Magna-Tek Systems Inc.
www.magna-tek.com

1327 Greenwood Cr.
Oakville, Ontario L6J 6V3
Tel: (905) 829-0587 Fax: (905) 829-1174

Independent Test Evaluation
Natural Gas Savings with Magnetic Conditioning Device

LOCATION: Toronto Metropolitan Separate School Board (De Charbonnel High School)

Test Results/Highlights

- Carbon Monoxide was reduced to 0 ppm (both hi-fire and low-fire)
- Over a 6-week period, natural gas consumption was reduced by 15% (hi-fire) and 11% (low-fire).

Test Summary

December 19, 1996

Before Device: Boiler was fine-tuned prior to installation of conditioning device. Carbon monoxide of 16-21 ppm was still exhausted into the atmosphere. The baseline BTU rating was recorded at 6000 ft^3 for hi-fire and 3600 ft^3 for low-fire.

After Device Installed: Two hours after the device was installed on the 4" feed line, carbon monoxide was reduced to 0 ppm, indicating a more complete burn of the fuel.

January 16, 1997

Readings were taken before any fine tuning adjustments (pre) and again after mechanical adjustments to optimize performance (post). In all cases, carbon monoxide remained at 0 ppm. Fuel flow was then decreased manually by 285 ft^3 (hi-fire) and 173 ft^3 (low fire).

January 30, 1997

After mechanical adjustments, natural gas flow is reduced to 5100 ft^3 (hi-fire) and 3100 ft^3 (low-fire)

February 13, 1997

Natural gas flow stabilized at 5100 ft^3 for hi-fire and 3200 ft^3 for low-fire, indicating a **savings of 15% and 11% respectively.**

	Dec 19, 1996		Jan 16, 1997		Jan 30, 1997		Feb 13, 1997	
	Before Installation	2 Hours after Installation	Pre Adjust	Post Adjust	Pre Adjust	Post Adjust	Pre Adjust	Post Adjust
Fuel Input (cu ft/hr)	6000	6000	6000	5715	5500	5100	5100	5100
CO ppm	16	0	0	0	2	0	13	0

Attached: Black & McDonald combustion set up and safety control worksheets

PRE MHD 2Hr post MHD

GAS ~~OIL~~

BURNER READINGS	LO	HI	LO	HI
Input MBH/~~GPH~~ Ft3	3600	6000	3600	6000
Fuel Pressure Manifold	.75"	2.5" W.C.	.75	2.5
Orifices - Nozzle				
Oil Return/Air PSIG				
Oil Temperature °F				
Oil Temperature Inlet				
Oil Temperature Outlet				
Oil Pump Vacuum				
Oil Pump PSIG				
Combustion Test				
CO_2 %	8.3	9.4	8.3	9.7
O_2 %	6.2	3.4	6.2	3.7
CO % PPM	21	16	Ø	Ø
Smoke No.			225°F	
Stack Temperature Gross	263°F	292°F	~~255°F~~	280°F
Efficiency %	84.1	84.2	85.3	84.4
Draft Overfire				
Draft Breeching				
Room Temperature	51°F	51°F	51°F	51°F
Air Inlet Low Fire				
Air Inlet High Fire				
Pilot Flame Signal	19.5	X		
Main Burner Flame Signal	19.75	20.75	20.5	20.8
Burner Motor, Amps	10.7	11.7	10.3	11.2
Air Compressor Motor, Amps				
Oil Pump Motor, Amps				
Induced Fan Motor, Amps				

Outdoor Air Temp. (40°F ↗)(46°F)

Customer MGR. DE CHARBONNEL

Address 110 DREWRY

Boiler/Heater BLR 01

Burner FUEL MASTER CGO 230

Location #680-43

Date of Test DEC-19/96

Mechanic T. WIGGINS

SAFETY CONTROL CHECK

1. Low-Water Cut-Off	
2. Sec. Lo-Water Cut-Off	
3. High Water Cut-Off	
4. Guarded Plant System	
5. High Limit	
6. Low Limit	
7. Operating Limit	
8. Firing Rate Control	
9. Pilot Turn Down Test	
10. Leak Test Gas Valves	
11. Flame Failure	
12. Low Gas Press Switch	
13. High Gas Press Switch	
14. Low Fire Start	
15. Combustion Air Switch	
16. Low Oil Press Switch	
17. Low Oil Temperature Switch	
18. Low Oil Air Atomizing Switch	
19. Combustion & Ventilation Air	
20. Barometric Damper	

BLACK & McDONALD COMBUSTION SET UP, SAFETY CONTROL CHECK

BURNER READINGS	PRE GAS LO	PRE GAS HI	POST GAS LO	POST ~~OIL~~ HI
Input MBH/GPH FT^3	3400	6000	3427	5715
Fuel Pressure "W.C.	0.75	2.75	0.65	2.5
Orifices - Nozzle				
Oil Return/Air PSIG				
Oil Temperature °F				
Oil Temperature Inlet				
Oil Temperature Outlet				
Oil Pump Vacuum				
Oil Pump PSIG				
Combustion Test				
CO_2 %	8.5	10.1	8.3	9.9
O_2 %	5.9	3.0	6.2	3.3
CO %	Ø	Ø	Ø	Ø
Smoke No.				
Stack Temperature	261°F	293°F	236°F	281°F
Efficiency	84.5	84.5	85.2	84.7
Draft Overfire				
Draft Breeching				
Room Temperature	59°F	59°F	59°F	59°F
Air Inlet Low Fire				
Air Inlet High Fire				
Pilot Flame Signal	19.8		19.8	
Main Burner Flame Signal	20.5	20.9	20.5	20.9
Burner Motor, Amps	10.1	10.8	10.1	10.8
Air Compressor Motor, Amps				
Oil Pump Motor, Amps				
Induced Fan Motor, Amps				

