DE HAVILLAND AIRCRAFT OF CANADA LIMITED

PPS 9.09

PRODUCTION PROCESS STANDARD
PROPRIETARY INFORMATION

SPLICING ELECTRICAL WIRES

Issue 23
- This standard supersedes PPS 9.09, Issue 22.
- Vertical lines in the left hand margin indicate technical changes over the previous issue.
- Direct PPS related questions to christie.chung@dehavilland.com or (416) 375-7641.
- This PPS is effective as of the distribution date.

Prepared By: (Christie Chung) June 23, 2021

PPS Group

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M&P Engineering

Signed original on file. Validation of paper prints is the responsibility of the user.

Issue 23 - Summary of Changes (over the previous issue)

The following summaries are not detailed and are intended only to assist in alerting PPS users to changes which may affect them. Refer to the applicable sections of this PPS for detailed procedure and requirements.

- Thomas & Betts is currently ABB Electrification Canada ULC.
- Amended wire sizes for DSC 44 as per new DSC 44, issue C, release.
- Revised crimp tools for DSC 44 connectors.
- Deleted reference to Tyco, AMP and Raychem as company name is currently TE Connectivity.

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1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for the splicing of electrical wire and cable assemblies.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction. The procedure specified in this PPS shall be followed to ensure compliance with all applicable specifications. In general, if this PPS conflicts with the engineering drawing, follow the engineering drawing. The requirements specified in this PPS are necessary to fulfil the engineering design and reliability objectives.

1.1.1.1 Perform splicing of braided electrical shields according to PPS 9.34.

1.1.1.2 Splice aluminum wire according to PPS 9.35.

1.1.2 Refer to PPS 13.26 for the subcontractor provisions applicable to this PPS.

2 HAZARDOUS MATERIALS

2.1 Before receipt at De Havilland Aircraft of Canada Limited (DHC), all materials shall be approved and assigned Material Safety Data Sheet (MSDS) numbers by the DHC Environment, Health and Safety Department. Refer to the manufacturer's MSDS for specific safety data on any of the materials specified in this PPS. If the MSDS is not available, contact DHC Environment, Health and Safety Department.

3 REFERENCES

3.1 PPS 9.22 - Assembly of Connectors.

3.2 PPS 9.24 - Wire and Cable Stripping.

3.3 PPS 9.34 - Terminating Electrical Shields.

3.4 PPS 9.35 - Terminating and Splicing Aluminum Wire.

3.5 PPS 9.39 - Installation and Termination of Braided Shields for EMI & HIRF Protection of Wire Harnesses on DASH 8 Series 400 Aircraft.

3.6 PPS 9.55 - Qualification of Crimp Tools.

3.7 PPS 13.26 - General Subcontractor Provisions.

3.8 PPS 13.34 - Installation of Plastic Cable Ties.

3.9 PPS 13.39 - DASH 8 & Lear 45 Critical and Special Processes PPS Index.

3.10 PPS 31.17 - Solvent Usage.

4 MATERIALS AND EQUIPMENT

4.1 Materials

4.1.1 Unless otherwise specified in this section, use only the materials specified; use of superseding or alternative materials is not allowed.

4.1.2 Splice connectors as specified on the engineering drawing or wiring list. See Figure 1 for a general description of electrical splice connectors.

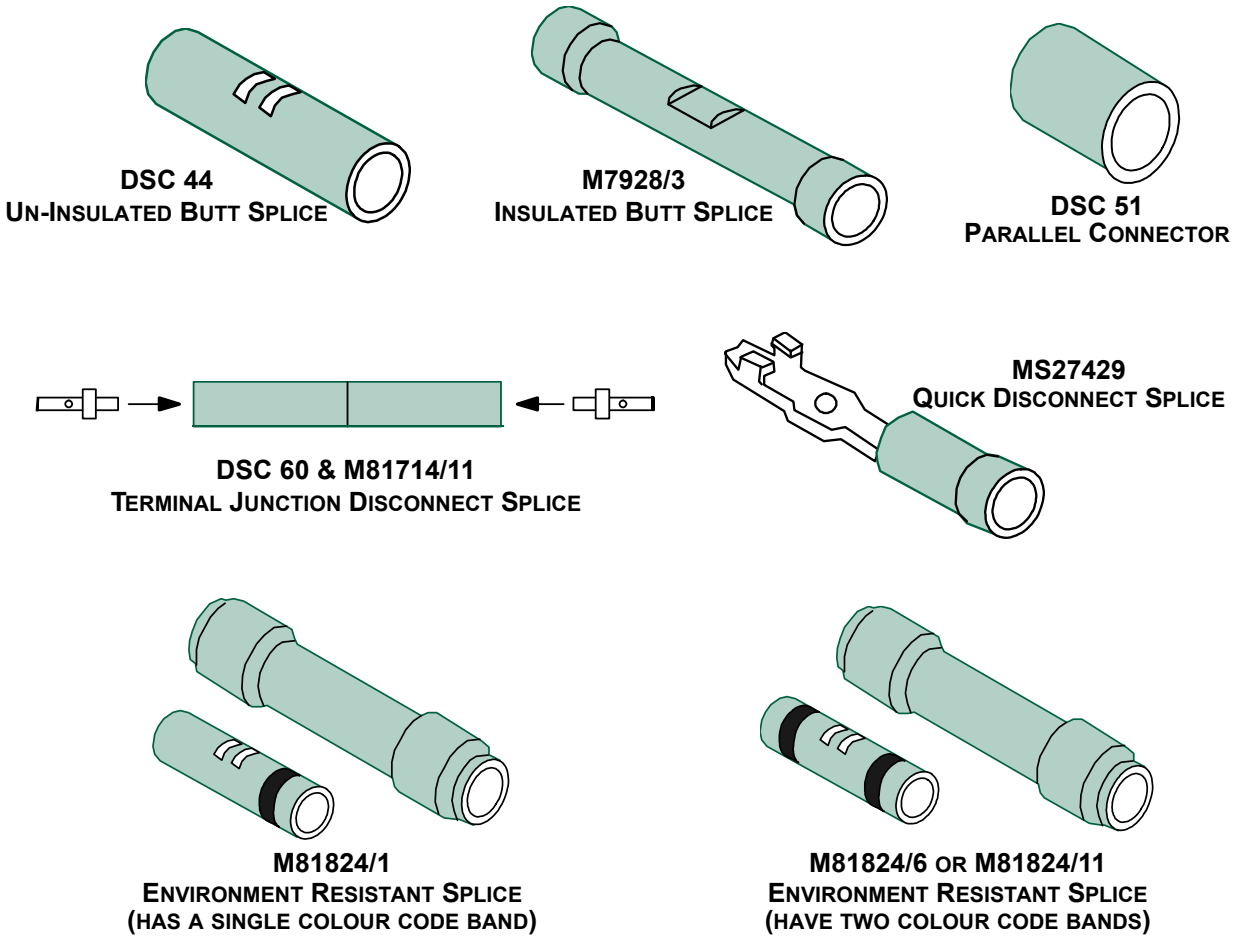


FIGURE 1 - ELECTRICAL SPLICE CONNECTORS

4.2 Equipment

4.2.1 Crimping tools as listed in Table IV Crimping tools shall be qualified according to PPS 9.55 before use on production parts. For tool operation, refer to the manufacturers' instructions.

