1.0 INTRODUCTION

1.1 This Design Standard specifies hardware and installation methods for supporting wiring harnesses using plastic tiedown straps.

1.2 The purpose of this Standard is to facilitate selection of suitable mounting hardware for specific design applications as well as providing the design criteria required for drawing call-out.

1.3 Mounting hardware and accessories not listed herein may be called out on drawings after consultation with DHI Standards Engineering department. Following agreement by the Standards Engineering department, this Design Standard shall be updated accordingly

1.4 Unless otherwise noted, all dimensions are in inches.

2.0 GENERAL DESIGN NOTES

2.1 Application/Limitations

2.1.1. Plastic tiedown straps shall be used as the preferred method of supporting (clipping) wiring harnesses and bundles on the interior structure of the fuselage, subject to the following limitations:

a) Except as noted below, plastic tiedown straps used in conjunction with mounts and brackets as specified herein, shall be 3/16 (.190) inch width "TEFZEL[1]" high-temperature, weather-resistant type. Ref. Bombardier Standard No. B0816019-003.

b) Plastic tiedown straps used as secondary support and within wiring trays shall be standard 3/16 inch width, MS3367-3-9 natural nylon.

c) Power cables "00" and larger shall be routed and supported with cushioned metal clamps. Ref. MS 21919.

d) Wire bundles larger than 1.25 inches in diameter shall be supported with cushioned clamps.

e) Plastic tiedown strap type mounts or brackets to be riveted to primary structure, e.g. stringers, frames, floor beams, bulkheads, etc., shall use solid, protruding (universal) head (AD) rivets with shop formed head on structure side of assembly.

f) Rivet locations for all nylon mounts specified herein shall be defined on the relevant engineering drawing.

1. TEFZEL is a DuPont trade name for a fluoropolymer material with a characteristic blue color.

g) Where nylon mounts or brackets are to be riveted to bonded structure, e.g. bonded stringers on Dash 8 Series 100/200/300 A/C, the relevant engineering drawing must contain a Note to SQUEEZE RIVET ONLY for such rivets.

h) On vertical installations, the wire bundle shall be wrapped with two (2) wraps of fire resistant silicone rubber (Guideline) tape (Ref. PPS 9.04) at every 4th tie strap support to prevent slippage of the wire bundle.

i) Where tiedown straps are used as the first support adjacent to a connector, the wire bundle shall have two (2) wraps of fire resistant silicone rubber (Guideline) tape applied in the area of the tie strap, to prevent slippage and strain on the wires at the connector backshell.

j) Cables and wire bundles having a diameter greater than 3/8" shall be protected with a minimum of 1 1/2 turns of MIL-I-19166 fiberglass tape applied in the area of the tie strap at all primary supports, except where silicone rubber "Guideline" tape is required as per 2.1.1.h and 2.11.i.

k) Where mounts and brackets specified herein do not provide the required stand-off clearance from the aircraft structure, conventional nutplates, cushioned clamps, spacers, etc., shall be used.

l) Plastic tiedown straps shall not be used as primary support in areas where failure would permit the strap or wire bundle to fall into moving mechanisms.

2.2 Edge Protection

2.2.1. All holes in frames, bulkheads, etc., with wire bundles passing through, shall have plastic grommet edging, MS 21266 or NAS 557, applied to protect the wire bundle in the event of failure of the plastic tiedown strap.

3.0 MULTIPLE HARNESS TIE MOUNT PLATE -MS3339

3.1 General Description

3.1.1. Refer to Figure 1 for a general description of the MS3339, Tie Mount Plate.

3.1.2. Material: Nylon 6/6 Natural

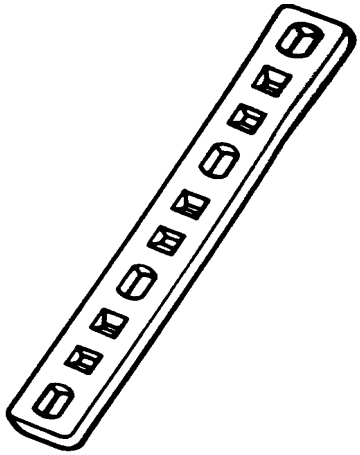


FIGURE 1: MS3339 - MULTIPLE HARNESS TIE MOUNT PLATE

3.2 Application Notes

3.2.1. Tie mount plates are designed to be mounted flat against the structure to support multiple wire bundles running parallel to the structure.

3.2.2. Primary usage - series of wire bundles running parallel to one another in a wire harness tray. Refer to Table 1 for selection of appropriate tie plate for the particular application.

3.2.3. Number of wire bundles = 2 to 6. For single wire bundles use a cradle or miniature type tie mount.

3.2.4. Plates may be offset in series to facilitate securing smaller wire bundles in a restricted area. Refer to Figure 2.

