DE HAVILLAND AIRCRAFT OF CANADA LIMITED

PPS 9.24

PRODUCTION PROCESS STANDARD

PROPRIETARY INFORMATION

WIRE AND CABLE STRIPPING

Issue 12
- This standard supersedes PPS 9.24, Issue 11.
- Vertical lines in the left hand margin indicate technical changes over the previous issue.
- Direct PPS related questions to PPS.Group@dehavilland.com or (416) 375-7641.
- This PPS is effective as of the distribution date.

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	Quality	

Issue 12 - 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.

- Replaced throughout PPS where “Bombardier” is specified with “De Havilland Aircraft of Canada Limited” or “De Havilland Canada”.
- Deleted aluminum wire strip length table from PPS 9.24 and referred to PPS 9.35 for such data.
- Revised strip lengths for copper wires to be terminated with terminal lugs to be as per SAE Aerospace Standard with an additional factor as specified in PPS 9.01 to ensure the protrusion is met.
- Specified strip length in decimal format in place of fractions.

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1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for stripping insulation from electrical wire.

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.

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

2 HAZARDOUS MATERIALS

2.1 Before receipt at De Havilland Canada, all materials shall be approved and assigned Material Safety Data Sheet (MSDS) numbers by the De Havilland Canada 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 De Havilland Canada Environment, Health and Safety Department.

3 REFERENCES

3.1 PPS 9.01 - Crimping Electrical Terminal Lugs to Copper Wire.

3.2 PPS 9.35 - Terminating and Splicing Aluminum Wires.

3.3 PPS 13.26 - General Subcontractor Provisions.

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.

4.2 Equipment

4.2.1 Wire and cable stripping tools and machines capable of consistently removing the wire or cable insulation without exceeding the maximum allowable number of nicked or broken wire strands as specified herein and without damaging the unstripped wire insulation. **Do not** use any type of manual, bare bladed cutting tool (e.g., Utility Knife) for stripping wire insulation under any circumstances.

4.2.2 Thermal knife (e.g., Meisei 201 Model 2A “HOTnife” with M-10 power supply or Hakko FT-8003 Hot Knife). Thermal knives must be capable of cleanly cutting the wire or cable outer jacket or insulation without damaging shields or conductors.

4.2.3 Hot tweezer wire stripper (e.g., Meisei 412 Model 4C HOTweezers with M-10 power supply or Hakko FT-801 Thermal Wire Stripper). Hot tweezers must be capable of cleanly cutting the wire or cable outer jacket or insulation without damaging shields or conductors.

5 PROCEDURE

5.1 General

5.1.1 Unless otherwise specified herein, for the purposes of this PPS the term “wire” includes both wire and cables.

5.1.2 Before wires can be terminated with lugs, contacts, connectors or terminals it is necessary to remove a certain length of the wire insulation to expose the wire conductor (e.g., as shown in Figure 1 and Figure 2). The amount of wire insulation which must be removed as specified herein is calculated to ensure that the stripped wire will bottom in the wire barrel with no insulation protruding into the wire barrel to ensure good conductivity.

5.1.3 Operate manual and automatic stripping tools and machines according to the equipment manufacturer’s instructions.

5.1.4 For wires or cables which are not round, use of a thermal knife (ref. paragraph 4.2.2) is recommended to remove the outer jacket and/or insulation.

5.1.5 For smaller diameter shielded wires, hot tweezers (ref. paragraph 4.2.3) may be used for stripping of the outer jacket and/or wire insulation.

