

TEST REPORT

(Prepared September 16, 2009)

FOR:

METROPOLITAN WASHINGTON

COUNCIL of GOVERNMENTS

ENERGY ADVISORY GROUP

WASHINGTON, D.C.

MAXR 100 EFFICIENCY TEST

UNIT: YORK 4 TON AIR CONDITIONER/HEAT PUMP

LOCATION:

COMMUNITY CENTER

LOVETTSVILLE, VIRGINIA

TEST REPORT AUTHORIZED BY:

TRANS BIO ENERGY COMPANY, LLC

Owner/Manufacturer of MaxR Products

201 N. Cleveland-Massillon Road, Akron, OH 44333

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Test Summary

What is MaxR 100?

Manufacturer's definition:

MaxR 100 is an inter-metallic compound. Following the MaxR 100 treatment, a period of approximately 10 to 14 days should be allowed for the product to fully integrate through the system. During the integration period, as MaxR 100 is bonding to the metal, existing oil fouling is removed and a permanent bond of the inter-metallic compound is created on the metal surfaces. As a result, MaxR 100 restores the heat transfer efficiency producing a subsequent reduction in overall operating expenses.

Information Provided for Documentation of Test:

A test was performed on a twenty-three (23) year old, York 4 Ton Air Conditioner/Heat Pump at the Community Center in Lovetsville, Virginia. The purpose of the test was to evaluate the efficiency impact that a MaxR 100 treatment would have on the test unit.

Prior to initiating the test, the unit was inspected and found to be in good working condition. Monitoring equipment manufactured by ONSET COMPUTER CORPORATION, 470 MacArthur Blvd., Bourne, MA 02532 was installed on the test unit and data collected through their data logger, HOBO Data Logger. This data was made available on the Internet and is available for downloading.

Data was logged in one minute increments. Each measured parameter was the average value of a one minute interval of use which allowed for a critical evaluation of the details needed to determine the impact of changes to the operational values of the unit being tested. The data was further summarized in daily format between the hours of 10 a.m. and 5 p.m. The time period of 10 a.m. to 5 p.m. was chosen to capture the normal demand for air conditioning in terms of facility occupancy and highest outside air temperatures, to include Solar Noon on any particular day.

The use of an add-in program for making engineering calculations of total BTU, Latent BTU and Sensible BTU made the summarized data practical with a high degree of accuracy. Data used by the American Society of Heating, Refrigeration and Air Condition Engineering (ASHRAE) for Psychrometric calculations was used. A value of 1400 CFM was used throughout the report based on the technical manual for this unit and validated from the York factory personnel as an acceptable assumption.

Results:

To measure the efficiency impact of MaxR 100 a number of efficiency calculations were utilized and applied to data logged from the hours of 10 a.m. to 5 p.m.

A 4 ton air conditioner running at maximum efficiency would produce 48,000 BTU's per Hour (12,000 BTU's X 4). During the Pre-Treatment Period, the average maximum BTU/Hr Run was 35,489. During the Integration Period, the average maximum BTU/Hr Run was 37,355. After the Integration Period, the average maximum BTU/Hr Run was 41,443, revealing a very respectable increased efficiency of an average 16.8% of the operating system. The formula for Total BTU calculation was $TOTAL\ BTU = 4.5 \times (Return\ Air\ Enthalpy\ minus\ Supply\ Air\ Enthalpy) \times CFM$. The Add-IN program for Excel spreadsheets were used. These calculations were made during each minute of operation after the air conditioner had been running for at least 3 minutes to give itself time to function effectively. The Sensible BTU calculations were discovered by using the formula $Sensible\ BTU = 1.08 \times (Difference\ of\ Temperature\ between\ Return\ and\ Supply\ Temperatures) \times CFM$. These calculations were made at comparable times as Total BTU calculations.

The Energy Efficiency Ratio (EER) was calculated for each minute of run-time by dividing the Total BTU by the total kwh rate referenced to one hour. The EER went from an average 6.0 in the Pre-Treatment Period to 6.2 during the Integration Period and increased to 6.8 after the Integration Period. The average increase in the EER was 13.54% compared to 19.48% if considering maximum peaks in each period. This shows that substantially more cooling capacity (BTU's) for the amount of kWh's being used results from the MAXR 100 treatment.

The average Coefficient of Performance (COP) started with an average 1.7 in the Pre-Treatment Period, during the Integration Period 1.9 and after the Integration Period 2.0. The average increase in COP was the same as EER change, since by definition the EER times .293 is COP.

The average kW/Ton, Pre-Treatment was 3.2, during the Integration Period 3.3 and after the Integration Period 2.5. That's a 19.88 percent average reduction in kW/Ton, which is a substantial achievement and reveals the impact that MaxR 100 has on the operating costs.

The MaxR 100 Efficiency test has demonstrated that the product impacts the operation of the system by restoring its efficiency and ability to produce cooler air at less cost to operate. After the MAXR 100 treatment, operating the air conditioner was approaching the level expected from a newly installed system.

The measured cost per day (again between the hours of 10 a.m. and 5 p.m.) in the Pre-Treatment Period was an average of \$0.90 per day. During the Integration Period it was \$1.10 per day as the unit had more demand on it to clean the system. After the Integration Period

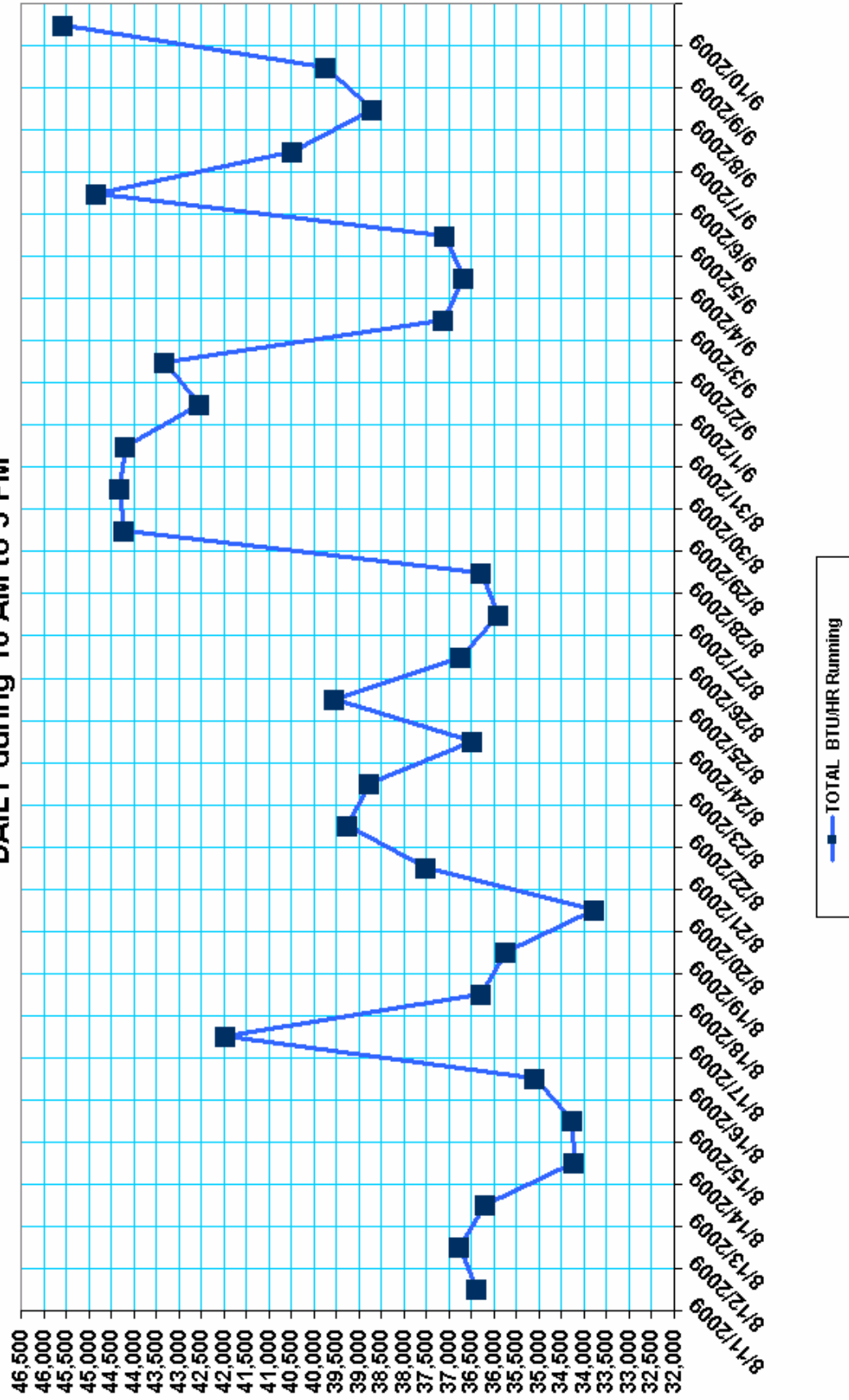
the average cost per day dropped to \$0.48. These averages are shown as simple comparisons, but no claim to linear reality can be justified.

