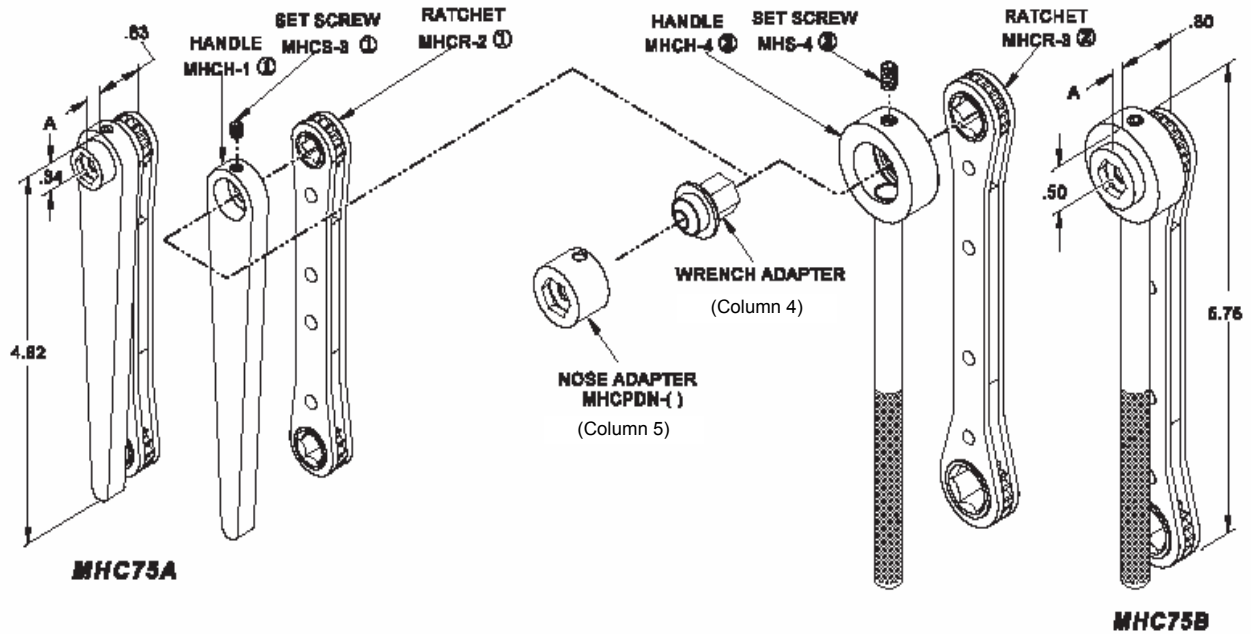


TABLE 7

1		2	3	4	5	6	A REF	B REF	C REF	D REF	E REF
BASIC DIA		TYPICAL COMPOSI-LOK® 3 PART NO.	HAND TOOL ASSEMBLY	WRENCH ADAPTER (TURNS SCREW (3))	NOSE ADAPTER (HOLDS NUT)	COMPLETE HAND TOOL ASSEMBLY					
5/32	-5-()	MBF 2310 2312 2313 2315 2334	MHC75A	MHCBF3-05	MHCPDN-01	MHC75BF3-5AA	.65	.38	.32	4.50	.34
3/16	-6-()			MHCBF3-06		MHC75BF3-6AA					
7/32	-7-()		MHC75B	MHC-08	MHCPDN-02	MHC75BF3-7AA	.80	.38	.50	5.75	.45
1/4	-8-()					MHC75DN-8AA					
9/32 & 5/16	-9-() -10-()		MHC75DN-10AA	MHC-10	MHCPDN-03	MHC75DN-10AA	.80	.38	.50	5.75	.60
11/32 & 3/8	-11-() -12-()										

- (1) Included with MHC75A hand tool assembly (column 3).
- (2) Included with MHC75B hand tool assembly (column 3).
- (3) MHCBF3 series Composi-Lok® 3 wrench adapters are not interchangeable with other Composi-Lok series wrench adapters.

The complete hand tool assembly (column 6) includes the hand tool assembly (column 3), the appropriate wrench adapter (column 4) and the appropriate nose adapter (column 5).



