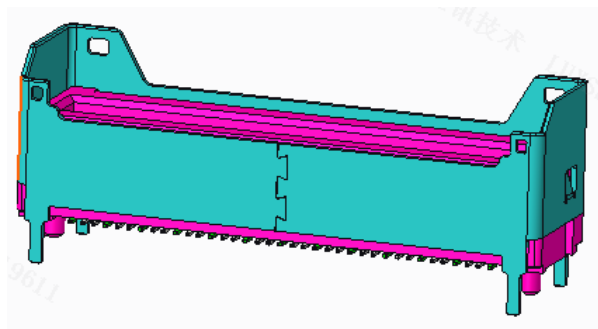
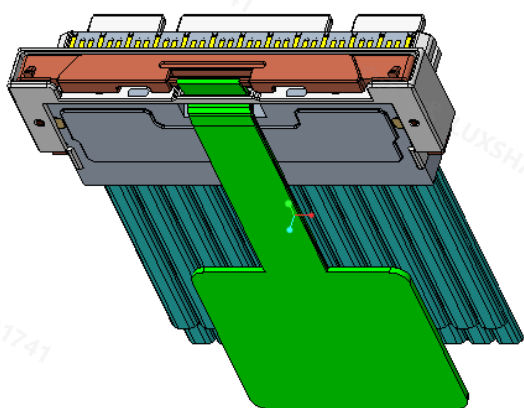


PADDLELESS CRE Cable Assembly.



Prepared by:

ShangFeng

Check by:

SongTao

Approved by:

Rongzhe Guo

Date:

10/29/21

Date:

10/29/21

Date:

10/29/21

	TYPE PRODUCT SPECIFICATION	SPEC. NO	Revision. X1
		Date 10/29/21	Page 2 / 11

1 SCOPE

This specification defines the performance, tests, quality and reliability requirements of the CRE Cable Assembly product.

2 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, latest edition of the specification applies. In the event of conflict between requirements of this specification and product drawing, product drawing shall take precedence.

2.1 Industry standards

- 2.1.1 GB/T 5095.2-1997-1a and 1b, Examination of product.
- 2.1.2 GB/T 5095.3-1997-5a, Temperature rise vs current
- 2.1.3 GB/T 5095.2-1997-2a, Low Level Contact Resistance(LLCR)
- 2.1.4 GB/T 5095.2-1997-3a, Insulation resistance
- 2.1.5 GB/T 5095.2-1997-4a, Withstanding voltage
- 2.1.6 GB/T5095.7-1997-13b, Mating force & Unmating force
- 2.1.7 GB/T 5095.8-1997-15a, Contact Retention Force
- 2.1.8 GB/T 5095.8-1997-15a, Shell Retention Force
- 2.1.9 GB/T 5095.8-1997-15a, Plug Destructive Force
- 2.1.10 GB/T 5095.5-1997-9a, Durability
- 2.1.11 GB/T 5095.5-1997-9a, Pre-durability
- 2.1.12 GB/T5095.4-1997-6c, Mechanical shock
- 2.1.13 GB/T 5095.4-1997-6d, Random vibration
- 2.1.14 GB/T5095.6-1997-11d, Thermal shock
- 2.1.15 GB/T 5095.6-1997-11m, Humidity/temperature cycling
- 2.1.16 EIA-364-110, Thermal Cycling
- 2.1.17 EIA-364-110, Thermal Disturbance
- 2.1.18 GB/T 5095.6-1997-11i, Temperature life
- 2.1.19 GB/T 5095.6-1997-11i, Temperature life(Pre-conditioning)
- 2.1.20 GB/T 5095.6-1997-11f, Salt Spray
- 2.1.21 EIA-364-65B-IIA, Mixed flowing gas
- 2.1.22 EIA-364-91, Dust composition
- 2.1.23 EIA-364-38B, Cable pulling force