In conclusion, the average of the data per day demonstrated that MaxR 100 increased the effectiveness of the cooling system while naturally reducing the operating costs. The cost of the installation of MaxR 100 should have a Return On Investment (ROI) of less than one cooling season.

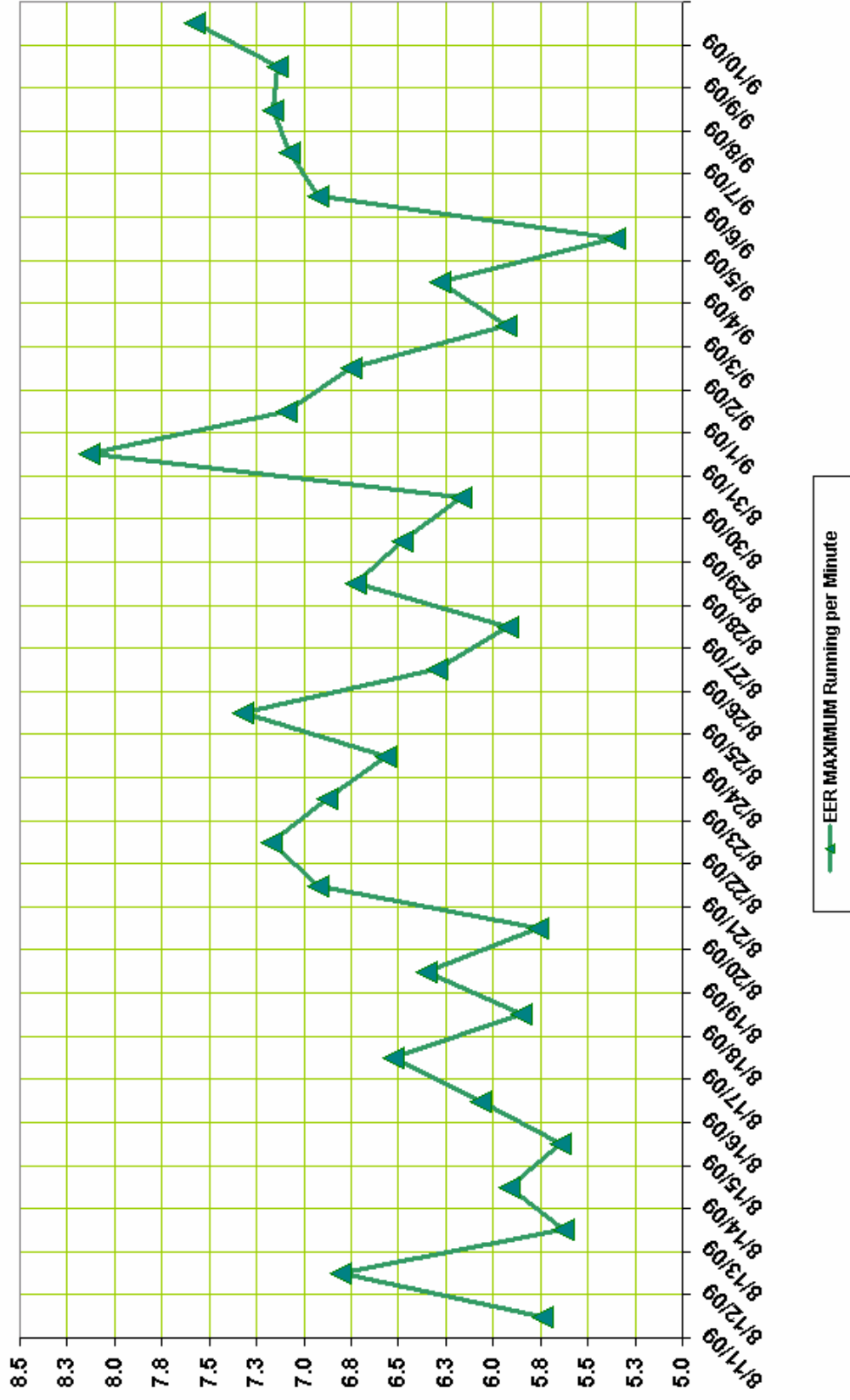
Charles H. Fuller, BSEE

FULLER INSTRUMENTS, INC.

