LLNL-TR-470811

## Combustion Gas Analysis Data for 8 Registered Natural Gas Boilers

Source Numbers: S-1146, S-1634, S-1679, S-1680, S-1681, S-1682, S-1683, and S-1684

**February 4, 2011** 



## FOR 8 REGISTERED NATURAL GAS BOILERS

SOURCE NUMBERS: S-1146, S-1634, S-1679, S-1680, S-1681, S-1682, S-1683, AND S-1684

#### LIST OF BOILERS REGISTERED WITH THE BAAQMD LAWRENCE LIVERMORE NATIONAL LABORATORY (2/4/11)

ITEM	SOURCE NUMBER	DEVICE TYPE (BOILER)	EQUIPMENT MANUFACTURER	MODEL NAME	ORIGINAL MANUFACTURE DATE	SERIAL NUMBER	HEAT RATING (MM BTU/hr)	PRIMARY FUEL TYPE
1	S-1054	HOT WATER	RITE CORP	250WG	01/01/1990	S-1054 (9021836)	2.10	NATURAL GAS
2	S-1058	HOT WATER	BRYAN	CL210WGI	01/01/1989	S-1058 (67075)	2.10	NATURAL GAS
3	S-1059	HOT WATER	BRYAN	CL210WGI	01/01/1989	S-1059 (67080)	2.10	NATURAL GAS
4	S-1064	HOT WATER	CLEAVER BROOKS	CBH70060	01/01/1988	S-1064 (L-83696)	2.51	NATURAL GAS
5	S-1065	HOT WATER	CLEAVER BROOKS	CBH70060	01/01/1988	S-1065 (L-83695)	2.51	NATURAL GAS
6	S-1132	HOT WATER	CLEAVER BROOKS	CB-700-150	01/01/1989	S-1132 (L86873)	6.28	NATURAL GAS
7	S-1133	HOT WATER	CLEAVER BROOKS	CB-700-150	01/01/1989	S-1133 (L86874)	6.28	NATURAL GAS
8	S-1140	HOT WATER	CLEAVER BROOKS	CB-700-150	01/01/1984	S-1140 (L79216)	6.28	NATURAL GAS
9	S-1141	HOT WATER	CLEAVER BROOKS	CB-700-150	01/01/1984	S-1141 (L79215)	6.28	NATURAL GAS
10	S-1146	HOT WATER	BURNHAM	PF512	01/01/1986	S-1146 (7583824)	2.37	NATURAL GAS
11	S-1149	HOT WATER	CLEAVER BROOKS	CB-700-200-125	01/01/2008	S-1149 (OL090155)	8.16	NATURAL GAS
12	S-1150	HOT WATER	CLEAVER BROOKS	CB-700-200-125	01/01/2008	S-1150 (OL090156)	8.16	NATURAL GAS
13	S-1600	HOT WATER	JOHNSTON BOILER	PFTJ60-4G125W (CAT)	01/01/2000	S-1600 (10004-02)	2.51	NATURAL GAS
14	S-1601	HOT WATER	JOHNSTON BOILER	PFTJ60-4G125W (CAT)	01/01/2000	S-1601 (10004-01)	2.51	NATURAL GAS
15	S-1602	HOT WATER	JOHNSTON BOILER	PFTJ50-4G15S (CAT)	01/01/2000	S-1602 (10003-01)	2.08	NATURAL GAS
16	S-1604	HOT WATER	JOHNSTON BOILER	PFTJ80-4G30W	01/01/1999	S-1604 (9878-01)	3.33	NATURAL GAS
17	S-1605	HOT WATER	JOHNSTON BOILER	PFTJ80-4G30W	01/01/1999	S-1605 (9878-02)	3.33	NATURAL GAS
18	S-1611	HOT WATER	JOHNSTON BOILER	PFXF250-2G125W	01/01/2005	S-1611 (10509-01)	9.00	NATURAL GAS
19	S-1612	HOT WATER	JOHNSTON BOILER	PFXF250-2G125W	01/01/2005	S-1612 (10509-02)	9.00	NATURAL GAS
20	S-1615	HOT WATER	KEWANEE	M235KG (CAT)	01/01/1999	S-1615 (886711)	2.35	NATURAL GAS
21	S-1617	HOT WATER	CLEAVER BROOKS	ICB 700-200	01/01/2004	S-1617 (OL103676)	8.17	NATURAL GAS
22	S-1618	HOT WATER	CLEAVER BROOKS	ICB 700-200	01/01/2004	S-1618 (OL1036752B)	8.17	NATURAL GAS
23	S-1633	HOT WATER	JOHNSTON BOILER	PFTJ60-4G125W	01/01/1999	S-1633 (9879-01)	2.08	NATURAL GAS
24	S-1634	HOT WATER	KEWANEE	M-205-G	01/01/1997	S-1634 (21282)	2.56	NATURAL GAS
25	S-1639	HOT WATER	JOHNSTON BOILER	PFTJ100-4G125W	01/01/2005	S-1639 (10467-02)	4.14	NATURAL GAS
26	S-1640	HOT WATER	JOHNSTON BOILER	PFTJ100-4G125W	01/01/2005	S-1640 (10467-01)	4.14	NATURAL GAS
27	S-1641	HOT WATER	JOHNSTON BOILER	PFTJ60-4G125W	01/01/2004	S-1641 (10400-01)	2.40	NATURAL GAS
28	S-1659	HOT WATER	CLEAVER BROOKS	FLX 700	01/01/1998	S-1659 (BT6060)	8.00	NATURAL GAS
29	S-1662	HOT WATER	FULTON ELECTRIC	FT-0240C	09/27/2002	S-1662 (3293C)	2.40	NATURAL GAS
30	S-1663	HOT WATER	FULTON ELECTRIC	FT-0240C	09/27/2002	S-1663 (3309C)	2.40	NATURAL GAS
31	S-1668	HOT WATER	KEWANEE	M-205-KG	01/01/1999	S-1668 (886701)	2.56	NATURAL GAS
32	S-1677	HOT WATER	AERCO	BENCHMARK 3.0 LN	01/01/2007	S-1677 (G-07-1556)	3.00	NATURAL GAS
33	S-1679	HOT WATER	FULTON	VTG3000LE	01/01/2010	S-1679 (2262)	3.00	NATURAL GAS
34	S-1680	HOT WATER	FULTON	VTG3000LE	01/01/2010	S-1680 (2263)	3,00	NATURAL GAS
35	S-1681	HOT WATER	CLEAVER BROOKS	CFC-700-2500-125HW	01/01/2009	S-1681 (16010250110000)	2.50	NATURAL GAS
36	S-1682	HOT WATER	CLEAVER BROOKS	CFC-700-2500-60HW	01/01/2009	S-1682 (02174-1-1)	2.50	NATURAL GAS
37	S-1683	HOT WATER	CLEAVER BROOKS	CFC-700-2500-60HW	01/01/2009	S-1683 (02174-1-2)	2.50	NATURAL GAS
38	S-1684	HOT WATER	CLEAVER BROOKS	CFC-700-2500-60HW	01/01/2009	S-1684 (02174-1-3)	2.50	NATURAL GAS

