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The following pages will outline a case study, which shows the benefits in energy and cost savings of properly installed mechanical insulation.

Insulation is a proven means for conserving energy, reducing greenhouse gas emissions, increasing process productivity, providing a safer and more productive work environment, controlling condensation (which can lead to mold growth), supporting sustainable design technology and a host of other benefits.

Mechanical insulation does all of this, while providing a return on investment (ROI) rate, which is seldom rivaled. Despite the proven ROI, insulation is often overlooked and its benefits undervalued. Insulation is truly the lost or forgotten technology. Can you think of a more important time than now to think about how insulation can help you?

An insulation system is a technology, which needs to be engineered and maintained throughout the entire process. Several studies have estimated roughly 10 to 30 percent of all installed insulation is now missing or damaged.

The practice of not replacing or maintaining an insulation system in a timely and correct manner reduces the full benefits of insulation, and in return, decreases the ROI. In many cases, significant other issues - such as excessive energy loss, corrosion under insulation (CUI), mold development, increased cost of operations and reduced process productivity or efficiency - develop.

You can learn more on www.MechanicalInsulatorsLMCT.com, where additional case studies can be viewed.

Please do not hesitate to contact me should you have any additional questions.
Thank you,

Peter Ielimi

Executive Director
Mechanical Insulators Labor Management Cooperative Trust

ENERGY AUDIT ECOLE SECONDAIRE NEPISIGUIT

Total Heat Loss
5 year savings of
\$ 283,134.50

CO₂ Reduction of
180.76 MT/Year



Benefits:

- Simple payback period
- CO₂ Reduction
- Personnel safety

*Audit Done By:
Joshua Sherrard
Certified Thermographer
Certified 3E Plus Auditor*

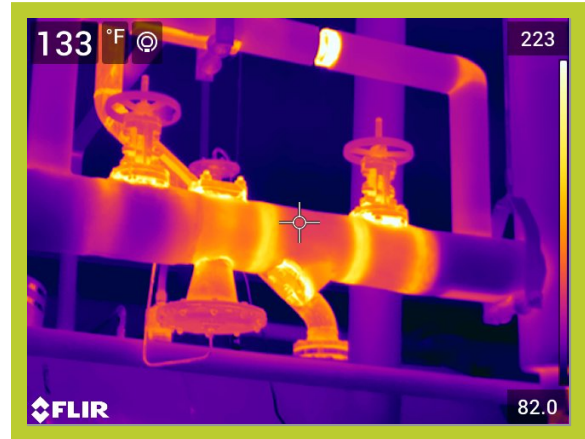
Boiler Room



Operating Temperature,	180°F	Emittance of Surface	0.95
Ambient Temperature,	81°F	Expected Useful Life of Insulation System	20 yrs.
Insulation selected	Fiberglass	Operating hours per year	8320
		Efficiency of fuel Conversion%	75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	49,620	\$ 1,479.00	\$1,479.00	\$7,395.00	4.8
1	6,750	\$ 201.60	\$1,277.40	\$6,387.00	0.6
1.5	4,680	\$ 139.20	\$1,339.80	\$6,699.00	0.6

Boiler Room



Operating Temperature,	235°F	Emittance of Surface	0.95
Ambient Temperature,	81 °F	Expected Useful Life of Insulation System	20 yrs.
Insulation selected	Fiberglass	Operating hours per year	8320
		Efficiency of fuel Conversion%	75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	41,742	\$ 1,243.98	\$1,243.98	\$6,219.90	4.02
1	5,124	\$ 152.70	\$1,091.28	\$5,456.40	0.48
1.5	3,576	\$ 106.62	\$1,137.36	\$5,686.80	0.36

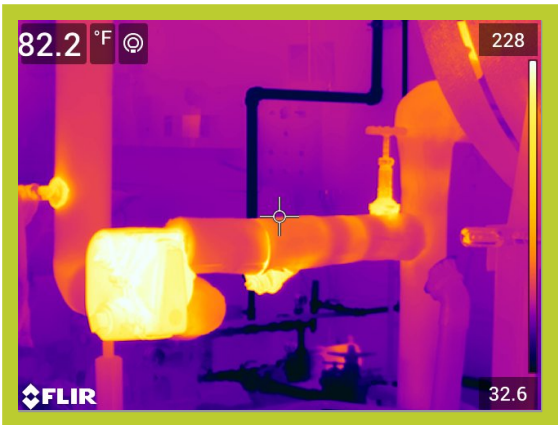
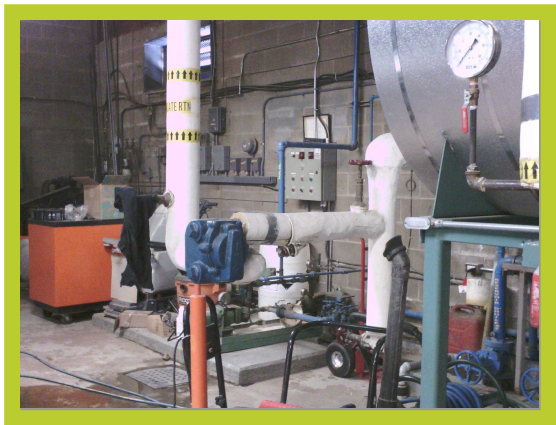
Boiler Room