3.2.5. Maximum wire bundle diameter = 1 inch.

PART NO	NO OF BUNDLES	WIRE BUNDLE PITCH	ATTACHMENT BLIND RIVET (PPS 2.02)	RIVET PLACEMENT GUIDE
MS3339-2-9	2	1 1/4	CHERRY CR9127-4-()	* O *
MS3339-3-9	3			* O O *
MS3339-4-9	4			* O * O *
MS3339-5-9	5			* O * * O *
MS3339-11-9	6	1 1/2		* O O * O O *

Table 1: MS3339 MULTIPLE HARNESS TIE MOUNT PLATE

3.3 Attachment

3.3.1. Rivet directly onto wiring tray or support bracket using pull through type, blind rivets.

3.3.2. Refer to Table 1 for a listing of the applicable rivet for the particular size plate.

3.3.3. Where the thickness of the mounting structure is less than 0.025 inch, one (1) NAS1149DN632J washer shall be used under the shop head to prevent pull out of the rivet.

3.3.4. Tie Mount Plates only require riveting in every 2nd or 3rd rivet hole. Refer to Table 1 for recommended rivet placement.

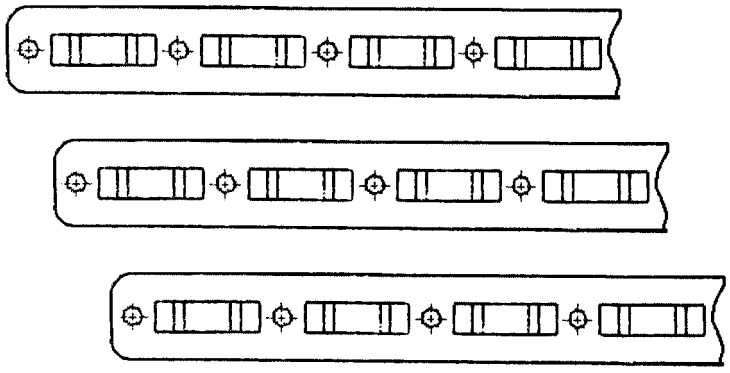


FIGURE 2: TIE MOUNT PLATE OFFSET INSTALLATION (TYPICAL)

4.0 SINGLE HARNESS TIE MOUNT - CRADLE TYPE - B0816031

4.1 General Description

4.1.1. Refer to Figure 3 for a general description of the B0816031, Cradle Type, Tie Mount.

4.1.2. Material: Nylon 6/6 Natural.

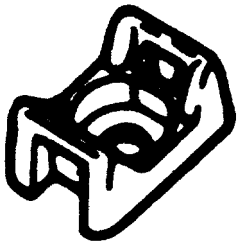


FIGURE 3: B0816031, TIE MOUNT, CRADLE TYPE

4.2 Application Notes

4.2.1. Single harness, cradle type, tie mounts are designed to be mounted flat against the structure to secure wire bundles running parallel to the structure.

4.2.2. Primary usage - securing a series of small wire bundles in wire harness tray or support bracket where space prohibits using a tie plate. Securing individual wire bundles on support brackets.

4.2.3. Refer to Table 2 for selection of appropriate tie mount for the particular application.

4.2.4. Cradle type tie mounts may be staggered to facilitate installation of a number of wire bundles in a restricted area.

BOMBARDIER STANDARD NUMBER	BUNDLE DIA		ATTACHMENT BLIND RIVET (PPS 2.66)
	MIN	MAX	
B0816031-001	1/4 (Note 1)	3/8	M7885/6-4-()
B0816031-002	3/8	5/8	
B0816031-003	5/8	1	M7885/6-5-()

NOTES:
1.For wire bundles smaller than 1/4 inch diameter, use MINIATURE type tiemount or wrap wire bundle with two (2) wraps of fire resistant (Guideline) rubber tape.

Table 2: B0816031 TIE MOUNT - CRADLE TYPE

4.3 Attachment

4.3.1. Rivet directly onto wiring tray or support bracket using a single locked spindle type oversize diameter blind rivet. **Do not use B0816031 brackets on primary structure as defined per para 2.1.1.e**

4.3.2. Where the thickness of the mounting structure is less than 0.025 inch, one (1) NAS1149DN632J washer shall be used under the shop head to prevent pull out of the rivet.

4.3.3. Refer to Table 2 for a listing of the applicable rivet for the particular size mount.

5.0 SINGLE HARNESS TIE MOUNT - MINIATURE - B0816006

5.1 General Description

5.1.1. Refer to Figure 4 for a general description of the B0816006, Miniature Tie Mount.

5.1.2. Material: Nylon 6/6 Natural

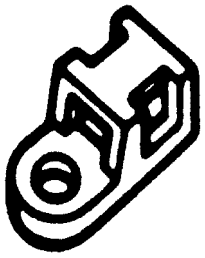


FIGURE 4: B0816006 TIE MOUNT - MINIATURE

5.2 Application Notes

5.2.1. Single harness, miniature type tie mounts are designed to be mounted flat against the structure to secure wire bundles running parallel to the structure.

