

**50+**  
Years of Legacy

# COATING POT

Advanced Induction Systems

for Continuous Galvanizing Lines (CGLs)



**DirectMOD**

**Pioneer<sup>®</sup>**  
**DFO** DYNAMIC  
FLOW  
OPTIMIZATION

Pioneer Furnaces is a trusted name in the field of induction melting and heating technology, designing and manufacturing advanced induction furnaces for the non-ferrous metal melting, heating, heat-treatment, and coating industries since 1972. With an engineering legacy spanning over five decades, Pioneer is recognized for delivering robust, energy-efficient and highly reliable furnace systems backed by prompt and committed service support. The company is ISO 9001:2015 certified, reflecting its strong process discipline, quality orientation and customer-centric approach.

**High-Efficiency | High Reliability | High Value – The Pioneer Promise**

For over five decades, Pioneer Furnaces has been a trusted engineering partner to the global non-ferrous and steel industries. Our high-performance induction technologies powers some of the most advanced GI, GL, GA, ZAM, Galfan and Al-Si coating lines in operation. With 259+ coating pot inductors, a 65%+ share of the Indian market, and long-standing partnerships with integrators, Pioneer is approached by leading suppliers for the CGL line builders like John Cockerill, Mas RollPro, SMS Esmech, Danieli, Yogyi Digi, RollCon, Tenova, Prime Metals, Magadh Precisions, Clecim, Andritz Metals, etc.

Our systems integrate precision engineering, thermal science and metallurgical expertise to deliver uniform coating quality, high operational stability and lowest lifecycle cost.

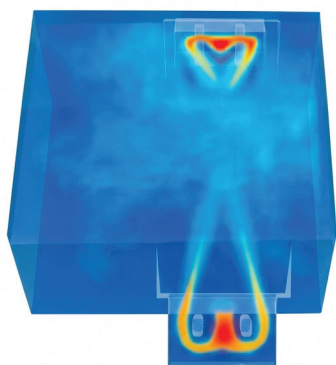
## ■ Integrated CGL Ecosystem:

Pioneer offers a complete thermal and metallurgical ecosystem for galvanizing lines:

- ▶ Pre-Melt Furnaces (ZAM / Zn-Al / Al-Si Alloys)
- ▶ High-Efficiency Channel Inductors
- ▶ Heated Launderers and Metal Transfer Systems
- ▶ Main Coating Pots (GI / GL / GA / ZAM / Al-Si / Galfan)
- ▶ IGBT based Power Supplies and Industry 4.0 Ready Automation Systems

This integrated approach ensures seamless metal flow, temperature consistency, coating quality, process safety and minimal downtime.

## ■ Engineering Innovation – DFO Technology:



Dynamic Flow Optimisation (DFO) is a proprietary innovation of Pioneer, engineered to outperform conventional flow principles.

### **DFO delivers:**

- ▶ Balanced metal circulation (Jet + Directional Flow Synergy)
- ▶ Highly uniform temperature field across pot width, depth and length
- ▶ Reduced thermal gradients for longer refractory life
- ▶ Reduced cold spots and stratification
- ▶ Optimized power-to-melt transfer resulting in lowest specific energy consumption, higher coating consistency and reduced dross formation

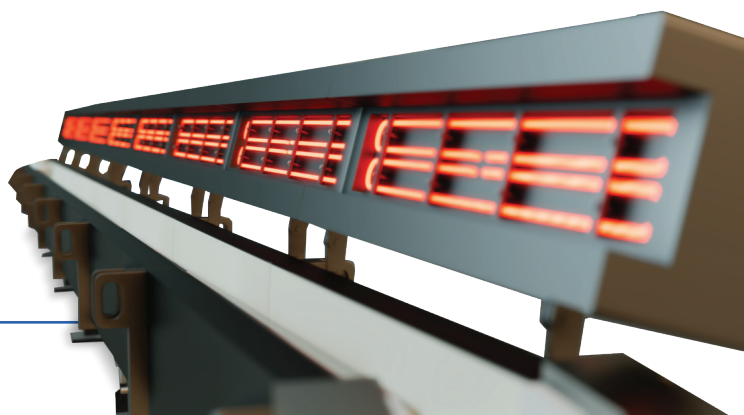
## ■ Pre-Melt Furnaces & Heated Launderers:

### **Pre-Melt Furnaces:**

- ▶ Channel-based melting for ZAM / Zn-Al / Galfan
- ▶ Coreless-based melting for Al-Si
- ▶ High energy efficiency, uniform temperature throughout the metal bath and minimal oxidation
- ▶ Ensures clean, temperature-stabilized melt for main pot

### **Heated Launderers:**

- ▶ Electrically heated or gas-fired heating options
- ▶ Precisely engineered slopes for controlled metal flow
- ▶ Multiple temperature control
- ▶ Prevention of metal freeze and thermal shock



## ▪ Heavy-Duty Feeding Mechanism:

### Static Coating Pots:

Engineered for continuous production lines operating a single alloy system (GI / GL / GA / ZAM / Al-Si / Galfan).

