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Cancelled

25 December 2025

DIFFERENTIAL TRANSMISSION CABLES (1 PAIR),
HIGH RELIABILITY, SPACE USE,
DETAIL SPECIFICATION FOR

Prepared and Established by Junkosha Inc.

Issued by Japan Aerospace Exploration Agency

This document is the English version of JAXA QTS/ADS which was originally written and authorized in Japanese and carefully translated into English for international users. If any question arises as to the context or detailed description, it is strongly recommended to verify against the latest official Japanese version.

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Record of Revisions

Rev.	Date	Description
NC	20 Jul. 2010	Original
A	20 May 2016	Revised to reflect in accordance with JBS-0015829-AB (Revision A) issued by Junkosha Inc.
B	19 Jan. 2017	Revised to reflect in accordance with JBS-0015829-AB (Revision B) issued by Junkosha Inc.
C	25 Dec. 2025	Revised to reflect in accordance with JBS-0015829-AB (Revision C) issued by Junkosha Inc.
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Revision History

Rev.	Date	Description
NC	20 Jul. 2010	Original
A	20 May 2016	· Tables 3, 6, and 7: Added the paragraph number of JAXA-QTS-2120 appendix D for the mass test method.
B	19 Jan. 2017	· Table 3: Clarified the difference in insulation resistance herein as compared to the general specification.
C	25 Dec. 2025	· Cover sheet Changed the document number to the specification number designated by Junkosha Inc., and added the specification number in the header of this specification. · Cover sheet Deleted the issued agency in order to add the cover sheet by JAXA. · Contents Added the title of paragraph 4.2.1 from "Flammability" to "Flame Test (UL 1581: VW-1)". · Applicable documents Added "UL 1581 - Reference Standard for Electrical Wires, Cables, and Flexible Cords." · Paragraph 4.2 "Qualification Test" Added paragraph 4.2.1 titled "VW-1 (Vertical-Specimen) Flame Test." · Paragraph 4.5 "Change or Optimization of Tests and Inspections" Added item a) titled "VW-1 (Vertical-Specimen) Flame Test." to reflect the change. · Tables 3 "Performance", 6 "Qualification Test" and 8 "Quality Conformance Inspection (Group B) Changed the test method paragraph number from "D.4.4.21" to "4.2.1" with note number "(3)." (for Japanese version only) · Note Added "This means the paragraph number of this specification." as note (3). (for Japanese version only) · Numbering rule for notes to tables Changed numbering of table notes from restarting at each table to continuous numbering throughout the specification. (for Japanese version only)

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**DIFFERENTIAL TRANSMISSION CABLES (1 PAIR),
HIGH RELIABILITY, SPACE USE,
DETAIL SPECIFICATION FOR****1. GENERAL****1.1 Scope**

This specification establishes the dimensions, construction, characteristics and required test items for 1 pair type differential transmission cables (hereinafter referred to as cables) specified in appendix D of JAXA-QTS-2120.

1.2 Part Number

The part number shall be given in the following form.

(Example)

JAXA ⁽¹⁾ 2120 / D 101 - 22

Conductor size number (D.1.3.1)

Identification number

Note: ⁽¹⁾ "JAXA" indicates the part is for space use and may be abbreviated "J".

Table 1. Part Number

Item	Applicable paragraph of JAXA-QTS-2120	Description
Identification number	-	101
Conductor size No.	D.1.3.1	20 AWG, 22 AWG, 24 AWG, 26 AWG, 28 AWG e.g.) Conductor size No. 20: 20 AWG
No. of cable core pairs	D.1.2	1 pair

1.3 Ratings

Ratings shall be as specified in Table 2.