Operating Temperature,	180°F	Emittance of Surface	0.95
Ambient Temperature,	81°F	Expected Useful Life of Insulation System	20 yrs.
Insulation selected	Fiberglass	Operating hours per year	8320
		Efficiency of fuel Conversion%	75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	8,328	\$ 248.10	\$248.10	\$1240.50	0.78
1	1,176	\$ 35.04	\$213.06	\$1065.30	0.12
1.5	912	\$ 27.12	\$220.98	\$1104.90	0.06

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

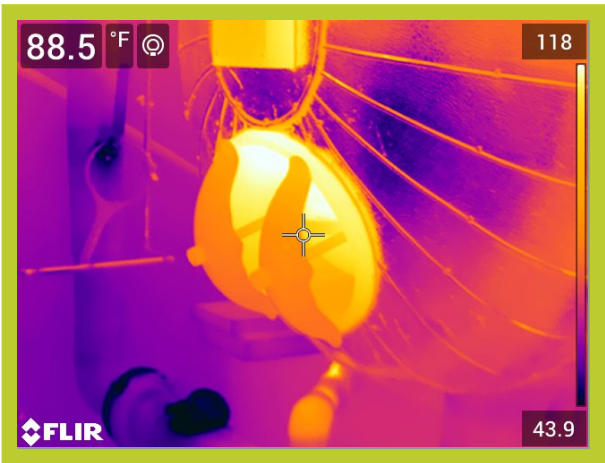
180°F
81 °F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	12,420	\$ 370.11	\$370.11	\$1850.55	1.2
1	1,602	\$ 47.73	\$322.38	\$1611.90	0.15
1.5	1,122	\$ 33.39	\$336.72	\$1683.60	0.12

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

128°F
81°F
Fiberglass

Emittance of Surface 0.95
Expected Useful Life of Insulation System 20 yrs.
Operating hours per year 8320
Efficiency of fuel Conversion% 75%

THICKNESS	HEAT LOSS	FUEL COST	1styr	5yr.	CO2
		\$/yr	SAVINGS.	SAVINGS	EMMISSIONS
0	17,532	\$ 522.48	\$522.48	\$2612.40	1.68
1	2,364	\$ 70.40	\$452.08	\$2260.40	0.24
1.5	1,672	\$ 49.76	\$472.72	\$2363.60	0.16

Boiler Room



Operating Temperature, 130°F
Ambient Temperature, 81 °F
Insulation selected Fiberglass

Emittance of Surface 0.95
Expected Useful Life of Insulation System 20 yrs.
Operating hours per year 8320
Efficiency of fuel Conversion% 75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	1,437	\$ 42.78	\$42.78	\$213.90	0.15
1	255	\$ 7.62	\$35.16	\$175.80	0.03
1.5	198	\$ 5.91	\$36.87	\$184.35	0.03

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

232*F
81*F
Fiberglass

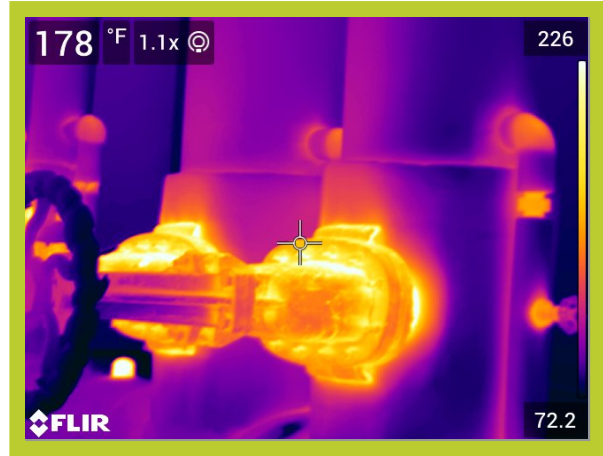
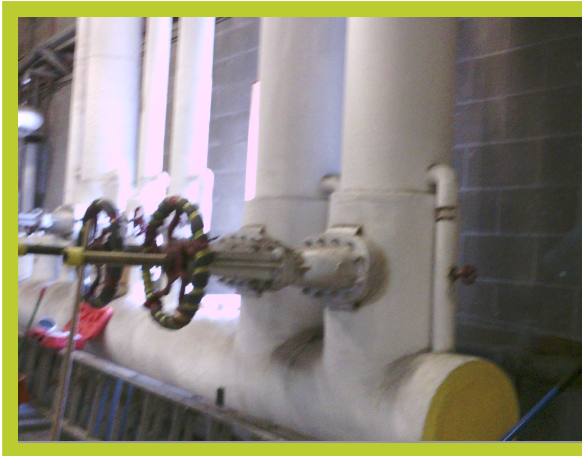
Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	27,651	\$ 823.98	\$823.98	\$4119.90	2.67
1	3,336	\$ 99.39	\$724.59	\$3622.95	0.33
1.5	2,229	\$ 66.42	\$757.56	\$3787.80	0.21

*Estimated Calculations supplied by 3E Plus Mechanical Insulation Energy Calculator *