5.2.2. Primary usage - securing small wire bundles in wire harness tray or support bracket where the bundle diameter is too small to use a cradle type tie mount.

5.2.3. Refer to Table 3 for a listing of miniature type single harness tie mount.

BOMBARDIER STANDARD NO	BUNDLE DIA		ATTACHMENT BLIND RIVET (PPS 2.02) or SOLID RIVET (PPS 2.01)
	MIN	MAX (Note 1)	
B0816006-TC814	0.08	1/4	CHERRY CR9127-4-() or B0205016AD4-()S

NOTES
1. For wire bundles larger than 1/4 inch diameter, use cradle type tie mount (refer to Table 2)

Table 3: B0816006 TIE MOUNT - MINIATURE

© 6.0 SINGLE HARNESS TIE MOUNT - ADHESIVE BONDED - B0816035

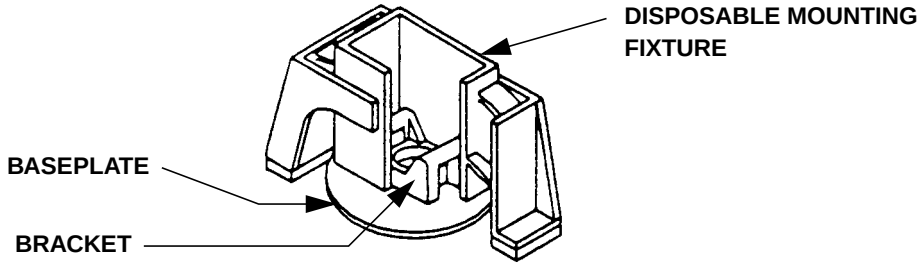
6.1 General Description

6.1.1. Refer to Figure 5 for a general description of the B0816035, adhesive bonded tie mount.

6.1.2. Material:

Baseplate - Anodized Aluminum

Tie Mount Bracket - Nylon 6/6 Natural



© FIGURE 5: - B0816035 ADHESIVE BONDED TIE MOUNT

6.2 Application Notes

6.2.1. B0816035 adhesive bonded tie mount assemblies consist of a mounting baseplate with a 360° swivel, nylon tie mounting bracket riveted in place.

6.2.2. Adhesive bonded tie mounts are supplied assembled into a disposable mounting fixture to facilitate bonding directly to the aircraft structure using high strength structural adhesive.

6.2.3. Primary usage - primary support of wire bundles in areas where it is not practicable to drill mounting holes in the aircraft structure, e.g. machined frames, spars, fuel or hydraulic reservoirs, composite structures.

6.2.4. Restrictions - adhesive bonded tie mounts shall not be used where in-service failure of the adhesive bond could cause the wire bundle to fall onto fuel or hydraulic lines or onto moving cables or components.

6.2.5. Refer Table 4 for a listing of adhesive bonded type tie mounts and installation envelope dimensions.

© ADHESIVE BONDED TIE MOUNT	INSTALLED DIMENSIONS	MINIMUM RADIUS OF CURVATURE	INSTALLATION ENVELOPE DIMENSIONS
B0816035	1.25 in. Dia.	12 in.	1.5 in. x 2.1 in.

Table 4: - B0816035 TIE MOUNT - INSTALLATION DIMENSIONS

6.3 Attachment

6.3.1. Refer to PPS 2.70 for installation instructions for adhesive bonded type tie mounts.

6.3.2. Drawing Note: **BOND IN PLACE TO PPS 2.70**

7.0 SINGLE HARNESS BULKHEAD MOUNT - TRANSVERSE - B0816026

7.1 General Description

7.1.1. Refer to Figure 6 for a general description of the B0816026 Transverse Bulkhead Type Tie Mount.

7.1.2. Material: Nylon 6/6 Natural

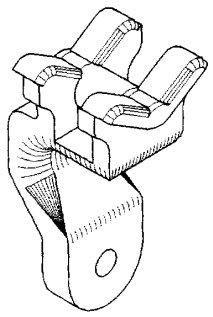


FIGURE 6: B0816026 - TRANSVERSE BULKHEAD TIE MOUNT

7.2 Application Notes

7.2.1. Primary usage - support of single wire bundles running at 90 degrees to the frames, stringers, or bulkheads, including bundles passing through lightening holes.

7.2.2. Although B0816026 tie mount brackets are primarily designed for use in lightening hole applications they may be used on frames, stringers or bulkheads.

7.2.3. In order to minimize the potential rotation of the bracket on the single attachment rivet, the tie mount shall be installed with the base of the bracket overlapping the structure with a minimal gap between the base and structure. A nominal gap of 0.030 - 0.050 inches is recommended. Refer to Figure 7 for a general description of a typical installation.

