

Cleaver Brooks Start-up

```

V1.21      01330786/USA
FIBERWEB 11/11/11
LOW
-----
Protocol: 1/4
Start: 11/11/11 10:39:39
-----
12.5 % Oxygen
4.78 % CO2
65 ppm CO
131.5 % ExAir
364.5 % T stack
79.1 % EFF
141 ppm Undiluted CO
inh20 Draft
79.9 °F Ambient temp
84.8 °F Instr. temp
°F Diff. temp.
mbar Diff. Press.
ppm CO2amb
ppm aCO
Fuel: Natural gas
O2ref.: 3.82
CO2max: 11.72
Heat transf.*F: -----F
-----
Protocol: LOW #1 2/4
Start: 11/11/11 10:40:55
-----
12.8 % Oxygen
5.28 % CO2
66 ppm CO
119.2 % ExAir
365.5 % T stack
79.6 % EFF
154 ppm Undiluted CO
inh20 Draft
78.9 °F Ambient temp
84.3 °F Instr. temp
°F Diff. temp.
mbar Diff. Press.
ppm CO2amb
ppm aCO
Fuel: Natural gas
O2ref.: 3.82
CO2max: 11.72
Heat transf.*F: -----F
-----
Protocol: Low #2 3/4
Start: 11/11/11 10:41:37
-----
11.5 % Oxygen
5.28 % CO2
108.2 % ExAir
366.1 % T stack
89.1 ppm Undiluted CO
inh20 Draft
78.7 °F Ambient temp
85.0 °F Instr. temp
°F Diff. temp.
mbar Diff. Press.
ppm CO2amb
ppm aCO
Fuel: Natural gas
O2ref.: 3.82
CO2max: 11.72
Heat transf.*F: -----F
-----
Protocol: 7/4 FIRE 4/4
Start: 11/11/11 10:47:39
-----
7.8 % Oxygen
7.34 % CO2
92 ppm CO
52.8 % ExAir
369.0 % T stack
82.3 % EFF
147 ppm Undiluted CO
inh20 Draft
78.7 °F Ambient temp
85.3 °F Instr. temp
°F Diff. temp.
mbar Diff. Press.
ppm CO2amb
ppm aCO
Fuel: Natural gas
O2ref.: 3.82
CO2max: 11.72
Heat transf.*F: -----F
    
```

**BEFORE:**  
Cleaver Brooks Boiler  
Cleaver Brooks Burner  
Cleaver Brooks Controls

- Proprietary Parts
- Lower Efficiencies
- Before: 82.9% Efficiency



**AFTER:**  
Cleaver Brooks Boiler  
Riello Burner  
Siemens Linkageless Controls

- Boiler retro-fitted with new door
- Non-Proprietary Parts
- High Efficiency Burner
- Siemens is the World Leader in Combustion Controls
- After: 86.5% Efficiency



MCCOTTER ENERGY SYSTEMS  
904 E. PEARSON ST.  
MILWAUKEE, WI 53202  
1.800.950.4822

www.mccotterenergy.com



Start-up after the Riello Burner Retrofit

Field	Fuel. Gas Fired													
	1	2	3	4	5	6	7	8	9	10	11	12	13	
Combustion Settings	5	10	15	20	25	30	40	50	60	70	80	90	100	
Servo Settings														
	<b>Fuel</b>	10	12.5	15	19	24	29	33.5	39	44	50	55	60	64
	<b>Air</b>	22	23	26	30	37.5	44	50	56	63	69.5	76	82	90
	<b>VSD</b>	70	72	74	79	85	88	89.5	92	94	95.5	97	98.5	100
O2	4.4	4.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3	2.9	2.4	2.3	
Smoke or CO (ppm)	0	0	3	0	0	0	0	0	0	0	0	0	3	
CO2	9.25	9.5	9.97	9.97	9.97	9.97	9.97	9.97	9.97	10	10.1	10.4	10.4	
NOx (ppm)	22	24	28	31	36	41	41	43	47	29	50	51	52	
Stack Temp. °F	324	321	319	316	359	358	358	353	366	362	367	348	361	
Room Temperature °F	92	92	92	92	96	96	96	96	95	95	93	92	92	
Combustion Efficiency	85.6	85.7	86.1	86.1	85.4	85.4	85.5	85.5	85.3	85.3	85.2	85.7	86.5	
Oil noz press/manifold gas press	0.3	0.5	0.9	1.2	1.8	3	3.5	5	7.6	10.7	13	15.2	17	
Running Motor Amps & Volts	L1	480	23a	L2	480	23a	L3	480	23a					