ENGINEERING GUIDE

FORM 145.05-EG2 (1219)

Water-Cooled Self-Contained Units

L-Series, Vertical

Johnson Controls

Nomenclature

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
L	S	W	U	0	9	5	S	E	A	4	6	S	P	D	4	0	O	H	3	6	P	2	V	V	C	O	0	0	0	S

UNIT TYPE
- L = "L" Series
- S = Self-Contained
- W = Water-Cooled
- U/D/F = Up/Down/Frontflow

NOMINAL CAPACITY
- 025 = 25 Ton
- 032 = 32 Ton
- 035 = 35 Ton
- 040 = 40 Ton
- 050 = 50 Ton
- 060 = 60 Ton
- 070 = 70 Ton
- 080 = 80 Ton
- 095 = 95 Ton
- 105 = 105 Ton

DESIGN SEQUENCE
- A = Initial Design

EVAPORATOR COIL
- SE = Standard Efficiency
- HE = High Efficiency

SUPPLY VOLTAGE
- 17 = 208V-3-6-0
- 28 = 230V-3-6-0
- 46 = 460V-3-6-0
- 58 = 575V-3-6-0

POWER SUPPLY CONNECTION
- SPT = Single Point Terminal Block
- SPD = Single Point Disconnect Switch
- DPT = Dual Point Terminal Block
- DPD = Dual Point Disconnect Switch

SUPPLY MOTOR HP
- 05 = 5 HP
- 07 = 7.5 HP
- 10 = 10 HP
- 15 = 15 HP
- 20 = 20 HP
- 25 = 25 HP
- 30 = 30 HP
- 40 = 40 HP
- 50 = 50 HP
- 60 = 60 HP

SUPPLY MOTOR TYPE
- OH = ODP High Eff
- OP = ODP Premium Eff.
- TH = TEFC High Eff
- TP = TEFC Premium Eff.

FAN SIZE
- 25 = 25 inch
- 28 = 28 inch
- 32 = 32 inch
- 36 = 36 inch
- 40 = 40 inch

FAN CLASS
- P2 = CL2, Plenum
- P3 = CL3, Plenum
- 2R = CL2, Plenum w/ Piezo Ring

VFD OPTION
- CV = Constant Volume
- VV = Variable Air Volume (VAV)
- VB = VAV with Bypass
- VR = VFD Ready

HEAT OPTION
- CO = Cooling Only
- HW = Hot Water
- ST = Steam Coil
- EH = Electric Heat

ELECTRIC HEAT SIZE
- 000 = No EH
- 017 = 17.5 KW
- 035 = 35 KW
- 052 = 52.5 KW
- 070 = 70 KW
- 105 = 105 KW

ENTERING WATER TEMPERATURE
- S = Standard Temperature
- H - High Temperature

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Features and Benefits

LOW OWNERSHIP COST

Lower Installation Cost

- Single point power connections.
- Single condenser water inlet and outlet connections. Factory installed internal piping.
- Comprehensive factory testing of refrigerant, condenser water piping, supply fan, and control system.
- Factory installed internal condensate drain connection.
- Compact design allows smaller mechanical equipment room.
- Optional low service clearance units allow installation in even smaller mechanical equipment rooms.
- Optional multiple piece shipment allows installation in tight spaces. No field refrigerant or water piping is required.
- Condenser water piping connections from the top of the unit minimizes piping in mechanical equipment room.

LOWER OPERATING COST

Efficient Operation

- Plenum fan with backward inclined airfoil blades provides required airflow at a lower energy consumption compared to the most competitive units.
- All scroll compressors combined with highly efficient condenser and evaporator coil design provides efficient cooling, lowering energy consumption.
- Water economizer and air economizer options provide free cooling to reduce power consumption.
- Partial occupancy on any floor reduces power consumption, due to multiple compressor operation and optional variable frequency drive (VFD) to match capacity to the load.
- After hours operation on any floor only requires unit on that floor with partial operation of cooling tower and pumps. This saves significant amount of energy over chilled water systems.
- Variable condenser water flow option, with internal actuated valve(s), prevents flow through units not requiring cooling, saving pump energy.
- Evaporator coil circuiting supports low leaving air temperature designs to reduce design air flow and reduce fan operating energy.
- High efficiency evaporator coil available for lower air flow, low leaving air temperature applications.

Features and Benefits (Cont'd)

Easier Maintenance

- Large, intuitive operator interface makes for quick set up and easier diagnostics. It is on the external panel for easy viewing.
- Operator interface for optional VFD on the external panel.
- Easy access to important components through hinged doors for easy maintenance.
- Easily accessible components out of the air stream allow adjustment of components, including expansion valves, while unit is operating.
- Easy filter access for inspection, removal, and replacement.
- Internally trapped condensate drain cleanout with easy access.
- Available BACnet® communications with Building Automation System (BAS) allows for easier control of larger installations.
- Emergency stop input.

Indoor Air Quality

- Condensate drain pan sloped in all directions to the drain point.
- Stainless steel drain pan standard
- High efficiency filters option with pre-filters.
- Evaporator and waterside economizer coils surface may be cleaned from air entering side as well as air leaving side.
- Easy access to internally trapped condensate drain cleanout.
- Matt faced fiberglass insulation.

Quieter Acoustic Performance

- Plenum fan with backward inclined airfoil blades provides required airflow at a lower sound power level compared to the most competitive units.
- Unique placement of internal components minimizes amount of acoustic energy leaving the unit.
- Supply fan and motor assembly mounted on a frame and isolated with springs.
- Optional discharge plenum configurations allow horizontal supply air discharge, minimizing the outlet sound and pressure losses.
- Optional inlet plenum configuration minimizes sound escaping the unit inlet.
- Multiple scroll compressors, due to their smoother flow and stepped operation, minimize the sound associated with the refrigerant system.
- The compressors are located outside the air stream, including all the refrigerant piping and condenser water piping.

STANDARD FEATURES

Controls

- Microprocessor based control system proven algorithms.
- Large 32-key operator interface with large display, in clear language, accessible without opening panel.
- Alarms and faults displayed and stored in the controller memory.
- Occupied and Unoccupied mode operation.
- Timed Override operation.
- Supply airflow proving switch.
- Condensing pressure control when condenser valves are present.
- All refrigerant controls like thermostatic expansion valves, sight glass are out of the air stream and adjustable while unit is working.
- ETL and CETL listing for US and Canada.

Refrigerant Circuits

- Multiple scroll compressors for better temperature control. Up to six compressors.
- All compressors have independent refrigerant circuits and independent short circuit protection.
- Automatic compressor lead-lag on units larger than 40 tons.
- Environmentally friendly R-410A refrigerant.
- Completely factory piped, charged, and protected refrigerant circuits.
- Each refrigerant circuit with suction and discharge pressure transducers for enhanced diagnostics and control.
- Evaporator coil frost protection
- Mechanically cleanable shell and tube condenser, factory tested and piped.
- Factory leak and pressure tested refrigerant piping
- Low ambient compressor lockout.

Features and Benefits (Cont'd)

Supply Fan

- Plenum fan with backward inclined airfoil blades provides required airflow at lower energy consumption and sound compared to the most competitive units.
- Minimum class II fans for high static requirements. Class III fans available.
- Supply fan and motor assembly is isolated with springs to minimize the vibration and sound transmission to the rest of the unit and beyond.
- Bearing lubrication line brought to one location for easy maintenance.

Unit Cabinet

- Welded base made out of 10-gauge galvanized steel frame and structural members.
- External cabinet parts made out of painted 16-gauge galvanized steel.
- External panels made out of painted 18-gauge galvanized steel.
- Lifting lugs to lift the unit without skid.
- Hinged 2-inch thick access doors covering the coil, compressors, condensers, water piping, electrical components, and fan access. Insulated where necessary with 2-inch matt faced fiberglass insulation.
- Stainless steel drain pan with insulation, sloped in all directions.
- Condensate drain with cleanout and proper slope towards the drain.

Filters Section

- Filter section made out of 18-gauge painted galvanized steel.
- 4-inch thick MERV 8 filters are standard.

Condenser Water Piping

- Factory installed and tested condenser water piping.
- Condenser water piping exiting unit from the top for easier and shorter field connections.

OPTIONAL FEATURES

Variable Frequency Drive (VFD)

- Factory installed, wired, and commissioned VFD controls the fan speed in conjunction with the unit controller, based on a signal from controller.
- Unit installed duct static pressure sensor to sense duct static using fields installed pneumatic tubes.
- Optional manual electrical bypass manually enables unit to run the supply fan motor at full speed in case the VFD failure.

Waterside Economizer

- Waterside economizer, which uses colder condenser water available during colder outdoor conditions, to provide cooling by passing cold condenser water through additional water economy coil upstream of the evaporator coil in terms of air flow.

  Internal temperature sensors determine suitability of condenser water for full or partial free cooling and route condenser water flow through the water economy coil when suitable. Internal water piping and valves are included.

- Water economy coil with optional mechanically cleanable return bends is available.

- Condenser water flow through the unit is enabled only in cooling mode. Minimum condenser water temperature for unit compressor operation in this mode is 40.0°F.

Condenser Water Regulating Valves

- Units without waterside economizer will permit compressor operation up to 55.0°F and above. For condenser water temperatures below this threshold, optional condenser water regulating valve(s) are available. Optional condenser water valve controls the water flow though unit condensers to maintain minimum discharge pressure for all compressors with flow through unit enabled only in the cooling mode.

  Optional Condenser and Bypass water valves maintain minimum discharge pressure for all compressors with flow through unit always enabled.

Heating

- Hot water coil with factory installed and tested water piping and valve for modulated control. Controlled by the unit controller.

- Electric heat, factory installed, wired, and tested.

- All of the heating options are in reheat position. However, the heating will only be used when cooling is off.

- Only one heating option is available in any unit.

Controls

- Factory installed and wired non-fused disconnect switch for the unit power. Disconnect switch is accessible without opening unit doors.

- Static pressure transducer is installed and wired on all variable air volume (VAV) units to control VFD operation.

- Additional static pressure transducer installed and wired with comparative logic built in.

- Duct static pressure limit switch mounted and wired in unit to disable unit operation in case of high duct static.

- BACnet (MS/TP) interface for communication with BAS.

- Water Flow Switch will lock out all compressors in the unit if minimum water flow is not present.

High Efficiency Air Filtration

- Optional High Efficiency MERV 13 4-inch thick filters are available with 4-inch thick MERV 8 pre-filter.

Features and Benefits (Cont'd)

High Efficiency Evaporator Coils

- High efficiency evaporator coil for lower air flow, low leaving air temperature applications. Provides higher EER and higher capacity.

Modular Construction

- Unit shipped in multiple sections. All refrigerant piping, condenser water piping, and condensate drain piping is factory assembled and does not require additional field work. Various sections are as follows:
    - Refrigerant and heating section consisting of evaporator coil, water economy coil, condensers, compressors, condenser water piping, and heating options.
    - Fan and power section consisting of supply fan and motor assembly, power and control panels, and VFD.
    - Filter section, including the filters.

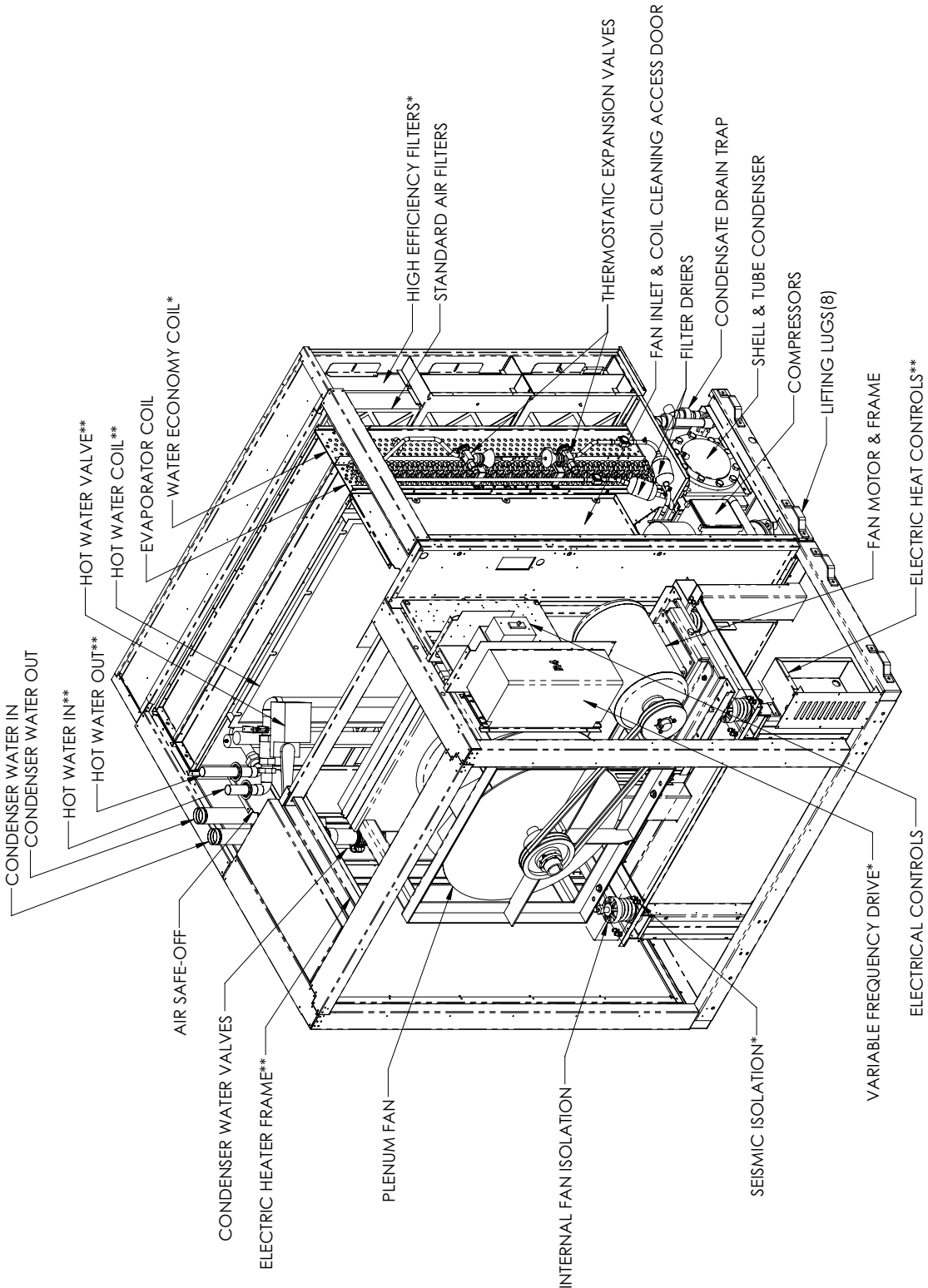
Low service clearance

- For areas with limited mechanical equipment room space, optional configuration of the unit requiring less (3 inch) than standard clearance on left of the unit as looking at the unit from the fan side is required. Less (3 inch) service clearance on the fan side is also available.

Field Installed Accessories

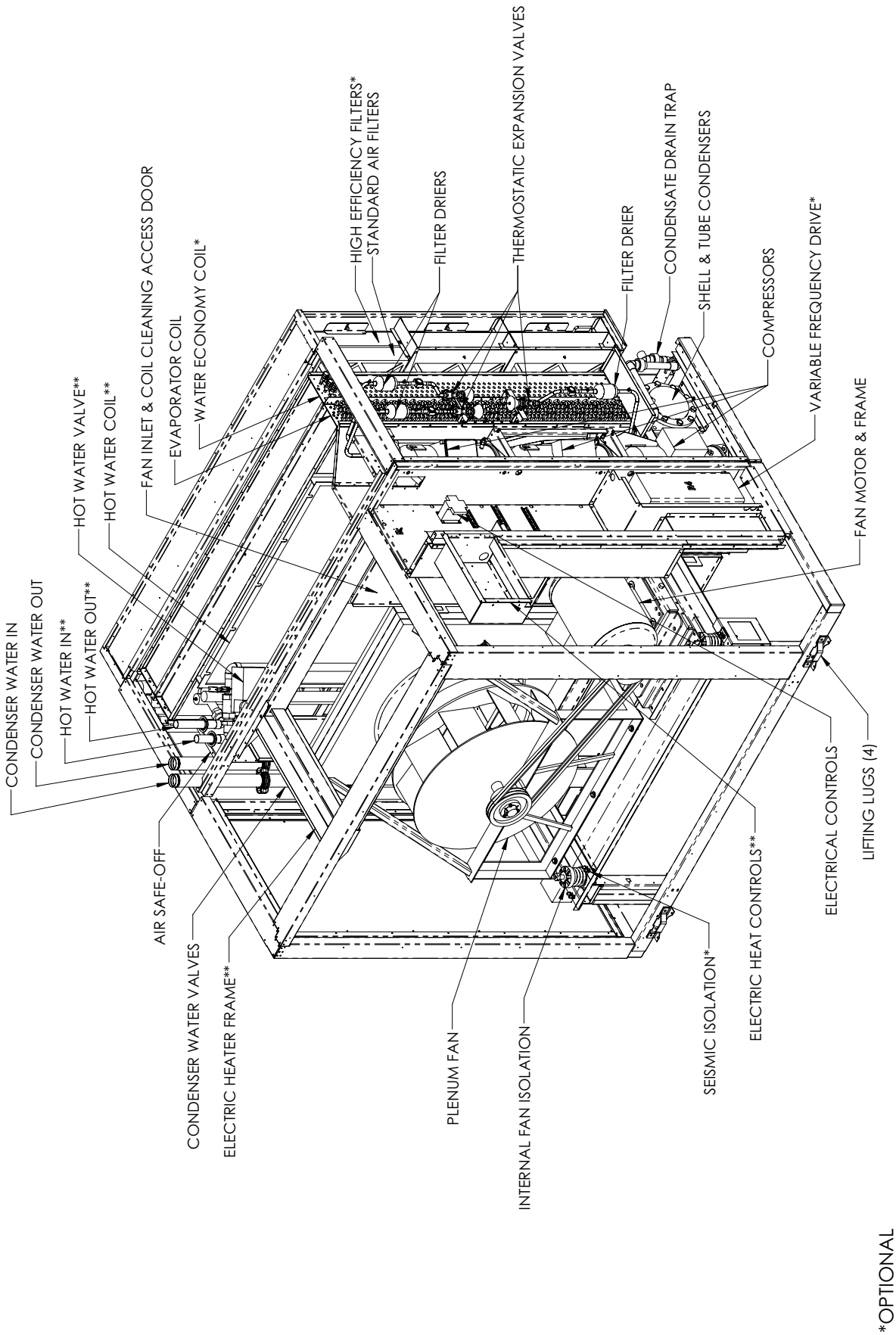
- Discharge plenum/Outlet plenum.
    - Full discharge plenum is factory manufactured discharge plenum with 3-inch thick matt faced insulation and 20-gauge perforated galvanized steel liner, with or without factory cut openings.
    - Half discharge plenum is factory manufactured discharge plenum with 3-inch thick matt faced insulation and 20-gauge perforated galvanized steel liner, with or without factory cut openings.
- Airside economizer with outdoor air connection, damper, and damper actuator at the top, return air connection, damper, and damper actuator at the back. Provided with connecting harness for the actuators and sensors, installed by others. Different control options:
    - Dry bulb
    - Single enthalpy
    - Dual enthalpy
- Inlet sound attenuating plenum attaches to the filter section for further reducing the sound emitted through the unit air inlet.

Features and Options



* OPTIONAL
**OPTIONAL HOT WATER OR ELECTRIC HEAT

Features and Options (Cont'd)



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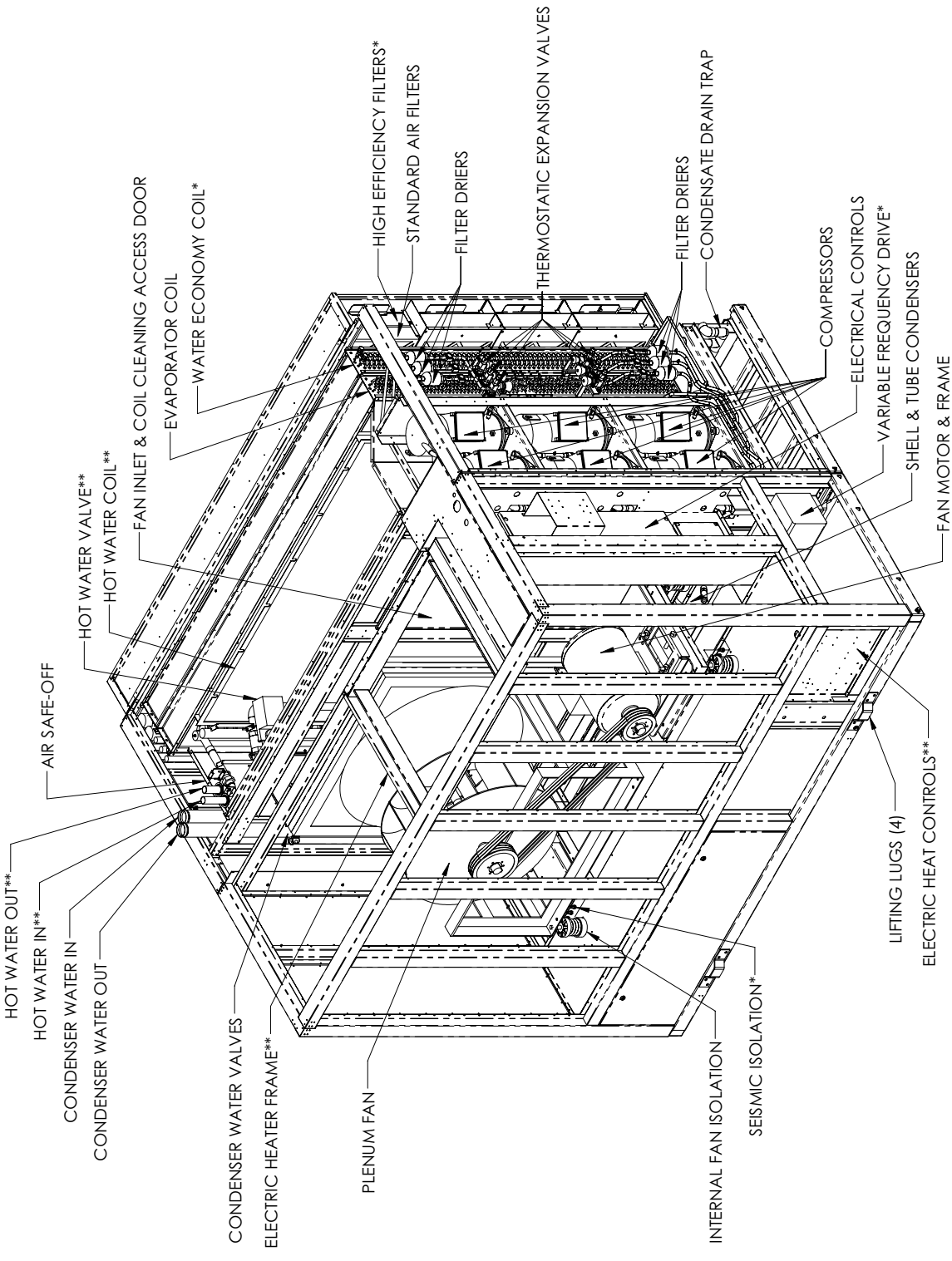

* OPTIONAL

** OPTIONAL HOT WATER OR ELECTRIC HEAT

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Selection Procedure

1. Design Criteria should be available to select a unit. These criteria include:
   a. Design airflow
   b. Entering air conditions
      - Summer
      - Winter (if heating is required)
   c. Total and sensible loads
   d. Condenser water entering and leaving temperatures
   e. External static pressure
   f. Factory installed options required
2. Based on design air flow, select the smallest unit with maximum air flow higher than design air flow and minimum airflow lower than design air flow from Unit Physical Data Tables on *page 19* through *page 21*. Please note that standard and high efficiency units of the same size have different air flow limits.
3. Divide the design air flow by the air flow indicated at the top of the appropriate Cooling Performance Table for the selected unit and efficiency, on *page 22* through *page 31.* Use *Table 2 on page 17* to determine the correction factors for total and sensible capacities and compressor power.
4. Multiply the total and sensible capacities and compressor power from appropriate Cooling Performance Table for design air and water conditions with the correction factors above to determine the unit capacity adjusted for the airflow.
5. Determine if the cooling performance of this unit is acceptable. If not, repeat steps 2 through 4 above with a higher capacity unit.
6. If waterside economizer option is chosen, follow steps 3 and 4 above with appropriate Waterside Economizer Cooling Performance Table on *page 32*.
7. If hot water heating option is required, follow steps 3 and 4 with appropriate Hot Water data from Physical Data tables on *page 19–20*.
8. If electric heat option is required, obtain heating capacity based on electric heat capacity and unit voltage from Electric Heat Capacity Table on *page 68*.
9. Select filtration types and efficiencies needed with corresponding air pressure drop from *Table 30 on page 69 and Table 31 on page 70*.
10. Select either airside economizer or inlet sound attenuating plenum, if required, with corresponding air pressure drop from *Table 19 and Table 20 on page 57.*
11. Select half or full outlet plenum, if required, with corresponding air pressure drop from *Table 19 and Table 20 on page 57*.
12. With all options selected, add air pressure drops of all the components selected, including evaporator coil, to external static pressure required to determine total static pressure required for the supply air fan.

Selection Procedure (Cont'd)

13. Select appropriate fan for the unit to deliver design air flow at required static pressure. There may be more than one supply air fan option available for the unit being selected.

14. Add 5% belt drive losses to the motor BHP calculated, and select next available supply fan motor.

15. Supply fan motor heat gain in MBH, based on 93.5% motor efficiency, may be calculated by multiplying above BHP plus the belt drive losses by 2.72.

16. Minimum Circuit Ampacity (MCA) of the unit may be calculated, using electrical data in *Table 27 and Table 28 on page 68*, as follows:

    a. For units without electric heat:

       MCA = 1.25 * (largest motor RLA or FLA) + (FLA or RLA of all the rest of the motor) + two transformers FLA

    b. For units with electric heat, MCA is the lower of the heating and cooling mode MCA. Cooling mode MCA is as shown in step a above.

       - Electric heat less than 50 kW

         Heating mode MCA = 1.25 * (electric heat FLA + supply fan motor FLA) + two transformers FLA.

       - For units with electric heat 50 kW or more, MCA is the lower of the heating and cooling mode MCA

         Heating mode MCA = 1.25 * supply fan motor FLA + electric heat FLA + two transformers FLA.

17. Maximum Overcurrent Protection (MOP) for the unit is calculated as follows:

    a. For units without electric heat:

       - MOP = 2.25 * (largest motor RLA or FLA) + (FLA or RLA of all the rest of the motor) + two transformers FLA.

    b. For units with electric heat, MOP is the lower of the heating and cooling mode MOP. Cooling mode MOP is as shown in step a above.

       - Heating mode MOP = 2.25 * (electric heat FLA + supply fan motor FLA) + two transformers FLA.

    c. MOP is equal to next lower fuse size available of the higher of the values calculated above, unless:

       - Value in step c is lower than MCA, in which case the MOP value is the next size higher than the MCA.