4.2.2 Hot air gun (e.g., Steinel HG 2520E or Steinel STEI-HG2310-BB) with interchangeable heat deflector attachments.

4.3 Facilities

4.3.1 This PPS has been categorized as a Controlled Special Process according to PPS 13.39 and as such only facilities specifically approved according to PPS 13.39 are authorized to perform splicing of electrical wire and cable assemblies according to this PPS.

4.3.2 Subcontractors shall direct requests for approval to DHC Quality.

4.3.3 Facility approval shall be based on a facility report, a facility survey and completion of a qualification test program, if required. The facility report shall detail the materials and equipment to be used, the process sequence to be followed and the laboratory facilities used to show compliance with the requirements of this PPS. Any deviation from the procedure or requirements of this PPS shall be detailed in the facility report. Based upon the facility report, DHC Engineering may identify additional qualification and/or process control test requirements. During the facility survey, the facility requesting qualification shall be prepared to demonstrate their capability. Once approved, no changes to subcontractor facilities may be made without prior written approval from DHC Quality.

4.3.3.1 For approval of subcontractor facilities to perform perform splicing of electrical wire and cable assemblies according to this PPS, completion of a test program and submission of suitable test samples representative of production parts is required. Test samples shall meet the requirements specified in section 6.

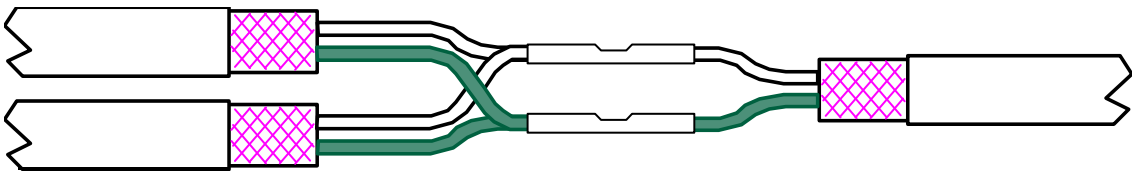
5 PROCEDURE

5.1 General

5.1.1 Do not splice wires which run through conduit. If the engineering drawing specifies splicing wires which are to be covered with conduit, contact Liaison Engineering.

5.1.2 The engineering drawing or wiring list specifies the type of splice to be employed for any particular wire or cable assembly. However, if the engineering drawing or wiring list specifies the use of an M7928/3 insulated butt splice, it is preferred but not mandatory that an M81824/1 environment resistant splice be used instead.

5.1.3 When splicing twisted pairs, triplets, etc., ensure that like wires are spliced together as shown below:



5.1.4 The following splice kits include M81824/1 insulated environment resistant splices; prepare wires for crimping and crimp the M81824/1 included in these kits as specified herein.

- Cantwell Cullen 3C-97250
- TE Connectivity series D-500 and B-500-600-00

5.1.5 Where the engineering drawing specifies use of a M81824 environment resistant splice, but is not specific as to which particular M81824 splice to use, refer to Table I for M81824 splice selection by wire rating (i.e., maximum operating temperature). In cases of confusion or concern about which splice to use, refer to Liaison Engineering.

TABLE I - M81824 ENVIRONMENT RESISTANT SPLICE IDENTIFICATION/SELECTION

PART NUMBER		WIRE RANGE	COLOUR CODE	COLOUR CODE BAND(S)	WIRE APPLICABILITY
SPLICE	SIZE DASH NUMBER				
M81824/1	-1	26 - 20	RED	ONE COLOUR CODE BAND	Tin coated copper wire, rated for 302°F (150°C) maximum operating temperature
	-2	20 - 16	BLUE		
	-3	16 - 12	YELLOW		
M81824/6	-1	26 - 20	RED	TWO COLOUR CODE BANDS	Nickel or silver plated copper wire, rated for 347°F (175°C) maximum operating temperature
	-2	20 - 16	BLUE		
	-3	16 - 12	YELLOW		
M81824/11	-1	26 - 20	RED	TWO COLOUR CODE BANDS	Nickel or silver plated copper wire, rated for 392°F (200°C) maximum operating temperature
	-2	20 - 16	BLUE		
	-3	16 - 12	YELLOW		

5.2 Filler Wire

5.2.1 General

5.2.1.1 Unless the engineering drawing or wiring list specifies the use of an adaptor, refer to Table II for filler wire which may be required for the splice. Do not use filler wire if the engineering drawing or wiring list specifies the use of an adaptor.

5.2.1.2 Ensure that the filler wire butts against the splice wire stop before crimping.

5.2.1.3 The filler wire shall be qualified to the same specification as the lead wire. If filler wire is to be added to two or more wires of different specifications, use filler wire which is qualified to the same specification as one of the wires.

5.2.2 Single Filler Wire Method

5.2.2.1 Install a single filler wire as follows (see Figure 2). Only use the single filler wire method if the requirements of Step 5 can be met.

Step 1. Cut a suitable length of the appropriate size (AWG) and type of filler wire.

Step 2. Strip back one end of the filler wire according to PPS 9.24 to the length specified in Table III.

Step 3. Insert the filler wire into the splice along with the other leads.

Step 4. Crimp the wires in the splice as specified herein.

Step 5. After crimping, trim the filler wire so that the filler wire protrudes from the crimp portion of the splice barrel by 0" - 1/32". The filler wire shall not protrude beyond the splice insulation under any circumstance.

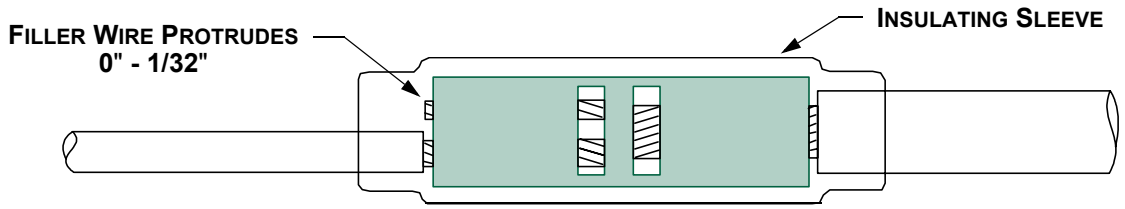


FIGURE 2 - SINGLE FILLER WIRE METHOD

5.2.3 Double Back Filler Wire Method

5.2.3.1 Strip back the appropriate gauge lead double the length specified in Table III and fold the lead back on itself as shown in Figure 3.

