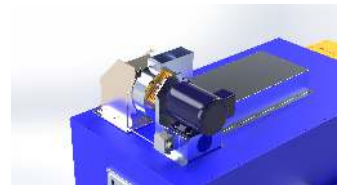




#### CASE STUDY

## Electric Heated Cabinet Ovens for Low-Temperature Batch Baking and Process Heating

*Precision Quincy engineered this oven as a batch of two identical electric-heated 40 Series cabinet ovens for low-temperature batch baking and general process heating. The equipment was developed to provide repeatable 350°F processing in a compact full-horizontal-airflow platform while incorporating NFPA 86 Class A ventilation and safety architecture for volatile-bearing loads. The order combined two matching ovens with added shelf capacity and elevated oven stands to support flexible loading and ergonomic access.*



## OVERVIEW

Precision Quincy engineered this oven as a pair of identical electric-heated cabinet ovens designed around the 40B-350 platform. The system was configured as a Class A oven package for batch baking and process heating at an operating temperature of 145°F with a maximum temperature rating of 350°F. Both ovens were built with the same work chamber dimensions, airflow system, controls architecture, and exhaust-purge safety sequence to provide repeatable processing across both units.

Each oven used a 48 in W × 30 in D × 48 in H work chamber with full horizontal airflow and a stated uniformity of  $\pm 10^{\circ}\text{F}$ . Heating was provided by a 9 kW electric heater bank, while recirculation was supplied by a fan system rated at 1,200 CFM. Because the ovens were configured as NFPA 86 Class A units, each oven also incorporated a PQ1 powered exhauster rated at 225 CFM along with purge timing, airflow proving, and excess temperature protection.

The package included one 12 in high oven stand per oven and five total 100 lb capacity shelves per oven, creating a compact batch-processing platform with improved loading flexibility and ergonomic access. The final equipment combined cabinet-oven simplicity with a Class A safety architecture suited for low-temperature process work where controlled ventilation and dependable repeatability were required.



## CUSTOMER PROCESS REQUIREMENTS

The project was developed for a customer requiring two identical cabinet ovens for batch baking and general low-temperature process heating. The delivered equipment emphasized repeatability, compact footprint, flexible shelf loading, and Class A ventilation capability.

### Application requirement

- The equipment was supplied for baking service.
- The documented process basis identified the product as TBD, indicating the ovens were intended as flexible batch-processing tools rather than a single dedicated fixture-specific machine.
- The customer required two identical ovens to provide matching processing capability across both units.

**Work chamber / load requirement**

- Required work chamber: 48 in W × 30 in D × 48 in H.
- Each oven included five adjustable 100 lb capacity shelves.
- Shelf positions were adjustable on 3 in centers to support different product heights and load arrangements.
- Each oven was mounted on a 12 in high stand to improve operator loading height.

**Process requirement**

- The ovens were designed for low-temperature batch baking and process heating.
- Required operating temperature was 145°F.
- Maximum temperature rating was 350°F.
- The application required repeatable temperature control in a compact cabinet format with enough internal flexibility to support changing load configurations.

**Safety requirement**

- The ovens were configured as NFPA 86 Class A units.
- The documented maximum VOC load basis was 0.21 gal/batch of o-xylene.
- The process therefore required powered exhaust, purge sequencing, airflow proving, and excess temperature protection as part of the operating sequence.

**Utility / site requirement**

- Required electrical service: 208V / 3PH / 60Hz.
- Full load amps: 35.9 A.
- Design elevation: less than 1,000 ft.

**Material / construction requirement**

- Exterior finish: Traffic Gray (RAL 7042).
- Control enclosure finish: Gray (ANSI 61).
- Interior finish: unpainted aluminized steel.
- The ovens were designed as insulated cabinet units with 2 in thick walls.

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**THERMAL / PHYSICAL PROCESS REQUIREMENTS**

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These thermal process requirements were established from the customer's need for repeatable low-temperature batch baking in a compact cabinet oven platform with Class A ventilation protection.

**Temperature capability**

- Operating temperature: 145°F
- Maximum temperature: 350°F
- Required work-area uniformity: ±10°F

**Process basis**

- The thermal process basis was low-temperature batch baking and general process heating.
- The ovens were designed to provide stable thermal performance across identical chambers for repeatable use on changing product loads.
- The thermal design supported shelf-based loading within a compact cabinet platform.

