

Aircraft Wiring

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**Federal Aviation
Administration**



Recent Aircraft Wiring Tests

- Testing was performed on Cross-Linked ETFE wires with three different wall thicknesses: 0.006", 0.008", and 0.010"
- Included in this testing were single wires, bundles of 6 or 7 wires, cables of twisted pairs (20 and 22 AWG), flat and round shields, and jackets.
- The wire was supplied by two manufacturers.
- Bombardier prepared all of the wires and cables.
- The Task Group suggested that we evaluate 7-wire bundles since they are used in the Arc-Tracking Tests.
- The Task Group also wanted to compare the burn length of a single wire with that of a bundle

Recent Aircraft Wiring Test Results

TABLE 1 - INDIVIDUAL, SINGLE WIRES

Specimen	Qty	Supplier	Type	AWG	Wall	Length
A - 1	03	1	XLETFE (AS22759/41./42./45)	20	0.006"	20"
A - 2	03	2	XLETFE (AS22759/41./42./45)	20	0.008"	20"
A - 3	03	1	XLETFE (AS22759/41./42./45)	20	0.010"	20"

TABLE 2 - BUNDLES WITH 06 and 07 WIRES

Specimen	Qty	Supplier	Type	No. of Wires in Bundle	AWG	Wall	Length Of bundle														
B - 1	02	1	XLETFE (AS22759/41./42./45)	07	20	0.006"	20"														
	01			06				B - 2	02	2	XLETFE (AS22759/41./42./45)	07	20	0.008"	20"	01	06	B - 3	02	1	XLETFE (AS22759/41./42./45)
B - 2	02	2	XLETFE (AS22759/41./42./45)	07	20	0.008"	20"														
	01			06				B - 3	02	1	XLETFE (AS22759/41./42./45)	07	20	0.010"	20"	01	06				
B - 3	02	1	XLETFE (AS22759/41./42./45)	07	20	0.010"	20"														
	01			06																	

Recent Aircraft Wiring Test Results

TABLE 3 - INDIVIDUAL CABLES

Specimen	Qty	Supplier	Cable Type	AWG	Wall (Comp. Wire)	Length
C - 1	03	2	XLETFE (M27500-20SM2G23) Twisted pair, flat shield & jacket	20	0.006"	20"
C - 2	03	2	XLETFE (M27500-20SM2N23) Twisted pair, round shield & jacket	20	0.008"	20"
C - 3	03	1	XLETFE (M27500-22SD2T23) Twisted pair round shield & jacket	22	0.010"	20"

TABLE 4 - BUNDLES WITH 06 and 07 CABLES

Specimen	Qty	Supplier	Cable Type	No. of Cables in Bundle	AWG	Wall (Comp. Wire)	Length Of bundle
D - 1	02	2	XLETFE (M27500-20SM2G23) Twisted pair, flat shield & jacket	07	20	0.006"	20"
	01			06			
D - 2	02	2	XLETFE (M27500-20SM2N23) Twisted pair, round shield & jacket	07	20	0.008"	20"
	01			06			
D - 3	03	1	XLETFE (M27500-22SD2T23) Twisted pair round shield & jacket	07	22	0.010"	20"

Recent Aircraft Wiring Test Results

INDIVIDUAL, SINGLE WIRES

Specimen	No	Burn Length		Flame-Extinguish Time (sec)	Drip Flame-Extinguish Time	Conductor Exposed	Comments
		inch	mm				
A-1	1	0.5	12.69	0	0	N	Pass
A-1	2	0.5	12.69	0	0	N	Pass
A-1	3	0.5	12.69	0	0	Y	Pass
A-2	1	0.75	19.04	0	0	Y	Pass
A-2	2	0.75	19.04	0	0	Y	Pass
A-2	3	0.75	19.04	0	0	N	Pass
A-3	1	0.75	19.04	0	0	N	Pass
A-3	2	0.75	19.04	0	0	N	Pass
A-3	3	0.62	15.87	0	0	N	Pass

Recent Aircraft Wiring Test Results

BUNDLES WITH 06 and 07 WIRES

Specimen	No	Max Burn Length		Flame-Extinguish Time (sec)	Drip Flame-Extinguish Time	Conductor Exposed	Comments
		inch	mm				
B-1	1	0.75	19.04	0	0	N	Pass
B-1	2	1	25.39	0	0	N	Pass
B-1	3 (6 wire)	0.93	23.81	0	0	N	Pass
B-2	1	1	25.39	0	0	N	Pass
B-2	2	1.75	44.44	1½	0	N	Pass
B-2	3 (6 wire)	1.5	38.09	0	0	N	Pass
B-3	1	1.5	38.09	0	0	N	Pass
B-3	2	1.25	31.74	0	0	N	Pass
B-3	3 (6 wire)	1	25.39	0	0	N	Pass

- Requirements:** The average burn length may not exceed 3 inches (76.197mm), and the average flame time after removal of the flame source may not exceed 30 seconds. Drippings from the test specimen may not continue to flame for more than an average of 3 seconds after falling.

