

### **Lead-plated brass and stainless steel hardware (bolts and nuts) for battery installations**

Traditionally, C&D used lead-plated brass hardware on solid lead posts to match cold flow characteristics. By keeping the contact material the same to make connections, we would minimize increase in intercell connection resistance. Subsequent testing has shown that there is no significant difference in resistance change between the uses of stainless steel versus lead-plated brass hardware. For both cases, the connectors continued to be lead-plated copper.

In the 1970s, Bell Labs specified the use of stainless steel hardware as standard for use with the solid lead posts on the Round Cells. Compared to lead-plated brass, the stainless steel hardware is stronger and provides extra protection against “stripping” of bolts by accidental over-torquing. The stainless steel bolts can withstand numerous bolting / unbolting, which may occur during regular maintenance. In addition, when stainless steel bolts are used with copper inserted posts, it is possible to torque to a higher level thus reducing the need to retorque as a maintenance measure. The solid lead posts use lower torque values (when making connections) to avoid distorting the posts.

Many customers continue to request lead-plated brass hardware because of their existing specification. C&D offers the 1/4-20 brass bolt with cast-on head and brass-inserted cast lead nut with flag terminals on smaller batteries. The 5/16-18 brass studs and lead cap nuts are offered on solid lead posts. The batteries with copper-inserted posts, which are usually found on large UPS and Switchgear batteries with high-rate current demands, always use stainless steel bolt assemblies.

Regardless of which hardware is used, initial cleaning, surface preparation, and correct torque values establish the lowest possible resistance between posts and intercell connectors. It is highly recommended that the specified torque values and connection methods (see C&D’s Installation and Operating Instructions RS-1476) be used when servicing the battery connections, as over-torquing will distort lead posts.