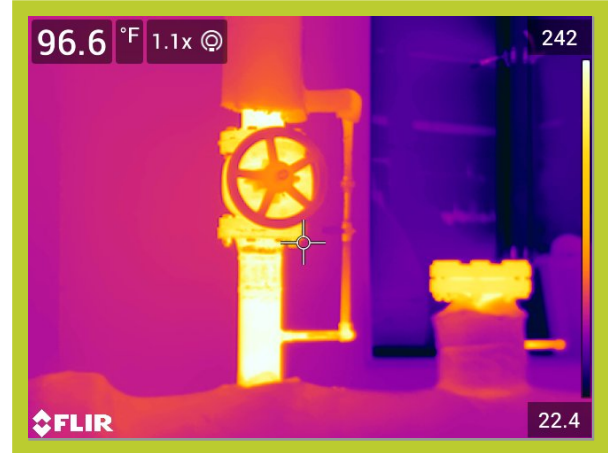
Boiler Room



Operating Temperature,	230°F	Emittance of Surface	0.95
Ambient Temperature,	74°F	Expected Useful Life of Insulation System	20 yrs.
Insulation selected	Fiberglass	Operating hours per year	8320
		Efficiency of fuel Conversion%	75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	6,252	\$ 186.24	\$186.24	\$931.20	0.6
1	1,122	\$ 33.42	\$152.82	\$764.10	0.12
1.5	876	\$ 26.04	\$160.20	\$801.00	0.06

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

170°F
74°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	3,552	\$ 105.84	\$105.84	\$529.20	0.33
1	510	\$ 15.21	\$90.63	\$453.15	0.06
1.5	396	\$ 11.79	\$94.05	\$470.25	0.03

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

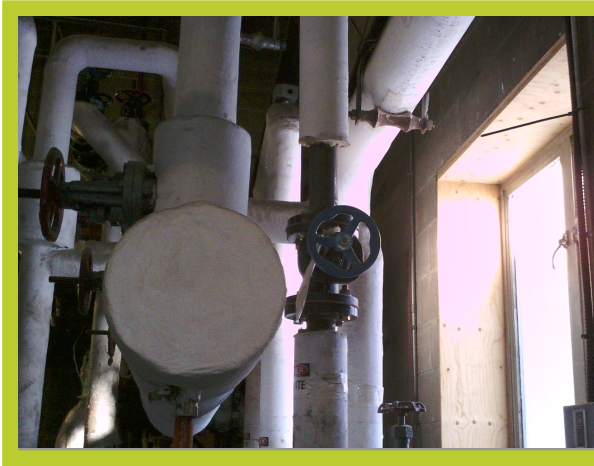
232°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	66,633	\$ 1,985.76	\$1,985.76	\$9,928.80	6.51
1	8,589	\$ 255.78	\$1,729.98	\$8,649.90	0.84
1.5	6,447	\$ 191.94	\$1,793.82	\$8,969.10	0.63

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

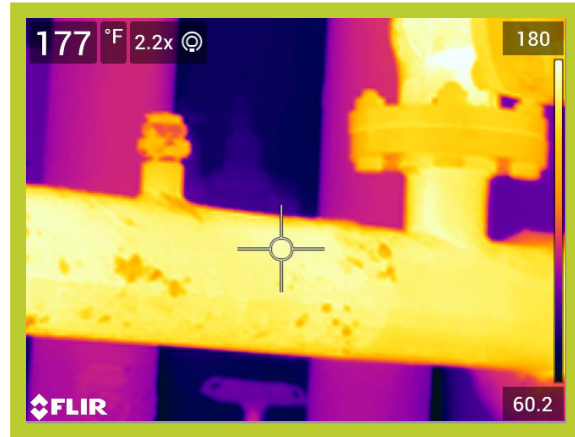
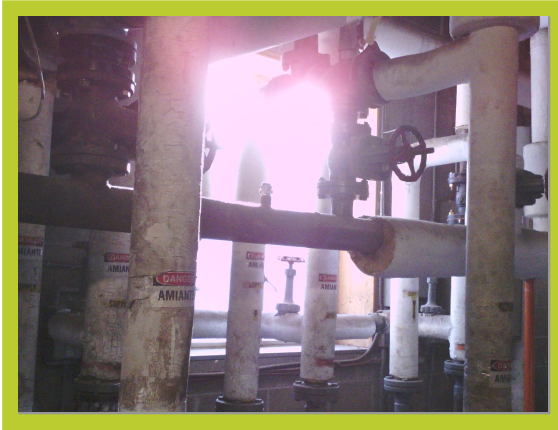
175°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	61,587	\$ 1,835.19	\$1,835.19	\$9,175.95	5.94
1	7,911	\$ 235.71	\$1,599.48	\$7,997.40	0.81
1.5	5,994	\$ 178.74	\$1,656.45	\$8,282.25	0.54

