

 <b>FurnacePros</b> DIVISION OF LOCHABER CORNWALL, INC. CONTINUOUS BELT IR FURNACE	<b>EQUIPMENT SPECIFICATIONS</b>	DOC NBR: 16-008 - 802-101401 R0	
		MODEL: RTC LA-306	CUSTOMER: Global Circuit Innovations
		SERIAL NBR: 1306039006	SHT 1 OF 1 PRNT 04/12/21

Equipment Model		Application: Low O2 Glass Plate			
Model	Base Equipment	Control Zones	Furnace Heated Length		Nominal Furnace Belt Width
RTC LA-306	Continuous Belt Controlled Atmosphere Furnace	3	28 in	70 cm	6.0 in 15 cm

Equipment Arrangement					
Phase	Process	Max	Length		Process Gas Temperature (range)
Phase 1	IR Furnace, 3 Zones	1000 °C	28 in	70 cm	N2 100-960 C
Phase 2	Transition Tunnel		15 in	38 cm	N2 100-850 C
	Gas Convective Cooling, Exterior Fan Heat Removal		30 in	76 cm	N2 25-360 C

Process Sections					
Function	Name	Location	Length		Process Gas Temperature (typ)
	Load Station	Entrance load area	9.5 in	24 cm	ambient
IR Furnace	ENTRANCE BAFFLE	Entrance barrier	6.3 in	16 cm	N2 360 °C
	ZONE 1	Heating chamber 1	6.6 in	17 cm	N2 650 °C
	ZONE 2	Heating chamber 1	14.3 in	36 cm	N2 800 °C
	ZONE 3	Heating chamber 1	6.6 in	17 cm	N2 800 °C
Cooling	TRANS TUNNEL, NO ED	Heat/cool barrier, single ed	6.3 in	16 cm	N2 700 °C
	CACT-COOLING TUNNEL	Cooling section	40.0 in	102 cm	N2 260 °C
Product Unload	Unload Station	Exit station	9.5 in	24 cm	ambient
	Frame Adjustment		1.0 in	3 cm	
	Total		100.0 in	254 cm	

Process Gas						
	Actual Condions		Typical	Typ Annealing (pos atmos)		Max (all flowmeters open)
Furnace Replenishment Rate			2.0 rep/min	3.3 rep/min		8.7 rep/min
	Temp °C	Press psi	Min Flow scfh	Min Flow sL/m	Typical scfh	Typical sL/m
N2 Supply or CDA	21	70	177	84	286	135
TOTAL PROCESS GAS			177	84	286	135
					scfh	Max Compressor sL/m
					1,547	730

Exhaust Gas							
	Temp °C	Press in H2O	Min Flow scfh	Min Flow sL/m	Typical scfh	Typical sL/m	Maximum Exhaust sL/m
N2 & none mix	200	6	89	42	176	83	3,477 1 641


Cabinet Ventilation			
Cabinet Ventilation Fans (vent to room or exhaust system)	Flowrate	550 cfm	930 m3/h
	Temperature	<86°F	<30°C

Transport System			
Belt width	6.0 in	15.2 cm	Belt Edge Heater(s): none
Belt type	Balanced spiral weave		Motor: Bison 1/10 HP
Product height	2 in (5.1 cm) above belt level.		Baffle plate clearance: 0.25" above belt
Belt speed range	0.5 - 10 inches per minute		1.27 - 25.4 cm per minute
Conveyor height	36.0 in	+/- 1.5 in adjustable	91.4 cm +/-3.8 cm adjustable

Electrical System	
Voltage required	208 Vac, 60 Hz, 3 Ph
Maximum power required	13.9 kW, 38.5 A
Typical (operating) power required	7.4 kW, 20.6 A

Materials of Construction					
Heating Chamber	Aluminum, aircraft	Cooling	Aluminum, aircraft	Belt	Nichrome V, 80%Ni,20%Cr, <1% Fe
Baffle & Eductor	Aluminum, aircraft	Belt support	Quartz rod, Quartz tube	Frame	Steel, 2-prt urethane or powder coated
Heating element	Quartz, near infrared	Belt Return	UHMW-PE	Cover Panels	18GA Steel, urethane or powder coated