Table 2. Rating

Item	Applicable paragraph of JAXA-QTS-2120	20 AWG	22 AWG	24 AWG	26 AWG	28 AWG
Nominal characteristic impedance (Ω)	D.3.5	100				
Maximum continuous working voltage (V _{rms})	D.3.5	200				
Propagation delay time	D.3.7.22	4.3 nsec/m max.				
Operating temperature range (°C)	D.3.5	-200 to +180 °C				

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2. APPLICABLE DOCUMENTS			
The applicable documents shall be as specified in paragraph D.2.1, appendix D of JAXA-QTS-2120 and as follows.			
a) UL 1581 Reference Standard for Electrical Wires, Cables, and Flexible Cords			
3. REQUIREMENTS			
The requirements shall be as follows and as specified in paragraph D.3, appendix D of JAXA-QTS-2120.			
3.1 Performance			
The performance requirements for the cables shall be as shown in Table 3.			

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Table 3. Performance

Test item		Requirement paragraph of JAXA-QTS-2120	Test method paragraph of JAXA-QTS-2120	Performance				
				20 AWG	22 AWG	24 AWG	26 AWG	28 AWG
Externals, constructions, marking and mass		D.3.6	D.4.4.2 D.4.4.3	As shown in appendix D of JAXA-QTS-2120. Constructions and dimensions shall be as shown in Figure 1 and Table 4.				
Eccentricity ratio of inner conductor		D.3.6.2	D.4.4.2.2	10 % max.				
Conductor resistance		D.3.7.2	D.4.4.5	As shown in Table 4.				
Dielectric withstanding voltage		D.3.7.3	D.4.4.6.1	2500 Vrms (between shield and jacket)				
		D.3.7.3	D.4.4.6.2 D.4.4.6.3	500 Vrms·1 minute (between inner conductor and shield, between inner conductors)				
Insulation resistance		D.3.7.4	D.4.4.7	1000 MΩ·km min. ⁽¹⁾				
Capacitance	(pF/m max. @Cond/Cond)	D.3.7.5	D.4.4.8	45	45	45	45	50
	(pF/m max. @Cond/Shield)			79	79	79	79	90
Characteristic impedance		D.3.7.6	D.4.4.9	100±6 Ω				
RF transmission loss (attenuation) (dB/m max.@100 MHz)		D.3.7.7	D.4.4.10	0.22	0.24	0.26	0.37	0.43
Propagation delay time		D.3.7.22	D.4.4.25	As shown in appendix D of JAXA-QTS-2120				
Propagation delay time difference (within pair)		D.3.7.23	D.4.4.26	0.08 nsec/m max.				
Adhesion of conductor		D.3.7.8	D.4.4.11	As shown in appendix D of JAXA-QTS-2120				
Corrosion resistance		D.3.7.9	D.4.4.12	As shown in appendix D of JAXA-QTS-2120				
Conductor tensile strength		D.3.7.10	D.4.4.13	As shown in appendix D of JAXA-QTS-2120				
Platability of inner conductor and shield		D.3.7.1	D.4.4.4	There shall be no black pit or discoloration on cables except for the area of 10 mm from the ends. Plating of inner conductors shall not be peeled off. Plating thickness shall be as shown in Table 4.				
Flex resistance		D.3.7.11	D.4.4.14	As shown in appendix D of JAXA-QTS-2120				
Accelerated life		D.3.7.12	D.4.4.15	Shrinkage or protrusion of dielectric core shall be 5.0 mm or less. (Test temperature: 200±5 °C)				
Cold bend		D.3.7.20	D.4.4.23	As shown in appendix D of JAXA-QTS-2120				
Solderability		D.3.7.13	D.4.4.16	As shown in appendix D of JAXA-QTS-2120				
Corona extinction voltage (Vac)		D.3.7.14	D.4.4.17	800 min.			500 min.	
Resistance to chemicals		D.3.7.15	D.4.4.18	As shown in appendix D of JAXA-QTS-2120 (No evaluation conducted for dimethylhydrazine)				
Radiation tolerance		D.3.7.16	D.4.4.19	As shown in appendix D of JAXA-QTS-2120				
High temperature exposure		D.3.7.17	D.4.4.20	As shown in appendix D of JAXA-QTS-2120 (Test temperature: 200±5°C)				
Flammability		D.3.7.18	4.2.1 ⁽²⁾	As shown in appendix D of JAXA-QTS-2120 (Test method: in accordance with "VW-1 (Vertical-Specimen) Flame Test" specified in UL 1581)				
Outgassing		3.3.1	3.3.1	As shown in JAXA-QTS-2120				
Stress-crack resistance		D.3.7.19	D.4.4.22	Outer diameter of mandrel shall be 5 times of jacket outer diameter.				
Temperature cycling		D.3.7.21	D.4.4.24	As shown in appendix D of JAXA-QTS-2120 Adhesion strength of inner conductor to dielectric core shall be 0.3 N or more.				