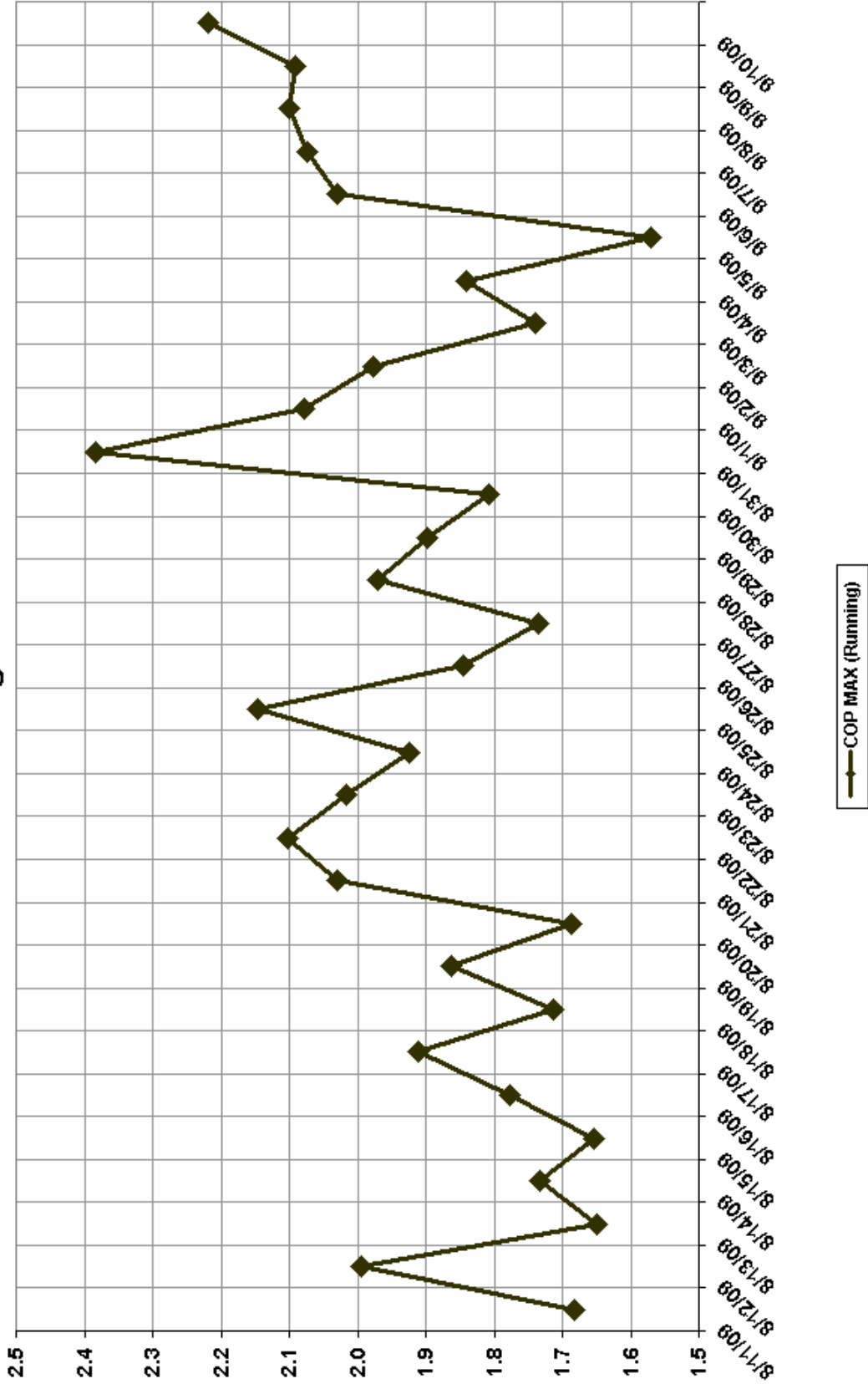
MAXR 100 TEST
MAXIMUM BTU/HR per Minute Running
DAILY during 10 AM to 5 PM



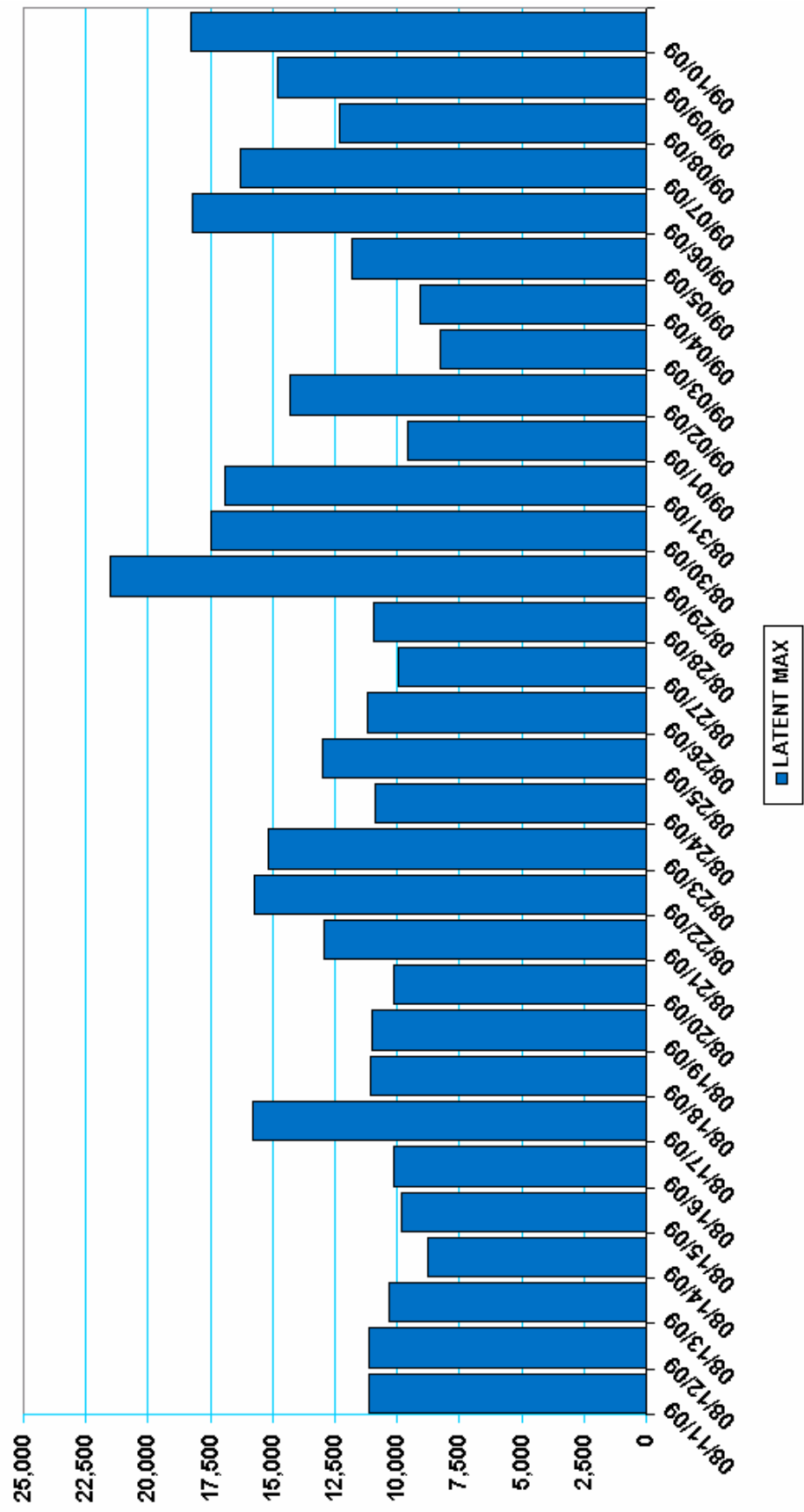
**MAXR 100 TEST
ENERGY EFFICIENCY RATIO (EER)
DAILY during 10 AM to 5 PM**