5.2.3.2 When folding back the lead, avoid excessive disturbance of the lay of the wire strands.

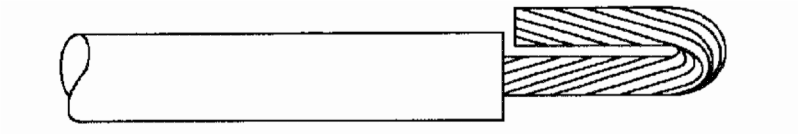


FIGURE 3 - DOUBLE BACK FILLER WIRE METHOD

5.2.4 Loop Filler Wire Method

5.2.4.1 Apply the loop filler wire method as follows:

Step 1. Cut a 3" - 4" length of the appropriate size (AWG) and type of filler wire.

Step 2. Strip back both ends of the filler wire to the length specified in Table III.

Step 3. Form the length of filler wire into a loop as shown in Figure 4.

Step 4. Insert both ends of the filler wire along with the other leads into the splice.

Step 5. Crimp the wires in the splice as specified herein.

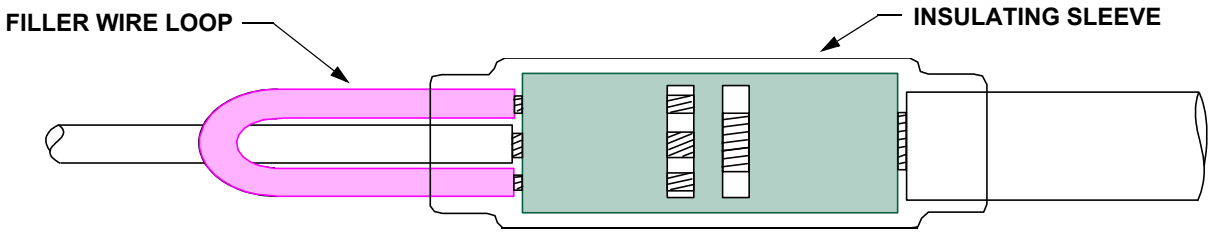


FIGURE 4 - LOOPED FILLER WIRE METHOD

5.3 Step Down Adapters

5.3.1 If the engineering drawing or wiring list specifies the use of a step down adapter, assemble the adapter onto the stripped end of the wire, or wire combination, before inserting the wire(s) into the splice. Ensure that the stripped wire protrudes through the end of the adaptor as shown in Figure 5.

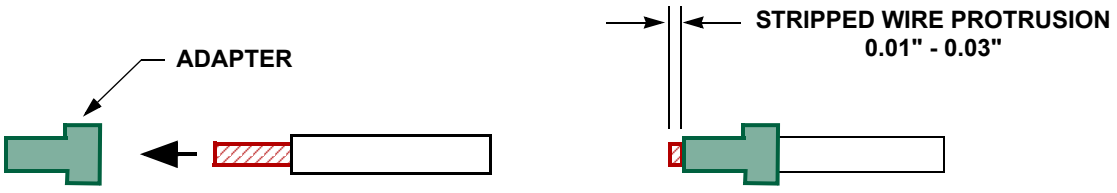


FIGURE 5 - USE OF ADAPTORS

TABLE II - FILLER WIRE REQUIREMENTS

SPLICE SIZE	LEAD WIRES (AWG)	FILLER WIRE REQUIRED (AWG)	FILLER METHOD	FILLER SECTION
8	1 #8 WIRE	NONE	N/A	N/A
	1 #10 WIRE			
	1 #12 WIRE	1 #12 WIRE	SINGLE FILLER	5.2.2
			DOUBLE BACK	5.2.3
		2 #16 WIRES	LOOP	5.2.4
	1 #14 WIRE	1 #10 WIRE	SINGLE FILLER	5.2.2
		2 #14 WIRES	LOOP	5.2.4
	2 #14 WIRES	1 #14 WIRE	SINGLE FILLER	5.2.2
			DOUBLE BACK ONE LEAD	5.2.3
		2 #16 WIRES	LOOP	5.2.4
	3 #14 WIRES	NONE	N/A	N/A
	2 #16 WIRES	1 #12 WIRE	SINGLE FILLER	5.2.2
		2 #14 WIRES	LOOP	5.2.4
12-10	1 #10 WIRE	NONE	N/A	N/A
	1 #12 WIRE			
	1 #14 WIRE	1 #14 WIRE	SINGLE FILLER	5.2.2
			DOUBLE BACK	5.2.3
	2 #14 WIRES	NONE	N/A	N/A
	1 #16 WIRE	1 #12 WIRE	SINGLE FILLER	5.2.2
		2 #16 WIRES	LOOP	5.2.4
	2 #16 WIRES	1 #16 WIRE	SINGLE FILLER	5.2.2
			DOUBLE BACK ONE LEAD	5.2.3
		2 #18 WIRES	LOOP	5.2.4
	3 #16 WIRE	NONE	N/A	N/A
	2 #18 WIRE	1 #14 WIRE	SINGLE FILLER	5.2.2
		2 #18 WIRES	DOUBLE BACK BOTH LEADS	5.2.3
			LOOP	5.2.4
	3 #18 WIRES	1 #18 WIRE	SINGLE FILLER	5.2.2
			DOUBLE BACK ONE LEAD	5.2.3
		2 #20 WIRES	LOOP	5.2.4
	4 #18 WIRES	NONE	N/A	N/A

TABLE II - FILLER WIRE REQUIREMENTS

SPLICE SIZE	LEAD WIRES (AWG)	FILLER WIRE REQUIRED (AWG)	FILLER METHOD	FILLER SECTION
16-12	1 #12 WIRE	NONE	N/A	N/A
	1 #14 WIRE			
	1 #16 WIRE	1 #16 WIRE	SINGLE FILLER	5.2.2
			DOUBLE BACK	5.2.3
	2 #16 WIRES	NONE	N/A	N/A
	1 #18 WIRE	1 #14 WIRE	SINGLE FILLER	5.2.2
		2 #18 WIRES	LOOP	5.2.4
	1 #18 WIRE WITH 1 #20 WIRE	1 #16 WIRE	SINGLE FILLER	5.2.2
	2 #18 WIRES	1 #18 WIRE	DOUBLE BACK ONE LEAD	5.2.3
	3 #18 WIRES	NONE	N/A	N/A
	1 #20 WIRE	1 #14 WIRE	SINGLE FILLER	5.2.2
		2 #16 WIRES	LOOP	5.2.4
	2 #20 WIRES	1 #16 WIRE	SINGLE FILLER	5.2.2
		2 #18 WIRES	LOOP	5.2.4
	3 #20 WIRES	1 #16 WIRE	SINGLE FILLER	5.2.2
		2 #20 WIRES	DOUBLE BACK 2 LEADS	5.2.3
			LOOP	5.2.4
	4 #20 WIRES	NONE	N/A	N/A
	2 #22 WIRES	1 #14 WIRE OR 1 #16 WIRE	SINGLE FILLER	5.2.2
		2 #18 WIRES OR 2 #20 WIRES	LOOP	5.2.4
	3 #22 WIRES	1 #16 WIRE OR 1 #18 WIRE	SINGLE FILLER	5.2.2
		2 #20 WIRES	LOOP	5.2.4
		3 #22 WIRES	DOUBLE BACK ALL LEADS	5.2.3
	4 #22 WIRES	1 #16 WIRE, 1 #18 WIRE OR 1 #20 WIRE	SINGLE FILLER	5.2.2
		2 #22 WIRES	DOUBLE BACK 2 LEADS	5.2.3
			LOOP	5.2.4
	5 #22 WIRES	1 #18 WIRE OR 1 #20 WIRE	SINGLE FILLER	5.2.2
		1 #22 WIRE	DOUBLE BACK ONE LEAD	5.2.3
	6 #22 WIRES	NONE	N/A	N/A

