

FURNACE CONFIGURATION

CUSTOMER FIRST SOLAR

Date 11-Jun-16

FURNACE MODEL RTC LA-306 LCI LA-306 LCI LA-309P

Serial Number 1303091401 **Job / Order Nbr** 16-004

BASE EQUIPMENT

Power	<input checked="" type="checkbox"/> Standard	<input type="checkbox"/> High Power	<input type="checkbox"/> Half Power (SCR's)
Voltage	<input type="checkbox"/> 208 Vac, 1 Ø	<input type="checkbox"/> 220 Vac, 1 Ø	<input type="checkbox"/> 230 Vac, 1 Ø
	<input type="checkbox"/> 208 Vac, 3 Ø	<input type="checkbox"/> 220 Vac, 3 Ø	<input type="checkbox"/> 240 Vac, 1 Ø
Belt Speed, Units (Optional Speed)	<input checked="" type="checkbox"/> 0.5-10 inches/min	<input type="checkbox"/> 1.3-25 cm/min	<input type="checkbox"/> 13-250 mm/min
	<input type="checkbox"/> 1-20 inches/min	<input type="checkbox"/> 2.5-50 cm/min	<input type="checkbox"/> 25-500 mm/min
	<input type="checkbox"/> 2-40 inches/min	<input type="checkbox"/> 5-100 cm/min	<input type="checkbox"/> 50-1000 mm/min
	<input checked="" type="checkbox"/> 50 mm (2 in.), std	<input type="checkbox"/> 25 mm (1 in.)	<input type="checkbox"/> 100 mm (4 in.)
Product Clearance (height)	<input checked="" type="checkbox"/> 6 mm (1/4 in.), std	<input type="checkbox"/> 12 mm (1/2 in.), std	<input checked="" type="checkbox"/> _____ other
Baffle, Swinging Clearance (ht)	<input type="checkbox"/> CDA	<input type="checkbox"/> Nitrogen	<input type="checkbox"/> Other
Process Gas Arrangement	<input type="checkbox"/> CDA	<input checked="" type="checkbox"/> Nitrogen	<input checked="" type="checkbox"/> Other, <u>CDA MIX</u>
Single Gas	<input type="checkbox"/> CDA	<input type="checkbox"/> Nitrogen	<input type="checkbox"/> Other
Dual Gas, Gas 1	<input type="checkbox"/> CDA	<input checked="" type="checkbox"/> Nitrogen	<input checked="" type="checkbox"/> Other, <u>CDA MIX</u>
Dual Gas, Gas 2	<input type="checkbox"/> Forming Gas	<input type="checkbox"/> Nitrogen	<input type="checkbox"/> Other

CONFIGURATION AND OPTIONAL EQUIPMENT

<input type="checkbox"/>	AFR	Air Filter / Trap / Regulator	<input type="checkbox"/>	LFI	Line Interference Filter
<input checked="" type="checkbox"/>	BNV	Belt, HiTemp Nichrome-V	<input checked="" type="checkbox"/>	LTR	Left to Right Belt Travel (standard)
<input type="checkbox"/>	BSS	Belt, 316 Stainless Steel	<input type="checkbox"/>	MA	Moisture Analyzer
<input type="checkbox"/>	CB-1	Circuit Breaker Switch	<input type="checkbox"/>	OA	Oxygen Analyzer
<input type="checkbox"/>	CB-3	Circuit Breaker, 3-Phase	<input checked="" type="checkbox"/>	OSS	Sampling System
<input type="checkbox"/>	CXE	Load Extension (15 inches)	<input type="checkbox"/>	RTL	Right to Left Belt Travel
<input type="checkbox"/>	CXX	Unload Extension (15 inches)	<input checked="" type="checkbox"/>	SENSLAS	Product Alert, CMOS Laser
<input type="checkbox"/>	DGO	Dual Gas Manifolds	3	SSP	Sample Port(s)
<input checked="" type="checkbox"/>	EH	Edge Heaters (LA-309P only)	<input checked="" type="checkbox"/>	TT	Transition Tunnel, No Eductor
<input type="checkbox"/>	GSM	Supply Gas Mixing System	<input type="checkbox"/>	TTSE	Transition Tunnel, Single Eductor
<input checked="" type="checkbox"/>	HC	Hermetic Chamber	<input type="checkbox"/>	UCD	Ultrasonic Cleaner/Dryer
<input checked="" type="checkbox"/>	HT	High Temperature (<600C operation)	<input checked="" type="checkbox"/>		CDA Mix