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

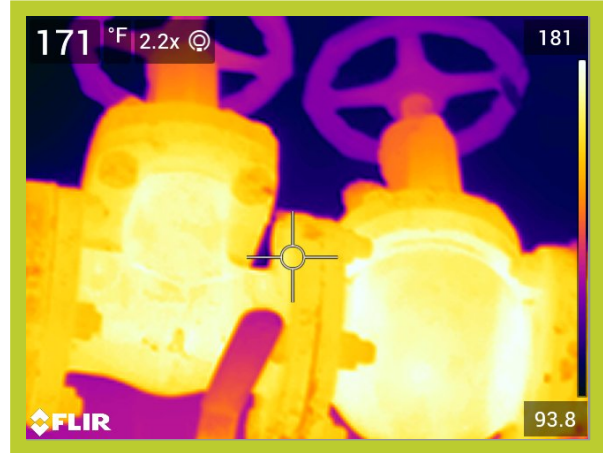
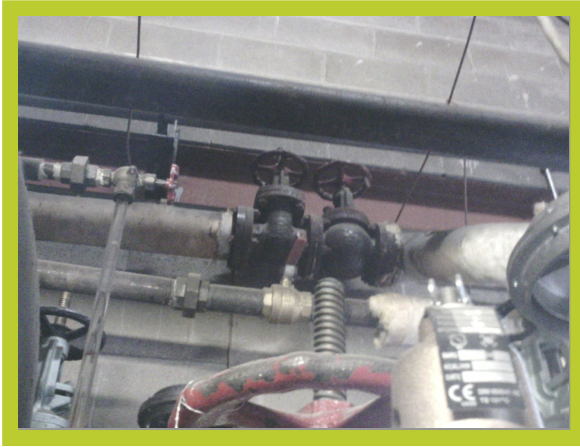
170°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	63,552	\$ 1,893.76	\$1,893.76	\$9,468.80	6.08
1	7,856	\$ 233.92	\$1,659.84	\$8,299.20	0.8
1.5	5,760	\$ 171.68	\$1,722.08	\$8,610.40	0.48

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

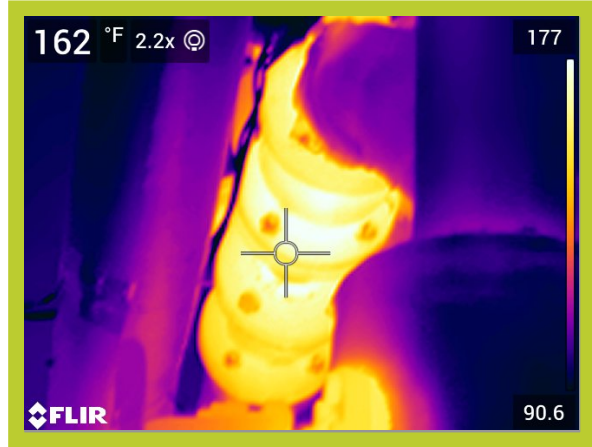
230°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	39,204	\$ 1,168.20	\$1,168.20	\$5,841.00	3.78
1	5,328	\$ 158.58	\$1,009.62	\$5,048.10	0.54
1.5	4,122	\$ 122.58	\$1,045.62	\$5,228.10	0.36

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

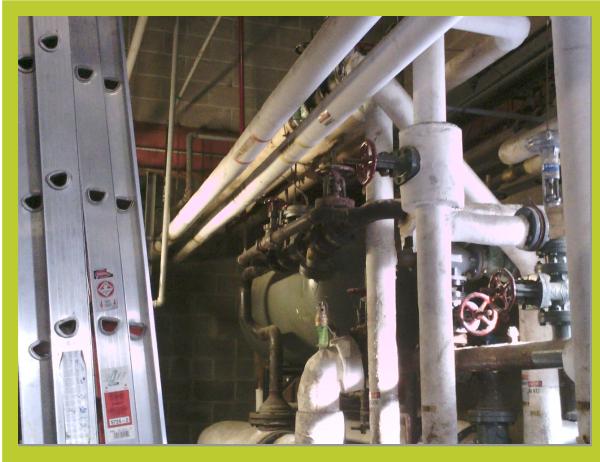
225°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	57,240	\$ 1,705.20	\$1,705.20	\$8,526.00	5.52
1	6,812	\$ 203.04	\$1,502.16	\$7,510.80	0.64
1.5	4,792	\$ 142.84	\$1,562.36	\$7,811.80	0.48

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

225°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	61,440	\$ 1,831.14	\$1,831.14	\$9,155.70	5.94
1	6,714	\$ 200.10	\$1,631.04	\$8,155.20	0.66
1.5	4,920	\$ 146.64	\$1,684.50	\$8,422.50	0.48

*Estimated Calculations supplied by 3E Plus Mechanical Insulation Energy Calculator *

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

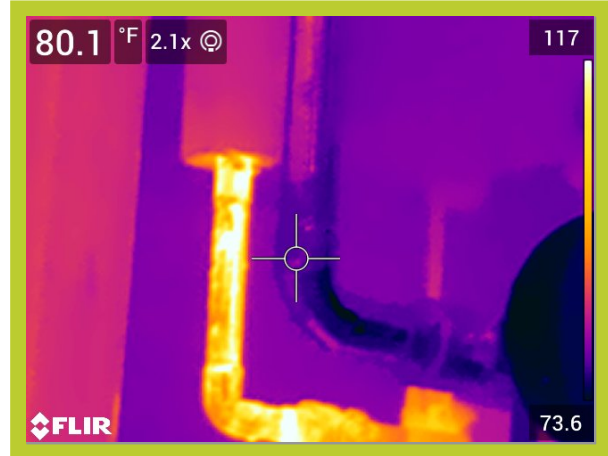
225°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	52,116	\$ 1,553.16	\$1,553.16	\$7,765.80	5.04
1	6,318	\$ 188.34	\$1,364.82	\$6,824.10	0.6
1.5	4,224	\$ 125.88	\$1,427.28	\$7,136.40	0.42