TABLE II - FILLER WIRE REQUIREMENTS

SPLICE SIZE	LEAD WIRES (AWG)	FILLER WIRE REQUIRED (AWG)	FILLER METHOD	FILLER SECTION
16-14	1 #14 WIRE	NONE	N/A	N/A
	1 #16 WIRE			
	1 #18 WIRE	1 #18 WIRE	SINGLE FILLER	5.2.2
			DOUBLE BACK	5.2.3
	2 #18 WIRES	NONE	N/A	N/A
	1 #20 WIRE	1 #16 WIRE	SINGLE FILLER	5.2.2
		2 #20 WIRES	LOOP	5.2.4
	2 #20 WIRES	1 #20 WIRE	SINGLE FILLER	5.2.2
			DOUBLE BACK	5.2.3
		2 #22 WIRES	LOOP	5.2.4
	3 #20 WIRES	NONE	N/A	N/A
	2 #22 WIRES	1 #16 WIRE	SINGLE FILLER	5.2.2
		2 #22 WIRES	DOUBLE BACK BOTH LEADS	5.2.3
			LOOP	5.2.4
	3 #22 WIRES	1 #22 WIRE	SINGLE FILLER	5.2.2
			DOUBLE BACK ONE LEAD	5.2.3
	4 #22 WIRES	NONE	N/A	N/A
20–14 HYREDUCER BUTT SPLICE	1 #14 WIRE	NONE	N/A	N/A
	1 #16 WIRE			
	1 #18 WIRE			
	1 #20 WIRE			
20-16	1 #16 WIRE	NONE	N/A	N/A
	1 #18 WIRE			
	1 #20 WIRE			
	2 #20 WIRES			
	1 #22 WIRE	1 #22 WIRE	SINGLE FILLER	5.2.2
			DOUBLE BACK	5.2.3
		1 #18 WIRE	SINGLE FILLER	5.2.2
	2 #22 WIRES	NONE	N/A	N/A

TABLE II - FILLER WIRE REQUIREMENTS

SPLICE SIZE	LEAD WIRES (AWG)	FILLER WIRE REQUIRED (AWG)	FILLER METHOD	FILLER SECTION
22-18	1 #18 WIRE	NONE	N/A	N/A
	1 #20 WIRE			
	1 #22 WIRE	1 #22 WIRE	SINGLE FILLER	5.2.2
			DOUBLE BACK	5.2.3
	2 #22 WIRES	NONE	N/A	N/A
24-20	1 #20 WIRE	NONE	N/A	N/A
	1 #22 WIRE			
	1 #24 WIRE			
26-20	1 #20 WIRE	NONE	N/A	N/A
	1 #22 WIRE			
	1 #24 WIRE			
	2 #24 WIRES			
26-24	1 #24 WIRE	NONE	N/A	N/A

5.4 Preparation of Wires

5.4.1 If specified by the engineering drawing, wiring list, or PPS, trim the conductor wires before splicing.

5.4.2 Before assembly of wires to splice connectors, strip the wire insulation from the connecting ends according to PPS 9.24 to expose the bare conductor. Refer to Table III for the length of insulation to be removed for the particular type and size of splice connector.

TABLE III - WIRE STRIPPING DATA

SPLICE			WIRE SIZE (AWG) (Note 1)	WIRE STRIP LENGTH (+/- 1/64")
TYPE	PART NUMBER	SIZE/DASH NUMBER		
BUTT CONNECTOR, INSULATED	M7928/3	-1	26 - 24	3/16"
		-2	22 - 18	
		-3	16 - 14	5/16"
		-4	12 - 10	3/8"

Note 1. Wire size refers to the range of wire gauge normally used in the particular splice.
Note 2. DSC 44 material: -1, -2 & 3 is copper, tin-plated; -4, -5 & -6 is copper, nickel-plated.

TABLE III - WIRE STRIPPING DATA

SPLICE			WIRE SIZE (AWG) (Note 1)	WIRE STRIP LENGTH (+/- 1/64")
TYPE	**PART NUMBER**	**SIZE/DASH NUMBER**		
BUTT CONNECTOR, UN-INSULATED	DSC 44 (Note 2)	-1	22 - 16	1/4"
		-2	18 - 14	
		-3	12 - 10	0.35
		-4	22 - 16	1/4"
		-5	16 - 14	
		-6	12 - 10	0.30"
	Burndy YSV8C-L	---	8	7/16"
BUTT SPLICE, HYREDUCER	Burndy YRV8CV14-L	"B" barrel	8	15/32"
		"BB" barrel	20 - 14	13/32"
ENVIRONMENT RESISTANT, INSULATED	M81824/1, M81824/6 or M81824/11	-1	26 - 20	1/4"
		-2	20 - 16	9/32"
		-3	16 - 12	
PARALLEL CONNECTOR, UN-INSULATED	DSC 51	-1	22 - 18	5/16"
		-2	16 - 14	
		-3	12 - 10	
		-4	8	3/8"
TERMINAL JUNCTION DISCONNECT	DSC 60	-1	24 - 20	11/64"
		-2	20 - 16	17/64"
		-3	14 - 12	
		-4	26 - 22	9/64"
	M81714/11 or M81714/12	-22	26 - 22	9/64"
		-20	24 - 20	11/64"
		-16	20 - 16	17/64"
		-12	14 - 12	
QUICK DISCONNECT	MS27429	-1	22 - 18	1/4"
		-2	16 - 14	9/32"

Note 1. Wire size refers to the range of wire gauge normally used in the particular splice.
Note 2. DSC 44 material: -1, -2 & 3 is copper, tin-plated; -4, -5 & -6 is copper, nickel-plated.

5.5 General Installation of Crimp Type Splices

5.5.1 If the insulation sleeving cannot be slipped onto the splice after assembly, position the sleeve on the wires before assembly of the splice.

5.5.2 Install crimp type splice connectors with the applicable crimp tool specified in Table IV. These tools crimp the splice to the wire and, where applicable, simultaneously form an insulation support for the wire insulation.

5.5.3 Before any use of a crimp tool on production parts, ensure that the crimp tool has been qualified according to PPS 9.55 and validate that the qualification has not expired.