3 MECHANIC DIMENSIONS

3.1 Dimensions:

Refer to customer drawing



TYPE

PRODUCT SPECIFICATION

SPEC. NO

Revision.
X1Date
10/29/21Page
3 / 11**4 REQUIREMENTS****4.1 Qualification**

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein. Unless otherwise specified, all measurements shall be performed within the following lab conditions:

- a. Temperature: $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$.
- b. Relative Humidity: 20% to 80%
- c. Atmospheric Pressure: 650mm to 800mm of Hg (86 ~106Kpa)

4.2 Materials

- a. Contacts: Copper and Copper alloy.
- b. Insulator: High temperature Engineering plastics, UL94 V-0.
- c. Other material: Stainless steel

4.3 Finish

Plated spec for qualification components shall be meet the connector's application.

4.4 Workmanship

Connectors shall be uniform in quality and free from burrs, scratches, cracks, voids, chips, blisters, sharp edges, and other defects that may impair performance.

5 RATING

5.1 Operating Voltage Rating = 12 VDC

5.2 Operating Temperature Range = -45°C TO $+105^{\circ}\text{C}$

6 ELECTRICAL CHARACTERISTIC**6.1 Temperature Rise**

The temperature rise above ambient shall not exceed 30°C at any point in the system. When applied contacts' quantity greater than 20pcs, the test current is 0.5 amperes, or when applied contacts' quantity greater than 10pcs and less than 20pcs ($10 < \text{contact's quantity} \leq 20$), the test current is 0.7 amperes, or when applied contacts' quantity less than or equal to 10pcs, the test current is 1 amperes. The following details shall apply:

- a. Ambient Conditions: $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$
- b. Reference: GB/T 5095.3-1997 5a

6.2 Low Level Contact Resistance (LLCR)



TYPE PRODUCT SPECIFICATION	SPEC. NO	Revision. X1
	Date 10/29/21	Page 4 / 11

The low level contact resistance shall not exceed 30 milliohms initially. The low level contact resistance shall also not exceed 15 milliohms increase in resistance (from the initial measurement) after any treatment and/or environmental exposure.

Measurements shall be in accordance with GB/T 5095.2-1997 2a.

The following details shall apply:

- a. Method of Connection – 4-wire
- b. Test Voltage - 20 milli-volts DC max open circuit.
- c. Test Current - Not to exceed 100 milli-amperes.

6.3 Insulation Resistance

The insulation resistance of mated connectors shall not be less than 1000M ohms initially and 1000M ohms after environmental exposure.

Measurements shall be in accordance with GB/T 5095.2-1997 3a.

The following details shall apply:

- a. Test Voltage - 100 volts DC.
- b. Electrification Time - 1 minutes min., unless otherwise specified.
- c. Points of Measurement - Between adjacent contacts

or between contacts and other conductive surfaces, if applicable.

6.4 Dielectric Withstanding voltage

There shall be no evidence of arc-over, insulation breakdown, or excessive leakage current $< 0.5\text{mA}$ when mated connectors are tested in accordance with GB/T 5095.2-1997 4a.

The following details shall apply:

- a. Test Voltage - 300 volts (DC or AC RMS, 60Hz).
- b. Test Duration - 60 seconds min.
- c. Test Condition - 1 (760 Torr - sea level).
- d. Points of Measurement - Between adjacent contacts

or between contacts and other conductive surfaces, if applicable.



TYPE PRODUCT SPECIFICATION	SPEC. NO	Revision. X1
	Date 10/29/21	Page 5 / 11

7 MECHANICAL CHARACTERISTICS

7.1 Durability

Mating and un-mating with applicable PCB, Durability tested in accordance with GB/T 5095.5-1997 9a.

The following details shall apply:

- Number of Cycles: 200 cycles.
- Cycling Rates: 500 ± 50 cycles/hour

7.2 Durability (Preconditioning)

Mating and un-mating with applicable PCB, Durability tested in accordance with GB/T 5095.5-1997 9a. The following details shall apply:

- Number of Cycles: 20 cycles.
- Cycling Rates: 500 ± 50 cycles/hour.
- No physical damage.