Tunnel



Operating Temperature,
Ambient Temperature,
Insulation selected

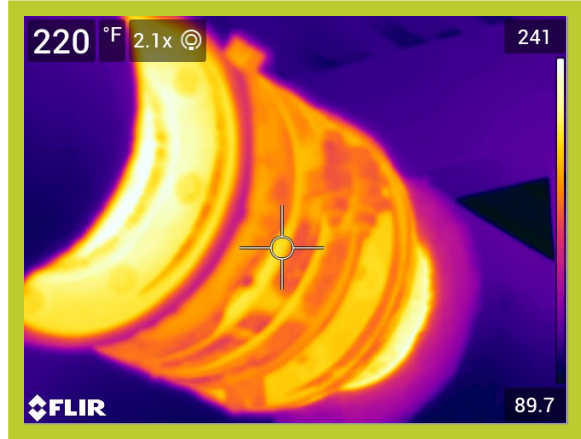
235°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	29,040	\$ 865.38	\$865.38	\$4326.90	2.82
1	3,489	\$ 103.92	\$761.46	\$3807.30	0.33
1.5	2,331	\$ 69.42	\$795.96	\$3979.80	0.24

Tunnel



Operating Temperature,
Ambient Temperature,
Insulation selected

224°F
81°F
Fiberglass

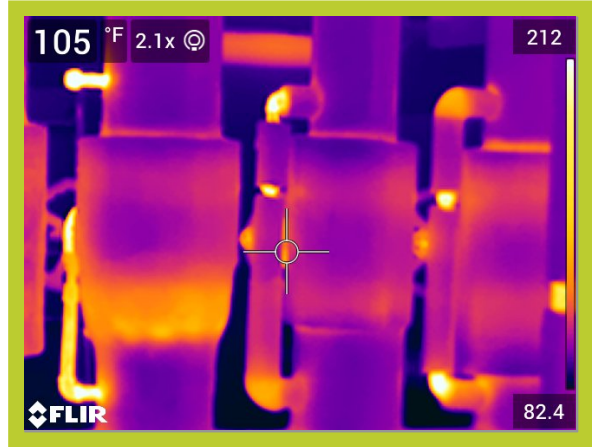
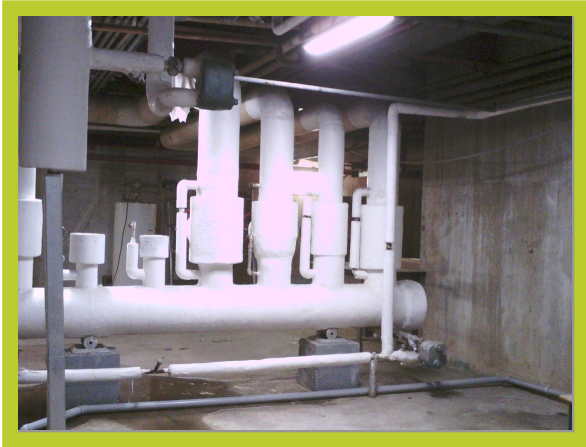
Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	34,448	\$ 1,026.52	\$1,026.52	\$5,132.60	3.32
1	4,180	\$ 124.56	\$901.96	\$4509.80	0.4
1.5	2,796	\$ 83.28	\$943.24	\$4716.20	0.28

*Estimated Calculations supplied by 3E Plus Mechanical Insulation Energy Calculator *

Tunnel



Operating Temperature,
Ambient Temperature,
Insulation selected

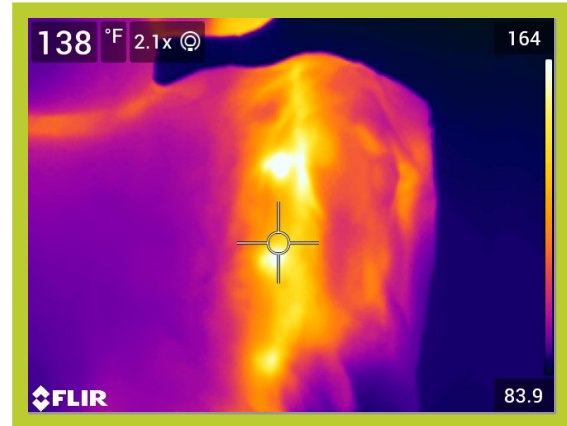
230°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	46,800	\$ 1,394.40	\$1,394.40	\$6,972.00	4.52
1	5,604	\$ 167.00	\$1,227.40	\$6,137.00	0.56
1.5	3,964	\$ 118.16	\$1,276.24	\$6,381.20	0.4