### Technical Highlights:

- ▶ Direct foundation mounted with reinforced structure
- ▶ Designed for maximum thermal stability and longevity
- ▶ Heavy-duty pot construction using  $\geq 16$  mm high quality steel plates
- ▶ Alumina-rich refractory for low erosion and corrosion  
Ideal for high-speed CGLs requiring stable long runs

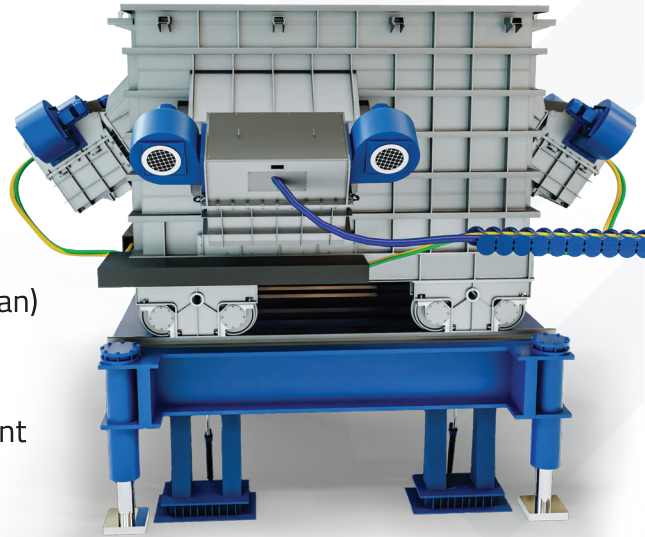
## ▪ Shift & Lift Coating Pots:

### Preferred for plants having multiple coating alloys:

- ▶ Frequent alloy changeovers (GI / GL / GA / ZAM / Al-Si / Galfan)
- ▶ Multiple coating lines sharing pot clusters

### Technical Highlights:

- ▶ Bogie-mounted modular frames for smooth lateral movement
- ▶ Hydraulic lifting and precise positional locking system
- ▶ Configurable layouts (Inline / L -Type / Perpendicular)
- ▶ Rapid changeover minimizing downtime



## ▪ Channel Inductor Technology:

Pioneer's pre-melt furnaces and main coating pots powered by high-efficiency mains-frequency channel inductors (50-60 Hz) are designed to deliver precise thermal control, uniform metal circulation, low metal oxidation, and the industry's lowest energy consumption across GI, GL, GA, ZAM, Al-Si and

### Technical Highlights:

- ▶ High-flow U-type or W-type channels for optimal stirring
- ▶ 30% higher copper content than typical designs resulting into greater electrical efficiency
- ▶ Air-cooled coil and bushing construction for lower maintenance and also provision for water cooled inductors
- ▶ Integrated dual blowers for each inductor for efficient cooling
- ▶ Thermocouple-based monitoring of bushing temperatures
- ▶ Modular assembly for quick replacement / maintenance
- ▶ Emergency nitrogen / air cooling compatibility for inductors

### Performance Superiority:

- ▶ High stirring ensuring uniform metal bath temperature
- ▶ Minimal dross formation resulting into reduced zinc / metal loss
- ▶ Stable thermal behaviour even under high strip speed



## ▪ Smart Power & Automation Platform:

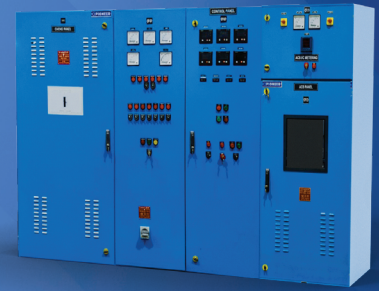
Pioneer's Coating Pot for CGL systems are powered by conventional Contactor based System and alternatively advanced Power Supply Unit with IGBT-based DirectMod inverter technology and PLC based automation & Industry 4.0 connectivity.

The final selection is determined by the end user in consultation with the line builder, based on the specific technical application requirements.

## ■ Technical Highlights of Contactor based system:

- ▶ Ensure operation at unity power factor at all conditions
- ▶ Ensure operation at balanced currents on Mains at all conditions
- ▶ System integrated with low power, Intermediate power and High power contactor
- ▶ Microprocessor PLC based controls for furnace switching, fault annunciation and real time data display system in HMI
- ▶ Automatic mode through temperature feedback from thermocouple, the power switching is governed by a temperature controller provided with temperature setting facility
- ▶ Manual mode selectable through selector switch for Low Power/ Intermediate power/High Power

Contactor Based Panel



## ■ Technical Highlights of IGBT based system:

- ▶ IGBT based DirectMOD Inverter avoiding LC resonant tank
- ▶ FPGA based embedded controller integrated with an adaptive control algorithm
- ▶ Auto metal bath temperature control using a closed-loop control algorithm with stepless IGBT based power regulation
- ▶ Adaptive power management to offset drag-out rate
- ▶ Full SCADA connectivity
- ▶ Real time dashboards, energy monitoring, data logging and trends
- ▶ Predictive diagnostics for air and water flow, pressure, temperature for complete line
- ▶ Power factor close to unity at all loads
- ▶ Industry 4.0 compatibility (Ethernet / Modbus / IoT / RS485)
- ▶ Metal level monitoring system (optional)

IGBT Based Panel



## ■ Our Key Clientele



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