MONOGRAM AEROSPACE FASTENERS

**FIGURE 8
FASTENER CLOSE QUARTER TOOLING CLEARANCE**

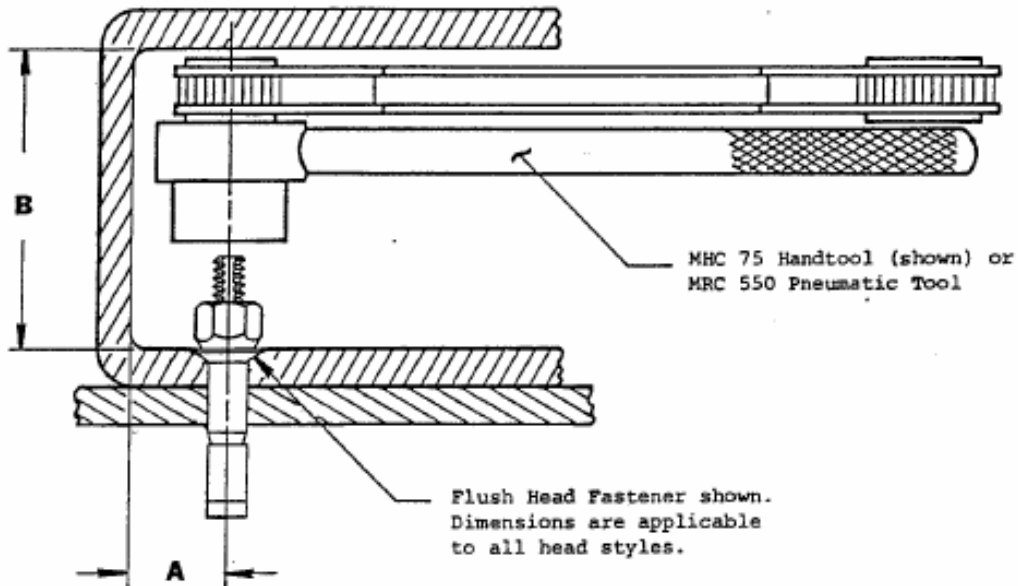


TABLE 8

NOMINAL FASTENER DIAMETER	MHC 75		MRC 550	
	A MIN	B MIN	A MIN	B MIN
5/32	.344	1.597	.344	1.696
3/16	.344	1.658	.344	1.757
7/32	.500	2.004	.344	1.976
1/4	.500	2.102	.344	2.074
9/32	.500	2.385	--	--
5/16	.500	2.357	--	--
11/32	.500	2.585	--	--
3/8	.500	2.610	--	--



