



**Engineered
Materials Solutions**

Wickeder Group

Clad Battery Materials

The widest range of clad metals, from the company that developed the technology

Clad metals have been used to make better batteries for more than 35 years and the cold roll bonding process that made this possible was developed by Engineered Materials Solutions.

We have worked closely for many years with the design, manufacturing, and quality teams of the world's leading battery producers to help create a more powerful, corrosion resistant, higher quality, and more cost effective battery. Our clad metal systems are designed to improve functionality and reduce costs.

By joining two or more dissimilar metals or alloys through our roll bonding process, it produces a metallurgical bond at the atomic level. Their combined characteristics can be tailored to match virtually any need of a specific product design.

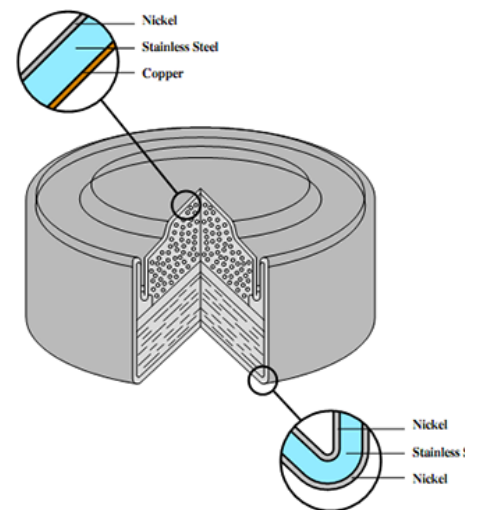
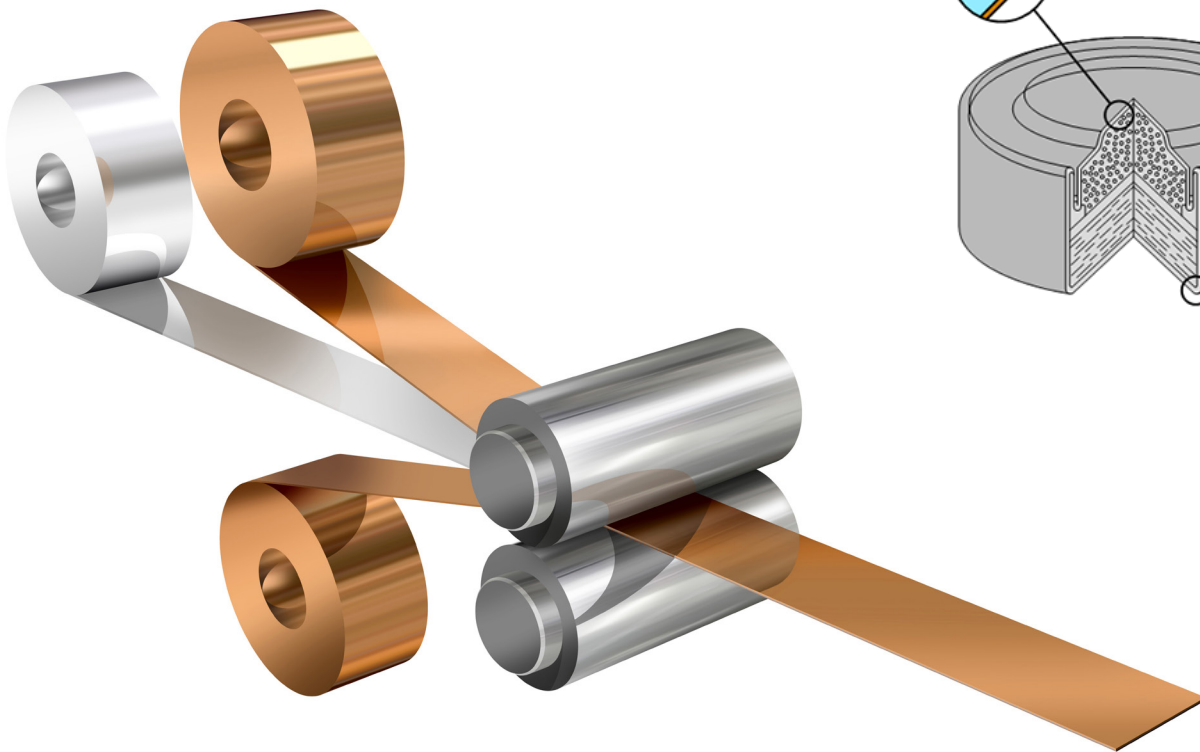
We have produced thousands of clad metal combinations and welcome the opportunity to put our fabrication and materials experience to work on your battery design.

We are the Industry Standard

Clad metal battery materials were developed by Engineered Materials Solutions (then part of Texas Instruments) in the 1970's. The use of clad metals overcame mechanical, chemical, handling, appearance and cost difficulties inherent in single metal packaging systems. Since their introduction, clad metals have become the industry standard and are used by major battery manufacturers around the world.

