



BR LABORATORIES, INC.
 P.O. Box 1249
 Huntington Beach, CA 92647
 (714) 891-0206 • Fax: (714) 893-0818
 E-mail: bsbri@aol.com



REPORT NUMBER: 1404-01

**TEST REPORT ON
 PATTERSON-KELLEY NATURAL GAS-FIRED
 HOT WATER/HEATING BOILER (CONDENSING TYPE)**

BRAND : NEW P-K SONIC™
MODEL : SC-4000
SERIAL NO : S400-13-00502


APRIL 1, 2014

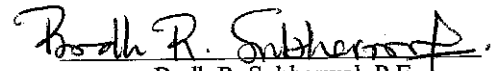
TEST PROCEDURE: BAAQMD Test Method 9-7-307.1, NITROGEN OXIDES EMISSIONS COMPLIANCE TESTING FOR NATURAL GAS-FIRED BOILERS AND WATER HEATER.

CONCLUSIONS: PATTERSON-KELLEY Hot Water/Heating Boiler Model: SC-4000 met the 3% O₂ corrected 30 PPM NO_x and 400 PPM CO requirements of BAAQMD Reg 9-7 with the following results:

Input, Rating	:	<u>High</u>	<u>Mid</u>	<u>Low</u>
3% O ₂ Corrected NO _x , PPM	:	7.8	8.4	5.3
3% O ₂ Corrected CO, PPM	:	26	20	9.4
Load, %	:	80.3	50.9	23.9
Appliance	:	<u>Hot Water Boiler</u>		

PASS


 Sun Oung, P.E.
 Project/Test Engineer


 Bodh R. Subherwal, P.E.
 Technical Manager

PREPARED FOR : HARSCO INDUSTRIAL
 PATTERSON-KELLEY
 155 Burson Street
 East Stroudsburg, PA 18301
CONTACT : MR. LUKE WONNELL
PHONE : (570) 476-7276
FAX : (570) 476-7447

TABLE OF CONTENTS

	<u>PAGE</u>
SUMMARY OF NO _x AND CO EMISSION RESULTS.	(i)
I. BACKGROUND	1
II. HOT WATER/HEATING BOILER	2 - 3
III. TEST METHOD	4
IV. TEST PROCEDURE	5 - 9
V. TEST DATA	10 - 31
VI. APPENDIX I	
• STRIP CHARTS	
• CALIBRATION DATA	
• NO CONFLICT OF INTEREST	
• COPY OF CARB CERTIFICATE	



REPORT NO.: 1404-01

SUMMARY OF NO_x & CO EMISSION TEST RESULTS

- **PATTERSON-KELLEY NEW P-K SONIC™ Model: SC-4000 Hot Water Boiler**
Input: 4.0 MMBTU/hr

	High Fire	Mid Fire	Low Fire	Pass/Fail
Appliance S/N	S400-13-0502	S400-13-0502	S400-13-0502	
Fuel	Natural Gas	Natural Gas	Natural Gas	
Test Location	BR Labs	BR Labs	BR Labs	
Test Date	03/14/14	03/14/14	03/14/14	
Test Duration (mins.)	30	30	30	
Ambient Temperature, °F	70	73	74	
Load, %	80.3	50.9	23.9	
Load MMBTU/hr	3.21	2.03	0.956	
O ₂ %	7.18	6.68	7.57	
CO ₂ %	7.84	8.12	7.62	
NO _x , ppm	5.95	6.68	3.92	
NO_x, ppm @ 3% O₂	7.8	8.4	5.3	PASS
NO _x , lbs/hr	0.030	0.021	0.0061	
NO _x , lbs/day	0.72	0.504	0.1464	
NO _x , lbs/MMBTU	0.009	0.0102	0.006	
CO, ppm	19.83	15.82	7.0	
CO, ppm @ 3% O₂	26	20	9.4	PASS
CO, lbs/hr	0.060	0.030	0.007	
CO, lbs/day	1.44	0.72	0.168	
CO, lbs/MMBTU	0.037	0.015	0.007	

NO_x = Oxides of Nitrogen as NO₂ (MW = 46)
CO = Carbon Monoxide (MW = 28)
O₂ = Oxygen
Lbs/MMBTU = Pounds per Million BTU
Lbs/MMBTU = Fd * MW *ppm * 2.59E-9 *20.9/ (20.9 - % O₂)
Fd = 8710 (EPA F Factor for Natural Gas)
3% O₂ correction = ppm of pollutant *17.9/ (20.9 - % O₂)

Comments: PATTERSON-KELLEY NEW P-K SONIC™ 4.0MMBTUH Natural Gas-Fired Hot Water Boiler Model SC-4000 met the 3% O₂ Corrected NO_x and CO emissions requirements of BAAQMD Regulations 9-7:

3% O₂ Corrected NO_x ≤ 30 PPM
3% O₂ Corrected CO ≤ 400 PPM

TEST RESULT = **PASS**

