

Small-Scale Spacecraft Composite Curing Oven

University of Colorado, Boulder Mechanical
Engineering Senior Design Project

Significant Features

Temperature Profile Precision

Max Temp: 500 °F
Uniform Temp Precision: +/- 5 °F
Temp Change Rate: 2 °F/min
Exterior Surface Temperature: max
140 °F

Payload Structural Support

Oven accepts 300-lb tooling plates

PID Controlled Interface

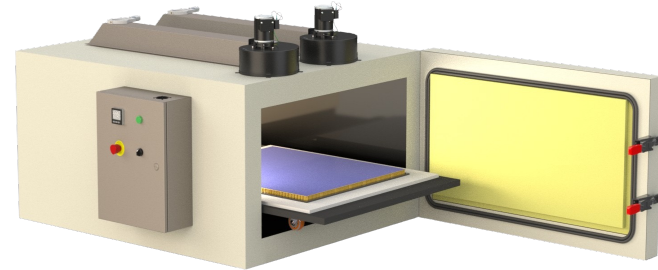
Capable of precise temperature
display, simple user interface
design, and stores curing cycle
profiles for convenient access

Thermal Resistant Materials

Frame: steel square tubing
Panels: 22-gauge A36 mild steel
Insulation: 4" thick mineral wool

HVAC

Supports electrical heating
element, two industry-grade
blowers, and custom duct for
uniform heat distribution
Additive Control Feature:
Arduino



Technical Specifications

Oven Details

Door Latch Amount: 2
Door Removable: No
Power on Indicator Light: Yes
Language: English, Italian
Emergency Shut-off: Yes
Post Cycle Automatic Shut-off: No
Latch Material: Rubber Composite
Panel Coating: TBD
Frame Coating: HIGH HEAT
Removable HVAC System: Yes
Removable Panels: Yes
Adjustable Baffle: Yes
Serviceable Heating Element: Yes
Cycle Profile/Time Displayed: Yes
Exhaust Ports: 3
Vacuum Ports: 1

Configuration & Overview

Emergency Shut-off: Yes
High Temperature Override Shut-off: Yes
Power Type: Electric
Heating Element: Resistive Finned
Strip Heater – 3450W each
Thermocouple Amount: 3
Thermocouple Types: K-Type
High-Temp Blowers: 2
Intake Blower Temperature: 450 F
Internal Filtration System: No
Exhaust Filtration System: TBD

Oven Details

Thermocouple Mounts: 2
Convection Element: High-Temp Blowers
Cleaning Method: Manual

Oven Dimensions (LxWxH)

System – 60"x48"x28"
Chamber – 52"x40"x20"
Door – 48"x28"x4"

Maximum Temperature

500 °F

Design Temperature

350 °F

Total System Weight

700 lbs

Electrical Design

240V / 50A
Power Cord Included

System Power

7418 W