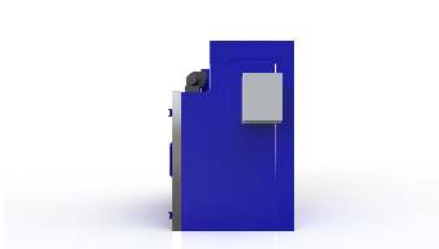




CASE STUDY

High-Temperature Gas Class A Truck Oven for Shelf-Loaded Industrial Coating Cure

Precision Quincy engineered this oven as a gas-fired Class A truck oven for high-temperature curing of industrial coating systems on shelf-loaded parts and fixtures. The documented design basis combined 800°F capability, full horizontal airflow, guided truck loading, and interlocked combustion and exhaust controls in a compact batch format suited for repeatable thermal processing in a specialty coating environment.



OVERVIEW

The project was developed as a 73-800 gas Class A truck oven for the customer, an industrial coating applicator serving a wide range of part sizes, batch quantities, and coating chemistries. The oven was built to support high-temperature batch cure processing for coated components and fixtures in a manufacturing environment handling both custom work and production-oriented coating throughput.

The documented equipment package centers on a 36 in W × 36 in D × 60 in H work chamber with a single guided shelf truck, 750°F to 800°F operating temperature, 800°F maximum temperature, and ±10°F uniformity. The oven uses full horizontal airflow across the work chamber, a 300,000 BTU/hr Selas PC0-B burner, a 1,600 CFM recirculation fan, and a 550 CFM PQ1 powered exhauster to deliver controlled high-temperature processing within a Class A safety framework.

The final electrical package incorporates a Watlow F4T ramp/soak controller, dual excess-temperature protection, and a NEMA 12 UL508A open industrial control panel. The oven also includes a guided truck track system, a 1500 lb truck capacity, and interlocked purge, airflow-proving, flame-safety, and cooldown functions to support repeatable operation in a solvent-bearing coating environment.



CUSTOMER PROCESS REQUIREMENTS

The project required a high-temperature truck-loaded batch oven for industrial coating operations where coated parts, fixtures, and mixed part geometries must be processed in a controlled thermal environment. The customer's business involves engineered coating application across a broad range of part sizes and coating types, so the oven had to support flexible loading and repeatable batch processing rather than a single dedicated product geometry.

Application requirement

- The project required a batch oven for high-temperature industrial coating cure processing.
- The oven had to support coated components and fixtures processed in a specialty coating environment handling variable product sizes and batch contents.
- The process required a thermal platform appropriate for solvent-bearing coating systems operating within a documented Class A basis.

Work chamber / loading requirement

- Required work chamber: 36 in W × 36 in D × 60 in H.
- The load format had to use a guided shelf truck for batch loading and unloading.
- The truck package had to include three 150 lb shelves with a total truck capacity of 1500 lb.
- The oven had to support repeatable airflow passage around loaded shelves and parts, making product positioning and fixturing discipline important to final processing performance.

Operator / access requirement

- The oven had to allow front loading and unloading through a single swing door.
- The floor system had to include integrated guide tracks to keep the cart aligned during loading and processing.
- The design had to support practical access to the work chamber while maintaining a compact equipment footprint.

Quality / process control requirement

- The customer required repeatable high-temperature thermal processing within the stated work-zone uniformity.
- The process required programmable temperature control for defined heat-up, soak, and cooldown behavior.
- The thermal package had to provide a consistent airflow pattern across the cart-loaded work zone.

Safety / environmental requirement

- The oven had to be configured as a Class A oven.
- The documented maximum volatile load basis was 0.25 gal/batch o-xylene.
- The process required powered exhaust, purge, airflow proving, flame supervision, and burner interlocks appropriate for solvent-bearing industrial coating work.

Site / utility requirement

- Required electrical service: 480V / 3PH / 60Hz.
- Required fuel: natural gas.
- Required gas inlet pressure: 2 PSI.

THERMAL / PHYSICAL PROCESS REQUIREMENTS

The project required a controlled high-temperature forced-convection process for thermal curing of coated parts under a Class A operating basis.

Temperature requirement

- Operating temperature basis: 750°F to 800°F.
- Maximum temperature basis: 800°F.

