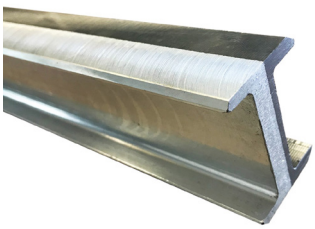
Strong Bimetal Pieces & Hybrid Parts to Power the Modern World



It may come as no surprise that metals are at the heart of powering and sustaining our modern, industrial world.

One such NobelClad solution is delivering for the marine, railway, road transport, precision and high technologies—transition joints. These composite inserts make it possible to permanently join dissimilar metals in structural, electrical and piping designs.

Transition Joints: Endless 'Solid-State' Solutions

When joining dissimilar metals that cannot otherwise be combined by fusion welding, like aluminum and steel, NobelClad uses a 'solid-state' welding process to join them, creating a transition joint with an extremely strong metallurgical bond.

These bimetal joints can be welded – on either side – by conventional techniques, so fabricators do not need to invest in additional training or equipment to use transition joints in challenging applications.

Industries are turning to transition joints because they open a world of possibilities with alloy metals without sacrificing application reliability. They can be used to join steel or stainless steel to reactive metals, and nickel, copper and aluminum alloys.

The bimetal transition joints can be machined, drilled, bent and pressed into different shapes—round, cylinder, beam and square are all possible. Transition joints can be used in thin or thick applications, and short or long profiles, and NobelClad is the world's leading-edge provider of these advanced solutions.

Transition Joints in Use Around the World

You needn't look far to see bimetal transition joints at work in the world today. Lighter and stronger than riveted systems, transition joints reduce application weight, fight corrosion and wear, and hold up better in wet environments. Transition joints also offer additional, time-proven benefits, including improved production performance, upgraded reliability and lower lifetime maintenance costs.

In fact, transition joints have connected aluminum decks to steel hulls in the marine industry for more than 40 years, while the railway industry now relies on transition joints to assemble hybrid structures or weld stainless steel ground latches to aluminum roofing. For perspective, each railway car has anywhere from 60-80 of these contacts.

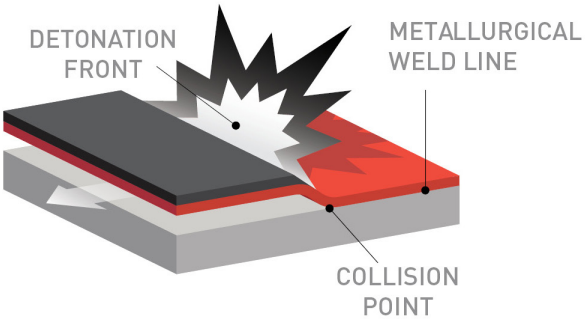
Other transition joint applications of today can be seen across the construction equipment and transportation industries: copper-aluminum parts in electrical formats; copper-steel clads for mill arms; tubular joints for rotating transmissions or piping; and high technology applications like neutron windows or high vacuum tubular flanges.

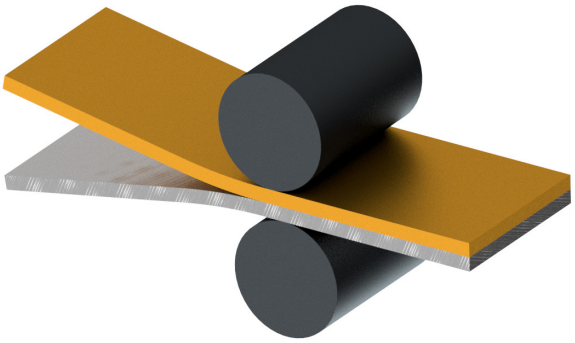
Creating Transiton Joints by Explosion Welding

There are two ways to make a transition joint from dissimilar metals: explosion welding and roll bonding.

Explosion welding is a solid-state, cold-welding process that uses precision explosions to bond two metals while retaining the mechanical, electrical and corrosion properties of both. The process is most commonly used to clad steel with a thin layer of corrosion-resistant alloy metals. NobelClad created and maintains the world standard for explosion welding.

Using the technique, NobelClad has produced large steel and aluminum plates, and cut and machined them into long, lightweight bars in the marine and railway industries. The bimetal solution, or transition joint, caused by the explosion connects the aluminum and steel, allowing customers to further weld, by conventional means, using either or both metals to achieve their application goals.





Creating Transiton Joints by Roll Bonding

Roll bonding is a solid-state welding process that combines heat and pressure to break up oxide layers and expose fresh metals that create a high-strength metallurgical bond.

Using this technique, NobelClad provides thinner layers and smaller pieces with fully dense interface quality suitable for vacuum application in electronics and medical industries, for example.

Both explosion welding and roll bonding create fully welded, bimetal sections, which are stronger than the weaker of the parent metals in customized solutions.

Dissimilar Metals Power the World

While the energy, industrial and infrastructure markets have made technological advancements using metals in corrosive, high temperature and high-pressure environments more possible, success still depends on a trusted foundation of metallurgical expertise and unbreakable dissimilar metal solutions.

The future is bright for engineers who are reimagining the world powered and sustained by composite metals, and NobelClad is leading the way with them, providing strong heavy bimetal pieces and custom solutions, like design and high precision hybrid parts with challenging specifications.