7.2.4. Refer to Table 5 for a listing of transverse bulkhead tie mounts.

7.3 Attachment

7.3.1. Transverse bulkhead tie mounts are designed to be riveted directly to the aircraft structure using a single solid rivet.

Bombardier STANDARD NO	BUNDLE DIA		ATTACHMENT SOLID RIVET (PPS 2.01)
	MIN	MAX	
B0816026-001	0.08	5/8	B0205016AD4-()S

Table 5: B0816026 BULKHEAD TIE MOUNT BRACKET - TRANSVERSE

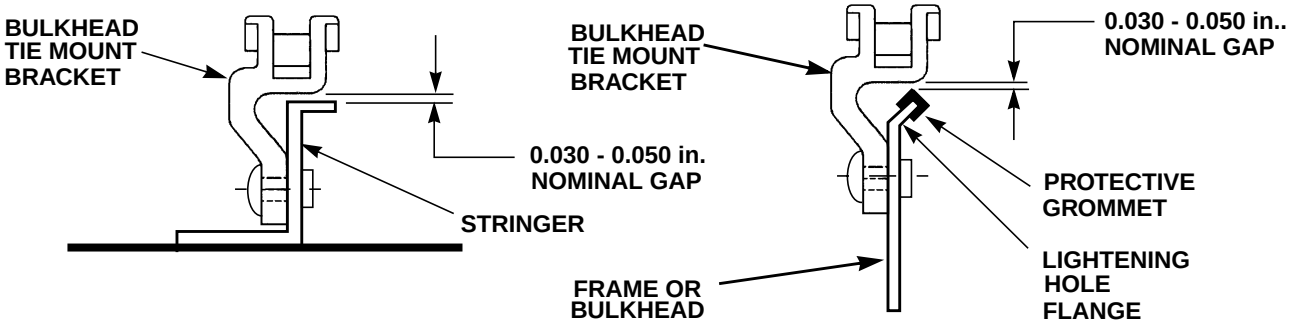


FIGURE 7: B0816026 TIE MOUNT BRACKET - TYP. INSTALLATION

8.0 SINGLE HARNESS BULKHEAD MOUNT - LONGITUDINAL - B0816005

8.1 General Description

8.1.1. Refer to Figure 8 for a general description of the B0816005 Single Harness, Longitudinal Bulkhead Tie Mount.

8.1.2. Material: Nylon 6/6.

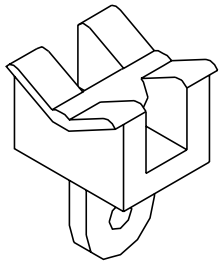


FIGURE 8: B0816005 - BULKHEAD TIE MOUNT - LONGITUDINAL

8.2 Application Notes

8.2.1. Primary usage - support of single wire bundles running parallel to frames, stringers or bulkheads.

8.2.2. In order to minimize the potential rotation of the bracket on the single attachment rivet, the tie mount shall be installed with the base of the bracket overlapping the structure with a minimal gap between the base and structure. A nominal gap of 0.030 - 0.050 inches is recommended. Refer to Figure 8 for a general description of a typical installation.

8.2.3. Refer to Table 6 for a listing of longitudinal tie mounts.

BOMBARDIER STANDARD NO.	BUNDLE DIA		ATTACHMENT SOLID RIVET (PPS 2.01)
	MIN	MAX	
B0816005-11559	0.08	5/8	B0205016AD4-()S
B0816005-11659	1/2	1	

Table 6: B0816006 - BULKHEAD TIE MOUNT - LONGITUDINAL

8.3 Attachment

8.3.1. Longitudinal bulkhead tie mounts are designed to be riveted directly to the aircraft structure using a single solid rivet.

9.0 SINGLE HARNESS BULKHEAD MOUNT - TRANSVERSE, HEAVY DUTY - B0816027

9.1 General Description

9.1.1. Refer to Figure 9 for a general description of the B0816027 Heavy Duty Single Harness Transverse Bulkhead Tie Mount.

9.1.2. Material: Nylon 6/6

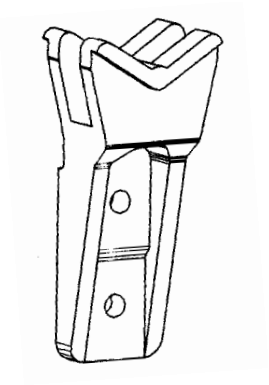


FIGURE 9: B0816027- Bulkhead Tie Mount - Transverse - Heavy Duty

9.2 Application Notes

9.2.1. Primary usage - support of heavy wire bundles running at 90 degrees to frames, stringers or bulkheads, including bundles passing through lightening holes.

9.2.2. Refer to Table 7 for a listing of heavy duty transverse bulkhead tie mounts.

BOMBARDIER STANDARD NO.	BUNDLE DIA		ATTACHMENT SOLID RIVET (PPS 2.01))
	MIN	MAX	
B0816027-001	1/2	1 1/4	B0205016AD-4-()S

Table 7: B0816027 - BULKHEAD TIE MOUNT - TRANSVERSE, HEAVY DUTY

9.3 Attachment

9.3.1. Heavy duty, transverse bulkhead tie mounts are designed to be riveted directly to the aircraft structure using two (2) solid rivets.