#### COMBUSTION GAS ANALYSIS DATA FOR NATURAL GAS BOILER SOURCE NUMBER:

S-1146

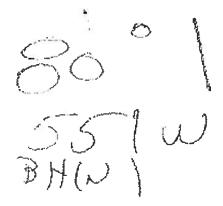
Tom Honour Rob Swanson

BACHARACH. INC. Source No. S-1146 ECA 450 SN: NU1056

TIME 05:18:53 pm DATE 01/27/2011

FUEL Natural Gas

COMMENTS:



lofa

Tom Honour Rob Swanson

BACHARACH, INC. ECA 450 SN: NU1058 ===========

### Source No: 5-1146

COMMENTS:

80° 551 W

## FOR NATURAL GAS BOILER SOURCE NUMBER:

S-1634

#### **BOILER TEST REPORT**

PM# PW0039.	3226	DATE	4-10
BLDG. 3//	ROOM /230	PRESS. 15	TEMP. /80
BOILER # BHW-1	TYPE 2/43		

	EQUIPMENT	TEST	ALARM	REMARKS
1.	LOW WATER CUT OFF 🙀		AUK 1	Gasket size? 4 Hole
2.	LOW LOW WATER CUT OFF	1	296	Gasket size?
3.	LOW GAS PRESSURE SWITCH	1	290	7.002
4.	HIGH GAS PRESSURE SWITCH	1	2911	
5.	AIR SWITCH	i.e.	29	
610	AIR SWITCH #2	MA		
7.	OPERATOR			
8.	HIGH LIMIT			
9.	MODULATING CONTROL	1		
10.	LOW/HIGH FIRE SWITCHES	1	******	
11.	FLAME SENSOR	اسسسا	28	(circle one) IR (UV) FR TC
12.	RELIEF VALVE #1	سسسا		Relieved at 30 psi
13.	RELIEF VALVE #2	nla		Relieved at psi
14.	GAS VALVE POC SWITCH	1	V/C	11
15.	FLOW SWITCH	NA		

#### **COMBUSTION ANALYSIS**

-	NOx	СО	02
LOW	6060	21	2.6
MED	<del></del>		
HIGH	P. T. C.		

Rob Swanson Tom Honour

9 -

BACHARACH, INC. ECA 450 SN: KP1068

TIME DATE 01:12:13 pm 09/04/2010

" FUEL Natural Gas

02 C0 EFF C02 T-STACK T-AIR EA NO NO2 NOX S02 HC C0(3) NO(3) NO2(3) NO2(3) S02(3) 7.6 %
21 ppm
88.0 %
7.5 %
16.7 \*F
78.2 \*F
2.8 ppm
48.9 ppm
48.9 ppm
0.07 %
28 ppm
0.07 %
29 ppm
62 ppm
62 ppm
62 ppm 66 ppm 0 ppm

COMMENTS: L.F.

BHWI

### COMBUSTION GAS ANALYSIS DATA FOR NATURAL GAS BOILER SOURCE NUMBER:

S-1679

VTG 3000 LE WR 281.2 Lawrence Livermore National Laboratory

Natural Gas Testing. 2262 Boiler no. 1 Burner Assy DWG Bekaert burner NB # Injector DWG Test Date

9/22-23/2010	
LMV37, Air servo, gas servo, VFD	

Control

2.9 2.9 2.9	Eclipse Size 5 / 3 HP 460v 3ph.	like Allen
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Fan Size/Motor H/F Amp Draw

	-	_	- 1	_	$\overline{}$	_	_	_				_	ŕ
Flame	Signal	(%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Frequency	VFD	(Htz)	60.5	61.1	60.7	60.5	59.5	59.4	59.4	59.4	59.4	59.5	
Air	Pressure	("wc)	2.4	1.6	2.1	3.3	4.7	6.4	8.0	9.3	11.8	14.2	
HZO		(°F)	168.0	172.0	176.0	190.0	177.0	177.0	192.0	185.0	197.0	199.0	
Flue		(°F)	137.0	138.0	136.0	214.0	220.0	244.0	268.0	268.0	296.0	313.0	
Ambient		(F)	80	98	82	80	69	68	89	89	89	69	
Air Servo	Open	ຄ	13.0	6.4	12.0	16.7	20.8	25.0	28.5	31.5	38.5	50.0	
Fuel Servo	Open	Đ	24.8	20.0	24.0	27.5	31.0	34.2	36.8	39.0	46.0	70.0	
Nox	3% 0,	(mdd)	18.9	15.3	17.9	16.6	16.0	15.1	14.8	13.8	16.2	18.7	
2		(mdd)	15.0	12.0	14.0	13.0	12.5	11.8	11.6	10.8	13.0	15.0	-
05		(%)	6.5	6.7	6.7	6.7	9.9	9.9	9.9	9.9	6.3	6.2	
8		(mdd)	0.0	0.0	0:0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ço,		(%)	8.1	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.2	8.2	
Last Elbow	Gas Pressure	("wc)	6.0	4.0	0.8	1.4	2.3	3.5	4.6	5.5	7.5	9.2	
Incoming	Gas Pressure	("wc)	24.1	24.3	24.1	23.9	22.8	22.5	22.0	20.9	19.9	20.8	
Input		(CFH)	940	900	877	1,180	1,485	1,800	2,075	2,295	2,660	2,960	
			<u>6</u>	2	22	8	4 4	P5	P6	Ь7	82	6	

Notes. Removed burner, looks good, cleaned and reinstalled new pilot tube assembly. Installed new scanner tube assembly. Modified refractory donut to accept the new pilot tube and scanner sight tube. Pliot gas pressure = 2.6 \*w.c., Philot fame signal = 100%, 1.12% CO2, 134ppm CO, 18.0% O2, 1.2ppm NO, Standing expessure = 2.4 \*w.c. Whit holier no. 2 operating at 45% 1,377 operating at 45% 1,377 operating at 45% 1,377 operating at 100%, High Fire supply gas pressure drops to 16.3 \*w.c. And both boilers still run good. Purge pressure at High = 14.3 \*w.c. Fan discharge and 4.3 \*w.c. LE.. Purge pressure at Low (PO) = 1.9 \*w.c. Fan discharge and 4.3 \*w.c. LE.. Purge pressure at Low (PO) = 1.9 \*w.c. Fan discharge and 4.3 \*w.c.