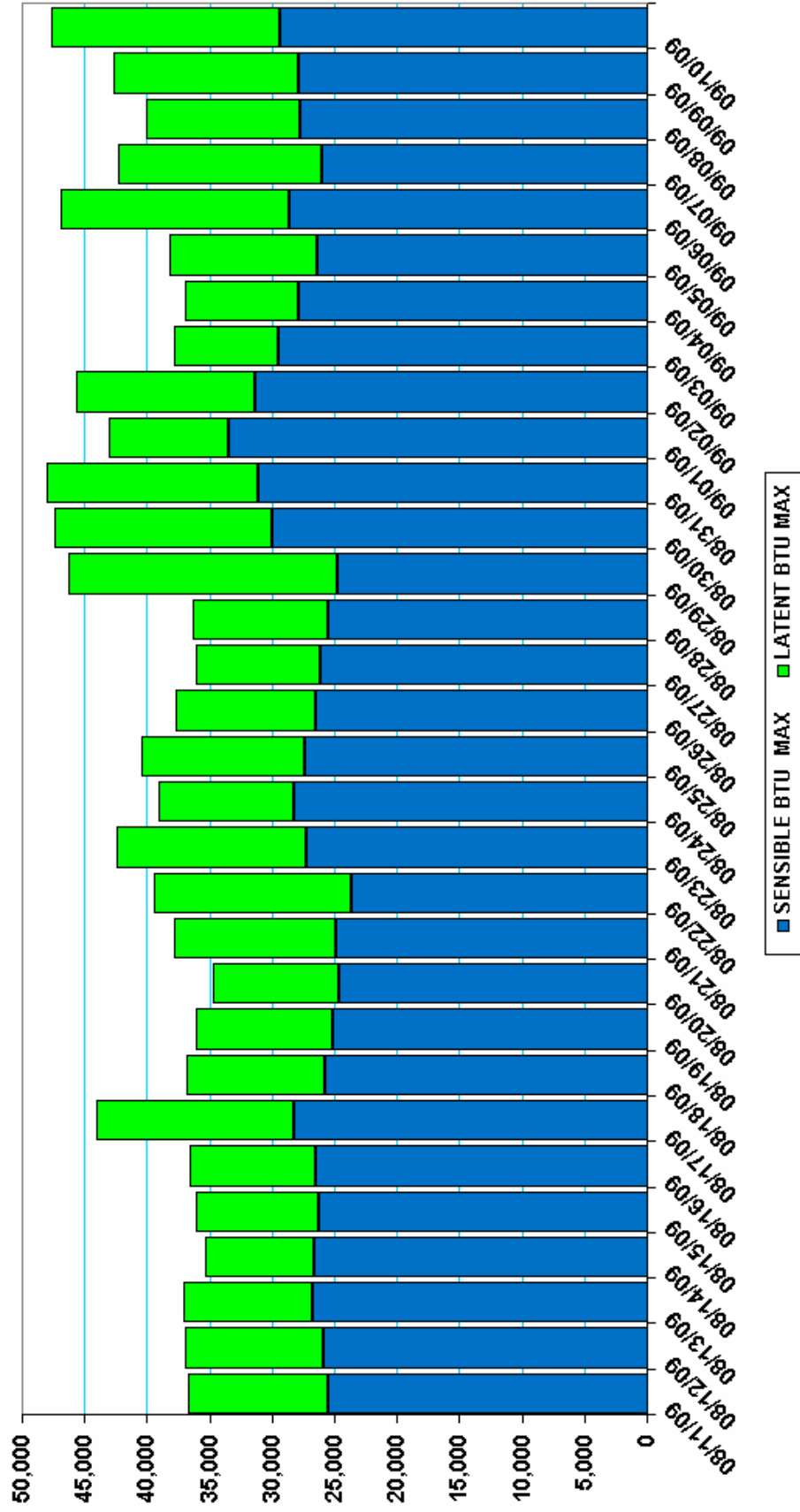
MAXR 100 TEST
COEFFICIENT OF PERFORMANCE (COP)
DAILY during 10 AM to 5 PM



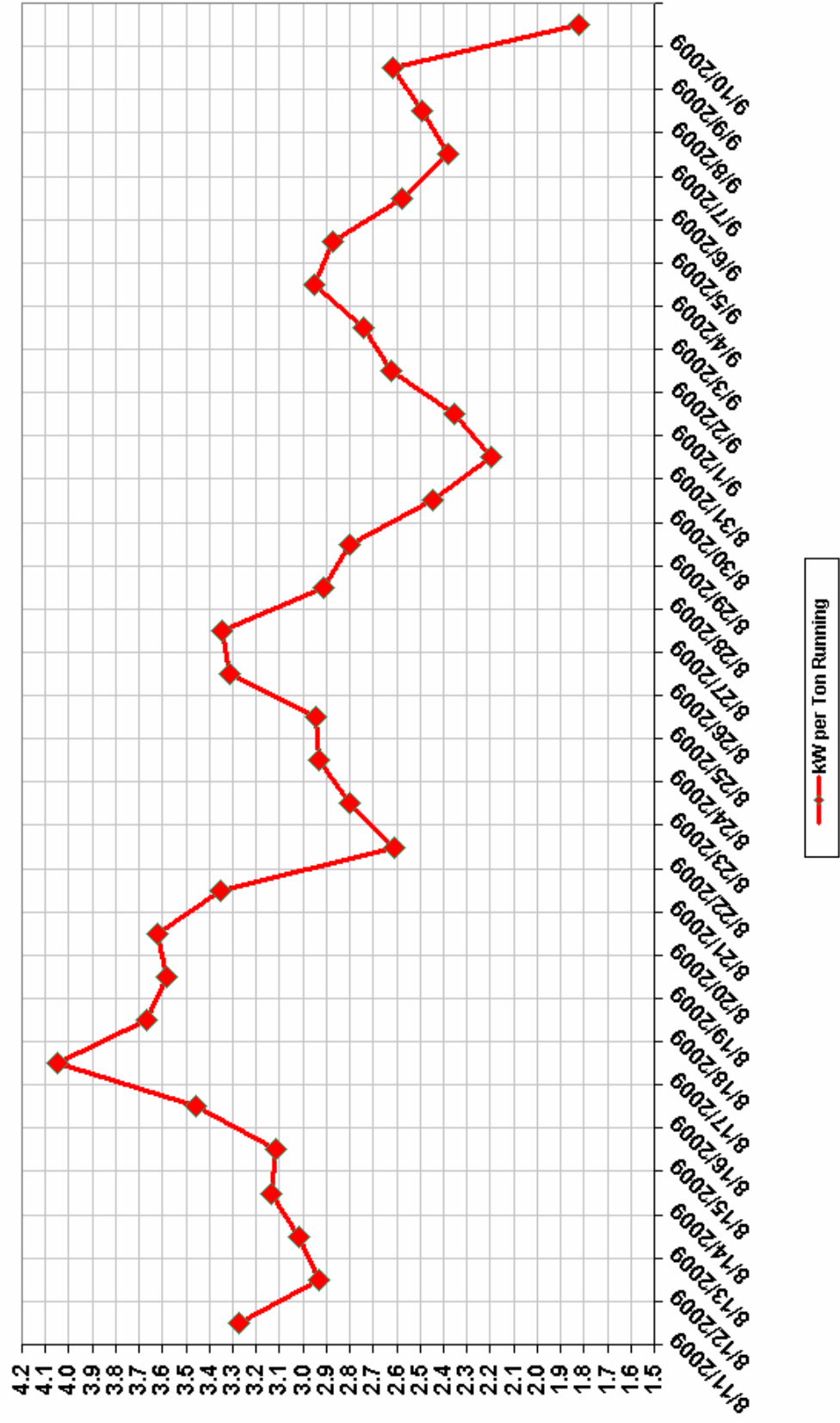
**MAXR 100 TEST
LATENT BTU's Generated
DAILY during 10 AM to 5 PM**