10.0 HARNESS SUPPORT BRACKET, STRINGER MOUNT, SNAP-ON - B016028

10.1 General Description

10.1.1. Refer to Figure 10 for a general description of the B0816028, snap-on, stringer mounted, tie mount type, harness support bracket.

10.1.2. Material: Nylon 6/6.

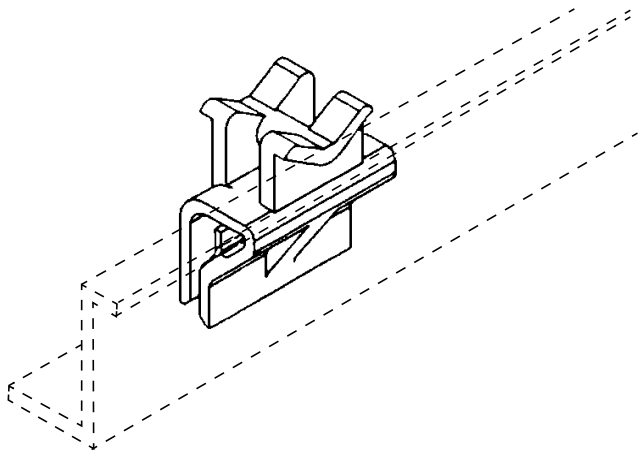


FIGURE 10: B0816028 - STRINGER TIE MOUNT - TRANSVERSE - SNAP-ON

10.2 Application Notes

10.2.1. Primary usage - support of single wire bundles running transverse to stringers.

10.2.2. Refer to Table 8 for a listing of Stringer Type tie mounts.

BOMBARDIER STANDARD NO.	BUNDLE DIA	
	MIN	MAX
B0816028	0.08	5/8

Table 8: B0816028 - STRINGER TIE MOUNT, SNAP-ON

10.3 Attachment

10.3.1. Snap-On stringer mount harness support brackets are designed to snap into place on extruded ZED or TEE section stringers without riveting.

10.3.2. Refer to Figure 11 for dimensional limits of extruded ZED and TEE section stringers for installation of snap-on, stringer mounted, harness support brackets.

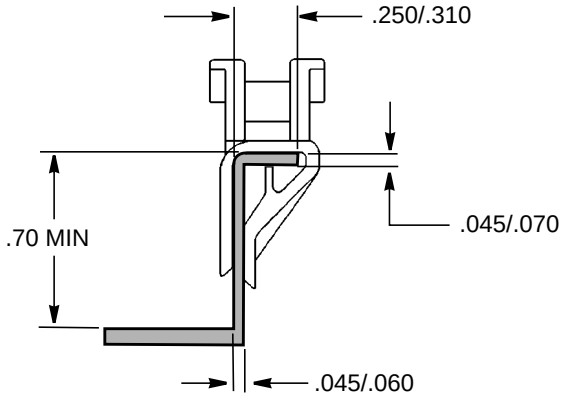


FIGURE 11: B0816028 - STRINGER TIEMOUNT/EXTRUDED SECTION - DIMENSIONAL LIMITS

11.0 SINGLE HARNESS TIE MOUNT BRACKET - MS3341

11.1 General Description

11.1.1. Refer to Figure 12 for a general description of the MS3341 Single Harness, Tie Mount Bracket.

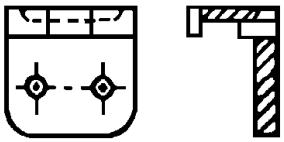


FIGURE 12: MS3341 - TIE MOUNT BRACKET

11.2 Application Notes

11.2.1. Primary usage - support of single wire bundles running at 90 degrees to frames, stringers or bulkheads.

11.2.2. Refer to Table 9 for a listing of MS3341 tie mount brackets.

11.2.3. MS3341 brackets are not recommended for primary support of wire harness, use only as secondary support for routing of wires or cables between primary supports.

BOMBARDIER STANDARD NO.	BUNDLE DIA		ATTACHMENT BLIND RIVET (PPS 2.02)
	MIN	MAX	
MS3341-1	1/2	1.0	CR9127-5-()
MS3341-2	.080	5/8	CR9127-4-()

Table 9: MS3341 TIE MOUNT BRACKET

11.3 Attachment

11.3.1. MS3341 tie mount brackets are designed to be riveted to secondary aircraft structure (mounting brackets or angles) using pull through type blind rivets. **Do not use MS3341 brackets on primary structure as defined per para 2.1.1.e.**

