

# Increased pickling line productivity, eliminated downtime the HRS way!!!

Steel plants are engaged in many heat treatment processes like forming, rolling, forging etc. These processes which occur at high temperatures leave a discolored oxide layer or something similar to very heavy rust on surface of the steel, called 'Scale', which needs to be removed to separate oxides and iron contamination. 'Pickling' is a metal surface treatment used to remove scale or alike contaminations by dipping the rolled material into the solution of strong acids, also termed as 'pickle liquor'.

Pickle liquor is primarily hydrochloric acid, although Sulfuric acid was previously more common. Hydrochloric acid is more expensive but it pickles much faster while minimizing base metal loss. The effectiveness of acids increases strongly with temperature, therefore temperature control at high temperature limits is essential. Here comes the need of suitable heat transfer equipment. Traditionally, direct steam injection or graphite heat exchangers have been used for heat control in this process.

The steel plants have increasingly faced problems like lesser efficiency

due to dilution of acid, frequent salt deposition, leakages, choking of line due to rust and metal particles, repeated maintenance and more downtime resulting into lower production and inconsistent product quality due to these heat transfer processes.

HRS Process Systems Ltd., one of India's leading heat transfer specialist offered the 'Skid Mounted Acid Heating System' to overcome above all hindrances in steel plate pickling line. The heart of each skid is 'ECOFLUX\*' shell and tube heat exchanger in Tantalum material. Tantalum offers strong corrosion resistance compared to other metals when exposed to pickle bath chemistries. Heat exchanger in Tantalum material offers better heat transfer characteristics and higher pressure capabilities in compact size. HRS has proven expertise in design and manufacture of exotic high value material like Tantalum, Titanium, Hastelloy, Inconel and others. Additional key components of the skid are PTFE lined pumps, steam regulating valves, steam trap at outlet of heat exchanger and control panel unit with automated temperature control.

The entire acid line piping is with PTFE lining which restricts direct contact of pipe material with acid. Optionally, CPVC pipes also can be used to serve the purpose.

In this well designed automated system, acid is continuously circulated through closed loop system by using lined pumps. ECOFLUX\* shell and tube heat exchanger in tantalum material is used to heat acid at required temperature. Temperature sensors at the outlet of heat exchanger

detect the acid temperature which acts as input signals to controllers to further enable steam flow rate control. The controller works on feedback control system which produces output signal for every input signal by comparing set desired point value to maintain constant temperature.

This system has evolved as a robust solution and enabled increase in line speed, elimination of downtime thus giving better productivity and improved quality of plate coils. A standby line of pump and valves can be provided for continuous running even during maintenance of the primary line. Steel plants can finally deal with high maintenance costs and expensive shutdowns with this 'Skid Mounted Acid Heating System'.

These systems can be customized according to process requirement for better results. HRS has recently supplied this system to SAIL, an eminent player in Steel Industry where direct steam injection process was used for plate pickling line. It has particularly been helpful by maintaining uniform temperature of pickle bath which has further omitted problems like dilution of acid and frequent downtimes. This increased the productivity of their plate pickling line along with better quality of product.

Other key applications in steel industry like gas heating, heat recovery of exhaust gas, condensation are also enhanced through specialized tubular heat transfer solutions of HRS. The compact and effective range of HRS Funke Plate Heat Exchanger is also a preferred choice for common



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processes in steel industry like cooling of continuous cast water and rolling mill or bearing oil cooling.

**About HRS PSL:**

HRS Process Systems, a part of the HRS Group that operates at the forefront of thermal processing technology is one of India's leading heat exchanger and solutions specialists. Established in India in year 2003, the company is ISO 9001:2008 certified with high rating from CRISIL with over a decade of experience in supplying

state-of-the-art solutions to chemical, pharmaceutical, fertiliser, agrochemical, cement, power, steel and many more process industries.

The product range is also applied for various thermal processes like heating cooling, pasteurization, sterilization, evaporation and aseptic processing for the food/fruit/beverage industry. Their innovative products include ECOFLUX\* corrugated tube heat exchanger, UNICUS scraped surface heat exchanger, HRS FUNKE plate heat exchanger, HRS Piston Pump, HRS ParaDice\* dice pasteurizer, HRS Monobloc\* Aseptic Steriliser

and Filler, Evaporators, UHT Systems & Nutraceutical processing Systems.



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