#### COMBUSTION GAS ANALYSIS DATA FOR NATURAL GAS BOILER SOURCE NUMBER:

S-1680

90-100 79-100 83-100 100.0 100.0 100.0 100.0 100.0 100.0 100.0

Flame Signal 8

,	esting				
	Natural Gas lesting				VFD
ational Laboratory	<b>2263</b> Boiler no. 2	9/22/10			LMV37, Air servo, gas servo, VFD
VTG 3000 LE WR 281.2 Lawrence Livermore National Laboratory	NB #	Test Date	Injector DWG	Burner Assy DWG	Control

		2011	THE COURT IN											
		9/22/10				Eng/Tech		Mike Allen						
5	0				,	Fan Size/Motor	ក	Eclipse Size 5 / 3 HP 460v 3ph	/ 3 HP 460v 3					
ssy r	ssy DWG					H/F Amp Draw	>	2.9	2.9	2.9				
		LMV37, Air servo,	rvo, gas servo, VFD	VFD		9								
	Incoming	Last Elbow	§	8	02	٩	Nox	Fuel Servo	Air Servo	Ambient	Flue	HZO	Şi.	Frequency
	Gas Pressure	Gas Pressure Gas Pressure					3% 0,	Open	Open				Pressure	VFD
	(Jwc)	(Jwc)	(%)	(mdd)	(%)	(mdd)	(mdd)	อ	ຍ	(F)	(P)	(f.)	(J#C)	(Htz)
	23.9	1.1	8.0	0:0	6.6	13.0	16.6	11.7	15.0	77	188.0	172.0	2.7	60.2
	24.6	4.0	8.0	0.0	9.9	13.0	16.6	5.4	8.3	82	171.0	167.0	1.3	60.7
	23.9	0.7	8.0	0.0	6.6	13.5	17.3	9.0	12.0	78	181.0	172.0	2.1	60.3
	24.1	1.4	8.1	0.0	6.5	14.1	17.8	13.5	17.0	75	210.0	185.0	3.2	0.09
	23.9	2.2	8.1	0.0	6.5	13.0	16.4	16.9	20.8	7.1	211.0	176.0	4.5	59.7
	23.1	3.3	8.2	0.0	6.3	14.5	18.1	20.0	24.5	71	233.0	185.0	6.0	59.7
	20.8	4.5	8.1	0.0	6.4	11.8	14.9	23.0	28.5	73	251.0	185.0	7.9	59.9
	20.9	5.7	8.0	0.0	6.6	10.4	13.3	26.0	32.5	71	272.0	190.0	9.4	59.7
	19.5	7.7	8.0	0.0	6.7	9.5	12.1	35.0	41.0	71	288.0	192.0	12.3	59.7
	20.4	9.2	8.1	1.0	6.5	11.5	14.5	59.0	52.0	73	301.0	195.0	14.3	59.9

Notes: Removed burner, looks good, cleaned and reinstalled. Installed new pilot tube assembly, Installed new scanner tube assembly. Modified refractory donut to accept the new pilot tube and scanner sight tube. Pilot gas pressure = 2.5°wc., pilot flame signal = 100%, 0.9% CO2, 93ppm CO, 19.3% O2, 1.6ppm NO.
Standing supply gas pressure = 24.7°wc. With boiler no. 1 operating at 45% 1,320,000.
With both boilers running at 100% High Fire supply gas pressure drops to 16.3°wc. And both boilers still run good.
Purge pressure at High = 14.2°wc. Fan discharge and 4.3°wc. LE.. Purge pressure at Low (PO) = 2.3°wc. Fan discharge and 4.3°wc. LE..

2,728 2,351

P8 P8

1,220 1,520

P3 P4 P5

855

1,833 2,131

1,068

620

# COMBUSTION GAS ANALYSIS DATA FOR NATURAL GAS BOILER SOURCE NUMBER:

S-1681



#### Clearfire - Condensing Start-up Report

Date _	10/21/10	
Serial N	16193501000	C

#### THIS FORM IS FOR MODEL CFC CLEARFIRE BOILERS

Customer's Name // A/L B # 20/	
Customer's Name LLNL B # 38 / Location? LIVER more, CA	
Rated input [Nameplate rating] 2.5 MmBTU's/hr	
This unit is fueled by: Nat. Gas LP Gas	
BTU Value of the gas: (40.) gar/a 5	0
Burner Voltage: 10. Control of the state of	<del></del>
How many boilers are tied into the same system?  4  Control Circuit Voltage: 120	·
Boiler Water Treatment Discount to the second	
Has the boiler been Hydro tested in the field? If so, what pressure? MD	
Was the water level control explained and procedure for toothing the same and procedure for t	
vvas setting and adjusting the temperature controls domenated at the set of t	
Has the operator been instructed on troubleshooting and maintenance? Yes No	
<b>BOILER ROOM INSTALLATION &amp; CONDITIONS</b>	
1. What is the general condition of the Boller Room at Start-up?	
New construction Damp Dusty Clean Other	
2. What is the approximate altitude of the boiler installation?	
was the boiler used for heat during construction [before actual start-upl?	
If yes, how long? And who operated this unit?	
4 Are electrical supply, wires, fuses, circuit breakers or disconnects	-
supplied and sized per the boiler drawings and specifications?	
If no, please explain	
5 Are all external limits and controls connected [flow switch,alarms,circuits,outdoor resets?]  Yes	No 🗆
o. This any wiring been modified or changed prior to start-up or during Start-up?	🗖
if yes, provide a marked-up wiring diagram of the changes.	
7. Is the boiler level? Yes No	
8. Have the casing panels been installed properly and without damage? Yes ☑ No ☐ If no, explain	
9. Is the safety relief valve piping properly supported to prevent distortion?  Yes No	
10. Relief valve manufacturer Kuldvick	
11. Relief Valve Set point / a 0: 1	<u>~</u>
12. Relief valve capacity  Valve Discharge Size // "  BTU's /hr	
13. Is the bottom drain line piped to a pate with the	
14. Is the optional Condensate Collection Pan Installed	
The Condensate line heart	
15. Is the air vent line pined to the	
16 What is the source for	۷.
17 le a victor acti	
Other methods employed for water conditioning	-
CB10-2345A-1 Page 1 of 4	

