

USB Type-C ENGINEERING CHANGE NOTICE

Title: ECN Wrenching test

Applied to: USB Type-C Specification Release 1.0, August 11, 2014

Brief description of the functional changes:

Update the wrenching test to apply to the plug only and provide a maximum wrenching strength mechanical failure requirement for the plug.

Benefits as a result of the changes:

Integrators are provided plug strength limits for enclosure design.

An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
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No impact. Numbers and performance requirements are based on measurements made on existing samples of the Type-C connector system.
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An analysis of the hardware implications:
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None. Minimum performance requirements have not changed from the original values and the maximum limit is approximately 20% higher than failures of existing samples.

An analysis of the software implications:
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N/A.

An analysis of the compliance testing implications:
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Compliance test to be updated to reflect these changes.

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Actual Change

(a). Section 3.2.1, note 7 updated per approved ECR, Pages 26-27

From Text (as updated per approved ECR):

7. This specification defines the USB Type-C receptacle shell length (6.20 ± 0.02 mm) as a reference dimension. The receptacle shell length of 6.2 mm provides proper mechanical and electrical mating of the plug to the receptacle in addition to providing both the plug and receptacle a defined configuration to design to for the wrenching and contact mating requirements. The effective shell length of the USB Type-C receptacle at the system level shall be implemented such that the Type-C receptacle connector mounted in the associated system hardware shall pass all applicable electrical and mechanical compliance tests and shall not cause a compliant Type-C plug connector to fail the wrenching test if it passes the wrenching test with a second receptacle connector having the reference shell length.

To Text:

7. This specification defines the USB Type-C receptacle shell length (6.20 ± 0.02 mm) as a reference dimension. The receptacle shell length of 6.2 mm provides proper mechanical and electrical mating of the plug to the receptacle in addition to providing both the plug and receptacle a defined configuration to design to for the wrenching and contact mating requirements. The USB Type-C receptacle at the system level should be implemented such that the Type-C receptacle connector mounted in the associated system hardware has an effective shell length equal to the reference dimension.

(b). Section 3.8.1.7, Page 93

From Text:

3.8.1.7 Wrenching Strength

The wrenching strength test shall be performed using virgin parts. Perpendicular forces (F_p) are applied to a plug when inserted at a distance (L) of 15 mm from the edge of the receptacle. These forces shall be applied in all four directions (i.e., left, right, up, and down). Compliant connectors shall meet the following force thresholds:

- No plug or receptacle damage shall occur when a force of 0-50 N is applied
- The plug may be damaged, but only in such a way that the receptacle does not sustain damage when a force of 50-75 N is applied.
- The plug shall be mated with a different receptacle after the forces are applied to verify no damage has occurred that causes discontinuity or shorting.

A plug should be tested with a full shell receptacle compliant with the receptacle dimensions shown in Figure 3-1.

A receptacle should be tested with a cable assembly having a plug compliant with the dimensions shown in Figure 3-3.

To Text:

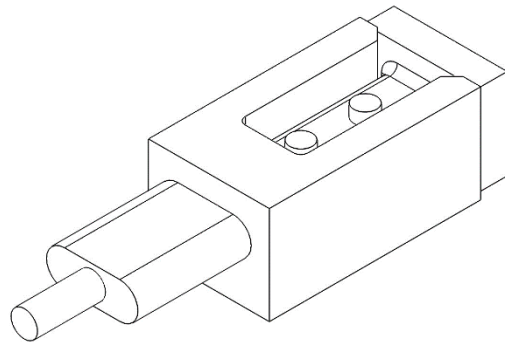
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3.8.1.7 Wrenching Strength

Type-C plugs shall be tested using the mechanical wrenching test fixture defined in the Universal Serial Bus Type-C Connectors and Cable Assemblies Compliance Document. Perpendicular moments are applied to the plug for a period of at least 10 seconds when inserted in the test fixture to achieve the defined moments in four directions of up or down (i.e., perpendicular to the long axis of the plug opening) and left or right (i.e., in the plane of the plug opening). Compliant connectors shall meet the following force thresholds:

- No plug mechanical damage when a moment of 0-0.75 Nm (e.g., 50 N at 15 mm from the edge of the receptacle) is applied to a plug inserted in the test fixture in each of the four directions. A single plug shall be used for this test. The plug shall be mated with the continuity test fixture after the test forces have been applied to verify no damage has occurred that causes discontinuity or shorting.
- The plug shall disengage from the test fixture or mechanically fail (i.e., deforms to non-compliance with Figure 3-3 or Figure 3-9, as applicable or sustain an obviously visible change in the shell orientation with respect to the overmold) when a moment of 2.0 Nm is applied to the plug in the up and down directions and a moment 3.5 Nm is applied to the plug in the left and right directions. A new plug is required for each test direction.

Figure 3-1 View of Wrenching Strength Test with Cable in Fixture



(This is a new figure and number.)