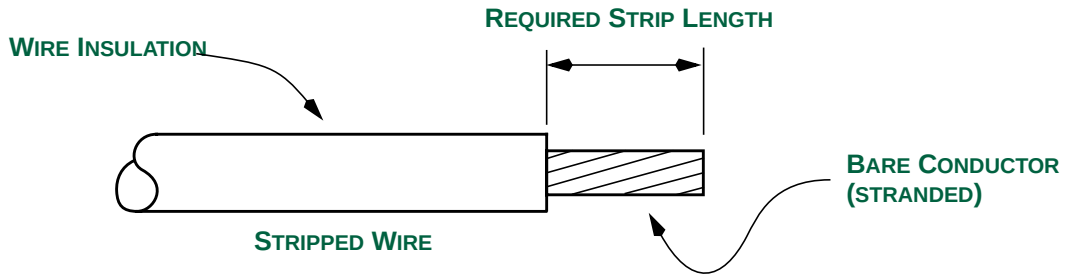


FIGURE 1 - TYPICAL WIRE STRIPPING

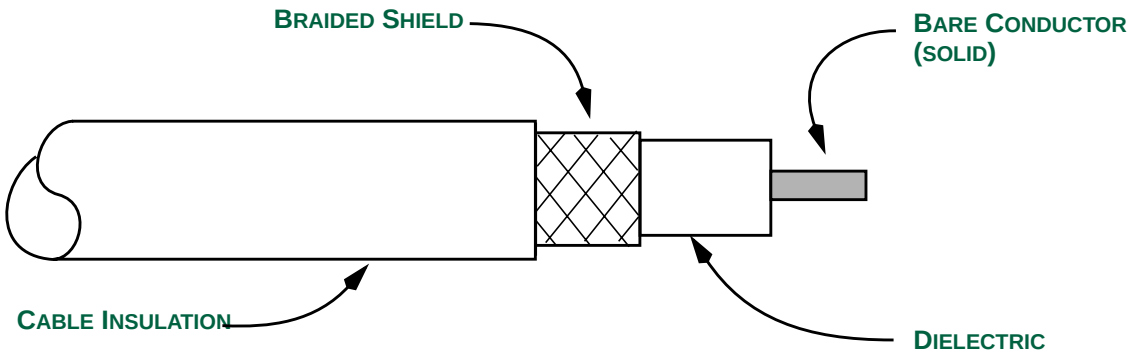


FIGURE 2 - TYPICAL CO-AXIAL CABLE STRIPPING

5.2 Strip Lengths

5.2.1 Strip Lengths for Coaxial Cable

5.2.1.1 Refer to Table I for the trim code applicable to the specific connectors and K-Grips. Refer to Table II for the required strip lengths for the determined trim code.

TABLE I - COAXIAL CONNECTOR CROSS REFERENCE AND TRIM CODES

SERIES	UG/U NUMBER	AMPHENOL NUMBER	AUTOMATIC NUMBER	CANNON NUMBER	DAGE NUMBER	KINGS NUMBER	DESCRIPTION	K-GRIP	TRIM CODE	FOR USE ON CABLE RG/U
BNC	88	31-2	100-B1505	BNC-PL18-M-55	056-1	KC-51-01	PLUG	KS-89-10	GG	58, 58A, 58C, 223
	88C	31-202	100-B1000	BNC-PL-M-55	813-1	KC-58-01	PLUG	KS-89-05	I	58, 58A, 58C, 223
	88E	31-3202	100-B1000B	BNC-PL38-M-55	4756-1	KC-53-01	PLUG	KS-89-05	I	58, 58A, 58C, 223
	89B	31-205	100-B3000	BNC-JC-F-55	415-1	KC-37-01	JACK	KS-89-05	I	58, 58A, 58C, 223
	89C	31-2205	100-B3000A	BNC-JC16-F-55	3420-1	KC-38-01	JACK	KS-89-05	I	58, 58A, 58C, 223
	260C	31-2212	150-B1000A	BNC-PL1-M-59	3421-1	KC-58-01	PLUG	KS-89-19	I	59, 59B, 62, 62A, 71B
	260D	31-3212	150-B1000B	BNC-PL14-M-59	4757-1	KC-56-02	PLUG	KS-89-19	I	59, 59B, 62, 62A, 71B
	262C	31-2211	150-B3000A-10	BNC-JP7-F-59	3423-1	KC-18-01	PANEL JACK	KS-89-19	I	59, 59B, 62, 62A, 71B
	274B	31-2208	B7200A	3BNC-AT5-2FM	3424-1	KC-97-02	TEE ADAPTOR	N/A	N/A	N/A
	290A	31-203	10-B3000	BNC-RP-F-O	671-1	KC-74-04	PANEL RECEPTACLE	N/A	N/A	N/A
	291B	31-201	100-B3000-10	BNC-JP-F-55	817-1	KC-17-02	PANEL JACK	KS-89-05	I	58, 58A, 58C, 223
	291C	31-2201	100-B3000A-10	BNC-JP8-F-55	3425-1	KC-18-02	PANEL JACK	KS-89-05	I	58, 58A, 58C, 223
	306B	31-2209	B2100A	BNC-BNC-ARIO-FM	4764-1	KC-97-04	ANGLE ADAPTER	N/A	N/A	N/A
	414	47000	B3055-10	BNC-BNC-ASP1-FF	551-1	KC-91-06	PANEL ADAPTER	N/A	N/A	N/A
	414A	47025	B3000-10	BNC-BNC-ASP-FF	1-475-1	KC-94-03	PANEL ADAPTER	N/A	N/A	N/A
	909B	31-3206	100-B3000B-75	BNC-JB14-F-55	4761-1	KC-17-06	BULKHEAD JACK	KS-89-05	I	58, 58A, 58C, 223
	913A	31-2204	100-B2000N	BNC-RPL9-M-55	4035-1	KC-54-03	ANGLE PLUG	KS-89-05	I	58, 58A, 58C, 223
	959	6775	N/A	N/A	N/A	N/A	PLUG	KS-89-04	D	8, 8A, 213
	959A	N/A	300-B1000	N/A	2142-1	KC-54-04	PLUG	KS-89-24	D	8, 8A, 213, 214
	1104A	N/A	15-B100B	N/A	N/A	KC-74-09	PANEL RECEPTACLE	N/A	N/A	N/A
SM	692	N/A	N/A	SM-PL-F-59	716-1	KY-59-02	PLUG	KS-89-15	G	59, 59B, 62, 62A, 71B
	699	N/A	N/A	SM-PL-F-55	753-1	KY-59-01	PLUG	KS-89-12	G	58, 58A, 58C
UHF	111	83-750	N/A	N/A	N/A	N/A	PLUG	N/A	N/A	59, 59B, 62, 62A, 71B
	363	83-1F	N/A	N/A	N/A	KU-91-06	ADAPTER	N/A	N/A	N/A
	PL259A	83-1SPN	N/A	N/A	1-430-1	KU-51-02	PLUG	KS-89-26	II	58, 58A, 58C

