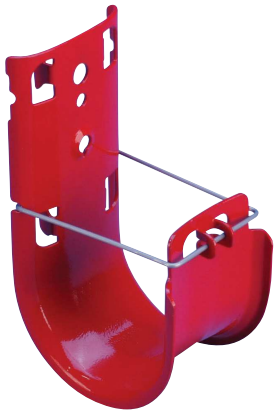
BEND RADIUS OVERVIEW REFERENCE SHEET



WHAT IS BEND RADIUS? WHY IS IT IMPORTANT?

During installation, cables are bent or flexed in order to accommodate various environmental conditions such as getting around obstacles and making elevation or directional changes. Minimum bend radius refers to the smallest radius the cable is allowed to be bent without degrading performance. Depending on cable types and industry standards, minimum cable bend radius varies. However, it can typically be calculated by using the following formula: (Minimum bend radius = cable outer diameter x cable multiplier)

ANSI/TIA 568.0-D for Generic Telecommunications Cabling requires a minimum bend radius of 4 times the cable diameter for 4-pair balanced twisted-pair cable during and after installation. So for a typical CAT 6A cable (about ¼" diameter), bend radius for appropriate cable supports such as a J-Hook need to be at least 1". This standard is meant to ensure quality performance and connectivity, support technological innovation, and provide superior, globally accepted products.

WHAT HAPPENS WITHOUT PROPER BEND RADIUS?

There are various implications of not complying with standards, including the bend radius. Cable manufacturers generally require a proper bend radius and do not like recommend cables being supported by non-continuous supports that cause indents and creases in the cable jacket. Such indents or creases may affect cable performance, or in worse situations the cables can be damaged while being pulled during installation, especially if there is a directional change of the cable bundle.

WHAT ARE MANUFACTURERS SAYING?

According to LEVITON, in their CAT 6A Reference Guide*, "To maintain CAT 6A performance, minimum bend radius should exceed 4x OD for UTP and shielded cable.."

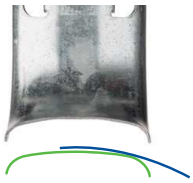
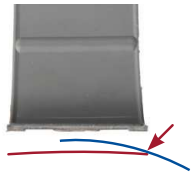
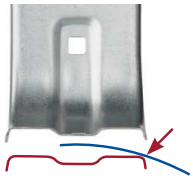
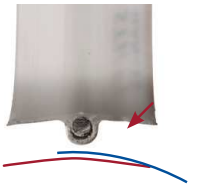
Another manufacturer, Superior Essex, makes a note in their Technical Guideline*, that states "when planning the route, be sure to: avoid any other possible hazards such as pinch points, sharp angles, heat sources, etc (all cables). The minimum cable bend radius must be maintained throughout the cable route."

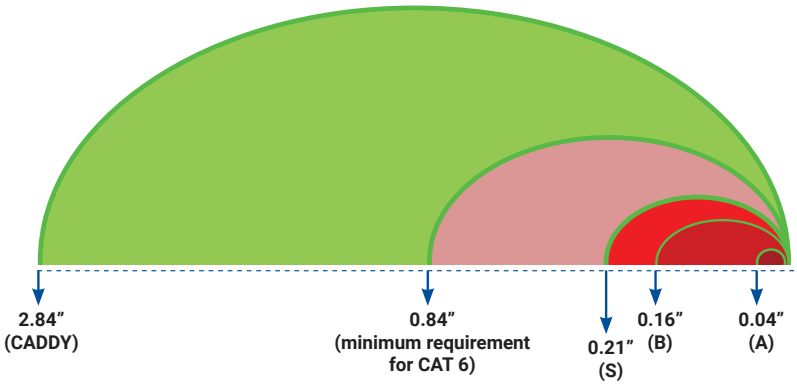
WHAT IS THE BEST SOLUTION?

Not all non-continuous cable supports provide the proper bend radius, so it is important to make sure your data infrastructure includes supports that have the proper bend radius. In order to determine which non-continuous cable supports offer the proper bend radius, multiple tests have been conducted on various manufacturer's products. Please refer to the chart on the next page for reference.

* Superior Essex. (2014). **Technical Guideline: TG02 Rev.10**. SuperiorEssex.com.
* Leviton. (2010). **CAT6A Reference Guide**. Leviton.com/networksolutions.

COMPETITIVE COMPARISON

BRAND	TEST 1 RESULTS	COMPLY WITH TIA
nVent CADDY	 	YES 2.84”
A	 	NO 0.04”
B		NO 0.16”
S	 Typical deformation caused by non-compliant J-hooks	NO 0.21”



*Mitutoyo Contracer C-3000. Content © Mitutoyo (UK) Ltd 2012.

- Indicates Pinch Points
- 0.84” Radius (minimum requirement for CAT 6)
- Competitor J-Hook Trace Line
- CADDY Cat HP J-Hook Trace Line

TEST 1

In order to find out how manufacturers measured up in bend radius, an installation test was conducted with 60 CAT6 cables in horizontal to vertical configuration. The cables were supported by J-hooks in 5-foot spacing and 1 foot sag, left in position for 24 hours. The cables were then offset from the J-Hook in order to examine the cable jackets for deformation. The results are shown in the table to the left.

TEST 2

To calculate an actual bend radius reading, a *Mitutoyo Contracer C-3000 machine was utilized in order to obtain a cross-section profile from different manufacturers supports. The equipment also provides bend radius readings once trace lines are available. nVent CADDY Cat HP J-Hook System is the only J-Hook that provides proper bend radius (greater than 4x cable diameter per TIA 568.0-D)

CABLE	DIAMETER	*REQUIRED BEND RADIUS
CAT 5e	0.20”	0.8”
CAT 6	0.21”	0.84”
CAT 6A	0.27”	1.08”

*Required bend radius per TIA 568.0-D.

Our powerful portfolio of brands:

CADDY ERICO HOFFMAN RAYCHEM SCHROFF TRACER