Furnace Dimensions							
		Length	Width	Height (floor to stack)	Furnace Sect	Cool Sectn	Weight
Furnace, English	Net	102 in	18 in	65 in +/- 1.5 in	800 LB		800 LB
Furnace, Metric	Net	2.59 m	0.46 m	1.64 m +/- 0.04 mm	363 kg		370 kg
Standard Conditions		Pressure	14.7 psia	101.3 kPa	Temperature	70 °F	21 °C

 <b>FurnacePros</b> DIVISION OF LOCHABER CORNWALL, INC.	<b>DATA SHEET</b>			DOC NBR:	16-008	802-101501	RO
	<b>IR FURNACE SYSTEM POWER &amp; CURRENT</b>			MODEL:	RTC LA-306	APVL:	SLB 3/30/16
				SERIAL NBR:	1306039006	CONF:	JMC 4/12/21
Customer: Global Circuit Innovations				PRINT:	04/12/21	SHT	1 of 1

INPUT TABLE	Entry OK?	VALID	
Enter Line Voltage: (208,220,380,400,415,480)		208 Vac	TRUE
Limit Lamps to Max Rating? (Y/N)		Y	TRUE
Line Frequency (50/60)		60 Hz	TRUE
Number of Phases:		3 Φ	TRUE
Lamp Length (6, 9, 15, 24, 36)		6 inches	TRUE
Typical Operating %		52 %	TRUE

SUMMARY OF RESULTS	
<b>Max Power:</b>	<b>13.8 kW</b>
<b>Max Current:</b>	<b>38.4 A</b>
<b>Typical Power:</b>	<b>7.4 kW</b>
<b>Typical Current:</b>	<b>20.5 A</b>

HARDWARE	
Lamps: 28	SCRs: 6
EMs: 12 LEDs	TCs: 3
EM IDC5: n/a	
Nbr strings 12	
Nbr Lamps in 10" zone: 6	AOV-25: none
	AITM: none

CONFIGURATION	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Zone 7	Zone 8	Zone 9	Zone 10	Zone 11	Zone 12	Totals
Length (6.6,7.5,10,14.3,15,20,30) in.	6.6	14.3	6.6										28 in.
Length Entry OK?	TRUE	TRUE	TRUE										
(F)urn., (F)urn. (1) SCR-Zn, (D)ryer	F	F	F										3
Zone Type OK?	TRUE	TRUE	TRUE										
No. Lamps in Series/String (1-5)	2	3	2										
Lamps/String OK?	TRUE	TRUE	TRUE										
No. Lamps in Top/Bottom Power	4/4	6/6	4/4										Plenum: 110
	F	H	F										
SCR PHASE	Zone Entry OK?	VALID	VALID	VALID									Lamp Balance (kW)
Top Lamp Phase (1/2/3):		1	2	3									Phase 1: 4.8
Bottom Lamp Phase (1/2/3):		1	2	3									Phase 2: 3.9
													Phase 3: 4.8
SCR POWER													<-- Vrms
Rated Lamp Voltage	104	104	104										
Max. Lamp Wired Voltage	104	69	104										
50% Power SCR Cal Span Setting	147	147	147										
Max. Lamp Wired Power (W)	600	321	600										
No. Strings per SCR	2	2	2										
Max. Current per String (A)	5.8	4.6	5.8										
No. Lamps in Zone	8	12	8									28	
No. SCRs in Zone	2	2	2									6	
No. Strings in Furnace Zones	4	4	4									12	
												Nbr. lamp strings per element monitor:	
Top Lamp Power (kW)	2.4	1.9	2.4										
Bottom Lamp Power (kW)	2.4	1.9	2.4										
Total Power/Zone (kW)	4.8	3.9	4.8									13.5	
Current Required Top SCR (A)	11.5	9.3	11.5										
Current Required Bottom SCR (A)	11.5	9.3	11.5										
Color Temp (K) (nominal: 2500K)	2500	2152	2500										
Peak Wavelength (µm)	1.16	1.35	1.16										
Estimated Lamp Life (hrs)	6000 hr	Long	6000 hr										
Lumen Output vs. Rated (%)	100	27	100										