18. What type of hot water system is employed? Three-Way Valve ☐ Primary-Secondary ☐ Reverse Return ☐ Other ☐ PANAWA ONLY
19. What is the size of the system pump? حصى gpm
20. Temperature: Inlet [return] 160 °F Outlet [Supply] 160 °F
21. What is the system operating pressure? 30 PSI and temperature 180 °F
22. Is there a Stack Thermometer? Yes No D
23. Is the unit tied into the lead-lag system? Yes 🗹 No 🔲 If yes, how many
Bollers are on the lead-lag system?
24. Is this unit tied into an Energy Management System? Yes No 🖸
25. Gas Piping:
a) The length of pipe from regulator to gas train is $6$ and the size is $1/2$ .
b) The size of the Cleaver Brooks supplied gas train is/ 1/2 "
c) Has the gas line been tested for leaks? Yes 🔼 No 🗌 If no, explain:
d) Has a gas line filter been provided? Yes No
e) Has a gas line drip leg been installed upstream of the regulator? Yes 🔟 No 🔲
NOTE: CLEAVER-BROOKS RECOMMENDS A GAS LINE DRIP LEG
f) Has the gas line been cleaned, or purged prior to starting?
g) Has the Cleaver Brooks supplied gas train been checked for internal cleanliness?
THE GAS LINES MUST BE CLEANED/PURGED PRIOR TO INITAIAL START-UP
FOR SAFE, RELIABLE OPERATION!
FOR SAFE, RELIABLE OPERATION!
FOR SAFE, RELIABLE OPERATION!
FOR SAFE, RELIABLE OPERATION!  26) Gas meter manufacturer?
FOR SAFE, RELIABLE OPERATION!  26) Gas meter manufacturer?     feet 5   capacity 300 CFH   size 2"
FOR SAFE, RELIABLE OPERATION!  26) Gas meter manufacturer?  \$\int_{\text{fort}} \sigma_{\text{capacity}} \frac{300 \text{ CFH}}{\text{size}} \frac{2'}{\text{27}} \text{ What is the inlet gas pressure to the meter?} \frac{2 \text{ FSI}}{\text{VSI}} \text{ No VI } \text{If Yes, explain.}  Qoes each have its own regulator? Yes \text{ No \text{ No \text{ In No \tex
FOR SAFE, RELIABLE OPERATION!  26) Gas meter manufacturer?
FOR SAFE, RELIABLE OPERATION!  26) Gas meter manufacturer?  \$\int_{\text{fort}} \sigma_{\text{capacity}} \frac{30\left_{\text{off}}}{30\left_{\text{off}}} \sigma_{\text{size}} \frac{2"}{2"}  27) What is the inlet gas pressure to the meter?  28) Does the gas meter feed gas to any other equipment? Yes \int_{\text{No}} \int_{\text{off}}
FOR SAFE, RELIABLE OPERATION!  26) Gas meter manufacturer?  for S  capacity 3000 CFH size 2"  27) What is the inlet gas pressure to the meter?  2 %1  28) Does the gas meter feed gas to any other equipment? Yes No P  If Yes, explain.  29) If multiple boilers, does each have its own regulator? Yes No I  If Yes, explain.  4/1644644 METEL 1600 Le4  30) Gas booster Mfr.  y/A size N/A  31) What is the booster inlet pressure N/A and outlet pressure
FOR SAFE, RELIABLE OPERATION!  26) Gas meter manufacturer?
FOR SAFE, RELIABLE OPERATION!  26) Gas meter manufacturer?
FOR SAFE, RELIABLE OPERATION!  26) Gas meter manufacturer?
FOR SAFE, RELIABLE OPERATION!  26) Gas meter manufacturer?
FOR SAFE, RELIABLE OPERATION!  26) Gas meter manufacturer?
FOR SAFE, RELIABLE OPERATION!  26) Gas meter manufacturer?
FOR SAFE, RELIABLE OPERATION!  26) Gas meter manufacturer?

### PROCEDURES

1) Was the burner door refractory and burner inspected?	Yes No T	
2) What is the setting of the High Gas Pressure Switch?	/4 "W.C.	
3) What is the setting of the Low Gas Pressure Switch?		
4) What is the gas pressure at the gas train inlet, downstre fire	eam of the regulator, at low fire	13.6 "W.C. and at high
<ul><li>5) What is the setting of the Combustion Air Proving Switch</li><li>6) What is the setting of the High Air Pressure Switch?</li></ul>	1 "W.C. "W.C.	

#### PLEASE PROVIDE THE SETTINGS AS NOTED IN THE TABLE BELOW:

Parameter No.	Description	Lower Limit	Upper Limit	Default Setting
4	T1 Top CH			
5	T1 Foot CH			
6	T4 Max			
7	T4 Min		12	
13	Max Fan Speed			
15	Max Fan Speed			
17	Min. Fan Speed		-	
19	Ignition Fan Speed		6	2
22	CH Mod Hysterisis On	#1		
23	CH Mod Hysterisis Off			, , , , , , , , , , , , , , , , , , ,
31	Diff. T1-T2 for Mod.Back			
34	CH Type			<del></del>

#### 8 USE THIS TABLE TO PROVIDE COMBUSTION ANALYSIS DATA:

Firing Rate	Low	High
% O2	6.5	5.9
%CO <sub>2</sub>	8 1	8.4
CO PPM	0	19
NOx PPM	19 (18,5)	26-5
Ambient Temperature	99	99
Stack temperature ° F	160	174
Stack Draft		
Water Temperature	(PD	180
Operating Pressure	30	<i>3</i> D
Flame Signal	llv	264
Gas Pressure at Burner		
Gas Pressure at Regulator	13.6"	9.2"

<ol><li>Electrical characteristics a</li></ol>	t high fire:	¥01	**			
Blower Motor voltage	797.	Blower rated amps	134			
Blower Motor actual voltage		Blower actual amps	13.0A			
Control Circuit Voltage		Control Circuit amps				
Control Circuit Fuse Size	6 A		<u> </u>	- 3		
COMMENTS					230	
		-				
This report was completed by: CB Authorized Service Compan This report was reviewed with:	y:	LOY LEVERTUR	tal	<del></del>	<u></u>	
And all questions were answered	d? Yes	□ No □				
Please return one copy t Registration	o Cleav	er-Brooks Serv	ice Depart	ment for V	Varranty	

**********  * E C O M  *********  Date  10.14.10  Gas analysi:  Fuel type Natural gas	- J2 ****** Time 02:51 P	K N. a
T.Air T.Gas T.Sensor 02 CO 3%02 NO 3%02 NO2 3%02 NOX 3%02 CO2 Eff. Losses Exc. air	99 174 91 5.9 19 21.2 5.2 26.5 8.4 88.2 11.8	oF oF oF PPM PPM PPM X X X
ECOM America 1628 Oakbrod Gainesville Georgia 3058 Tel. 770-532 Fax: 770-532 Toll-Free 87	ok Driv 07 2-3280 2-3620 7-326-	9.2

	100	
*********** * E C O M ***********************************	J 2 ****** ime	******
Gas analysis		
Fuel type Natural gas		
T.Air T.Gas T.Sensor 02 CO -3%02 HO -3%02 HO2 3%02 NOX 3%02 CO2 Eff. Losses Exc. air	99 160 91 6.5 17.4 1.1 18.5 8.1 88.5 11.45	PPM
ECOM America 1628 Oakbroo Sainasville Georgia 3050 Tel. 770-532 Fax: 770-532 Toll-Free 87 UUW.ecomusa.	k Driv 7 -3280 -3620 7~326-	13.6"

