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ENGINEERING COMMITTEE
Interface Practices Subcommittee

SCTE STANDARD

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**Torque Requirements for Bond Wire
Penetration of Bonding Set Screw**

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1. Introduction

1.1. Scope

This test procedure will determine the torque required for a bonding fastener to penetrate a bonding wire to the appropriate depth. Bonding wire penetration should be 25 +/-1% of wire diameter.

1.2. Benefits

Proper attachment of the bonding wire to the bonding block will eliminate:

- High resistance junction that will mitigate the ground between the cable system and the electrical grid.
- Excessive wire penetration that could lead to loss of the ground connection.

2. Normative References

2.1. SCTE References

- ANSI/SCTE 129 2017, Drop Passives: Bonding Blocks (Without Surge Protection)

2.2. Standards from Other Organizations

- No normative references are applicable.

2.3. Published Materials

- No normative references are applicable.

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4. Abbreviations and Definitions

4.1. Abbreviations

mm	millimeter
ASTM	ASTM International
AWG	American Wire Gauge
SCTE	Society of Cable Telecommunications Engineers

4.2. Definitions

pitch	Pitch is the distance between adjacent threads
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5. Test Equipment

- Wright Tools Torque Wrench model 2471 or equivalent
- Square drive socket to fit bonding screw heads

6. Test Samples

- 6 ea. drop bonding blocks (3 different manufacturers)
- 6 ea. subscriber splitters (3 different manufacturers)
- Bonding wire: 12 each 4 inch long pieces of 6 awg, 10 awg, 12 awg and 14 awg bare copper wire that has been manufactured in accordance to ASTM B3 - 01.

7. Test Method

1. Mount unit under test in a vice or attach unit to a stationary object using screws and holes built into product for said purpose.
2. Using torque wrench and an appropriately sized socket, slowly tighten screw onto bonding wire, contacting firmly but not penetrating the wire.
3. Tighten screw, depending on wire diameter and screw thread, by the rotation angle noted below. This rotation corresponds to 25 +/-1% wire penetration.
 - a. For 32 threads per inch or 0.8mm pitch bonding screws:
 - i. 6 AWG wire: 470°, 10 AWG wire: 300°, 12 AWG wire: 230°, 14 AWG wire: 180°
 - b. For 24 threads per inch or 1.0mm pitch bonding screws:
 - i. 6 AWG wire: 360°, 10 AWG wire: 230°, 12 AWG wire: 180°, 14 AWG wire: 140°
4. Note the torque just as the rotation limit is reached, and record. Repeat for all samples.

8. Measurements And Calculations

8.1. Bond wire typical diameters:

<u>Type</u>		<u>O.D. (TYPICAL)</u>
6 AWG	=	.1610"
10 AWG	=	.1050"
12 AWG	=	.0800"
14 AWG	=	.0635"

8.2. Penetration of 25 +/-1%

<u>Wire Size</u>	<u>O.D.</u>	<u>25% Penetration</u>	<u>24% to 26% penetration</u>
6 AWG	.1610"	.040"	.038 to .041"
10 AWG	.1050"	.026"	.025 to .027"
12 AWG	.0800"	.020"	.019 to .021"
14 AWG	.0635"	.0158"	.015 to .0165"

9. Test Results

Sample #	Torque at end of rotation