



## AERCO MODULEX EXT Primary Loop Design Guidelines

International, Inc.

### MINIMUM AND MAXIMUM FLOW RATES

	EXT 321	EXT 481/450	EXT 642/600	EXT 802/800	EXT 962	EXT 1123/1100
<b>Minimum Water Flow at Min. Fire (GPM)</b>	4	7	9	11	13	16
<b>Minimum Water Flow at Full Fire (GPM)</b>	12	18	24	30	35	42
<b>Maximum Water Flow (GPM)</b>	28	42	56	71	85	99

The following primary/secondary piping design guidelines should be used for AERCO ModulEx Boiler installations. The following data was calculated based upon systems with Return Water Temperatures above 80°F. A 20 mesh strainer (or finer) is required at each boiler inlet. Water flow rates and pressure drops shown below are for the boiler loop. Boiler water flow rates vary with system design parameters. **The boiler loop fittings and strainer pressure drops shown below are examples only – actual pressure drops will vary depending on actual piping layout and strainer size/type used.**

### 50°F ΔT Loop Conditions

	EXT 321	EXT 481/450	EXT 642/600	EXT 802/800	EXT 962	EXT 1123/1100
Water Flow (GPM) @ <b>Max. ΔT of 50°F</b>	12	18	24	30	35	41
Water Pressure Drop (Ft. of Hd.) across the Boiler @ 50°F ΔT Flow	1.6	2.1	1.7	1.6	1.7	1.8
Strainer ΔP (Ft. of Hd.) – ('Y' Strainer, 20 mesh)	0.41	0.50	0.89	0.41	0.59	0.80
ΔP (Ft. of Hd.) – (20' SCH.40, 4 x 90°, 2 x reducing couplings, 2 x Ball Valve)	1.09	0.81	1.47	0.65	0.96	1.23
<b>Total Primary Loop ΔP (Ft. of Hd.) @ ΔT of 50°F</b>	<b>3.05</b>	<b>3.44</b>	<b>4.09</b>	<b>2.67</b>	<b>3.29</b>	<b>3.82</b>
Strainer, Pipes, Valves and Fittings Sizes used to estimate ΔP for above piping configurations	1-1/4"	1-1/2"	1-1/2"	2"	2"	2"
Recommended AERCO Pump+Circuit Setter Kit for piping configurations not exceeding the above example	<b>99127-1</b>	<b>99127-1</b>	<b>99127-1</b>	<b>99127-2</b>	<b>99127-2</b>	<b>99127-3</b>
Kit includes: Pump Flange Size	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	2"
Kit includes: Circuit Setter Size (NPT)	1-1/2"	1-1/2"	1-1/2"	2"	2"	2"

### 40°F ΔT Loop Conditions

Water Flow (GPM) @ <b>40°F ΔT</b>	15	22	30	37	44	52
Water Pressure Drop (Ft. of Hd.) across the Boiler @ 40°F ΔT Flow	2.4	3.3	2.6	2.6	2.7	2.7
Strainer ΔP (Ft. of Hd.) – ('Y' Strainer, 20 mesh)	0.64	0.78	0.41	0.64	0.92	1.26
ΔP (Ft. of Hd.) – (20' SCH.40, 4 x 90°, 2 x reducing couplings, 2 x Ball Valve)	1.63	1.30	0.65	1.01	1.49	1.89
<b>Total Primary Loop ΔP (Ft. of Hd.) @ ΔT of 40°F</b>	<b>4.67</b>	<b>5.35</b>	<b>3.69</b>	<b>4.22</b>	<b>5.13</b>	<b>5.89</b>
Strainer, Pipes, Valves and Fittings Sizes used to estimate ΔP for above piping configurations	1-1/4"	1-1/2"	2"	2"	2"	2"
Recommended AERCO Pump+Circuit Setter Kit for piping configurations not exceeding the above example	<b>99127-1</b>	<b>99127-1</b>	<b>99127-2</b>	<b>99127-2</b>	<b>99127-3</b>	<b>99127-3</b>
Kit includes: Pump Flange Size	1-1/2"	1-1/2"	1-1/2"	1-1/2"	2"	2"
Kit includes: Circuit Setter Size (NPT)	1-1/2"	1-1/2"	2"	2"	2"	2"