Recent Aircraft Wiring Test Results

INDIVIDUAL CABLES

Specimen	No	Burn Length		Flame-Extinguish Time (sec)	Drip Flame-Extinguish Time	Shield Exposed	Comments
		inch	mm				
C - 1	1	0.87	22.22	0	0	N	Pass
	2	1	25.39	0	0	N	Pass
	3	0.87	22.22	0	0	Y	Pass
C - 2	1	1	25.39	0	0	Y	Pass
	2	1	25.39	0	0	Y	Pass
	3	1	25.39	0	0	N	Pass
C - 3	1	1	25.39	0	0	N	Pass
	2	0.87	22.22	0	0	N	Pass
	3	1	25.39	0	0	N	Pass

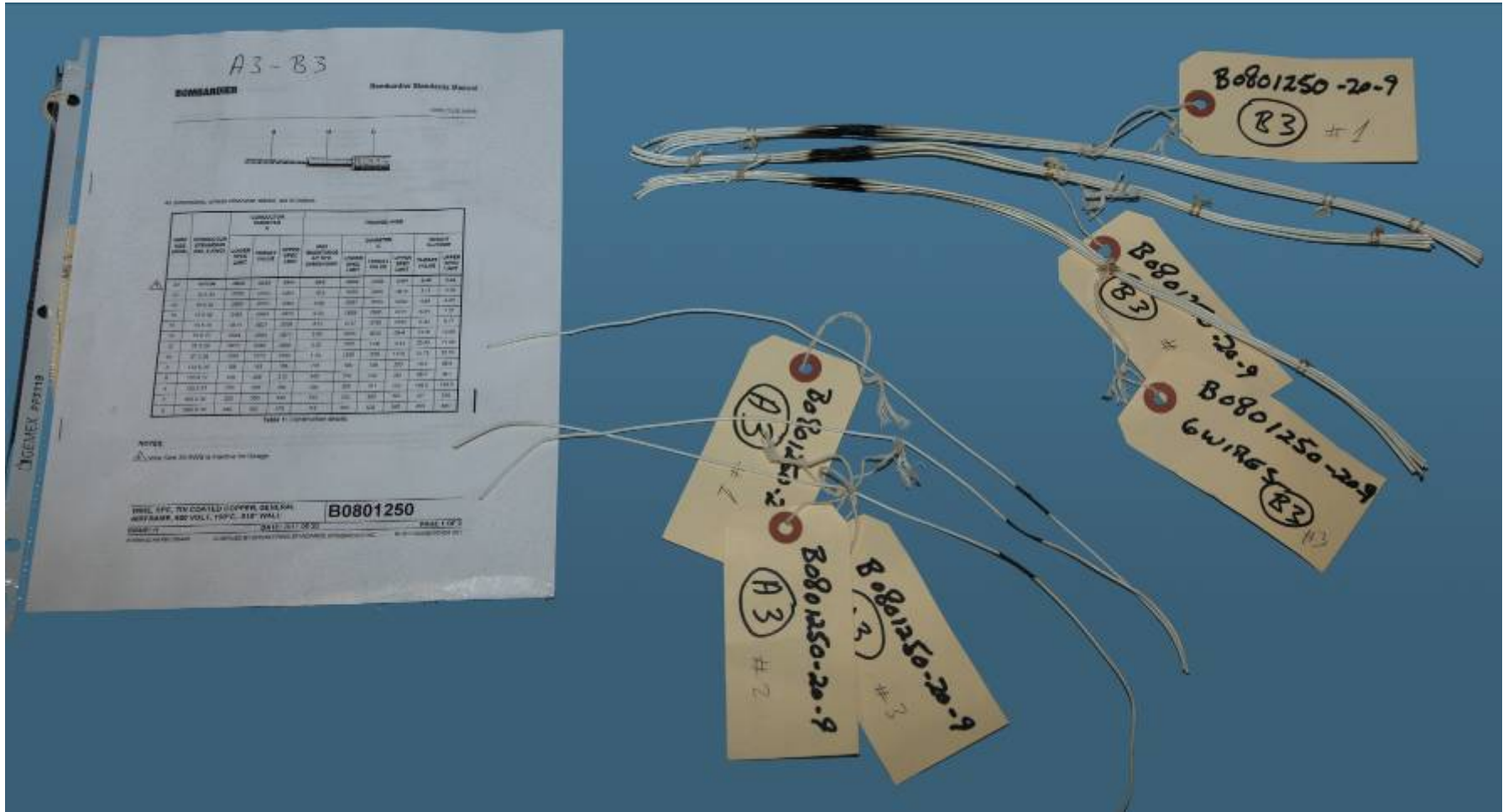
Recent Aircraft Wiring Test Results

