

## ◆ PCO<sub>2</sub>-14™ Polyimide cure

### A clean process oven designed for polyimide baking and curing applications



The Despatch PCO<sub>2</sub>-14™ electrically heated oven was designed to meet the specific process requirements for hard baking polyimide coatings in an inert atmosphere. This high-performance, clean process oven (ISO Class 5/Class 100 recirculated airflow) offers many unique components, including a pressure relief system, an oxygen control system and a process monitoring system which allows the oven to achieve the strict oxygen level and atmospheric requirements involved in polyimide curing.

**Pressure Relief System:** In the “hard bake” polyimide cure process, residual solvent is removed and desired surface properties are finalized. The process of removing solvents requires that the oven contain equipment to help prevent and collect solvent condensation. Despatch designed the PCO<sub>2</sub>-14™ with a pressure relief system that includes a removable “cold trap”, an easy-to-clean condensate trap that helps to prevent polyimide buildup in the oven’s exhaust.

**Oxygen Monitor and Control System:** The PCO<sub>2</sub>-14™ is an inert atmosphere oven which allows the oxygen level to be maintained at 20ppm or less to help prevent oxidation of the polyimides being cured. The oven contains an O<sub>2</sub> monitor which is wired to the purge valve and turns the nitrogen purge on whenever the oxygen level is above the O<sub>2</sub> monitor set point. Once the nitrogen purge is complete, the O<sub>2</sub> level is maintained at a set point by a controller that operates a modulating valve during the curing process. This process minimizes the nitrogen usage and allows for consistent and repeatable product curing.

**Process Monitoring System:** The oven’s PC features Protocol Plus™ software to allow for communication between the PC and the oven, an Ethernet connection and a 15” flat panel display screen. The Protocol Plus™ software communicates directly with the oven’s Protocol Plus™ controller, O<sub>2</sub> controller, O<sub>2</sub> monitor and integrated PC to observe and data log entire cycles and provide the user with real-time information on set points, actual chamber temperatures and O<sub>2</sub> levels throughout the entire process.



## PCO2-14

### PHYSICAL SPECIFICATIONS

Chamber size (width x depth x height) * Clear opening width is reduced by 1.5 in. (3.8 cm) due to 3/4 in. (1.9 cm) shelf supports on each side.	25.5w* x 26d x 37h in. 64w* x 66d x 94h cm
Capacity in cubic feet (liters)	14 (396)
Overall size (width x depth x height)	60w x 50d x 71h in. 152.4w x 127d x 180.3h cm
Electrical: Three phase 60 HZ, 208 volts	Heater: 16 KW
Electrical: Three phase 60 HZ, 240 volts	Heater: 16 KW
Electrical: Three phase 50 HZ, 380 volts	Heater: 16 KW
Electrical: Three phase 60 HZ, 480 volts	Heater: 16 KW
Ventilation exhaust diameter	3 in. flange connection
Number of shelves provided	2 stainless steel
Maximum number of shelves	11 on 3" (7.62 cm) centers
Approximate net weight	1000 lbs. (455 kg)
Approximate shipping weight	1200 lbs. (545 kg)

### FUNCTIONAL SPECIFICATIONS

Time to temperature with no load (50°C to 100°C)	3 minutes (non-ISO Class 5)
Time to temperature with no load (50°C to 200°C)	9 minutes (non-ISO Class 5)
Time to temperature with no load (50°C to 260°C)	15 minutes (non-ISO Class 5)
Time to temperature with no load (50°C to 350°C)	35 minutes (non-ISO Class 5)
Cooling time to temperature with no load (100°C to 65°C) *Based on cooling water supplied at 3 GPM, 13°C	15 minutes*
Cooling time to temperature with no load (175°C to 65°C) *Based on cooling water supplied at 3 GPM, 13°C	20 minutes*
Cooling time to temperature with no load (260°C to 65°C) *Based on cooling water supplied at 3 GPM, 13°C	25 minutes*
Cooling time to temperature with no load (350°C to 65°C) *Based on cooling water supplied at 3 GPM, 13°C	30 minutes*
Temperature uniformity at 100°C	+/- 1°C
Temperature uniformity at 200°C	+/- 2°C
Temperature uniformity at 260°C	+/- 3°C
Temperature uniformity at 350°C	+/- 3.5°C
Control stability	+/- 0.5°C
Operating range with 20°C ambient temperature	35°C-350°C (95°F-662°F)
Maximum load capacity	400 lbs (181 kg)
Maximum shelf capacity	50 lbs (23 kg)
1.5 HP recirculating fan with horizontal airflow	950 CFM (448 liter/sec)

### FEATURES AT A GLANCE

- ◆ Compact cabinet design that minimizes footprint
- ◆ All interior seams continuously welded on insulation side to protect the work chamber from contamination
- ◆ 4" thick insulation in chamber to minimize heat loss, air leakage and external thermal spots
- ◆ Recirculation air is 100% filtered through a 99.99% HEPA filter for ISO Class 5 (Class 100) or better operation
- ◆ Magnehelic gauge monitors HEPA filter pressure to indicate when to replace filter
- ◆ Protocol Plus microprocessor-based digital programmable control with LED temperature display and LCD status panel
- ◆ Silicone-free construction
- ◆ End of cycle, high-limit audible and visual alarms
- ◆ CE and Semi S2 compliant
- ◆ Programmable, electronic door lock
- ◆ Installation and burn-off of HEPA filter including post-burn off cleaning of the chamber
- ◆ Cleaning and triple bagging in clean room before shipment



- ◆ The removable "cold trap" is an easy-to-clean condensate trap that prevents polyimide buildup in the oven's exhaust.

Notes: Uniformity figures are based on a nine-point test conducted in an empty oven after stabilization period. Uniformity can vary slightly depending on unit and operating conditions. Minimum operating temperature and cooling times are based on 20°C ambient temperature measured at the fresh air inlet. Times to temperature with no load are based on non-ISO Class 5 (non-Class 100) conditions. Class 100 HEPA filtration will limit ramp rates to 5°C per minute. Specifications are subject to change without notice. If the existing specifications differ from yours, ask about our customizing capabilities.

Warning: Despatch PCO2-14™ ovens are not to be used with flammable solvents, materials or enclosed containers. Soft bake of the polyimide coatings must be done in a Class A oven prior to hard baking in the PCO2-14™.

### SERVICE AND TECHNICAL SUPPORT

service parts: 1-800-473-7373  
international service/main: 1-952-469-8230  
service fax: 1-952-469-8193

service@despatch.com

### GLOBAL HEADQUARTERS

phone: 1-888-DESPATCH (1-888-337-7282)  
international/main: 1-952-469-5424  
fax: 1-952-469-4513

sales@despatch.com  
www.despatch.com

8860 207th Street West  
Minneapolis, MN 55044 USA

**Despatch**  
INDUSTRIES