18. The component weights are in *Table 30 on page 69 and Table 31 on page 70*. Add weights of the components covered by the options selected. To obtain operating weight, add water weights corresponding to the option selected carrying water weights.

TABLE 1 - DX COOLING CORRECTION FACTORS

AIR FLOW PERCENT	TOTAL CAPACITY	SENSIBLE CAPACITY	COMPRESSOR POWER
80	0.967	0.900	0.980
85	0.976	0.926	0.985
90	0.984	0.951	0.990
95	0.991	0.976	0.995
100	1.000	1.000	1.000
105	1.006	1.024	1.003
110	1.013	1.047	1.007
115	1.019	1.070	1.012
120	1.025	1.093	1.016

TABLE 2 - WATERSIDE ECONOMIZER CORRECTION FACTORS

AIR FLOW PERCENT	TOTAL CAPACITY	SENSIBLE CAPACITY
80	0.883	0.863
85	0.914	0.899
90	0.944	0.934
95	0.973	0.968
100	1.000	1.000
105	1.026	1.031
110	1.052	1.061
115	1.076	1.090
120	1.100	1.118

TABLE 3 - HOT WATER HEATING CORRECTION FACTORS

AIR FLOW PERCENT	TOTAL CAPACITY
80	0.903
85	0.929
90	0.953
95	0.977
100	1.000
105	1.020
110	1.042
115	1.061
120	1.082

Operating Limitations

TABLE 4 - OPERATING LIMITATIONS — LSW_025–105

	MINIMUM	MAXIMUM
Entering Air DX Coil-Dry Bulb	68.0°F	90.0°F
Entering Air DX Coil-Wet Bulb	57.0°F	72.0°F
Condenser Water Flow	2.0 GPM/Ton	3.0 GPM/Ton
Entering Cond. Water Temp with Economizer	50.0°F	115.0°F
Entering Cond. Water Temp with Condenser Water Control Valve	Not Applicable	Not Applicable
Entering Cond. Water Temp w/o Condenser Water Control Valve	55.0°F	115.0°F
Steam Heat-Steam Pressure	5 psig	15 psig
Hot Water Heat Entering Water Temp	140.0°F	160.0°F

Physical Data

TABLE 5 - LSW_025–060

Model Nominal Tons		**025**	**032**	**035**	**040**	**050**	**060**
Air Flow Range	Maximum Design Air Flow - Standard - CFM	10,500	13,300	15,500	16,000	20,000	24,000
	Maximum Design Air Flow- High Efficiency - CFM	8,600	11,000	13,200	13,200	20,000	20,000
	Minimum Design Air Flow - Standard - CFM	7,200	9,000	10,800	10,800	16,000	16,000
	Minimum Design Air Flow - High Efficiency CFM	6,300	7,800	9,400	9,400	14,100	14,100
Cabinet Dimensions	Depth (Excluding Filter Section) - Inches	70	70	70	70	76	76
	Length - Inches	78	78	78	78	100	100
	Height - Inches	79.5	79.5	79.5	79.5	90	90
EER		14.3	13.6	13.3	13.1	14.2	13.3
EER - High Efficiency		15.3	14.2	14.2	13.6	14.9	13.8
Cooling Coil 3/8" OD	Face Area - Square Feet	17.8	22.2	26.7	26.7	40.1	40.1
	Rows	4	4	4	6	5	6
	Fins Per Inch (Standard/High Efficiency)	12/17	12/17	12/17	12/17	12/17	12/17
Supply Fan	Fan Type	Airfoil Plenum Fan (SWSI)					
	Diameter - Inches/Class - Standard	28/ Class II	28/ Class II	28/ Class II	28/ Class II	32/ Class II	36/ Class II
	Diameter - Inches/Class - High Capacity Fan	28/ Class II	28/ Class II	None	None	36/ Class II	
	Fan Motor HP	5 - 20	10 - 25	10 - 25	10 - 25	15 - 40	15 - 40
Filters	4 Inch Deep - MERV 8 20X20X4 / 24X20X4 / 24X24X4	3 / 6 / 0	3 / 6 / 0	3 / 6 / 0	3 / 6 / 0	0 / 6 / 6	0 / 6 / 6
	4 Inch Deep - MERV 13 20X20X4 / 24X20X4 / 24X24X4	3 / 6 / 0	3 / 6 / 0	3 / 6 / 0	3 / 6 / 0	0 / 6 / 6	0 / 6 / 6
Compressors	Type	Scroll / *Scroll with Capacity Modulation					
	Compressor Quantity / Nominal HP	10* + 10	15* + 11	15* + 13	15* + 15	15*+2-11	15*+2-15
Number of Capacity Steps		6	6	6	6	9	9
Condensers	Type	Shell and Tube					
	Quantity (2 refrigerant circuits per condenser)	1	1	1	1	2	2
Condenser Water Connections	Water In and Out Copper Victaulic Connections - Inches	2.625	2.625	2.625	2.625	2.625	2.625
Waterside Economizer Coil 1/2" OD	Face Area - Square Feet	17.8	22.2	26.7	26.7	40.1	40.1
	Rows/Fins Per Inch	4/11	4/11	4/11	4/11	4/11	4/11
Heating	Hot Water Coil Face Area - Square Feet	8.8	12.0	15.2	15.2	23.3	23.3
	Hot Water Coil Rows/Fins Per Inch	1/12	1/12	1/12	1/12	1/12	1/12
	Steam Coil	Consult Factory					
	Electric Heat - KW - 240/3/60 Nominal	17.5	17.5/35.0	17.5/35.0	17.5/35.0	35.0/52.5	35.0/52.5
	Electric Heat - KW - 480/3/60 Nominal	17.5	17.5/35.0	17.5/35.0	17.5/35.0	35.0/52.5	35.0/52.5
	Electric Heat - KW - 600/3/60 Nominal	17.5	17.5/35.0	17.5/35.0	17.5/35.0	35.0/52.5	35.0/52.5

Physical Data (Cont'd)

TABLE 6 - LSW_070–105

Nominal Capacity, Tons		**70**	**80**	**95**	**105**
Air Flow Range	Maximum Design Air Flow - Standard - CFM	29,800	33,900	36,100	36,100
	Maximum Design Air Flow- High Efficiency - CFM	24,800	28,200	30,100	30,100
	Minimum Design Air Flow - Standard - CFM	19,900	22,600	24,200	24,200
	Minimum Design Air Flow - High Efficiency - CFM	17,400	19,800	21,200	21,200
Cabinet Dimensions	Depth (Excluding Filter Section) - Inches	96	96	96	96
	Length - Inches	130	130	130	130
	Height - Inches	102	102	102	102
EER		14.1	13.7	13.7	13.3
EER - High Efficiency		14.5	14.1	14.1	13.7
Cooling Coil 3/8 inch OD	Face Area - Square Feet	49.7	56.5	60.3	60.3
	Rows	4	5	5	6
	Fins Per Inch (Standard/High Efficiency)	12/17	12/17	12/17	12/17
Supply Fan	Fan Type	Airfoil Plenum Fan (SWSI)			
	Diameter - Inches/Class - Standard	36/Class II	36/Class II	40/Class II	40/Class II
	Diameter - Inches/Class - High Capacity Fan	40/Class II	40/Class II	None	None
	Fan Motor HP	15 - 40	15 - 40	20 - 50	20 - 50
Filters	4 Inch Deep - MERV 8 20X20X4 / 24X20X4	8 / 12	8 / 12	8 / 12	8 / 12
	4 Inch Deep - MERV 13 20X20X4 / 24X20X4	8 / 12	8 / 12	8 / 12	8 / 12
Compressors	Type	Scroll			
	Compressor Quantity / Nominal HP	2 - 15 + 2 - 13	4 - 15	6 - 13	6 - 15
Number of Capacity Steps		4	4	6	6
Condensers	Type	Shell and Tube			
	Quantity (2 refrigerant circuits per condenser)	2	2	3	3
Condenser Water Connections	Water In and Out Copper Victaulic Connections - Inches	3.125	3.125	3.125	3.125
Waterside Economizer Coil	Face Area - Square Feet	49.7	56.5	60.3	60.3
	Rows/Fins Per Inch	4/11	4/11	4/11	4/11
Heating	Hot Water Coil Face Area - Square Feet	35.8	40.6	43.3	43.3
	Hot Water Coil Rows/Fins Per Inch	1/12	1/12	1/12	1/12
	Steam Coil	Consult Factory			
	Electric Heat - KW - 240/3/60 Nominal	17.5/35.0	17.5/35.0	35.0/52.5	35.0/52.5
	Electric Heat - KW - 480/3/60 Nominal	17.5/35.0	17.5/35.0	35.0/52.5	35.0/52.5
	Electric Heat - KW - 600/3/60 Nominal	17.5/35.0	17.5/35.0	35.0/52.5	35.0/52.5

TABLE 7 - REFRIGERANT CHARGE DATA – LSW_025–105

MODEL #	COMP A		COMP B		COMP C		COMP D		COMP E		COMP F	
	NORM HP	R-410A CHARGE-LBS	NORM HP	R-410A CHARGE-LBS	NORM HP	R-410A CHARGE-LBS	NORM HP	R-410A CHARGE-LBS	NORM HP	R-410A CHARGE-LBS	NORM HP	R-410A CHARGE-LBS
025	10	20.0	10	20.0	-	-	-	-	-	-	-	-
032	15	21.5	11	21.5	-	-	-	-	-	-	-	-
035	15	23.0	13	23.0	-	-	-	-	-	-	-	-
040	15	27.0	15	27.0	-	-	-	-	-	-	-	-
050	15	28.5	11	25.0	11	25.0	-	-	-	-	-	-
060	15	26.5	15	26.5	15	27.5	-	-	-	-	-	-
070	15	22.5	15	22.5	15	22.50	15	22.5	-	-	-	-
080	15	23.25	15	23.25	15	25.3	15	25.3	-	-	-	-
095	13	19.0	13	19.0	13	23.50	13	23.5	13	23.5	13	23.5
105	15	19.0	15	19.0	15	23.50	15	23.5	15	27.5	15	27.5

Cooling Performance Data

TABLE 8 - LSW_025

AIR FLOW 10,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	292	249	52.4	51.7	14.6	68.3	290	248	52.5	51.8	15.0	56.8	287	246	52.6	51.9	15.6	67.9
75	67	311	195	57.6	57.2	14.7	72.2	308	194	57.6	57.3	15.0	59.9	304	193	57.8	57.5	15.6	71.5
75	72	336	141	62.8	62.6	14.7	77.3	334	140	62.9	62.7	15.0	64.2	330	139	63.0	62.9	15.6	76.6
80	62	301	296	53.0	51.3	14.6	70.3	299	294	53.1	51.4	15.0	58.3	296	292	53.3	51.5	15.6	69.7
80	67	312	248	57.7	57.2	14.7	72.4	310	247	57.7	57.2	15.0	60.2	306	245	57.9	57.4	15.6	71.8
80	72	337	194	62.9	62.6	14.7	77.4	334	193	63.0	62.6	15.0	64.3	330	191	63.1	62.8	15.6	76.7
85	62	319	319	55.9	50.6	14.6	73.7	317	317	56.0	50.7	15.0	61.3	313	313	56.4	50.8	15.6	73.3
85	67	323	297	58.1	56.7	14.7	74.7	321	296	58.2	56.8	15.0	62.1	317	294	58.4	56.9	15.6	74.1
85	72	337	246	63.0	62.5	14.7	77.4	335	246	63.0	62.6	15.0	64.3	330	244	63.2	62.7	15.6	76.7

AIR FLOW 10,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	284	245	52.8	52.0	15.9	56.4	280.9	243.3	52.9	52.1	16.5	67.4	278.4	242	53.0	52.2	16.9	56.0
75	67	302	192	57.8	57.5	16.0	59.5	297.9	190.4	58.0	57.7	16.5	70.9	295.7	189.5	58.1	57.8	16.9	58.9
75	72	327	138	63.2	63.1	16.0	63.6	323	136	63.3	63.2	16.6	75.9	320	135	63.4	63.3	17.0	63.0
80	62	293	291	53.5	51.6	15.9	57.9	289.9	288.3	53.7	51.7	16.5	69.3	287.4	286.4	53.9	51.8	16.9	57.5
80	67	304	245	57.9	57.4	16.0	59.8	300.6	243	58.1	57.5	16.6	71.4	299	242.3	58.1	57.6	16.9	59.5
80	72	328	190	63.2	62.9	16.0	63.7	323	188.8	63.3	63.0	16.6	75.9	320.4	187.8	63.4	63.1	17.0	63.1
85	62	311	311	56.6	50.9	16.0	60.9	307.5	307.5	56.9	51.0	16.6	72.8	305.4	305.4	57.1	51.1	16.9	60.5
85	67	315	293	58.4	57.0	16.0	61.6	311	290.5	58.6	57.1	16.6	73.5	309	289.5	58.7	57.2	16.9	61.1
85	72	328	243	63.3	62.8	16.0	63.7	323.8	241.4	63.4	62.9	16.6	76.1	320.8	240.3	63.5	63.0	17.0	63.1

HIGH EFFICIENCY - AIR FLOW 8,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	297	235	48.5	48.4	14.6	69.4	295	234	48.6	48.5	15.0	57.6	291	232	48.8	48.7	15.6	68.9
75	67	318	188	54.2	54.1	14.7	73.6	316	187	54.3	54.2	15.0	61.2	312	185	54.5	54.4	15.6	72.9
75	72	345	142	59.7	59.6	14.7	79.1	343	141	59.8	59.7	15.0	65.7	338	139	60.0	59.9	15.6	78.3
80	62	306	281	48.1	48.0	14.6	71.2	304	280	48.2	48.1	15.0	59.2	300	278	48.4	48.3	15.6	70.7
80	67	319	233	53.9	53.8	14.7	73.9	317	232	54.0	53.9	15.0	61.3	313	231	54.1	54.0	15.6	73.3
80	72	346	187	59.5	59.4	14.6	79.2	343	186	59.6	59.5	15.0	65.7	338	184	59.8	59.7	15.6	78.4
85	62	319	319	48.5	47.2	14.6	73.9	317	317	48.7	47.4	15.0	61.4	314	314	49.1	47.5	15.6	73.4
85	67	330	280	53.4	53.3	14.6	76.0	327	279	53.5	53.4	15.0	63.1	324	277	53.7	53.6	15.6	75.4
85	72	346	232	59.3	59.2	14.7	79.2	343	231	59.4	59.3	15.0	65.8	339	229	59.6	59.5	15.6	78.4

HIGH EFFICIENCY - AIR FLOW 8,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	289	231	48.9	48.8	15.9	57.2	285	229	49.2	49.1	16.5	68.3	283	228	49.3	49.2	16.9	56.7
75	67	309	184	54.6	54.5	16.0	60.6	305	182	54.8	54.7	16.6	72.2	302	181	54.9	54.8	16.9	60.0
75	72	336	138	60.1	60.0	16.0	65.0	331	137	60.3	60.2	16.6	77.5	328	136	60.4	60.3	17.0	64.4
80	62	298	277	48.5	48.4	15.9	58.8	294	275	48.7	48.6	16.5	70.1	292	274	48.8	48.7	16.9	58.3
80	67	311	230	54.2	54.1	16.0	60.9	307	228	54.4	54.3	16.6	72.7	304	227	54.6	54.5	17.0	60.4
80	72	336	183	59.9	59.8	16.0	65.1	331	181	60.1	60.0	16.6	77.6	328	180	60.2	60.1	17.0	64.4
85	62	312	312	49.3	47.6	16.0	61.1	309	309	49.7	47.8	16.6	73.0	306	306	50.0	48.0	16.9	60.7
85	67	321	276	53.8	53.7	16.0	62.6	317	274	54.1	54.0	16.6	74.7	314	273	54.2	54.1	17.0	62.0
85	72	336	228	59.7	59.6	16.0	65.1	332	226	59.9	59.8	16.6	77.7	329	225	60.0	59.9	17.0	64.4

NOTE: EDB-entering dry bulb temp, EWB-entering wet bulb temp, EWT-entering water temp, LWT-leaving water temp, LDB-leaving dry bulb temp, LWB-leaving wet bulb temp, TMBH-total capacity, SMBH-sensible capacity.

TABLE 9 - LSW_032

AIR FLOW 12,800 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	371	320	52.3	51.8	19.8	87.7	369	319	52.4	51.9	20.2	72.9	364	316	52.6	52.0	20.9	87.1
75	67	399	251	57.5	57.2	20.1	93.5	395	249	57.6	57.3	20.5	77.5	390	247	57.8	57.5	21.2	92.5
75	72	431	181	62.7	62.6	20.6	100.2	427	179	62.9	62.7	21.0	83.1	422	177	63.0	62.9	21.6	99.1
80	62	385	380	52.9	51.3	20.0	90.7	382	378	53.0	51.4	20.4	75.3	378	375	53.3	51.5	21.1	89.9
80	67	399	318	57.6	57.2	20.1	93.6	396	316	57.7	57.2	20.6	77.7	392	315	57.8	57.3	21.2	92.8
80	72	431	248	62.9	62.6	20.6	100.3	428	247	63.0	62.6	21.0	83.2	423	245	63.1	62.8	21.6	99.3
85	62	407	407	55.9	50.6	20.4	95.3	404	404	56.1	50.7	20.8	79.2	400	400	56.4	50.8	21.4	94.7
85	67	413	382	57.9	56.7	20.4	96.5	410	381	58.0	56.8	20.8	80.1	405	378	58.2	56.9	21.4	95.7
85	72	432	316	62.9	62.5	20.6	100.5	429	315	63.0	62.6	21.0	83.4	423	313	63.1	62.7	21.7	99.5

AIR FLOW 12,800 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	362	315	52.7	52.1	21.3	72.4	357	313	52.8	52.2	22.0	86.4	355	311	52.9	52.3	22.5	71.9
75	67	387	246	57.8	57.5	21.6	76.8	382	244	58.0	57.7	22.3	91.5	378	243	58.0	57.8	22.7	76.0
75	72	418	176	63.1	62.9	22.0	82.3	412	174	63.2	63.1	22.7	97.9	409	173	63.3	63.2	23.2	81.3
80	62	375	374	53.3	51.6	21.5	74.8	370	370	53.6	51.8	22.2	89.2	368	368	53.8	51.8	22.7	74.2
80	67	388	313	57.9	57.5	21.6	77.0	383	311	58.1	57.6	22.3	91.9	379	310	58.1	57.7	22.8	76.2
80	72	419	244	63.2	62.9	22.1	82.4	414	242	63.3	63.0	22.7	98.3	410	241	63.4	63.1	23.2	81.5
85	62	398	398	56.6	50.9	21.9	78.7	393	393	56.9	51.0	22.6	94.0	391	391	57.1	51.1	23.0	78.2
85	67	402	377	58.3	57.0	21.9	79.5	397	374	58.5	57.2	22.6	94.9	394	373	58.5	57.2	23.1	78.7
85	72	420	311	63.3	62.8	22.1	82.6	415	309	63.4	62.9	22.7	98.4	411	308	63.5	63.0	23.2	81.7

HIGH EFFICIENCY - AIR FLOW 10,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	377	298	48.1	48.0	19.9	89.0	374	296	48.3	48.2	20.3	73.9	370	294	48.5	48.4	20.9	88.2
75	67	407	239	53.8	53.7	20.3	95.2	404	237	54.0	53.9	20.7	79.0	398	235	54.2	54.1	21.3	94.3
75	72	440	181	59.4	59.3	20.8	102.3	437	180	59.5	59.4	21.2	84.9	431	178	59.7	59.6	21.8	101.2
80	62	390	356	47.7	47.6	20.1	91.6	387	355	47.8	47.7	20.5	76.1	382	353	47.9	47.8	21.2	90.9
80	67	408	296	53.5	53.4	20.3	95.4	405	294	53.7	53.6	20.7	79.3	399	292	53.8	53.7	21.3	94.4
80	72	442	237	59.2	59.1	20.8	102.6	438	236	59.3	59.2	21.2	85.0	432	234	59.5	59.4	21.8	101.4
85	62	406	406	47.9	47.0	20.4	95.2	404	404	48.0	47.0	20.8	79.1	400	400	48.4	47.2	21.5	94.6
85	67	419	355	53.0	52.9	20.5	97.7	416	353	53.1	53.0	21.0	81.2	411	351	53.3	53.2	21.6	96.9
85	72	442	294	58.9	58.8	20.8	102.7	439	292	59.1	59.0	21.2	85.2	433	290	59.2	59.1	21.8	101.5

HIGH EFFICIENCY - AIR FLOW 10,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	367	293	48.5	48.4	21.4	73.3	362	290	48.8	48.7	22.1	87.4	359	289	48.9	48.8	22.5	72.6
75	67	395	234	54.2	54.1	21.7	78.1	390	232	54.4	54.3	22.4	93.2	386	230	54.6	54.5	22.9	77.4
75	72	428	176	59.7	59.7	22.2	84.0	422	174	60.0	59.9	22.9	100.1	418	173	60.1	60.0	23.4	83.0
80	62	380	351	48.1	48.0	21.6	75.6	375	349	48.3	48.2	22.3	90.1	372	347	48.5	48.4	22.8	74.9
80	67	396	291	53.9	53.8	21.8	78.4	391	289	54.1	54.0	22.5	93.6	388	287	54.3	54.2	23.0	77.7
80	72	429	233	59.5	59.4	22.2	84.2	423	230	59.8	59.7	22.9	100.3	419	229	59.9	59.8	23.4	83.2
85	62	396	396	48.8	47.4	21.9	78.5	392	392	49.1	47.6	22.6	93.9	389	389	49.4	47.7	23.1	78.0
85	67	408	350	53.4	53.3	22.0	80.5	403	347	53.7	53.6	22.7	96.0	400	346	53.8	53.7	23.2	79.8
85	72	430	289	59.3	59.2	22.3	84.2	423	287	59.5	59.4	22.9	100.3	420	285	59.7	59.6	23.4	83.3

NOTE: EDB-entering dry bulb temp, EWB-entering wet bulb temp, EWT-entering water temp, LWT-leaving water temp, LDB-leaving dry bulb temp, LWB-leaving wet bulb temp, TMBH-total capacity, SMBH-sensible capacity.

Cooling Performance Data (Cont'd)

TABLE 10 - LSW_035

AIR FLOW 14,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	402	348	52.4	51.9	21.4	95.0	399	346	52.6	52.0	21.8	78.9	394	344	52.7	52.1	22.5	94.1
75	67	428	272	57.7	57.4	21.7	100.4	424	271	57.7	57.5	22.2	83.3	419	269	57.8	57.6	22.8	99.4
75	72	462	195	62.9	62.8	22.3	107.7	459	194	63.0	62.9	22.7	89.4	453	192	63.1	63.0	23.4	106.5
80	62	415	413	53.1	51.5	21.6	97.8	413	411	53.2	51.5	22.1	81.4	408	407	53.5	51.7	22.7	97.2
80	67	429	346	57.7	57.3	21.8	100.8	427	345	57.8	57.4	22.2	83.7	421	343	57.9	57.5	22.9	99.9
80	72	463	270	63.0	62.8	22.3	107.9	459	268	63.1	62.8	22.7	89.5	454	266	63.2	63.0	23.3	106.7
85	62	440	440	56.2	50.8	22.1	103.1	438	438	56.4	50.8	22.5	85.7	433	433	56.7	51.0	23.1	102.4
85	67	445	416	58.0	56.9	22.1	104.2	442	415	58.1	57.0	22.5	86.6	437	412	58.3	57.1	23.2	103.3
85	72	464	344	63.0	62.7	22.3	108.0	460	343	63.1	62.8	22.7	89.7	454	341	63.2	62.9	23.4	106.8

AIR FLOW 14,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	391	342	52.8	52.2	22.9	78.2	386	340	52.9	52.3	23.7	93.4	383	338	53.1	52.4	24.2	77.6
75	67	415	267	58.0	57.7	23.3	82.4	410	265	58.1	57.9	24.0	98.3	406	264	58.2	58.0	24.5	81.6
75	72	449	190	63.2	63.1	23.8	88.4	443	188	63.4	63.3	24.5	105.3	439	187	63.4	63.3	25.0	87.4
80	62	405	405	53.6	51.8	23.2	80.8	401	401	53.9	51.9	23.9	96.6	398	398	54.0	52.0	24.4	80.3
80	67	419	342	58.0	57.6	23.3	83.1	414	339	58.2	57.7	24.1	99.1	411	338	58.2	57.8	24.6	82.4
80	72	450	265	63.3	63.0	23.8	88.5	444	263	63.4	63.2	24.5	105.5	440	261	63.5	63.3	25.0	87.5
85	62	430	430	56.9	51.0	23.6	85.1	425	425	57.2	51.2	24.3	101.6	422	422	57.4	51.3	24.8	84.4
85	67	434	410	58.4	57.2	23.6	85.7	429	408	58.5	57.3	24.3	102.3	425	406	58.7	57.4	24.8	85.0
85	72	451	339	63.3	63.0	23.8	88.7	445	337	63.5	63.1	24.5	105.7	441	336	63.5	63.2	25.0	87.7

HIGH EFFICIENCY - AIR FLOW 11,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	406	323	48.5	48.4	21.4	95.8	402	321	48.7	48.6	21.9	79.5	398	319	48.8	48.7	22.5	94.9
75	67	435	258	54.2	54.1	21.9	101.9	431	256	54.4	54.3	22.3	84.6	425	254	54.5	54.4	23.0	100.8
75	72	472	194	59.7	59.7	22.5	109.7	468	193	59.9	59.8	22.9	91.0	462	191	60.0	59.9	23.5	108.4
80	62	419	387	48.0	47.9	21.7	98.5	416	386	48.1	48.0	22.1	81.8	411	383	48.4	48.3	22.8	97.7
80	67	437	321	53.8	53.7	21.9	102.4	433	319	54.0	53.9	22.3	84.9	428	317	54.2	54.1	23.0	101.3
80	72	472	256	59.6	59.5	22.5	109.8	468	255	59.6	59.5	22.9	91.1	462	252	59.9	59.8	23.5	108.5
85	62	438	438	48.6	47.3	22.1	102.6	435	435	48.8	47.4	22.5	85.2	430	430	49.2	47.6	23.1	101.9
85	67	450	385	53.4	53.3	22.2	105.2	447	384	53.5	53.4	22.6	87.4	441	381	53.7	53.6	23.3	104.1
85	72	473	318	59.3	59.2	22.5	109.9	469	317	59.4	59.3	22.9	91.2	463	315	59.5	59.4	23.5	108.6

HIGH EFFICIENCY - AIR FLOW 11,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	394	317	49.0	48.9	23.0	78.8	390	315	49.1	49.0	23.7	94.1	386	313	49.3	49.2	24.2	78.1
75	67	422	252	54.7	54.6	23.4	83.7	417	250	54.8	54.7	24.1	99.8	412	248	55.0	54.9	24.6	82.7
75	72	458	189	60.2	60.1	24.0	89.9	452	187	60.4	60.3	24.7	107.1	448	185	60.4	60.4	25.1	88.9
80	62	407	382	48.4	48.3	23.3	81.1	402	379	48.7	48.6	24.0	96.8	399	377	48.9	48.8	24.5	80.4
80	67	425	315	54.3	54.2	23.5	84.1	419	313	54.5	54.4	24.2	100.3	416	312	54.6	54.5	24.7	83.3
80	72	459	251	60.0	59.9	24.0	90.1	453	249	60.1	60.0	24.7	107.4	448	247	60.3	60.2	25.2	89.0
85	62	427	427	49.5	47.7	23.6	84.6	422	422	49.9	47.9	24.3	101.1	419	419	50.2	48.0	24.8	84.0
85	67	438	380	53.8	53.7	23.7	86.6	433	377	54.0	53.9	24.4	103.3	430	376	54.1	54.0	24.9	85.8
85	72	459	313	59.7	59.6	24.0	90.2	453	311	59.9	59.8	24.7	107.4	449	310	59.9	59.8	25.2	89.2

NOTE: EDB-entering dry bulb temp, EWB-entering wet bulb temp, EWT-entering water temp, LWT-leaving water temp, LDB-leaving dry bulb temp, LWB-leaving wet bulb temp, TMBH-total capacity, SMBH-sensible capacity.

