

USB Type-C ENGINEERING CHANGE NOTICE

Title: Wrenching Strength

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

Brief description of the functional changes:

Update the wrenching strength test to apply to plug components without overmold (including PCB-mount plugs) and finished cable assemblies.
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Benefits as a result of the changes:

Provides for certification of plugs without overmold to be supplied for use in cable assemblies, provides for testing of finished cable assemblies to ensure adequate strength of the overmold, and provides for a standard method to test plugs that are mounted to a PCB without testing at the final product level.
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An assessment of the impact to the existing revision and systems that currently conform to the USB specification:
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N/A

An analysis of the hardware implications:
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N/A

An analysis of the software implications:
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N/A

An analysis of the compliance testing implications:
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Requires the supplier to provide a test fixture for testing of plugs without overmold or plugs that are mounted to a PCB. These changes are already reflected in the compliance specification.
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USB Type-C ENGINEERING CHANGE NOTICE

Actual Change

(a). Section 3.8.1.7, Page 95 - 97

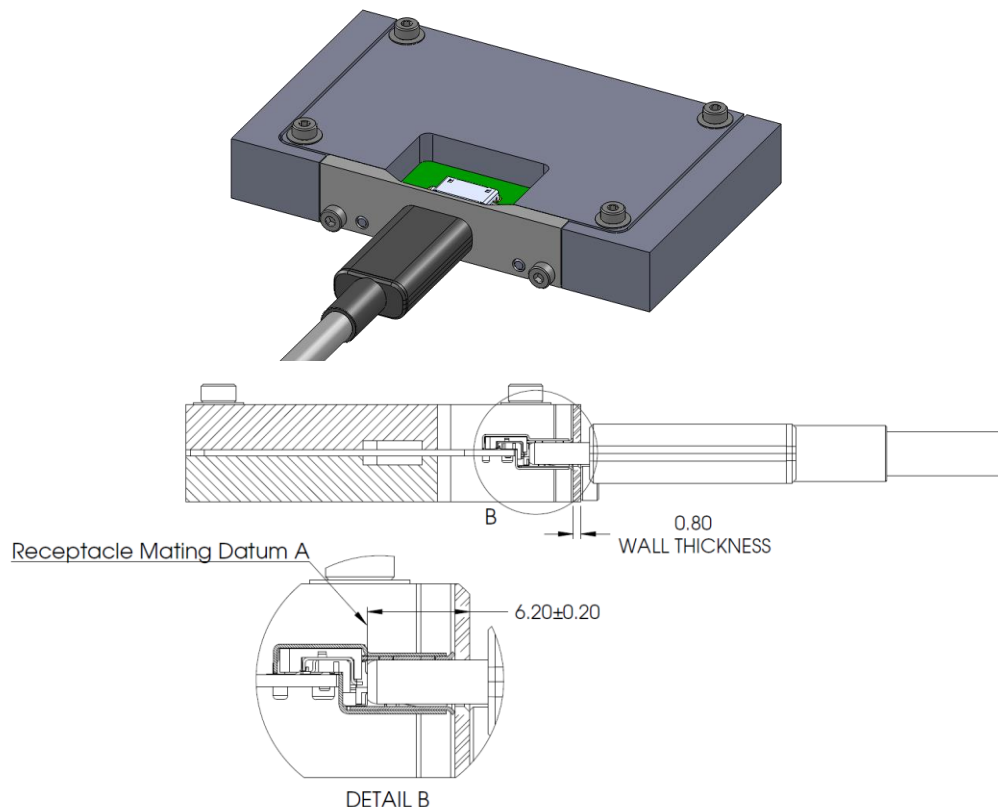
From Text:

10.1.1.1 Wrenching Strength

USB 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 with a 5 mm ball tipped probe 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:

- 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. Some mechanical deformation may occur. 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 continuity test fixture shall provide a planar surface on the mating side located 6.20 ± 0.20 mm from the receptacle Datum A, perpendicular to the direction of insertion. No moment forces are applied to the plug during this continuity test. **Error! Reference source not found.** illustrates an example continuity test fixture to perform the continuity test. The Dielectric Withstanding Voltage test shall be conducted after the continuity test to verify plug compliance.

Figure Error! No text of specified style in document.-1 Reference Wrenching Strength Continuity Test Fixture



USB Type-C ENGINEERING CHANGE NOTICE

- The plug shall disengage from the test fixture or demonstrate mechanical failure (i.e., the force applied during the test procedure peaks and drops off) 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 of the four test directions. An example of the mechanical failure point and an illustration of the wrenching test fixture are shown in Figure Error! No text of specified style in document.-2 and Figure Error! No text of specified style in document.-3, respectively.