MONOGRAM AEROSPACE FASTENERS

**FIGURE 9
RK5000 FASTENER REMOVAL KIT**

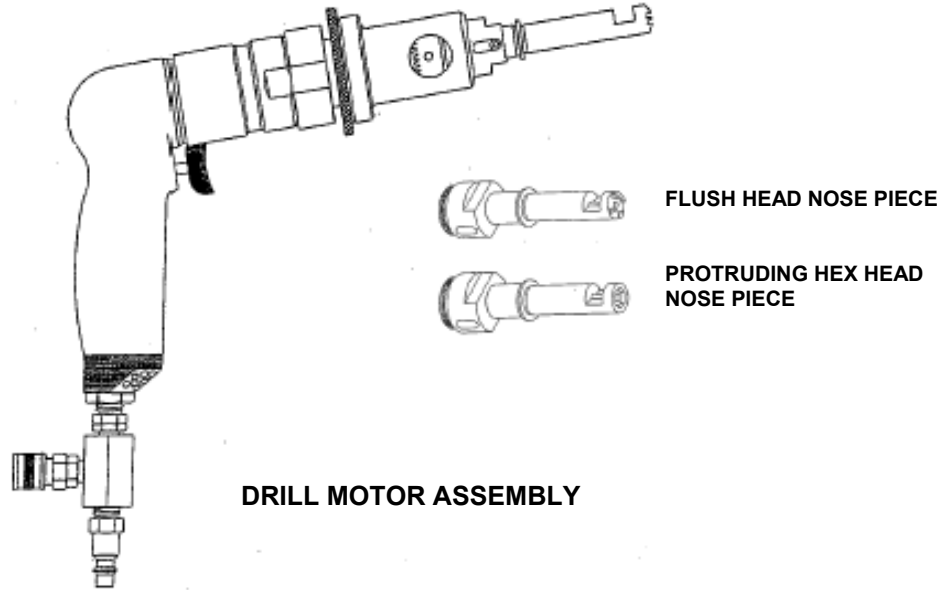


TABLE 9

NOMINAL FASTENER DIAMETER	HEAD STYLE (5)	NOSE PIECE MODULE PART NO.	CARBIDE STAR DRILL PART NO.	DRILL SIZE DIA. +.0000/.0005	DEPTH GAGE (6)	
-5 (.1635)	FLUSH	RM3118-05	RM3116-05	.1540	RM3125-01	
	PROTRUDING HEX	RM3122-05				
-6 (.1975)	FLUSH	RM3118-06	RM3116-06	.1890		
	PROTRUDING HEX	RM3122-06				
-7 (.2265) (1)	FLUSH	RM3118-07	RM3116-07	.2180		
	PROTRUDING HEX	RM3122-07				
-8 (.2585)	FLUSH	RM3118-08	RM3116-08	.2500		
	PROTRUDING HEX	RM3122-08				
-9 (.2885) (1)	FLUSH	RM3118-09	RM3116-09	.2810		RM3125-02
	PROTRUDING HEX	RM3122-09				
-10 (.3105)	FLUSH	RM3118-10	RM3116-10	.3020		
	PROTRUDING HEX	RM3122-10				
-11 (.3425) (1)	FLUSH	RM3118-11	RM3116-11	.3320		
	PROTRUDING HEX	RM3122-11				
-12 (.3735)	FLUSH	RM3118-12	RM3116-12	.3590		
	PROTRUDING HEX	RM3122-12				

(1)Used on Compositi-Lok™ fasteners only.

(2)This kit is used to remove alloy steel, titanium and A-286 Visu-Loks® or A-286 and titanium Compositi-Lok™ fasteners. To remove H-11 and similar material, contact factory for details.

(3)Corebolt protrusion should be milled flush prior to removal.

(4)A complete tool consists of the air motor module (#RM3197), a nose piece module (see Chart) and a carbide star drill (RM3116-()) and a depth gage for setting drilling debth.

(5)Use flush head style nose piece modules for non-hexagonal protruding head fasteners (e.g. MBF2010 and MBF2120).

(6)One blank receptacle #RC3076 should also be ordered for use with the depth to facilitate set up.



MONOGRAM AEROSPACE FASTENERS

TABLE 10
COMPOSI-LOK® 3 FASTENER – TYPICAL MECHANICAL PROPERTIES

ALL MATERIALS HEAD STYLES		TENSILE STRENGTH (LBS. Min.)	DOUBLE SHEAR STRENGTH (LBS. MIN.)	LOCKING TORQUE (IN. LBS. MIN.)
DIA	DASH			
5/32	-5	900	3150	1.0
3/16	-6	1400	4600	1.5
7/32	-7	1600	6050	2.0
1/4	-8	2100	7900	2.5
9/32	-9	2600	9800	3.0
5/16	-10	3600	11350	3.5
11/32	-11	4400	13850	4.0
3/8	-12	5000	16450	4.0

FIGURE 10

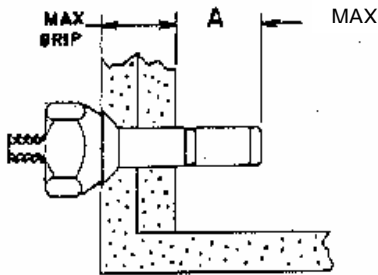


FIGURE A

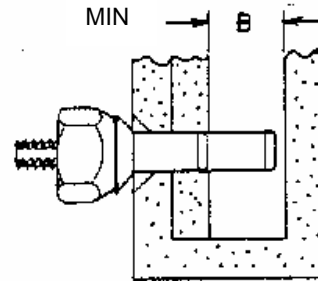


FIGURE B

TABLE 10A

NOMINAL SIZE DIA.	(A) BLIND SIDE PROTRUSION IN MAX. GRIP (FIG. A)	(B) BLIND SIDE PROTRUSION (FIG. B)
5/32	.625	.480
3/16	.675	.545
7/32	.762	.570
1/4	.900	.580
9/32	.930	.650
5/16	.912	.700
11/32	1.000	.720
3/8	1.100	.800



MONOGRAM AEROSPACE FASTENERS

- 4.5 Compositi-Lok[®] 3 are supplied to the user with proper lubrication to insure satisfactory driving characteristics. This lubricant should not be removed or any additional lubricant added.
- 4.6 If a fastener has been removed, the same diameter Compositi-Lok[®] 3 can be reinstalled provided the hole has not been damaged. In the event that the hole has been damaged, the next larger diameter Compositi-Lok[®] 3 should be used. (Note: for flush head fasteners the countersink will have to be deepened).
- 4.7 Use of the fastener in special applications necessitating the use of sealants, paints, primers, etc. should be thoroughly investigated by the user prior to installation.