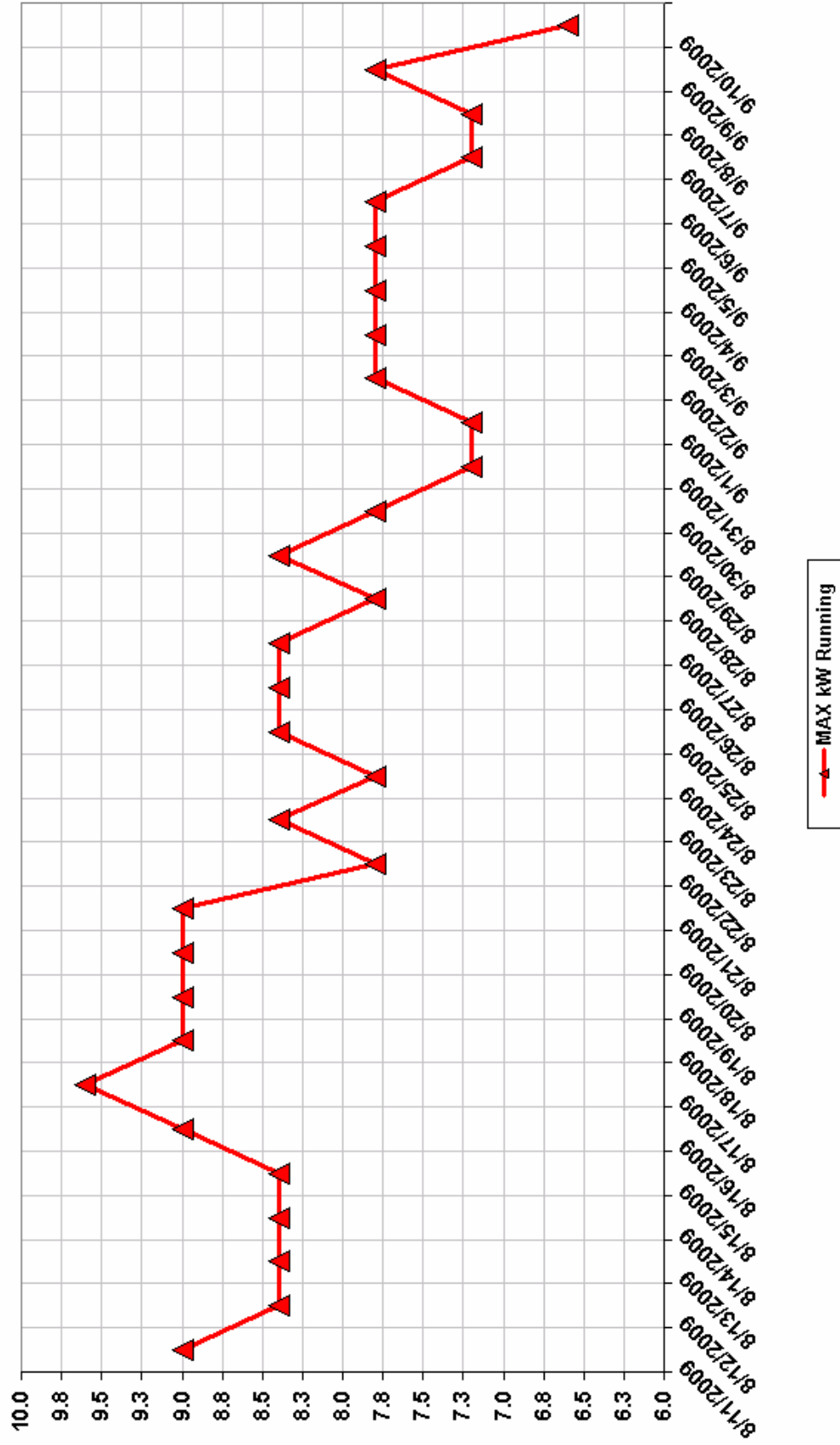
MAXR 100 TEST
TOTAL BTU = SENSIBLE BTU plus LATENT BTU
DAILY during 10 AM to 5 PM



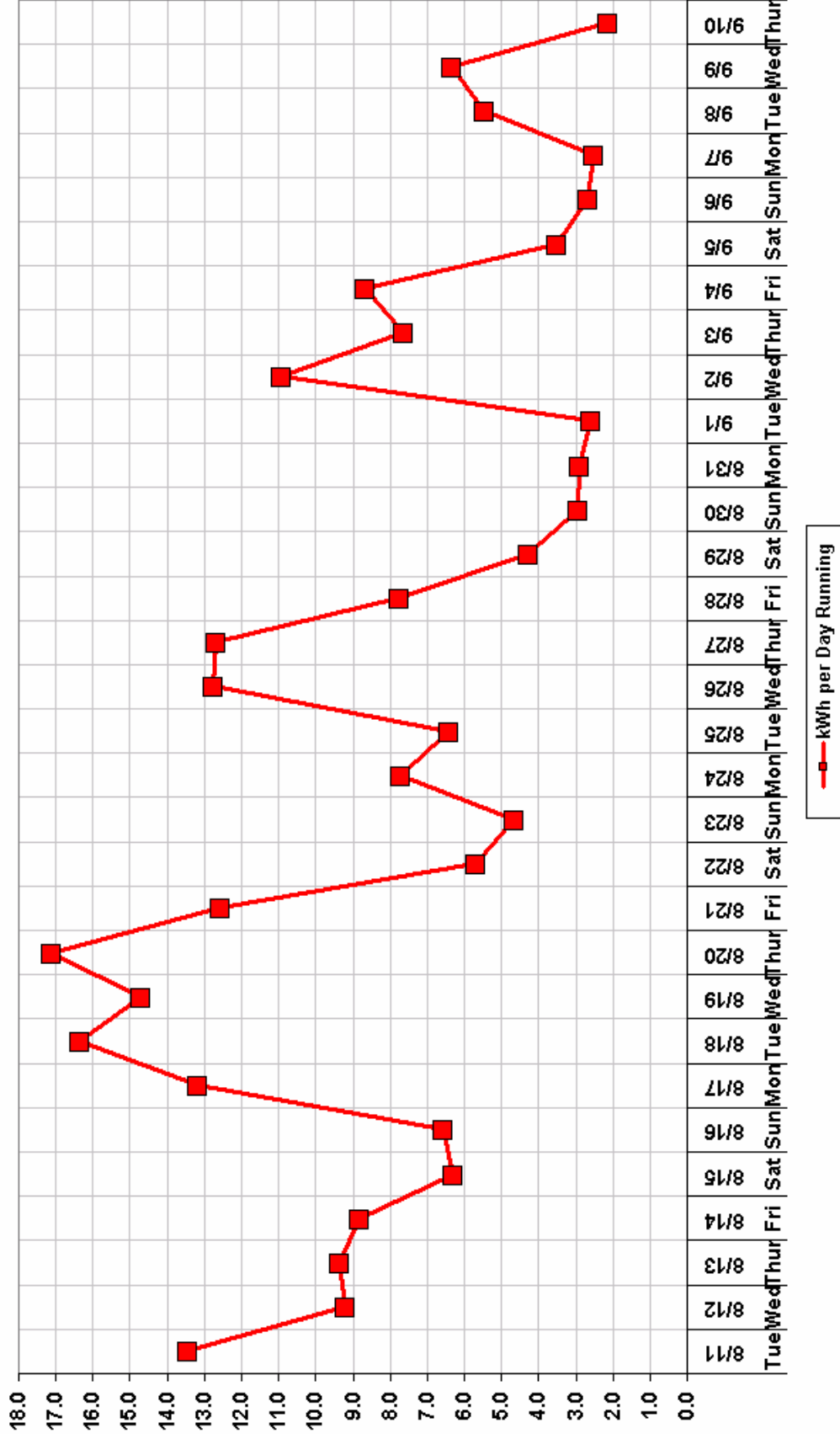
MAXR 100 TEST
kW per Ton Running
DAILY during 10 AM to 5 PM