7.3 Mating/un-mating Force

The force to mate a receptacle connector and compatible header shall not exceed 0.5 newton/pin *pin Quantity+5N (42N). The unmating force shall not be less than 0.04 newton /pin*pin Quantity (2.96N). The following details shall apply:

- Cross Head Speed: 25.4 ± 3 mm or inch per minute.
- Utilize free floating fixtures.
- Reference GB/T5095.7-1997 13b.

7.4 Shell Retention Force

The Shell are axially pull out at the speed rate of 25.4 ± 3 mm/minute

- Reference: GB/T 5095.8-1997 15a.
- Shell Retention force: 50N/pin Min.

7.5 Plug Destructive Force

The Plug are axially pull out at the speed rate of 25.4 ± 3 mm/minute

- Reference: GB/T 5095.8-1997 15a.
- Contact Retention force for plug: 70N/pin Min, Discontinuity less than $1 \mu s$, No damaged happened. Plug and receptacle is not separated.

7.6 Four axle Lifting Load

Plug and connector @ mated condition, no mechanical problem and discontinuity less than $1 \mu s$.

- Test Direction: 4directions that perpendicular to mating direction.

	TYPE PRODUCT SPECIFICATION	SPEC. NO	Revision. X1
		Date 10/29/21	Page 6 / 11

- b. Test Time: 30~60 seconds
- c. Test Cable Length: 300±50mm.
- d. Lifting load: 25N.

7.7 Vibration

Mated plug and connector with fixture and placed on the test bench.

- a Reference: GB/T5095.4-1997, 6d, test condition II (10-50-10 Hz), amplitude:1.52mm.
- b 2hours each axis, total 3 axial directions, No interrupts greater than 1 microsecond

7.8 Mechanical Shock

Mated plug and connector with fixture and placed on the test bench.

- a. Reference: GB/T5095.4-1997, 6c
- b. Peak Value: 50G, Duration: 11mSec. Waveform: Half Sine. Changed speed:2.07 m/s.
Quantities of Shocks/Direction: 3 shocks/direction (18 total). Discontinuity less than 1μs, No damage.
- c. Test current: 10 mA.

7.9 Cable pulling force

After the plugs and sockets are matched with each other, apply 50 N axial force and 25 n radial force on the conductor respectively, the latch of the plug will not be damaged, and the supporting connector will not be greater than 1 μ Electrical discontinuity of S

- a. Reference: EIA-364-38B
- b. Holding time: 60 s;
- c. Conductor size: 30 AWG;
- d. Conductor length: 300 mm ± 50 mm;
- e. Test current: 100 mA.

8 ENVIRONMENTAL CHARACTERISTICS

After exposure to the following environmental conditions in accordance with the specified test procedure and/or details, the product shall show no physical damage and shall meet the electrical and mechanical requirements per paragraphs 5.0 and 6.0 as specified in the Table 1 test sequences. Unless specified otherwise, assemblies shall be mated during exposure.

8.1 Thermal Shock GB/T5095.6-1997, 11d.

- a. Number of Cycles: 10cycles
- b. Temperature Range: Between -55 +3/-0 °C and 85 +3/-0 °C
- c. Time at Each Temperature: 30 minutes



TYPE

PRODUCT SPECIFICATION

SPEC. NO

Revision.

X1

Date

10/29/21

Page

7 / 11

8.2 Humidity GB/T 5095.6-1997 11m (cyclic temperature)

- a. Environmental condition: $25\pm 3^{\circ}\text{C}$ @ $80\pm 3\%$ RH ~ $65\pm 3^{\circ}\text{C}$ @ $50\pm 3\%$ RH;
- b. Ramp time 0.5Hous,
- c. Dwell time 1 hour for one cycle, total: 50Cycles.
- d. No damage.

