

Plasma Nitriding Furnace

CAPABILITY SHEET · HOT-WALL BELL · PLASMA (ION) NITRIDING · AMS 2750E

THE FURNACE

WHAT	A hot-wall vertical bell plasma (ion) nitriding furnace that surface-hardens steel components - tool, alloy and stainless steels - by glow-discharge diffusion of nitrogen under vacuum. Design, manufacture, installation, commissioning and proving.
CHAMBER	SS304L bell, approx 950 mm dia x 1200 mm high, 500 kg charge on a water-cooled SS304L base plate; serpentine wall heaters; ceramic insulation (skin <50 degC); twin Viton O-rings with an inter-seal support vacuum; two quartz view ports.
STATUS	Engineered to order - chamber size, charge, gas chemistry, plasma rating and automation are configured to the customer's parts and throughput; installed, commissioned and proved to AMS 2750E on site.

TEMPERATURE & VACUUM

TEMPERATURE	Wall to 650 degC; process 350-560 degC; uniformity +/-5 degC to AMS 2750E; thyristor control with programmable PID plus an independent over-temperature controller; K/N thermocouples +/-2 degC traceable to national standards.
VACUUM	Rotary pump approx 250 lpm backed by a roots pump approx 500 lpm; working 5x10 ⁻¹ , ultimate 5x10 ⁻² mbar; pirani plus absolute capacitance gauges behind protection valves, interlocked so the process runs only inside its pressure window.
UNIFORMITY SURVEY	A dedicated AMS 2750E temperature-uniformity survey fixture with K-type thermocouples and a recorder for periodic pyrometry checks.

GAS & PLASMA

GAS FEEDING	Mass-flow controllers (<=500 sccm), isolation / needle / solenoid valves and mixing manifolds meter H ₂ , N ₂ and Ar - Ar+H ₂ for stainless, N ₂ +H ₂ for carbon and alloy steels - for flush, sputter-clean and nitride cycles; flows and pressures interlocked.
PLASMA GENERATOR	IGBT pulsed - unipolar/bipolar, 0-600 V programmable, up to 10 kHz, 40 kVA, pulse 10-1990 microsecond, PLC pulse control; arc switch-off under 1 microsecond so an arc cannot mark a part; water-cooled view port for the glow.
CONTROL	Two panels (plasma + system) on a PLC with web-enabled SCADA - recipe storage, automatic cycle control, data logging and report generation; 19 inch display, UPS-backed instrumentation; interlocks with audio-visual alarms.

UTILITIES & SUPPORT

COOLING & UTILITIES	Tangential blowers for fast bell cooling; closed-loop water chiller; DM-water loop approx 200 LPM with an approx 60 TR tower and a 2000 L emergency tank; N ₂ /Ar 99.999% at approx 60 m ³ /h; PVC exhaust with oil trap; electric/hydraulic loading stacker.
SAFETY & DOCS	Safety on chamber, pumps, heating, plasma and gas train; door interlock; over-temperature protection; full manuals, PLC program and calibration certificates; foundation kit; operator and maintenance training; essential spares; 24-month warranty.
ENGAGEMENT	Send your parts, load size and target case to sales@neometrixgroup.com and the engineering team returns a clause-by-clause compliance matrix within two working days. Export subject to Government of India authorisation.

DEFENCE PROGRAMMES DESK

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Reference bell station. Chamber size, charge, gas chemistry, plasma rating and automation are configured to the customer's parts and throughput at proposal stage. Engineered to order.