



White Paper Series

IMPROVE FABRICATION WITH HOT ROLLED PICKLED AND OILED (HRPO) STEEL



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For fabricators looking to improve their operations, HRPO steel can help increase production, while also saving time and money. After hot rolling, HRPO steel undergoes a pickling process with hydrochloric acid that removes scale, rust and other impurities from its surface. The steel is then coated with a protective layer of oil.

The result is steel with a scale-free finish and a reduced risk of rust or corrosion. This makes HRPO steel easier to work with, improves process and product quality, and helps better meet customers' needs. Along with a variety of fabrication advantages, HRPO steel is an excellent alternative to heavy-gauge, wide steel HR and discrete plate in products with highly visible areas requiring a better surface.

PICKLING VERSUS BLASTING

While pickling and blasting processes both consist of removing scale from the steel's surface and applying a rust inhibitor, the results differ — particularly in how the finish affects fabricating.

Unlike pickling, blasting uses abrasive particles to remove the scale, which leaves small micro-craters on the steel's surface. The inconsistent surface negatively affects beam focus when laser cutting, causing poor cut quality. It also impacts the quality and efficiency of stamping, press braking and other fabrication processes, as well as creating a duller finish after painting.

Conversely, pickling ensures the removal of scale consistently throughout the entire plate, so fabrication processes, painting and enameling applications are more efficient.



A CLOSER LOOK AT HRPO ADVANTAGES

Due to its scale-free surface, fabricators can rely on HRPO to deliver benefits to common fabrication processes. Overall, these lead to higher quality parts and production savings.

- **IMPROVED LASER CUTTING**

HRPO steel allows fabricators to laser cut up to 25% faster, which maximizes the machine's capacity and produces more parts per hour. In addition, fabricators need to make fewer parameter adjustments since there isn't surface variation like blasted steel.

This also means greater laser cutting yields, closer tolerances and nesting, with less scrap between parts, and faster automatic or manual inspection of part surfaces. When using fiber lasers, HRPO eliminates the need for pre-etching and allows for a smoother cut without burrs on the backside of the plate.



- **IMPROVED STAMPING/PRESS BRAKING/ROLL FORMING**

With HRPO steel, fabricators gain closer tolerances since the material doesn't stick to the die. This also saves time since there is less need to stop processes to clean the die and it helps the die and tooling last longer. HRPO steel also makes it possible to achieve a deeper draw. The addition of dry lube adds formability and eliminates the need to apply drawing compound at the forming process, improving housekeeping and eliminating high costs for drawing compound and its application.



- **IMPROVED WELDING**

HRPO steel helps improve productivity by reducing secondary processes in manual and robotic welding. The oiled surface can prevent weld spatter adhesion, so fabricators can eliminate post-weld grinding and cleanup. HRPO also eliminates weld defects associated with scale inclusions and enhances the accuracy and repeatability of robotic welding.



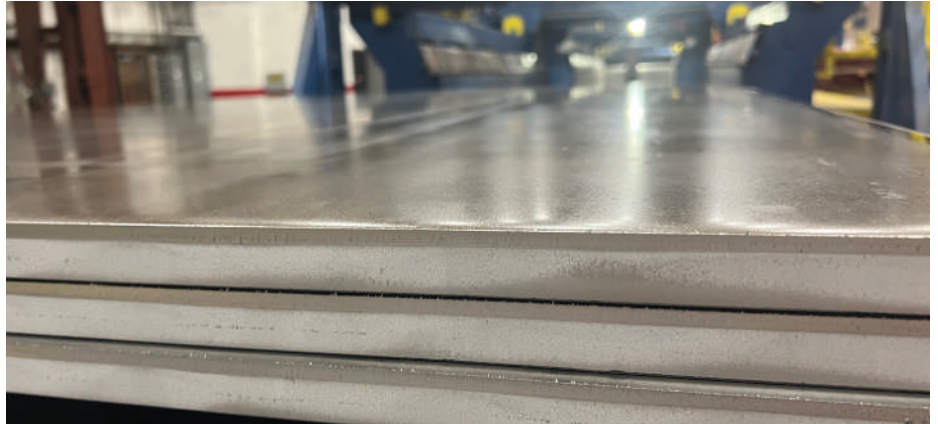
- **IMPROVED FINISHES**

Due to its scale-free surface, HRPO steel requires 30% less primer prior to painting and provides a glossier finish with less paint. It also chips less after painting compared to blasted material, so there are less instances of repainting. Combined, the improved finish lowers the overall cost of painting, while also providing customers with products that meet their requirements.



- **ELIMINATED BLASTING**

Since it doesn't require blasting, HRPO steel removes extra production steps and prevents potential bottlenecks in the fabrication process that could hinder productivity. There are also less maintenance and cleanup costs. Electrostatic oiling of the material allows for a precision rate of oil deposition and the minimal amount of oil necessary to provide corrosion protection reduces the amount of smoke during cutting and welding. The very light oil film also reduces the contamination rate in the paint system's cleaning section.