Roll Bonding of Clad Metals

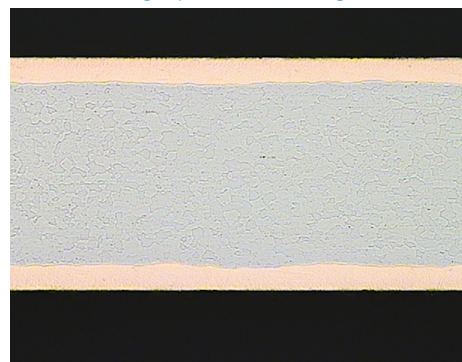
Do what you thought you couldn't



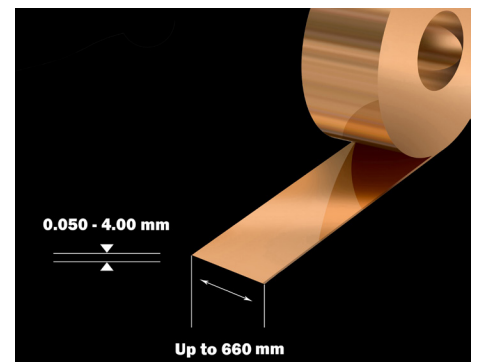
Copper Stainless Steel Copper



Photomicrograph of metallurgical bond



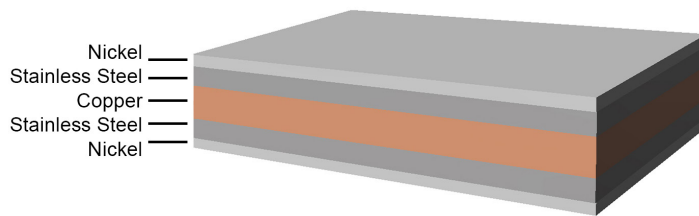
Clad coil dimensions



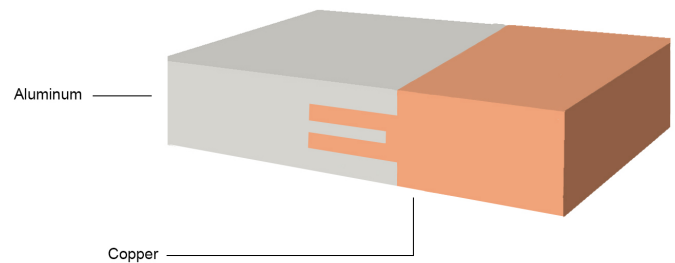
Clad Metal System Functional Advantages

- Improved joining integrity
- Higher conductivity
- Increased corrosion resistance
- More effective thermal management
- Enhanced physical properties
- Better oxidation resistance
- Reduced weight
- Improved process efficiency
- Reduced environmental risk

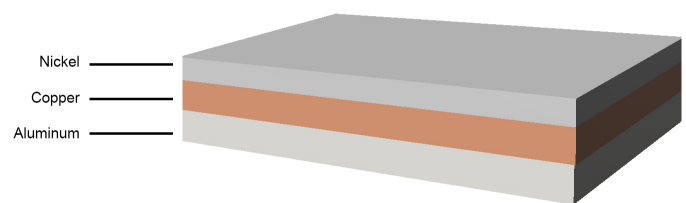
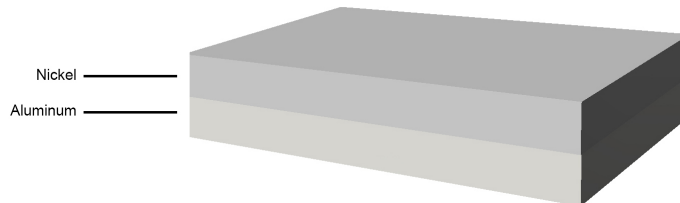
SIGMACLAD®



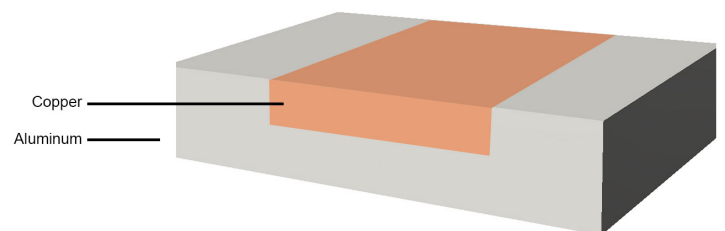
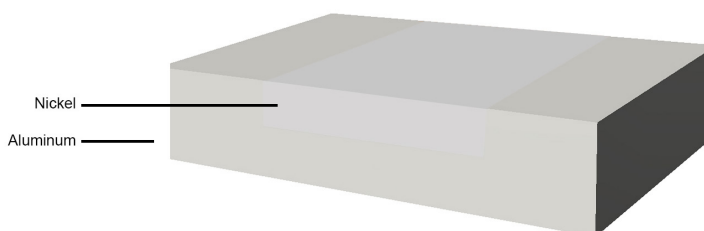
CoreLok®



Overlay Clad



Inlay Clad



www.emsclad.com



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