FLOWMETER SETTINGS

	Installed		deg C	Settings	Low Oxygen
Entrance Baffle	0-100 Lpm	N2		15	10
Zone 1	0-100 Lpm	N2	500	50	70
Zones 2 & 3	0-100 Lpm	N2	500	50	70
Zones 2 & 3	0-10 Lpm	CDA	500	0	0
Transition Tunnel	0-100 Lpm	N2	415	15	10
Lamp Seals (Plenums)	0-100 Lpm	N2		28	28
Cooling	0-100 Lpm	N2		#VALUE!	
				217	234
TOTAL INFLOW				0	160
SUBTRACT EXCESS FLOW* =				15	15
DIVIDE BY EDUCTOR MULTIPLIER =				6.3	1.0
ENTR Stack	0-10 Lpm	=		4.2	0.8
TT Stack	0-10 Lpm	=			

* POSITIVE FURNACE: Vent excess gas flow through entrance and exit to produce a low moisture / O2 atmosphere.
 NEGATIVE FURNACE: To assure volatiles do not escape into the room, enter ADD excess flow (pulls room air into furnace).

LIMITED WARRANTY

BUYER: <u>FIRST SOLAR INC</u>	PROJECT: <u>16-004</u>
PRODUCT: <u>LA-309P</u>	SHIPMENT DATE: <u>06/14/2016</u>
SERIAL NUMBER: <u>1303091401</u>	STARTUP DATE: <u>06/20/2016</u>

EQUIPMENT	WARRANTY PERIOD
✓ IR Continuous Belt Furnaces & Dryers	Field checkout/startup by LCI: Twelve (12) months from date of initial startup, in no event exceeding 15 months from date of shipment.
Refurbished Equipment, Cooling systems & Controls Upgrades	Field checkout/statup by others: Twelve months (12) months from date of shipment. Furnace Warranty Expires: 06/15/2017.
Computer	Next Business Day Support: Extended warranty expires (12) months from date of initial startup, in no event exceeding 15 months from date of shipment.
✓ Aftermarket Parts & Consumables	Sixty (60) days from date of shipment: 08/15/2016

Lochaber Cornwall (LCI) warrants that during the Warranty Period the original LCI supplied Equipment shall be free from defects in material and workmanship. This warranty is only applicable to the original system and components under normal use and service, and excludes damage due to misuse, chemical attack, wear and tear from abrasion or corrosion. Consumables such as filters, fuses, lamps, and thermocouples shall be expressly excluded from this warranty, except to the extent LCI is notified a failure of any consumable item within the first 60 days from shipment of the furnace from LCI.

During the Warranty Period LCI will at its option, repair or replace the defective part provided (1) BUYER promptly notifies LCI of any claimed defect, (2) BUYER receives return authorization and returns the product to LCI for inspection, and (3) the Product is determined by LCI to be defective and the remedy the responsibility of LCI. Minor deviations from the specifications shall not constitute defects or non-conformance.

No parts shall be received by LCI without LCI prior written authorization. If LCI determines that the warranty does not apply, BUYER will be responsible for any repair or replacement costs and all associated freight charges.

BUYER shall bear the cost of return of any materials, components and equipment to LCI. LCI shall bear the cost of non-expedited shipping to BUYER of parts and materials replaced under this warranty. When a LCI representative visits BUYER's facility for warranty work, BUYER shall only reimburse related normal and customary travel and lodging expenses.

Unless otherwise specifically authorized in advance, payment of charges incurred by others shall not be borne by LCI. In any event, approved charges shall be limited to the cost LCI would have reasonably incurred had the equipment been returned to its plant for correction. LCI will not accept any back charges for field corrections made without its prior written approval and instructions.

