



CASE STUDY

Electric Heated Cabinet Oven for Overseas Electric Motor Paint Drying

Precision Quincy engineered this oven as a 40C-550 Class A electric cabinet oven for a global industrial procurement and integration partner supporting an overseas electric-motor finishing application. The equipment was developed to provide repeatable batch drying of thin polyurethane paint on electric motors using full horizontal airflow, electric heat, Class A exhaust architecture, and a compact cabinet platform suitable for export preparation and overseas deployment.



OVERVIEW

Precision Quincy engineered this oven as a 40C-550 Class A electric cabinet oven for a global industrial procurement and integration partner supporting an overseas electric-motor finishing application. The equipment was developed to provide repeatable batch drying of thin polyurethane paint on electric motors in a compact cabinet format using full horizontal airflow, electric heat, Class A exhaust architecture, and a standardized platform suitable for export execution.

The oven used a 48 in W × 48 in D × 38 in H work chamber and was designed for an operating temperature of 482°F (250°C), a maximum temperature of 550°F (288°C), and a stated work-area uniformity of ±10°F. Heating was provided by an electric heater bank delivering 36 kW total through 24 × 1500 W heating elements, with a recirculation system rated at 1,500 CFM and a PQ1 exhauster rated at 300 CFM for Class A operation.

The oven was configured to process approximately 0.25 gal of paint per batch and was designed around a documented maximum VOC load basis of 0.22 gal/batch (o-xylene basis). Product support included two 100 lb evenly distributed capacity shelves, while the chamber layout preserved flexibility for different motor sizes and loading arrangements so long as airflow passage through the work area remained open.

Controls were housed in a NEMA 1 enclosure using an SSI-804 temperature controller, Gefran 650L excess temperature controller, and Type J thermocouples, with the control enclosure listed as a UL 508A Open Industrial Control Panel. The unit was shipped to for subsequent overseas export, with export crating included as part of project execution.



CUSTOMER PROCESS REQUIREMENTS

This oven was developed for a global industrial procurement and integration partner supporting an overseas deployment of thermal-processing equipment for an electric-motor paint-drying application.

Application requirement

- The equipment was required for drying polyurethane paint on electric motors.

- The customer required a repeatable batch-process platform suitable for industrial finishing work rather than a one-off laboratory unit.
- The project also reflected the need to support a customer relationship with global export reach through a procurement and integration partner.

Work chamber / load requirement

- Required work chamber: 48 in W × 48 in D × 38 in H.
- The oven was supplied with two 100 lb evenly distributed capacity shelves.
- The application also required load flexibility for varying motor sizes and configurations, with shelf loading limited to 100 lb per shelf.
- Customer loading practices had to preserve open airflow passage through the chamber for proper thermal performance.

Process requirement

- The system had to support drying of thin polyurethane paint coatings on electric motors.
- Process basis: approximately 0.25 gal of paint per batch.
- Required operating temperature: 482°F (250°C).
- The customer required consistent airflow and temperature control for repeatable batch drying results.

Safety requirement

- The oven was configured as an NFPA 86 Class A unit.
- The documented maximum VOC load basis was 0.22 gal/batch (o-xylene basis).
- The control enclosure basis was UL 508A Open Industrial Control Panel.

Utility / shipment / export requirement

- Required electrical service: 480V / 3PH / 60Hz.
- The equipment was shipped to for subsequent overseas export.
- Export crating was included as part of the project execution.
- The final operating site was overseas, with the project managed through a global procurement and integration channel rather than a purely domestic end-user installation.

THERMAL / PHYSICAL PROCESS REQUIREMENTS

These thermal process requirements were established from the customer's need to dry thin polyurethane paint coatings on electric motors in a controlled Class A batch oven platform suitable for overseas deployment through a global procurement and integration partner.

Temperature capability

- Operating temperature: 482°F (250°C)
- Maximum temperature: 550°F (288°C)
- Required work-area uniformity: ±10°F

Process basis

- The thermal process basis was drying thin polyurethane paint on electric motors.
- Process basis: approximately 0.25 gal of paint per batch.
- The application required repeatable temperature exposure and airflow across varying motor sizes while maintaining proper open airflow paths through the load.

Heat input requirement

- Heat source: electric resistance heat
- Heater bank: 24 elements × 1500 W
- Total installed heat: 36 kW

Airflow delivery requirements

- Airflow style: full horizontal airflow
- Recirculation airflow basis: 1,500 CFM
- Recirculation static pressure basis: 2 in. W.c.
- Recirculation fan motor: 1.5 HP

Exhaust / ventilation basis

- Exhaust fan: PQ1 exhauster
- Exhaust airflow: 300 CFM
- Exhaust static pressure: 1 in. W.c.
- Exhaust fan motor: 0.75 HP

Thermal instrumentation / control basis

- Primary controller: SSI-804 temperature controller
- Work-area thermocouple: Type J
- Excess temperature controller: Gefran 650L high-limit arrangement

Safety / classification basis

- Oven classification basis: NFPA 86 Class A
- Maximum VOC load basis: 0.22 gal/batch (o-xylene basis)
- Purge timer basis: 3 minutes minimum
- Airflow switches were used on both exhaust and recirculation fans as part of the safe-operating sequence



EQUIPMENT CONCEPT & ARCHITECTURE

To deliver the customer and thermal process requirements for this oven, Precision Quincy developed the following equipment concept and architecture.