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### 30°F ΔT Loop Conditions

	EXT 321	EXT 481/450	EXT 642/600	EXT 802/800	EXT 962	EXT 1123/1100
Water Flow (GPM) @ 30°F ΔT	20	30	39	49	59	69
Water Pressure Drop (Ft. of Hd.) across the Boiler @ 30°F ΔT Flow	4.2	5.7	4.6	4.6	4.8	4.8
Strainer ΔP (Ft. of Hd.) – ('Y' Strainer, 20 mesh)	0.62	0.41	0.73	1.14	0.80	1.09
ΔP (Ft. of Hd.) – (20' SCH.40, 4 x 90°, 2 x reducing couplings, 2 x Ball Valve) NOTE: Reducing coupling not applied to MLX-909 and MLX-1060 because boiler line size is already 2-1/2"	1.08	0.65	1.12	1.70	0.92	1.24
<b>Total Primary Loop ΔP (Ft. of Hd.) @ ΔT of 30°F</b>	<b>5.91</b>	<b>6.80</b>	<b>6.43</b>	<b>7.47</b>	<b>6.56</b>	<b>7.10</b>
Strainer, Pipes, Valves and Fittings Sizes used to estimate ΔP for above piping configurations	1-1/2"	2"	2"	2"	2-1/2"	2-1/2"
Recommended AERCO Pump+Circuit Setter Kit for piping configurations not exceeding the above example	<b>99127-1</b>	<b>99127-2</b>	<b>99127-3</b>	<b>99127-3</b>	<b>99127-4</b>	<b>99127-4</b>
Kit includes: Pump Flange Size	1-1/2"	1-1/2"	2"	2"	2"	2"
Kit includes: Circuit Setter Size (NPT)	1-1/2"	2"	2"	2"	2-1/2"	2-1/2"

### 20°F ΔT Loop Conditions

Water Flow (GPM) @ Min. ΔT of 20°F	28	42	56	71	85	99
Water Pressure Drop (Ft. of Hd.) across the Boiler @ 20°F ΔT Flow	8.6	11.8	9.2	9.7	10.0	9.5
Strainer ΔP (Ft. of Hd.) – ('Y' Strainer, 20 mesh)	0.41	0.92	0.80	1.26	1.81	2.46
ΔP (Ft. of Hd.) – (20' SCH.40, 4 x 90°, 2 x reducing couplings, 2 x Ball Valve) NOTE: Reducing coupling not applied to MLX-606, 757, 909, and 1060 because boiler line size is already 2-1/2"	0.65	1.49	0.91	1.49	2.14	2.71
<b>Total Primary Loop ΔP (Ft. of Hd.) @ ΔT of 20°F</b>	<b>9.62</b>	<b>14.19</b>	<b>10.91</b>	<b>12.41</b>	<b>13.94</b>	<b>14.71</b>
Strainer, Pipes, Valves and Fittings Sizes used to estimate ΔP for above piping configurations	2"	2"	2-1/2"	2-1/2"	2-1/2"	2-1/2"
Recommended AERCO Pump+Circuit Setter Kit for piping configurations not exceeding the above example	<b>99127-2</b>	<b>99127-3</b>	<b>99127-4</b>	<b>99127-4</b>	<b>99127-5</b>	<b>99127-5</b>
Kit includes: Pump Flange Size	1-1/2"	2"	2"	2"	1-1/2"	1-1/2"
Kit includes: Circuit Setter Size (NPT)	2"	2"	2-1/2"	2-1/2"	2-1/2"	2-1/2"



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### MINIMUM AND MAXIMUM FLOW RATES

	<b>EXT 1530/1500</b>	<b>EXT 1912</b>	<b>EXT 2295/2300</b>	<b>EXT 2677/2600</b>	<b>EXT 3060/3000</b>
<b>Minimum Water Flow at Min. Fire (GPM)</b>	4.4	4.4	4.4	8.8	8.8
<b>Minimum Water Flow at Full Fire (GPM)</b>	56	70	84	99	113
<b>Maximum Water Flow (GPM)</b>	113	141	169	197	225

	<b>EXT 1530/1500</b>	<b>EXT 1912</b>	<b>EXT 2295/2300</b>	<b>EXT 2677/2600</b>	<b>EXT 3060/3000</b>
Water Flow (GPM) @ <b>Max. ΔT of 50°F</b>	56	70	84	99	113
Water Pressure Drop (Ft. of Hd.) across the Boiler @ 50°F ΔT Flow	2.6	2.8	3.3	3.6	3.0
Strainer ΔP (Ft. of Hd.) – ('Y' Strainer, 20 mesh)	0.29	0.45	0.64	0.29	0.37
ΔP (Ft. of Hd.) – (20° SCH.40, 4 x 90°, 2 x reducing couplings, 2 x Ball Valve)	0.41	0.64	0.91	0.33	0.43
<b>Total Primary Loop ΔP (Ft. of Hd.) @ ΔT of 50°F</b>	<b>3.32</b>	<b>3.87</b>	<b>4.83</b>	<b>4.22</b>	<b>3.75</b>
Strainer, Pipes, Valves and Fittings Sizes used to estimate ΔP for above piping configurations	3"	3"	3"	4"	4"
Recommended AERCO Pump+Circuit Setter Kit for piping configurations not exceeding the above example	<b>99127-6</b>	<b>99127-7</b>	<b>99127-7</b>	<b>99127-7</b>	<b>99127-7</b>
Kit includes: Pump Flange Size	2"	3"	3"	3"	3"
Kit includes: Circuit Setter Size (NPT)	2 ½"	3"	3"	3"	3"