TABLE 11 - LSW_040

AIR FLOW 16,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	454	399	52.4	52.0	23.4	106.7	451	398	52.4	52.1	23.9	88.7	445	395	52.6	52.2	24.6	105.8
75	67	479	311	57.7	57.6	23.8	112.0	475	309	57.7	57.7	24.3	93.0	469	307	58.0	57.9	25.0	110.9
75	72	517	221	63.1	63.0	24.7	120.3	513	219	63.1	63.1	25.1	99.8	507	217	63.3	63.2	25.8	119.0
80	62	473	473	53.0	51.5	23.8	110.9	470	470	53.2	51.6	24.3	92.1	465	465	53.5	51.7	25.0	110.0
80	67	488	399	57.5	57.4	24.1	114.1	485	397	57.6	57.4	24.5	94.7	479	394	57.8	57.6	25.2	113.0
80	72	518	308	63.1	63.0	24.7	120.4	514	307	63.1	63.0	25.1	100.0	508	305	63.2	63.1	25.8	119.2
85	62	500	500	56.4	50.8	24.3	116.7	497	497	56.6	50.9	24.8	97.0	492	492	56.9	51.0	25.5	115.8
85	67	503	482	57.6	57.0	24.4	117.3	500	480	57.8	57.1	24.9	97.4	494	477	57.9	57.2	25.6	116.2
85	72	524	398	62.8	62.7	24.8	121.8	520	396	62.9	62.8	25.3	101.1	514	394	63.0	62.9	26.0	120.6

AIR FLOW 16,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	442	394	52.6	52.3	25.1	87.9	436	391	52.8	52.5	25.9	104.9	432	389	52.9	52.6	26.4	87.1
75	67	465	306	58.0	57.9	25.5	92.0	459	303	58.1	58.1	26.3	109.7	455	302	58.2	58.1	26.8	91.0
75	72	503	216	63.4	63.3	26.3	98.7	496	213	63.5	63.5	27.0	117.6	491	212	63.6	63.5	27.6	97.6
80	62	462	462	53.6	51.8	25.5	91.4	457	457	53.9	51.9	26.3	109.2	453	453	54.2	52.0	26.8	90.7
80	67	475	393	57.8	57.7	25.7	93.9	469	390	58.0	57.8	26.5	111.9	465	388	58.1	57.9	27.1	92.9
80	72	504	303	63.2	63.2	26.3	98.9	497	301	63.4	63.3	27.1	117.8	492	299	63.6	63.5	27.6	97.7
85	62	489	489	57.0	51.1	26.0	96.3	483	483	57.4	51.2	26.8	115.0	480	480	57.6	51.3	27.4	95.5
85	67	491	475	58.0	57.3	26.1	96.6	484	472	58.2	57.4	26.8	115.2	481	470	58.3	57.5	27.4	95.7
85	72	510	392	63.2	63.1	26.5	100.1	504	390	63.3	63.2	27.2	119.4	500	388	63.3	63.2	27.8	99.1

HIGH EFFICIENCY - AIR FLOW 13,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	455	370	49.3	49.2	23.4	107.0	452	369	49.4	49.3	23.9	88.9	446	366	49.4	49.3	24.6	106.0
75	67	483	292	55.1	55.0	23.9	113.0	479	291	55.1	55.0	24.4	93.8	474	288	55.1	55.0	25.1	111.9
75	72	523	217	60.6	60.5	24.8	121.6	519	216	60.7	60.6	25.2	100.9	513	214	60.7	60.6	25.9	120.3
80	62	469	447	48.7	48.6	23.7	110.1	467	446	48.8	48.7	24.2	91.5	461	443	48.8	48.7	24.9	109.2
80	67	490	368	54.6	54.5	24.1	114.4	487	367	54.7	54.6	24.6	95.1	480	364	54.7	54.6	25.3	113.3
80	72	524	290	60.4	60.3	24.8	121.7	520	289	60.5	60.4	25.3	101.0	513	287	60.5	60.4	25.9	120.3
85	62	494	494	50.2	48.1	24.2	115.4	491	491	50.4	48.2	24.7	95.8	485	485	50.4	48.2	25.4	114.4
85	67	505	445	54.1	54.0	24.4	117.7	501	443	54.2	54.1	24.9	97.7	495	441	54.2	54.1	25.6	116.5
85	72	527	365	60.0	59.9	24.9	122.4	523	364	60.1	60.0	25.3	101.6	517	361	60.1	60.0	26.0	121.1

HIGH EFFICIENCY - AIR FLOW 13,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	443	365	49.6	49.5	25.1	88.1	437	362	49.8	49.7	25.9	105.1	434	360	50.0	49.9	26.4	87.3
75	67	470	287	55.4	55.3	25.6	92.8	463	284	55.6	55.5	26.4	110.7	459	283	55.7	55.6	26.9	91.8
75	72	509	212	61.0	60.9	26.4	99.8	501	210	61.1	61.0	27.2	118.8	497	208	61.2	61.1	27.7	98.6
80	62	457	441	49.2	49.1	25.4	90.7	451	438	49.4	49.3	26.2	108.1	448	437	49.4	49.3	26.8	89.9
80	67	477	362	55.0	54.9	25.8	94.1	470	360	55.2	55.1	26.6	112.2	467	358	55.3	55.2	27.1	93.2
80	72	509	285	60.7	60.6	26.4	99.9	503	283	60.9	60.8	27.2	119.1	498	281	61.0	60.9	27.7	98.7
85	62	482	482	51.1	48.4	25.9	95.1	477	477	51.4	48.6	26.7	113.6	473	473	51.7	48.7	27.3	94.4
85	67	492	439	54.5	54.4	26.1	96.8	485	436	54.7	54.6	26.9	115.4	482	435	54.8	54.7	27.4	95.8
85	72	513	360	60.4	60.3	26.5	100.5	506	357	60.6	60.5	27.3	119.9	502	356	60.6	60.5	27.8	99.5

NOTE: EDB-entering dry bulb temp, EWB-entering wet bulb temp, EWT-entering water temp, LWT-leaving water temp, LDB-leaving dry bulb temp, LWB-leaving wet bulb temp, TMBH-total capacity, SMBH-sensible capacity.

Cooling Performance Data (Cont'd)

TABLE 12 - LSW_050

AIR FLOW 20,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	572	503	52.2	51.9	28.4	133.7	567	500	52.3	52.0	29.0	111.0	560	497	52.4	52.2	29.9	132.5
75	67	607	392	57.6	57.5	28.8	141.0	601	390	57.7	57.6	29.4	117.0	593	387	57.8	57.7	30.3	139.3
75	72	656	279	62.9	62.9	29.5	151.3	651	277	63.0	63.0	30.0	125.5	642	274	63.1	63.1	30.9	149.4
80	62	596	596	52.8	51.4	28.6	138.7	592	592	53.0	51.5	29.2	115.3	586	586	53.3	51.6	30.1	137.7
80	67	613	503	57.4	57.3	28.9	142.2	608	501	57.5	57.4	29.5	118.1	601	497	57.6	57.5	30.4	140.9
80	72	657	389	62.9	62.8	29.5	151.6	651	387	63.0	62.9	30.1	125.6	642	384	63.1	63.0	31.0	149.6
85	62	632	632	56.1	50.7	29.0	146.1	627	627	56.3	50.8	29.6	121.3	620	620	56.6	50.9	30.5	144.9
85	67	637	604	57.6	56.9	29.1	147.3	632	602	57.7	56.9	29.7	122.2	624	598	57.8	57.1	30.6	145.6
85	72	659	499	62.8	62.7	29.5	151.9	653	497	62.8	62.7	30.1	125.9	644	494	63.0	62.9	31.0	150.0

AIR FLOW 20,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	555	494	52.6	52.3	30.5	109.9	548	490	52.7	52.4	31.5	131.2	543	488	52.8	52.5	32.1	108.8
75	67	588	385	57.9	57.8	30.9	115.6	580	381	58.0	58.0	31.9	137.7	574	379	58.2	58.1	32.5	114.2
75	72	636	272	63.3	63.2	31.6	124.0	627	269	63.4	63.3	32.5	147.5	622	267	63.5	63.4	33.1	122.4
80	62	581	581	53.5	51.7	30.7	114.4	574	574	53.8	51.9	31.8	136.5	570	570	54.0	51.9	32.4	113.4
80	67	596	495	57.7	57.6	31.0	117.0	589	492	57.8	57.7	32.0	139.7	584	490	57.9	57.8	32.7	115.9
80	72	638	382	63.2	63.1	31.5	124.2	628	379	63.3	63.2	32.5	147.8	622	377	63.4	63.3	33.1	122.5
85	62	616	616	56.8	51.0	31.1	120.4	608	608	57.2	51.2	32.1	143.5	604	604	57.4	51.2	32.8	119.3
85	67	619	595	58.0	57.2	31.2	120.9	611	591	58.2	57.3	32.2	144.3	607	589	58.2	57.4	32.8	119.8
85	72	639	492	63.1	63.0	31.5	124.5	630	489	63.2	63.1	32.5	148.3	625	487	63.3	63.2	33.2	123.1

HIGH EFFICIENCY - AIR FLOW 16,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	569	462	48.9	48.8	28.3	133.2	565	460	49.0	48.9	28.9	110.7	558	457	49.2	49.1	29.8	132.0
75	67	612	367	54.7	54.6	28.9	142.0	607	365	54.8	54.7	29.5	117.9	599	362	54.9	54.8	30.3	140.5
75	72	664	275	60.2	60.1	29.5	152.9	658	273	60.3	60.2	30.1	126.7	649	269	60.5	60.4	31.0	150.9
80	62	592	557	48.4	48.3	28.5	137.8	587	555	48.5	48.4	29.1	114.3	579	551	48.7	48.6	30.0	136.3
80	67	615	459	54.3	54.2	28.9	142.7	609	457	54.4	54.3	29.5	118.3	602	454	54.5	54.4	30.4	141.1
80	72	664	365	60.0	59.9	29.5	153.0	658	363	60.1	60.0	30.1	126.8	650	360	60.2	60.1	31.0	151.1
85	62	621	621	49.5	47.7	28.8	143.9	617	617	49.7	47.8	29.4	119.5	610	610	50.1	48.0	30.3	142.7
85	67	634	554	53.7	53.6	29.1	146.7	629	552	53.8	53.7	29.6	121.8	622	549	54.0	53.9	30.5	145.3
85	72	666	456	59.7	59.6	29.6	153.3	660	454	59.8	59.7	30.1	127.2	652	451	59.9	59.8	31.0	151.5

HIGH EFFICIENCY - AIR FLOW 16,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	553	454	49.4	49.3	30.5	109.6	546	451	49.5	49.4	31.4	130.8	542	449	49.6	49.5	32.1	108.5
75	67	593	359	55.1	55.0	30.9	116.4	585	356	55.3	55.2	31.9	138.8	579	354	55.4	55.3	32.6	115.0
75	72	644	268	60.6	60.5	31.6	125.2	634	264	60.8	60.7	32.5	148.9	628	262	60.9	60.8	33.2	123.5
80	62	574	549	48.8	48.7	30.6	113.2	567	545	49.0	48.9	31.6	134.9	562	542	49.2	49.1	32.3	112.0
80	67	597	452	54.7	54.6	31.0	117.1	588	448	54.9	54.8	32.0	139.4	582	446	55.0	54.9	32.6	115.6
80	72	644	358	60.3	60.2	31.6	125.4	635	354	60.6	60.5	32.5	149.2	629	352	60.7	60.6	33.2	123.7
85	62	606	606	50.4	48.1	31.0	118.5	598	598	50.8	48.3	31.9	141.4	594	594	51.0	48.4	32.6	117.5
85	67	617	546	54.2	54.1	31.1	120.6	609	543	54.3	54.2	32.1	143.7	604	540	54.5	54.4	32.8	119.3
85	72	646	449	60.0	59.9	31.6	125.6	637	446	60.2	60.1	32.6	149.6	630	443	60.4	60.3	33.2	123.9

NOTE: EDB-entering dry bulb temp, EWB-entering wet bulb temp, EWT-entering water temp, LWT-leaving water temp, LDB-leaving dry bulb temp, LWB-leaving wet bulb temp, TMBH-total capacity, SMBH-sensible capacity.

TABLE 13 - LSW_060

AIR FLOW 24,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	677	601	52.3	52.1	35.0	159.3	672	598	52.4	52.2	35.7	132.3	664	594	52.5	52.3	36.8	157.9
75	67	718	467	57.7	57.6	35.8	168.1	713	465	57.8	57.7	36.5	139.5	704	462	57.9	57.8	37.5	166.3
75	72	775	331	63.1	63.0	37.0	180.3	769	329	63.2	63.1	37.7	149.6	760	326	63.3	63.2	38.7	178.4
80	62	707	707	53.1	51.6	35.6	165.8	704	704	53.2	51.6	36.3	137.9	696	696	53.5	51.7	37.4	164.8
80	67	725	601	57.5	57.4	35.9	169.4	719	599	57.6	57.5	36.6	140.6	711	596	57.7	57.6	37.7	167.9
80	72	777	464	63.0	62.9	37.0	180.6	771	461	63.1	63.0	37.7	149.9	762	458	63.2	63.1	38.7	178.8
85	62	750	750	56.4	50.8	36.5	174.8	745	745	56.6	50.9	37.1	145.2	737	737	56.9	51.0	38.2	173.4
85	67	755	720	57.8	57.0	36.5	175.8	748	717	57.9	57.1	37.3	145.9	741	713	58.0	57.2	38.3	174.3
85	72	780	597	62.8	62.7	37.1	181.2	773	595	62.9	62.8	37.8	150.4	764	591	63.0	62.9	38.8	179.3

AIR FLOW 24,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	659	591	52.6	52.4	37.6	131.1	650	587	52.8	52.5	38.7	156.5	645	584	52.9	52.6	39.6	130.1
75	67	698	459	58.0	57.9	38.3	138.0	688	455	58.2	58.1	39.4	164.5	682	453	58.2	58.1	40.2	136.5
75	72	754	324	63.4	63.3	39.4	148.1	744	320	63.5	63.4	40.6	176.5	737	318	63.6	63.5	41.3	146.4
80	62	691	691	53.7	51.8	38.2	136.8	683	683	54.0	51.9	39.4	163.4	677	677	54.2	52.0	40.2	135.7
80	67	706	593	57.8	57.7	38.4	139.5	697	589	57.9	57.8	39.6	166.4	692	587	58.0	57.9	40.4	138.2
80	72	756	456	63.3	63.2	39.4	148.4	746	452	63.4	63.3	40.6	176.8	738	450	63.5	63.4	41.4	146.6
85	62	732	732	57.1	51.1	39.0	144.1	723	723	57.4	51.3	40.2	172.0	718	718	57.6	51.4	41.0	142.9
85	67	735	710	58.1	57.3	39.0	144.8	726	705	58.3	57.4	40.2	172.7	720	702	58.4	57.5	41.0	143.4
85	72	758	589	63.1	63.0	39.5	148.8	748	586	63.2	63.1	40.7	177.4	742	584	63.3	63.2	41.5	147.3

HIGH EFFICIENCY - AIR FLOW 19,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	670	547	49.0	48.9	34.9	157.9	665	544	49.1	49.0	35.6	131.0	657	541	49.3	49.2	36.6	156.5
75	67	722	435	54.7	54.6	35.9	168.9	716	432	54.8	54.7	36.6	140.2	708	429	55.0	54.9	37.6	167.3
75	72	782	324	60.3	60.2	37.1	181.8	777	322	60.4	60.3	37.8	150.9	766	319	60.5	60.4	38.8	179.8
80	62	697	659	48.5	48.4	35.4	163.5	691	656	48.6	48.5	36.1	135.7	684	653	48.8	48.7	37.2	162.1
80	67	726	544	54.3	54.2	35.9	169.7	720	542	54.4	54.3	36.6	140.9	712	544	54.3	54.2	37.7	168.2
80	72	783	432	60.0	59.9	37.2	182.0	777	430	60.1	60.0	37.8	151.0	768	426	60.3	60.2	38.9	180.1
85	62	732	732	49.8	47.8	36.1	171.1	727	727	50.0	48.0	36.8	142.1	720	720	50.3	48.1	37.9	169.8
85	67	746	656	53.8	53.7	36.4	174.0	741	654	53.9	53.8	37.1	144.5	732	650	54.1	54.0	38.1	172.5
85	72	784	540	59.7	59.6	37.2	182.1	778	538	59.8	59.7	37.8	151.2	768	534	60.0	59.9	38.8	180.2

HIGH EFFICIENCY - AIR FLOW 19,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	651	538	49.4	49.3	37.4	129.8	643	534	49.6	49.5	38.6	155.0	638	532	49.7	49.6	39.4	128.7
75	67	702	426	55.1	55.0	38.4	138.9	693	422	55.3	55.2	39.5	165.5	686	420	55.4	55.3	40.3	137.2
75	72	760	316	60.7	60.6	39.5	149.2	750	313	60.8	60.7	40.7	177.8	744	310	61.0	60.9	41.5	147.6
80	62	679	650	48.9	48.8	37.9	134.7	670	646	49.1	49.0	39.1	160.7	664	643	49.2	49.1	40.0	133.4
80	67	705	535	54.7	54.6	38.4	139.4	695	531	54.9	54.8	39.6	166.1	688	529	55.0	54.9	40.4	137.7
80	72	761	424	60.4	60.3	39.6	149.4	751	420	60.6	60.5	40.7	178.0	744	417	60.7	60.6	41.5	147.7
85	62	715	715	50.6	48.2	38.6	141.1	707	707	51.0	48.4	39.9	168.5	701	701	51.2	48.5	40.7	140.1
85	67	726	647	54.2	54.1	38.9	143.1	718	643	54.4	54.3	40.0	170.8	712	641	54.5	54.4	40.8	142.0
85	72	762	532	60.1	60.0	39.6	149.5	751	528	60.3	60.2	40.7	178.1	746	526	60.4	60.3	41.6	148.0

NOTE: EDB-entering dry bulb temp, EWB-entering wet bulb temp, EWT-entering water temp, LWT-leaving water temp, LDB-leaving dry bulb temp, LWB-leaving wet bulb temp, TMBH-total capacity, SMBH-sensible capacity.

Cooling Performance Data (Cont'd)

TABLE 14 - LSW_070

AIR FLOW 28,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	803.8	693.4	52.5	51.9	42.7	189.9	798.1	690.4	52.6	52.0	43.6	157.8	788	685.3	52.8	52.1	45.0	188.3
75	67	856.6	542.8	57.7	57.4	43.5	201.0	849.3	539.9	57.8	57.5	44.3	166.8	839	535.8	57.9	57.6	45.7	199.0
75	72	926	389.9	62.9	62.8	44.6	215.7	918.7	387.3	63.0	62.9	45.4	179.0	908.4	383.7	63.1	63.0	46.7	213.6
80	62	831.1	821.8	53.2	51.5	43.3	195.7	825.6	818.4	53.3	51.5	44.1	162.7	816.3	811.5	53.5	51.7	45.5	194.3
80	67	861	690.4	57.8	57.3	43.6	202.0	855.9	688.6	57.8	57.4	44.5	167.9	845.5	684	58.0	57.5	45.8	200.4
80	72	928.4	538.3	63.0	62.7	44.7	216.2	920.4	535.4	63.1	62.8	45.5	179.3	910.2	531.8	63.2	62.9	46.8	214.0
85	62	879.9	879.9	56.2	50.8	44.1	206.1	874	874	56.4	50.8	44.9	171.2	865.1	865.1	56.7	51.0	46.3	204.6
85	67	891.2	828	58.2	56.9	44.2	208.4	884.5	824.6	58.3	57.0	45.1	173.0	874.6	819.5	58.5	57.1	46.4	206.6
85	72	929.9	685.6	63.1	62.7	44.7	216.5	923.7	683.3	63.2	62.7	45.5	179.8	911.1	678.5	63.3	62.9	46.8	214.1

AIR FLOW 28,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	782.4	682.3	52.9	52.2	45.9	156.5	772.3	677.1	53.0	52.3	47.4	186.8	765.7	673.7	53.1	52.4	48.3	155.1
75	67	832.6	533.3	58.0	57.7	46.5	165.2	820.8	528.7	58.1	57.9	48.0	196.9	813.5	525.8	58.2	58.0	48.9	163.4
75	72	900.4	380.9	63.2	63.1	47.6	177.1	887.5	376.3	63.4	63.2	49.0	210.9	881	374.1	63.4	63.3	50.0	175.3
80	62	810.9	807.9	53.7	51.8	46.4	161.5	801.7	800.8	53.9	51.9	47.9	193.0	795.3	795.1	54.1	52.0	48.9	160.3
80	67	838.6	681	58.1	57.6	46.7	166.3	829.1	677.1	58.2	57.7	48.1	198.7	821.9	673.7	58.3	57.8	49.1	164.9
80	72	902.3	528.9	63.3	63.0	47.7	177.5	891.1	524.9	63.4	63.1	49.1	211.7	883.1	522.1	63.5	63.2	50.0	175.6
85	62	859.2	859.2	56.9	51.1	47.2	170.0	850.3	850.3	57.2	51.2	48.6	203.2	844.1	844.1	57.4	51.3	49.6	168.9
85	67	867.8	816	58.5	57.2	47.3	171.5	857.9	810.8	58.7	57.3	48.7	204.8	851.2	807.3	58.8	57.4	49.7	170.1
85	72	904.8	676.1	63.4	62.9	47.7	177.9	892.6	671.6	63.5	63.1	49.1	212.0	883.8	668.3	63.6	63.2	50.2	175.8

HIGH EFFICIENCY - AIR FLOW 23,400 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	822.6	666.5	49.3	49.2	43.0	193.9	815.7	663.1	49.4	49.3	43.9	160.9	806.2	658.5	49.6	49.5	45.3	192.1
75	67	879.6	528.8	54.9	54.8	43.9	205.9	873.3	526.2	55.1	55.0	44.7	171.0	860.7	521.1	55.2	55.1	46.1	203.6
75	72	954.6	395.2	60.5	60.4	45.1	221.7	946.1	392	60.6	60.5	46.0	183.8	933.8	387.6	60.7	60.6	47.3	219.0
80	62	849.1	799.5	48.8	48.8	43.6	199.6	842.7	796.1	49.0	48.9	44.5	165.8	833.5	791.3	49.2	49.1	45.8	198.0
80	67	885.2	662	54.6	54.5	44.0	207.1	878.5	659.2	54.7	54.6	44.8	171.9	867.7	654.8	54.9	54.8	46.2	205.1
80	72	956.5	526.1	60.3	60.2	45.2	222.1	948.1	523	60.4	60.3	46.0	184.2	935.6	518.4	60.6	60.5	47.3	219.4
85	62	891.9	891.9	50.1	48.0	44.4	208.7	885.8	885.8	50.4	48.1	45.2	173.3	876.9	876.9	50.7	48.3	46.5	207.1
85	67	913.4	796.6	54.2	54.1	44.7	213.1	906.1	793.2	54.4	54.3	45.5	176.9	896.9	789.1	54.5	54.4	46.8	211.3
85	72	958.5	658.1	60.0	59.9	45.3	222.6	950.4	655.1	60.1	60.0	46.1	184.6	938.7	650.7	60.3	60.2	47.3	220.0

HIGH EFFICIENCY - AIR FLOW 23,400 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	799.5	655.3	49.7	49.6	46.2	159.5	789.8	650.6	49.9	49.8	47.7	190.5	783	647.2	50.0	49.9	48.6	158.1
75	67	854.3	518.5	55.3	55.2	46.9	169.1	842.9	513.8	55.5	55.4	48.4	201.6	835.3	510.8	55.6	55.5	49.3	167.3
75	72	925.6	384.6	60.8	60.7	48.1	181.6	913.3	380.1	61.0	60.9	49.5	216.4	904.7	376.9	61.1	61.0	50.5	179.5
80	62	827.7	788.6	49.3	49.2	46.8	164.5	816.9	782.9	49.5	49.4	48.2	196.3	810.9	779.7	49.6	49.5	49.2	163.1
80	67	861.6	652.2	55.0	54.9	47.1	170.4	850.3	647.5	55.2	55.1	48.5	203.2	842.9	644.5	55.3	55.2	49.6	168.7
80	72	928.2	515.6	60.6	60.5	48.1	182.1	916.2	511.2	60.8	60.7	49.5	217.0	907.3	507.9	60.9	60.8	50.5	179.9
85	62	870.9	870.9	50.9	48.4	47.5	172.1	860.6	860.6	51.3	48.6	48.9	205.5	854.6	854.6	51.6	48.7	49.9	170.8
85	67	889.8	785.8	54.7	54.6	47.7	175.4	879.1	780.9	54.8	54.7	49.1	209.4	871.8	777.6	55.0	54.9	50.1	173.8
85	72	932.4	648.6	60.3	60.2	48.2	182.8	919.6	643.7	60.5	60.4	49.6	217.8	911.5	640.7	60.6	60.5	50.6	180.7

NOTE: EDB-entering dry bulb temp, EWB-entering wet bulb temp, EWT-entering water temp, LWT-leaving water temp, LDB-leaving dry bulb temp, LWB-leaving wet bulb temp, TMBH-total capacity, SMBH-sensible capacity.