Notes: ⁽¹⁾ Although the insulation resistance value required in the general specification is "5000 MΩ·km min.", the value required herein is "1000 MΩ·km min." in consideration of the absolute maximum ratings.

⁽²⁾ This means the paragraph number of this specification.

3.2 External, Construction and Dimensions

External, construction and dimensions shall be as shown in Figure 1 and Table 4.

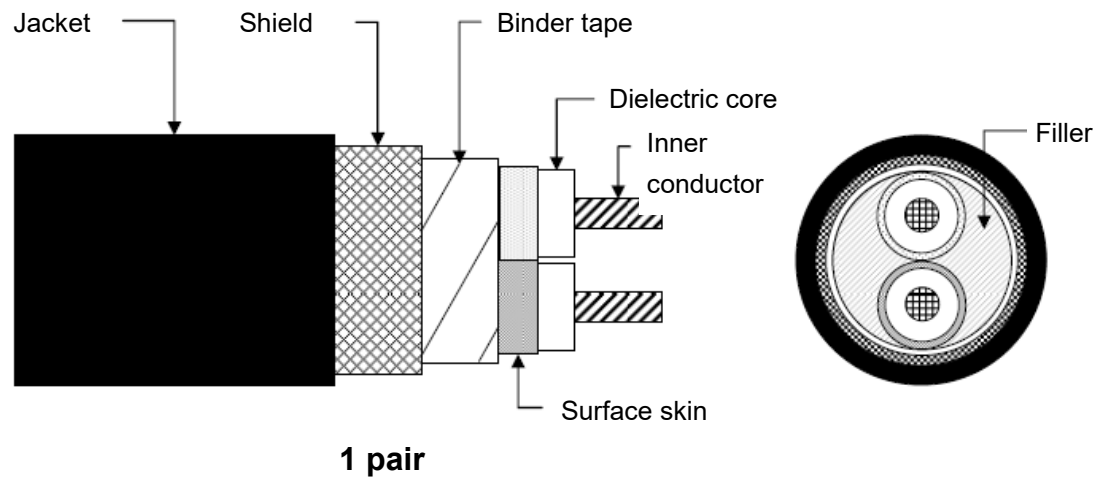


Figure 1. External and Construction

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Table 4. Construction and Dimensions

Item		Construction and dimension ⁽²⁾				
		20 AWG	22 AWG	24 AWG	26 AWG	28 AWG
Inner conductor	Construction	19×0.203	19×0.160	19×0.127	7×0.160	7×0.127
	Outer diameter (mm)	0.940 to 0.991	0.737 to 0.787	0.584 to 0.610	0.471 to 0.489	0.372 to 0.390
	Material	Silver-plated high tensile copper alloy wire				
	Silver plating thickness	2.0 µm min.				
	Conductor resistance (Ω/km max.)	35.8	58.5	95.1	160	256
Dielectric core	Material	EPTFE ⁽³⁾				
	Color	White				
	Outer diameter (mm)	(1.84)	(1.44)	(1.14)	(0.9)	(0.69)
Surface skin	Material	PFA				
	Color	Red x Blue (surface skin)				
	Thickness (mm)	(0.05)		(0.03)		
	Outer diameter (mm)	(1.94)	(1.54)	(1.20)	(0.96)	(0.75)
Filler	Material	EPTFE				
Strand	Pitch (mm)	50 to 67	50 to 67	30 to 40	27 to 35	20 to 26
Binder tape	Material	PTFE				
	Outer diameter (mm)	(4.1)	(3.3)	(2.6)	(2.12)	(1.64)
Shield	Material	Silver-plated annealed copper wire				
	Construction (pick/number/mm)	24/9/0.076 to 0.082	24/7/0.076 to 0.082	24/6/0.076 to 0.082	16/7/0.076 to 0.082	16/6/0.076 to 0.082
	Nominal density (%)	90 min.				
	Plating thickness	2.5 µm min.				
Print tape	Material	Polyimide				
	Printing	JAXA2120/D101-** ⁽¹⁾ Junkosha				
	Pitch	150 mm max.				
Jacket	Material	PFA				
	Color	Blue				
	Jacket thickness (mm)	(0.2)		(0.15)		
	Maximum outer diameter (mm)	5.6	4.7	3.9	3.1	2.6
Mass (g/m max.)		73	49.5	34.5	23.5	17

