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Rohde/Process-Electronic GmbH Nitriding System.

German furnace builder Rohde has teamed up with Process-Electronic to offer a furnace system which can deliver both Plasma and Gas Nitriding processes. The press release below says that this is not a new offering but on a personal level I am not familiar with furnaces that can offer both processes. Both have their advantages so we at "The Monty" are curious to know more about the system.

In the meantime read on and if you would like to know more about Rohde we would suggest our www.themonty.com recent interview with the President Jörn Rohde which can be found on this site at <http://www.themonty.com/Rhode.htm> September 17/2012

"Combined plasma and gas nitriding furnace for German research institute, "On request of the IWT Bremen, the research institute of the German Association for Heat Treatment and Materials Technology (AWT), Rohde Schutzgasöfen GmbH and Process-Electronic GmbH, a member of United Process Controls Inc., did a common project in order to create a nitriding system, able to perform controlled plasma (ion) and gas processes.

Rohde developed a new furnace type, the so called PGN, based on their well established horizontal retort design while Process-Electronic took care of sensors and controls needed to fulfil the IWT demands.

Of course, plasma nitriding furnaces, also able to operate gas nitriding stages or processes are not a new invention but the PGN is setting new standards.

The furnace can hold a load of 400 x 400 x 600 mm (16 x 16 x 24 inch), perfectly suited to process technology research but yet a small industrial size. Furnace pressure can be controlled in a range of 0.5 mbar to 2 bar absolute, enabling plasma nitriding but also low pressure and higher pressure gaseous nitriding.

The cascaded multi-zone electrical heating system is combined with an also multi-zone cooling system and a variable speed drive cooling blower, thus enabling perfect temperature uniformity throughout the load. Depending upon the operating conditions, the main loop uses either the retort thermocouple and/or load thermocouples controlling the set values for the independent zone controllers.

The variable speed drive internal gas agitator further enhances temperature uniformity while heating and cooling in an inert or reducing gas atmosphere but also grants perfect atmosphere conditions while in gas nitriding / nitrocarburizing stages.

The cooling system for the motor bushings and cover seals is temperature controlled and uses a heat conducting oil instead of water, preventing corrosion. The horizontal retort design enables to put the furnace into an automated line. The furnace also offers an option for a turbo cooling system where the furnace atmosphere is passed through a heat exchanger in order to cut down on cooling time, further increasing overall floor to floor performance.

The gas panel is equipped with mass flow controllers for argon, nitrogen, hydrogen, methane, carbon monoxide, carbon dioxide, ammonia, and dissociated ammonia and a liquid flow controller for water.

The dissociated ammonia is supplied by a small cracker furnace, installed underneath the retort. Besides the furnace plc, over temperature controllers and dedicated hardware circuits are taking care of all movements and safety functions.

Visualization, temperature, atmosphere and pressure control as well as recipe control is performed by a UPC Protherm 500 universal program controller, also connecting the flow controllers and the pulse plasma generator.

Equipped with the UPC standard nitriding and nitrocarburizing control system, comprising of an H2Smart hydrogen analyzer and a NitroCarb oxygen probe, the furnace offers state-of-the-art potential controlled gas nitriding (KN, Diss.), gas oxinitriding (KN, KO), gas nitrocarburizing (KN - KC) and post-oxidizing (KO, lg pO₂).

Additional ports are used to connect more gas analyzing systems, such as IR, FTIR or UV analyzers for research purposes. An additional heated oxygen probe is used to verify the oxygen partial pressure while in a low temperature range.

Energy and gas consumption is constantly measured and totalized, all process parameters such as pressure, temperatures, inlet gas flows, plasma parameters and analysis data but also alarms and operator events are stored on the internal solid state drive, easily to access via GUI or the internal web server. The furnace is connected to a UPC Protherm 9800 SCADA system providing remote control and longtime data storage and evaluation."