TABLE 15 - LSW_080

AIR FLOW 32,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	901.4	798.5	52.3	52.1	46.6	212.1	894.4	795.2	52.4	52.2	47.6	176.1	884.5	790.4	52.6	52.3	49.0	210.4
75	67	954.7	619	57.7	57.7	47.6	223.5	947	616.1	57.8	57.8	48.6	185.4	935.5	611.5	57.9	57.9	50.0	221.2
75	72	1032	439.7	63.1	63.1	49.2	239.9	1023	436.7	63.3	63.2	50.1	199.0	1010	432.2	63.3	63.3	51.5	237.2
80	62	940.3	940.3	53.2	51.6	47.4	220.4	933.5	933.5	53.4	51.7	48.4	183.1	924	924	53.6	51.8	49.8	218.8
80	67	970.5	796.4	57.6	57.4	48.0	226.8	963	793	57.6	57.5	48.9	188.3	952	788.1	57.8	57.6	50.3	224.7
80	72	1033	614.2	63.0	63.0	49.3	240.2	1026	611.5	63.1	63.1	50.2	199.4	1013	606.9	63.2	63.2	51.6	237.7
85	62	995.5	995.5	56.5	50.9	48.5	232.2	988	988	56.8	51.0	49.5	192.8	978	978	57.0	51.1	50.9	230.4
85	67	998.4	963.7	57.6	57.1	48.6	232.8	993.3	962	57.7	57.1	49.5	193.7	981.7	955.9	57.9	57.3	51.0	231.1
85	72	1041	790.9	62.9	62.9	49.4	241.8	1032	787.6	62.9	62.9	50.3	200.6	1021	783.6	63.1	63.0	51.8	239.4

AIR FLOW 32,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	877.5	787.1	52.7	52.4	50.1	174.7	866.4	781.9	52.8	52.5	51.6	208.5	859.4	778.6	52.9	52.6	52.7	173.2
75	67	927.8	608.5	58.0	58.0	50.9	183.6	916.1	603.9	58.1	58.1	52.5	219.0	907.4	600.6	58.2	58.2	53.6	181.7
75	72	1002	429.3	63.4	63.4	52.5	196.8	989.3	424.9	63.6	63.5	54.0	234.7	980.8	421.9	63.6	63.6	55.0	194.8
80	62	917.3	917.3	53.8	51.9	50.8	181.8	908	908	54.1	52.0	52.4	217.4	900.4	900.4	54.3	52.1	53.5	180.5
80	67	944.7	785	57.9	57.7	51.3	186.7	932.5	779.6	58.0	57.9	52.9	222.6	924.5	776	58.1	57.9	54.0	184.8
80	72	1005	604.2	63.3	63.3	52.5	197.4	991.2	599.3	63.4	63.4	54.1	235.1	982.8	596.3	63.5	63.5	55.1	195.1
85	62	972.1	972.1	57.2	51.2	51.9	191.5	960.4	960.4	57.6	51.3	53.5	228.6	954.5	954.5	57.7	51.4	54.5	190.1
85	67	974.5	952	58.0	57.3	52.0	192.0	963.4	946.7	58.1	57.5	53.5	229.2	956	942.4	58.2	57.5	54.6	190.4
85	72	1013	780.8	63.1	63.1	52.7	198.9	999.5	775.7	63.3	63.3	54.2	236.9	993.4	773.6	63.3	63.3	55.3	197.0

HIGH EFFICIENCY - AIR FLOW 26,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	901.4	798.5	47.2	47.1	46.6	212.1	894.4	795.2	47.3	47.2	47.6	176.1	884.5	790.4	47.5	47.4	49.0	210.4
75	67	954.7	619	53.8	53.7	47.6	223.5	947	616.1	53.9	53.8	48.6	185.4	935.5	611.5	54.0	53.9	50.0	221.2
75	72	1032	439.7	60.4	60.3	49.2	239.9	1023	436.7	60.5	60.4	50.1	199.0	1010	432.2	60.7	60.6	51.5	237.2
80	62	940.3	940.3	47.1	47.0	47.4	220.4	933.5	933.5	47.3	47.2	48.4	183.1	924	924	47.7	47.6	49.8	218.8
80	67	970.5	796.4	52.5	52.4	48.0	226.8	963	793	52.6	52.5	48.9	188.3	952	788.1	52.7	52.6	50.3	224.7
80	72	1033	614.2	59.2	59.1	49.3	240.2	1026	611.5	59.3	59.2	50.2	199.4	1013	606.9	59.4	59.3	51.6	237.7
85	62	995.5	995.5	50.0	47.9	48.5	232.2	988	988	50.2	48.1	49.5	192.8	978	978	50.6	48.2	50.9	230.4
85	67	998.4	963.7	51.4	51.3	48.6	232.8	993.3	962	51.5	51.4	49.5	193.7	981.7	955.9	51.7	51.6	51.0	231.1
85	72	1041	790.9	57.8	57.7	49.4	241.8	1032	787.6	57.9	57.8	50.3	200.6	1021	783.6	58.1	58.0	51.8	239.4

HIGH EFFICIENCY - AIR FLOW 26,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	877.5	787.1	47.6	47.5	50.1	174.7	866.4	781.9	47.8	47.7	51.6	208.5	859.4	778.6	47.9	47.8	52.7	173.2
75	67	927.8	608.5	54.1	54.0	50.9	183.6	916.1	603.9	54.3	54.2	52.5	219.0	907.4	600.6	54.4	54.3	53.6	181.7
75	72	1002	429.3	60.8	60.7	52.5	196.8	989.3	424.9	60.9	60.8	54.0	234.7	980.8	421.9	61.0	60.9	55.0	194.8
80	62	917.3	917.3	47.9	47.8	50.8	181.8	908	908	48.2	48.1	52.4	217.4	900.4	900.4	48.5	48.4	53.5	180.5
80	67	944.7	785	52.8	52.7	51.3	186.7	932.5	779.6	53.0	52.9	52.9	222.6	924.5	776	53.1	53.0	54.0	184.8
80	72	1005	604.2	59.5	59.4	52.5	197.4	991.2	599.3	59.7	59.6	54.1	235.1	982.8	596.3	59.8	59.7	55.1	195.1
85	62	972.1	972.1	50.8	48.3	51.9	191.5	960.4	960.4	51.2	48.5	53.5	228.6	954.5	954.5	51.4	48.6	54.5	190.1
85	67	974.5	952	51.8	51.7	52.0	192.0	963.4	946.7	52.0	51.9	53.5	229.2	956	942.4	52.2	52.1	54.6	190.4
85	72	1013	780.8	58.2	58.1	52.7	198.9	999.5	775.7	58.3	58.2	54.2	236.9	993.4	773.6	58.4	58.3	55.3	197.0

NOTE: EDB-entering dry bulb temp, EWB-entering wet bulb temp, EWT-entering water temp, LWT-leaving water temp, LDB-leaving dry bulb temp, LWB-leaving wet bulb temp, TMBH-total capacity, SMBH-sensible capacity.

Cooling Performance Data (Cont'd)

TABLE 16 - LSW_095

AIR FLOW 34,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	1092	909.3	50.7	50.6	58.7	258.5	1084	905.3	50.9	50.7	59.9	214.6	1068	898.2	51.0	50.8	61.8	255.8
75	67	1173	717	56.2	56.0	59.7	275.2	1163	713.2	56.3	56.2	60.8	228.5	1148	706.9	56.5	56.3	62.6	272.2
75	72	1271	528.3	61.5	61.5	60.7	295.7	1260	524.1	61.6	61.6	61.9	245.1	1242	518	61.8	61.7	63.7	292.0
80	62	1133	1085	50.9	50.0	59.2	267.0	1124	1080	51.0	50.1	60.4	221.7	1110	1073	51.2	50.3	62.2	264.4
80	67	1175	901.3	56.1	56.0	59.7	275.6	1165	897.2	56.2	56.1	60.8	228.7	1150	891.1	56.4	56.2	62.6	272.7
80	72	1272	711.6	61.5	61.4	60.8	295.8	1261	707.9	61.6	61.5	61.9	245.4	1244	701.6	61.8	61.7	63.7	292.3
85	62	1192	1192	52.9	49.3	59.8	279.2	1183	1183	53.2	49.4	61.1	231.9	1171	1171	53.5	49.5	62.9	277.1
85	67	1214	1088	56.0	55.5	60.1	283.8	1204	1083	56.1	55.6	61.2	235.6	1190	1075	56.3	55.7	63.1	281.0
85	72	1274	896.2	61.5	61.3	60.8	296.4	1263	892.1	61.6	61.4	62.0	245.7	1248	886.4	61.7	61.6	63.7	293.0

AIR FLOW 34,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	1060	894.2	51.1	50.9	63.0	212.4	1047	888.3	51.3	51.1	65.0	253.8	1037	883.4	51.4	51.2	66.3	210.5
75	67	1138	703	56.6	56.4	63.8	225.9	1121	696.5	56.7	56.6	65.8	269.2	1112	692.6	56.8	56.7	67.1	223.4
75	72	1232	514.3	61.9	61.8	64.9	242.3	1215	508.3	62.1	62.0	66.8	288.7	1205	504.6	62.1	62.1	68.1	239.5
80	62	1103	1069	51.3	50.4	63.5	219.9	1088	1061	51.5	50.6	65.4	262.3	1080	1056	51.7	50.6	66.7	217.9
80	67	1139	886.7	56.5	56.3	63.9	226.2	1123	880	56.7	56.5	65.8	269.6	1114	876.1	56.8	56.6	67.1	223.8
80	72	1233	697.7	61.9	61.8	64.9	242.5	1217	691.8	62.0	61.9	66.8	289.0	1206	687.9	62.1	62.0	68.0	239.8
85	62	1162	1162	53.7	49.6	64.1	230.1	1149	1149	54.1	49.8	66.1	275.0	1140	1140	54.3	49.9	67.4	228.3
85	67	1181	1071	56.4	55.8	64.3	233.4	1167	1063	56.6	56.0	66.2	278.5	1158	1059	56.7	56.1	67.5	231.4
85	72	1236	882	61.8	61.7	64.9	242.8	1219	876	62.0	61.8	66.8	289.4	1208	871.9	62.1	61.9	68.1	240.0

HIGH EFFICIENCY - AIR FLOW 27,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	1110	842.8	46.8	46.7	59.0	262.3	1100	837.9	47.0	46.9	60.2	217.5	1087	831.7	47.2	47.1	62.0	259.6
75	67	1193	683.6	52.5	52.4	59.9	279.5	1183	679.1	52.7	52.6	61.0	231.8	1166	672.3	52.9	52.8	62.8	276.1
75	72	1295	529.3	58.0	58.0	61.1	300.7	1285	525.2	58.1	58.1	62.2	249.5	1267	518.4	58.4	58.4	64.0	297.0
80	62	1141	1005	46.2	46.1	59.3	268.7	1133	1000	46.4	46.3	60.5	223.2	1119	993.4	46.6	46.5	62.3	266.2
80	67	1200	837.1	52.2	52.1	59.9	280.9	1189	832.5	52.4	52.3	61.1	233.0	1177	827.2	52.6	52.5	62.9	278.3
80	72	1298	680	57.9	57.8	61.1	301.3	1287	676	58.0	57.9	62.2	250.0	1269	669	58.3	58.2	64.0	297.5
85	62	1187	1167	45.6	45.5	59.8	278.2	1178	1162	45.7	45.6	61.0	231.0	1164	1154	45.9	45.9	62.8	275.6
85	67	1224	996.8	51.7	51.6	60.3	285.9	1216	993.2	51.8	51.7	61.4	237.5	1201	986.6	52.0	51.9	63.2	283.3
85	72	1299	831.3	57.7	57.6	61.1	301.4	1288	827.2	57.8	57.7	62.3	250.1	1270	820.2	58.0	57.9	64.0	297.7

HIGH EFFICIENCY - AIR FLOW 27,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	1078	827.6	47.3	47.2	63.1	215.6	1063	820.6	47.6	47.5	65.1	257.1	1055	816.5	47.7	47.6	66.4	213.5
75	67	1157	668.3	53.1	53.0	64.0	229.2	1142	662.1	53.3	53.2	65.9	273.4	1131	657.6	53.4	53.3	67.2	226.8
75	72	1257	514.5	58.5	58.5	65.1	246.5	1238	507.5	58.8	58.7	67.0	293.4	1227	503	58.9	58.8	68.3	243.3
80	62	1111	989.3	46.7	46.6	63.6	221.3	1096	982	47.0	46.9	65.5	264.0	1088	978	47.1	47.0	66.8	219.4
80	67	1168	823.2	52.7	52.6	64.2	231.1	1152	816.5	52.9	52.8	66.1	275.5	1142	812.4	53.1	53.0	67.4	228.7
80	72	1259	665.1	58.4	58.3	65.2	246.9	1241	658.1	58.6	58.5	67.0	293.9	1229	653.6	58.7	58.6	68.3	243.7
85	62	1156	1149	46.1	46.0	64.0	229.1	1142	1140	46.4	46.2	66.0	273.5	1135	1134	46.6	46.3	67.3	227.4
85	67	1192	982.9	52.2	52.1	64.4	235.3	1175	975.5	52.4	52.3	66.3	280.3	1168	972.2	52.5	52.4	67.6	233.1
85	72	1260	816.1	58.2	58.1	65.2	247.0	1243	809.7	58.4	58.3	67.1	294.4	1230	804.6	58.5	58.4	68.3	243.8

NOTE: EDB-entering dry bulb temp, EWB-entering wet bulb temp, EWT-entering water temp, LWT-leaving water temp, LDB-leaving dry bulb temp, LWB-leaving wet bulb temp, TMBH-total capacity, SMBH-sensible capacity.

TABLE 17 - LSW_105

AIR FLOW 36,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	1214	991.3	50.0	49.9	67.5	288.9	1204	986.7	50.1	50.0	69.0	239.9	1189	979.6	50.3	50.2	71.2	286.3
75	67	1315	790	55.4	55.3	69.3	310.3	1306	786.1	55.5	55.4	70.7	257.8	1289	779.4	55.7	55.6	72.9	307.6
75	72	1422	588	60.8	60.8	71.3	333.1	1411	584	60.9	60.9	72.7	276.5	1394	578	61.1	61.1	74.8	329.8
80	62	1262	1197	49.7	49.3	68.4	299.0	1253	1192	49.8	49.4	69.8	248.6	1240	1185	50.0	49.6	72.0	297.0
80	67	1316	986.4	55.3	55.2	69.3	310.5	1307	982.6	55.4	55.3	70.7	258.1	1292	976.3	55.6	55.5	72.9	308.1
80	72	1424	783.3	60.8	60.7	71.3	333.5	1414	779.6	60.9	60.8	72.7	276.9	1396	773	61.1	61.0	74.8	330.3
85	62	1324	1324	51.4	48.6	69.4	312.2	1315	1315	51.6	48.7	70.9	259.5	1303	1303	51.9	48.8	73.1	310.5
85	67	1352	1193	55.0	54.8	69.9	318.0	1343	1189	55.1	54.9	71.3	264.3	1328	1182	55.2	55.1	73.6	315.7
85	72	1425	979.7	60.7	60.6	71.3	333.8	1415	975.7	60.8	60.7	72.7	277.1	1398	969.4	61.0	60.9	74.9	330.7

AIR FLOW 36,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	1180	975.6	50.4	50.3	72.7	238.0	1165	968.7	50.6	50.5	75.2	284.3	1164	968.9	50.6	50.5	77.0	237.8
75	67	1278	774.7	55.8	55.7	74.4	255.3	1261	768.1	56.0	55.9	76.8	304.6	1251	764.2	56.1	56.0	78.3	253.1
75	72	1383	573	61.2	61.1	76.3	273.9	1366	567	61.4	61.3	78.7	326.9	1354	563	61.4	61.4	80.2	271.3
80	62	1230	1181	50.1	49.7	73.6	246.9	1215	1173	50.3	49.9	76.1	294.8	1206	1168	50.4	50.0	77.6	245.2
80	67	1280	971.5	55.7	55.6	74.4	255.7	1264	964.8	55.9	55.8	76.8	305.1	1253	960.6	56.0	55.9	78.4	253.5
80	72	1385	768.9	61.1	61.1	76.4	274.2	1367	762.3	61.3	61.2	78.7	327.0	1356	758.4	61.4	61.3	80.3	271.6
85	62	1294	1294	52.1	48.9	74.7	258.1	1279	1279	52.5	49.1	77.2	308.5	1271	1271	52.7	49.2	78.7	256.6
85	67	1317	1177	55.4	55.2	75.1	262.2	1301	1169	55.6	55.3	77.6	313.2	1292	1165	55.7	55.4	79.2	260.3
85	72	1387	965.4	61.1	61.0	76.4	274.6	1369	958.7	61.2	61.1	78.7	327.5	1358	954.7	61.3	61.2	80.3	272.0

HIGH EFFICIENCY - AIR FLOW 28,000 CFM

EDB	EWB	EWT	80			LWT	90	EWT	80			LWT	92	EWT	85			LWT	95
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	1237	915.2	45.5	45.4	68.0	293.7	1227	910.7	45.7	45.6	69.4	244.0	1213	904	45.9	45.8	71.6	291.6
75	67	1332	749.6	51.3	51.2	69.6	313.8	1321	745.2	51.4	51.3	71.0	260.6	1305	738	51.6	51.5	73.2	310.9
75	72	1444	588	56.8	56.8	71.7	337.7	1433	583.7	56.9	56.9	73.1	280.4	1415	576.8	57.2	57.1	75.2	334.4
80	62	1263	1084	44.9	44.8	68.4	299.3	1255	1080	45.0	44.9	69.9	249.0	1242	1073	45.2	45.1	72.1	297.7
80	67	1334	907	51.0	50.9	69.6	314.3	1324	902.5	51.2	51.1	71.0	261.0	1306	892.5	51.5	51.4	73.2	311.1
80	72	1445	744	56.7	56.6	71.7	337.9	1435	740	56.8	56.7	73.1	280.7	1417	733	57.0	56.9	75.3	334.8
85	62	1312	1261	43.9	43.8	69.3	309.6	1302	1256	44.1	44.0	70.7	257.3	1288	1248	44.4	44.3	73.0	307.4
85	67	1361	1075	50.4	50.3	70.1	320.1	1351	1071	50.5	50.4	71.5	265.9	1336	1064	50.7	50.6	73.7	317.5
85	72	1448	902	56.4	56.3	71.7	338.5	1437	897.8	56.6	56.5	73.1	281.1	1419	890.5	56.8	56.7	75.3	335.1

HIGH EFFICIENCY - AIR FLOW 28,000 CFM

EDB	EWB	EWT	85			LWT	97	EWT	90			LWT	100	EWT	90			LWT	102
		TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM	TMBH	SMBH	LDB	LWB	COMP KW	WATER FLOW GPM
75	62	1204	899.4	46.0	45.9	73.2	242.3	1188	891.9	46.3	46.2	75.6	289.2	1178	887	46.4	46.3	77.2	240.2
75	67	1294	733.5	51.8	51.7	74.7	258.2	1277	726.1	52.0	51.9	77.1	308.1	1267	721.7	52.1	52.0	78.7	255.9
75	72	1405	572.7	57.2	57.2	76.7	277.7	1385	565.2	57.5	57.5	79.1	331.0	1374	560.7	57.7	57.6	80.6	274.8
80	62	1232	1068	45.4	45.3	73.7	247.3	1218	1061	45.6	45.5	76.1	295.6	1208	1056	45.8	45.7	77.8	245.6
80	67	1297	890.7	51.5	51.4	74.7	258.6	1279	883	51.8	51.7	77.1	308.4	1268	878.5	51.9	51.8	78.7	256.1
80	72	1406	728.9	57.2	57.1	76.7	278.0	1387	721.2	57.4	57.3	79.1	331.3	1376	716.9	57.5	57.4	80.7	275.1
85	62	1279	1244	44.5	44.4	74.5	255.5	1263	1236	44.7	44.6	77.0	305.2	1254	1231	44.9	44.8	78.6	253.7
85	67	1325	1059	50.9	50.8	75.3	263.7	1308	1052	51.1	51.0	77.6	314.6	1298	1047	51.3	51.2	79.2	261.4
85	72	1407	886	56.9	56.8	76.8	278.2	1388	878.6	57.2	57.1	79.2	331.7	1378	874.5	57.3	57.2	80.7	275.5

NOTE: EDB-entering dry bulb temp, EWB-entering wet bulb temp, EWT-entering water temp, LWT-leaving water temp, LDB-leaving dry bulb temp, LWB-leaving wet bulb temp, TMBH-total capacity, SMBH-sensible capacity.

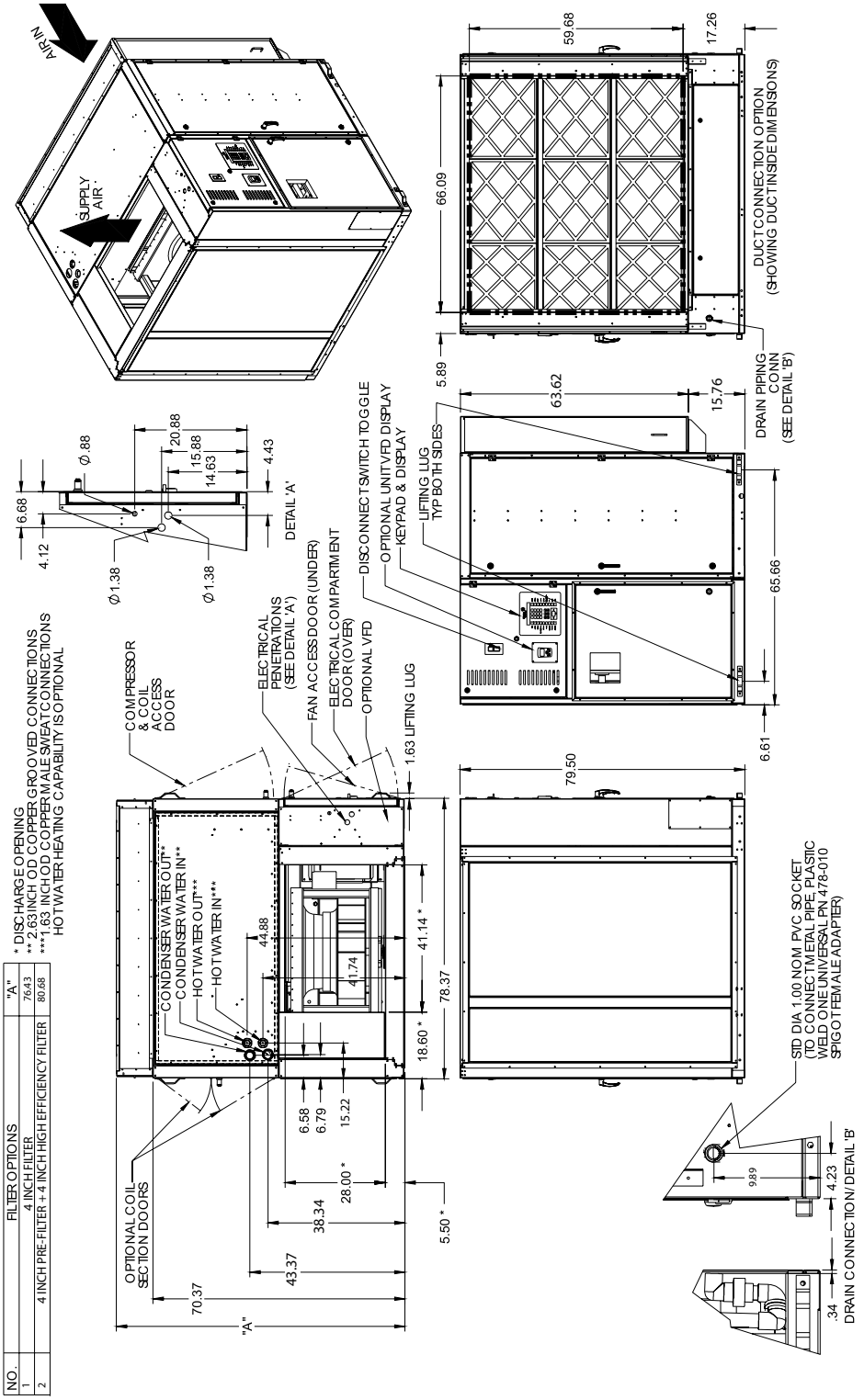
Cooling Performance Data (Cont'd)

TABLE 18 - WATERSIDE ECONOMIZER COIL

MODEL	AIR FLOW	LDB	LWB	TMBH	SMBH	WATER FLOW GPM
025	7,200	63.4	57.6	94.2	90.7	71.8
	8,850	64.3	58.0	104.0	102.1	71.8
	10,500	65.2	58.4	112.4	111.8	71.8
025 - HIGHEFF	6,300	62.7	57.3	88.0	83.6	73.3
	7,450	63.5	57.7	95.9	92.6	73.3
	8,600	64.2	58.0	102.8	100.6	73.3
032	9,000	63.4	57.6	117.9	113.5	92.8
	11,150	64.4	58.1	130.8	128.4	92.8
	13,300	65.2	58.4	141.7	141.0	92.8
032 - HIGHEFF	7,800	62.7	57.2	109.7	104.0	94.4
	9,400	63.6	57.7	120.6	116.5	94.4
	11,000	64.3	58.0	130.1	127.4	94.4
035	10,800	63.4	57.6	140.5	135.9	99.9
	13,150	64.3	58.0	154.4	151.9	99.9
	15,500	65.1	58.4	166.2	165.6	99.9
035 - HIGHEFF	9,400	62.7	57.3	131.2	125.2	101.3
	11,300	63.6	57.7	143.9	139.7	101.3
	13,200	64.3	58.1	154.8	152.4	101.3
040	10,800	63.4	57.6	141.6	136.2	113.0
	13,400	64.4	58.1	157.3	154.3	113.0
	16,000	65.2	58.4	170.3	169.4	113.0
040 - HIGHEFF	9,400	62.7	57.2	132.0	125.2	113.3
	11,300	63.6	57.7	144.9	140.0	113.3
	13,200	64.3	58.0	156.1	152.9	113.3
050	16,000	63.3	57.7	205.0	202.2	140.9
	18,000	63.9	57.9	216.9	215.9	140.9
	20,000	64.5	58.2	227.0	227.0	140.9
050 - HIGHEFF	14,100	62.7	57.4	192.7	188.0	141.1
	17,050	63.6	57.8	211.3	209.5	141.1
	20,000	64.5	58.2	227.1	227.1	141.1
060	16,000	63.3	57.6	208.1	203.4	167.9
	20,000	64.3	58.1	231.5	230.7	167.9
	24,000	65.4	58.5	249.2	249.2	167.9
060 - HIGHEFF	14,100	62.7	57.3	195.4	188.7	168.2
	17,050	63.6	57.7	214.6	211.0	168.2
	20,000	64.3	58.1	231.6	230.7	168.2
070	19,900	63.3	57.6	255.9	248.1	200.4
	24,850	64.4	58.1	284.7	281.4	200.4
	29,800	65.3	58.5	308.5	308.5	200.4
070 - HIGHEFF	19,900	63.4	57.6	252.7	247.0	168.7
	22,350	63.9	57.9	267.2	263.8	168.7
	24,800	64.4	58.1	280.2	278.8	168.7
080	22,600	63.3	57.6	294.7	286.1	224.7
	28,250	64.4	58.1	327.7	324.3	224.7
	33,900	65.3	58.5	354.9	354.9	224.7
080 - HIGHEFF	22,600	63.3	57.6	294.7	286.1	224.7
	25,400	63.9	57.9	312.0	306.0	224.7
	28,200	64.4	58.1	327.4	323.9	224.7
095	24,200	63.3	57.6	317.4	306.2	272.7
	30,150	64.3	58.1	353.4	347.9	272.7
	36,100	65.2	58.4	383.3	382.5	272.7
095 - HIGHEFF	24,200	63.3	57.6	317.8	306.2	278.3
	27,150	63.8	57.8	336.7	328.1	278.3
	30,100	64.3	58.0	353.5	347.7	278.3
105	24,200	63.3	57.5	319.5	306.4	308.1
	30,150	64.3	58.0	356.2	348.9	308.1
	36,100	65.2	58.4	386.9	384.7	308.1
105 - HIGHEFF	24,200	63.3	57.5	319.7	306.4	311.1
	27,150	63.8	57.8	338.9	328.6	311.1
	30,100	64.3	58.0	356.1	348.6	311.1