12.0 MULTIPLE HARNESS SUPPORT BRACKET - B0816018

12.1 General Description

12.1.1. Refer to Figure 13 for a general description of the B0816018 multiple harness tie mount support bracket

12.1.2. Material: Nylon 6/6.

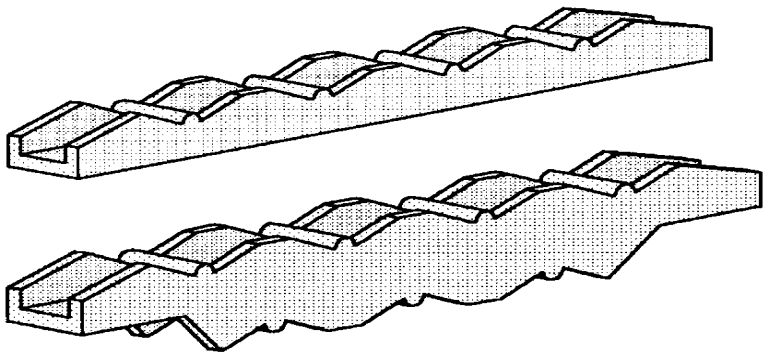


FIGURE 13: B0816018 TIE MOUNT SUPPORT BRACKET

12.2 Application Notes

12.2.1. Primary usage - support of up to 15 wire bundles in longitudinal or vertical runs within the fuselage.

12.2.2. Refer to Table 10 for a listing of B0816018 Harness Support Bracket type tie mounts

12.2.3. Refer to the B0816018 standard for specific details of a particular dash number.

BRACKET TYPE	BOMBARDIER STANDARD NO.	MAX NO. OF HARNESSES	BUNDLE DIA		ATTACHMENT HARDWARE	
			MIN	MAX	SCREW	WASHER
SINGLE SIDE	B0816018-11	8	1/2	1.0	NAS1801-3-(9) (NOTE 1)	NAS1149D0332J
	B0816018-13	7				
	B0816018-15	6				
	B0816018-17	5				
	B0816018-19	4				
DOUBLE SIDE	B0816018-21	15	1/2	1.0	NAS1801-3-(9) (NOTE 1)	NAS1149D0332J
	B0816018-23	13				
	B0816018-25	11				
	B0816018-27	9				
	B0816018-29	7				

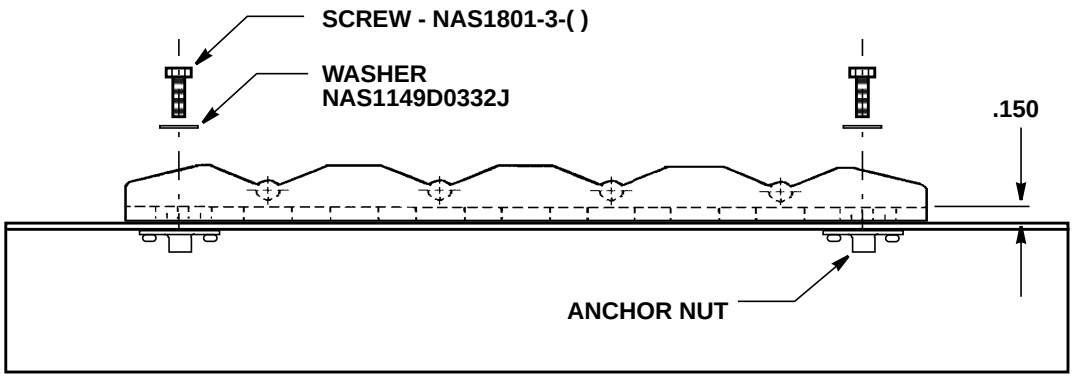
© NOTE 1 - SCREW LENGTH BASED ON 2D ENGAGEMENT OF SCREW THREAD IN NUTPLATE STAND-OFF