Overall concept

- One 40C-550 Class A electric cabinet oven
- Designed for drying thin polyurethane paint on electric motors
- Developed for a global industrial procurement and integration partner supporting an overseas deployment
- Configured as a full-horizontal-airflow batch oven for repeatable drying performance

Heating architecture

- Heat source: electric resistance heat
- Heater bank output: 36 kW total
- Heater bank arranged as 24 × 1500 W heating elements
- Heat controlled through solid-state relay architecture with a back-up contactor

Airflow / recirculation architecture

- Airflow pattern: full horizontal airflow
- Recirculation fan concept:
 - 1,500 CFM
 - 2 in. W.c.
 - 1.5 HP motor
- Exhaust fan concept:
 - PQ1 exhauster
 - 300 CFM at 1 in. W.c.
 - 0.75 HP motor

- The chamber and load concept required maintaining open airflow paths around the product for proper process performance

Chamber / construction architecture

- Internal work chamber: 48 in W × 48 in D × 38 in H
- Wall thickness: 4 in
- Insulation: 4 in of 6 lb mineral wool
- Interior material: unpainted aluminized steel
- Exterior finish: PQ Blue
- Control panel finish: ANSI 61 gray
- Floor: 3/16 in plate floor

Door / access architecture

- Two swing doors
- Supplied with two 100 lb evenly distributed capacity shelves
- Shelf spacing shown at 3 in adjustable increments
- The shelf and chamber arrangement supported load flexibility for varying electric-motor sizes and configurations, with 100 lb maximum per shelf

Controls architecture

- NEMA 1 control enclosure
- Primary temperature controller: SSI-804
- Excess temperature controller: Gefran 650L
- Work-area thermocouples: Type J
- Control enclosure listed to UL 508A Open Industrial Control Panel

Safety / compliance architecture

- Oven classification basis: NFPA 86 Class A
- Applicable standards basis: NFPA 79, NFPA 86, UL 508A
- Included Class A exhaust, purge timer, airflow switches on exhaust and recirculation fans, and overtemperature protection
- Maximum VOC load basis: 0.22 gal/batch (o-xylene basis)

Shipping / installation architecture

- The oven was shipped to for subsequent overseas export
- Export crating was included as part of the project execution
- The project reflects Precision Quincy's ability to support equipment delivery through a global procurement and integration channel

TECHNICAL SPECIFICATIONS

Oven Configuration

Quantity	1 oven
Type	40C-550 Class A electric cabinet oven
Application	Drying thin polyurethane paint on electric motors
Internal Work Chamber	48 in W × 48 in D × 38 in H
Airflow Style	Full horizontal airflow
Overseas Channel	Global industrial procurement and integration partner

Thermal Heat Power System

Operating Temperature	482°F (250°C)
Maximum Temperature	550°F (288°C)
Uniformity	±10°F
Heat Source	Electric resistance heat
Installed Heat	36 kW
Heater Bank Basis	24 × 1500 W elements

Recirculation / Airflow System

Recirculation Airflow	1,500 CFM
Recirculation Static Pressure	2 in. W.c.
Recirculation Fan Motor	1.5 HP
Airflow Pattern	Full horizontal

Exhaust System

Exhaust Fan	PQ1 exhauster
Exhaust Airflow	300 CFM

Exhaust Static Pressure	1 in. W.c.
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Exhaust Fan Motor	0.75 HP
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Construction Materials / Shell System

Wall Thickness	4 in
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Insulation	4 in of 6 lb mineral wool
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Interior Material	Unpainted aluminized steel
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Floor	3/16 in plate floor
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Exterior Finish	PQ Blue
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Control Panel Finish	ANSI 61 gray
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Door Style	Two swing doors
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Adjustable Shelf Pitch	3 in increments
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Loading / Product Support

Standard Shelves	Two 100 lb capacity shelves
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Shelf Rating Basis	100 lb evenly distributed load each
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Product	Electric motors
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Process Coating	Thin polyurethane paint
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Load Flexibility	Supports varying motor sizes/configurations
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Airflow Loading Note	Product positioning must preserve open airflow passage
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Controls & Electrical

Temperature Controller	SSI-804
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High Limit	Gefran 650L
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Thermocouples	Type J
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Control Cabinet	NEMA 1
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Listing Basis	UL 508A Open Industrial Control Panel
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Primary Power	480V / 3PH / 60Hz
Full Load Amperage	52.5 A
SCCR	5,000 A
Main Disconnect	100A non-fused disconnect switch
Heat Control	Solid-state relays with back-up contactor

Safety & Compliance

Classification	NFPA 86 Class A
Maximum VOC Load Basis	0.22 gal/batch (o-xylene)
Applicable Standards	NFPA 79, NFPA 86, UL 508A
Purge Timer Basis	3 minutes minimum
Airflow Safeties	Airflow switches on exhaust and recirculation fans
Overtemperature Protection	Excess temperature controller

Shipping / Export

Shipment Routing	Shipped to for overseas export
Export Preparation	Export crating included
Approximate Oven Weight	1,400 lb

Process Summary

Market / Application	Industrial finishing / electric motor paint drying
Process Type	Batch drying of thin polyurethane paint coatings
Batch Basis	Approximately 0.25 gal of paint per batch
Deployment Context	Overseas project through a global industrial procurement and integration partner
Key Verification Concept	Repeatable control of temperature, airflow, exhaust, and safe operating limits



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