5.5.4 Operate crimping tools according to the manufacturer's instructions.

5.5.5 Before crimping splice connectors incorporating an insulation support, check that the insulation grip adjustment pins on TE Connectivity plier type crimping tools are correctly set as follows:

Step 1. Set the pins in the No. 3 position (loose).

Step 2. Make a test grip by inserting an unstripped wire or wire combination which is representative of the assembly just into the insulation support of the connector and crimping in place.

Step 3. Bend the wire back and forth once. If the connector retains its grip on the insulation, the insulation grip pins are set correctly.

Step 4. If the wire pulls out of the initial test grip, set the adjustment pins into the next tighter position (No. 2) and re-check the insulation grip as specified in Step 2 and Step 3.

Step 5. If the wire pulls out of the second test grip, set the adjustment pins to position No. 1 (tightest) and re-check the insulation crimp as specified in Step 2 and Step 3.

5.5.5.1 Do not use a tighter insulation grip setting than is required. At each adjustment, ensure that both of the insulation grip adjustment pins are located in the same numeric position.

TABLE IV - CRIMP TOOL SELECTION

SPLICE			CRIMP TOOL	
TYPE	**PART NUMBER**	**SIZE/DASH NUMBER**	**TOOL NUMBER**	**TOOL MANUFACTURER**
BUTT CONNECTOR, INSULATED	M7928/3	-1 or -2	47386	TE Connectivity
			WT145	ABB Electrification Canada ULC
			MS90413 tool with a M90413-2 locator	
		-3	47387	TE Connectivity
			MS90413 tool with a M90413-2 locator	
		-4	59239	TE Connectivity
			MS3316	
BUTT CONNECTOR, UN-INSULATED	DSC 44	-1, -2 or -3	Sta-Kon ERG4002	ABB Electrification Canada ULC
		-4, -5 or -6	46447	TE Connectivity
	Burndy YSV8C-L	---	MY29-3	Burndy
BUTT SPLICE, HYREDUCER	Burndy YRV8CV14-L	"B" barrel or "BB" barrel	Y8MRB1	Burndy
			CT32 tool with a CT1-310100 die holder and a CT1-111021 die set	Schleuniger
ENVIRONMENT RESISTANT, INSULATED	M81824/1, M81824/6 or M81824/11	-1 or -2	AD-1377	TE Connectivity
			GMT 232	Daniels
			HX3 tool with an X528 die	
			M22520/5-01 tool with a M22520/5-103 die	
			M22520/10-01 tool with a M22520/10-104 die	
		-3	AD-1377	TE Connectivity
			GMT 232	Daniels
			M22520/5-01 tool with a M22520/5-102 die	
			M22520/10-01 tool with a M22520/10-103 die	
PARALLEL CONNECTOR, UN-INSULATED	DSC 51	-1, -2 or -3	49935	TE Connectivity
			169400	
			CT32 tool with a CT1-310100 die holder and a CT1-111020 die set	Schleuniger
		-4	Y29BU tool with a Y29BUR-1 die & a Y29PU1 punch	Burndy

TABLE IV - CRIMP TOOL SELECTION

SPLICE			CRIMP TOOL	
TYPE	**PART NUMBER**	**SIZE/DASH NUMBER**	**TOOL NUMBER**	**TOOL MANUFACTURER**
TERMINAL JUNCTION DISCONNECT	DSC 60	-1, -2 or -3	AFM8 tool with a TH1A turret head	Daniels
			M22520/1-01 tool with a M22520/1-02 turret head	
		-4	AFM8 tool with a K127 positioner	Daniels
	M81714/11 or M81714/12	-22	AFM8 tool with a K287 positioner	Daniels
			M22520/2-01	
			M22520/2-11	
		-20, -16 or -12	AFM8 tool with a TH1A turret head	Daniels
			M22520/1-01 tool with a M22520/1-02 turret head	
QUICK DISCONNECT	MS27429	-1	47386	TE Connectivity
			WT145	ABB Electrification Canada ULC
			MS90413 tool with a MS90413-2 locator	
		-2	47387	TE Connectivity
			MS90413 tool with a MS90413-2 locator	

5.6 Crimping of Splices

5.6.1 Butt Connector Splices

5.6.1.1 Assemble butt connector splices as follows:

Step 1. Squeeze the tool handles together until the ratchet mechanism releases to fully open the jaws.

Step 2. Place the butt connector into the crimping tool so that the splice locator engages the window indent in the connector, locating the connector barrel in the crimp jaws (see Figure 6-A).

Step 3. Squeeze the tool handles together just enough to hold the connector firmly in place. Do not deform the connector barrel.

Step 4. Insert the stripped wire(s), including filler wire or step down adapter as applicable, fully into the connector barrel.

Step 5. Close the crimping tool handles fully until the ratchet mechanism releases and remove the crimped assembly from the tool.

Step 6. Repeat Step 1 through to Step 5 to crimp the wires into the second half of the connector (see Figure 6-B).

Step 7. Ensure that the ends of the stripped wire are visible through the window in the centre of the connector after crimping (see Figure 6-C).

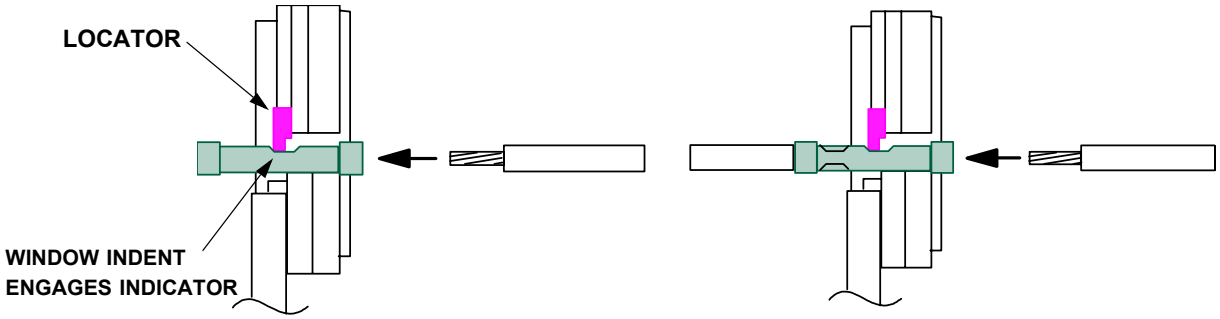


FIGURE 6-A

FIGURE 6-B

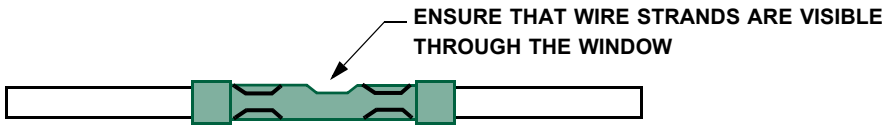


FIGURE 6-C

FIGURE 6 - CRIMPING BUTT CONNECTORS

5.6.2 Crimping Environment Resistant Splices

5.6.2.1 Crimp environment resistant splices as follows:

Step 1. Slide the sealing sleeve over the wire(s) on one half of the crimp.