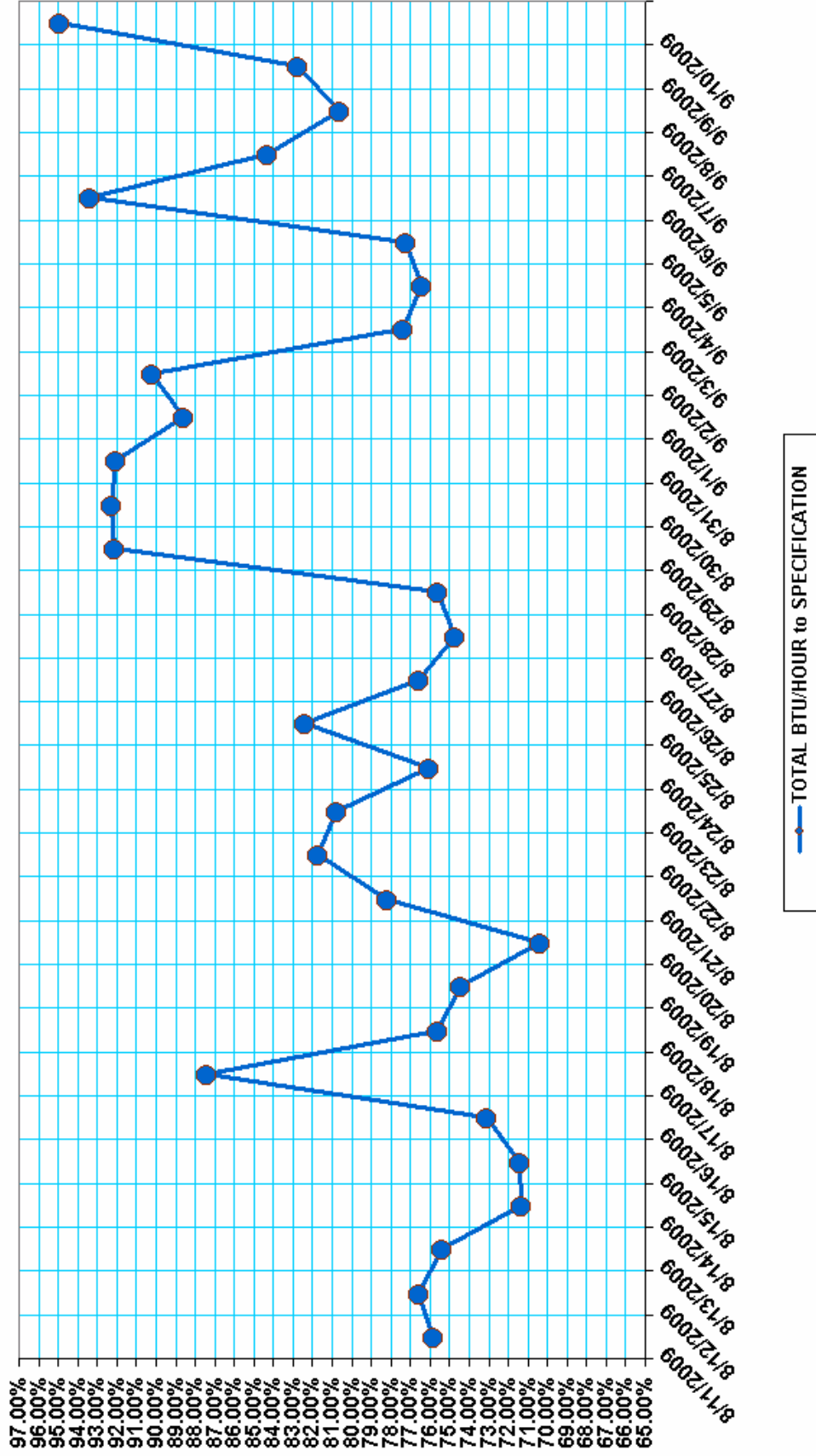
MAXR 100 TEST
MAXIMUM kW Running
DAILY during 10 AM to 5 PM



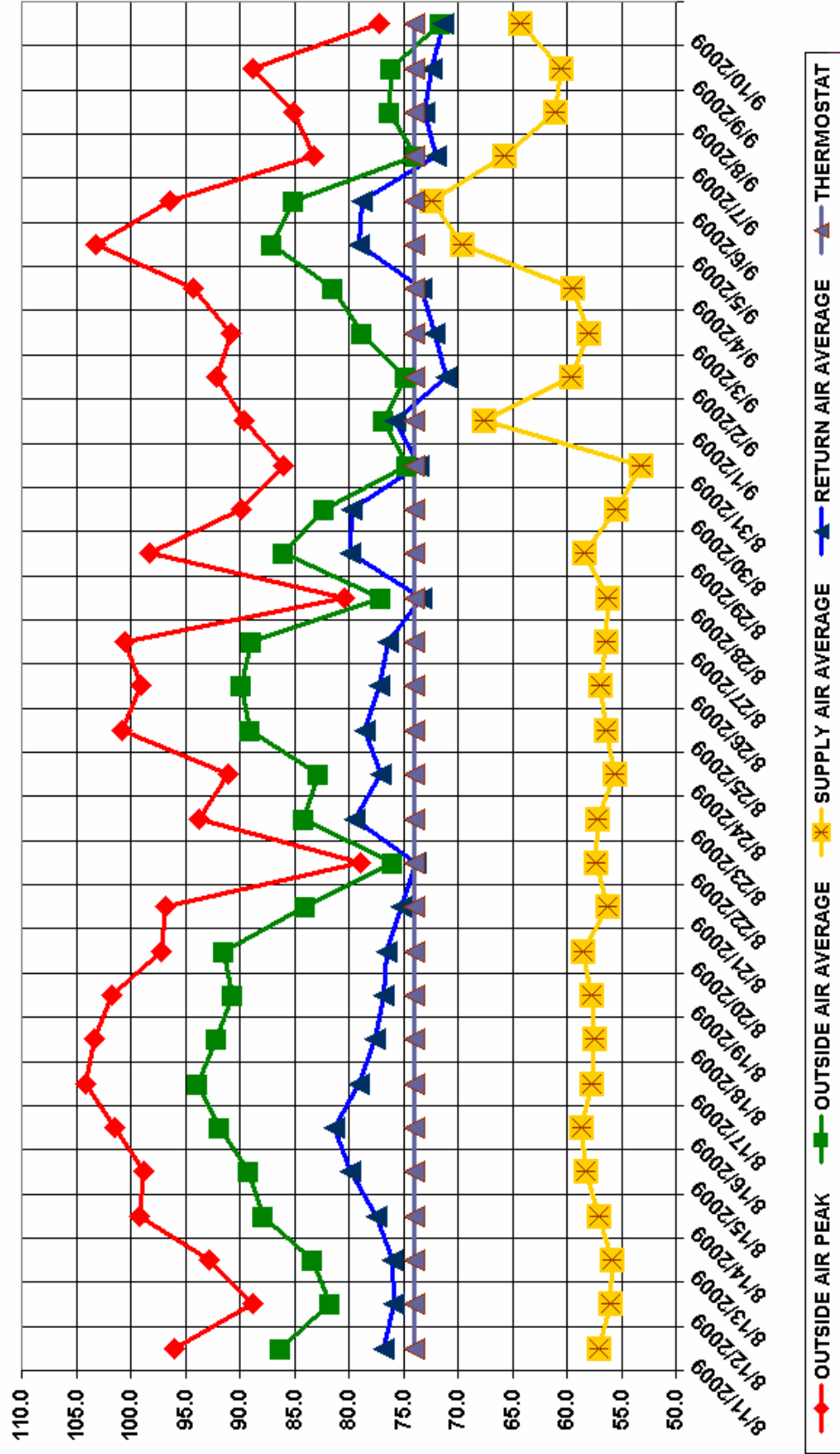
MAXR 100 TEST
kWh per Day
DAILY during 10 AM to 5 PM



