



The Material of Choice for Purified Terephthalic Acid Production: Titanium Clad

Before today's personal protective equipment, apparel, food and beverage packaging, and home furnishings, come to market, acetic acid producers must safely and reliably manufacture purified terephthalic acid (PTA), a commodity chemical used to make polyester fiber and polyethylene terephthalate (PET) resin, found in many of these consumer products.

PTA production is a hot, high-pressure, two-stage process. The first stage oxidizes the feedstock, paraxylene (PX) in acetic acid, and creates crude terephthalic acid (CTA). In the second stage, hydrogen is introduced to water and the CTA; the water is removed, and the PTA is crystallized and dried to a white powder.

To keep operations running smoothly, PTA producers rely on titanium for its excellent corrosion-resistant properties—properties that stand up to the harsh, acidic environment in their chemical process equipment.

More than 50 years ago, producers turn to Detaclad™ explosion welding to clad a thin layer of titanium, which significantly reduces equipment costs, to structurally durable carbon steel. Today, titanium-clad steel is commonly found in high-pressure reactors, crystallizers, columns, and heat exchanger tube sheets.

The functional benefits of using titanium-clad steel for PTA processing equipment are many—including the ability to design with large clad plates, far larger than commercially solid titanium plates. With fewer welds, large titanium-clad plates reduce fabrication time and cost, and large plates also improve the safety and reliability of the equipment when in operation.

Therefore, designing at the Front-End Engineering Design stage and fabricating with large titanium-clad plates, heads, and tube sheets, dramatically lowers capital expenditures (CAPEX) and improves planned return on investment for PTA projects, which typically aids fabricators in faster project approval.

Choosing the Right Clad Manufacturer Matters

The benefits of designing with large titanium-clad plates are only fully realized with the right clad partner—a partner with quality processes and globally-recognized expertise to reliably and consistently provide titanium cladding for PTA and other chemical projects, from specification to delivery and support.

Of the nearly 50 explosion clad production companies in the world, only NobelClad has demonstrated the expertise and invented the technology to reliably produce titanium clad for:

- Plates up to 4.4m wide x 10m long or larger, which can reduce equipment expenses by 15-20% or more;
- Single piece Pressure vessel heads, or hemispheres, up to 4.8m diameter;
- Tube sheets as large as 4.4m in diameter; and
- A wide range of titanium clad grades, including 1, 2, 7, 11, 12, 16 and 17.

The trend to integrate petrochemical refineries and pursue better process efficiency, PTA production equipment has gotten larger — with some reactors nearly 12m in diameter — challenging design engineers with important decisions selecting a clad manufacturer.

First, the titanium clad supply chain has become highly globalized with a fast-growing number of providers in China. While these new vendors may attract buyers with deep discounts, few have experience reliably producing large clad plates for today's PTA production equipment.

Second, due to the highly competitive nature of the industry, chemical processors and equipment fabricators carefully protect details related to their proprietary equipment. Very little information is publicly available on the specifications required to safely and reliably implement titanium clad designs.

As a result, there is a common misperception that all clad providers use the same standards. Unfortunately, some companies learn this the hard way. With mounting pressure to minimize expenses and reduce lead times, there is a temptation to choose less expensive providers on the front end of a project. When clad suppliers are not adequately vetted, and those suppliers fail to perform, project costs and lead times can increase dramatically due to poor quality and/or late delivery.

By choosing a trusted clad metals partner-expert like NobelClad to guide you throughout the design process—from the cladding specification onward—you can avoid these pitfalls and maximize your potential for PTA project success.

Why NobelClad

NobelClad is a proven explosive welding leader and offers the widest collection of customized clad metal products in the world—and more than just products, we are solutions partners. When you choose NobelClad, you invest in high-quality titanium clad and a partnership to improve your PTA project's success.

Knowledge is the First Step to Creating Value

We believe in sharing our metallurgical expertise and invite you to contact us to sign up for a free, 60-minute webinar — Titanium Cladding for Chemical Process Equipment. In the session, we will cover:

- An introduction to titanium cladding technology;
- Cost savings & reliability considerations for modern PTA plant equipment; and
- 5 keys to titanium clad project success.

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