8.3 Thermal Cycling

Mated with applicable card. No physical damages shall be observed after tested in accordance with EIA-364-110,

- a. Test condition: Cycle the connector between $15^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and $85^{\circ}\text{C} \pm 3^{\circ}\text{C}$, Humidity is not controlled
- b. Test Duration: Ramps should be a minimum of 2°C per minute, and dwell times should insure that the contacts reach the temperature extremes (a minimum of 5 minutes)
- c. Number of cycles: Perform 500 such cycles.

8.4 Thermal Disturbance

Mated with applicable card. No physical damages shall be observed after tested in accordance with EIA-364-110,

- a. Test condition: Cycle the connector between $15^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and $85^{\circ}\text{C} \pm 3^{\circ}\text{C}$, Humidity is not controlled
- b. Test Duration: Ramps should be a minimum of 2°C per minute, and dwell times should insure that the contacts reach the temperature extremes (a minimum of 5 minutes)
- c. Number of cycles: Perform 10 such cycles.

8.5 Temperature Life.

No physical damage shall be observed after tested in accordance with GB/T 5095.6-1997 11i. The following details shall apply:

- a. Test Duration: 240 hours.
- b. Temperature: $105^{\circ}\text{C} \pm 2^{\circ}\text{C}$.

8.6 Temperature Life (Preconditioning).

No physical damage shall be observed after tested in accordance with GB/T 5095.6-1997 11i. The following details shall apply:

- a. Test Duration: 120 hours.



TYPE

PRODUCT SPECIFICATION

SPEC. NO

Revision.

X1

Date

10/29/21

Page

8 / 11

b. Temperature: 105°C±2°C.

8.7 Salt Spray GB/T 5095.6-1997, 11f

- a. Temperature: 35°C+1/-2°C
- b. Humidity: 95%~98%RH
- c. Test Condition : 5% Salt Concentration
- d. Duration: 48 (hours if not specified by selected condition above)
- e. Acceptance criteria – (visual examination requirements and/or LLCR criteria)

8.8 Mixed Flowing Gas corrosion (MFG) EIA-364-65B

- a. Class – IIA
- b. Duration - 10 days
- c. Unmated 160Hours, mated 80Hours

8.9 Dust Contamination EIA-364-91

- a. Both connector halves are to be exposed unmated to dust composition #1 for 1 hour.
- b. There shall be no evidence of physical or mechanical damage.

9 QUALITY ASSURANCE PROVISIONS**9.1 Equipment Calibration**

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with MIL-C-45662 and ISO 9000.

9.2 Inspection Condition

Unless otherwise specified herein, all inspections shall be performed under the following ambient conditions:

- a) Temperature: 25°C±10°C.
- b) Relative Humidity: 20% to 80%
- c) Atmospheric Pressure: 650mm to 800mm of Hg (86 ~106Kpa)

9.3 Sample Quantity and Description

The sample size to be tested in each group shown in Qualification Testing Sequences should follow Table 1; All samples must be free of defects that would impair normal connector operation. All samples must meet dimensional requirements of connector.



TYPE PRODUCT SPECIFICATION	SPEC. NO	Revision. X1
	Date 10/29/21	Page 9 / 11

Acceptance

9.4.1 Electrical and mechanical requirements placed on test samples as indicated in Paragraphs 6 and Paragraphs 7 shall be established from test data using appropriate statistical techniques or shall otherwise be customer specified, and all samples tested in accordance with this product specification shall meet the stated requirements.

9.4.2 Failures attributed to equipment, test set up, or operator error shall not disqualify the product. If product failure occurs, corrective actions shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

9.5 Qualification Testing

Qualification testing shall be performed on sample units produced with equipment and procedures, normally used in production. The test sequence shall be as shown in Qualification Testing Sequences Visual Examination: GB/T 5095.2-1997-1a and 1b.

9.6 Re-qualification Testing

If any of the following conditions occur, the responsible product engineer shall initiate re-qualification testing consisting of all applicable parts of the qualification test matrix Table 1.