REAL WORLD RESULTS

HRPO steel from Steel Warehouse has helped fabricators improve their operations — increasing productivity and cost savings and generating high-quality parts.

HICKEY METAL FABRICATION in Salem, Ohio has cut steps in its robotic welding operations since investing in HRPO steel. Welder fitters no longer need to surface prep the material prior to welding and there is no concern about weld inclusions since the material is clean. Due to this surface condition, Hickey has also eliminated paint prep. Both improvements have helped save time and money for labor and ensured high weld quality. HRPO steel also allows the company to get more parts to its customers, faster.

 **WATCH VIDEO**

"I can get more parts out to the customer and give them a higher quality part, because we're not worried about having an inclusion in the weld. The plate is perfectly clean."

BEN PETERS
VICE PRESIDENT, HICKEY METAL FABRICATION

SQUARE DEAL MACHINING, a New York-based industrial parts provider, switched from blasted steel to HRPO steel after transitioning from CO₂ laser cutting to fiber lasers. The company no longer needed to etch cut prior to laser cutting, as was required with blasted steel. Skipping this step saves the company time and allows them to produce parts faster. Adding to the productivity gains, using HRPO steel makes it easier to pierce the material and run the laser at greater speeds. The material has extended the life of dies and press brakes and has allowed Square Deal to achieve greater consistency without parts catching in the die and throwing off tolerances.



"It's helped us keep a consistent product. It's helped us improve the way parts fit in our weld fixtures, and again allowing us to robotic weld much more efficiently."

JOE MORGAN
OWNER, SQUARE DEAL MACHINING

INDUSTRIAL METAL FAB (IMF) of South Bend, Ind. has taken its parts processing time from three or four weeks to one week since using HRPO steel, which reduces lead times for its customers. The consistency of the material allows for better forming without the need to stop the CNC press to adjust for variations, helping to increase productivity. Adding to that, IMF can laser cut the HRPO steel 25 to 50% faster than blasted steel and there is no need to shotblast the material prior to welding. Partnering with Steel Warehouse on the just-in-time (JIT) delivery of HRPO steel has further reduced lead times, so IMF has been able to increase its overall capacity.



"When you're operating at close to full capacity, purchasing pickled and oiled steel has allowed us to greatly reduce our processing time. Parts that would typically take 3 to 4 weeks to process, we are able to process through our shop now within one week."

KYLE BEAUDWAY
PRESIDENT, IMF



WHY HRPO FROM STEEL WAREHOUSE?

Steel Warehouse is the only company in the world that can continuously pickle up to 1" coil and up to 2" plate. Our processing capabilities ensure customers receive HRPO steel to meet their fabrication requirements. We offer HPRO steel in sheet, plate, coil, slit coil, and discrete plate.

Steel Warehouse is committed to investing in equipment to help better serve our customers. We own and operate three pickling lines, which allow us set our capacity and schedule, and ensures we produce high quality HRPO to meet our customers' needs. Our two coil-to-coil pickling lines process HRPO from .080" to 1" thick and 72" wide, while our plate pickler can process up to 2" thick and 96" wide.

- HRPO Sheet and Plate from Coil thickness: .080" through 1"
- HRPO/Plate Lengths: Up to 40'
- HRPO Coil Thickness: Up to 1"
- Pickled and Oiled Discrete Plate Thickness: Up to 2"

Steel Warehouse HRPO steel products also include temper pass cut to length, blanking, slitting, shearing, laser and plasma cutting, stretcher leveling and temper pass coil to coil (skin pass).

Common HRPO steel grades offered include ASTM A1011, ASTM A1018, ASTM A36, ASTM A572, ASTM A656, A569 Commercial Quality to Structural Quality – Grades 50, 80,100, as well as carbon steel grades that have not been quenched and tempered.

APPLICATIONS AND INDUSTRIES

- Construction
- Agriculture equipment
- Industrial storage racks
- Pipe
- Tubing
- Rack systems
- Heavy equipment
- ...and more

Beyond the range of HRPO steel processing capabilities and product types, Steel Warehouse provides exceptional customer support. We have metallurgists on staff to provide guidance to enhance the fabrication process and advise on alternatives like HRPO steel for producing high-quality parts — efficiently and with greater cost savings. Our metallurgists can also help customers find ways to innovate with HRPO steel through new designs and applications. In addition, Steel Warehouse provides inventory management with JIT delivery to help customers maximize their capacity.

**CONTACT STEEL WAREHOUSE
TO LEARN MORE ABOUT HRPO STEEL
(800) 348-2529**



ABOUT STEEL WAREHOUSE

Steel Warehouse is a family-owned steel solutions provider and service center with a 75-year heritage in the steel industry and 15 locations in the Americas. Recognized for the depth of its metallurgical and engineering expertise, the company distributes over two million tons of coil, sheet and plate annually in hot- and cold-rolled materials across a wide range of industries. Steel Warehouse is well known for its inventory management, providing just-in-time (JIT) shipments to ensure customers receive timely and efficient delivery of their steel. The company is committed to supporting its customers' needs, as well as the communities in which its facilities are located.

Contact us today at **www.steelwarehouse.com**