Step 2. Squeeze the crimping tool handles together until the ratchet mechanism releases to fully open the jaws.

Step 3. Place the environment resistant splice into the appropriate nest of the crimping tool so that the end of the splice butts against the splice locator (see Figure 7-A).

Step 4. Squeeze the tool handles together just enough to hold the connector firmly in place. Do not deform the connector barrel.

Step 5. Insert the stripped wire, or wire combination, into the connector barrel until the wire, or wire combination, butts against the wire stop of the connector.

Step 6. Ensure that the wire insulation is flush to 1/32" from the edge of the connector barrel.

Step 7. Close the crimping tool handles fully until the ratchet mechanism releases and remove the crimped assembly from the tool.

Step 8. Repeat Step 3 through to Step 7 to crimp the wires into the second half of the connector (see Figure 7-B).

Step 9. Check that the ends of the wire are visible in the window indent in the centre of the connector after crimping (see Figure 7-C).

Step 10. Before shrinking the sealing sleeve over the crimped assembly, ensure that the area over which the sleeve is to be applied is clean and free of grease or oil. If necessary, solvent clean according to PPS 31.17.

Step 11. If installing splices in-situ, protect the surrounding area with aluminum foil to prevent over heating other components.

Step 12. Centre the sealing sleeve over the crimped assembly and heat shrink it in place using a hot air gun (ref. paragraph 4.2.2). The heat shrinkable sealing sleeves have a meltable sealant insert on both ends of the sleeve; when shrinking the sleeve in place, apply heat to each insert until it melts and flows axially along the wire. If sealing a single wire, melted sealing material shall flow along the wire insulation. If sealing multiple wires, melted sealing material shall be visible between the wires where they exit from the sealing sleeve. The free end of a stub splice shall be completely sealed. Do not over heat the sealing sleeve to the point where it prevents visual inspection of the splice.

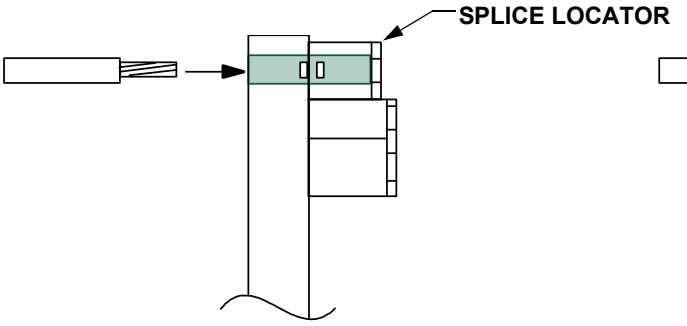


FIGURE 7-A

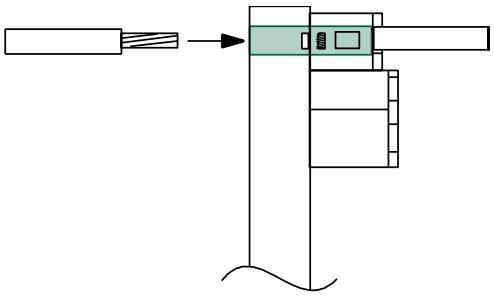


FIGURE 7-B

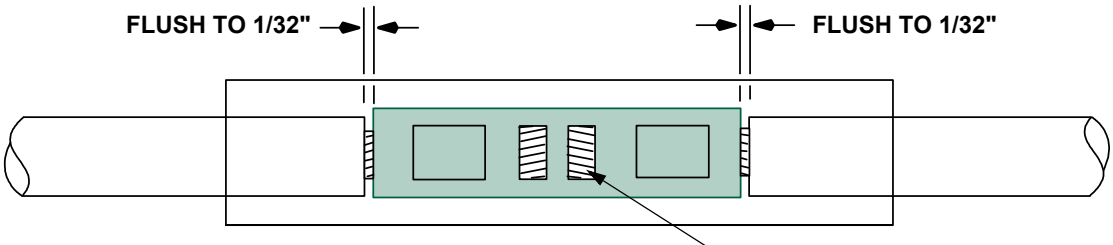


FIGURE 7-C

FIGURE 7 - CRIMPING OF ENVIRONMENT RESISTANT SPLICES

5.6.3 Crimping Parallel Connector Splices

5.6.3.1 Crimp parallel connector splices as follows:

Step 1. Insert the stripped wires into the splice. Ensure that overlapping wires within the splice are positioned parallel to one another without any kinking or displacement of the individual strands. Ensure that the wires are pushed fully into the connector so that the wire insulation butts against the end of the connector. Ensure that the wire insulation does not enter the connector (see Figure 8-B).

Step 2. Open the crimping tool jaws and insert the splice/wire assembly. Centre the connector in the crimp jaws, ensuring that the splice connector weld seam is positioned toward the crimp indenters (see Figure 8-A).

Step 3. Close the crimping tool fully to crimp the assembly.

Step 4. Ensure that the portion of stripped wire protruding from the connector after crimping is not more than 1/32" (see Figure 8-B).

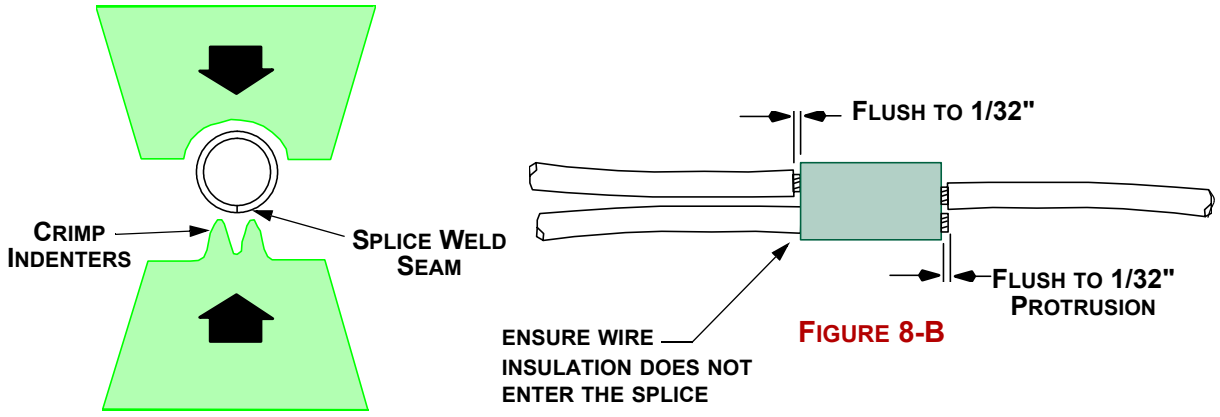


FIGURE 8-A FIGURE 8-B

FIGURE 8 - CRIMPING PARALLEL SPLICE CONNECTORS

5.6.4 Crimping Quick Disconnect Splices

5.6.4.1 Crimp quick disconnect splices as follows:

Step 1. Squeeze the tool handles together until the ratchet mechanism releases to fully open the jaws.

