

01/29/2024

Subject: Change #6 to SAE/USCAR-45 (initial release)

Changes have been made to the USCAR-45 to Update note 6 on Table 10. It is effective starting today. Comments and questions can be sent to [EWCAP@uscar.org](mailto:EWCAP@uscar.org).

**Concern:**

The note 6 on Table 10 was incomplete.

**Resolution:**

The following changes have been made:

**TABLE 10 - TESTS REQUIRED FOR VALIDATION**

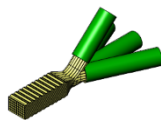
Test Name		Cross-Sectional Analysis	Bond Tensile Strength	Bond Tensile Strength (Incorrectly Made)	Bond Peel Strength	Performance after Environmental Aging
Test Group		A	B	C	D	E
Sample size minimum for group		2	30 <sup>(2)</sup>	5 <sup>(3)</sup>	10 <sup>(2, 6)</sup>	13 <sup>(2,4)</sup>
4.1	General	1	1	1	1	1
4.2	Visual Inspection	2	2	2	2	2, 6
4.3	Welded termination Cross-Section and compaction Analysis	3 <sup>(1)</sup>				
4.4	Weld Bond Tensile Strength		3 <sup>(5)</sup>			7 <sup>(5)</sup>
4.4 <sup>(3)</sup>	Weld Bond Tensile Strength (same test "4.4" but performed on incorrectly made samples)			3		
4.5	Weld Bond Peel Strength		3 <sup>(5)</sup>		3	
4.6	Thermal Shock Conditioning					4
4.7	Electrical Resistance Measurement					3, 5

**NOTES:**

- <sup>(1)</sup> Perform measurement of weld attribute dimensions on both samples. Separate sample group after measurement using one sample for photographs and cross-section analysis and save the other part as a representative sample.
- <sup>(2)</sup> If tensile or peel test is of a configuration at risk to fail requirements due to a low cable tensile strength (this is seen occasionally on small wire sizes with annealed copper strands), doubling the sample size is recommended. If the test fails, the extra samples can have a reinforcement added to the weld area (such as by adding dual-wall heat shrink) and then retested per section 4.4.
- <sup>(3)</sup> Samples intentionally made with worst-case wire orientation in the welding fixture are required for this test. Use samples with the biggest wire intentionally located on the anvil side of the ultrasonic tooling. All process tooling and settings are to be the same as for typical samples. Clearly identify samples as having "worst-case wire orientation for Group C."
- <sup>(4)</sup> Prepare 13 samples. Ten samples are for measurement and three are for an electrical resistance "deduct" reference. Construct the three reference samples by soldering the weld nugget to eliminate weld resistance.
- <sup>(5)</sup> Pick the applicable test for step 3 based on the application: "Weld Bond Tensile Strength" is the default test. If "Weld Bond Tensile Strength" test of the smallest wire is not possible due to WUT being a "butt splice" configuration, replace test 4.4 with test 4.5 (Weld Bond Peel Strength).

~~<sup>(6)</sup> Skip test path D for "Butt splice" type samples. They are not subjected to tensile stresses.~~

**(6) Peel and pull test do not apply to all splices. Omit Test path D for straight one-to-one splices (where no peel condition exists) and omit test paths B and C for butt splices (where no tensile conditions exist). See below:**



Omit Test path B and C on this splice configuration



Omit Test path D on this splice configuration