5.0 DETAIL REQUIREMENTS

5.1 Hole and Sheet Preparation:

- 5.1.1 Holes shall be drilled straight and perpendicular (within 1 ½°) to the surface against which the manufactured head will bear. The hole shall be reasonably round and free from burrs (metallic structure) and delamination (graphite/epoxy type structure).

The edge of fastener installation holes for both protruding and flush head style Compositi-Lok[®] 3 should be given a light chamfer on the head side as a radius relief to insure proper seating of the bearing surfaces. Chamfer should be equivalent in size to 50% of the maximum head to shank fillet radius specified on product drawings.

- 5.1.2 The sheets to be joined should be firmly clamped up or otherwise fixtured to prevent hole misalignment.
- 5.1.3 The recommended hole sizes and countersink diameter for the various type Compositi-Lok[®] 3 are shown in Table IX. The countersink diameters shown may be adjusted to suit a specific manufacturer's flushness requirements, as desired.



**FIGURE 11
FASTENER HOLE PREPARATION & INSTALLED DIMENSIONS**

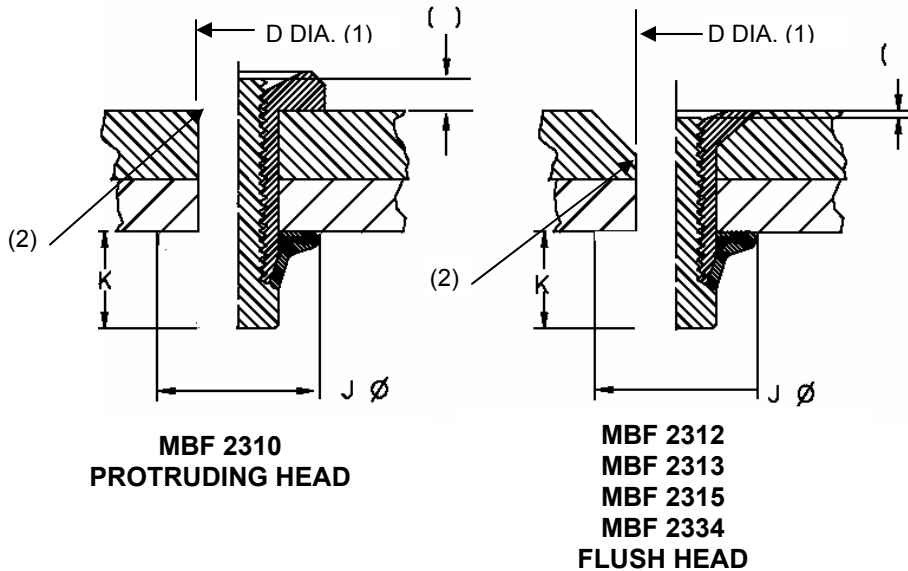


TABLE 11

DIA. DASH NO.	D DIA RECOMMENDED HOLE SIZE	FLUSH HEAD CSK P DIA.	J DIA. MIN.	K MAX.	N (3) COREBOLT BREAK-OFF LIMITS
-5	.165 - .168	.325 - .332	.250	.370	+ .000 - .030
-6	.199 - .202	.378 - .385	.300	.420	
-7	.228 - .231	.409 - .416	.350	.490	T.B.D.
-8	.260 - .263	.499 - .507	.400	.510	
-9	.290 - .293	.530 - .538	.450	.535	
-10	.312 - .315	.626 - .635	.475	.540	
-11	.344 - .347	.657 - .666	.525	.670	
-12	.375 - .378	.752 - .762	.565	.675	

- (1) Holes should be straight and perpendicular to surface. Holes should be reasonably round and free from delamination.
- (2) Edge of holes should be given a slight chamfer.
- (3) Corebolt break-off limits are measured from the head of the fastener. Break-off limits per applicable standards page.