Water Flow (GPM) @ <b>40°F ΔT</b>	70	88	106	123	141
Water Pressure Drop (Ft. of Hd.) across the Boiler @ 40°F ΔT Flow	3.6	4.3	4.9	5.2	4.6
Strainer ΔP (Ft. of Hd.) – ('Y' Strainer, 20 mesh)	0.45	0.70	1.00	0.45	0.58
ΔP (Ft. of Hd.) – (20° SCH.40, 4 x 90°, 2 x reducing couplings, 2 x Ball Valve)	0.63	0.99	1.42	0.50	0.66
<b>Total Primary Loop ΔP (Ft. of Hd.) @ ΔT of 40°F</b>	<b>4.69</b>	<b>5.95</b>	<b>7.35</b>	<b>6.20</b>	<b>5.83</b>
Strainer, Pipes, Valves and Fittings Sizes used to estimate ΔP for above piping configurations	3"	3"	3"	4"	4"
Recommended AERCO Pump+Circuit Setter Kit for piping configurations not exceeding the above example	<b>99127-7</b>	<b>99127-7</b>	<b>99127-7</b>	<b>99208-3</b>	<b>99208-3</b>
Kit includes: Pump Flange Size	3"	3"	3"	3"	3"
Kit includes: Circuit Setter Size (NPT)	3"	3"	3"	3"	3"



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	EXT 1530/1500	EXT 1912	EXT 2295/2300	EXT 2677/2600	EXT 3060/3000
Water Flow (GPM) @ 30°F ΔT	94	117	141	164	188
Water Pressure Drop (Ft. of Hd.) across the Boiler @ 30°F ΔT Flow	5.2	7.2	9.5	9.8	8.5
Strainer ΔP (Ft. of Hd.) – ('Y' Strainer, 20 mesh)	0.79	1.24	1.79	0.79	1.04
ΔP (Ft. of Hd.) – (20' SCH.40, 4 x 90°, 2 x reducing couplings, 2 x Ball Valve) NOTE: Reducing coupling not applied to MLX-909 and MLX-1060 because boiler line size is already 2-1/2"	1.12	1.72	3.81	0.88	1.15
<b>Total Primary Loop ΔP (Ft. of Hd.) @ ΔT of 30°F</b>	<b>7.17</b>	<b>10.18</b>	<b>15.11</b>	<b>11.52</b>	<b>10.72</b>
Strainer, Pipes, Valves and Fittings Sizes used to estimate ΔP for above piping configurations	3"	3"	3"	4"	4"
Recommended AERCO Pump+Circuit Setter Kit for piping configurations not exceeding the above example	<b>99127-7</b>	<b>99208-4</b>	<b>99208-5</b>	<b>99208-5</b>	<b>99208-6</b>
Kit includes: Pump Flange Size	3"	3"	3"	3"	3"
Kit includes: Circuit Setter Size (NPT)	3"	3"	3"	3"	3"

Water Flow (GPM) @ Min. ΔT of 25°F	113	141	169	197	225
Water Pressure Drop (Ft. of Hd.) across the Boiler @ 25°F ΔT Flow	7.9	11.8	16.4	17.7	13.1
Strainer ΔP (Ft. of Hd.) – ('Y' Strainer, 20 mesh)	1.14	1.78	2.57	1.14	1.49
ΔP (Ft. of Hd.) – (20' SCH.40, 4 x 90°, 2 x reducing couplings, 2 x Ball Valve) NOTE: Reducing coupling not applied to MLX-606, 757, 909, and 1060 because boiler line size is already 2-1/2"	2.27	3.47	4.97	1.79	2.31
<b>Total Primary Loop ΔP (Ft. of Hd.) @ ΔT of 25°F</b>	<b>11.28</b>	<b>17.07</b>	<b>23.95</b>	<b>20.65</b>	<b>16.92</b>
Strainer, Pipes, Valves and Fittings Sizes used to estimate ΔP for above piping configurations	3"	3"	3"	4"	4"
Recommended AERCO Pump+Circuit Setter Kit for piping configurations not exceeding the above example	<b>99208-4</b>	<b>99208-5</b>	<b>99208-7</b>	<b>99208-7</b>	<b>99208-7</b>
Kit includes: Pump Flange Size	3"	3"	3"	3"	3"
Kit includes: Circuit Setter Size (NPT)	3"	3"	3"	3"	3"