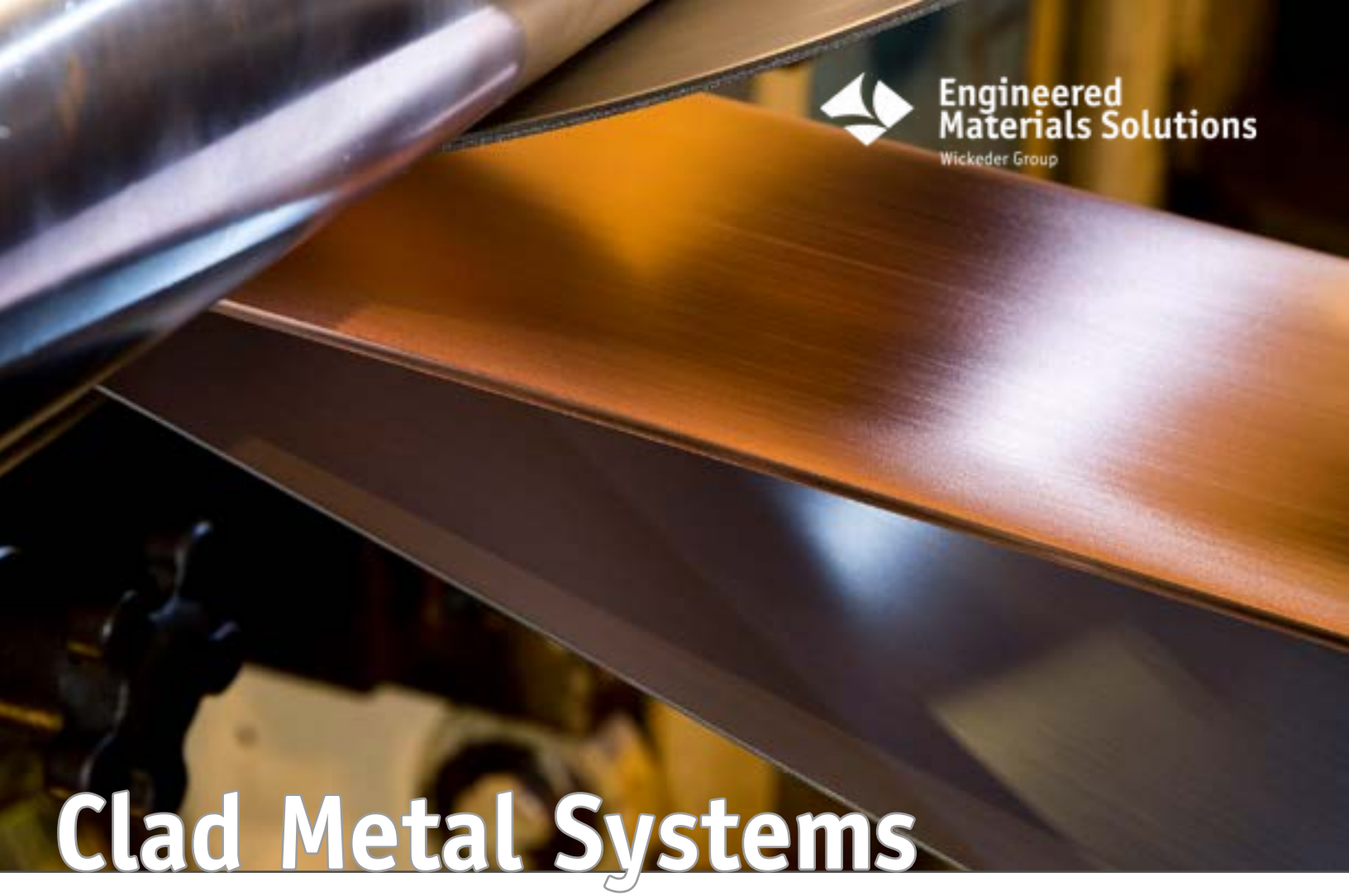

Clad Metal Systems

Open the Doors of Design to an Exciting New World of Possibilities

Design possibilities would be endless if there were one metal that provided all the characteristics we needed. However, the reality is there are many limitations to what one metal can provide.