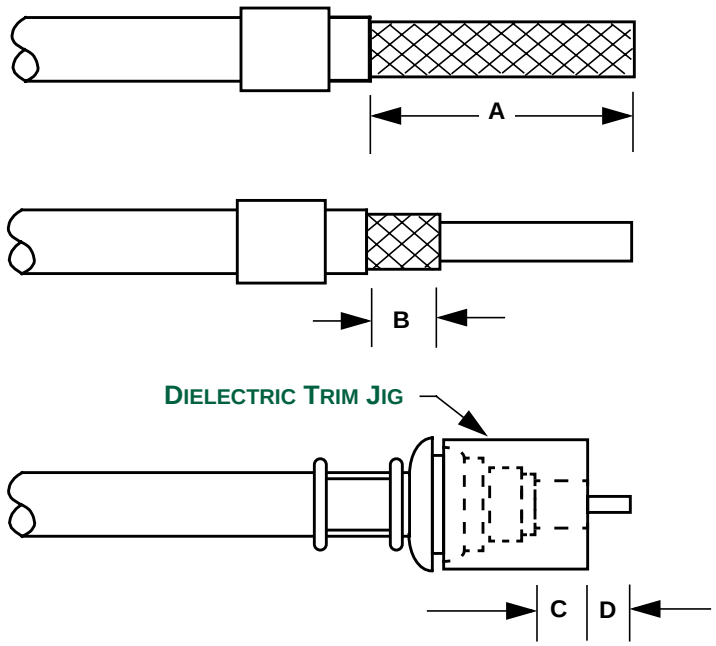
Note 1. FOR CONNECTION OF AN N SERIES 21E PLUG TO AN RG/U 214 CABLE, USE A KS-89-04 K-GRIP WITH A KS-89-24 K-GRIP RING.
Note 2. If preparing coaxial cable to install connectors not listed in this table, trim the coaxial cable to the dimensions specified by the connector manufacturer.