## FOR NATURAL GAS BOILER SOURCE NUMBER:

S-1682



## Clearfire - Condensing Start-up Report

Date	10/21	10		
Serial No	. 02	174-1	_	

#### THIS FORM IS FOR MODEL CFC CLEARFIRE BOILERS

•••	HOT ONW IS FUR WUDE	L CFC CLEAR	FIRE BOILERS	
Customer's Name	LLNL BHJSEY		ü,	
	nger. CA.			
Model No. Crc - 2500		Working Pressure	40	
Rated input [Nameplate	rating] 2. SnmBTU's/hr	The state of the s		
This unit is fueled by:	Nat. Gas D LP Gas D		<del></del>	
BTU Value of the gas:	1020 BTV/ef	Gas Company	PG F E	
Burner Voltage:	Control Circuit V		747 6	
How many boilers are ti	ed into the same system?	-120		
Boiler Water Treatment	Discussed with [Name]:	CEMIE DUZ		6.
Has the boiler been Hyd	fro tested in the field? If so, what I	pressure? NO.	<u> </u>	
was the water level con	trol explained and procedure for te	esting demonstrated	12 Ves [7]	
Trad octaing and aujustif	ig the temperature controls demor	nstrated and evoluin	odo Vas EV N. ET	
Has the operator been in	nstructed on troubleshooting and n	naintenance? Vec	ed? Yes No 🗆	
	<b>BOILER ROOM INSTAL</b>	LATION & CO	<u>NDITIONS</u>	
<ol> <li>What is the general</li> </ol>	condition of the Boiler Room at Sta	art-up?	<del></del>	
New	construction Damp	1 Dusty □	Clean  Other	
<ol><li>What is the approxin</li></ol>	nate altitude of the boiler installation	on?	100'	0.1
3 Was the boiler used	for heat during construction [before	e actual start-uni?	Yes No 🗇	
if yes, now long?	And who one	rated this unit?	1.69 Ti 140 TJ	
4 Are electrical supply,	wires, fuses, circuit breakers or dis	sconnects		
supplied and sized per t	he boiler drawings and specification	ons?	Yes 🛛 No 🞵	
lf no, please explai	n		III	
5 Are all external limits	and controls connected [flow swite	ch alarms circuits or	Itdoor roosto?	<del>-</del>
<ol><li>Has any wiring been</li></ol>	modified or changed prior to start-	IID of during Start in	utdoor resets?] Yes [	
If yes, provide a ma	arked-up wiring diagram of the cha	inues	p? Yes ☑ No ☐	1
7. Is the boiler level?	Yes No 🗆	mgoo.		
8. Have the casing pane	els been installed properly and with	Out domes-0	w <del></del>	
if no, explain	Property and Will	iout damage?	Yes 🖸 No 🗌	
9. Is the safety relief valv	e piping properly supported to pre			
10. Relief valve manufac		_	Yes 🗹 No 🗌	
11. Relief Valve Set poin	- 15-15-15-1		537 - Ec   - Hm	
12. Relief valve capacity		Valve Discharge	Size 1 1/4"	
•	2.7 mm BTU	's /hr		24 <sup>303</sup>
10. Is the bottom drain in	ne piped to a safe point of discharg	ge? Yes 🗹	No 🗆	• *
14. Is the optional Conde	nsate Collection Pan Installed?	Yes 🗹	No 🗍 If no, has	18
The Condensate line	been trapped and piped to drain?	Yes 🗹	No 🗆	
15. Is the air vent line pipe	ed to the expansion tank? Yes [	□ No □ If no.	please explain IN FACH B	
<ol><li>What is the source for</li></ol>	water make-up?		FILL OF CAPITUTE NO FACH E	HLER
17. Is a water softener em	ployed? Yes No Pl			
	yed for water conditioning	₩		
CB10-2345A-1				
6-05	Page 1 of 4		1 055	

18. What type of hot water system is employed? Three-Way Valve Primary-Secondary Reverse Return Other PRIMARY WAY
19. What is the size of the system pump? 300 gpm
20. Temperature: Inlet [return] /60 °F Outlet [Supply] /60 °F
21. What is the system operating pressure? 20 PSI and temperature 160 PF
22. Is there a Stack Thermometer? Yes No 🗆
23. Is the unit tied into the lead-lag system? Yes No I if yes, how many
Boilers are on the lead-lag system?
24. Is this unit tied into an Energy Management System? Yes No
25. Gas Piping:
a) The length of pipe from regulator to gas train is 6 and the size is 11/2"
b) The size of the Cleaver Brooks supplied gas train is
c) Has the gas line been tested for leaks? Yes 🖸 No 📋 If no, explain:
d) Has a gas line filter been provided? Yes  No
e) Has a gas line drip leg been installed upstream of the regulator? Yes 🇹 No 🗌
NOTE: CLEAVER-BROOKS RECOMMENDS A GAS LINE DRIP LEG
f) Has the gas line been cleaned, or purged prior to starting?  Yes No
g) Has the Cleaver Brooks supplied gas train been checked for internal cleanliness?
THE GAS LINES MUST BE CLEANED/PURGED PRIOR TO INITAIAL START-UP FOR SAFE, RELIABLE OPERATION!
26) Gas meter manufacturer? <u>forts</u> capacity <u>3000 CTH</u> size <u>J</u> "
27) What is the inlet gas pressure to the meter?
28) Does the gas meter feed gas to any other equipment? Yes No 🖸
If Yes, explain.
29) If multiple boilers, does each have its own regulator? Yes 🗹 No 🗌
If Yes, explain. AMERICAN METER 1600 REG.
30) Gas booster Mfr. N/A capacity N/A size N/A
31) What is the booster inlet pressure $\nu/A$ and outlet pressure
32) Does the booster run continuously?Or simultaneously with burner?
33) Is the Unit set-up for Sealed Combustion? Yes No
If Yes, explain hook up and size and type piping.
34) Are adequate openings provided for combustion air if sealed combustion is not utilized?
How many? 1 Size? 100 \$
25) What control the second state of the secon
35) What controls the combustion air supply? Outside air damper Fan  Open Ventilation. If other, explain

#### **PROCEDURES**

1) Was the burner door refractory and burner inspected?	Yes No I	
2) What is the setting of the High Gas Pressure Switch?	<u>14</u> "W.C.	
3) What is the setting of the Low Gas Pressure Switch?	6 "W.C.	
4) What is the gas pressure at the gas train inlet, downstre	eam of the regulator, at low fire	13 - 7 "W.C. and at high
fire <u>9.6</u> "W.C.		To and at high
5) What is the setting of the Combustion Air Proving Switch	h? 1 "W.C."	14 <sub>2</sub> ,
6) What is the setting of the High Air Pressure Switch?	# 5.25 "W.C.	

