

PIN EQUIPMENT

PLASMA ION NITRIDING EQUIPMENT



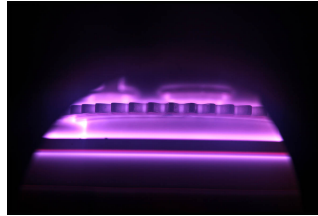
MAIN FEATURES

- ❖ PROCESS VACUUM CHAMBER WITH THERMAL INSULATION AND COOLING FACILITY
- ❖ NOVEL HOT RETORT DESIGN TO ENHANCE HEAT TRANSFER AND LOWER HEAT LOSS
- ❖ THREE ZONE HEATING WITH INDEPENDENT PID CONTROL PROVIDES THERMAL UNIFORMITY
- ❖ FULLY AUTOMATIC PLC / PC BASED CONTROL WITH SCADA PACKAGE TO PROVIDE RECIPIE STORAGE, RECALL FOR PROCESS REPEATABILITY.
- ❖ CLOSED LOOP PID BASED PRESSURE CONTROL WITH CAPACITANCE MANOMETER AND MOTORIZED VALVE.
- ❖ PRECISION MASS FLOW CONTROLLERS PROVIDE EXCELLENT CONTROL OVER GAS PHASE CHEMISTRY FOR PROCESS CONTROL.
- ❖ PULSED DC POWER SUPPLY WITH ADVANCED ARC CONTROL AND SETTING OF PEAK VOLTAGE, PULSE FREQUENCY AND DUTY CYCLE
- ❖ ONLINE FINE TEMPERATURE CONTROL BY INTERACTIVE DUTY CYCLE CONTROL DURING NITRIDING
- ❖ PROCESS DATA BASE WITH PROCESS RECIPIES FOR STANDARD NITRIDING STEELS.
- ❖ INTEGRATION OF DUAL PROCESS CHAMBER POSSIBLE TO ENHANCE PRODUCTIVITY.

WHAT IS PLASMA ION NITRIDING?

PLASMA ION NITRIDING [PIN] is a technique to diffuse Nitrogen in steels in the presence of Plasma to impart surface hardness; for a wide variety of Applications.

In this process, parts to be Nitrided are kept in a Vacuum Process Vessel at elevated temperatures, and pulsed DC voltage in the presence of Ionized Gases [Plasma] of N₂, H₂, Ar, CH₄ etc.



ADVANTAGES OF PLASMA ION NITRIDING* [see Annexure A for Comparison]

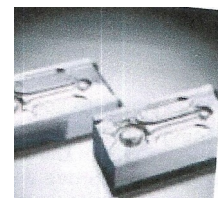
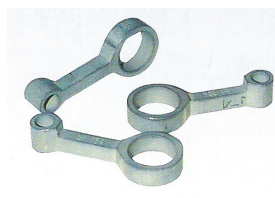
- Low Distortion and High Process Reproducibility
- Reduced Cycled Time
- Uniformity of Case Depth and Hardness
- Minimum or Elimination of Post Machining
- Control of Compound layer
- Variant Processes like Plasma Nitrocarburizing and Plasma Oxidation
- Environmental Friendly: No Toxic Gases / Salts

WHAT STEELS CAN BE NITRIDED

- Alloy Steels containing (Cr, Al, Mo, V, W, Ti)
- Nitriding Steels
- Medium Carbon Chrome Steels
- Chrome, Chrome-Vanadium Steels
- Stainless Steels (300, 400, PH)
- Tool Steels

APPLICATIONS

- Tooling for Die Casting, Forging and Extrusions
- Plastic Molds
- Metal Working
- Composite Tooling
- Power Transmission Components
- Hydraulic System Hardware
- Bearings
- Gears
- Powdered Metal Components