Table 10: B0816018 - TIE MOUNT SUPPORT BRACKETS

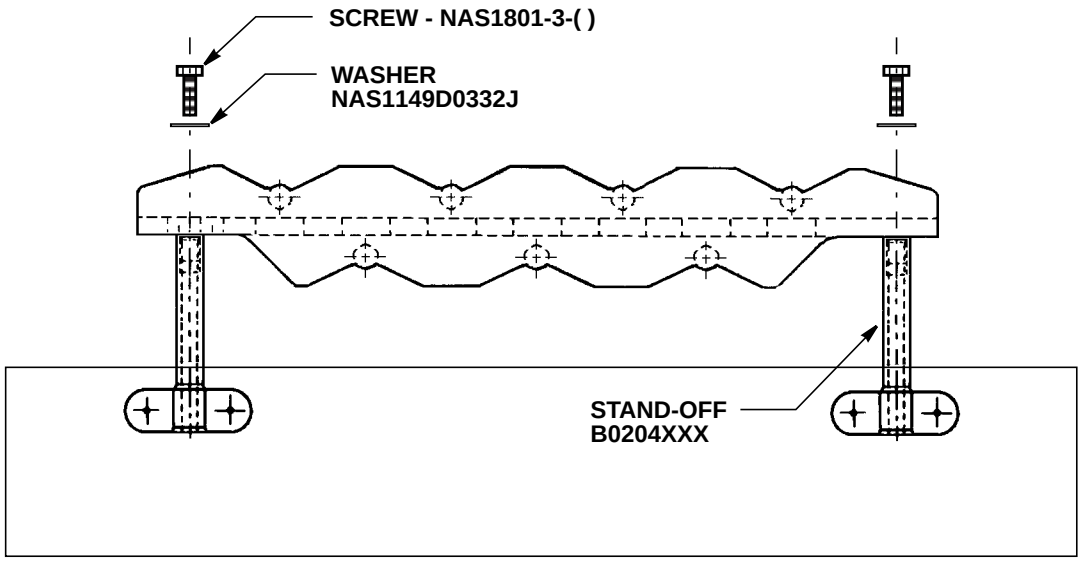
12.3 Attachment

12.3.1. Multiple harness tie mount support brackets are designed to be secured by means of #10 hex-head, cross-recess, machine screws either directly onto the structure for single sided brackets or on stand-offs for double sided brackets. Ref Figure 14.

© NOTE 1 - ADDED TO TABLE 10



B0816018 INST'N DIRECTLY ON BRACKET OR STRUCTURE (TYP)



B0816018 INST'N ON NUTPLATE STAND-OFFS (TYP)

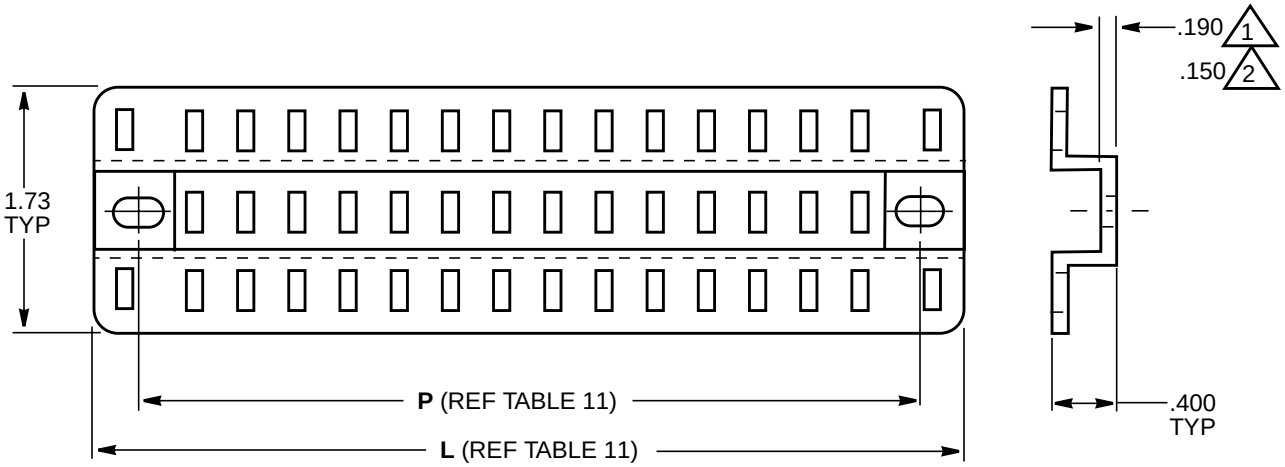
FIGURE 14: B0816018 TIE MOUNT SUPPORT BRACKET INST'N (TYP)

© 13.0 MULTIPLE HARNESS TIEDOWN, TOP HAT SUPPORT - B0816034

13.1 General Description

13.1.1. Refer to Figure 15 for a general description of the B0816034 top hat support bracket.

13.1.2. Material: Nylon 6/6



1 SECTION THICKNESS AT END PICK-UP POINTS - REF B0816034
2 SECTION THICKNESS AT INTERMEDIATE PICK-UP POINTS - REF B0816034

FIGURE 15: B0816034 TOP HAT, TIE MOUNT SUPPORT BRACKET

13.2 Application Notes

13.2.1. Primary usage - support of up to 30 wire bundles in longitudinal or vertical runs within the fuselage. Top hat supports provide for single or double sided mounting of wire harnesses.

13.2.2. Refer to Table 11 for a listing of B0816034 Top Hat Support type harness tie mounts.

© 13.2.3. Refer to the B0816034 standard for specific details of a particular dash number.