MAXR 100 TEST
PERCENTAGE OF ORIGINAL SPECIFICATION (48,000 BTU/Hr)
DAILY during 10 AM to 5 PM



**MAXR 100 TEST
VARIOUS TEMPERATURE PARAMETERS
DAILY during 10 AM to 5 PM**



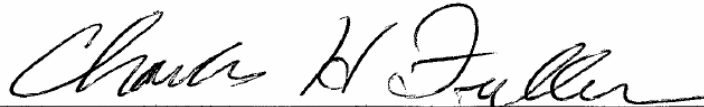
MAXR 100 CC 4T LOVETTSVILLE, VA

	10 AM to 5 PM	OA Temp Maximum	OA Temp Average	RH, % Average	DewPt, *F Average	SA Temp Minimum	RH, % Average	DewPt Average	RA Temp Average	RH, % Average	DewPt Average	kWh Total	Peak kW Maximum	Run-Time Minutes	Ret - Sup Temp Max	Run-Time Max Time	DELTA T Maximum	BTU Run Maximum	Run-Time No.Times	SA Temp WB degF	SENSIBLE Maximum	% Sensible Maximum	LATENT Maximum	%LATENT Maximum	BTU Max 100% Spec	Tons Running	kW/Ton Running	EER BTU/Wh	COP .293X EER	COST/DAY \$.10/kWh	Thermostat Setting
Tue	8/11	96.0	86.3	58.7	69.9	57.0	92.6	59.9	76.8	63.4	63.4	13.4	9.0	192	16.9	10	7.3	36,395	22	69.4	25,492	73.96%	11,145	31.20%	75.82%	3.0	3.3	5.7	1.7	\$1.34	74
Wed	8/12	88.8	81.8	63.8	68.2	56.0	92.9	60.3	75.8	63.0	62.2	9.2	8.4	140	17.1	8	7.6	36,769	21	68.3	25,855	75.58%	11,125	30.26%	76.60%	3.1	2.9	6.8	2.0	\$0.92	74
Thur	8/13	92.9	83.3	55.2	65.2	55.8	92.8	59.8	75.9	57.5	59.8	9.4	8.4	139	17.7	7	7.3	36,197	22	68.6	26,702	78.57%	10,341	28.57%	75.41%	3.0	3.0	5.6	1.6	\$0.94	74
Fri	8/14	99.2	87.9	48.5	65.3	57.1	92.8	61.8	77.5	55.6	60.3	8.8	8.4	127	17.6	8	5.5	34,228	21	69.9	26,566	82.23%	8,740	26.63%	71.31%	2.9	3.1	5.9	1.7	\$0.88	74
Sat	8/15	98.8	89.2	46.3	65.4	58.2	90.1	64.7	79.8	63.3	65.9	6.3	8.4	92	17.4	7	5.4	34,262	16	77.1	26,263	79.53%	9,843	29.09%	71.38%	2.9	3.1	5.6	1.7	\$0.63	74
Sun	8/16	101.5	91.8	41.1	63.7	58.7	87.2	65.0	81.3	64.3	67.6	6.6	9.0	95	17.5	8	5.6	35,087	15	78.6	26,505	83.89%	10,109	30.12%	73.10%	2.9	3.5	6.1	1.8	\$0.66	74
Mon	8/17	104.2	93.8	40.8	65.3	57.7	88.4	61.3	79.1	56.5	62.1	13.2	9.6	188	18.7	44	6.7	41,948	19	78.5	28,274	83.19%	15,790	37.64%	87.39%	3.5	4.1	6.5	1.9	\$1.32	74
Tue	8/18	103.4	92.1	48.1	69.1	57.4	91.8	60.7	77.6	58.1	61.7	16.4	9.0	233	17.0	14	6.1	36,290	22	72.1	25,719	82.04%	11,054	30.58%	75.60%	3.0	3.7	5.8	1.7	\$1.64	74
Wed	8/19	101.7	90.6	51.8	70.1	57.7	93.4	60.9	76.8	59.4	61.6	14.7	9.0	215	16.6	14	6.7	35,736	22	72.9	25,099	80.61%	11,029	31.07%	74.45%	3.0	3.6	6.4	1.9	\$1.47	74
Thur	8/20	97.2	91.4	52.4	71.2	58.5	93.4	60.6	76.5	59.2	61.2	17.1	9.0	241	16.3	14	5.8	33,766	22	70.0	24,600	79.18%	10,134	30.01%	70.35%	2.8	3.6	5.8	1.7	\$1.71	74
Fri	8/21	96.8	84.0	70.9	73.0	56.2	95.4	61.0	75.2	63.5	62.0	12.6	9.0	188	16.5	10	6.1	37,523	23	71.2	24,933	77.96%	12,923	34.64%	78.17%	3.1	3.4	6.9	2.0	\$1.26	74
Sat	8/22	79.0	76.0	86.9	71.8	57.3	96.9	63.6	73.8	77.5	66.3	5.7	7.8	88	15.6	6	7.2	39,239	17	74.0	23,617	66.03%	15,757	40.48%	81.75%	3.3	2.6	7.2	2.1	\$0.57	74
Sun	8/23	93.8	84.1	52.8	64.3	57.3	87.9	66.2	79.4	61.5	64.7	4.7	8.4	69	18.0	6	6.6	38,775	13	77.1	27,276	76.51%	15,167	39.44%	80.78%	3.2	2.8	6.9	2.0	\$0.47	74
Mon	8/24	91.1	82.8	46.9	60.1	55.6	92.5	61.1	77.0	54.2	59.2	7.7	7.8	118	18.7	7	6.1	36,495	21	71.9	28,199	83.75%	10,912	29.90%	76.03%	3.0	2.9	6.6	1.9	\$0.77	74
Tue	8/25	100.8	89.0	44.9	64.3	56.3	90.6	63.6	78.6	56.4	61.6	6.4	8.4	94	18.1	6	6.3	39,549	17	74.3	27,352	79.51%	13,020	33.40%	82.39%	3.3	2.9	7.3	2.1	\$0.64	74
Wed	8/26	99.1	89.9	46.3	66.0	57.0	91.7	60.1	77.2	57.5	61.0	12.8	8.4	181	17.5	10	6.3	36,747	23	70.7	26,505	83.28%	11,164	30.59%	76.56%	3.1	3.3	6.3	1.8	\$1.28	74
Thur	8/27	100.6	88.9	49.0	66.8	56.3	92.3	59.8	76.4	56.2	59.6	12.7	8.4	184	17.3	10	5.7	35,888	22	69.8	26,097	83.04%	9,973	28.08%	74.77%	3.0	3.3	5.9	1.7	\$1.27	74
Fri	8/28	80.4	77.1	82.7	71.5	56.3	96.1	60.7	73.3	62.7	59.9	7.8	7.8	121	16.9	7	5.8	36,301	21	67.1	25,447	73.65%	10,929	30.66%	75.63%	3.0	2.9	6.7	2.0	\$0.78	74
Sat	8/29	98.2	86.0	60.8	70.3	58.4	87.7	66.8	79.8	73.6	70.3	4.3	8.4	60	16.4	6	7.0	44,218	12	77.8	24,736	68.59%	21,492	48.77%	92.12%	3.7	2.8	6.5	1.9	\$0.43	74
Sun	8/30	89.8	82.3	44.8	58.2	55.4	71.1	61.8	79.7	58.4	63.2	2.9	7.8	44	19.9	5	7.2	44,293	9	73.8	29,953	76.43%	17,485	39.48%	92.28%	3.7	2.4	6.2	1.8	\$0.29	74
Mon	8/31	86.0	74.7	46.9	52.6	53.2	75.4	56.9	73.6	56.1	56.3	2.9	7.2	47	20.6	5	7.3	44,178	12	66.1	31,117	80.59%	16,896	38.46%	92.04%	3.7	2.2	8.1	2.4	\$0.29	74