These warranties will not apply if the equipment or any components thereof have been subject to:

- (1) operation, maintenance, overhaul, installation, storage or use which is improper or not in accordance with LCI's instructions;
- (2) any alteration modification, or repair by anyone other than LCI or its authorized representative;
- (3) any accident, misuse, neglect, or negligence after shipment; or
- (4) damage due to uncontrollable external events or acts of God.

LCI's LIABILITY IS LIMITED TO THE REPAIR OR REPLACEMENT OF THE EQUIPMENT FOUND TO BE DEFECTIVE AT SUCH LOCATION AS MAY BE DETERMINED IN THE SOLE DISCRETION OF LCI. ALL WORK UNDER THIS WARRANTY SHALL BE PERFORMED DURING NORMAL WORKING HOURS. ALL REPLACEMENT PARTS, WHETHER NEW OR REMANUFACTURED, ASSUME AS THEIR WARRANTY PERIOD ONLY THE REMAINING TIME PERIOD OF THIS WARRANTY.

All payments must be made according to the agreement terms to activate this warranty. Warranties will commence for the remainder of the original Warranty Period upon late receipt of any balance due LCI.

THE EXPRESS WARRANTIES MADE HEREIN ARE EXCLUSIVE AND ALL OTHER WARRANTIES, EXPRESS, STATUTORY OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL LOCHABER CORNWALL, INC. OR ANY OF ITS SUBSIDERARIES BE LIABLE FOR ANY CONSEQUENTIAL DAMAGES (SUCH AS SPECIAL OR INDIRECT) NOR FOR ANY LOSS OF PRODUCTION OR OTHER LOSSES arising out of, resulting from, or in any way connected with its work, the performance of the Equipment, any failure of the Equipment or any breach of the agreement.

 LCI Furnaces DIVISION OF LOCHABER CORNWALL INC CONTINUOUS BELT IR FURNACE	EQUIPMENT SPECIFICATIONS	DOC NBR: 16-004 - 802-101401 R0
		MODEL: LA-309P CUSTOMER: FIRST SOLAR
		SERIAL NBR: 1303091401 SHT 1 OF 1 PRNT 06/12/16

Equipment Model		Application: Glass Plate			
Model	Base Equipment	Control Zones	Furnace Heated Length		Nominal Furnace Belt Width
LA-309P	Continuous Belt Controlled Atmosphere Furnace	3	30 in	76 cm	9.5 in 24 cm

Equipment Arrangement						
Phase	Process	Max	Length		Process Gas	Temperature (range)
Phase 1	IR Furnace, 3 Zones	1000 °C	30 in	76 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	15.0 in	38 cm		ambient
IR Furnace	ENTRANCE BAFFLE	Entrance barrier	15.0 in	38 cm	N2	350 °C
	ZONE 1	Heating chamber 1	7.5 in	19 cm	N2	500 °C
	ZONE 2	Heating chamber 1	15.0 in	38 cm	N2	500 °C
	ZONE 3	Heating chamber 1	7.5 in	19 cm	N2	500 °C
Cooling	TRANSITION TUNNEL	Exhaust Transition	15.0 in	38 cm	N2	415 °C
	CACT-COOLING TUNNEL	Cooling section	30.0 in	76 cm	N2	260 °C
Product Unload	Unload Station	Exit station	15.0 in	38 cm		ambient
	Frame Adjustment		1.0 in	3 cm		
	Total		121.0 in	307 cm		

Process Gas								
	Actual Conditions		Typical		Typ Annealing (pos atmos)		Max (all flowmeters open)	
Furnace Replenishment Rate	Temp °C	Press psi	Min Flow scfh	Min Flow sL/m	Typical scfh	Typical sL/m	scfh	Max Compressor sL/m
			2.0 rep/min		3.4 rep/min		6.2 rep/min	
N2 Supply	21	70	283	133	480	227	1,765	833
CDA Supply	21	70	4	2	7	3	21	10
TOTAL PROCESS GAS			287	135	487	230	1,785	843