Notes: ⁽¹⁾ Conductor size shall be put in place of asterisks (**). e.g.) Put 20 for No. 20 AWG.⁽²⁾ Dimensions within brackets () are standard value.⁽³⁾ Expanded Polytetrafluoroethylene.

4. QUALITY ASSURANCE PROVISIONS

The quality assurance provisions shall be as specified in paragraph D.4, appendix D of JAXA-QTS-2120 and as follows.

4.1 In-Process Inspection

The in-process inspection shall be performed as specified in paragraph D.4.1 of JAXA-QTS-2120. The inspections shown in Table 5 shall also be conducted for each manufacturing lot.

Table 5. In-Process Inspection

Item No.	Inspection item	Requirement paragraph of JAXA-QTS-2120	Test method paragraph of JAXA-QTS-2120	Sample size
1	Conductivity (Shield)	D.3.7.24	D.4.4.27	100 %
2	Dielectric withstanding voltage (between inner conductors)	D.3.7.3	D.4.4.6.3	

4.2 Qualification Test

The qualification test shall be performed as specified in paragraph D.4.2, appendix D of JAXA-QTS-2120, paragraph 4.2.1 in this specification and as shown in Table 6.

4.2.1 Flammability (VW-1 (Vertical-Specimen) Flame Test specified in UL 1581)

A 455 mm cable specimen shall be secured vertically. The surface of the absorbent cotton shall be flattened and it shall be placed horizontally so that the vertical axis of the specimen is centered. The burner shall be mounted 20° from the vertical such that the tip of the blue inner cone of flame touches the center of the specimen's front side. An indicator flag shall be placed 250 mm above the point of contact between the blue inner cone and the specimen.

The flame shall be applied to the specimen for 15 seconds and then removed from the specimen for 15 seconds if the specimen flaming ceases within 15 seconds or less. The flame application and removal cycle shall be repeated five times. If the specimen flaming persists longer than 15 seconds, the interval between applications of the test flame shall be the duration of the specimen flaming. No more than 25 % of the indicator flag shall be burned after test. No flaming drops of the specimen shall ignite the absorbent cotton. The specimen shall not continue to burn for more than 60 seconds.

Table 6. Qualification Test

Group	Test item	Requirement paragraph of JAXA-QTS-2120	Test method paragraph of JAXA-QTS-2120
I	External, dimensions, marking and mass	D.3.6	D.4.4.2 D.4.4.3
	Platability of inner conductor and shield	D.3.7.1	D.4.4.4
	Conductivity (shield)	D.3.7.24	D.4.4.27
	Conductor resistance	D.3.7.2	D.4.4.5
	Dielectric withstanding voltage	D.3.7.3	D.4.4.6
	Insulation resistance	D.3.7.4	D.4.4.7
II	Capacitance	D.3.7.5	D.4.4.8
	Characteristic impedance	D.3.7.6	D.4.4.9
	RF transmission loss (Attenuation)	D.3.7.7	D.4.4.10
	Adhesion of conductors	D.3.7.8	D.4.4.11
	Corrosion resistance	D.3.7.9	D.4.4.12
	Conductor tensile strength	D.3.7.10	D.4.4.13
	Flex resistance	D.3.7.11	D.4.4.14
	Accelerated life	D.3.7.12	D.4.4.15
	Solderability	D.3.7.13	D.4.4.16
	Corona extinction voltage	D.3.7.14	D.4.4.17
	Resistance to chemicals	D.3.7.15	D.4.4.18
	Radiation Tolerance	D.3.7.16	D.4.4.19
	High temperature exposure	D.3.7.17	D.4.4.20
	Flammability	D.3.7.18	4.2.1 ⁽²⁾
	Stress-crack resistance	D.3.7.19	D.4.4.22
	Cold bend	D.3.7.20	D.4.4.23
	Temperature cycling	D.3.7.21	D.4.4.24
	Propagation delay time	D.3.7.22	D.4.4.25
	Propagation delay time difference	D.3.7.23	D.4.4.26
	Materials ⁽¹⁾	D.3.2	-