**Heat input requirement**

- Heat source: electric resistance heat
- Total installed heat: 9 kW
- Heater arrangement: 1 kW ST42014 heating elements

**Airflow delivery requirements**

- Airflow style: full horizontal airflow
- Recirculation airflow basis: 1,200 CFM
- Recirculation static pressure basis: 2 in. W.c.
- Recirculation fan motor: 1.5 HP

**Exhaust / ventilation basis**

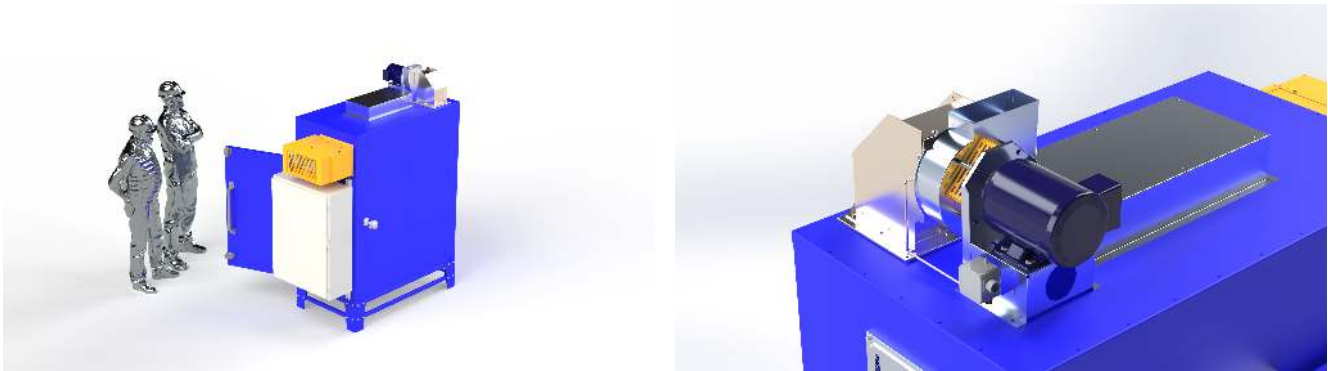
- Exhaust fan: PQ1 exhauster
- Exhaust airflow: 225 CFM
- Exhaust static pressure: 1 in. W.c.
- Exhaust fan motor: 0.75 HP

**Thermal instrumentation / control basis**

- Primary temperature controller: SSI-804 controller
- Excess temperature controller: Gefran 650L
- Heat control basis: solid-state relay control
- Purge timer: Eagle BRE8A6

**Safety / classification basis**

- Oven classification basis: NFPA 86 Class A
- Maximum VOC load basis: 0.21 gal/batch of o-xylene
- Powered exhaust and purge sequence were included as part of the Class A operating logic
- Airflow switches were used on both the exhaust and recirculation fans as part of the safety sequence
- Heat was disabled whenever required safe operating conditions were not met



## EQUIPMENT CONCEPT & ARCHITECTURE

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

### Overall concept

- Two identical electric-heated cabinet ovens
- Based on the 40B-350 full-horizontal-airflow platform
- Configured for low-temperature batch baking and process heating
- Designed as NFPA 86 Class A ovens

### Heating architecture

- Heat source: electric resistance
- Heater bank output: 9 kW total
- Heater arrangement: 1 kW ST42014 elements
- Heat control basis: solid-state relay control

### Airflow / recirculation architecture

- Airflow pattern: full horizontal airflow
- Recirculation fan concept:
  - 1,200 CFM
  - 2 in. W.c.
  - 1.5 HP motor
  - Jan Air 12.188 in × 4 in radial blade assembly
- Exhaust fan concept:
  - PQ1 exhauster
  - 225 CFM at 1 in. W.c.
  - 0.75 HP motor
- Fresh-air damper and powered exhaust architecture integrated into the Class A design

**Chamber / construction architecture**

- Internal work chamber: 48 in W × 30 in D × 48 in H
- Wall thickness: 2 in
- Insulation package: 2 in of 6 lb mineral wool
- Interior material: unpainted aluminized steel
- Exterior finish: Traffic Gray (RAL 7042)
- Control enclosure finish: Gray (ANSI 61)
- Two front swing doors for product access

**Product handling / loading architecture**

- Five 100 lb capacity shelves per oven
- Shelf supports on 3 in adjustable centers
- One 12 in high welded oven stand per oven
- Elevated loading height to improve operator access to the work chamber

**Controls architecture**

- Oven-mounted NEMA 1 control enclosure
- Enclosure size: 36 in × 30 in × 12 in
- SSI-804 temperature controller
- Gefran 650L work-area high-limit controller
- Start/stop stations for exhaust and recirculation fans on enclosure face
- Purge complete and heat-bank-on indication
- UL 508a open industrial control panel construction

**Safety / compliance architecture**

- Applicable standards basis: NFPA 79, NFPA 86, UL 508a
- Class A exhaust and purge architecture included for volatile-bearing process loads
- Airflow proving switches on both fan systems
- Work-area excess temperature protection and safety interlocks included in the control logic
- Minimum 2-minute purge sequence incorporated before heat enable

**Shipping / installation architecture**

- Each oven shipped assembled
- Approximate shipping weight: 1,150 lb per oven
- Compact cabinet format supported shipment of two identical units with separate stands