#### PLEASE PROVIDE THE SETTINGS AS NOTED IN THE TABLE BELOW:

Parameter No.	Description	Lower Limit	Upper Limit	Default Setting
4	T1 Top CH	€2.	i i	
5	T1 Foot CH			
6	T4 Max			
7	T4 Min			-
13	Max Fan Speed		400	
15	Max Fan Speed			
17	Min. Fan Speed		10	
19	Ignition Fan Speed			
22	CH Mod Hysterisis On			0
23 . =	CH Mod Hysterisis Off			
31	Diff. T1-T2 for Mod.Back			
34	СН Туре			

#### 8 USE THIS TABLE TO PROVIDE COMBUSTION ANALYSIS DATA:

Firing Data	Τ .	
Firing Rate	Low	High
% O2	6.7	5.9
%CO <sub>2</sub>	8.0	8.4
СО РРМ	es in	17
NOx PPM	18 (17.6)	14 (23.7)
Ambient Temperature	98	98
Stack temperature ° F	168	179
Stack Draft		
Water Temperature	(පීට	180
Operating Pressure	30	30
Flame Signal	12v	25√
Gas Pressure at Burner		
Gas Pressure at Regulator	13.7 4,5	13-7 9.6

<ol><li>Electrical characteristics</li></ol>	at high fire:					
Blower Motor voltage	124 Blows	er rated amps	130			
Blower Motor actual voltage	122 Blowe	er actual amps	13.14			
Control Circuit Voltage		ol Circuit amps				
Control Circuit Fuse Size	_ 5A	•			1.00	
COMMENTS		ā			1.	
M.						
		<del></del>				
This report was completed by: CB Authorized Service Compa		LEVERTOI DONALD	NA	1		
This report was reviewed with:		L.				
And all questions were answere	ed? Yes 🗌	No 🗌				
Please return one copy Registration.	to Cleaver-E	Brooks Serv	rice Depar	tment for	Warranty	

8HW-2A	HILH
***************  * E C 0 M - 1	J 2 K N → ***********************************
Gas analysis	in er nettida un din de gen per per
Fuel type Natural gas	
T A:	50 05

T.Air T.Gas T.Sensor 02 CO 3%02 NO 3%02 NO2 3%02 NOX 3%02 CO2 Eff.	98 179 90 5.9 17 20.3 3.5 23.7 8.4 88.1	oF oF oF PPM PPM PPM
CO2	8.4	7
Losses Exc. air	11.9	<b>%</b>

ECOM America Ltd.
1628 Oakbrook Drive
Gainesville GAS 9.6
Georgia 30507
Tel. 770-532-3280
Fax: 770-532-3620
Toll-Free 877-326-6411
www.ecomusa.com

\*\*\*\*\*\*\*\*\*\* \*ECOM - J2KN \* 艾子子本本本本本本本本本本本大学本本本本本本本本本 Date Time 19, 14, 19 92:29 PM Gas analysis Fuel type Natural sas 98 °F 165 °F T.Air T.Gas T.Sensor 90 02 6.7 X. 00 3%02 1 FPM NO 3%02 16.9 PPM NO2 3%02 0.8 PPM NOx 3%02 17.6 PPM 002 Eff. */* 8.0 88.3 Losses 11.7

ECOM America Ltd.
1628 Oakbrook Drive
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.6eorsia 38587 GAS
Tel. 778-532-3288 (3.7"
Fax: 778-532-3628
Toll-Free 877-326-6411

1.47

Exc. air

## FOR NATURAL GAS BOILER SOURCE NUMBER:

S-1683



Clearfire - Condensing Start-up Report

Date _	10	21	10		
Serial I	No.	117	174.	 - 2	

#### THIS FORM IS FOR MODEL CFC CLEARFIRE BOILERS

	ANN 10 1 OK MODEL CFC	CLEARFIRE BOILE	RS
Customer's Name	LINL B#381	7792	
Location? LIVERMORE.			
Model No. <u>LFC - 250</u>	Design Pressure 60 Working	Pressure 4D	
Rated input [Nameplate rating]	2- SAMBTU's/hr	10	
This unit is fueled by: Nat.	Gas D LP Gas D	<u> </u>	
	9 Brilet Gas Com	pany PG # E	
Burner Voltage: 120	Control Circuit Voltage:	Do.	
How many boilers are tied into	the same system?	100	
Boiler Water Treatment Discuss	sed with [Name]:	7714	15
Has the boiler been Hydro teste	d in the field? If so, what pressure?	440	
Was the water level control exp	lained and procedure for testing den	nonstrated? Yes No	
Was setting and adjusting the te	emperature controls demonstrated a	nd explained? Yes	
Has the operator been instructed	d on troubleshooting and maintenan	ce? Vec Z Ne Z	NO []
	5.4.7		
BOIL	ER ROOM INSTALLATIO	N & CONDITIONS	
<ol> <li>What is the general condition</li> </ol>	n of the Boller Room at Start-up?		
New constru	ction 🗹 Damp 🔲 Du	sty 🔲 Clean 🗇	Other
2. What is the approximate alti	tude of the boiler installation?		Other
3 Was the boiler used for heat	during construction [before actual s	tart-up]? Yes	No 17
If yes, how long?	And who operated this	unit?	NO [1]
4 Are electrical supply, wires, fi	uses, circuit breakers or disconnects		
supplied and sized per the boile	r drawings and specifications?	Yes 1	No []
lf no, please explain	-	res 🖸	NO []
5 Are all external limits and cor	ntrols connected [flow switch,alarms	circuite outdoor react-01	V 5/
<ol><li>Has any wiring been modified</li></ol>	d or changed prior to start-up or duri	na Start up?	Yes No 🗆
lf yes, provide a marked-up	wiring diagram of the changes.	ug orgit-riht tes	☑ No □
7. Is the boiler level? Yes	✓ No □		
	installed properly and without dama		
If no, explain	moteried properly and without dama	nge? Yes 🗹 No	
	properly supported to prevent disto		
10. Relief valve manufacturer	1.	<del></del>	
11. Relief Valve Set point	KUNKLE Serial		lm
		Discharge Size 1/4"	
12. Relief valve capacity	2.7 mg BTU's /hr		
13. Is the bottom drain line piped	to a safe point of discharge?	Yes 🗹 No 🔲	***
14. Is the optional Condensate C	ollection Pan Installed?	Yes No II If no	has
The Condensate line been tr	apped and piped to drain?	Yes 🖸 No 🔲	, rido
<ol><li>15. Is the air vent line piped to the</li></ol>	e expansion tank? Yes 🗍 No 🗓	If no, please explain	on coul once
16. What is the source for water r	nake-up? (174	m bicase exhiain	ON EUCH GILLGE
17. Is a water softener employed?	Yes No 🗹	1 6	
Other methods employed for			
CB10-2345A-1 6-05	Page 1 of 4	1 0	¥5