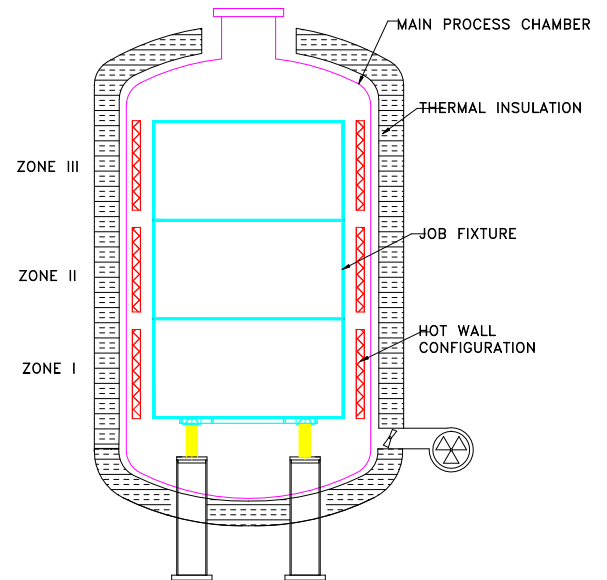


PLASMA NITRIDERS FOR MILMAN

THE NOVEL HOT RETORT DESIGN

- Three zone heaters with Retort placed internally for fast heat transfer and energy saving.
- Independent PID controls in each zone with Retort temperature monitoring for Thermal uniformity.
- In-built advance Software for Temperature Control to achieve uniform heating.
- Optional Convective Fan for reducing initial heat up-time

PROCESS CHAMBER SCHEMATIC

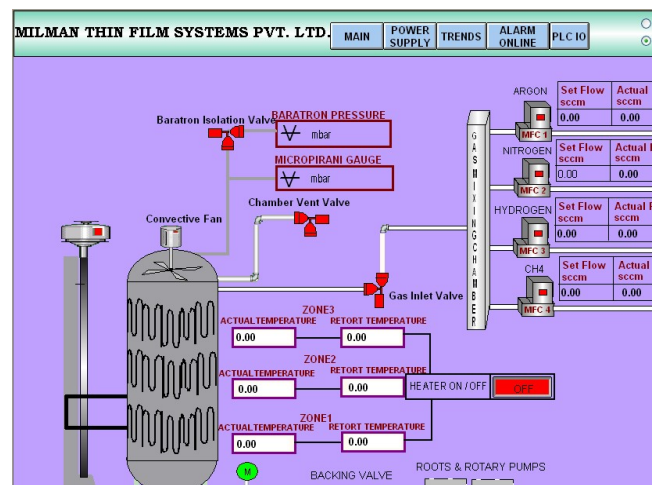


ADVANCED PULSED DC POWER GENERATOR

- Independent voltage, Frequency and Pulsed width Control
- Active Arc Suppression Circuitry
- Pulsed Voltage upto 700V
- Maximum Pulsed Current: 120 Amp (p – p)
- Pulsed Frequency: 10 – 25 kHz
- Duty Cycle: 30 – 90%

AUTOMATION

- PLC-PC based Automation with SCADA Package and Touch Screen Control
- On-line changes in process parameters for fine control
- Recipe Storage, recall for standard jobs for Reproducibility
- Alarm and Maintenance Management
- Batch report Generation and Remote Connectivity Internet.



MILMAN PLASMON SERIES

MODELS	PLASMON 300	PLASMON 800	PLASMON 1000
FEATURES			
HOT ZONE (mm)	300x 300	800 x 800	1000 x 1300
WORK LOAD (Kg)	100 – 200	500 – 700	1500 – 2000
POWER SUPPLY (kW)	5	35	50
PULSED CURRENT (Amp)	20	80	120
PRESSURE (mbar)	5 – 10	5 – 10	5 – 10
GASES	Ar, N ₂ , H ₂	Ar, N ₂ , H ₂ , C ₂ H ₂ , O ₂	Ar, N ₂ , H ₂ , C ₂ H ₂ , O ₂



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