- Required work-zone uniformity: $\pm 10^{\circ}\text{F}$.

Airflow / heat-transfer requirement

- Airflow direction basis: full horizontal airflow.
- The process required forced-convection heat transfer across the cart-loaded work chamber.
- Using the documented recirculation airflow and the chamber cross-sectional area in the airflow direction, the first-pass chamber air velocity is approximately 107 FPM.

Heat-input requirement

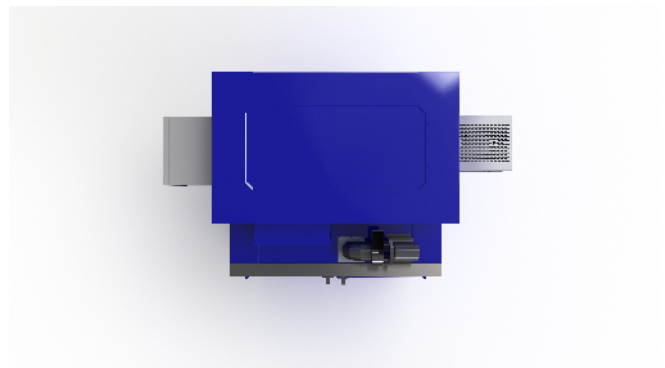
- Heat source: natural gas.
- Burner basis: Sela PC0-B.
- Burner heat input basis: 300,000 BTU/hr.
- Gas flow basis: 300 CFH.
- The burner package required controlled heat delivery suitable for sustained high-temperature batch operation.

Ventilation / safety-process requirement

- The process required Class A exhaust and purge sequencing.
- Powered exhaust basis: 550 CFM at 1 in. W.c.
- Maximum volatile load basis: 0.25 gal/batch o-xylene.
- The operating sequence required exhaust fan start, recirculation fan start, purge, burner light-off, and controlled heat-up.

Control / cooldown requirement

- Primary control basis: ramp/soak temperature control.
- The oven required a controlled shutdown profile supporting automatic cooldown and fan shutdown logic.
- The source package states that fans are not to be shut down while oven temperature is above 250°F .



EQUIPMENT CONCEPT & ARCHITECTURE

To satisfy those requirements, Precision Quincy configured the project as a high-temperature gas Class A truck oven with guided truck loading, horizontal airflow, and interlocked combustion and control architecture.

Pages 6–8 — Technical Specifications

Overall concept

- One 73-800 gas Class A truck oven.
- Compact batch configuration built around a truck-loaded work chamber.
- High-temperature thermal package developed for repeatable industrial coating cure processing.

Heating architecture

- Heat source: natural gas.
- Burner: Selas PC0-B.
- Burner input: 300,000 BTU/hr.
- Gas train arranged for NFPA 86-compliant safety shutoff, pressure supervision, and modulating heat control.
- Combustion package includes double blocking valves with proof of closure, high and low gas pressure switches, and flame safety supervision.

Airflow architecture

- Airflow pattern: full horizontal airflow.
- Recirculation system based on a 13.5 in × 5 in forward-curved fan wheel delivering 1,600 CFM at 2 in. W.c.
- The airflow circuit drives heated air across the truck load from one side of the work zone to the other for controlled cross-chamber convection.

Exhaust / ventilation architecture

- Class A exhaust based on a PQ1 exhauster delivering 550 CFM at 1 in. W.c.
- Fresh-air damper integrated into the oven body.
- Exhaust airflow proving and purge logic are interlocked with burner enable.

Chamber / shell architecture

- Internal work chamber: 36 in W × 36 in D × 60 in H.
- 6-inch insulated wall construction.
- Standard wall insulation: 6 lb density mineral wool.
- Heat chamber wall construction: 1 in 8 lb Superwool plus 5 in 6 lb mineral wool.
- Interior: unpainted aluminized steel.
- Exterior finish: PQ Blue.

- The oven includes a guided insulated floor track system for truck positioning.

Door / loading architecture

- Single front swing door.
- One guided shelf truck sized for the work chamber.
- Truck construction includes a mild steel frame with aluminized steel shelves.