Exhaust Gas								
	Temp °C	Press in H ₂ O	Min Flow scfh	Min Flow sL/m	Typical scfh	Typical sL/m	scfh	Maximum Exhaust sL/m
N2 & CDA mix	200	6	143	68	487	230	6,954	3 282

Cabinet Ventilation			
Cabinet Ventilation Fans (vent to room or exhaust system)	Flowrate	1100 cfm	1870 m3/h
	Temperature	<86°F	<30°C


Transport System			
Belt width	9.5 in	24.1 cm	Belt Edge Heater(s): 30-inch, pair
Belt type	Balanced spiral weave		
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	480 Vac, 60 Hz, 3 Ph
Maximum power required	25.4 kW, 30.5 A
Typical (operating) power required	11.2 kW, 13.4 A

Materials of Construction			
Heating Chamber	Aluminum, aircraft	Cooling	Aluminum, aircraft
Baffle & Eductor	304 Stainless steel	Belt support	Quartz rod, Quartz tube
Heating element	Quartz, near infrared	Belt Return	UHMW-PE
		Belt	Nichrome V, 80%Ni,20%Cr, <1% Fe
		Frame	Steel, 2-prt urethane or powder coated
		Cover Panels	18GA Steel, urethane or powder coated

Furnace Dimensions						
		Length	Width	Height (floor to stack)	Furnace Sect	Weight
Furnace, English	Net	121 in	29 in	68 in +/- 1.5 in	1650 LB	1650 LB
Furnace, Metric	Net	3.07 m	0.74 m	1.73 m +/- 0.04 mm	749 kg	750 kg

Standard Conditions			
Pressure	14.7 psia	101.3 kPa	Temperature 70 °F 21 °C

 LCI Furnaces DIVISION OF LOCHABER CORNWALL INC	DATA SHEET			DOC NBR: 16-004	802-101501	RO
	IR FURNACE SYSTEM POWER & CURRENT			MODEL: LA-309P	APVL: SLB	3/30/16
				SERIAL NBR: 1303091401	CONF: JMC	3/30/16
	Customer: FIRST SOLAR				PRINT: 06/12/16	SHT 1

INPUT TABLE	Entry OK?	VALID
Enter Line Voltage: (208,220,380,400,415,480)	480 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)	9 inches	TRUE
Typical Operating %	43 %	TRUE

SUMMARY OF RESULTS	
Max Power:	25.3 kW
Max Current:	30.5 A
Typical Power:	11.1 kW
Typical Current:	13.4 A

HARDWARE	
Lamps: 28	SCRs: 8
EMs: 12 LEDs	TCs: 3
EM IDC5: n/a	
Nbr strings 12	
Nbr Lamps in 10" zone: 6	AOV-25: none AITM: none

Standard Power configuration

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.	7.5	15	7.5										30 in.
Length Entry OK?	TRUE	TRUE	TRUE										
(F)urn., Furn. (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: 120
	F	H	F										
SCR PHASE	Zone Entry OK?	VALID	VALID	VALID									
Top Lamp Phase (1/2/3):	1	2	3										Lamp Balance (kW)
Bottom Lamp Phase (1/2/3):	1	2	3										Phase 1: 7.2 Phase 2: 6.8 Phase 3: 7.2 ←- Vrms
SCR POWER													
Rated Lamp Voltage	216	216	216										
Max. Lamp Wired Voltage	216	160	216										
50% Power SCR Cal Span Setting	305	339	305										
Max. Lamp Wired Power (W)	900	567	900										
No. Strings per SCR	2	2	2										
Max. Current per String (A)	4.2	3.5	4.2										
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: 4
Top Lamp Power (kW)	3.6	3.4	3.6										
Bottom Lamp Power (kW)	3.6	3.4	3.6										
Total Power/Zone (kW)	7.2	6.8	7.2										21.2
Current Required Top SCR (A)	8.3	7.1	8.3										
Current Required Bottom SCR (A)	8.3	7.1	8.3										
Color Temp (K) (nominal: 2500K)	2500	2237	2500										
Peak Wavelength (µm)	1.16	1.29	1.16										
Estimated Lamp Life (hrs)	6000 hr	Long	6000 hr										
Lumen Output vs. Rated (%)	100	38	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	480	as above	21.2	9.1	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)		480	16.0					TR1: 2 TR2: 4 TR3: 2
Edg Htr 1 Length	30	480	7.8	3.7	1.6	2	OK	EH1 Ω: 124 Current: 3.9 A Cal Span: 339 Vac
Edg Htr 2 Length								EH2 Ω: Current: Cal Span:
Edg Htr 3 Length								EH3 Ω: Current: Cal Span:
Cabinet Vent Fan 10"	2	117	0.29	0.1	0.1	3	OK	Cabinet/CACT/Control Box Fans: 1.16 A
CACT Fans 10"	2	117	0.29	0.1	0.1	3	OK	
CACT Fans 4"	0	117	0.16					
Control Box Fans 4"	0	117	0.16					
Prod Cooling fans		117	0.16					
Furnace Totals:				25.3	11.1			