BOMBARDIER STANDARD NO.	GENERAL DESCRIPTION				BUNDLE DIA		ATTACHMENT HARDWARE	
	L OVERALL LGTH	NO OF MTG HOLES	P MTG HOLE PITCH		MIN	MAX	SCREW	WASHER
			O/A	INT				
B0816034-001	8.90	2	8.30	---	.08	1.0	NAS1801-3-10 (1)	NAS1149D0332J
B0816034-002	9.15	2	6.70	---				
B0816034-003	9.90	2	9.30	---				
B0816034-004	5.40	2	2.94	---				
B0816034-005	8.40	2	7.80	---				
B0816034-006	9.53	2	6.10	---				
B0816034-007	8.00	2	7.40	---				
B0816034-008	7.65	2	4.80	---				
B0816034-009	6.90	2	6.30	---				
B0816034-010	6.10	3	5.50	3.78				
B0816034-011	12.90	2	12.30	---				
B0816034-012	8.10	3	7.30	6.15				
B0816034-013	7.70	2	7.10	---				
B0816034-014	12.78	2	9.00	---				
B0816034-015	11.40	2	10.80	---				
B0816034-016	6.90	3	4.65	3.94				
B0816034-017	4.54	2	3.94	---				
B0816034-018	8.40	2	5.75	---				
B0816034-019	7.19	2	6.59	---				
B0816034-021	10.40	2	9.80	---				
B0816034-023	11.30	2	10.70	---				
B0816034-025	7.38	2	6.78	---				
B0816034-027	6.20	2	5.60	---				
B0816034-029	9.37	2	8.77	---				
B0816034-031	8.10	2	7.50	---				
B0816034-035	6.40	2	5.80	---				
B0816034-036	6.10	2	5.50	---				
NOTE 1 - SCREW LENGTH BASED 2D ENGAGEMENT OF SCREW THREAD IN NUTPLATE STAND-OFF.								

Table 11: B0816034 - TOP HAT TIE MOUNT SUPPORT BRACKETS

© TABLE 11 - ADDED

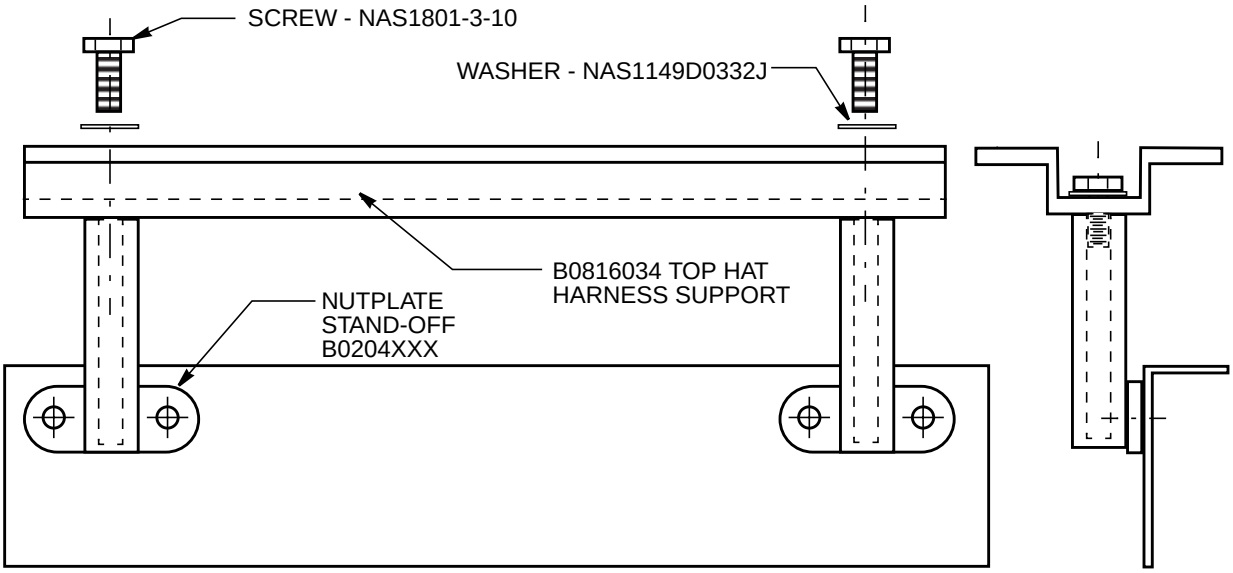
SEE ENGINEERING STANDARDS APPROVAL RECORD FOR ORIGINAL SIGNATURES AND CHANGE SUMMARY

DRAWN	B. McDONALD	TITLE: **WIRING HARNESS SUPPORTS & BRACKETS, TIE MOUNT TYPE**	**DS 141**
CHECKED	K. FLINDERS		
STRESS	D. TODD		PAGE 18 OF 19
APPROVED	S. HAMID		

REV:
REV:
REV:
REV: B - 25 JAN 99
REV: A - 10 APR 96
APPROVED: 9 FEB 1996

© 13.3 Attachment

13.3.1. B0816034 top hat support brackets are designed to be secured to nutplate stand-offs by means of #10 hex-head, cross-recess, machine screws Ref Figure 16.



© **FIGURE 16: B0816034 TIE MOUNT SUPPORT BRACKET INST'N (TYP)**

© FIGURE 16 - ADDED