Figure Error! No text of specified style in document.-2 Example of Wrenching Strength Test Mechanical Failure Point

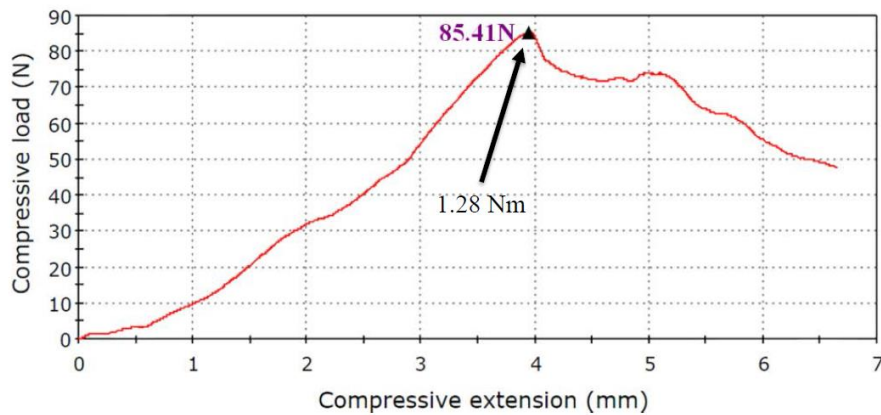
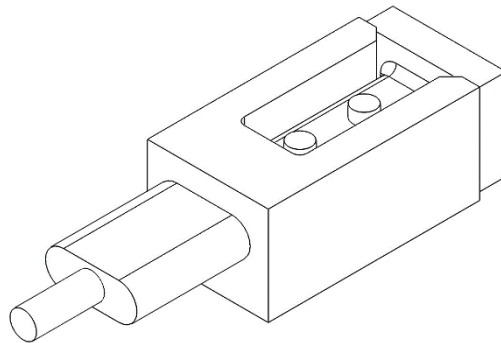


Figure Error! No text of specified style in document.-3 Wrenching Strength Test with Cable in Fixture



USB Type-C ENGINEERING CHANGE NOTICE

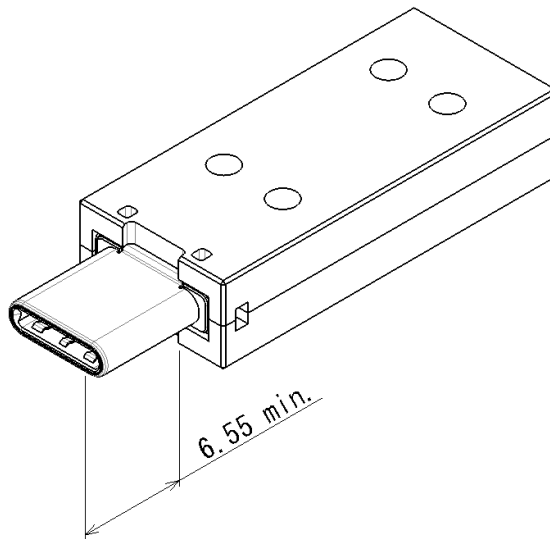
To Text:

10.1.1.2 Wrenching Strength

USB Type-C plugs on cable assemblies and fixture plugs without overmold (including PCB-mount 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. For plug without overmold, the supplier shall provide a plug test fixture that conforms to the specified plug overmold dimensions for the Type-C plug. See Figure 3-61. The fixture may be metal or other suitable material. Perpendicular moments are applied to the plug with a 5 mm ball tipped probe 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:

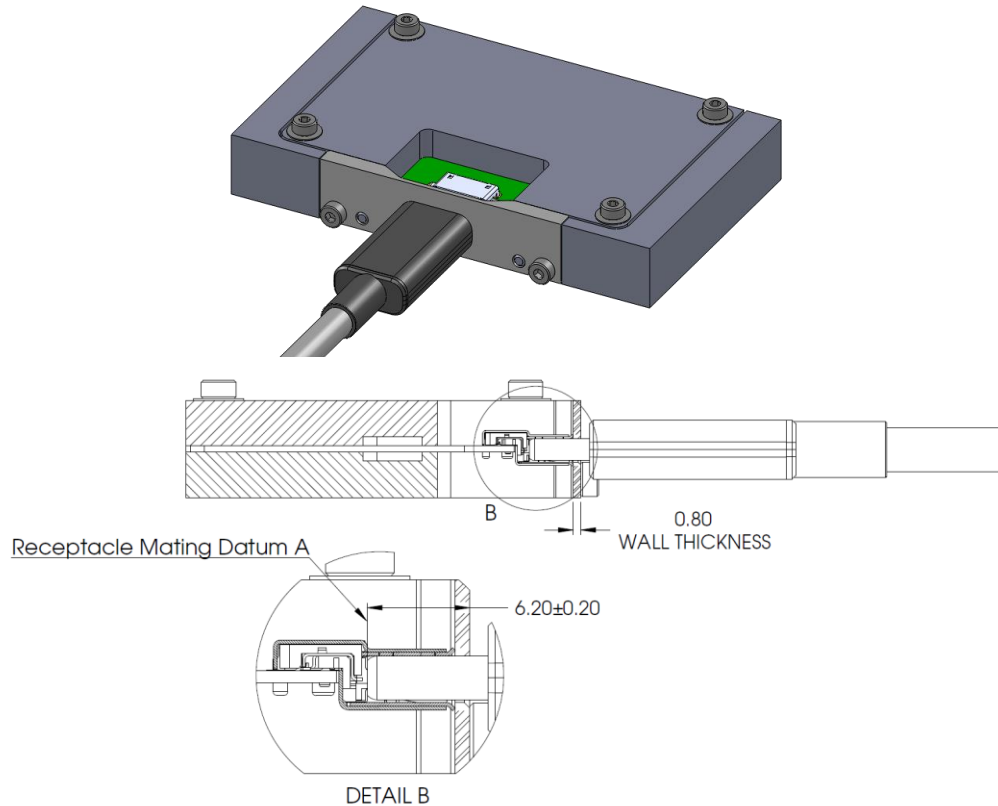
- A moment of 0-0.75 Nm (e.g., 50 N at 15 mm from the edge of the receptacle) is applied to a plug inserted in the test fixture in each of the four directions. A single plug shall be used for this test. Some mechanical deformation may occur. The plug shall be mated with the continuity test fixture after the test forces have been applied to verify no damage has occurred that causes discontinuity or shorting. The continuity test fixture shall provide a planar surface on the mating side located 6.20 ± 0.20 mm from the receptacle Datum A, perpendicular to the direction of insertion. No moment forces are applied to the plug during this continuity test. **Error! Reference source not found.** illustrates an example continuity test fixture to perform the continuity test. The Dielectric Withstanding Voltage test shall be conducted after the continuity test to verify plug compliance.

Figure Error! No text of specified style in document.-4 Example Wrenching Strength Test Fixture for Plugs Without Overmold



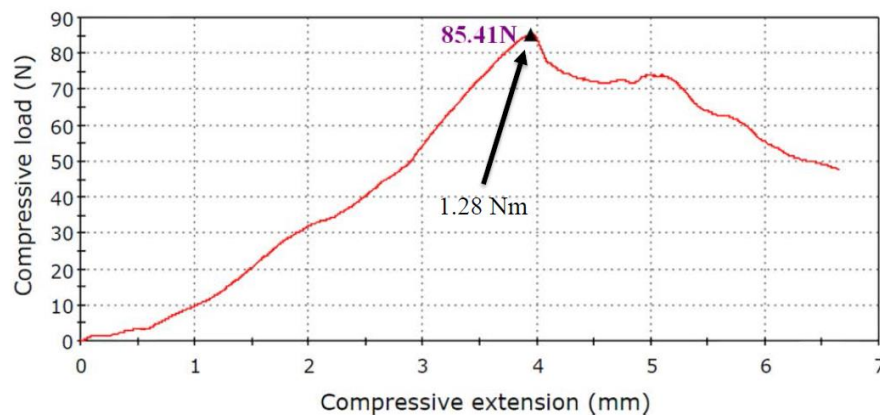
USB Type-C ENGINEERING CHANGE NOTICE

Figure ~~3-613-62~~ Reference Wrenching Strength Continuity Test Fixture



- The plug shall disengage from the test fixture or demonstrate mechanical failure (i.e., the force applied during the test procedure peaks and drops off) 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 of the four test directions. An example of the mechanical failure point and an illustration of the wrenching test fixture are shown in Figure **Error! No text of specified style in document.-2** and Figure **Error! No text of specified style in document.-3**, respectively.

Figure ~~3-623-63~~ Example of Wrenching Strength Test Mechanical Failure Point



USB Type-C ENGINEERING CHANGE NOTICE

Figure ~~3-633-64~~ Wrenching Strength Test with Cable in Fixture