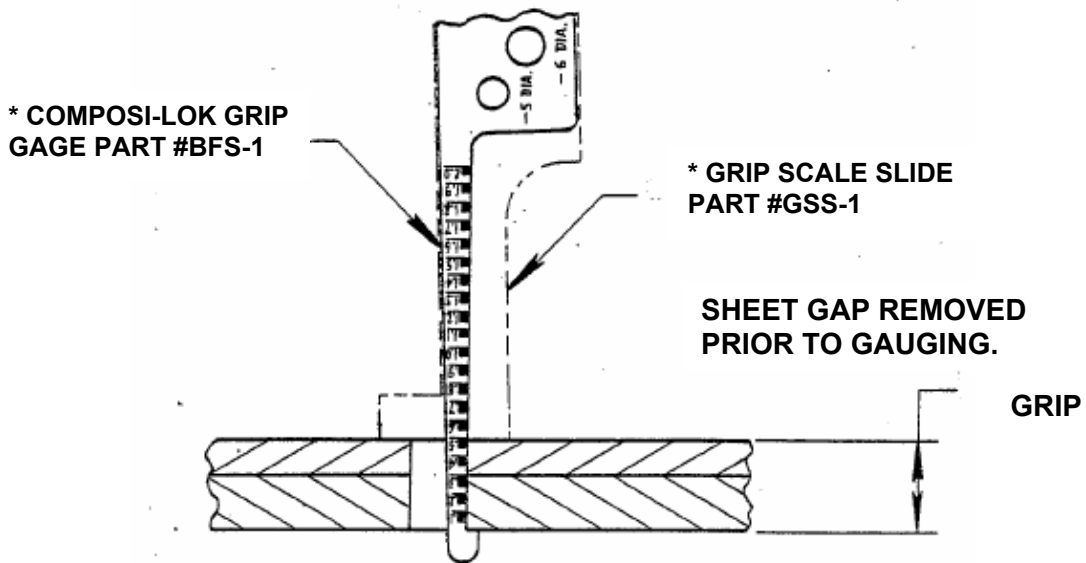
Sheets should be firmly clamped together during drilling.



6.0 SELECTION OF GRIP LENGTH:

6.1 Prior to installation, the grip length should be checked with a grip gauge (see Figure 12). Refer to product drawings for available grip ranges. All sheet gap should be removed prior to gauging for proper grip.

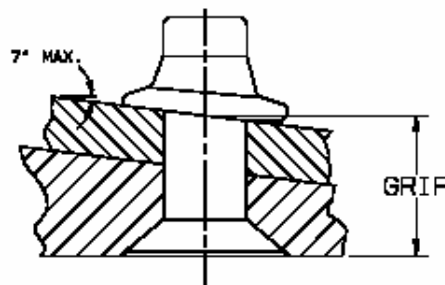
FIGURE 12
GRIP GAUGE



* COMPOSI-LOK GRIP GAGE AND GRIP SCALE SLIDE AVAILABLE AS AN ASSEMBLY – PART #BFS-1A

6.2 In those applications where a tapered sheet condition exists on the blind side, the grip length must be determined by the depth at the centerline of the hole. In no case should this taper exceed 7°, in order to insure proper performance of the fastener. (Refer to Figure 13).

FIGURE 13
TAPERED SHEET CONDITION



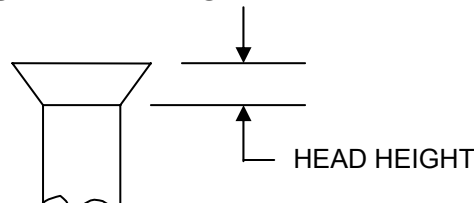


MONOGRAM AEROSPACE FASTENERS

- 6.3 In those applications where the grip is a borderline condition, it is recommended that a maximum grip condition be favored, (i.e. a 0.250 reading uses a -250 grip part). This practice will help to assure optimum performance.

Note: The minimum grip for a flush-type shall in no case ever be less than the head height (see Figure 14).

