Section 11

# SPECIFICATIONS

| LCI Furnaces DIVISION OF LOCHABER CORNWALL INC<br>CONTINUOUS BELT IR FURNACE | EQUIPMENT SPECIFICATIONS | DOC NBR: STD - 802-101401-01 \| R1<br>MODEL: LA-306 STD & HIGH POWER<br>SERIAL NBR: ALL SIZE A SHT 1 OF 1 |
|---|---|---|

## Equipment Model

| Model | Base Equipment | Control Zones | Furnace Heated Length | Nominal Furnace Belt Width |
|---|---|---|---|---|
| LA-306 | Continuous Belt Controlled Atmosphere Furnace | 3 | 30 in 762 mm | 6.0 in 152 mm |

## Equipment Arrangement

| Phase | Process | Max | Length | Process Gas | Temperature (typ) |
|---|---|---|---|---|---|
| Phase 1 | IR Furnace, 3 Zones | 1000 °C | 30 in 762 mm | CDA, N2, FG | 80-950 C |
| Phase 2 | Gas Convective Cooling, Exterior Fan Heat Removal (includes transition tunnel) | | 45 in 1143 mm | CDA or N2 | 350-40 C |

## Process Sections

| Function | Name | Location | Length | Process Gas (typ) | Temperature (typ) |
|---|---|---|---|---|---|
| Product Load | Load Station | Entrance load area | 15 in 381 mm | none | ambient |
| IR Furnace | Entr Baffle/Entrance Eductor | Entrance barrier | 15 in 381 mm | CDA or N2 | 80-250 |
| | Zone 1 | Heating chamber 1 | 7.5 in 191 mm | N2 or FG | 80-975 |
| | Zone 2 | Heating chamber 1 | 15 in 381 mm | N2 or FG | 80-975 |
| | Zone 3 | Heating chamber 1 | 7.5 in 191 mm | N2 or FG | 80-975 |
| Cooling Section | Transition Tunnel | Heat/cool barrier | 15 in 381 mm | CDA or N2 | 80-450 |
| | Cooling | Cooling section | 30 in 762 mm | CDA or N2 | 55-350 |
| Product Unload | Unload Station | Exit unload area | 15 in 381 mm | none | ambient |
| | Frame Adjustment | | 3 in 76 mm | | |
| | Total | | 123 in 3124 mm | | |

## Process Gas (If Single Gas combine GAS1 & GAS2. Dual Gas: GAS 2 = CDA, N2 or FG to furnace heating zones, GAS1=N2 or CDA to all except zones)

| | Actual Conditons | | Minimum | | Typical | | Max (all flowmeters open) | |
|---|---|---|---|---|---|---|---|---|
| Furnace Replenishment Rate | | | 1.0 rep/min | | 2.0 rep/min | | 14.6 rep/min | |
| | Temp °C | Press psi | Min Flow scfh | Min Flow sL/m | Typical scfh | Typical sL/m | Max Compressor scfh | Max Compressor sL/m |
| GAS 1 SUPPLY | 21 | 70 | 75 | 35. 2 | 190 | 90 | 928 | 438 |
| GAS 2 SUPPLY | 21 | 70 | 17 | 8 | 121 | 57 | 417 | 197 |
| TOTAL PROCESS GAS | | | 92 | 43 | 312 | 147 | 1,345 | 635 |

## Exhaust Gas

| | Temp °C | Press in $H_2O$ | Min Flow scfh | Min Flow sL/m | Typical scfh | Typical sL/m | Max Stack (exhaust flowmeter open full) scfh | Max Stack (exhaust flowmeter open full) sL/m |
|---|---|---|---|---|---|---|---|---|
| GAS 1 & 2, MIX | 200 | 6 | 92 | 43 | 312 | 147 | 348 | 164 |

## Exhaust Cooling Air

| | | | | | |
|---|---|---|---|---|---|
| CABINET EXHAUST - HEATING CHAMBER | Flowrate | 656 cfm | 1110 m3/h | 656 cfm | 1110 m3/h |
| | Temperature | <104°F | <40°C | <104°F | <40°C |
| CABINET EXHAUST - COOLING MODULE EXTERIOR FANS | Flowrate | 424 cfm | 720 m3/h | 424 cfm | 720 m3/h |
| | Temperature | <104°F | <40°C | <104°F | <40°C |
| **STANDARD CONDITIONS** | Pressure | | 14.7 psia | | 101.3 kPa |
| | Temperature | | 70 °F | | 21 °C |