Tunnel



Operating Temperature,
Ambient Temperature,
Insulation selected

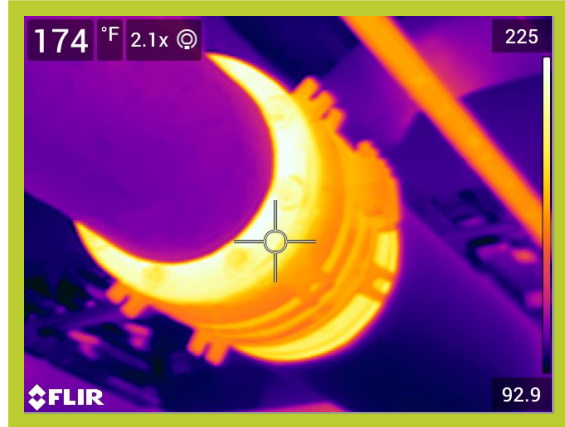
230°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	6,252	\$ 186.24	\$186.24	\$931.20	0.6
1	1,122	\$ 33.42	\$152.82	\$764.10	0.12
1.5	876	\$ 26.04	\$160.20	\$801.00	0.06

Tunnel



Operating Temperature,
Ambient Temperature,
Insulation selected

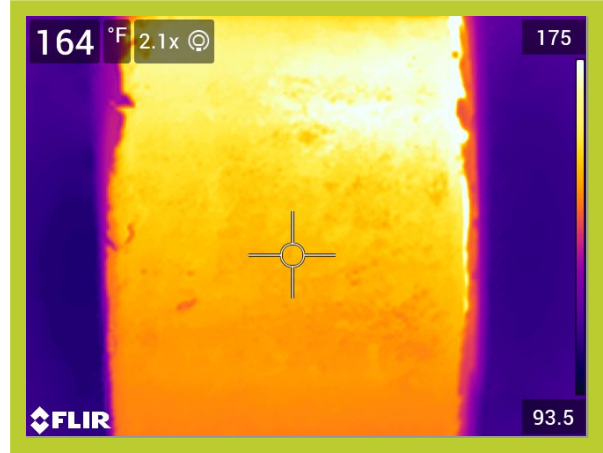
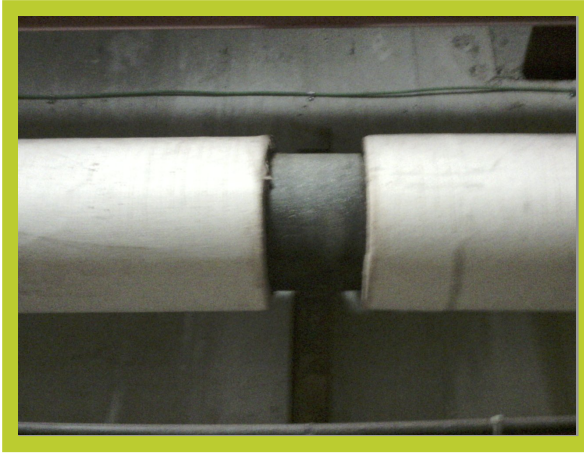
160°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	7,056	\$ 210.24	\$210.24	\$1051.20	0.69
1	1,092	\$ 32.55	\$177.69	\$888.45	0.12
1.5	795	\$ 23.70	\$186.54	\$932.70	0.09

Tunnel



Operating Temperature,
Ambient Temperature,
Insulation selected

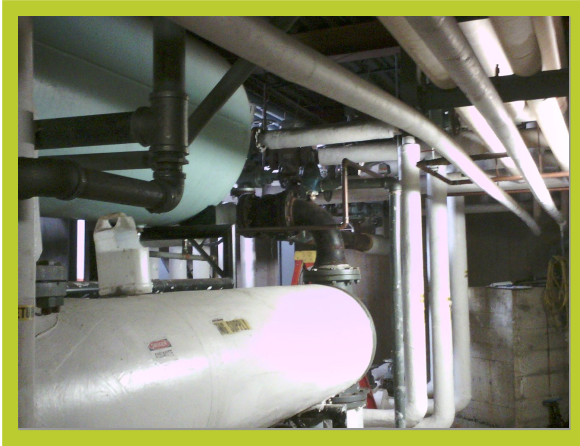
168°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	78,600	\$ 2,161.20	\$2,161.20	\$10,806.00	6.6
1	12,030	\$ 330.60	\$1,830.60	\$9,153.00	0.9
1.5	8,760	\$ 240.90	\$1,920.30	\$9,601.50	0.6

Tunnel



Operating Temperature,
Ambient Temperature,
Insulation selected

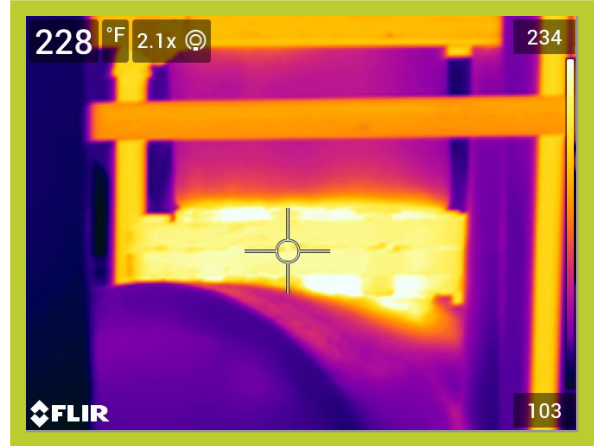
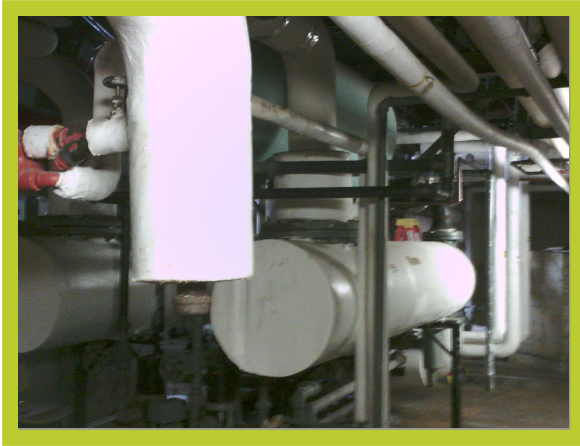
240°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	32,692	\$ 899.00	\$899.00	\$4495.00	2.72
1	4,548	\$ 125.08	\$773.92	\$3869.60	0.4
1.5	3,040	\$ 83.56	\$815.44	\$4077.20	0.24