**FIGURE 14
FLUSH HEAD HEIGHT**

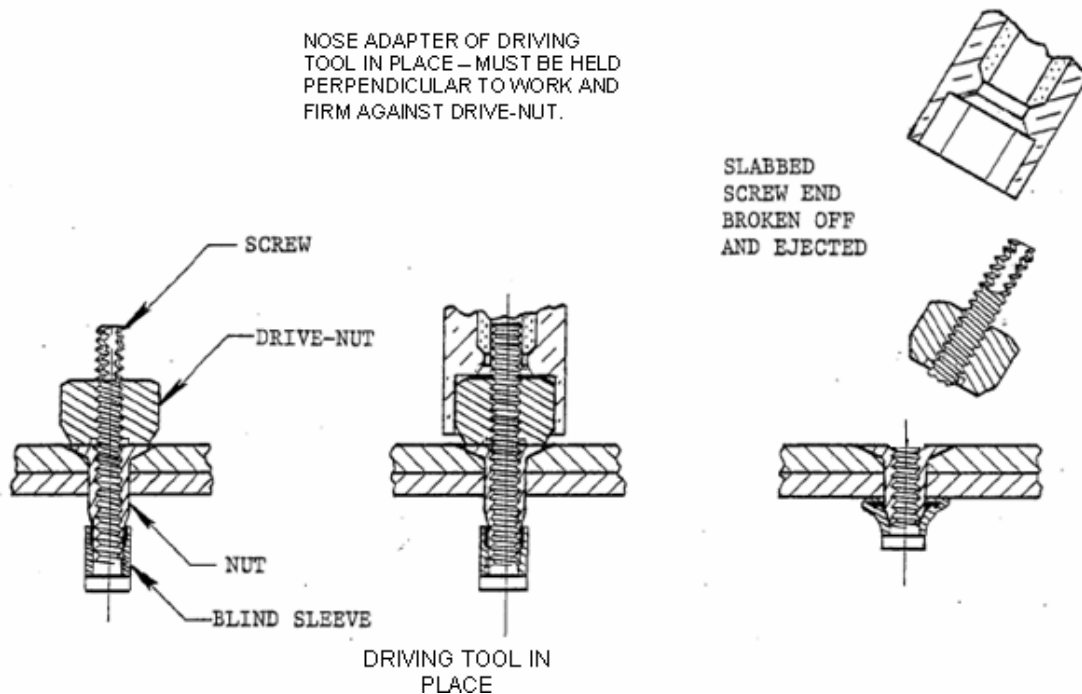


7.0 DRIVING PROCEDURE:

- 7.1 Composi-Lok[®] 3 are driven with special tools and equipment designed specifically for this job. The correct tools and equipment are listed in Paragraph 3 of this specification.
- 7.2 Insert the fastener in the hole. The Composi-Lok[®] 3 can be inserted in a properly prepared hole without interference.
- 7.3 The wrenching part of the adapter assembly is inserted over the slabbed portion of the screw and the nose piece engages the drive nut. The driving tool must be held firmly against the head of the fastener and perpendicular to it. Cocking of the driver may cause premature stem break-off before the fastener is completely driven.
- 7.4 The driving force is then applied by the pneumatic power tool or by a hand driving tool. As power is applied, the screw is turned as the nut is held stationary by the drive-nut which in turn is held stationary by the nose piece. The sleeve is compressed between the screw head and the conical end of the nut and is drawn over the tapered nose portion of the nut. The sleeve is thereby expanded subsequently forming a head against the mating surface being joined. As driving is completed, the slabbed portion of the screw is snapped off and ejected along with the drive-nut (see Figure 15). The resultant break-off should be within the limits specified on the product drawings.
- 7.5 In those instances where special driving tools are adopted by the user, wrenching speed of this tooling shall not exceed 600 RPM.



FIGURE 15
DESCRIPTION OF INSTALLATION



8.0 REMOVAL OF COMPOSI-LOK® 3:

Composi-Lok® 3 may be removed with the tooling shown in Figure 9 of this specification. Complete kits are available from Monogram Aerospace Fasteners. Contact factory for details.

9.0 INSPECTION AFTER INSTALLATION:

- 9.1 Composi-Lok® 3 is designed to provide a flush break throughout the fastener's grip accommodation. For this reason the stem break-off position of the screw in the head of the nut is **NOT** an indicator that the fastener has been properly installed. Product drawings list the stem break-off limits for installed fasteners
- 9.2 If desired, clamp-up may be determined indirectly by seating torque. Adapt the applicable torque adaptor (Table 12) to a suitable torque wrench, engage the recess in the fastener head and apply the minimum seating torque. The ability of the fastener to resist rotation when subjected to the torque values in Table 12 is a good indication that the required preload has been imparted to the joint. To prevent damage to the joint, care should be taken not to exceed the seating torque.



MONOGRAM AEROSPACE FASTENERS

**TABLE 12
SEATING TORQUE**

FASTENER SIZE	TORQUE ADAPTOR PART NO.	SEATING TORQUE IN. LB. MINIMUM
-5	MHTFDN -05	25
-6	MHTFDN -06	25
-7	MHTFDN -07	25
-8	MHTFDN -08	50
-9	MHTFDN -09	50
-10	MHTFDN -10	50
-11	MHTFDN -11	50
-12	MHTFDN -12	50