18. What type of hot water system is employed? Three-Way Valve Primary-Secondary
Reverse Return Other PRIMARY ANLY
19. What is the size of the system pump? 300 gpm
20. Temperature: Inlet [return] <u>/60</u> °F Outlet [Supply] /60 °F
21. What is the system operating pressure? 80 PSI and temperature 180 °F
22. Is there a Stack Thermometer? Yes No 🗆
23. Is the unit tied into the lead-lag system? Yes No I If yes, how many
Boilers are on the lead-lag system?
24. Is this unit tied into an Energy Management System? Yes 🗍 No 🗍
25. Gas Piping:
a) The length of pipe from regulator to gas train is $b^{\prime}$ and the size is $b^{\prime}/2^{\prime\prime}$
b) The size of the Cleaver Brooks supplied gas train is 1/2"
c) Has the gas line been tested for leaks? Yes 🗹 No 🔲 If no, explain:
d) Has a gas line filter been provided? Yes \( \text{No } \text{ No }
e) Has a gas line drip leg been installed upstream of the regulator? Yes 🗹 No 🔲
NOTE: CLEAVER-BROOKS RECOMMENDS A GAS LINE DRIP LEG
f) Has the gas line been cleaned, or purged prior to starting?
g) Has the Cleaver Brooks supplied gas train been checked for internal cleanliness?
THE CAS LINES ALIOT DE OLEANED IDUDOED DOLO DE DOLO DE DES
THE GAS LINES MUST BE CLEANED/PURGED PRIOR TO INITAIAL START-UP FOR SAFE, RELIABLE OPERATION!
TON OATE, RELIABLE OFERATION!
26) Gas meter manufacturer? <u>foot5</u> capacity <u>3eo o CFH</u> size 2 1
27) What is the inlet gas pressure to the meter?
28) Does the gas meter feed gas to any other equipment? Yes No 🗹
If Yes, explain.
29) If multiple boilers, does each have its own regulator? Yes 🖸 No 🗌
If Yes, explain. AMERICAN NETER 1500 REC
30) Gas booster Mfr
31) What is the booster inlet pressure and outlet pressure
32) Does the booster run continuously? / N/A Or simultaneously with burner?
33) Is the Unit set-up for Sealed Combustion? Yes No
If Yes, explain hook up and size and type piping.
34) Are adequate openings provided for combustion air if sealed combustion is not utilized? Yes No
How many? / Size? 100 P
35) What controls the combustion air supply? Outside air damper Fan
Open Ventilation If other, explain

## Source No. 5-1683 PROCEDURES

1) Was the burner door refractory and burner inspected? Yes 1 No 1	
2) What is the setting of the High Gas Pressure Switch? /4 "W.C.	
3) What is the setting of the Low Gas Pressure Switch? // "W.C.	
4) What is the gas pressure at the gas train inlet, downstream of the regulator, at low fire	パラフ"W.C. and at high
fire 10,2 "W.C.	- W.O. and at my
5) What is the setting of the Combustion Air Proving Switch? / "W.C.	Ye.,
6) What is the setting of the High Air Pressure Switch? 5-26 "W.C.	

#### PLEASE PROVIDE THE SETTINGS AS NOTED IN THE TABLE BELOW:

Parameter No.	Description	Lower Limit	Upper Limit	Default Setting
4	T1 Top CH	8		<u> </u>
5	T1 Foot CH			
6	T4 Max			
7	T4 Min			
13	Max Fan Speed			
15	Max Fan Speed			
17	Min. Fan Speed		6	
19	Ignition Fan Speed			
22	CH Mod Hysterisis On	8	D.	
23	CH Mod Hysterisis Off			·
31	Diff. T1-T2 for Mod.Back			-
34	СН Туре		20	To the second

#### 8 USE THIS TABLE TO PROVIDE COMBUSTION ANALYSIS DATA:

Firing Rate	Low	High
% O2	6.3	5,&
%CO <sub>2</sub>	8.2	8.5
СО РРМ	5	9
NOx PPM	22 (21.6)	25 (244)
Ambient Temperature	Gol	100
Stack temperature ° F	173	182
Stack Draft		
Water Temperature	180	160
Operating Pressure	30	30
Flame Signal	lov	26V
Gas Pressure at Burner		
Gas Pressure at Regulator	# 13.7	13-7 10.2

<ol><li>Electrical characteristics at</li></ol>	t high fire:		
Blower Motor voltage	120 Blower rated amps	13A	
Blower Motor actual voltage	122 Blower actual amps	<del></del>	
Control Circuit Voltage	122 Control Circuit amps		
Control Circuit Fuse Size	54	<u> </u>	
COMMENTS		9	
-			
This report was completed by: CB Authorized Service Company This report was reviewed with: And all questions were answered		Fred -	ti
Please return one copy to	o Cleaver-Brooks Serv	rice Department for Warranty	

BHW - 03A HIGH  ***************  * E C O M - J 2 K N *  ********************************	
Gas analysis	lin
Fuel type Natural 935	****************** * E C O M - J 2 K N * ***************
T.Air 100 °F T.Gas 182 °F T.Sensor 91 °F 02 5.8 % 00 3%02 9 PPM NO 3%02 21.4 PPM NO2 3%02 3.2 PPM	Date Time 10.14.18 03:32 PM Gas analysis Fuel type Natural gas
NOx 3%02 24.6 PPM CO2 8.5 % Eff. 88.0 % Losses 12.0 % Exc. air 1.38	T.Air 100 °F T.Gas 173 °F T.Sensor 91 °F 02 6.3 % 00 3%02 5 PPM
ECOM America Ltd. 1628 Oakbrook Drive Gainesville Georgia 30507 Tel. 770-532-3280 (0.2) Fax: 770-532-3620 Toll-Free 877-326-6411	NO 3%02 19.3 PPM NO2 3%02 2.2 PPM NOX 3%02 21.6 PPM CO2 8.2 % Eff. 88.2 % Losses 11.8 % Exc. air 1.43
WUM. ECCHUSA. COM	ECOM America Ltd. 1628 Oakbrook Drive 6ainesville GAS 6eoreia 30507 Tel. 770-532-3280 Fax: 770-532-3620 Toll-Free 877-326-6411

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## FOR NATURAL GAS BOILER SOURCE NUMBER:

S-1684



Clearfire - Condensing Start-up Report Date 10 21 10 Serial No. 42174 - 1 - 3

#### THIS FORM IS FOR MODEL CFC CLEARFIRE BOILERS

Customer's Name LLVL # 381
Model No. Aft. are
Rated input [Nameplate rating] 2.5 May BTU's/hr This unit is fueled by: Nat. Gas 1 LP Gas 1
BTII Value of the ground and a second
79,
How many bollers are tied into the same system?  4  Control Circuit Voltage: 120  How many bollers are tied into the same system?
Roller Water Transport Di
Has the boller been Hydro tested in the field? If so, what pressure?
Was the water level control explained and annually it is a
Was setting and adjusting the termonature and the
Has the operator been instructed on troubleshooting and maintenance? Yes Mo
•
<b>BOILER ROOM INSTALLATION &amp; CONDITIONS</b>
1. What is the general condition of the Boiler Room at Start-up?
New construction ☐ Damp ☐ Dusty ☐ Clean ☐ Other
2. What is the approximate altitude of the boller installation?
3 Was the boiler used for heat during construction [before actual start-up]? Yes ☐ No ☐
If yes, how long? And who operated this unit?
4 Are electrical supply, wires, fuses, circuit breakers or disconnects
supplied and sized per the boller drawings and specifications?  Yes  No
If no, please explain
5 Are all external limits and controls connected [flow switch,alarms,circuits,outdoor resets?] Yes No
6. Has any wiring been modified or changed prior to start-up or during Start-up? Yes No
If yes, provide a marked-up wiring diagram of the changes.  7. Is the boller level? Yes No C
8. Have the casing panels been installed properly and without damage? Yes ☐ No ☐  If no, explain
9. Is the safety relief valve piping properly supported to prevent distortion? Yes ☐ No ☐
10. Relief valve manufacturer KJNKLE Serial No? 0537 - For - IM
11. Relief Valve Set point  Valve Discharge Size 1/4"  Valve Discharge Size 1/4"
12. Relief valve capacity 2.7 MM BTU's /hr
13. Is the bottom drain line piped to a safe point of discharge?
14. Is the optional Condensate Collection Pop Installed
The Condensate line been trapped and piped to drain?  Yes  No  If no, has Yes  No  No  If no, has
15. Is the air vent line pined to the average of the second of the secon
16. What is the source for water make-up? (177)
17. Is a water softener employed? Yes \( \subseteq \text{No } \subseteq \)
Other methods employed for water conditioning
CB10-2345A-1 Page 1 of 4