Furnace Total	Number of Item?	Voltage (Vac)	Current (Amps)	Power (kW)		Phase Assigned	EH in EM? (y/n)	Other Items
				Max	Typical			
Lamps	28	208	as above	13.5	7.0	as above	N	10" Cabinet or CACT Fans, 117 Vac, 0.30/029 A for 50/60 Hz
PC, Monitor	0	117	1.3			1	TRUE	4" Box (Muffin) Fans, product cooling, 117 Vac, 0.16 A
Belt, Opto22, EM	1	117	2.1	0.2	0.2	1		Cross-flow Fans, product cooling, 230 Vac, 1.27 A max
UC (Pump & Gen)		117	10.0					Lower Cabinet Blowers (Impellers), 230 Vac, 0.72 A max
UC (Tank Heater)		117	8.4					H2 Igniters, 120 Vac, 5 A 24 Vdc PS, 120 Vac, 2 A
UCD (Blower)		117	2.0					No more than 8 SCRs/phase per TRx xfmr 24 Vac secondary
UCD (Heater)		208	6.9					TR1: 2 TR2: 2 TR3: 2
Edg Htr 1 Length								EH1 Ω: Current: Cal Span:
Edg Htr 2 Length								EH2 Ω: Current: Cal Span:
Edg Htr 3 Length								EH3 Ω: Current: Cal Span:
Cabinet Vent Fan 10"	1	117	0.29	0.0	0.0	1	OK	Cabinet/CACT/Control Box Fans: 1.25 A
CACT Fans 10"	0	117	0.29					
CACT Fans 4"	4	117	0.16	0.1	0.1	1	OK	
Control Box Fans 4"	2	117	0.16	0.0	0.0	1	OK	
Prod Cooling fans		117	0.16					
Furnace Totals:				13.8	7.4			

PHASE	PHASE BALANCING			TOTAL
	1	2	3	
LAMP PWR, kW	4.8	3.9	4.8	13.5
EH/OTHER	0.4	0.0	0.0	0.4
TOTAL	5.2	3.9	4.8	13.8

**FLOWMETER SETTINGS**

DOC NBR:	16-008 - 802-101460-01	R0
MODEL:	RTC LA-306	DWN: SLB 03/31/16
SERIAL NBR:	1306039006	APVL: JMC 04/12/21
PRINT:	14Apr21	PM: JMC 04/14/21

PROCESS GAS

GAS1  Nitrogen

GAS2  none

**SETTINGS FOR STANDARD FLOW: SINGLE GAS MODEL**  
**N2 or CDA**

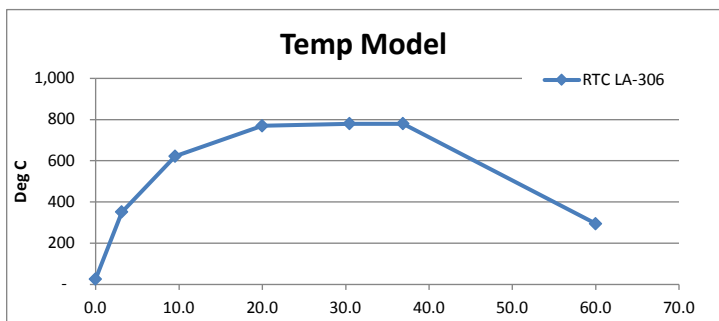
Replenish Rate is the number of times/minute that the furnace (or a section of the furnace) evacuates its gas

Replenish Rate	Furnace or Section Replenishes/Hour	Time to Refresh Furnace or Section
1 times/minute	60 times/hour	60 seconds
2 times/minute	120 times/hour	30 seconds
3 times/minute	180 times/hour	20 seconds
4 times/minute	240 times/hour	15 seconds

Different sections of the furnace can be replenished at different rates, if required

