

Feb. 1, 2021

Subject: Change to SAE/USCAR-44 Rev. 1 (Revision letter #1)

A new section is being added to the USCAR-44 specification that describes “Clip-to-slot insertion and retention force.” It is being placed in a new section, 5.12. The intent is to add a test of the connector retention of a clip (and make it possible without having the connector available. This test method is an adaption of the existing connector clip validation procedure, USCAR-2 Section 5.4.5, “Miscellaneous Component Engage/Disengage Force.” Comments and/or questions can be addressed to EWCAP@uscar.org.

5.12 Clip-to-slot insertion and retention force

5.12.1 Purpose

This test is conducted to ensure that the design of the clip under test meets needed insertion and retention force requirements. This test method is an adaption of the connector clip slot validation procedure for connectors, USCAR-2 Section 5.4.5, “Miscellaneous Component Engage/Disengage Force.” The intent is to have the same test and requirements as the connector test but allow fixtures for the benefit of the clip makers.

5.12.2 Equipment

1. Force tester, with peak reading feature.
2. Steel fixture built to the nominal dimension of the intended clip slot (as shown in Figure 5.12.2).

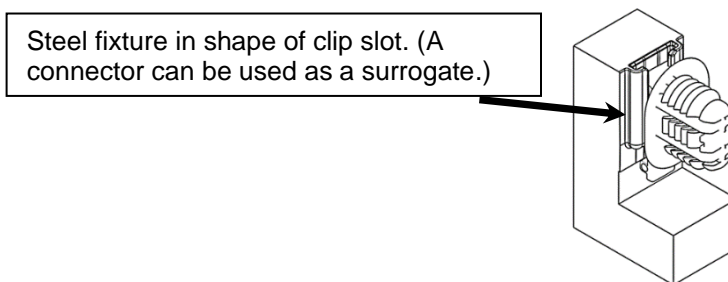


Figure 5.12.2: Steel fixture example showing clip slot

5.12.3 Procedure

1. Perform both A and B on a minimum of 10 samples. The same sample may be used for the A and B test.

A. ENGAGEMENT FORCE

1. Identify and number each component to be tested.
2. Secure the fixture that represents the clip slot.
3. Engage each component to be tested at 50 ± 5 mm/min. as shown in Figure 5.12.3A. Assure that proper alignment is maintained during testing. (Straight-in engagement and extraction are critical to avoid side loads and binding which can affect force measurements.)
4. Record the force required to engage the clip into the slot.

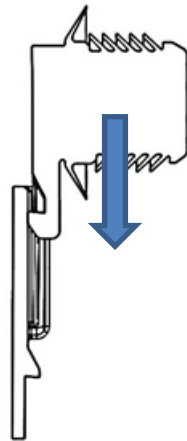


Figure 5.12.3A: Insertion to fixture example

B. DISENGAGING FORCE

1. With the component fully installed and properly fixtured as shown in Figure 5.12.3B, disengage the component in the direction opposite to the direction of normal insertion of the part, at a rate not to exceed 50 mm/min. The force must be applied parallel to the centerline of the component being tested to avoid side loads and binding, which can affect force measurements.

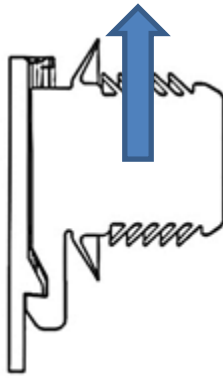


Figure 5.12.3B: Removal from fixture example

2. Record the force to disengage the clip from its mating slot.
3. On one sample, repeat Steps 1 and 2 in the 90° orthogonal direction (straight up) as shown in Figure 5.12.3C. Stop the test when 110N is met. A new or reused sample may be used.

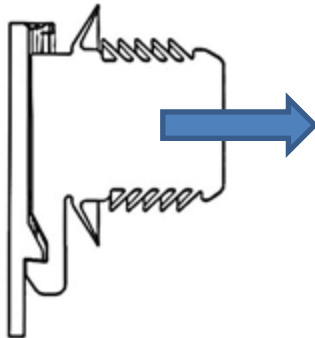


Figure 5.12.3C: Removal from fixture example in orthogonal direction

5.12.4 Acceptance Criteria

- Insertion force shall be $\leq 60\text{N}$
- Retention force shall be:
 - 110 min. for slots with nominal width $\leq 11\text{mm}$.
 - 165N min. for slots with nominal width $> 11\text{mm}$.
- No part damage or release from the clip slot shall result from application of the 110N force in the 90° (orthogonal) direction.

NOTE: Since a steel fixture may not simulate the flexibility of a connector, a separate test using the intended connector may be requested by customer.