BUNDLES WITH 06 and 07 CABLES

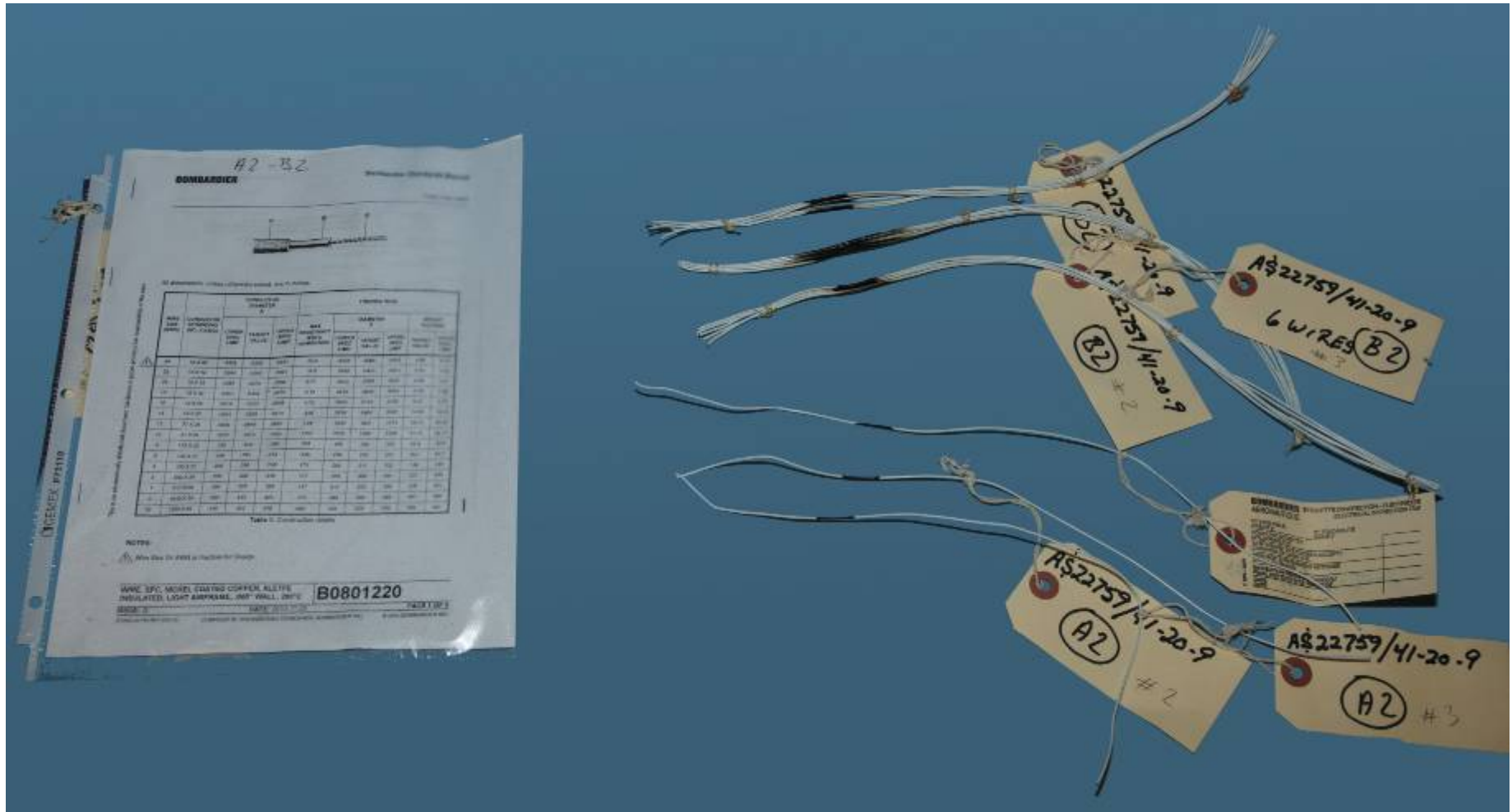
Specimen	No	Max Burn Length		Flame-Extinguish Time (sec)	Drip Flame-Extinguish Time	Shield Exposed	Comments
		inch	mm				
D - 1	1	1.87	47.62	0	0	Y	Pass
	2	1.75	44.44	0	0	Y	Pass
	3 (6 cables)	1.87	47.62	0	0	Y	Pass
D - 2	1	1.25	31.74	0	0	N	Pass
	2	1.75	44.44	0	0	N	Pass
	3 (6 cables)	1.87	47.62	0	0	N	Pass
D - 3	1	1.5	38.09	0	0	N	Pass
	2	1.5	38.09	0	0	N	Pass
	3 (6 cables)	1.87	47.62	0	0	N	Pass