## Transport System

| | | | |
|---|---|---|---|
| Belt type | Balanced spiral weave | | |
| Belt width | 6.0 in 152.4 mm | Belt Edge Heater(s): | none |
| Product height clearance | Standard: 2 in (50 mm) \| Optional:1 in (25 mm), 4 in (100 mm) | Baffle plate clearance: | 0.5" above belt |
| Belt speed ranges & units | Standard: 2-20 ipm \| 2.5-50 cm/min \| 25-500 mm/min | Optional: | 4-40 ipm \| 5-100 cm/min \| 50-1000 mm/min |
| Conveyor height | 36.0 in +/- 1.5 in adjustable | | 914.4 mm +/-38.1 mm adjustable |

| Electrical System | Standard | | | | High Power | | | |
|---|---|---|---|---|---|---|---|---|
| Voltage (as configured) | 208 Vac | 220 Vac | 230 Vac | 240 Vac | 208 Vac | 220 Vac | 230 Vac | 240 Vac |
| Frequency, Hz | 50/60 | 50/60 | 50/60 | 50/60 | 50/60 | 50/60 | 50/60 | 50/60 |
| Phase | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Power, maximum, kW | 13.8 | 14.2 | 14.5 | 14.8 | 17.2 | 17.2 | 17.2 | 17.2 |
| Current, maximum, A | 66.5 | 64.4 | 62.9 | 61.6 | 82.6 | 78.1 | 74.7 | 71.6 |

## Materials of Construction

| | | | | | |
|---|---|---|---|---|---|
| Heating Chamber | 304 Stainless steel | Cooling | Aluminum, aircraft | Belt | NichromeV, 80%Ni,20%Cr,<1% Fe |
| Baffle & Eductor | 304 Stainless steel | Belt support | Quartz rod, Quartz tube | Frame | Steel, epoxy or powder coated |
| Heating element | Quartz, near infrared | Belt Return | UHMW-PE | Cover Panels | 18GA steel, epoxy or powder coated |

## Furnace Dimensions

| | Length | Width | Height (floor to stack) | Furnace Sect | Coolg Sectn | Total Net Wt |
|---|---|---|---|---|---|---|
| U.S. | 121 in | 25 in | 67.5 in +/- 1.5 in | 1100 LB | included | 1100 LB |
| Metric | 3.07 m | 0.64 m | 1.71 m +/- 0.038 m | 500 kg | included | 500 kg |

| LCI Furnaces DIVISION OF LOCHABER CORNWALL INC | DATA SHEET | DOC NBR: STD | 802-101529 | R0 |
|---|---|---|---|---|
| | IR FURNACE SYSTEM BASE FUSE LIST | MODEL: LA-306 | APVL SLB | 11/12/12 |
| | | SERIAL NBR: ALL | PRNT 12Nov12 | |
| SPECIFICATIONS | | DATE: 05/09/12 | SHT 1 of 1 | |

## STANDARD LA-306

| Safety Enclosure (TR0, basic control) | | |
|---|---|---|
| **Fuse Label** | **Size (A)** | **Comments** |
| FA | 5 | 24 Vac control, AGC |
| FB | 4 | 117 Vac power, AGC |
| F1 | 4 | To TR0, L1 leg, KTK |
| F2 | 4 | To TR0, L2 leg, KTK |

| Power Distribution Panel | | |
|---|---|---|
| **Fuse Label** | **Size (A)** | **Comments** |
| FE | 1 | Zone Controller 1, 117 Vac, AGC |
| EF | 1 | Zone Controller 2, 117 Vac, AGC |
| FG | 1 | Zone Controller 3, 117 Vac, AGC |
| FH | 1 | Belt Speed Readout, 117 Vac, AGC |

| Belt Motor Controller | | |
|---|---|---|
| **Fuse Label** | **Size (A)** | **Comments** |
| MB & MC | 0.062 | Isolation board, slow blow |
| Line Fuse | 15 | On control board, ABC (ceramic) |
| Motor Fuse | 1.5 or 2 | On control board, varies w/ motor HP, ABC |

| Heating Lamp/Edge Heat SCR Fuses (all KTK) | | |
|---|---|---|
| **Fuse Label** | **Size (A)** | **Comments** |
| F30 | 15.0 | Zone 1 Top, 208-240 Vac, KTK |
| F31 | 15.0 | Zone 1 Bottom, 208-240 Vac, KTK |
| F32 | 15.0 | Zone 2 Top, 208-240 Vac, KTK |
| F33 | 15.0 | Zone 2 Bottom, 208-240 Vac, KTK |
| F34 | 15.0 | Zone 3 Top, 208-240 Vac, KTK |
| F35 | 15.0 | Zone 3 Bottom Top, 208-240 Vac, KTK |