Controls architecture

- Watlow F4T ramp/soak controller for primary temperature control.
- Dual Gefran 650L controllers for excess-temperature protection at the combustion chamber and work area.
- NEMA 12 control enclosure with UL508A open industrial control panel basis.
- Separate operator controls for exhaust fan, recirculation fan, and burner enable.
- Panel indication includes purging, burner on, and flame safety fault status.
- The control system includes fan shutdown and burner disable relay logic.

Safety architecture

- Applicable standards basis: NFPA 79, NFPA 86, UL508A.
- Safety logic includes:
 - Exhaust airflow proving
 - Recirculation airflow proving
 - Combustion blower airflow proving
 - High and low gas pressure supervision
 - Purge before burner light-off
 - Flame supervision and manual flame-safety reset
 - Dual excess-temperature protection

TECHNICAL SPECIFICATIONS

Oven Configuration

Model / Family	73-800
Type	Gas-fired Class A truck oven
Quantity	1 oven
Application	High-temperature industrial coating cure
Work Chamber	36 in W × 36 in D × 60 in H
Airflow Pattern	Full horizontal
Door Style	Single swing door
Loading Method	Guided shelf truck

Thermal / Heat Power System

Operating Temperature	750°F to 800°F
Maximum Temperature	800°F
Uniformity	±10°F
Heat Source	Natural gas
Burner	Selas PC0-B
Burner Input	300,000 BTU/hr
Gas Inlet Pressure	2 PSI
Gas Flow Basis	300 CFH
Design Elevation	<1000 ft

Recirculation / Airflow System

Airflow Pattern	Full horizontal airflow
Recirculation Fan Wheel	13.5 in × 5 in forward-curved wheel
Recirculation Airflow	1600 CFM

Recirculation Static Pressure	2 in. W.c.
Recirculation Fan Motor	1.5 HP
Estimated Chamber Air Velocity	~107 FPM

Exhaust / Ventilation System

Exhaust Fan	PQ1 exhauster
Exhaust Airflow	550 CFM
Exhaust Static Pressure	1 in. W.c.
Exhaust Fan Motor	0.75 HP
Maximum VOC Load	0.25 gal/batch o-xylene
Oven Classification	Class A
Fresh Air Provision	Integral fresh-air damper

Truck / Loading System

Truck Quantity	1
Truck Capacity	1500 lb total
Shelf Package	3 shelves at 150 lb each
Truck Structure	Mild steel
Shelf Material	Aluminized steel
Cart Width	30.00 in
Cart Depth	32.00 in
Cart Height	58.82 in
Shelf Width	26.43 in
Shelf Spacing	13.82 in × 3 spaces
Floor to First Shelf	11.88 in

Construction

Wall Thickness	6 in
Main Wall Insulation	6 lb mineral wool
Heat Chamber Wall Insulation	1 in 8 lb Superwool + 5 in 6 lb mineral wool
Interior Material	Unpainted aluminized steel
Exterior Finish	PQ Blue
Approximate Oven Weight	3300 lb
Floor Feature	Integrated guided insulated floor track

Controls & Electrical

Power Supply	480V / 3PH / 60Hz
Full Load Amps	7.7 A
Main Temperature Controller	Watlow F4T ramp/soak
Excess Temperature Controllers	2 × Gefran 650L
Control Enclosure	NEMA 12
Enclosure Size	42 in × 30 in × 12 in
Junction Box Size	14 in × 12 in × 6 in
Enclosure Listing Basis	UL508A open industrial control panel
SCCR	5000 amps
Control Indicators	Purging, burner on, flame safety fault

Combustion / Safety Package

Fuel	Natural gas
Regulated Pressure at Gauge	5.0 in. W.c.
Recommended Low Gas Pressure Setting	3 in. W.c.
Recommended High Gas Pressure Setting	6 in. W.c.
Flame Safety	Dungs flame safety

Gas Safety Valves	Dual safety shutoff / double blocking valves with proof of closure
Control Signal	4–20 mA
Control Voltage	120V

Equipment Dimensions

Overall Width	80.19 in
Overall Depth	61.28 in
Overall Height	100.12 in
Oven Body Width	60.27 in
Oven Body Depth	53.64 in
Oven Body Height	95.97 in
Height to Top of Control Enclosure	52.00 in
Track Center-to-Center Width	19.00 in
Track Width	4.50 in
Guide Width	2.50 in
Guide Height	1.00 in



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