- Requirements:** The average burn length may not exceed 3 inches (76.197mm), and the average flame time after removal of the flame source may not exceed 30 seconds. Drippings from the test specimen may not continue to flame for more than an average of 3 seconds after falling.

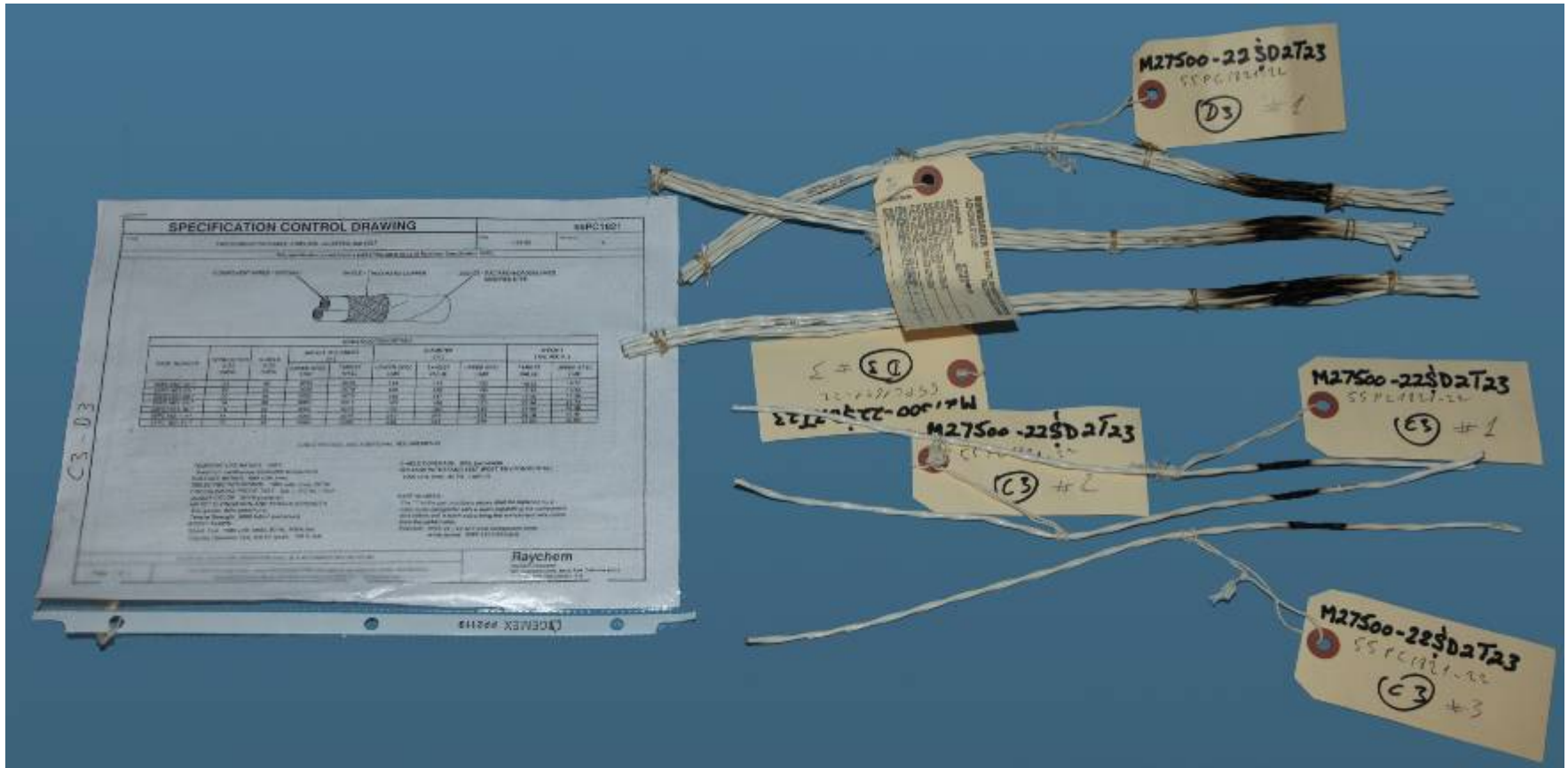
Recent Aircraft Wiring Test Results



Recent Aircraft Wiring Test Results



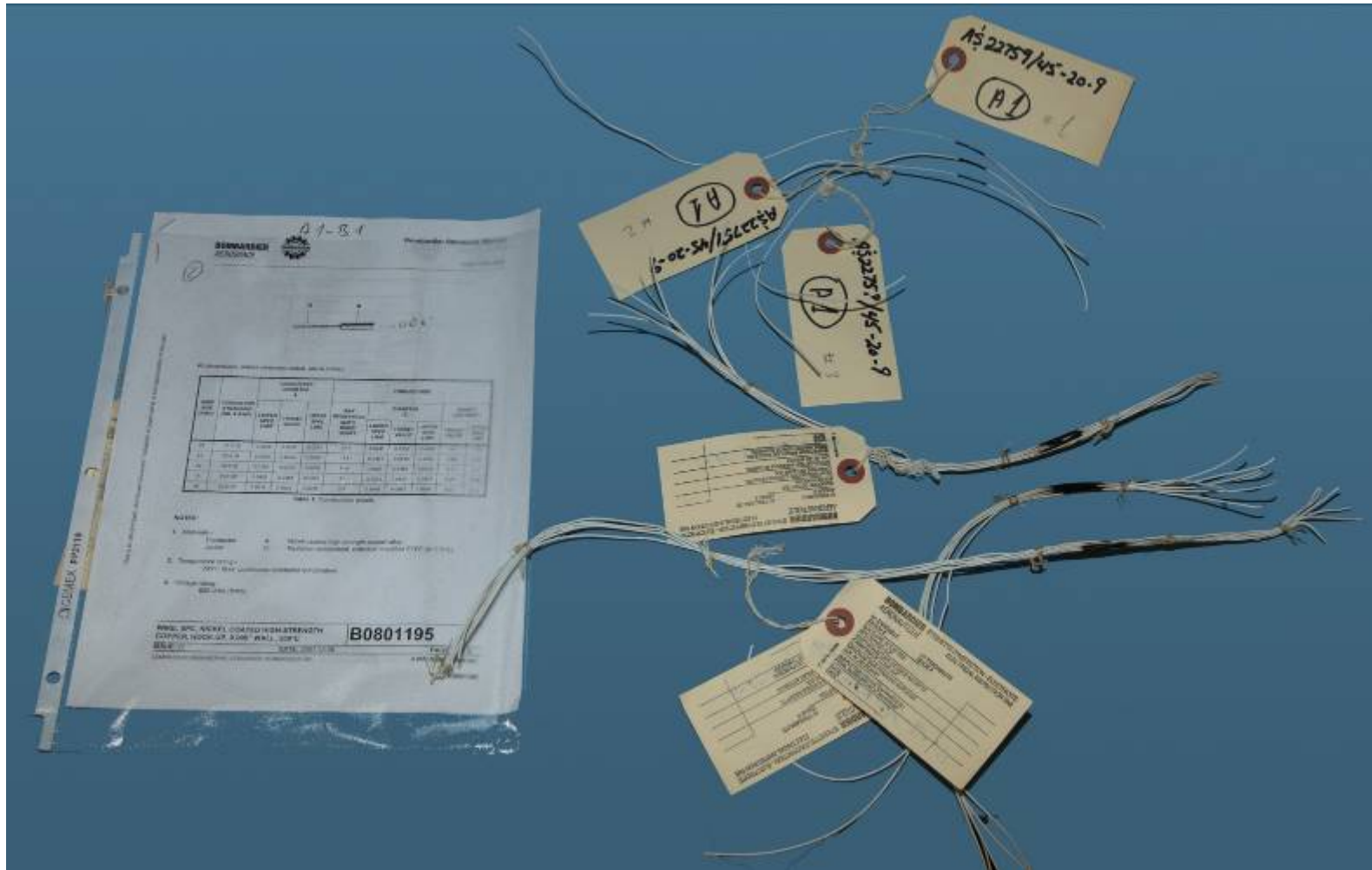
Recent Aircraft Wiring Test Results



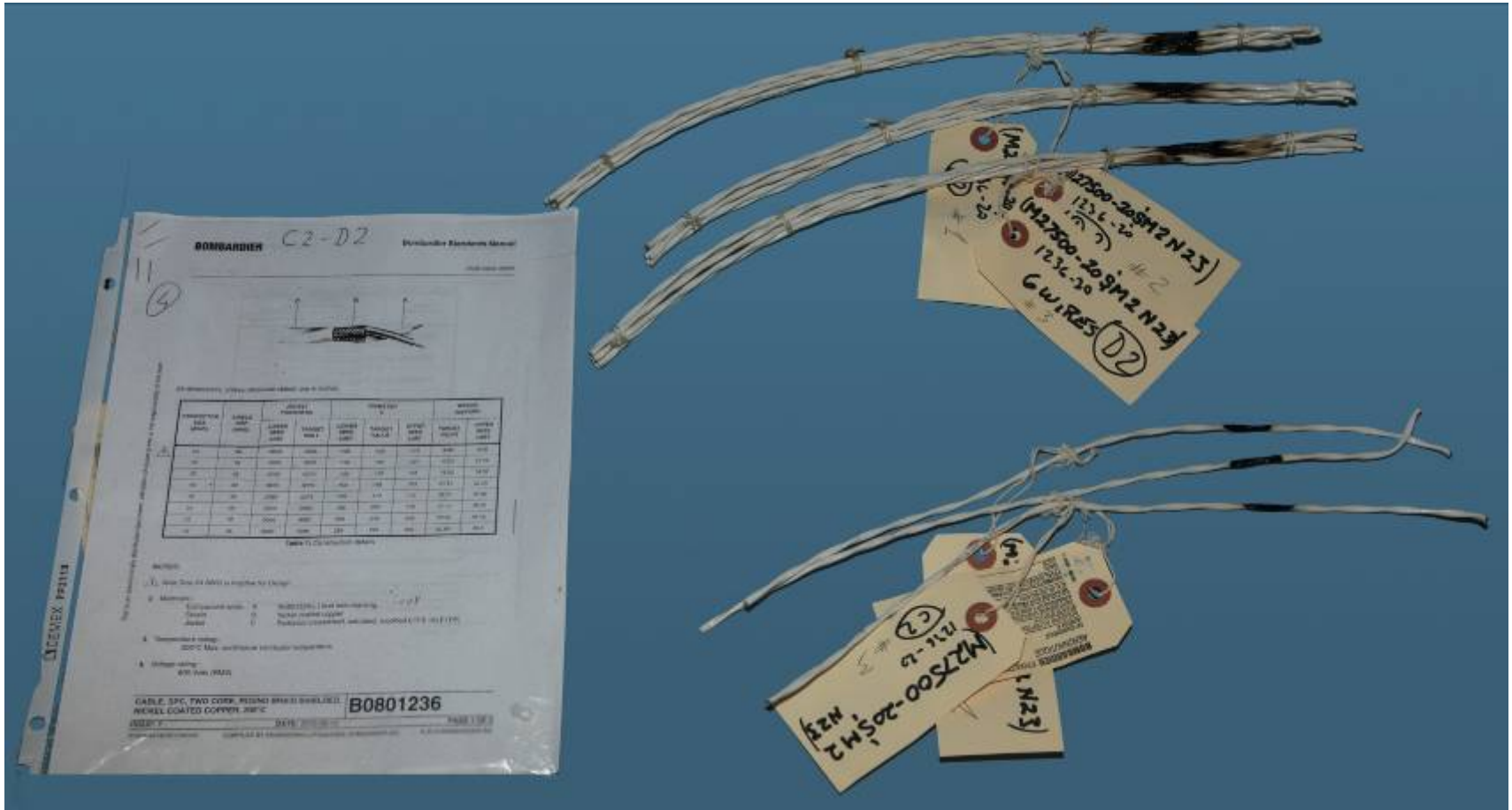
Recent Aircraft Wiring Test Results



Recent Aircraft Wiring Test Results



Recent Aircraft Wiring Test Results



Recent Aircraft Wiring Tests

- This series of testing will be performed with the hybrid construction which is PTFE/polyimide/PTFE.

Task Group Discussion

- The 7-wire bundle
- Single wire test?
- Planning a Round Robin?