PHASE	PHASE BALANCING			TOTAL
	1	2	3	
LAMP PWR, kW	7.2	6.8	7.2	21.2
EH/OTHER	0.2	1.6	0.1	2.0
TOTAL	7.4	8.4	7.3	23.2

**FLOWMETER
SETTINGS**

DOC NBR:	16-004 - 802-101460-01	R0
MODEL:	LA-309P	DWN: SLB 03/31/16
SERIAL NBR:	1303091401	APVL: JMC 03/31/16
PRINT:	12Jun16	PM: JMC 03/31/16

PROCESS GAS

GAS1 Nitrogen
 GAS2 Clean Dry Air

SETTINGS FOR STANDARD FLOW: SINGLE GAS MODEL
Glass Plate

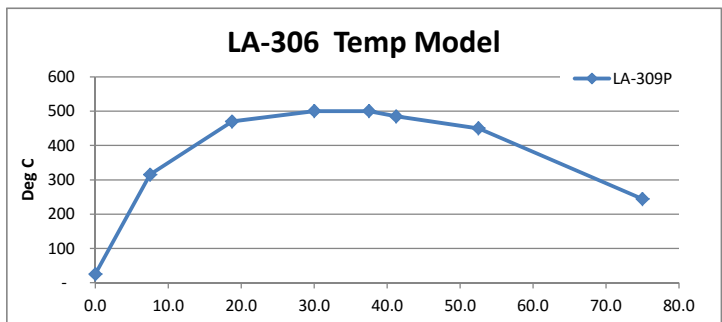
Replenish Rate is the number of times/minute that the furnace (or a section of the furnace) evacuates its gas

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		Balanced atmosphere in furnace		1 per Minute Replenish Rate Flow Setting		Desired Replenish Rate per Minute		Initial Flowmeter Setting	Initial Flowmeter Setting	
0.0 scfh difference		0.0% incr (decr) of inflows over outflows		Metered	Size	Setting	Rate per Minute	scfh grad	sL/m grad	
No.	Location	Label	deg C	Gas	L/m	sL/m grad	Rate per Minute	scfh grad	sL/m grad	
1	BESE Entrance barrier	ENTRANCE BAFFLE		N2	100	7.3	2.0	31	15	
2	Z1 Heating chamber 1	ZONE 1	500	N2	100	4.4	11.2	105	50	
3	Z2 Heating chamber 1	ZONE 2 & 3	500	N2	100	13.3	3.8	106	50	
4	Z2-3 Heating chamber 1	CDA MIX	500	CDA	10	0.9	0.0	0	0	
5	TTSE Exhaust Transition	TRANSITION TUNNEL	415	N2	100	6.6	2.3	32	15	
6	CACT Cooling section	COOLING		N2	100	13.6	2.7	78	37	
7	HC Heat chamber sides	LAMP SEALS		N2	100	13.6	2.1	59	28	
						60	3.2	411	194	
								distr %	scfh grad	sL/m grad
8	EEBE Entrance Stack	ENTRANCE STACK		N2	100		60%	13.3	6.3	
9	EETT Transition tunnel ed	TRANS TUNNEL STACK		N2	100		40%	8.9	4.2	
								100%	28.8	13.6