Tunnel



Operating Temperature,
Ambient Temperature,
Insulation selected

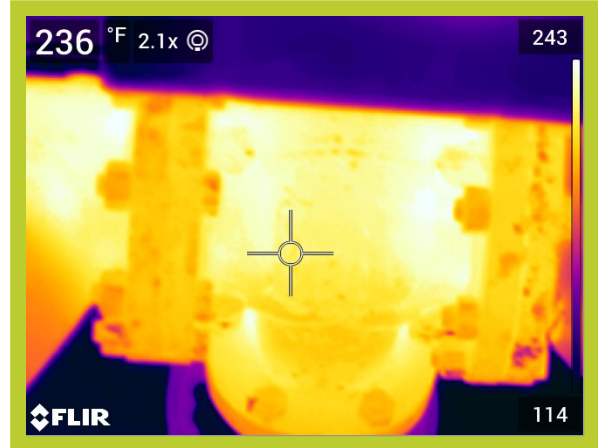
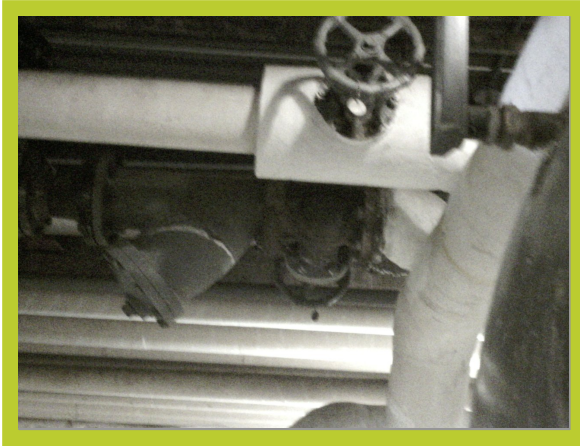
171°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	46,840	\$ 1,287.92	\$1,287.92	\$6,439.60	3.92
1	5,416	\$ 148.88	\$1,139.04	\$5,695.20	0.48
1.5	3,976	\$ 109.28	\$1,178.64	\$5,893.20	0.32

Tunnel



Operating Temperature,
Ambient Temperature,
Insulation selected

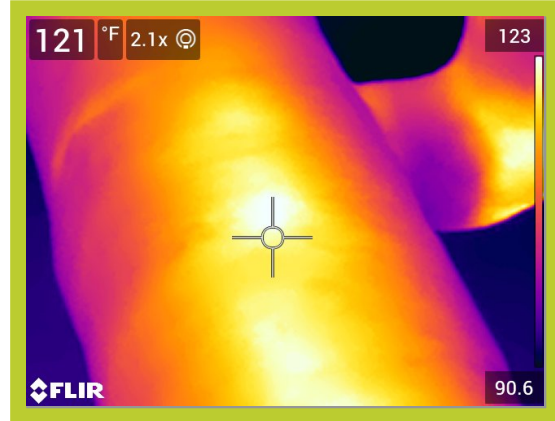
226°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	63,960	\$ 1,758.32	\$1,758.32	\$8,791.60	5.36
1	7,584	\$ 208.52	\$1,549.80	\$7,749.00	0.64
1.5	5,324	\$ 146.36	\$1,611.96	\$8,059.80	0.44

Tunnel



Operating Temperature,
Ambient Temperature,
Insulation selected

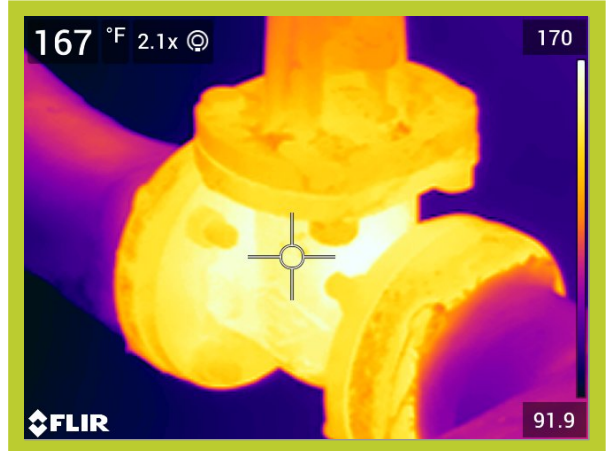
112°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	6,004	\$ 165.24	\$165.24	\$826.20	0.52
1	832	\$ 22.84	\$142.40	\$712.00	0.08
1.5	608	\$ 16.76	\$148.48	\$742.40	0.04