Notes: ⁽¹⁾ The manufacturer shall submit a document that provides evidence that their products conform to the design specification.

⁽²⁾ This means the paragraph number of this specification.

4.3 Quality Conformance Inspection

The quality conformance inspection shall be performed as specified in paragraph D.4.3, appendix D of JAXA-QTS-2120 and as shown in Tables 7 and 8.

Table 7. Quality Conformance Inspection (Group A)

Group	Inspection item	Requirement paragraph of JAXA-QTS-2120	Test method paragraph of JAXA-QTS-2120
1	External, dimensions marking and mass	D.3.6	D.4.4.2 D.4.4.3
	Conductivity (Shield) ⁽¹⁾	D.3.7.24	D.4.4.27
	Conductor resistance	D.3.7.2	D.4.4.5
	Dielectric withstanding voltage ⁽²⁾	D.3.7.3	D.4.4.6
	Insulation resistance	D.3.7.4	D.4.4.7
2	Capacitance	D.3.7.5	D.4.4.8
	Characteristic impedance	D.3.7.6	D.4.4.9
	RF transmission loss (Attenuation)	D.3.7.7	D.4.4.10
	Propagation delay time	D.3.7.22	D.4.4.25
	Propagation delay time difference	D.3.7.23	D.4.4.26

Notes: ⁽¹⁾ Data from in-process inspection will be used.

⁽²⁾ Data from in-process inspection will be used for dielectric withstanding voltages between shield and jacket and between inner conductors.

Table 8. Quality Conformance Inspection (Group B)

Group	Inspection item	Requirement paragraph of JAXA-QTS-2120	Test method paragraph of JAXA-QTS-2120
B1	Platability of inner conductor and shield	D.3.7.1	D.4.4.4
	Adhesion of conductors	D.3.7.8	D.4.4.11
	Corrosion resistance	D.3.7.9	D.4.4.12
	Conductor tensile strength	D.3.7.10	D.4.4.13
	Accelerated life	D.3.7.12	D.4.4.15
	Solderability	D.3.7.13	D.4.4.16
	Corona extinction voltage	D.3.7.14	D.4.4.17
	Flammability	D.3.7.18	4.2.1 ⁽¹⁾
	Stress-crack resistance	D.3.7.19	D.4.4.22
	Cold bend	D.3.7.20	D.4.4.23
	Temperature cycling	D.3.7.21	D.4.4.24

Note: ⁽¹⁾ This means the paragraph number of this specification.

4.4 Long-Term Storage

The long-term storage shall be as specified in paragraph D.4.5, appendix D of JAXA-QTS-2120.

4.5 Change or Optimization of Tests and Inspections

The following item of quality conformance inspection specified in appendix D of JAXA-QTS-2120 has been changed as follows.

a) Flammability

Due to the aging of the test equipment, the test method shall be changed to "VW-1 (Vertical-Specimen) Flame Test" specified in UL 1581. This change is acceptable because test conditions for the time and area of the flame applied for the specimen and the criteria are more harsh than those specified in paragraph D.4.4.21, appendix D of JAXA-QTS-2120.

5. PREPARATION FOR DELIVERY

Preparation for delivery shall be in accordance with paragraph 5 of JAXA-QTS-2120.

6. NOTES

Notes shall be in accordance with paragraph 6 of JAXA-QTS-2120.