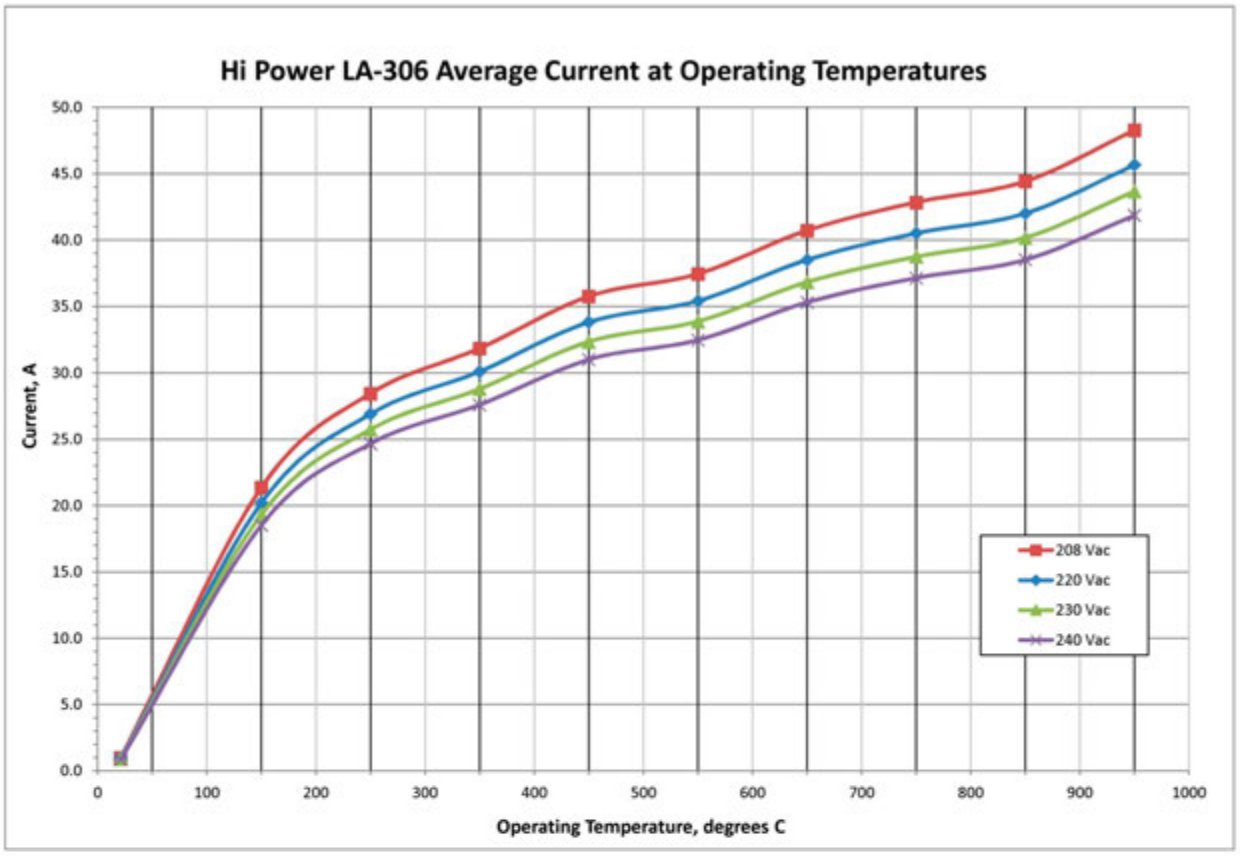
## HIGH POWER LA-306

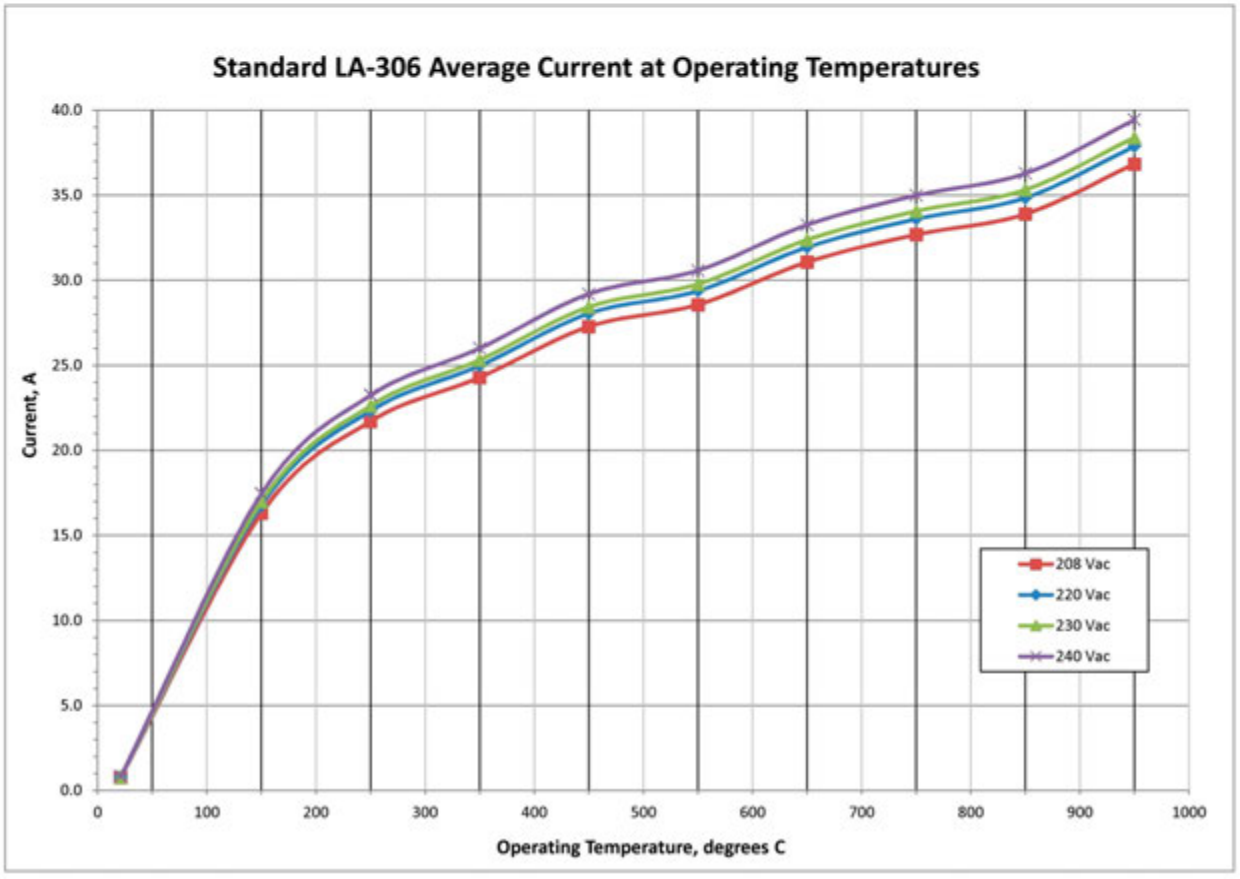
| Safety Enclosure (TR0, basic control) | | |
|---|---|---|
| **Fuse Label** | **Size (A)** | **Comments** |
| FA | 5 | 24 Vac control, AGC |
| FB | 4 | 117 Vac power, AGC |
| F1 | 4 | To TR0, L1 leg, KTK |
| F2 | 4 | To TR0, L2 leg, KTK |

| Power Distribution Panel | | |
|---|---|---|
| **Fuse Label** | **Size (A)** | **Comments** |
| FE | 1 | Zone Controller 1, 117 Vac, AGC |
| EF | 1 | Zone Controller 2, 117 Vac, AGC |
| FG | 1 | Zone Controller 3, 117 Vac, AGC |
| FH | 1 | Belt Speed Readout, 117 Vac, AGC |

| Belt Motor Controller | | |
|---|---|---|
| **Fuse Label** | **Size (A)** | **Comments** |
| MB & MC | 0.062 | Isolation board, slow blow |
| Line Fuse | 15 | On control board, ABC (ceramic) |
| Motor Fuse | 1.5 or 2 | On control board, varies w/ motor HP, ABC |

| Heating Lamp/Edge Heat SCR Fuses (all KTK) | | |
|---|---|---|
| **Fuse Label** | **Size (A)** | **Comments** |
| F30 | 15.0 | Zone 1 Top, 208-240 Vac, KTK |
| F31 | 15.0 | Zone 1 Bottom, 208-240 Vac, KTK |
| F32 | 20.0 | Zone 2 Top, 208-240 Vac, KTK |
| F33 | 20.0 | Zone 2 Bottom, 208-240 Vac, KTK |
| F34 | 15.0 | Zone 3 Top, 208-240 Vac, KTK |
| F35 | 15.0 | Zone 3 Bottom Top, 208-240 Vac, KTK |




Expected furnace current draw when stabilized at various temperatures.