Furnace Balance		scfh	sL/m
Gas Inflow to furnace		432	204
Gas to Eductors		29	14
Total Gas Required		461	217
- Stack Exhaust Flow (Net outflow)		461	217
		0	0
Furnace internal volume		cu ft	L
		4	108

PROCESS GAS SUPPLY REQUIREMENTS			Temp °C	Press psi	Gas	scfh	sL/m
1	Gas 1	All furnace areas except CDA Mix	21	70	N2	480	227
2	Gas 2	CDA Mix, Heating Chambers Z2 & 3	21	70	CDA	7	3
STP = 21C, 1 atm						Total	487 230

**FLOWMETER
SETTINGS**

DOC NBR:	16-004 - 802-101460-02	R0
MODEL:	LA-309P	DWN: SLB 03/31/16
SERIAL NBR:	1303091401	APVL: JMC 03/31/16
PRINT:	12Jun16	PM: JMC 03/31/16

PROCESS GAS

GAS1 Nitrogen

GAS2 Clean Dry Air

SETTINGS FOR LOW O2 FLOW: SINGLE GAS MODEL
Very Low O2

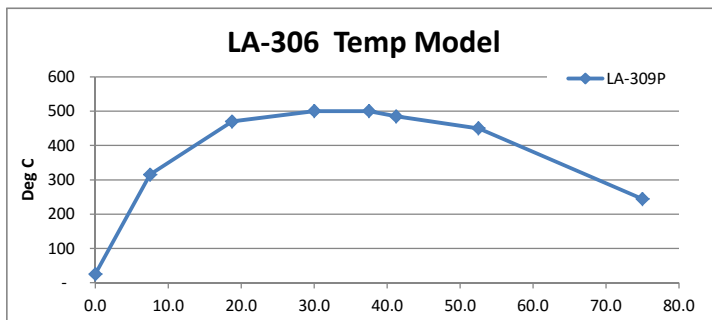
Replenish Rate is the number of times/minute that the furnace (or a section of the furnace) evacuates its gas

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		=> Positive pressure in furnace to purge O2		1 per Minute Replenish Rate Flow Setting		Desired Replenish Rate per Minute		Initial Flowmeter Setting	Initial Flowmeter Setting	
No.	Location	Label	deg C	Metered Gas	Size L/m	sL/m grad	Minute	scfh grad	sL/m grad	
340.0 scfh difference		145.1% incr (decr) of inflows over outflows		60		3.8		476	225	
1	BESE Entrance barrier	ENTRANCE BAFFLE		N2	100	7.3	1.4	22	10	
2	Z1 Heating chamber 1	ZONE 1	500	N2	100	4.4	15.8	148	70	
3	Z2 Heating chamber 1	ZONE 2 & 3	500	N2	100	13.3	5.3	148	70	
4	Z2-3 Heating chamber 1	CDA MIX	500	CDA	10	0.9	0	0	0	
5	TTSE Exhaust Transition	TRANSITION TUNNEL	415	N2	100	6.6	1.5	21	10	
6	CACT Cooling section	COOLING		N2	100	13.6	2.7	78	37	
7	HC Heat chamber sides	LAMP SEALS		N2	100	13.6	2.05	59	28	
								distr %	scfh grad	sL/m grad
8	EEBE Entrance Stack	ENTRANCE STACK		N2	100		55%	2.1	1.0	
9	EETT Transition tunnel ed	TRANS TUNNEL STACK		N2	100		45%	1.8	0.8	
								100%	10.4	4.9



Furnace Balance		scfh	sL/m
Gas Inflow to furnace		497	234
Gas to Eductors		10	5
Total Gas Required		507	239
- Stack Exhaust Flow		167	79
Net inflow		340	160
Furnace internal volume		cu ft	L
		4	108

PROCESS GAS SUPPLY REQUIREMENTS			Temp °C	Press psi	Gas	scfh	sL/m	
1	Gas 1	All furnace areas except CDA Mix	21	70	N2	480	227	
2	Gas 2	CDA Mix, Heating Chambers Z2 & 3	21	70	CDA	7	3	
STP = 21C, 1 atm						Total	487	230