Dimensional Data

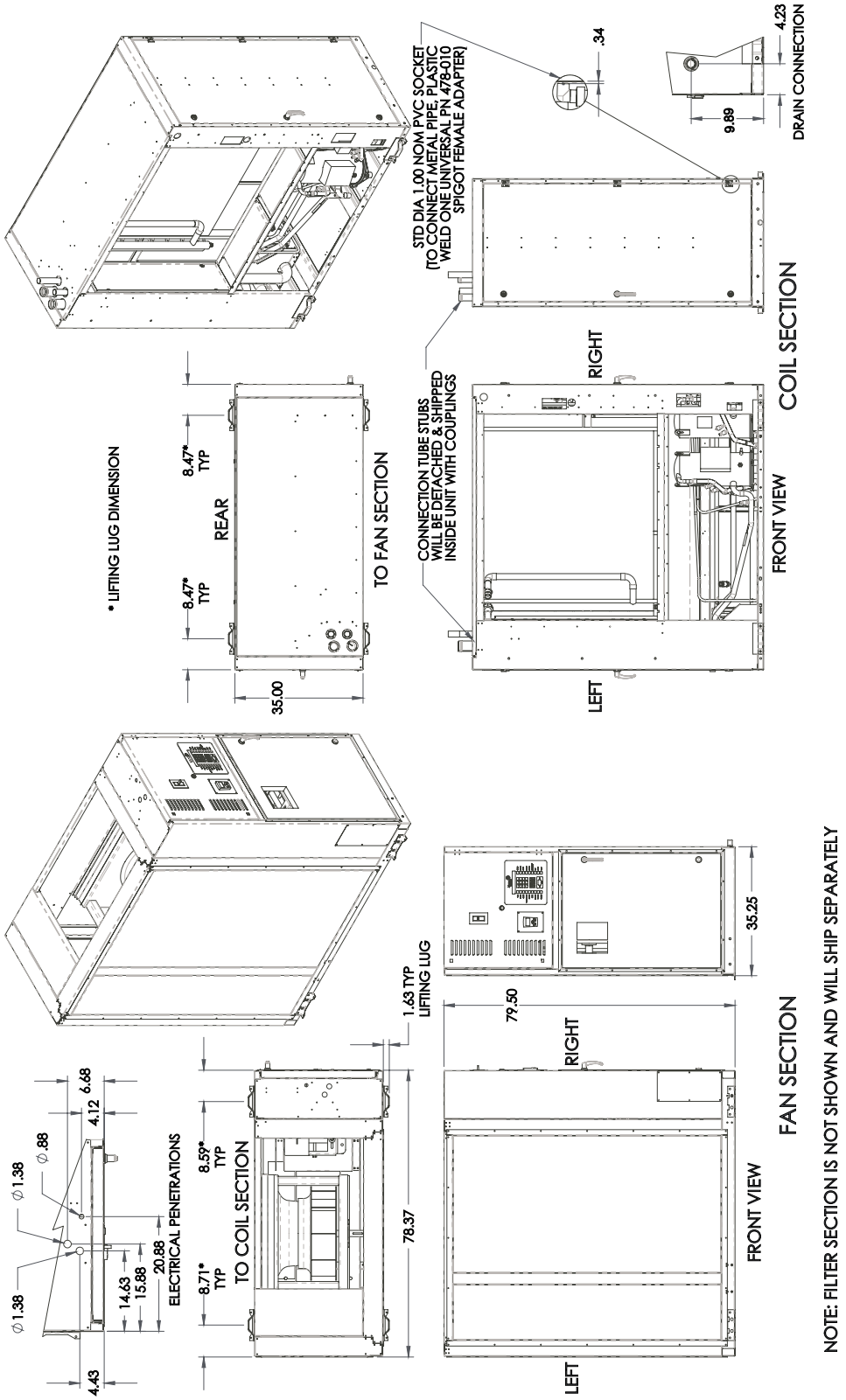
OVERVIEW OF COMBINED UNIT
LSW_025–040 MODELS



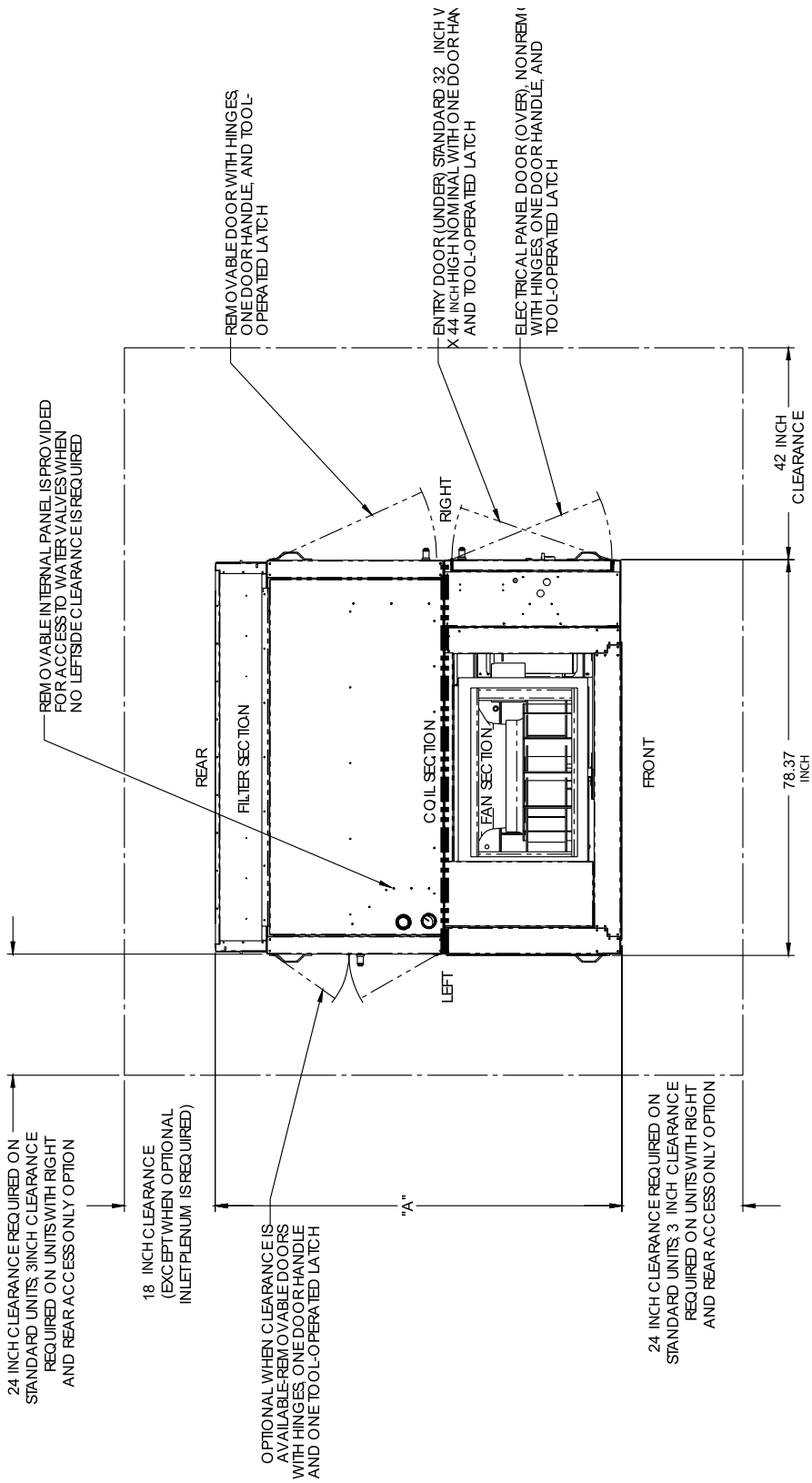
NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	76.43
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	80.68

Dimensional Data (Cont'd)

OVERVIEW OF SPLIT SHIPMENT
LSW_025–040 MODELS

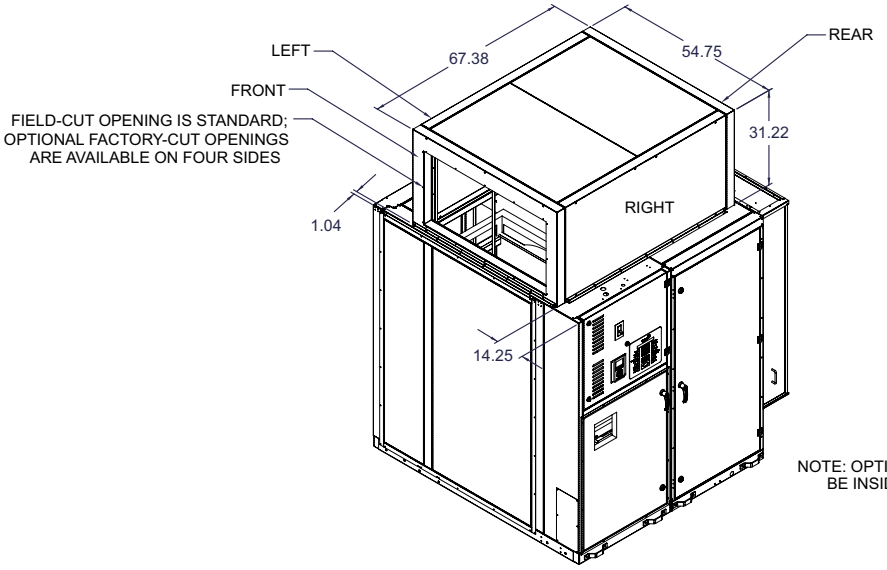


OVERVIEW OF SERVICE CLEARANCES
LSW_025–040 MODELS



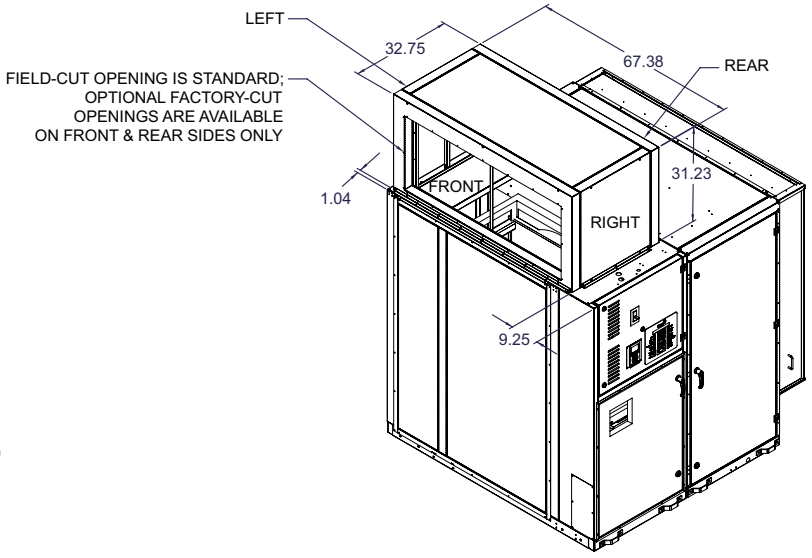
Dimensional Data (Cont'd)

PLENUM OPTIONS
LSW_025–040 MODELS

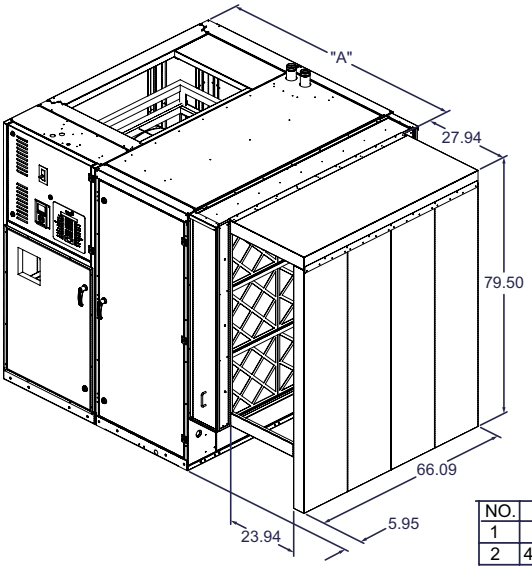


NOTE: OPTIONAL HOT WATER P
BE INSIDE FULL PLENUM

OPTIONAL FULL PLENUM



OPTIONAL HALF PLENUM
(POSITIONED OVER FAN SECTION ONLY)

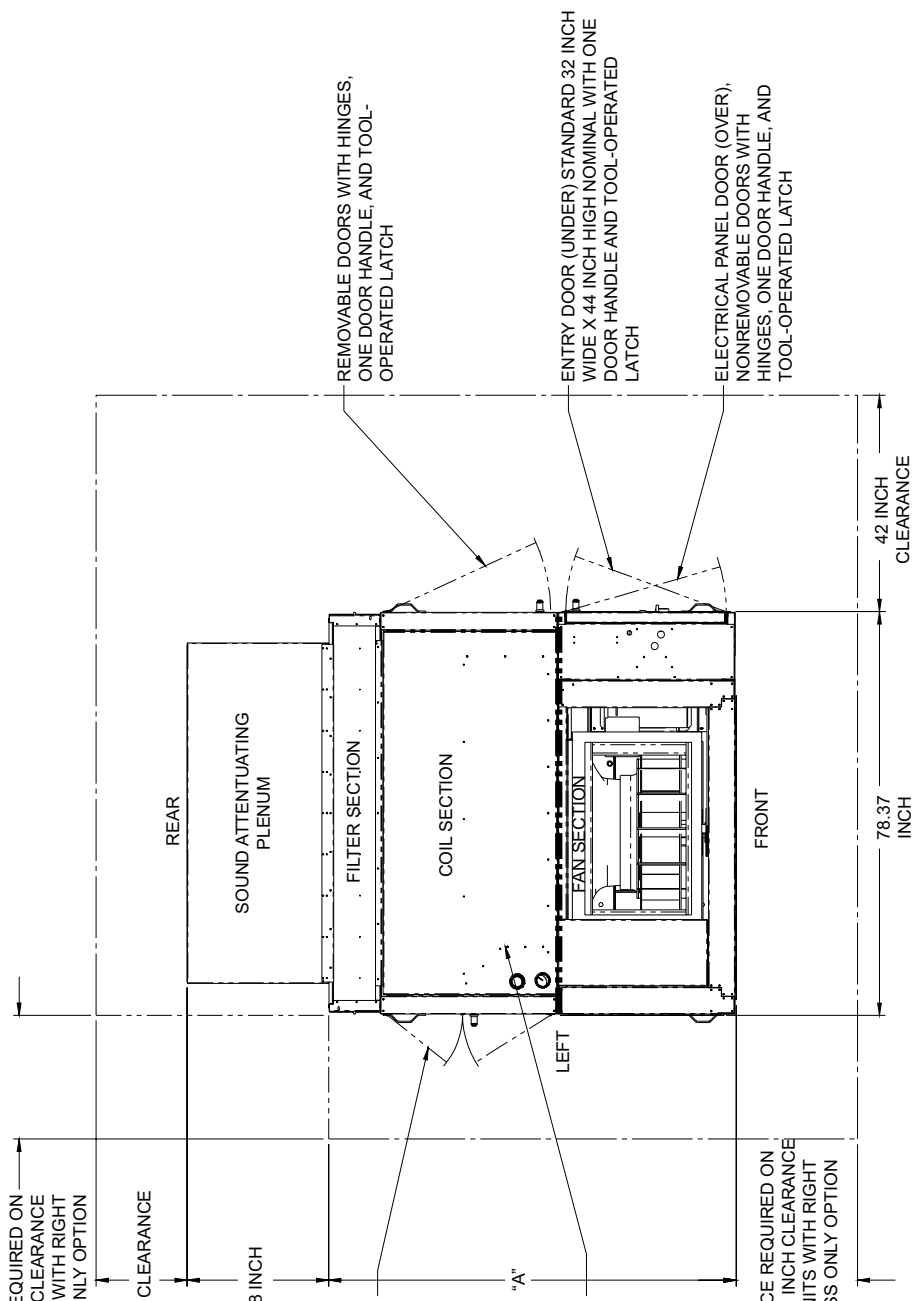


NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	76.43
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	80.68

OPTIONAL SOUND-ATTENUATING (INLET) PLENUM OPTION

NOTES:
1. SOUND-ATTENUATING PLENUM OPTION CAN BE COMBINED WITH ANY FILTER SECTION OPTION.
2. SOUND-ATTENUATING PLENUM SHIPS SEPARATELY FROM BASE UNIT SEGMENT(S).
3. OPTION IS NOT AVAILABLE WITH DUCTED CONNECTIONS.
4. WITH THIS OPTION THE TOP ROW OF FILTERS CAN ONLY BE REMOVED FROM THE END OF THE FILTER RACK.

SOUND ATTENUATING PLENUM SERVICE CLEARANCE
LSW_025–040 MODELS



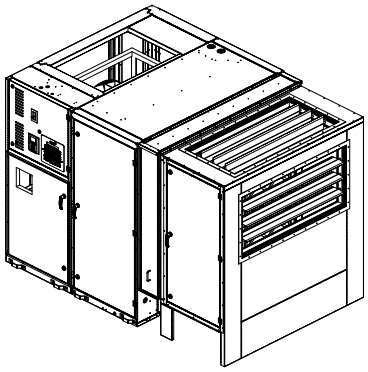
NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	76.43
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	80.68

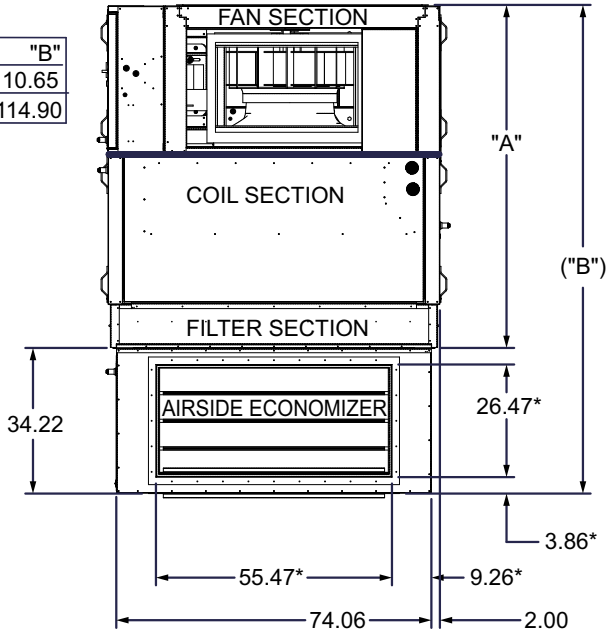
Dimensional Data (Cont'd)

AIRSIDE ECONOMIZER OPTION
LSW_025–040 MODELS

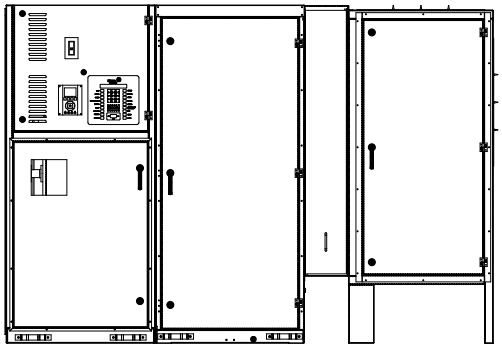
NO.	FILTER OPTIONS	"A"	"B"
1	4 INCH FILTER	76.43	110.65
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	80.68	114.90

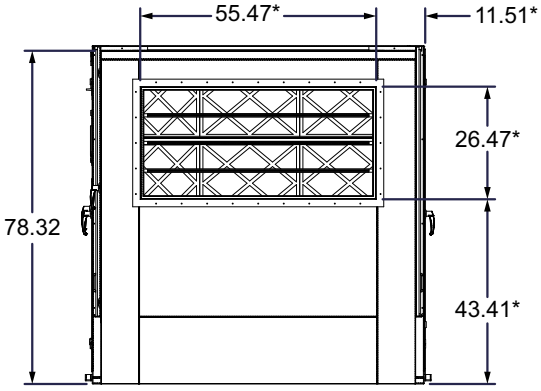
*MINIMUM INTERIOR DUCT DIMENSIONS



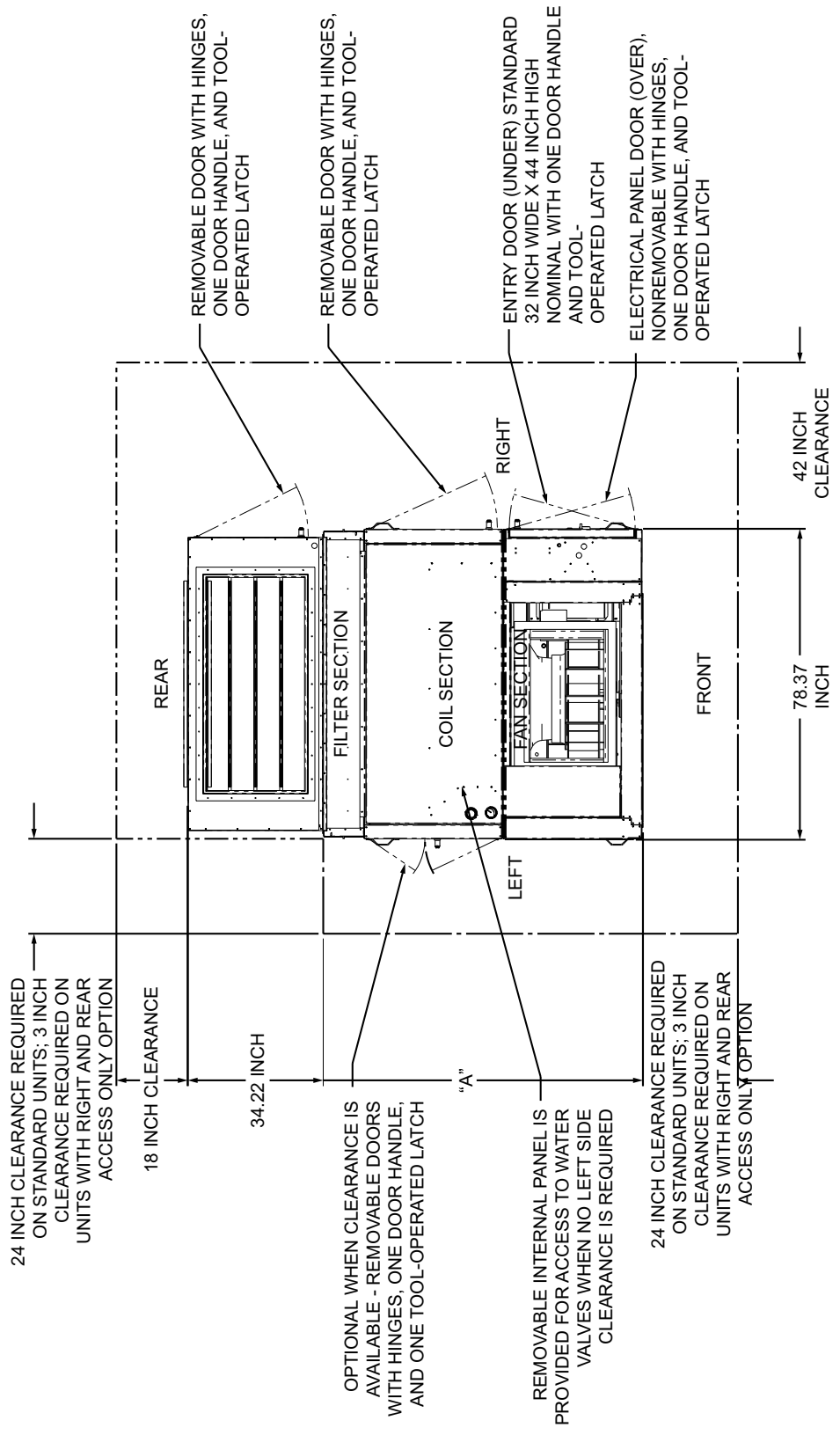


NOTE: AIRSIDE ECONOMIZER WILL BE SHIPPED SEPARATELY





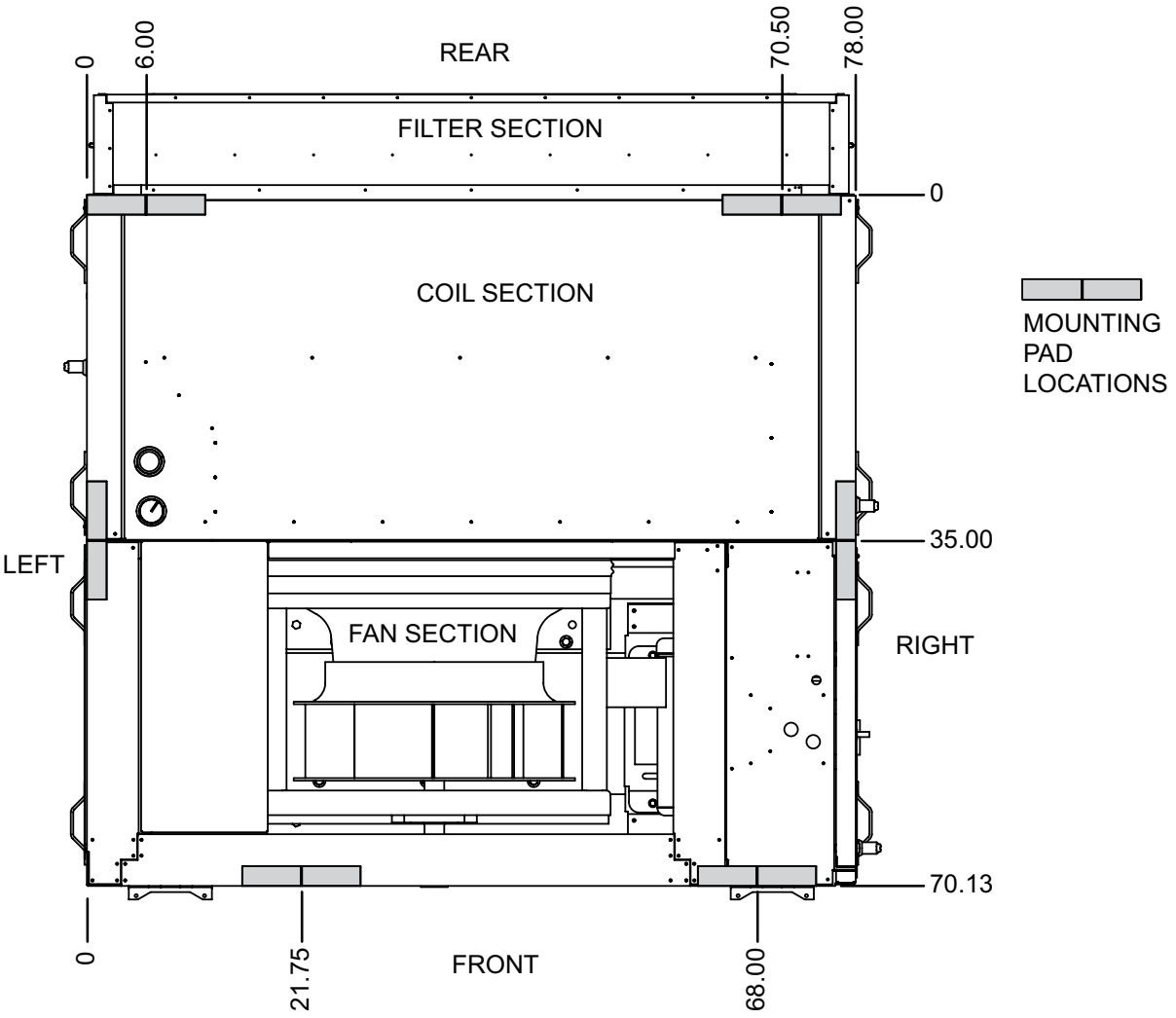
AIRSIDE ECONOMIZER SERVICE CLEARANCES
LSW_025–040 MODELS