Flowmeters graduated in: sL/m (lg=RMC flowmeters, sm=small RMA flowmeters)

BALANCE		0.0 scfh difference		Balanced atmosphere in furnace		1 per Minute Replenish Rate Flow Setting		2.5		Initial Flowmeter Setting		Initial Flowmeter Setting		
0 sL/m grad		0.0% incr (decr) of inflows over outflows		Metered Gas		Flowmeter Size L/m		Desired Replenish Rate per Minute		scfh grad		sL/m grad		
No.	Location	Label	deg C	Metered Gas	Flowmeter Size L/m	1 per Minute Replenish Rate Flow Setting sL/m grad	Desired Replenish Rate per Minute	Initial Flowmeter Setting scfh grad	Initial Flowmeter Setting sL/m grad					
1	BESE Entrance barrier	ENTR BAFFLE		N2	100	2.0	2.5	11	5					
2	Z1 Heating chamber 1	ZONE 1	650	N2	100	2.2	5.0	23	11					
3	Z3 Heating chamber 1	ZONES 2 & 3	800	N2	100	5.9	5.0	63	30					
4	TT Heat/cool barrier, no ed	TRANS TUNNEL	700	N2	100	1.3	3.0	8	4					
5	CACT Cooling section	COOLING		N2	100	12.1	1.7	42	20					
6	HC Heat chamber sides	LAMP SEALS		N2	100	12.5	2.5	66	31					
						39.2	2.6	213	101					
EXHAUST										distr %	scfh grad	sL/m grad		
7	EEBE Entrance Stack	ENTR STACK		N2	100		100%	10.7	5.0					
										100%	10.7	5.0		



Furnace Balance		scfh	sL/m
Gas Inflow to furnace		213	101
Gas to Eductors		11	5
Total Gas Required		224	106
- Stack Exhaust Flow		171	81
Net inflow		53	25
Furnace internal volume		cu ft	L
		2	65

PROCESS GAS SUPPLY REQUIREMENTS				Temp °C	Press psi	Gas	scfh	sL/m
1	Gas 1	All furnace areas except CDA Mix		21	70	N2	239	113
2	Gas 2	Z2 & 3		21	70	none	0	0
				STP = 21C, 1 atm		Total	239	113

**PROCESS GAS**

GAS1  Nitrogen    
 GAS2  none

**SETTINGS FOR LOW O2 FLOW: SINGLE GAS MODEL**  
**N2**

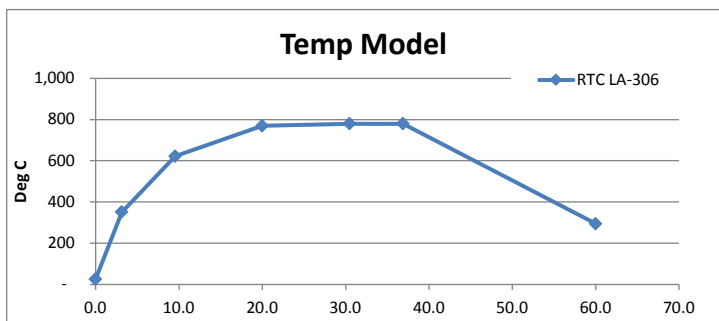
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1 times/minute	60 times/hour	60 seconds
2 times/minute	120 times/hour	30 seconds
3 times/minute	180 times/hour	20 seconds
4 times/minute	240 times/hour	15 seconds

Different sections of the furnace can be replenished at different rates, if required


Flowmeters graduated in: sL/m (lg=RMC flowmeters, sm=small RMA flowmeters)