- a. A significant design change is made to the existing product which impacts the product form, fit or function. Examples of significant changes shall include, but not be limited to, changes in the plating material composition or thickness, contact force, contact surface geometry, insulator design, contact base material, or contact lubrication requirements.
- b. A significant change is made to the manufacturing process, which impacts the product form, fit or function.
- c. A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

	TYPE	SPEC. NO	Revision. X1
	PRODUCT SPECIFICATION	Date 10/29/21	Page 10 / 11

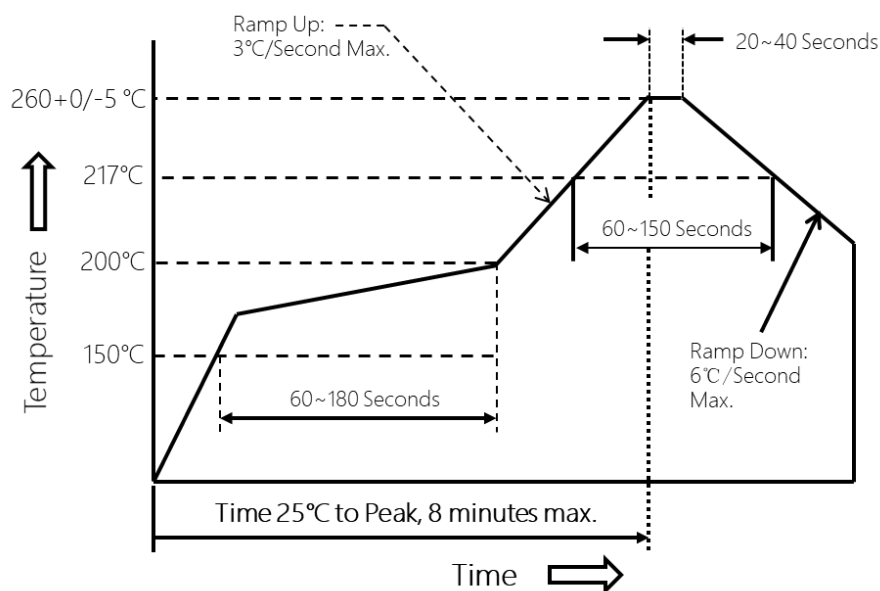
10 QUALIFICATION TESTING SEQUENCES

QUALIFICATION TEST

No.	Description	Item	Test Group & Sequence													
			A	B	C	D	E	F	G	H	I	J	K	L	M	N
1.	Examination of connector(s)		1,15	1,20	1,15	1,17	1	1	1	1	1	1	1	1		
2.	SI Test			6,11,18	6,13											
3.	LLCR		4,7,9,11	4,8,13,15	4,8,10	4,7,11,13	2,5,7,9	2,5,7,9	3,5							
4.	Insulation Resistance		2,12	2,9,16	2,11	2,8,14										
5.	Dielectric Withstanding Voltage		3,13	3,10,17	3,12	3,9,15			2,6							
6.	Durability								4							
7.	Durability (Preconditioning)		5	5	5	5	3	3								
8.	Mating/un-mating Force		14	19	14	16										
9.	Reseating			14	9	12	8	8								
10.	Shell Retention Force									2						
11.	Four axle Lifting Load										2					
12.	Cable pulling force											2				
13.	Thermal Shock			7												
14.	Humidity-Temperature Cycling			12												
15.	Thermal Cycling						6									
16.	Thermal Disturbance							6								
17.	Dust Contamination							4								
18.	High Temperature Life				7											
19.	High Temperature Life (Preconditioning)		6			6	4									
20.	Mechanical Shock		10													
21.	Vibration		8													
22.	Salt Spray												2			
23.	Mix Flowing Gas(MFG)					10										
24.	Temperature Rise													2		
Sample Quantity			5	5	5	5	5	5	5	5	5	5	5	5		

11

Table 1



Recommended Reflow Curve Pb-Free Process

REVISION RECORD

Rev	Page	Description	EC#	Date
X1	All	New Design		2021.10.29