Step 2. Place the disconnect splice into the crimping tool so that the terminal locator butts against the end of the terminal barrel (see Figure 9-A).

Step 3. Squeeze the tool handles together just enough to hold the splice connector firmly in place, without deforming the connector barrel.

Step 4. Insert the stripped wire fully into the connector barrel.

Step 5. Close the crimp tool handles until the ratchet mechanism releases and remove the crimped assembly from the tool.

Step 6. Ensure that the portion of stripped wire protruding from the connector barrel after crimping is not more than 1/32" (see Figure 9-B).

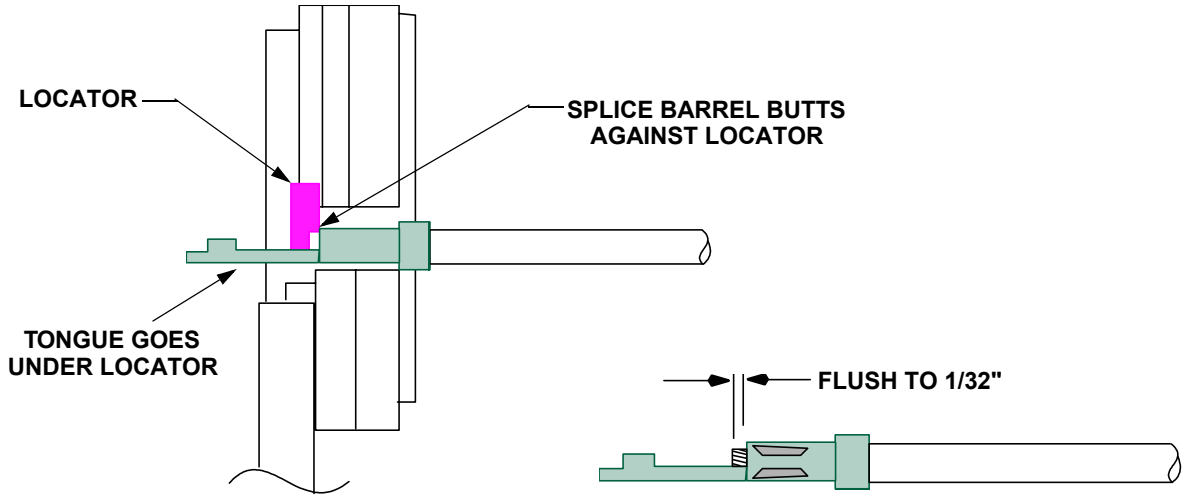


FIGURE 9-A FIGURE 9-B

FIGURE 9 - CRIMPING QUICK DISCONNECT SPLICES

5.6.5 Crimping Terminal Junction Disconnect Splices

5.6.5.1 Crimp terminal junction disconnect splices as follows:

Step 1. Select the proper crimping tool and contact positioner from Table IV for the particular type and size of splice connector to be crimped.

Step 2. Ensure that the tool handles are fully open before adjusting the settings. If required, squeeze the handles of the tool together to cycle the tool to the open position.

Step 3. Assemble the contact positioner onto the tool or select the correct turret head positioner for the size and type of splice contact to be crimped.

Step 4. Set the wire size selector to the correct setting according to the data plate on the positioner or turret head for the applicable contact and wire size combination.

Step 5. Insert the stripped wire end into the contact barrel until the insulation butts against the end of the barrel. Ensure that the stripped wire end is visible through the contact hole (see Figure 10).

Step 6. Insert the contact and wire assembly into the indenter opening until the contact butts against the positioner.

Step 7. Squeeze the handles together until the ratchet mechanism releases and remove the crimped contact from the tool.

Step 8. Push the crimped contact into the splice body by hand until the contact snaps into position and pull back gently on the wire to verify proper contact seating.

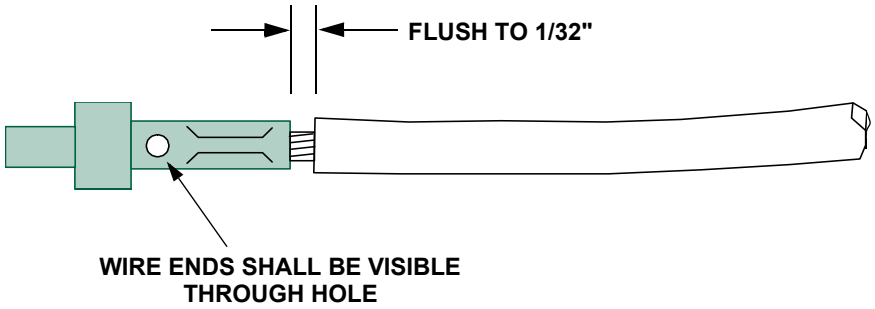


FIGURE 10 - TERMINAL JUNCTION DISCONNECT SPLICES

5.6.5.2 Disassemble terminal junction disconnect splices using a standard plastic insertion/extraction tool for rear release type contacts, as listed in PPS 9.22.

5.6.6 Crimping Hyreducer Butt Splices

5.6.6.1 Assemble Hyreducer butt splices as follows:

Step 1. Squeeze the tool handles together until the ratchet mechanism releases to fully open the jaws.

Step 2. Place the Hyreducer butt splice into the crimping tool, locating the “B” or “BB” barrel in the appropriate crimp jaws.

Step 3. Squeeze the tool handles together just enough to hold the splice firmly in place. Do not deform the splice barrel.

Step 4. Insert the appropriate stripped wire fully into the splice barrel. For Hyreducer butt splices, the strip length for the larger wire to be inserted into the “B” barrel (see Figure 11 below) is different than the strip length for the smaller wire to be inserted into the “BB” barrel of the splice. Refer to Table III for both of the required wire strip lengths.

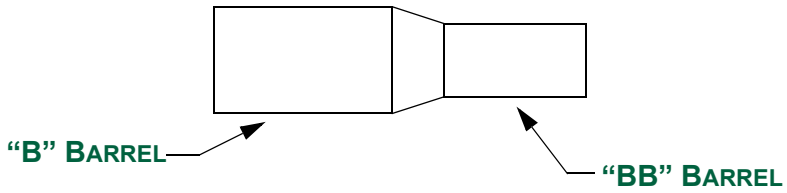


FIGURE 11 - HYREDUCER BUTT SPLICE (TYP.)

Step 5. Close the crimping tool handles fully until the ratchet mechanism releases and remove the crimped assembly from the tool.

Step 6. Repeat Step 1 through to Step 5 to crimp the other wire into the other side of the splice.

5.7 Insulation of Crimp Type Splices

5.7.1 Insulate all uninsulated splice connectors with heat shrinkable insulation sleeving according to PPS 10.16 (see Figure 12). Unless as specified below, use M23053/8 heat shrinkable insulation sleeving approximately double the length of the splice. Clear heat shrinkable insulation sleeving shall be used for visual inspection purposes.