TABLE I - COAXIAL CONNECTOR CROSS REFERENCE AND TRIM CODES

SERIES	UG/U NUMBER	AMPHENOL NUMBER	AUTOMATIC NUMBER	CANNON NUMBER	DAGE NUMBER	KINGS NUMBER	DESCRIPTION	K-GRIP	TRIM CODE	FOR USE ON CABLE RG/U
C	568	82-504	20-C3000	C-RP-F-0	306-1	N/A	PANEL RECEPTACLE	N/A	N/A	N/A
	570	82-502	300-C3000-90	C-JB-F-8	308-1	KD-19-15	BULKHEAD JACK	KS-89-04	D	8, 8A, 213, 214
	573A	82-530	300-C1000	C-PL-M-8	288-1	KD-59-09	PLUG	KS-89-04	D	8, 8A, 213, 214
	573B	28650	300-C1000A	N/A	3433-1	KD-59-10	PLUG	KS-89-04	D	8, 8A, 213, 214
	709A	82-534	100-C1000	C-PL-M-55	1-121-1	KD-59-15	PLUG	KS-89-05	N	58, 58A, 58C, 223
	709B	N/A	100-C1000A	N/A	3579-1	KD-59-28	PLUG	KS-89-05	N	58, 58A, 58C
	710B	N/A	300-C2000N	N/A	3577-1	KD-59-14	ANGLE PLUG	KS-89-04	F	8, 8A, 213
HN	59B	82-804	300-H1205	HN-PL1-M-8	N/A	KH-59-10	PLUG	KS-89-08	V	8, 8A, 213, 214
	59E	N/A	300-H1000A	HN-PL7-M-8	4000-1	KH-59-08	PLUG	KS-89-04	C	8, 8A, 213, 214
	1213	82-320	301-H1305	N/A	2829-1	KH-59-11	PLUG	KS-90-08	T	8, 8A, 213, 214
		82-833					PLUG			
N	21E	82-3202	300-N1000A	N-PL13-M-8	3641-1	KN-53-02	PLUG	KS-89-08	A	8, 8A, 213
	21E	82-3202	300-N1000A	N-PL13-M-8	3641-1	KN-53-02	PLUG	KS-89-04	A	214 (NOTE 1)
	22E	82-3208	300-N3000A-25	N/A	3639-1	KN-13-01	PANEL JACK	KS-89-04	A	8, 8A, 213, 214
	29	15000	N/A	N/A	205-1	N/A	ADAPTER	N/A	N/A	N/A
	30D	91100	N3071-85	N-N-ASBH-FF	3032-1	KN-96-02	BULKHEAD ADAPTER	N/A	N/A	N/A
	58C	N/A	N/A	N/A	N/A	N/A	RECEPTACLE	N/A	N/A	N/A
	536B	34025	100-N1000A	N/A	3196-1	KN-57-05	PLUG	KS-89-04	A	58, 58A, 58C, 223
	594A	15425	300-N2205R	N/A	N/A	KN-54-15	ANGLE PLUG	KS-89-04	A	8, 8A, 213, 214

NOTE 1 FOR CONNECTION OF AN N SERIES 21E PLUG TO AN RG/U 214 CABLE, USE A KS-89-04 K-GRIP WITH A KS-89-24 K-GRIP RING.
Note 2. If preparing coaxial cable to install connectors not listed in this table, trim the coaxial cable to the dimensions specified by the connector manufacturer.

TABLE II - STRIP LENGTHS FOR COAXIAL CABLE



TRIM CODE (NOTE 1)	BRAID TRIM SPACER SLEEVE	DIELECTRIC TRIM JIG	Strip Length (± 1/64")			
			"A"	"B"	"C"	"D"
A	S-89-04-4	S-89-04-3	1 3/4"	3/8"	1/16"	3/16"
C	S-89-04-4	S-89-24-3	1 3/4"	3/8"	5/16"	1/4"
D	S-89-04-4	S-89-04-3	1 1/2"	3/8"	1/16"	3/16"
F	S-89-05-4	S-89-04-3	1 1/2"	5/16"	1/16"	1/8"
G	S-89-05-4	S-89-04-3	3/4"	5/16"	1/16"	1/16"
I	S-89-05-4	S-89-12-3	1 1/4"	5/16"	1/8"	1/4"
N	S-89-05-4	S-89-12-3	1 1/4"	5/16"	1/8"	3/16"
T	S-89-04-4	S-89-46-3	2 1/2"	3/8"	3/4"	3/4"
V	S-89-04-4	S-89-46-3	2 1/2"	3/8"	3/4"	3/16"
GG	S-89-05-4	S-89-12-3	1 1/4"	5/16"	1/8"	1/8"
II	S-89-05-4	S-89-12-3	2 1/2"	5/16"	1/2"	11/16"

Note 1. Refer to Table I for trim codes for individual connectors.

5.2.2 Strip Lengths for Wires to be Terminated with Terminal Lugs

5.2.2.1 For copper wires, refer to Table III for the length of insulation to be removed for the particular type and size of terminal lug to be installed and the maximum allowable number of nicked or broken wire strands.

5.2.2.2 The strip lengths for termination of aluminum wires are specified in PPS 9.35 (e.g., termination with Tyco (AMP) Copalum terminal lugs, etc.). Tyco (AMP) terminal lugs may have been procured from a number of sources including AMP, Tyco, Tyco Electronics, TE Connectivity, etc.