		BALANCE				1 per Minute Replenish Rate Flow Setting		Desired Replenish Rate per Minute		Initial Flowmeter Setting		Initial Flowmeter Setting	
		<input type="text" value="210.0"/> scfh difference	=> Positive pressure in furnace to purge O2										
		<input type="text" value="99"/> sL/m grad	129.9% incr (decr) of inflows over outflows										
No.	Location	Label	deg C	Metered Gas	Flowmeter Size L/m	Setting sL/m grad	Rate Flow sL/m grad	Rate per Minute	Rate per Minute	Setting scfh grad	Setting sL/m grad	Setting sL/m grad	Setting sL/m grad
1	BESE Entrance barrier	ENTR BAFFLE		N2	100	2.0	2.0	2.0	2.0	8	4	4	4
2	Z1 Heating chamber 1	ZONE 1	650	N2	100	2.2	2.2	18.5	18.5	85	40	40	40
3	Z3 Heating chamber 1	ZONES 2 & 3	800	N2	100	5.9	5.9	6.7	6.7	84	40	40	40
4	TT Heat/cool barrier, no ed	TRANS TUNNEL	700	N2	100	1.3	1.3	2.0	2.0	5	3	3	3
5	CACT Cooling section	COOLING		N2	100	12.1	12.1	1.7	1.7	42	20	20	20
6	HC Heat chamber sides	LAMP SEALS		N2	100	12.5	12.5	4.45	4.45	118	55	55	55
						36.0	36.0	4.5	4.5	344	162	162	162
										distr %	scfh grad	sL/m grad	
7	EEBE Entrance Stack	ENTR STACK		N2	100			100%	100%	5.3	2.5	2.5	2.5
										100%	5.3	2.5	



Furnace Balance		scfh	sL/m
Gas Inflow to furnace		344	162
Gas to Eductors		5	2
Total Gas Required		349	165
- Stack Exhaust Flow		85	40
Net inflow		264	125
Furnace internal volume		cu ft	L
		2	65

PROCESS GAS SUPPLY REQUIREMENTS			Temp °C	Press psi	Gas	scfh	sL/m
1	Gas 1	All furnace areas except CDA Mix	21	70	N2	239	113
2	Gas 2	Z2 & 3	21	70	none	0	0
			STP = 21C, 1 atm		Total	239	113

 <b>LCI Furnaces</b> DIVISION OF LOCHABER CORNWALL INC. Customer: <a href="#">Global Circuit Innovations</a>	<b>DATA SHEET</b>	DOC NBR: 16-008 802-101521 R4		
	<b>IR FURNACE SYSTEM BASE FUSE LIST</b>	MODEL: RTC LA-306	APVL SLB	6/28/13
		SERIAL NBR: 1306039006	PRNT 14Apr21	
	DATE: 05/09/12	SHT 1	of 1	

**Safety Enclosure (TR0, basic control)**

Fuse Label	Size (A)	Comments
FA	5	24 Vac control, AGC
FB	4	Switched/Unswitched 117 Vac, AGC
F1	4	To TR0, L1 leg, KTK
F2	4	To TR0, L2 leg, KTK
F3	20	To K3 Contactor, KTK
F4	20	To K3 Contactor, KTK
F5	20	To K3 Contactor, KTK

**Power Distribution Panel (TR1-TR3 power supplies to TB2 & TB3)**

Fuse Label	Size (A)	Comments
FC	4	Phase 1, 117 Vac switched, AGC
FD	4	Phase 2, 117 Vac switched, AGC
FE	4	Phase 3, 117 Vac switched, AGC
FF	1	Phase 1, 24 Vac switched, AGC
FG	1	Phase 2, 24 Vac switched, AGC
FH	1	Phase 3, 24 Vac switched, AGC
F6	4	TR1, L1 leg, KTK
F7	4	TR1, L2 leg, KTK
F8	4	TR2, L2 leg, KTK
F9	4	TR2, L3 leg, KTK
F10	4	TR3, L3 leg, KTK
F11	4	TR3, L1 leg, KTK

**Belt Motor Controller**

Fuse Label	Size (A)	Comments
MB & MC	0.062	Isolation board, special size
Line Fuse	15	On control board, ABC
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
F31	15.0	
F32	15.0	Zone 1 Btm
F33	15.0	
F34	15.0	Zone 2 Top
F35	15.0	
F36	15.0	Zone 2 Btm
F37	15.0	
F38	15.0	Zone 3 Top
F39	15.0	
F40	15.0	Zone 3 Btm
F41	15.0	

Fuse Label Size (A) Comments