8HUV4



Operating Temperature,
Ambient Temperature,
Insulation selected

230°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	19,560	\$ 537.90	\$537.90	\$2689.50	1.65
1	2,418	\$ 66.48	\$471.42	\$2357.10	0.21
1.5	1,689	\$ 46.44	\$491.46	\$2457.30	0.15

8HUV5-6-7



Operating Temperature,
Ambient Temperature,
Insulation selected

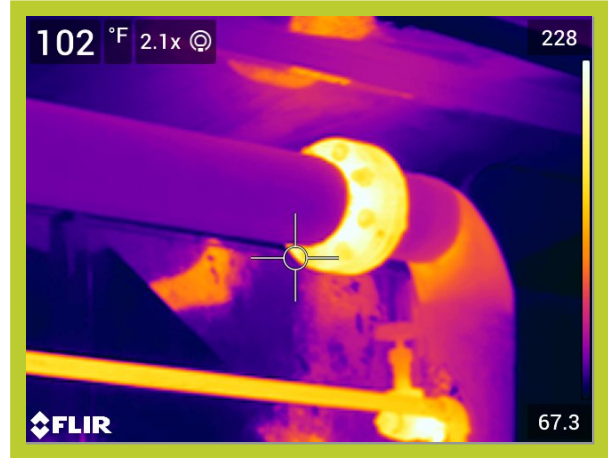
230°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	15,975	\$ 439.20	\$439.20	\$2196.00	1.35
1	2,277	\$ 62.55	\$376.65	\$1883.25	0.18
1.5	1,800	\$ 49.50	\$389.70	\$1948.50	0.18

8HUV5-6-7



Operating Temperature,
Ambient Temperature,
Insulation selected

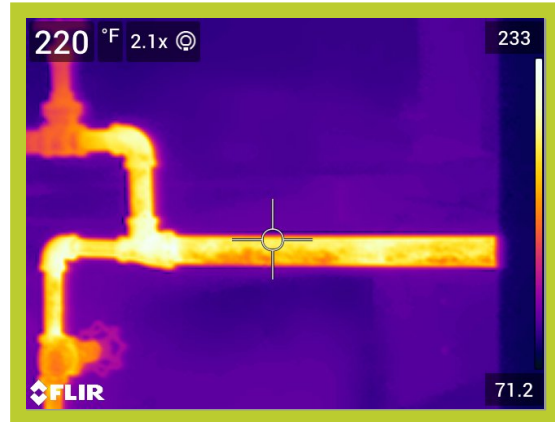
230°F
81°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8320
75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	19,602	\$ 538.92	\$538.92	\$2694.60	1.62
1	2,664	\$ 73.17	\$465.75	\$2328.75	0.18
1.5	2,061	\$ 56.52	\$482.40	\$2412.00	0.18

8HUV5-6-7



Operating Temperature,	225°F	Emittance of Surface	0.95
Ambient Temperature,	81°F	Expected Useful Life of Insulation System	20 yrs.
Insulation selected	Fiberglass	Operating hours per year	8320
		Efficiency of fuel Conversion%	75%

THICKNESS	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	49,185	\$ 1,352.52	\$1,352.52	\$6,762.60	4.14
1	6,174	\$ 169.83	\$1,182.69	\$5,913.45	0.54
1.5	4,491	\$ 123.39	\$1,229.13	\$6,145.65	0.36

*Estimated Calculations supplied by 3E Plus Mechanical Insulation Energy Calculator *

Results

Simple Payback Period, yrs	0.5
Internal Rate of Return (IRR or ROI)	185.8%
Net Present Value,	\$1,102,035

Calculations

Year	Investment	Annual Savings	Annual Cash Flow	Cumulative Cash Flow
0	\$-30,485	\$0	\$-30,485	\$-30,485
1	\$0	\$56,626	\$56,626	\$26,141
2	\$0	\$56,626	\$56,626	\$82,767
3	\$0	\$56,626	\$56,626	\$139,393
4	\$0	\$56,626	\$56,626	\$196,019
5	\$0	\$56,626	\$56,626	\$252,645
6	\$0	\$56,626	\$56,626	\$309,271
7	\$0	\$56,626	\$56,626	\$365,897
8	\$0	\$56,626	\$56,626	\$422,523
9	\$0	\$56,626	\$56,626	\$479,149
10	\$0	\$56,626	\$56,626	\$535,775
11	\$0	\$56,626	\$56,626	\$592,401
12	\$0	\$56,626	\$56,626	\$649,027
13	\$0	\$56,626	\$56,626	\$705,653
14	\$0	\$56,626	\$56,626	\$762,279
15	\$0	\$56,626	\$56,626	\$818,905
16	\$0	\$56,626	\$56,626	\$875,531
17	\$0	\$56,626	\$56,626	\$932,157
18	\$0	\$56,626	\$56,626	\$988,783
19	\$0	\$56,626	\$56,626	\$1,045,409
20	\$0	\$56,626	\$56,626	\$1,102,035