TABLE III - STRIP LENGTHS FOR COPPER WIRES TO BE TERMINATED WITH TERMINAL LUGS

Wire Size	Wire Strip Length (± 0.016" or 1/64") - See Note 1							Maximum Nicked or Broken Wire Strands
	M7928/1	M7928/4	M7928/7	MS20659	MS25036	MS25189	322* (Note 2)	
26 - 24	0.157"	0.157"	---	---	0.157"	---	---	2 Nicked, None Broken
22 - 14	0.187"	0.187"	0.271"	0.281"	0.187"	---	0.187"	
12 - 10	0.265"	0.265"	---	0.281"	0.265"	n/a	0.281"	4 Nicked, None Broken
8	---	0.377"	---	0.377"	0.377"	0.429"	---	6 Nicked or Broken
6	---	0.437"	---	0.437"	0.437"	0.532"	---	
4	---	0.499"	---	0.499"	0.499"	0.532"	---	
2	---	0.567"	---	0.567"	0.567"	0.662"	---	
1	---	0.627"	---	0.627"	0.627"	---	---	
0	---	0.692"	---	0.692"	0.692"	0.727"	---	
00	---	0.762"	---	0.762"	0.762"	0.842"	---	
000	---	n/a	---	0.780"	0.780"	0.867"	---	
0000	---	n/a	---	0.796"	0.796"	1.046"	---	

Note 1. The wire strip lengths are values taken from the SAE Aerospace Standards with an added factor (i.e., 1/32" for wire sizes 26-10 and 1/16" for wire sizes 8-4/0) to ensure wire protrusion through the terminal barrel as specified in PPS 9.01 is met.
Note 2. * represents the remainder of the lug part number (e.g., part number Tyco (AMP) 322797).

5.2.3 Strip Lengths for Wires to be Terminated with Contacts

5.2.3.1 Refer to Table IV for the length of insulation to be removed for the particular size of contact to be installed and the maximum allowable number of nicked or broken wire strands.

TABLE IV - STRIP LENGTHS FOR WIRES TO BE TERMINATED WITH CONTACTS

CONTACT SIZE	WIRE STRIP LENGTH (± 0.016" OR 1/64")	MAXIMUM NICKED OR BROKEN WIRE STRANDS
22 - 20	0.187" (3/16")	2 NICKED, NONE BROKEN
16 - 12	0.297" (9/32")	
8 - 4	0.500" (1/2")	6 NICKED OR BROKEN
0	0.625" (5/8")	

5.2.4 Strip Lengths for Wire to be Terminated with Tyco (AMP)-MR Contacts

5.2.4.1 Before assembly of wire to electrical contacts, strip the wire insulation from the bare conductor for a length of 0.187" - 0.218".

5.2.5 Strip Lengths for Wire to be Terminated with Berg Contacts

5.2.5.1 Before termination of wires with Berg electrical contacts, strip the wire insulation 0.150" - 0.170" from the wire end to expose the bare conductor. Due to the design of the Berg contacts, it is imperative that the wire strip lengths be maintained within the specified limits in order to attain an acceptable crimp.

5.3 Post Stripping Procedure

5.3.1 If the natural lay and tightness of the wire strands has been disturbed by the stripping process, gently re-twist the wire strands together by hand.

6 REQUIREMENTS

6.1 The wire strip length shall meet the requirements specified herein.

6.2 The maximum number of nicked or cut wire strands as specified herein shall not be exceeded.

6.3 Wire insulation shall be cleanly cut with no frayed or ragged edges.

6.4 Coaxial cable wire shields and dielectric shall be free of nicks or cuts.

6.5 In the stripped area, stranded conductors shall have the natural lay and tightness of the wire (gently re-twisted by hand, if necessary).

7 DE HAVILLAND CANADA SAFETY PRECAUTIONS

7.1 The safety precautions specified herein are specific to De Havilland Canada 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 Ensure that the air and/or power supply is disconnected at all times when changing or removing cutting blades sets from wire stripping machines.

8 PERSONNEL REQUIREMENTS

8.1 Personnel responsible for wire and cable stripping must have a good working knowledge of the applicable procedure and requirements as specified herein and shall have exhibited their competency to their supervisor.

9 DE HAVILLAND CANADA MAINTENANCE OF EQUIPMENT

9.1 Submit wire stripping tools which fail to meet the operational requirements of this PPS for adjustment or repair.

9.2 It is recommended that filters on air lines be drained daily.