Clad Materials can uniquely match any requirement of a specific product design, allowing design engineers to have their concepts realized. But, what are Clad Materials?

Cladding is a process in which a minimum of two different types of metal are joined to form an inseparable "laminated" material. Thanks to the remarkable adaptability afforded to us by the process of cold-rolled cladding – a process which was largely developed when we were the clad metals operation of Texas Instruments – it is possible to combine a significant variety of metals in a way that opens the doors of design to an exciting new world of possibilities.

This roll bonding and thermal treatment process produces a metallurgical bond as the lattice structures of the metals are forced into conformance with each other. High pressure causes a sharing of electrons at the interface, which produces a bond on the atomic level. No intermediate layers such as adhesives or braze metal are involved.

No matter what design limitations you've faced in the past, it is possible to gain a competitive edge with clad.

Advantages

- Improved thermal management
- Higher conductivity
- Increased corrosion resistance
- Enhanced physical properties
- Better oxidation resistance
- Reduced weight
- Improved process efficiency and yeilds
- Reduced environmental risk
- Improved joining integrity
- Lower costs

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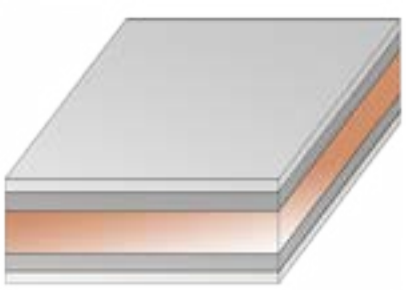

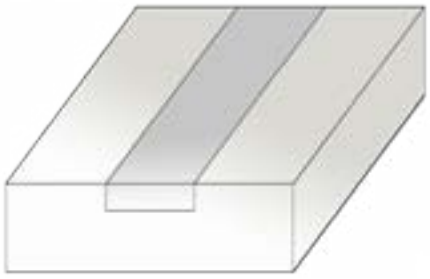

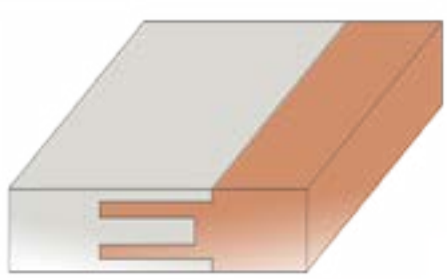

Overlay Clad

Clad metals use one material on the surface (for corrosion resistance, weldability or other benefits) and a different material in the core to create unique properties. Some examples include light weight with corrosion resistant surfaces or high thermal conductivity with good welding properties.

With hundreds of metal combinations available, overlay cladding allows material designers the freedom to create clads with a wide range of properties that are not found in mono-metals or alloys.

Inlay Clad

Clad metal inlays feature one or more metal strips bonded (or inlaid) into a base metal strip. This approach provides flexibility allowing the designer to incorporate diverse properties, such as weldability, corrosion resistance, and conductivity, at different locations. It can also reduce cost by positioning more expensive metals only where they are needed.

The inlay material can be positioned along the edges of the strip, displaced away from the edges, or placed on both the top and bottom sides of the strip.

Edge Clad

Some metals cannot be joined reliably by traditional welding processes. Edge cladding creates a strong reliable joint that can be used in a variety of applications.

Our "CoreLok" joint provides not only good mechanical strength, but also good electrical and thermal performance.

We can also create unique edge clad solutions for specific customer applications and needs.

Cold-roll Bonding Combinations

	Al	Ni	Cu	Brass / Bronze	Carbon Steel	Stainless Steel	Ni-Fe Alloys	Ti
Aluminum	■	□	■	■	■	■	■	■
Nickel	□	□	■	■	■	■	■	■
Copper	■	■	□	□	■	■	■	■
Brass / Bronze	□	■	□	□	■	■	■	□
Carbon Steel	■	■	■	■	□	■	■	■
Stainless Steel	■	■	■	■	■	■	■	□
Ni-Fe Alloys	■	■	■	■	■	■	□	□
Titanium	■	■	■	□	■	□	□	□

■ - Cold-roll bonding of these materials can be done on a commercial scale.

□ - Cold-roll bonding of these materials requires development.

(1) - EMS also has hot bonding capability to join Stainless Steel and Aluminum.

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