Tue	9/1	89.6	76.8	36.0	47.3	67.6	70.9	56.5	75.4	44.1	52.1	4.2	6.2	42	22.1	4	6.8	42,534	10	67.8	33,476	87.46%	9,593	23.75%	88.61%	3.5	2.4	7.1	2.1	\$0.26	74
Wed	9/2	92.1	74.8	50.1	53.0	59.6	87.3	55.5	71.0	54.1	53.2	10.9	7.8	178	20.7	17	6.9	43,318	33	66.5	31,298	86.76%	14,288	32.98%	90.25%	3.6	2.6	6.7	2.0	\$1.09	74
Thur	9/3	90.8	78.8	45.0	55.0	58.0	91.8	55.7	72.2	50.7	52.9	7.6	7.8	121	19.5	7	5.9	37,129	21	69.3	29,484	86.61%	8,299	23.31%	77.35%	3.1	2.7	5.9	1.7	\$0.76	74
Fri	9/4	94.2	81.5	45.9	58.1	59.5	92.9	57.5	73.3	53.2	55.2	8.7	7.8	134	18.5	8	5.8	36,679	21	68.6	27,896	84.56%	9,054	24.69%	76.41%	3.1	3.0	6.3	1.8	\$0.87	74
Sat	9/5	103.2	87.0	41.3	59.2	69.6	90.1	66.4	79.1	56.3	61.8	3.5	7.8	54	17.5	5	5.9	37,076	11	79.5	26,430	80.67%	11,796	32.25%	77.24%	3.1	2.9	5.4	1.6	\$0.35	74
Sun	9/6	96.4	85.0	43.6	59.9	72.4	92.0	61.6	78.8	68.5	67.1	2.7	7.8	40	19.0	6	7.2	44,839	9	73.7	28,652	76.25%	18,228	40.70%	93.42%	3.7	2.6	6.9	2.0	\$0.27	74
Mon	9/7	83.3	73.8	72.2	64.3	65.8	87.6	61.9	72.0	70.5	61.6	2.5	7.2	41	17.2	5	6.7	40,484	10	69.6	25,961	71.49%	16,322	40.32%	84.34%	3.4	2.4	7.1	2.1	\$0.25	74
Tue	9/8	85.1	76.2	60.6	61.4	61.1	93.3	59.2	73.1	58.2	57.5	5.5	7.2	87	18.3	6	6.2	38,698	18	67.7	27,730	76.67%	12,299	31.78%	80.62%	3.2	2.5	7.2	2.1	\$0.55	74
Wed	9/9	88.8	76.1	65.9	63.3	60.6	95.0	59.2	72.4	62.5	58.8	6.3	7.8	101	18.4	6	6.3	39,736	20	70.2	27,881	77.89%	14,772	37.18%	82.78%	3.3	2.6	7.1	2.1	\$0.63	74
Thur	9/10	77.2	71.5	57.9	55.5	64.2	82.8	58.7	71.3	66.4	59.3	2.1	6.6	35	19.4	4	7.2	45,576	10	66.2	29,348	73.10%	18,284	40.12%	94.95%	3.8	1.8	7.6	2.2	\$0.21	74
AVERAGE		96.2	86.7	52.3	66.3	57.2	91.4	61.9	77.9	61.2	63.2	9.0	8.6	130.8	17.3	8.0	6.4	35,489	19.5	72.0	26,231	78.96%	10,217	29.31%	73.94%	3.0	3.2	6.0	1.7	\$0.90	74.0
AVERAGE		95.7	86.7	56.1	67.8	57.0	92.5	61.6	76.8	60.2	61.7	11.0	8.6	160.0	17.3	12.3	6.3	37,355	20.2	72.5	26,093	79.06%	12,321	33.04%	77.82%	3.1	3.3	6.5	1.9	\$1.10	74.0
AVERAGE		90.4	78.8	51.6	58.3	62.0	84.5	59.8	74.8	59.4	59.2	4.8	7.6	75.7	19.0	6.5	6.7	41,443	15.1	70.5	28,766	79.01%	14,524	34.91%	86.34%	3.5	2.5	6.8	2.0	\$0.48	74.0
BASE (PRE)		96.2	86.7	52.3	66.3	57.2	91.4	61.9	77.9	61.2	63.2	9.0	8.6	130.8	17.3	8.0	6.4	35,489	19.5	72.0	26,231	78.96%	10,217	29.31%	73.94%	3.0	3.2	6.0	1.7	\$0.90	74.0
PERCENTAGE		-0.54%	-0.07%	7.39%	2.30%	-0.31%	1.25%	-0.44%	-1.41%	-1.54%	-2.31%	22.58%	-0.58%	22.29%	-0.50%	54.17%	-2.63%	5.26%	3.42%	0.68%	-0.52%	0.12%	20.59%	12.73%	5.26%	5.26%	3.32%	9.35%	9.35%	22.58%	0.00%
PERCENTAGE		-6.05%	-9.11%	-1.25%	-12.01%	8.40%	-7.60%	-3.38%	-3.97%	-2.84%	-6.39%	-46.22%	-11.99%	-42.15%	9.72%	-19.23%	3.24%	16.78%	-22.68%	-2.03%	9.67%	0.05%	42.15%	19.09%	16.78%	16.78%	-19.88%	13.54%	13.54%	-46.22%	0.00%
MAXIMUM		101.5	91.8	63.8	69.9	58.7	92.9	65.0	81.3	64.3	67.6	13.4	9.0	192.0	17.7	10.0	7.6	36,769	22.0	78.6	26,702	83.89%	11,145	31.20%	76.60%	3.1	3.5	6.8	2.0	\$1.34	74.0
MAXIMUM		104.2	93.8	86.9	73.0	58.5	96.9	66.2	79.4	77.5	66.3	17.1	9.6	241.0	18.7	44.0	7.2	41,948	23.0	78.5	28,274	83.75%	15,790	40.48%	87.39%	3.5	4.1	7.3	2.1	\$1.71	74.0
MAXIMUM		103.2	87.0	72.2	70.3	72.4	95.0	66.8	79.8	73.6	70.3	10.9	8.4	178.0	22.1	17.0	7.3	45,576	33.0	79.5	33,476	87.46%	21,492	48.77%	94.95%	3.8	3.0	8.1	2.4	\$1.09	74.0
BASE (PRE)		101.5	91.8	63.8	69.9	58.7	92.9	65.0	81.3	64.3	67.6	13.4	9.0	192.0	17.7	10.0	7.6	36,769	22.0	78.6	26,702	83.89%	11,145	31.20%	76.60%	3.1	3.5	6.8	2.0	\$1.34	74.0
PERCENTAGE		2.70%	2.17%	36.09%	4.57%	-0.31%	4.28%	1.80%	-2.31%	20.52%	-1.97%	27.45%	6.67%	25.52%	5.89%	340.00%	-4.85%	14.09%	4.												

CERTIFICATION

Date: 9/16/2009

By his signature below, Charles H Fuller, President of FULLER INSTRUMENTS, INC., certifies that the tables and charts contained in the preceding test report show values that were derived directly from downloaded raw data from HOBO loggers and sensors installed on the rooftop air conditioner located at CC at Lovettsville, VA. The loggers were installed from August 10 to September 10 of 2009 and downloading of data began on August 11 and continued through September 10, 2009.



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