- In fuel tank areas, use only M23053/8 (175°C max.) heat shrinkable insulation sleeving.
- For high temperature wires (i.e., above 175°C), use only clear M23053/12 or M23053/16 insulation sleeving.

5.7.2 Locate the insulating sleeve on the splice so as to completely cover the splice hardware and overlap approximately equally onto the wire insulation at each end of the splice.

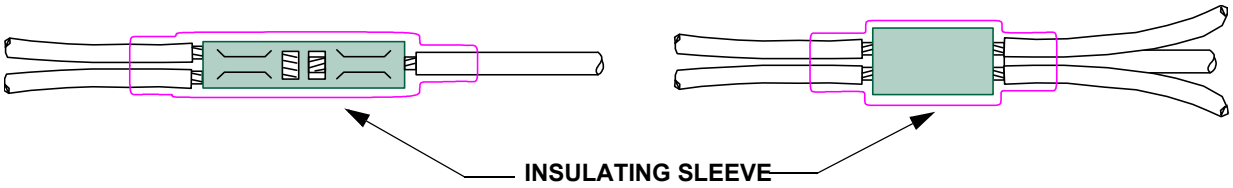


FIGURE 12 - INSULATION OF PERMANENT CRIMP SPLICES

5.8 Splicing to Repair Damaged or Broken Wires

5.8.1 Do not use splices for salvaging scrap lengths of wire or cable.

5.8.2 Do not use permanent splices for any installation or repair of damaged wiring unless appropriately authorized.

5.9 Splicing in Wire Runs

5.9.1 Do not make splices before installation if the cable has to be pulled through small openings.

5.9.2 Do not locate splices in positions where the cable may be clamped or subject to flexing or bending (splices may break if compressed or bent).

5.9.3 Use disconnect splices only if specified by the engineering drawing.

5.9.4 If possible, position splices in wire bundles so that they do not overlap. Shield termination splices shall be located 3" - 6" from the connector back shell; shield termination splices may overlap, if necessary, to maintain the proper distance from the connector.

5.9.5 Stagger and locate splices on the outside of the cable group.

5.9.6 Support the splices by installing a plastic cable tie (according to PPS 13.34) on either side of each splice or pair of overlapping splices (avoid placing cable ties directly over splices).

5.9.7 When installing splices (especially disconnect type splices), ensure that there will be no strain on the wires terminating at the splice (e.g., for disconnect type splices, loop and secure the wires in a manner similar to that shown in Figure 13, if possible,).

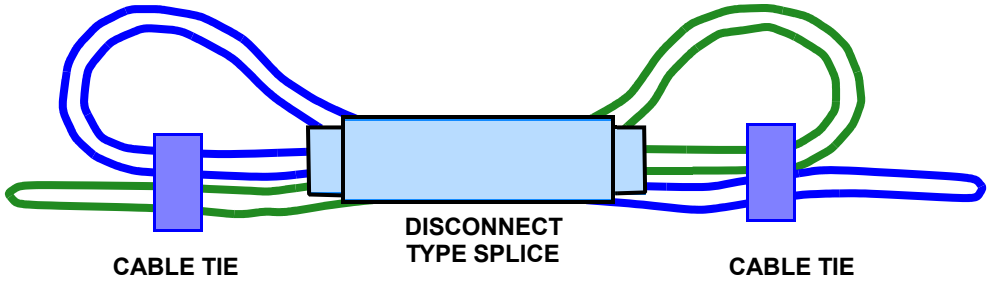


FIGURE 13 - TERMINATION LOOP AT DISCONNECT TYPE SPLICES

6 REQUIREMENTS

6.1 Splice types, location and configuration shall be as specified on the engineering drawing.

6.2 Shield termination splices shall be located 3" - 6" from the connector back shell. Refer to PPS 9.39 for positioning of solder sleeve termination of individual wire shields at connector adapters or splices on DASH 8 Series 400 aircraft.

6.3 Step down and shield interconnect splices shall be located at least 3" from the connector backshell and no more than the distance required to ensure that they are not located in positions where the cable may be clamped or subject to flexing or bending (12" maximum for step down splices; no maximum for shield interconnect splices). If the splice location requirements specified cannot be met (e.g., harness bends prevent proper splice placement) refer to Liaison Engineering for disposition.

6.4 Splices shall be staggered as much as practical.

6.5 All wire insulation in the area of splices shall be undamaged.

6.6 The ends of stripped wires shall be visible through the window on all butt connector splices.

6.7 Stripped wire protrusion through parallel connectors and quick disconnect splice barrels shall be flush to 1/32".

6.8 Wire ends shall be visible through the hole on terminal junction disconnect splice contacts.

6.9 Wire insulation shall not be included in the crimped portion of any non-insulated splice.

6.10 There shall not be any evidence of looseness of any terminating hardware.

6.11 Heat shrinkable insulating sleeving shall be secure on the termination or splice and shall completely cover all uninsulated terminating hardware after being shrunk in place according to PPS 10.16.

6.12 If splicing twisted shielded pairs, triplets, etc., ensure that the correct wires are crimped together before installing crimp insulation sleeves.

6.13 Preferably, for butt splices and environment resistant splices crimp indentations on either side of the splice barrel will approximately line up with each other and the inspection window(s). However, it is acceptable for the crimp indentations to be offset from each other or the inspection window(s), if necessary (e.g., for ease of manufacture).

6.14 Shrunk sealing sleeves shall be approximately centred on the splice and free of cracks, looseness, edge peeling or signs of over-heating (e.g., discoloured to the point where visual inspection of the splice is prevented). Wire insulation in the vicinity of the shrunk sealing sleeve shall also be free of signs of overheating (such as cuts, tears, melting, charring, etc.). Ensure the meltable sealing material of shrunk sealing sleeves has sealed both ends of the assembly.

7 DHC SAFETY PRECAUTIONS

7.1 The safety precautions specified herein are specific to DHC to meet Canadian Federal and Provincial government environmental, health and safety regulations. It is strongly recommended that other facilities consider these safety precautions; however, suppliers, subcontractors and partners are responsible for ensuring that their own environmental, health and safety precautions satisfy the appropriate local government regulations.

7.2 Observe standard plant safety precautions when performing the procedure specified herein.

7.3 Turn hot air guns off when not in use.

7.4 It is recommended to use hot air guns which include a power interrupt reset feature which will prevent an unattended heat gun from resuming heat (e.g., after a power failure); for hot air guns which are not equipped with a power interrupt reset feature, take care to ensure turning the gun off immediately in the event of a power interruption.

7.5 Refer to PPS 31.17 for the safety precautions for handling and using solvents.

8 PERSONNEL REQUIREMENTS

8.1 This PPS has been categorized as a Controlled Special Process according to PPS 13.39. Refer to PPS 13.39 for personnel requirements.