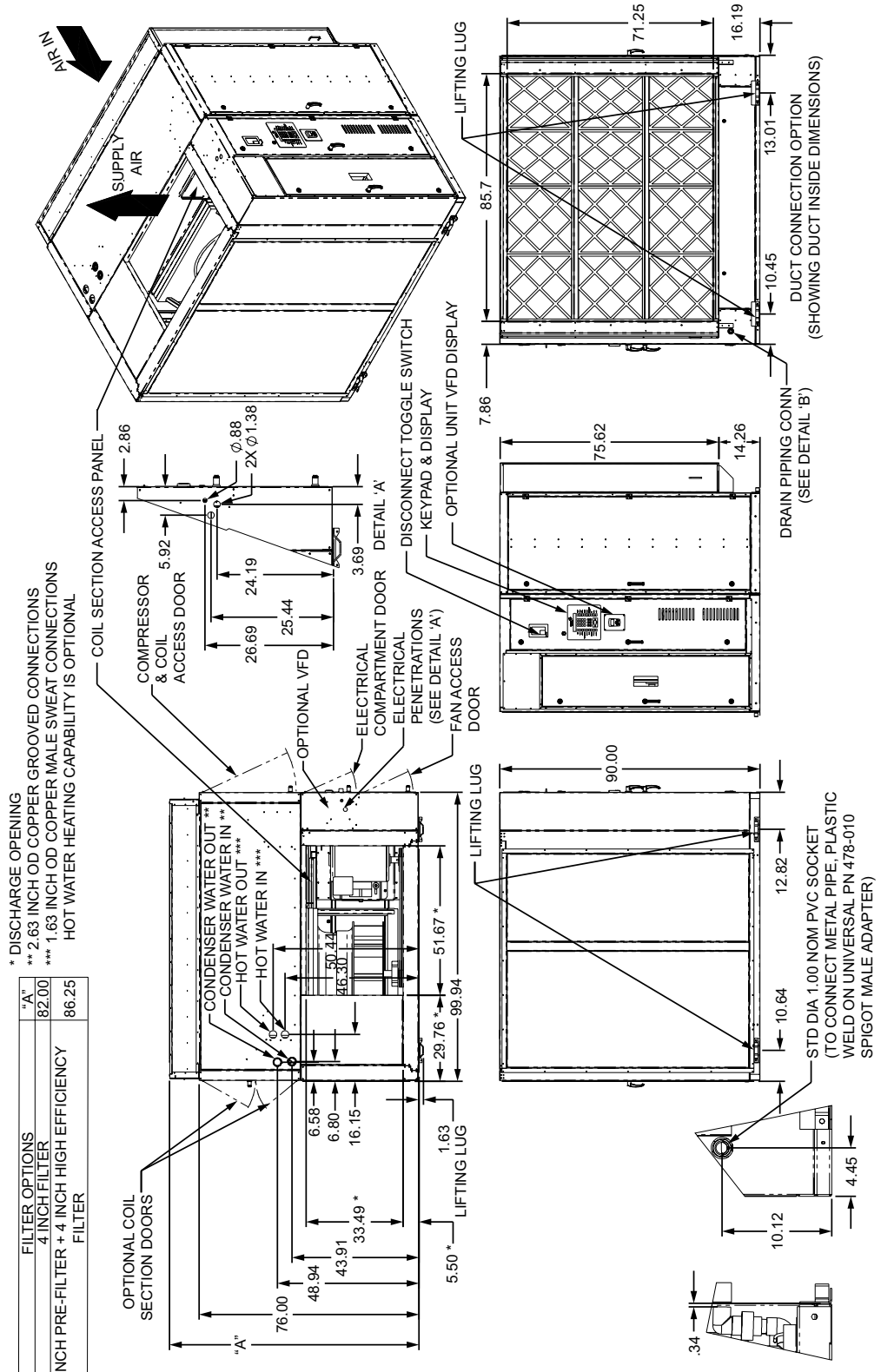
NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	76.43
24	INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	80.68

Dimensional Data (Cont'd)

MOUNTING PAD LOCATIONS
LSW_025–040 MODELS



OVERVIEW OF COMBINED UNIT
LSW_050–060 MODELS

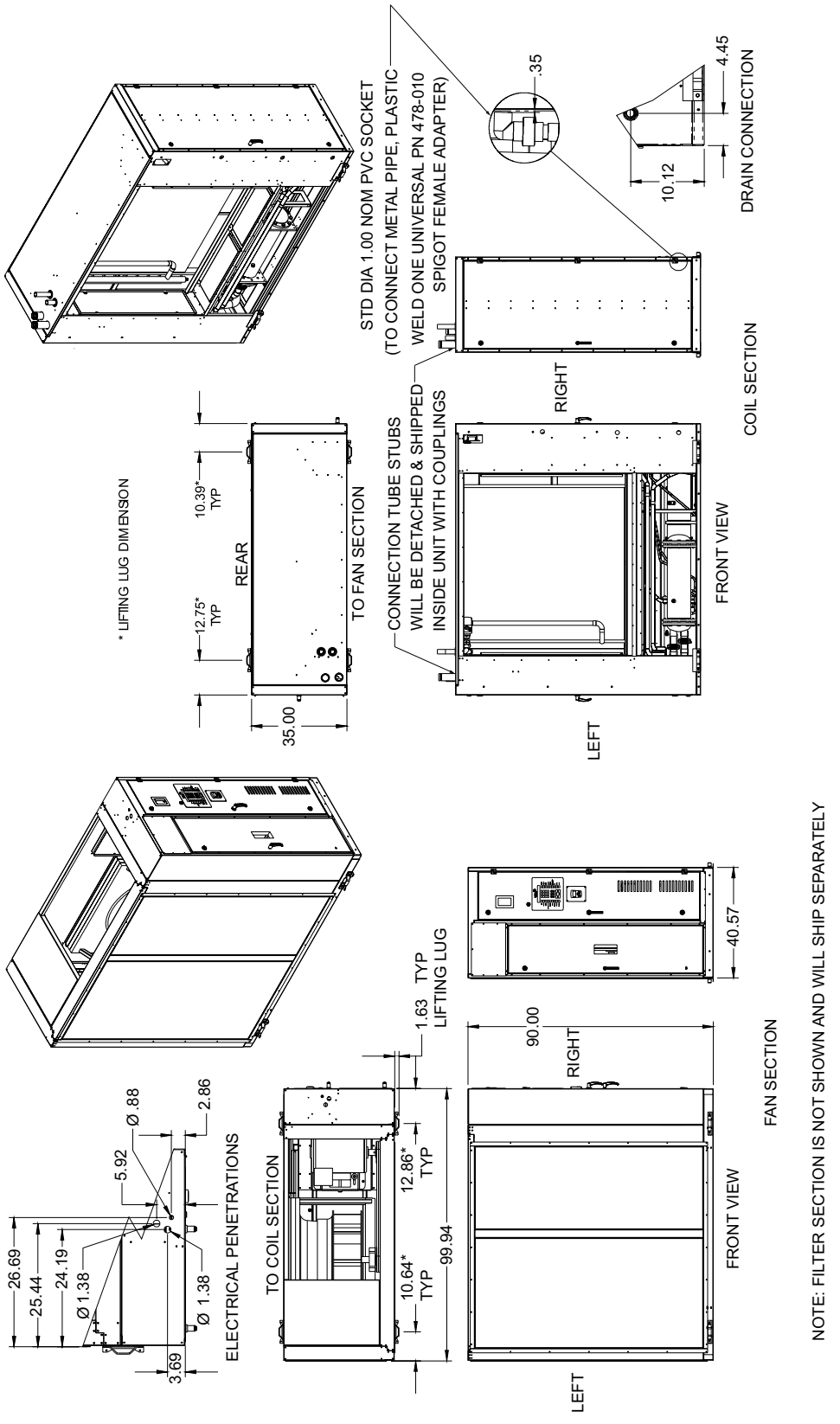


* DISCHARGE OPENING
** 2.63 INCH OD COPPER GROOVED CONNECTIONS
*** 1.63 INCH OD COPPER MALE SWEAT CONNECTIONS
HOT WATER HEATING CAPABILITY IS OPTIONAL

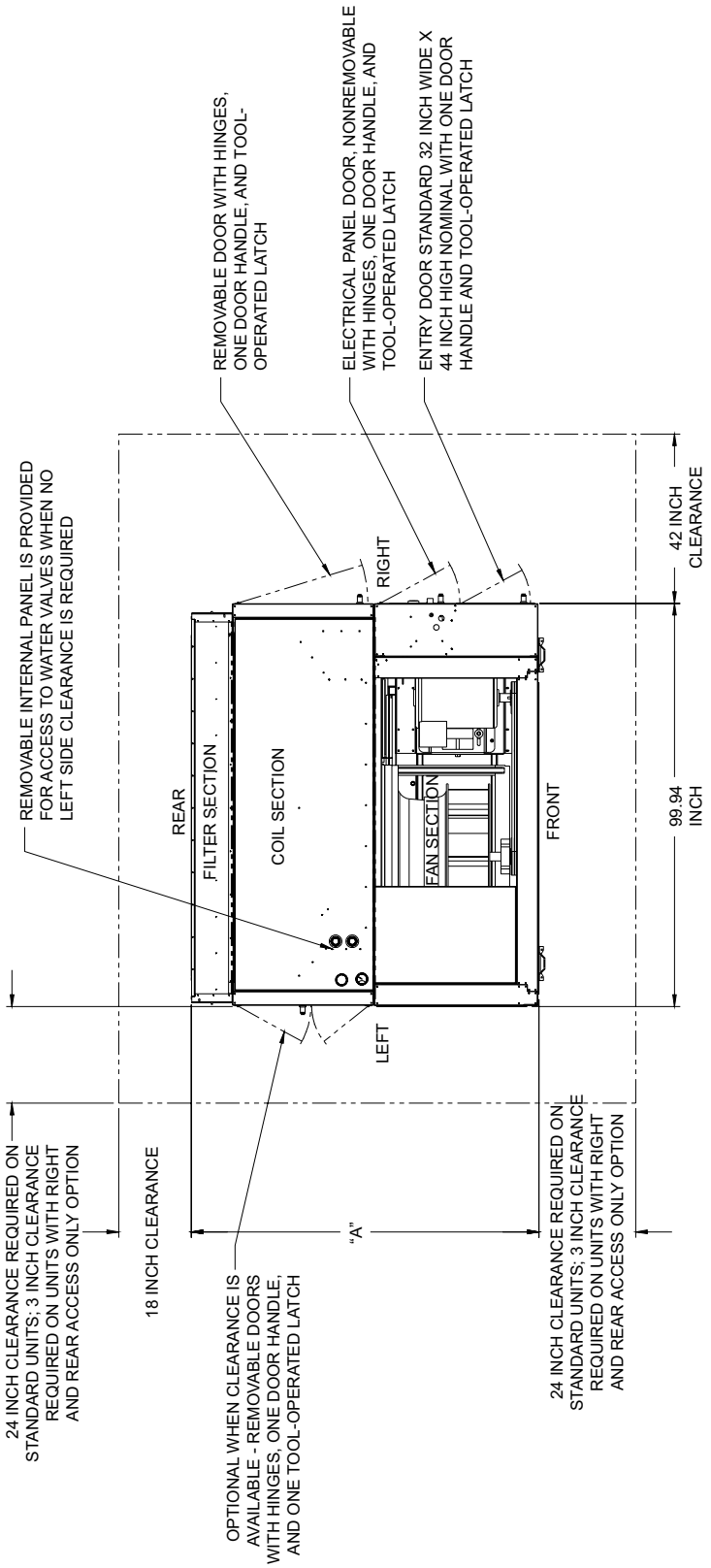
NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	82.00
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	86.25

Dimensional Data (Cont'd)

OVERVIEW OF SPLIT SHIPMENT
LSW_050–060 MODELS



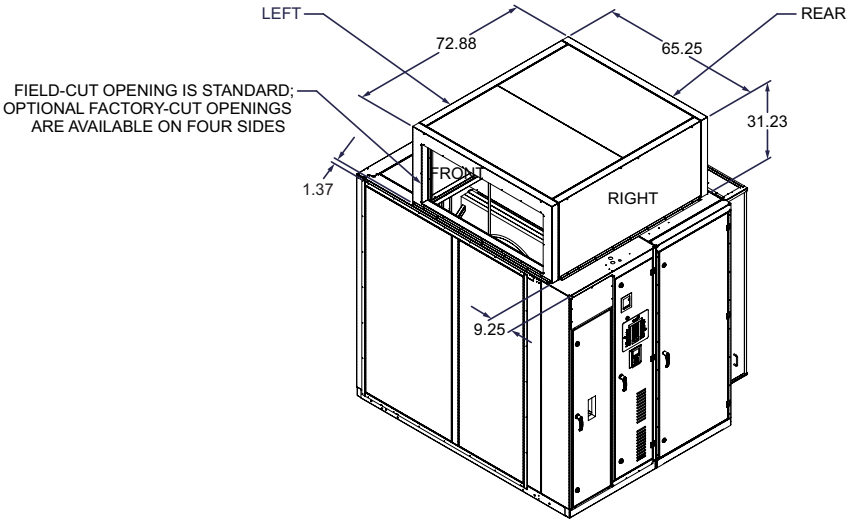
OVERVIEW OF SERVICE CLEARANCES
LSW_050–060 MODELS



NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	82.00
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	86.25

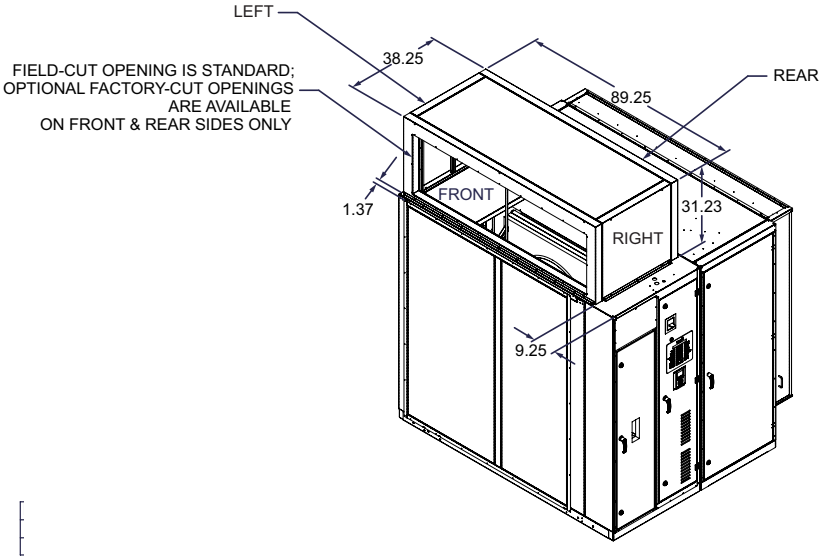
Dimensional Data (Cont'd)

PLENUM OPTIONS
LSW_050–060 MODELS

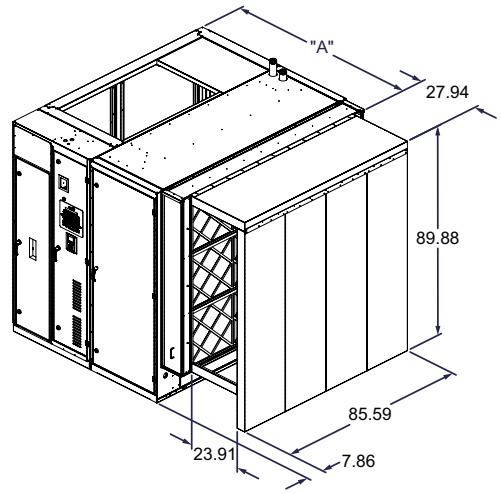


NOTE: OPTIONAL HOT WATER PIPING WILL BE INSIDE FULL PLENUM

OPTIONAL FULL PLENUM



OPTIONAL HALF PLENUM
(POSITIONED OVER FAN SECTION ONLY)



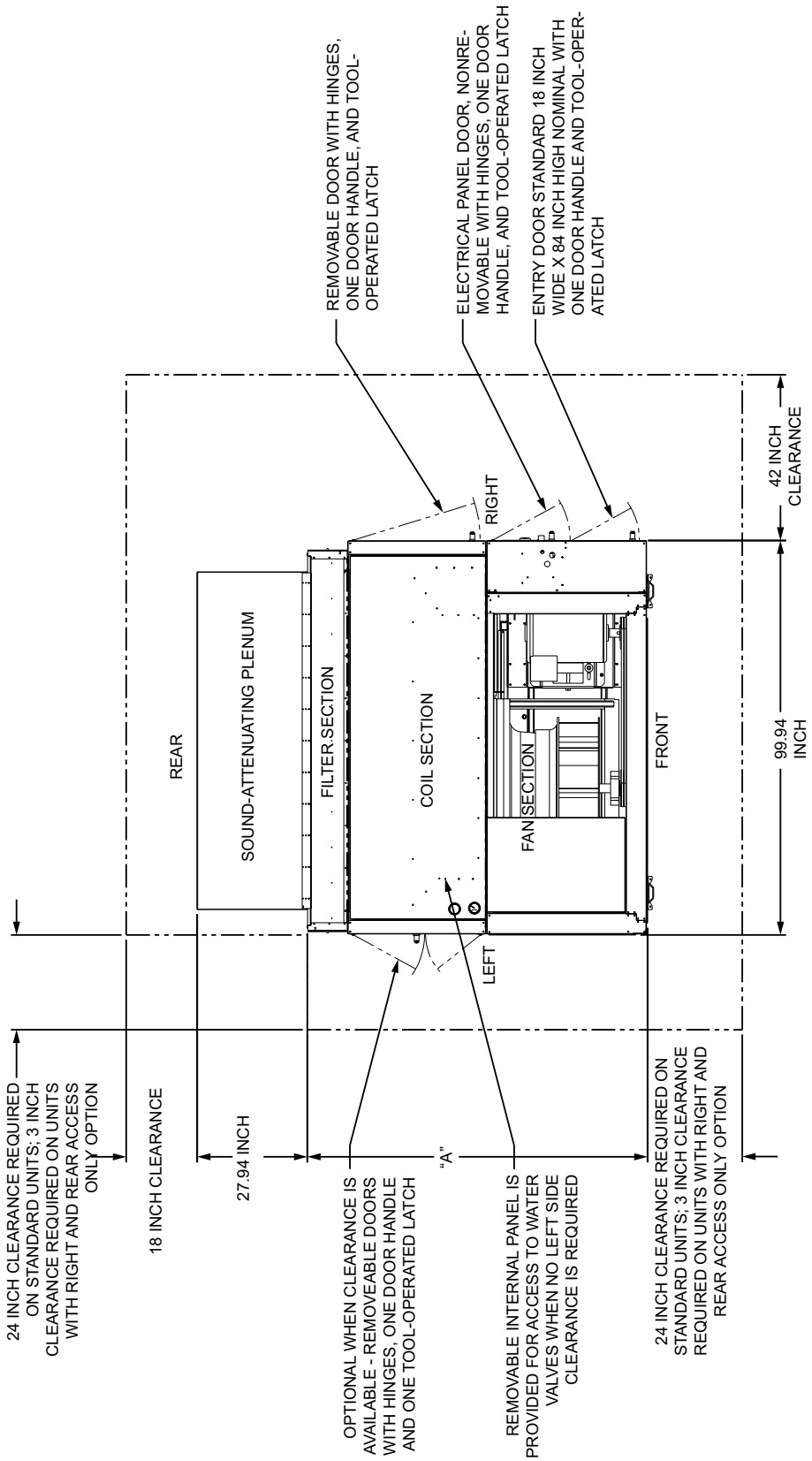
OPTIONAL SOUND-ATTENUATING (INLET) PLENUM

NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	82.00
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	86.25

NOTES:

1. SOUND-ATTENUATING PLENUM OPTION CAN BE COMBINED WITH ANY FILTER SECTION OPTION.
2. SOUND-ATTENUATING PLENUM SHIPS SEPARATELY FROM BASE UNIT SEGMENT(S).
3. OPTION IS NOT AVAILABLE WITH DUCTED CONNECTIONS
4. WITH THIS OPTION THE TOP ROW OF FILTERS CAN ONLY BE REMOVED FROM THE END OF THE FILTER RACK.

SOUND ATTENUATING PLENUM SERVICE CLEARANCES
LSW_050–060 MODELS



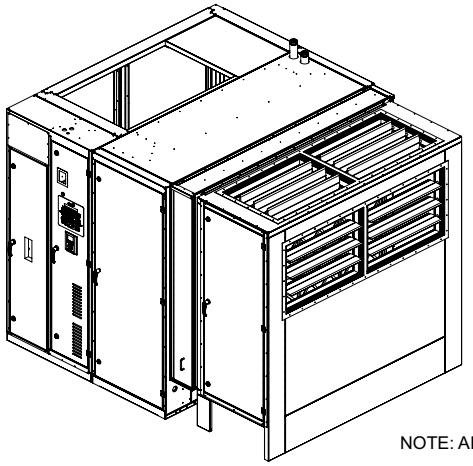
NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	82.00
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	86.25

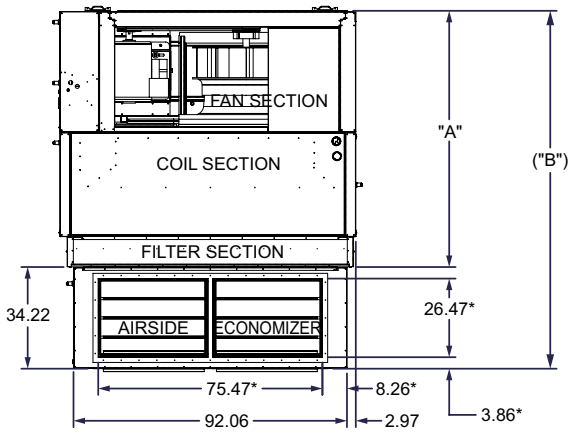
Dimensional Data (Cont'd)

AIRSIDE ECONOMIZER OPTION
LSW_050–060 MODELS

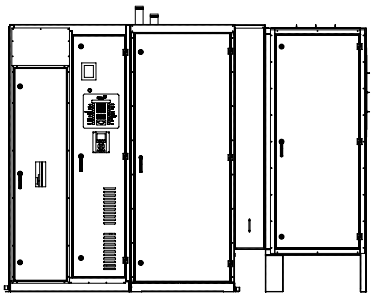
NO.	FILTER OPTIONS	"A"	"B"
1	4 INCH FILTER	82.00	116.22
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	86.25	120.47

