



## Rapid Ring™ UL Testing

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A Cooper B-Line Case Study

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The current edition of Underwriters Laboratories Inc. standard UL 514A, Metallic Outlet Boxes, does not address the use of adjustable mud rings in electrical device installations. In an effort to create a performance standard to which adjustable mud rings can be certified to, a Certification Requirement Decision (CRD) was created by UL. This CRD allows products to be tested and certified by a 3<sup>rd</sup>-party testing agency and used in applications requiring a UL 514A Listed product.

In recognition that the CRD did not include requirements to address the innovative functionality of the Rapid Ring™, Cooper B-Line's engineers worked extensively with Underwriters Laboratories Inc. to develop and add rigorous test requirements into the CRD.

The added requirements to the CRD included addressing issues such as assembly of the Rapid Ring's™ sleeve to the box plate. The CRD was modified to ensure that the Rapid Ring™ is secure enough to prevent the device from pulling out of the electrical box, such as when an electrical cord is unplugged from a receptacle. Related concerns of the amount of push-in force required to install the Rapid Ring to prevent damage to the brackets installed behind the drywall were also addressed. A preferred test method was created limiting the maximum force required to insert the sleeve to 45 lbf and requiring that the sleeve hold a minimum of 25 lbf once engaged. Additionally, a cycling test was created to verify a secure installation and proper grounding. To represent electrical plug insertions and removals, the related test method has one cycle being defined as a push-in force of 15 lbf immediately followed by a pull-out force of 15 lbf. Single-gang assemblies must endure a minimum of 1000 cycles, and multiple-gang assemblies must withstand a minimum of 500 cycles at each device position with no movement allowed.

Maintaining sufficient clearance at the back of the electrical box was addressed by UL with additional requirements. When Rapid Ring™ is installed on a ½-inch thick wall surface, there must be a minimum of 1-inch of clearance between the innermost edge of the sleeve and the bottom of the inside of the electrical box.

Further requirements were added to measure resistance after exposure to a corrosive environment. Test methods include measuring the electrical resistance of assembled Rapid Ring™ samples before they are placed in a salt spray environment. After 72 hours in the salt spray environment, the samples were removed and electrical resistance measured again. The before and after measurements were compared to ensure that the corrosion had not increased the electrical resistance beyond an acceptable limit.

Additionally, the Rapid Ring™ assemblies were tested to verify that they can safely carry elevated current levels for extended periods of time after being subjected to the corrosion and push-in/pull-out cycle tests. After the previously mentioned tests are performed, Rapid Ring™ assembly samples are subjected to a current test of 1530A passed through the sample for 6 seconds. Finally, the sample was checked to verify that electrical continuity is maintained between the Rapid Ring™ assembly and the electrical box.

In summary, through partnership and careful evaluation, UL and Cooper B-Line were able to effectively define, measure, and test the Rapid Ring™ product. Through this rigorous process, Rapid Ring™ has

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been listed to the Underwriters Laboratories Inc. UL 514A standard for 1-gang, 2-gang, 3-gang, 4-gang, and extender product offerings.

For further information regarding Rapid Ring™ please visit [www.blineRapidRing.com](http://www.blineRapidRing.com).