18. What type of hot water system is employed? Three-Way Valve Primary-Secondary Reverse Return Other Officially and
19. What is the size of the system pump? 300 gpm
20. Temperature: Inlet [return] /bo °F Outlet [Supply] /bo °F
21. What is the system operating pressure? 30 PSI and temperature (\$0 op
22. Is there a Stack Thermometer? Yes No
23. Is the unit tied into the lead-lag system? Yes No I if yes, how many
Boilers are on the lead-lag system?
24. Is this unit tied into an Energy Management System? Yes No 🗆
25. Gas Piping:
a) The length of pipe from regulator to gas train is $\frac{1}{2}$ and the size is $\frac{1}{2}$
b) The size of the Cleaver Brooks supplied gas train is
c) Has the gas line been tested for leaks? Yes No If no, explain:
d) Has a gas line filter been provided? Yes To No D
e) Has a gas line drip leg been installed upstream of the regulator? Yes ☑ No □
NOTE: CLEAVER-BROOKS RECOMMENDS A GAS LINE DRIP LEG
f) Has the gas line been cleaned, or purged prior to starting?  Yes No
g) Has the Cleaver Brooks supplied gas train been checked for internal cleanliness?
THE GAS LINES MUST BE CLEANED/PURGED PRIOR TO INITAIAL START-UP FOR SAFE, RELIABLE OPERATION!
26) Gas meter manufacturer? LEBYS capacity Xono LFH size Q <sup>II</sup>
27) What is the inlet gas pressure to the meter? 2.75 t
28) Does the gas meter feed gas to any other equipment? Yes No I No I If Yes, explain.
29) If multiple boilers, does each have its own regulator? Yes No 🗌
If Yes, explain. AMERICAN METER 1800 LEG.
30) Gas booster Mfr capacity v/4 size//4
31) What is the booster inlet pressure //// and outlet pressure
32) Does the booster run continuously? / 4/0 Or simultaneously with burner?
70\
33) Is the Unit set-up for Sealed Combustion? Yes No
If Yes, explain hook up and size and type piping.
If Yes, explain hook up and size and type piping.  34) Are adequate openings provided for combustion air if sealed combustion is not utilized?  Yes No
If Yes, explain hook up and size and type piping.  34) Are adequate openings provided for combustion air if sealed combustion is not utilized?  Yes No How many?   Size?   190 pt
If Yes, explain hook up and size and type piping.  34) Are adequate openings provided for combustion air if sealed combustion is not utilized?  How many? _   Size? _   100 pt  35) What controls the combustion air supply? Outside air damper Fan
If Yes, explain hook up and size and type piping.  34) Are adequate openings provided for combustion air if sealed combustion is not utilized?  How many?   Size?   100 pc  35) What controls the combustion air supply? Outside air damper Fan  Open Ventilation. If other, explain
If Yes, explain hook up and size and type piping.  34) Are adequate openings provided for combustion air if sealed combustion is not utilized?  How many? _   Size? _   100 pt  35) What controls the combustion air supply? Outside air damper Fan

#### PROCEDURES

1) Was the burner door refractory and burner inspected?	Yes 🗹 No 🞵	
2) What is the setting of the High Gas Pressure Switch?	14 "W.C.	
3) What is the setting of the Low Gas Pressure Switch?	%.C.	
4) What is the gas pressure at the gas train inlet, downstre fire "W.C.	eam of the regulator, at low fire	13.1 "W.C. and at high
<ul><li>5) What is the setting of the Combustion Air Proving Switch</li><li>6) What is the setting of the High Air Pressure Switch?</li></ul>	h?	<i>'</i> 4

#### PLEASE PROVIDE THE SETTINGS AS NOTED IN THE TABLE BELOW:

Parameter No.	Description	Lower Limit	Upper Limit	Default Setting
4	T1 Top CH	191		
5	T1 Foot CH			
6	T4 Max			35
7	T4 Min			
13	Max Fan Speed			
15	Max Fan Speed			
17	Min. Fan Speed		¥	
19	Ignition Fan Speed			57
22	CH Mod Hysterisis On			
23	CH Mod Hysterisis Off			<u> </u>
31	Diff. T1-T2 for Mod.Back	84		
34	СН Туре			

#### 8 USE THIS TABLE TO PROVIDE COMBUSTION ANALYSIS DATA:

Firing Rate	Low	High
% O2	6.6	5.9
%CO <sub>2</sub>	8.0	8.4
CO PPM		18
NOx PPM	19 (19.1)	26 (26.2)
Ambient Temperature	88	88
Stack temperature ° F	168	185
Stack Draft	Yeste.	
Water Temperature	180	180
Operating Pressure	30	30
Flame Signal	124	261
Gas Pressure at Burner		
Gas Pressure at Regulator	13.5	9.2

9) Electrical characteristics at high fire:	
Blower Motor voltage 120 Blower rated amps 134	
Blower Motor actual voltage 122 Blower actual amps 13.1A	
Control Circuit Voltage 122 Control Circuit amps 0, 5A	
Control Circuit Fuse Size CA	
COMMENTS	
	· <del>····································</del>
This report was completed by: TROY LEVELTON FI	
CB Authorized Service Company: AF MACDONALD	
This report was reviewed with:	
And all questions were answered? Yes □ No □	
Please return one copy to Cleaver-Brooks Service Department for Warranty	
Registration	

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \* E C O M - J 2 K N \* Date Time 10.13.10 12:10 PM Gas analysis Fuel type Natural gas T.Air T.Gas 185 % T.Sensor 81 oF 02 5.9 % · 00 3%02 18 ppm NO 3%02 22.1 FPM 1102 3%02 4.2 PPM NOx 3%02 26.2 PPM % % 002 8.4 Eff. 87.6 Losses i2.4 1/2 Exc. air 1.39 ECON America Ltd. 1628 Oakbrook Drive NG SA Gainesville Georgia 30507 Tel. 770-532-3280 Fax: 770-532-3620 Toll-Free 877-326-6411 www.ecomusa.com

* E C O M - J 2 K N * ************ Date Time 10.13.10 12:12 PM
Gas analysis Fuel tyre Natural sas
T.Air S8 °F T.Gas 168 °F T.Sensor 81 °F 02 6.6 % 00 3%02 1 PPM NO 3%02 17.5 PPM NO2 3%02 1.6 PPM NO% 3%02 19.1 PPM 002 8.0 % Eff. 88.0 % Exc. air 1.46