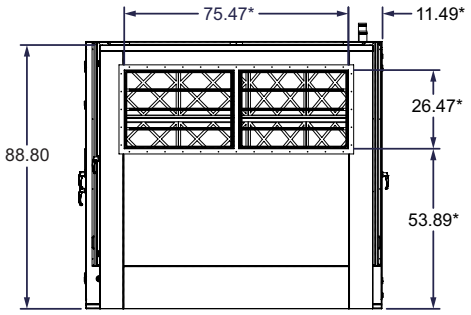
*MINIMUM INTERIOR DUCT DIMENSIONS



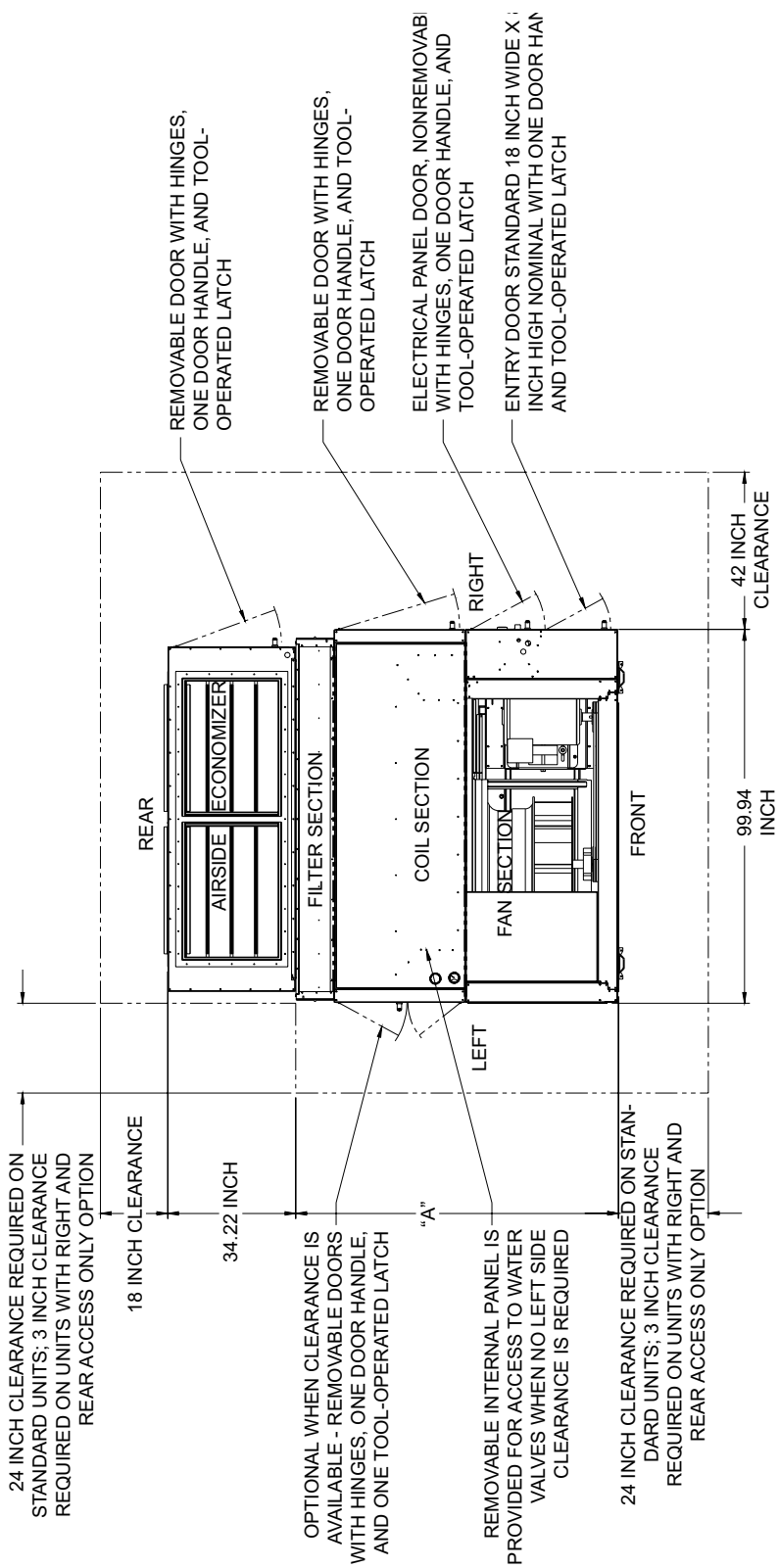


NOTE: AIRSIDE ECONOMIZER WILL BE SHIPPED SEPARATELY





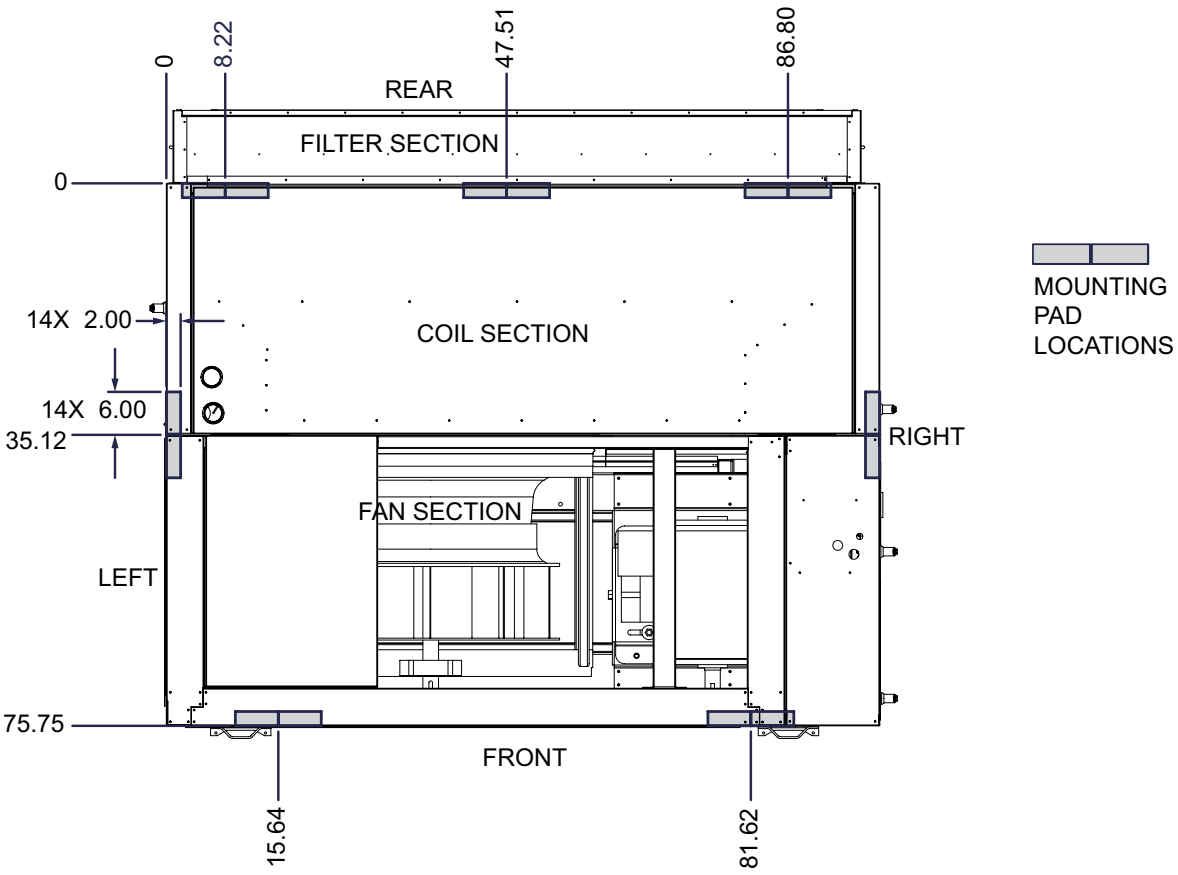
AIRSIDE ECONOMIZER SERVICE CLEARANCES
LSW_050–060 MODELS



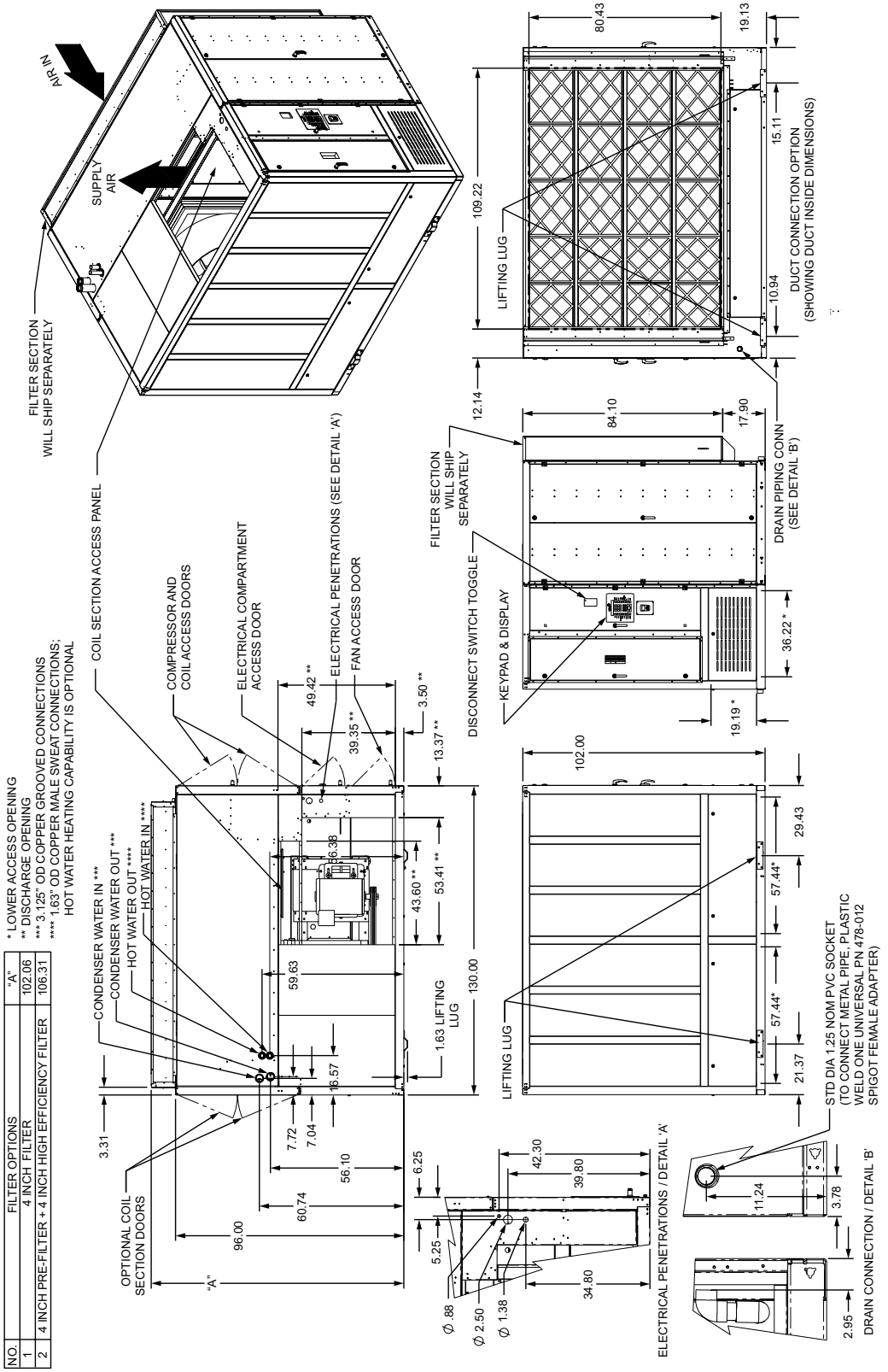
NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	82.00
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	86.25

Dimensional Data (Cont'd)

MOUNTING PAD LOCATIONS
LSW_050–060 MODELS



OVERVIEW OF COMBINED UNIT
LSW_070–105 MODELS

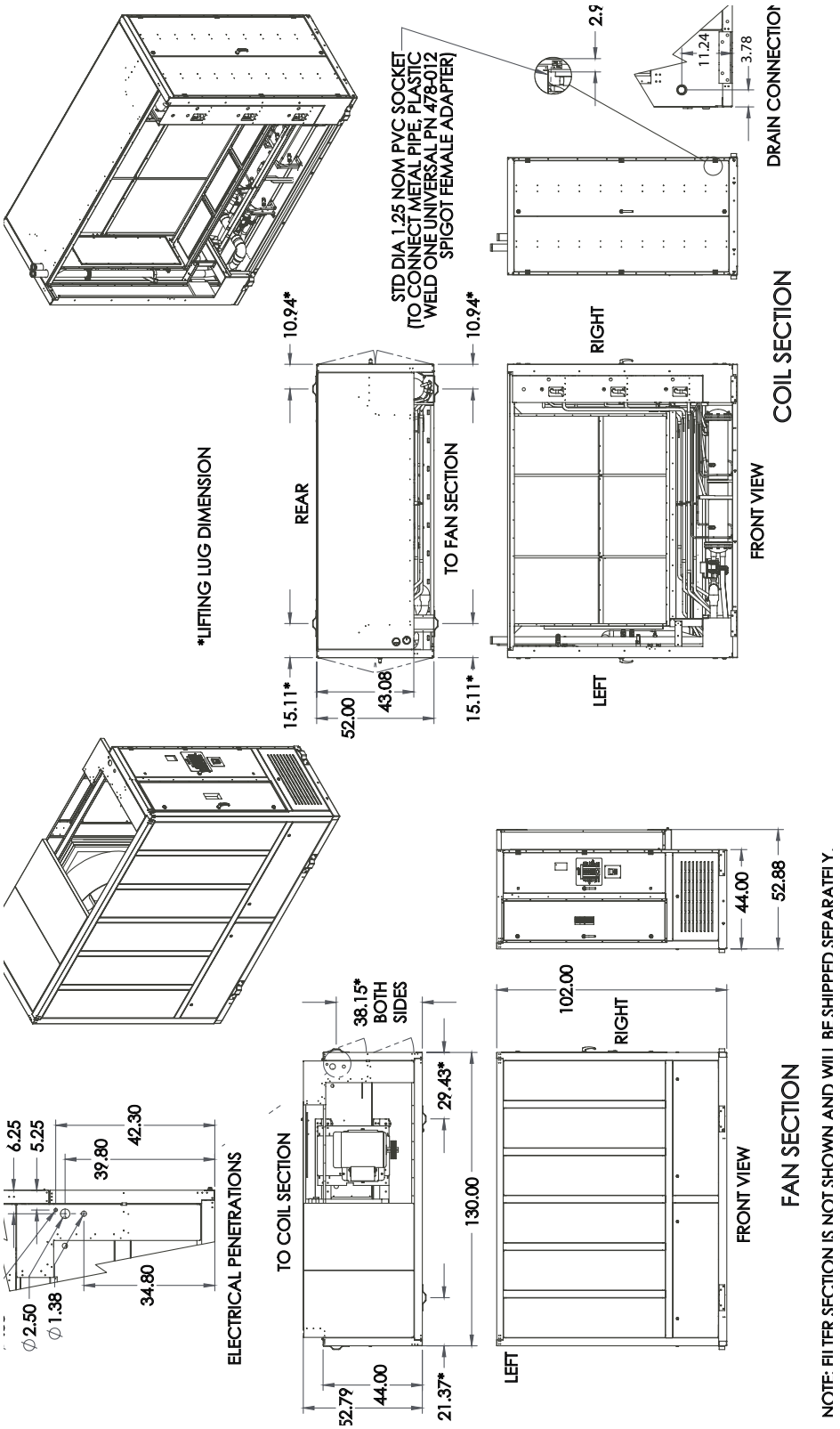


NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	102.06
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	106.31

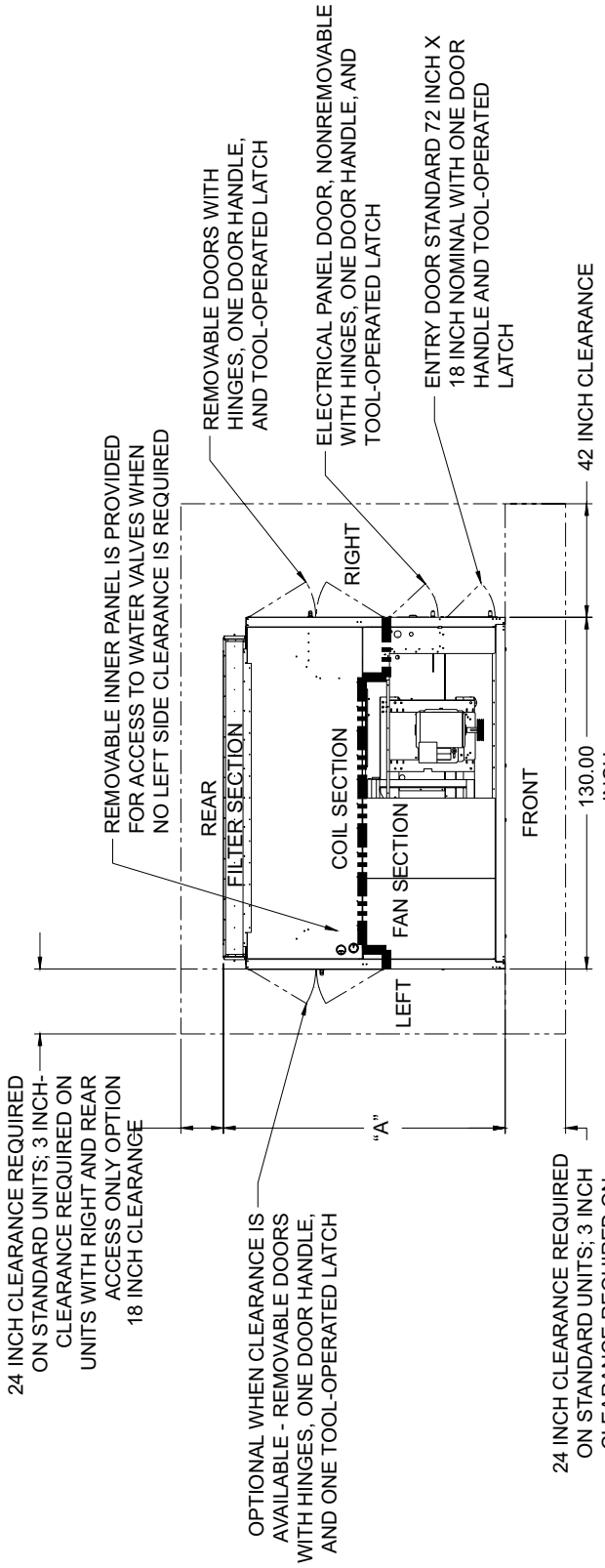
* LOWER ACCESS OPENING
** DISCHARGE OPENING
*** 3.125" OD COPPER GROOVED CONNECTIONS
**** 1.63" OD COPPER MALE SWEAT CONNECTIONS;
HOT WATER HEATING CAPABILITY IS OPTIONAL

Dimensional Data (Cont'd)

OVERVIEW OF SPLIT SHIPMENTS
LSW_070–105 MODELS



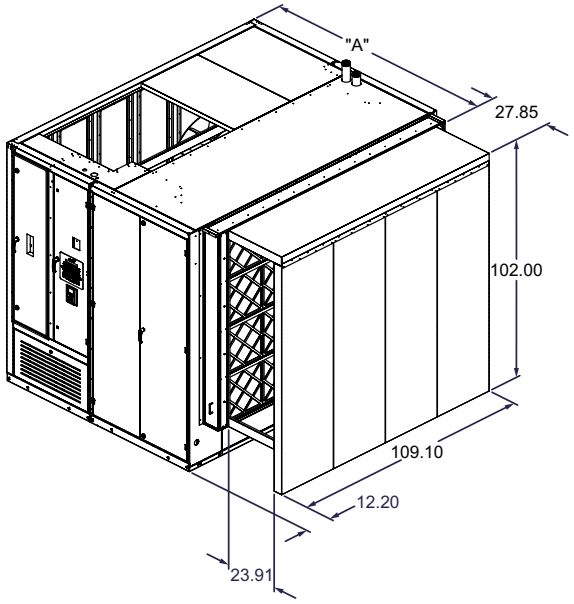
OVERVIEW OF SERVICE CLEARANCES
LSW_070–105 MODELS



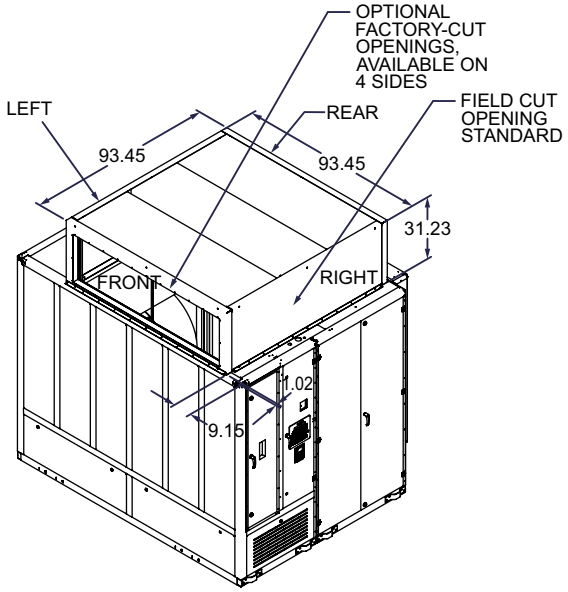
NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	102.06
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	106.31

Dimensional Data (Cont'd)

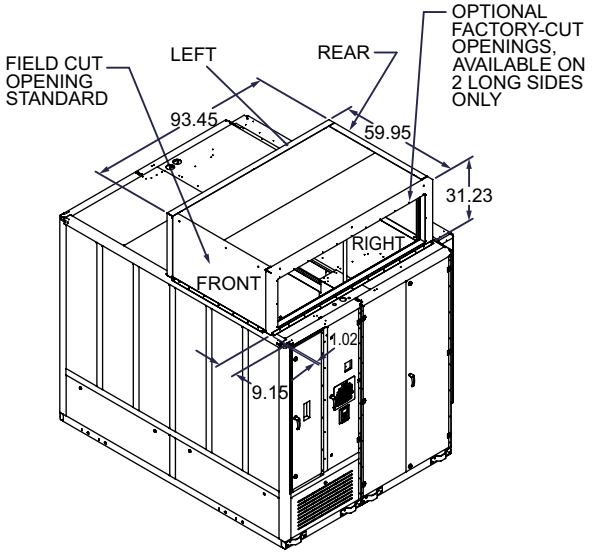
PLENUM OPTIONS
LSW_070–105 MODELS



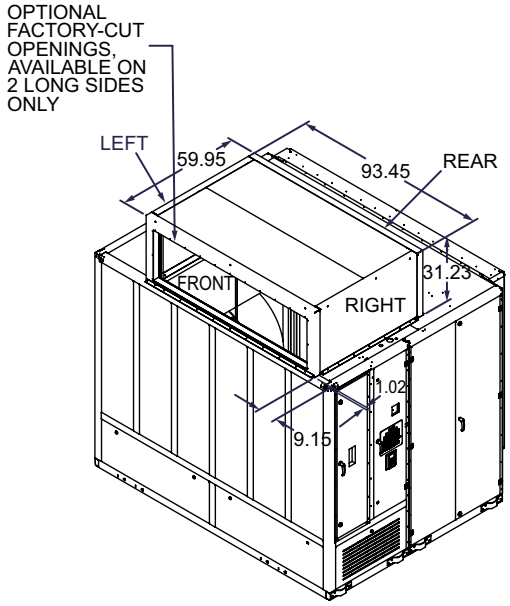
OPTIONAL SOUND-ATTENUATING (INLET) PLENUM



OPTIONAL FULL PLENUM



OPTIONAL HALF PLENUM
(POSITIONED OVER
FAN & COIL SECTIONS)

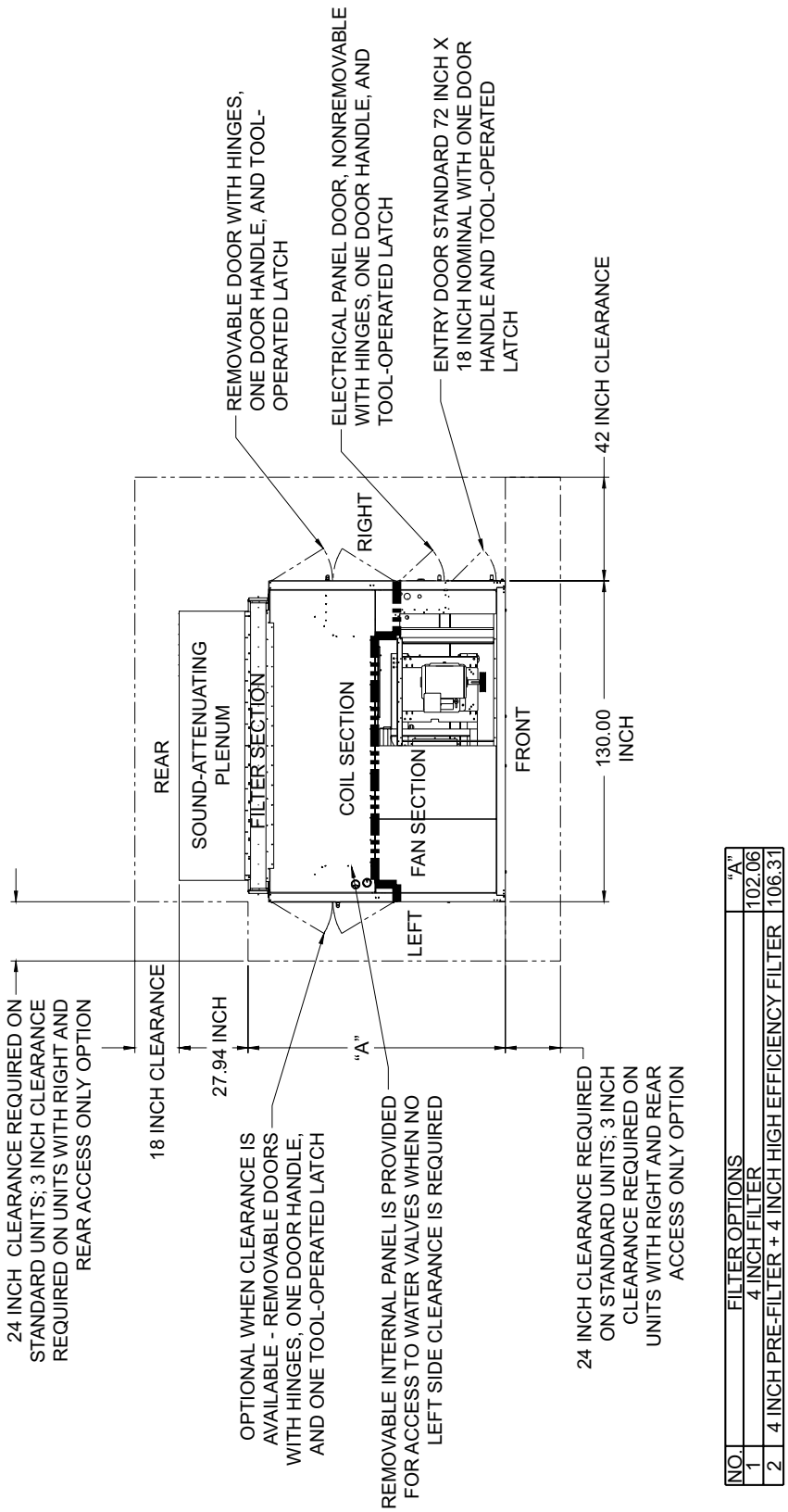


OPTIONAL HALF PLENUM
(POSITIONED ONLY
OVER FAN SECTION)

NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	102.06
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	106.31

NOTES:
1. SOUND-ATTENUATING PLENUM OPTION CAN BE COMBINED WITH ANY FILTER SECTION OPTION.
2. SOUND-ATTENUATING PLENUM SHIPS SEPARATELY FROM BASE UNIT SEGMENT(S).
3. OPTION IS NOT AVAILABLE WITH DUCTED CONNECTIONS
4. WITH THIS OPTION THE TOP ROW OF FILTERS CAN ONLY BE REMOVED FROM THE END OF THE FILTER RACK.