## TECHNICAL SPECIFICATIONS

### Oven Configuration

|                       |                                |
|-----------------------|--------------------------------|
| Quantity              | 2 identical ovens              |
| Type                  | Electric-heated cabinet ovens  |
| Model                 | 40B-350                        |
| Application           | Batch baking / process heating |
| Product Basis         | TBD                            |
| Internal Work Chamber | 48 in W × 30 in D × 48 in H    |
| Airflow Style         | Full horizontal airflow        |

### Thermal Heat Power System

|                       |                               |
|-----------------------|-------------------------------|
| Operating Temperature | 145°F                         |
| Maximum Temperature   | 350°F                         |
| Uniformity            | ±10°F                         |
| Heat Source           | Electric resistance heat      |
| Installed Heat        | 9 kW                          |
| Heater Basis          | 1 kW ST42014 heating elements |

### Recirculation / Airflow System

|                               |                                                |
|-------------------------------|------------------------------------------------|
| Recirculation Airflow         | 1,200 CFM                                      |
| Recirculation Static Pressure | 2 in. W.c.                                     |
| Recirculation Fan             | Jan Air 12.188 in × 4 in radial blade assembly |
| Recirculation Fan Motor       | 1.5 HP                                         |
| Airflow Pattern               | Full horizontal                                |

### Exhaust System

|                         |               |
|-------------------------|---------------|
| Exhaust Fan             | PQ1 exhauster |
| Exhaust Airflow         | 225 CFM       |
| Exhaust Static Pressure | 1 in. W.c.    |
| Exhaust Fan Motor       | 0.75 HP       |

### Construction Materials / Shell System

|                      |                            |
|----------------------|----------------------------|
| Wall Thickness       | 2 in                       |
| Insulation           | 2 in of 6 lb mineral wool  |
| Interior Material    | Unpainted aluminized steel |
| Exterior Finish      | Traffic Gray (RAL 7042)    |
| Control Panel Finish | Gray (ANSI 61)             |
| Door Style           | Double swing doors         |
| Oven Stand           | 12 in high welded stand    |

### Product Handling / Internal Fixtures

|                  |              |
|------------------|--------------|
| Shelf Quantity   | 5 per oven   |
| Shelf Capacity   | 100 lb each  |
| Shelf Adjustment | 3 in centers |

### Controls & Electrical

|                        |                       |
|------------------------|-----------------------|
| Temperature Controller | SSI-804               |
| High Limit             | Gefran 650L           |
| Purge Timer            | Eagle BRE8A6          |
| Control Cabinet        | Oven-mounted NEMA 1   |
| Enclosure Size         | 36 in × 30 in × 12 in |
| Primary Power          | 208V / 3PH / 60Hz     |
| Full Load Amperage     | 35.9 A                |

|              |         |
|--------------|---------|
| Heat Control | 60A SSR |
|--------------|---------|

## Safety & Compliance

|                |                 |
|----------------|-----------------|
| Classification | NFPA 86 Class A |
|----------------|-----------------|

|                        |                         |
|------------------------|-------------------------|
| Maximum VOC Load Basis | 0.21 gal/batch o-xylene |
|------------------------|-------------------------|

|                      |                           |
|----------------------|---------------------------|
| Applicable Standards | NFPA 79, NFPA 86, UL 508a |
|----------------------|---------------------------|

|                 |                                            |
|-----------------|--------------------------------------------|
| Airflow Proving | Exhaust and recirculation airflow switches |
|-----------------|--------------------------------------------|

## Overall Dimensions / Shipping

|               |          |
|---------------|----------|
| Overall Width | 76.30 in |
|---------------|----------|

|               |          |
|---------------|----------|
| Overall Depth | 44.21 in |
|---------------|----------|

|                |          |
|----------------|----------|
| Overall Height | 92.73 in |
|----------------|----------|

|                         |          |
|-------------------------|----------|
| Approx. Shipping Weight | 1,150 lb |
|-------------------------|----------|

## Process Summary

|         |                                            |
|---------|--------------------------------------------|
| Product | Batch-processed product, customer-specific |
|---------|--------------------------------------------|

|                      |                                     |
|----------------------|-------------------------------------|
| Market / Application | Industrial process heating / baking |
|----------------------|-------------------------------------|

|              |                                                        |
|--------------|--------------------------------------------------------|
| Process Type | Low-temperature batch baking in a Class A cabinet oven |
|--------------|--------------------------------------------------------|

|                 |                                                   |
|-----------------|---------------------------------------------------|
| Order Structure | Two identical ovens with added shelves and stands |
|-----------------|---------------------------------------------------|

|                          |                                                                                                             |
|--------------------------|-------------------------------------------------------------------------------------------------------------|
| Key Verification Concept | Repeatable low-temperature processing with full horizontal airflow and Class A exhaust-purge safety control |
|--------------------------|-------------------------------------------------------------------------------------------------------------|



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