OUTDOOR AIR TEMP (24.8°F)

Customer MGR. DE CHARBONNE

Address 110 DEEWEY

Boiler/Heater BLR 01

Burner FUEL MASTER CGO

Location 680-43

Date of Test JAN. 16/97

Mechanic T. WIGGINS

SAFETY CONTROL CHECK

1.	Low-Water Cut-Off
2.	Sec. Lo-Water Cut-Off
3.	High Water Cut-Off
4.	Guarded Plant System
5.	High Limit
6.	Low Limit
7.	Operating Limit
8.	Firing Rate Control
9.	Pilot Turn Down Test
10.	Leak Test Gas Valves
11.	Flame Failure
12.	Low Gas Press Switch
13.	High Gas Press Switch
14.	Low Fire Start
15.	Combustion Air Switch
16.	Low Oil Press Switch
17.	Low Oil Temperature Switch
18.	Low Oil Air Atomizing Switch
19.	Combustion & Ventilation Air
20.	Barometric Damper

BLACK & McDONALD COMBUSTION SET UP, SAFETY CONTROL CHECK

BURNER READINGS	* pre GAS LO	HI	*post GAS ~~OIL~~ LO	HI
Input ~~MBH/GPH~~ FT^3	3400	5500	3100	5100
Fuel Pressure "W.C.	1"	2.75	.75	2.5
Orifices - Nozzle				
Oil Return/Air PSIG				
Oil Temperature °F				
Oil Temperature Inlet				
Oil Temperature Outlet				
Oil Pump Vacuum				
Oil Pump PSIG				
Combustion Test				
CO_2 %	8.1	9.8	8.9	10.6
O_2 %	6.6	3.6	5.2	2.2
CO %	Ø	2	Ø	Ø
Smoke No.				
Stack Temperature °F	262	303	240	266
Efficiency	84.5	84.2	85.5	85.5
Draft Overfire				
Draft Breeching				
Room Temperature °F	66°F	66	66	66
Air Inlet Low Fire				
Air Inlet High Fire				
Pilot Flame Signal				
Main Burner Flame Signal	20.2	20.6	20.4	20.5
Burner Motor, Amps	10.1	~~11~~	10.2	10.9
Air Compressor Motor, Amps				
Oil Pump Motor, Amps				
Induced Fan Motor, Amps				

(Outdoor Air 13.7°F)

Customer MSGR. DE CHARBONNEL

Address 110 DREWRY

Boiler/Heater BLR 01

Burner FUEL MASTER CGO 230

Location 680-43

Date of Test JAN. 30/97

Mechanic T. WIGGINS

SAFETY CONTROL CHECK

1. Low-Water Cut-Off	
2. Sec. Lo-Water Cut-Off	
3. High Water Cut-Off	
4. Guarded Plant System	
5. High Limit	
6. Low Limit	
7. Operating Limit	
8. Firing Rate Control	
9. Pilot Turn Down Test	
10. Leak Test Gas Valves	
11. Flame Failure	
12. Low Gas Press Switch	
13. High Gas Press Switch	
14. Low Fire Start	
15. Combustion Air Switch	
16. Low Oil Press Switch	
17. Low Oil Temperature Switch	
18. Low Oil Air Atomizing Switch	
19. Combustion & Ventilation Air	
20. Barometric Damper	

BLACK & McDONALD COMBUSTION SET UP, SAFETY CONTROL CHECK

BURNER READINGS	PRE. ~~GAS~~ LO	PRE. ~~GAS~~ HI	POST ~~OIL~~ LO	POST ~~OIL~~ HI
Input MBH/~~BPH~~ FT^3	3100 3.1x10⁶	5100 5.1x10⁶	3200 3.2x10⁶	5100 5.1x10⁶
Fuel Pressure "W.C.	0.8"wc	2.75	1"w.c.	2.75
Orifices - Nozzle				
Oil Return/Air PSIG				
Oil Temperature °F				
Oil Temperature Inlet				
Oil Temperature Outlet				
Oil Pump Vacuum				
Oil Pump PSIG				
Combustion Test				
CO_2 %	8.3	10.0	8.7	10.2
O_2 %	6.2	3.1	5.5	2.8
CO %	12	13	Ø	Ø
Smoke No.				
Stack Temperature °F	196	257	237	289
Efficiency %	86.6	85.6	85.6	84.8
Draft Overfire				
Draft Breeching				
Room Temperature				
Air Inlet Low Fire				
Air Inlet High Fire				
Pilot Flame Signal				
Main Burner Flame Signal VDC	20.5	20.6	20.8	21
Burner Motor, Amps	10.5	11.2	10.4	11.2
Air Compressor Motor, Amps				
Oil Pump Motor, Amps				
Induced Fan Motor, Amps				

Outdoor Air 14.7°F

Customer MGR. DE CHARBONNEL

Address 110 DEWEY

Boiler/Heater BLR 01

Burner CGO 230 #680-43

Location

Date of Test FEBRUARY 13/97

Mechanic T. WIGGINS

SAFETY CONTROL CHECK	
1. Low-Water Cut-Off	
2. Sec. Lo-Water Cut-Off	
3. High Water Cut-Off	
4. Guarded Plant System	
5. High Limit	
6. Low Limit	
7. Operating Limit	
8. Firing Rate Control	
9. Pilot Turn Down Test	
10. Leak Test Gas Valves	
11. Flame Failure	
12. Low Gas Press Switch	
13. High Gas Press Switch	
14. Low Fire Start	
15. Combustion Air Switch	
16. Low Oil Press Switch	
17. Low Oil Temperature Switch	
18. Low Oil Air Atomizing Switch	
19. Combustion & Ventilation Air	
20. Barometric Damper	