SOUND ATTENUATING PLENUM SERVICE CLEARANCE
LSW_070–105 MODELS



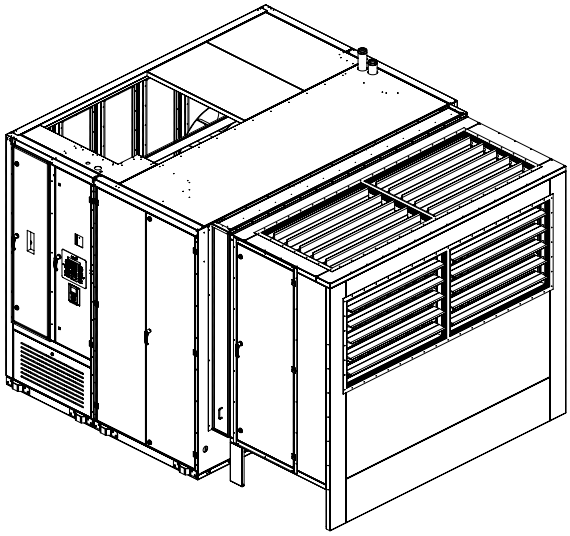
NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	102.06
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	106.31

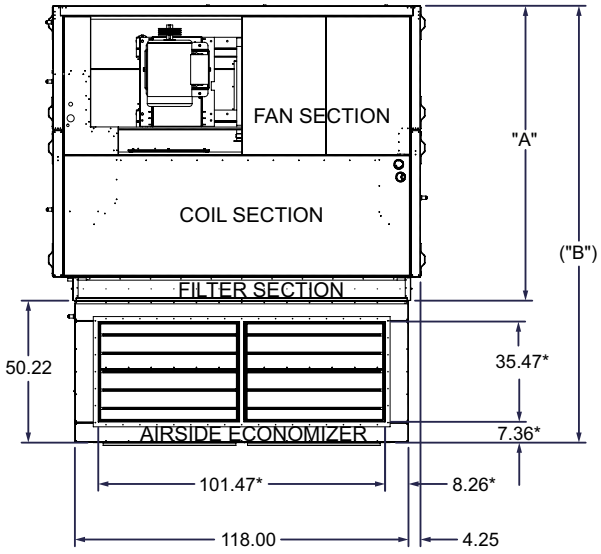
Dimensional Data (Cont'd)

AIRSIDE ECONOMIZER OPTION
LSW_070–105 MODELS

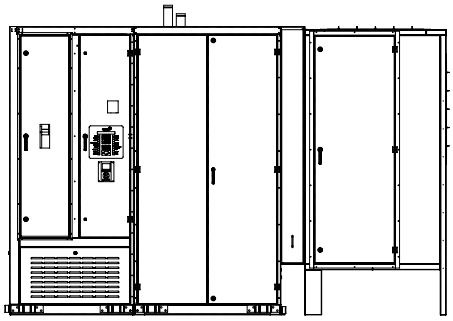
NO.	FILTER OPTIONS	"A"	"B"
1	4 INCH FILTER	102.06	152.28
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	106.31	156.53

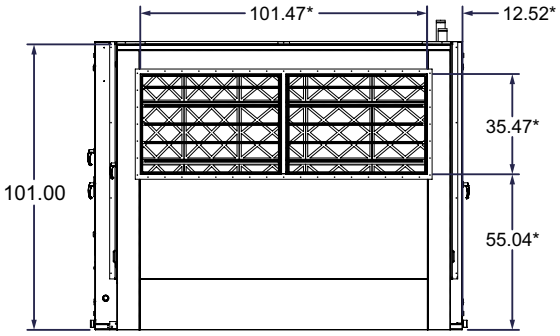
*MINIMUM INTERIOR DUCT DIMENSIONS



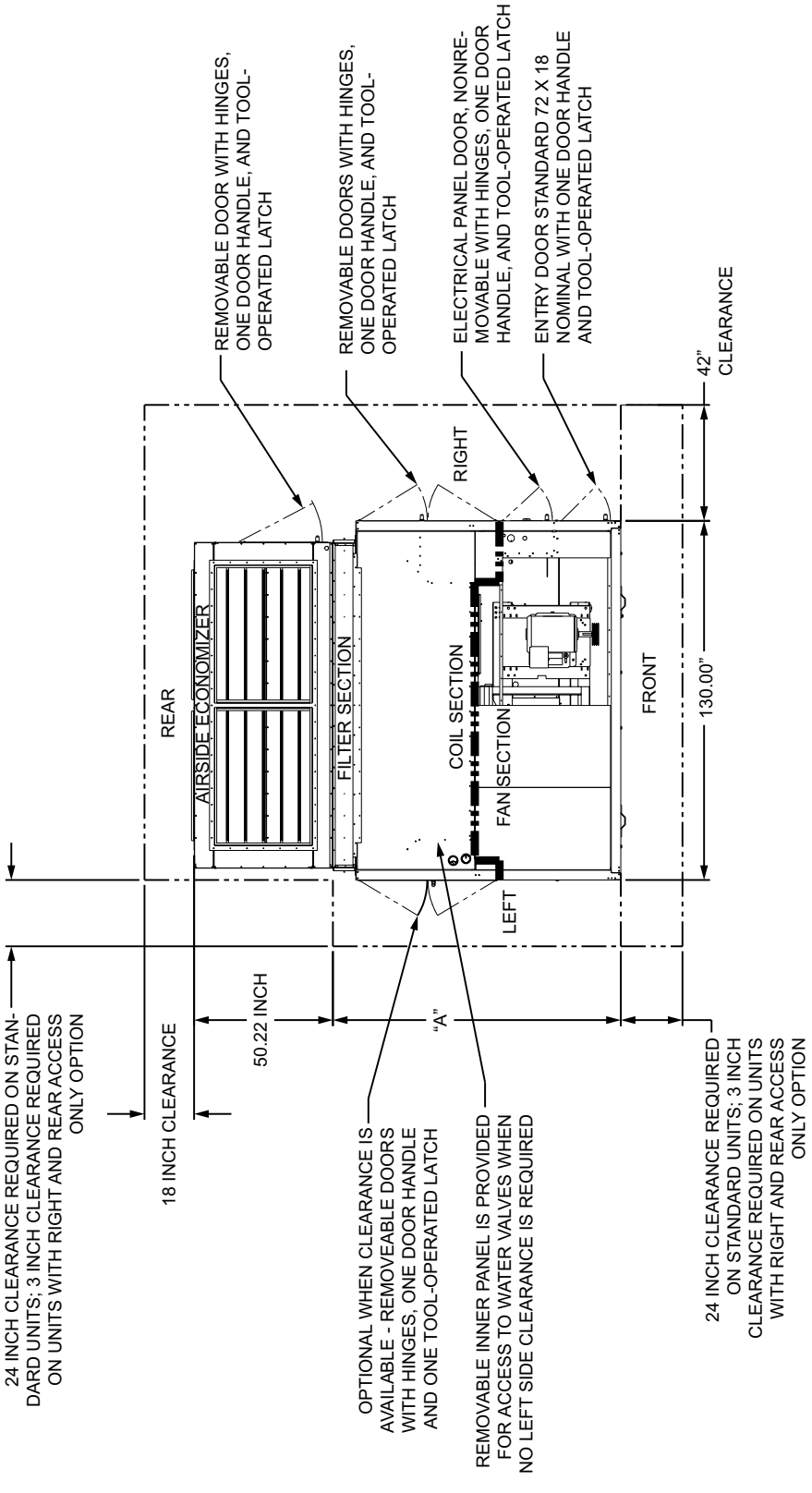


NOTE: AIRSIDE ECONOMIZER WILL BE SHIPPED SEPARATELY





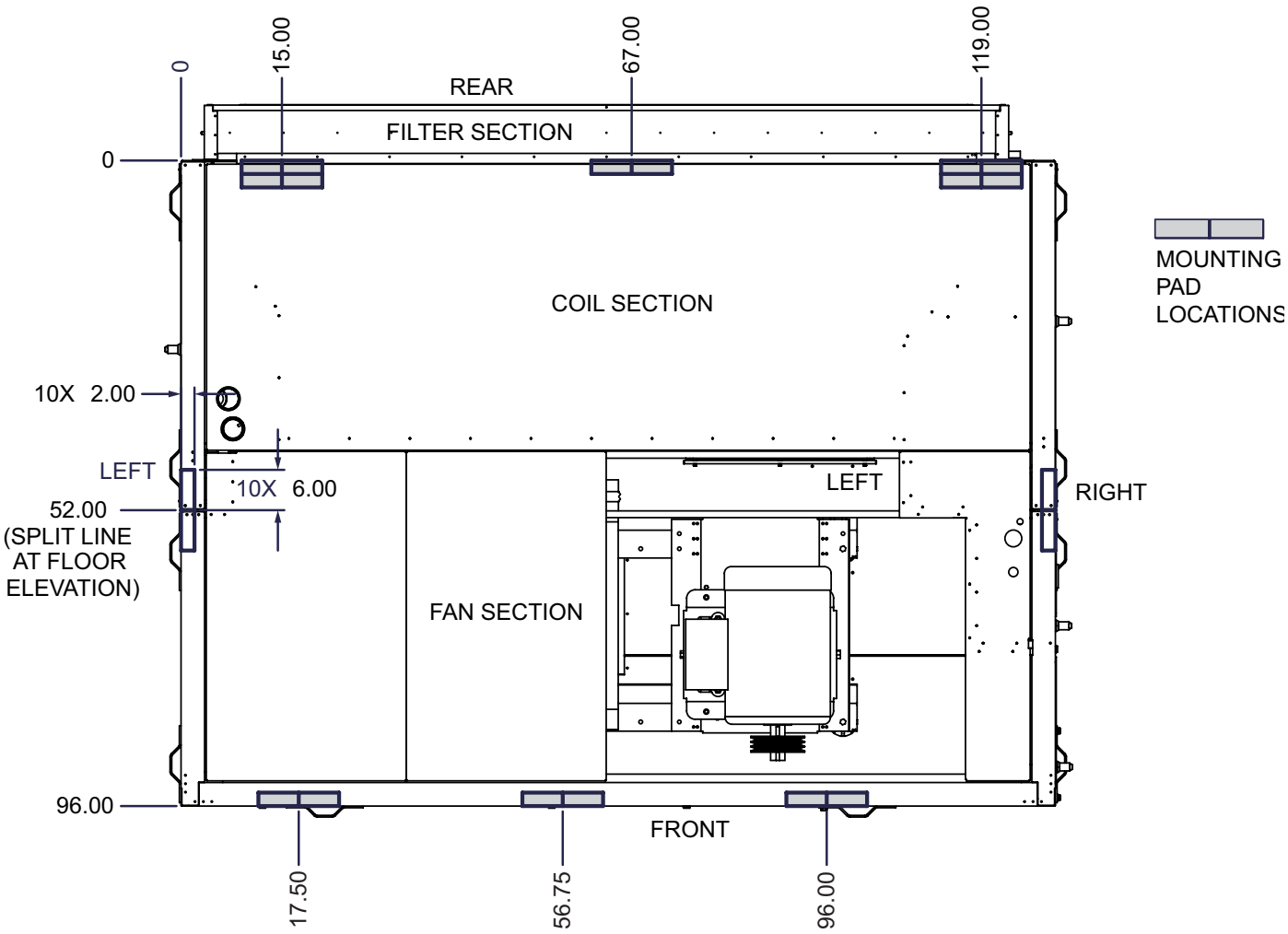
AIRSIDE ECONOMIZER SERVICE CLEARANCES
LSW_070–105 MODELS



NO.	FILTER OPTIONS	"A"
1	4 INCH FILTER	102.06
2	4 INCH PRE-FILTER + 4 INCH HIGH EFFICIENCY FILTER	106.31

Dimensional Data (Cont'd)

MOUNTING PAD LOCATIONS
LSW_070–105 MODELS



Air Pressure Drops

TABLE 19 - AIR PRESSURE DROPS (INCHES W.C.) FOR LSW_025–060

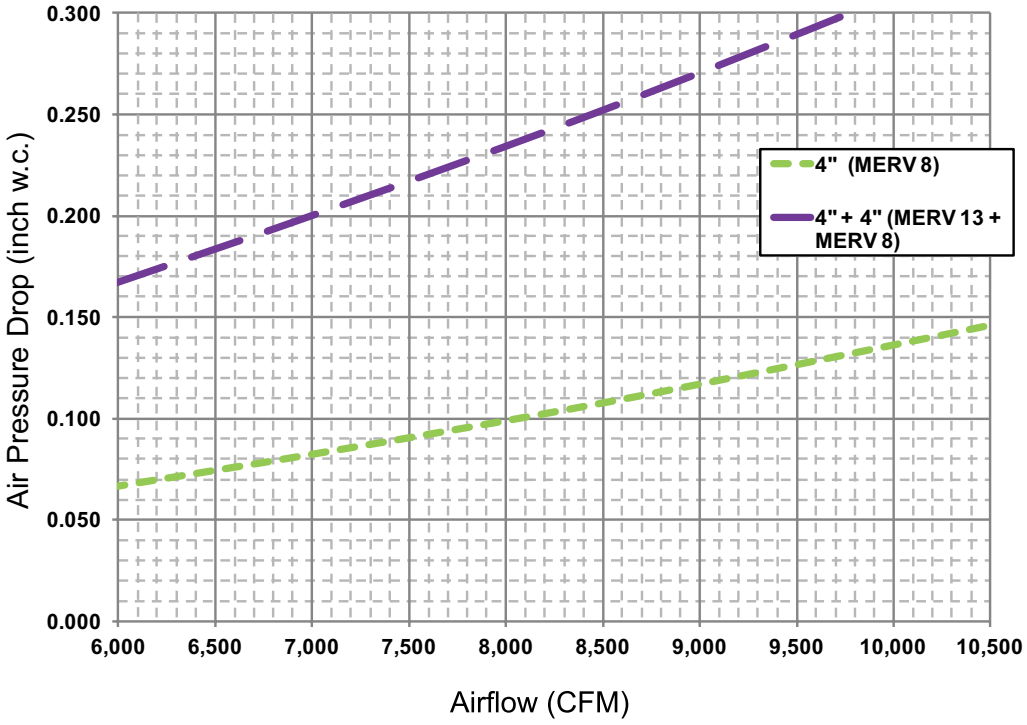
MODEL	AIR FLOW	EVAPORATOR COIL	HOT WATER COIL	WATER ECONOMY COIL	DISCHARGE PLENUM - FRONT OR REAR	DISCHARGE PLENUM - SIDE	SOUND ATTEN PLENUM	ELECTRIC HEAT
025 - Std	7,200	0.43	0.22	0.07	0.07	0.05	0.01	0.05
	8,850	0.58	0.31	0.10	0.11	0.08	0.02	
	10,500	0.73	0.43	0.12	0.15	0.11	0.02	
025 - HiEff	6,300	0.60	0.17	0.06	0.05	0.04	0.01	0.05
	7,450	0.75	0.23	0.07	0.08	0.05	0.01	
	8,600	0.91	0.3	0.09	0.10	0.07	0.01	
032 - Std	9,000	0.42	0.19	0.07	0.11	0.08	0.02	0.05
	11,150	0.56	0.27	0.10	0.17	0.12	0.02	
	13,300	0.72	0.37	0.13	0.24	0.17	0.03	
032 - HiEff	7,800	0.57	0.15	0.06	0.08	0.06	0.01	0.05
	9,400	0.73	0.2	0.08	0.12	0.09	0.02	
	11,000	0.91	0.27	0.10	0.17	0.12	0.02	
035 - Std	10,800	0.42	0.17	0.07	0.16	0.11	0.02	0.05
	13,150	0.55	0.24	0.09	0.24	0.17	0.03	
	15,500	0.69	0.25	0.12	0.33	0.23	0.05	
035 - HiEff	9,400	0.57	0.13	0.06	0.12	0.09	0.02	0.05
	11,300	0.74	0.18	0.08	0.17	0.12	0.02	
	13,200	0.91	0.24	0.09	0.24	0.17	0.03	
040 - Std	10,800	0.42	0.17	0.07	0.16	0.11	0.02	0.05
	13,400	0.56	0.25	0.10	0.24	0.17	0.03	
	16,000	0.72	0.34	0.13	0.35	0.25	0.05	
040 - HiEff	9,400	0.57	0.13	0.06	0.12	0.09	0.02	0.05
	11,300	0.74	0.18	0.08	0.17	0.12	0.02	
	13,200	0.91	0.24	0.10	0.24	0.17	0.03	
050 - Std	16,000	0.51	0.16	0.07	0.08	0.06	0.03	0.05
	18,000	0.60	0.20	0.08	0.10	0.07	0.04	
	20,000	0.70	0.24	0.09	0.12	0.09	0.04	
050 - HiEff	14,100	0.72	0.13	0.06	0.06	0.04	0.02	0.05
	17,050	0.92	0.18	0.07	0.09	0.06	0.03	
	20,000	1.14	0.24	0.09	0.12	0.09	0.04	
060 - Std	16,000	0.61	0.16	0.07	0.08	0.06	0.03	0.05
	20,000	0.84	0.24	0.09	0.12	0.09	0.04	
	24,000	1.08	0.33	0.12	0.18	0.13	0.06	
060 - HiEff	14,100	0.86	0.13	0.06	0.06	0.04	0.02	0.05
	17,050	1.11	0.18	0.07	0.09	0.06	0.03	
	20,000	1.37	0.24	0.09	0.12	0.09	0.04	

TABLE 20 - AIR PRESSURE DROPS (INCHES W.C.) FOR LSW_070–105

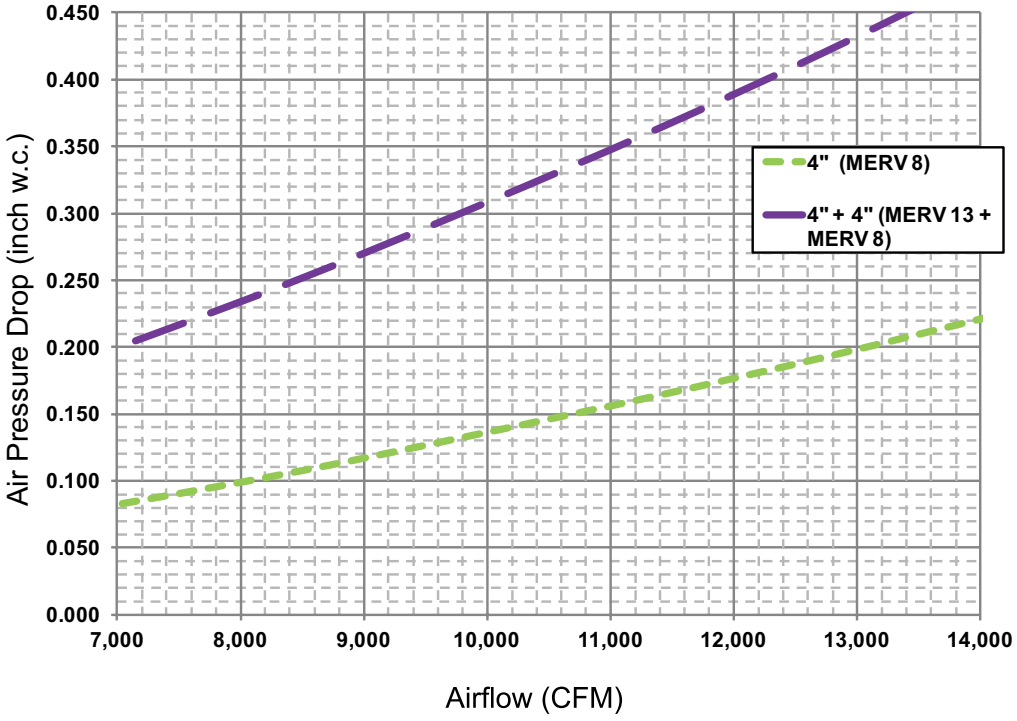
MODEL	AIR FLOW	EVAPORATOR COIL	HOT WATER COIL	WATER ECONOMY COIL	DISCHARGE PLENUM - FRONT OR REAR	DISCHARGE PLENUM - SIDE	SOUND ATTEN PLENUM	ELECTRIC HEAT
070 - Std	19,900	0.41	0.13	0.07	0.12	0.09	0.04	0.05
	24,850	0.56	0.19	0.10	0.19	0.14	0.07	
	29,800	0.72	0.26	0.13	0.27	0.20	0.10	
070 - HiEff	19,900	0.68	0.13	0.07	0.12	0.09	0.04	0.05
	22,350	0.80	0.16	0.08	0.15	0.11	0.05	
	24,800	0.92	0.19	0.09	0.19	0.14	0.07	
080 - Std	22,600	0.51	0.12	0.07	0.16	0.11	0.06	0.05
	28,250	0.70	0.18	0.10	0.25	0.18	0.09	
	33,900	0.90	0.24	0.13	0.36	0.25	0.12	
080 - HiEff	22,600	0.85	0.12	0.07	0.16	0.11	0.06	0.05
	25,400	1.00	0.15	0.08	0.20	0.14	0.07	
	28,200	1.15	0.18	0.10	0.25	0.18	0.09	
095 - Std	24,200	0.52	0.09	0.07	0.18	0.13	0.06	0.05
	30,150	0.70	0.14	0.10	0.28	0.20	0.10	
	36,100	0.90	0.19	0.13	0.40	0.29	0.14	
095 - HiEff	24,200	0.85	0.09	0.07	0.18	0.13	0.06	0.05
	27,150	0.48	0.11	0.08	0.23	0.16	0.08	
	30,100	0.56	0.2	0.10	0.28	0.20	0.10	
105 - Std	24,200	0.62	0.09	0.07	0.18	0.13	0.06	0.05
	30,150	0.84	0.14	0.10	0.28	0.20	0.10	
	36,100	1.08	0.19	0.13	0.40	0.29	0.14	
105 - HiEff	24,200	1.03	0.09	0.07	0.18	0.13	0.06	0.05
	27,150	1.20	6.98	0.08	0.23	0.16	0.08	
	30,100	1.37	0.14	0.10	0.28	0.20	0.10	

Air Pressure Drops (Cont'd)

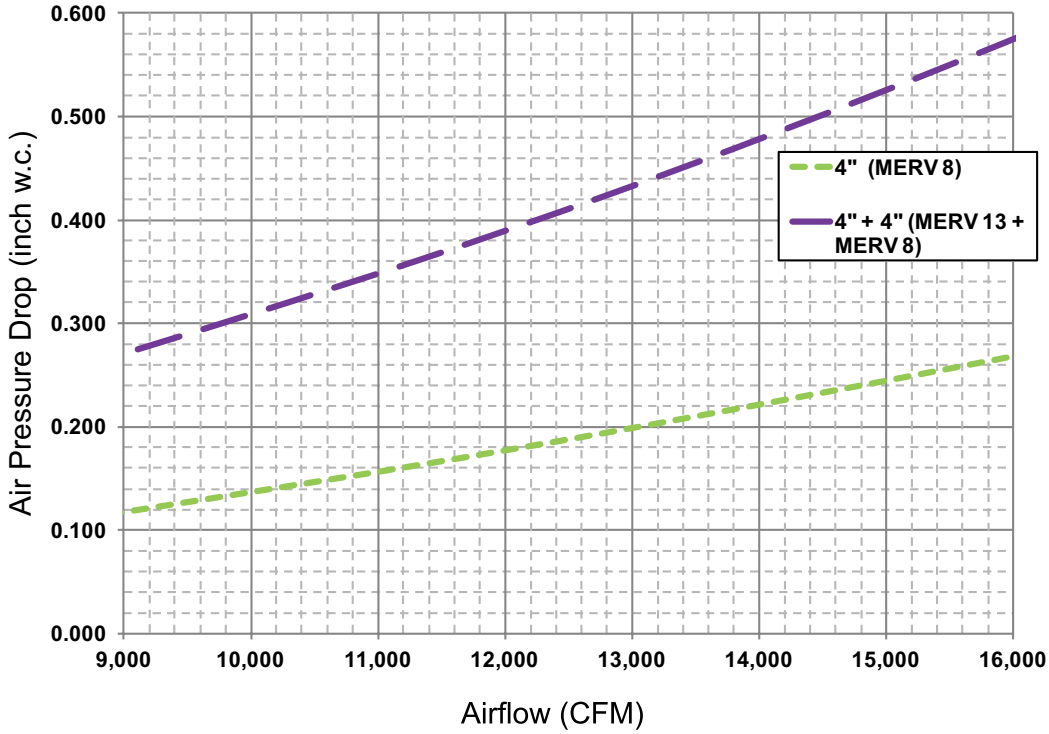
LSW_025 Air Pressure Drops Across Clean Filters



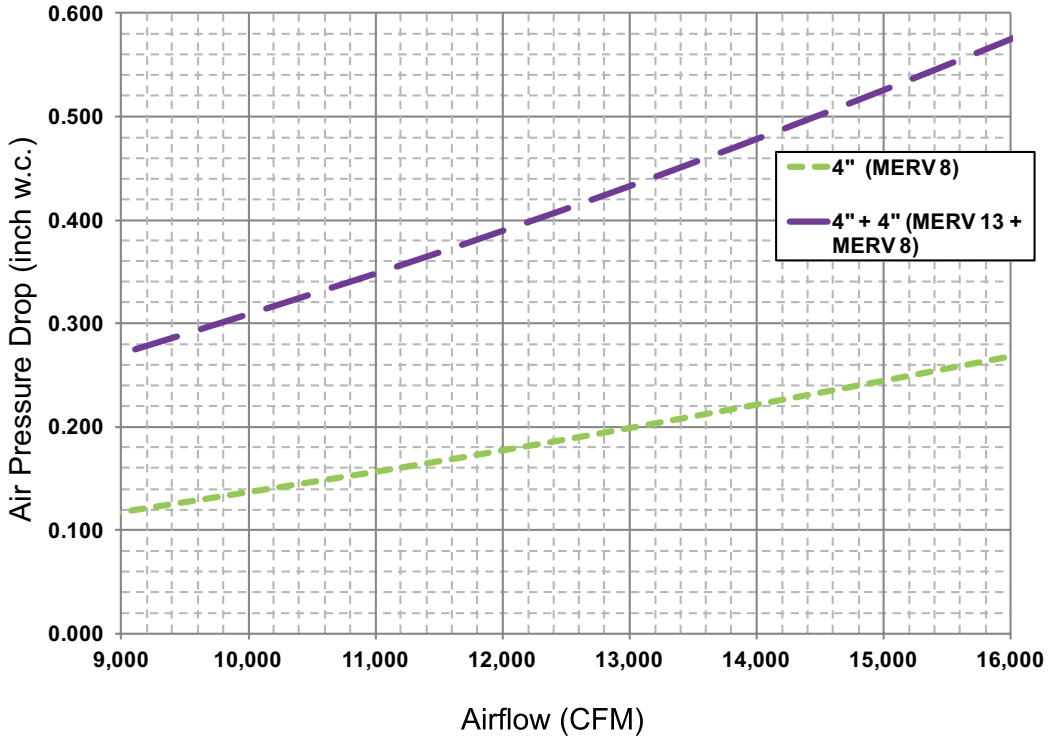
LSW_032 Air Pressure Drops Across Clean Filters



LSW_035 Air Pressure Drops Across Clean Filters

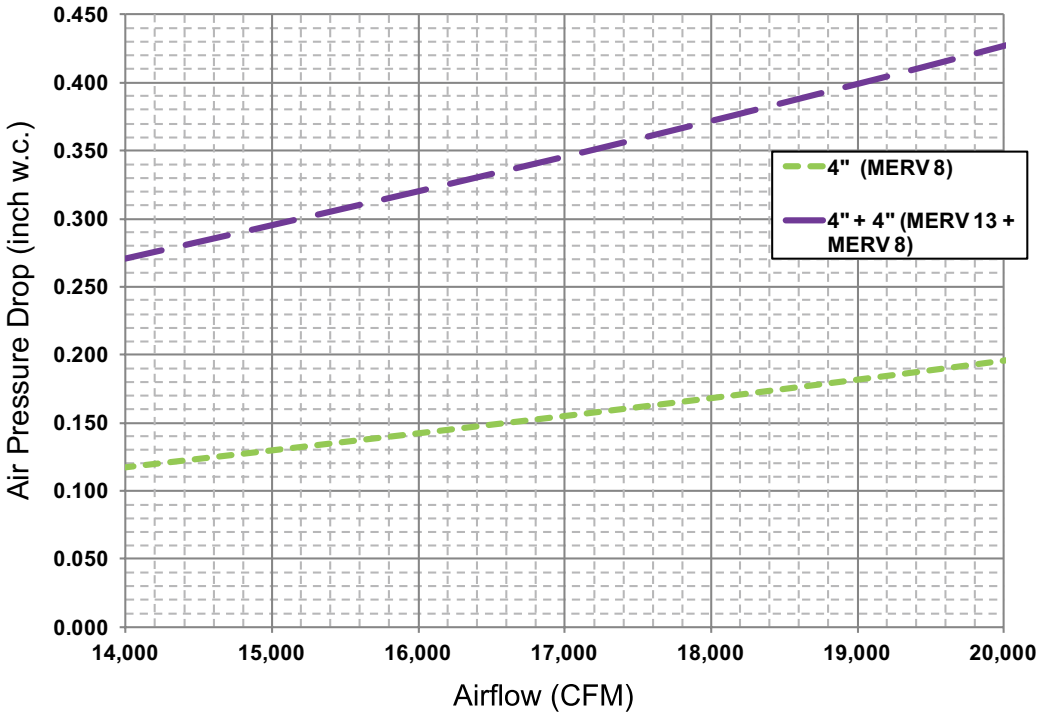


LSW_040 Air Pressure Drops Across Clean Filters

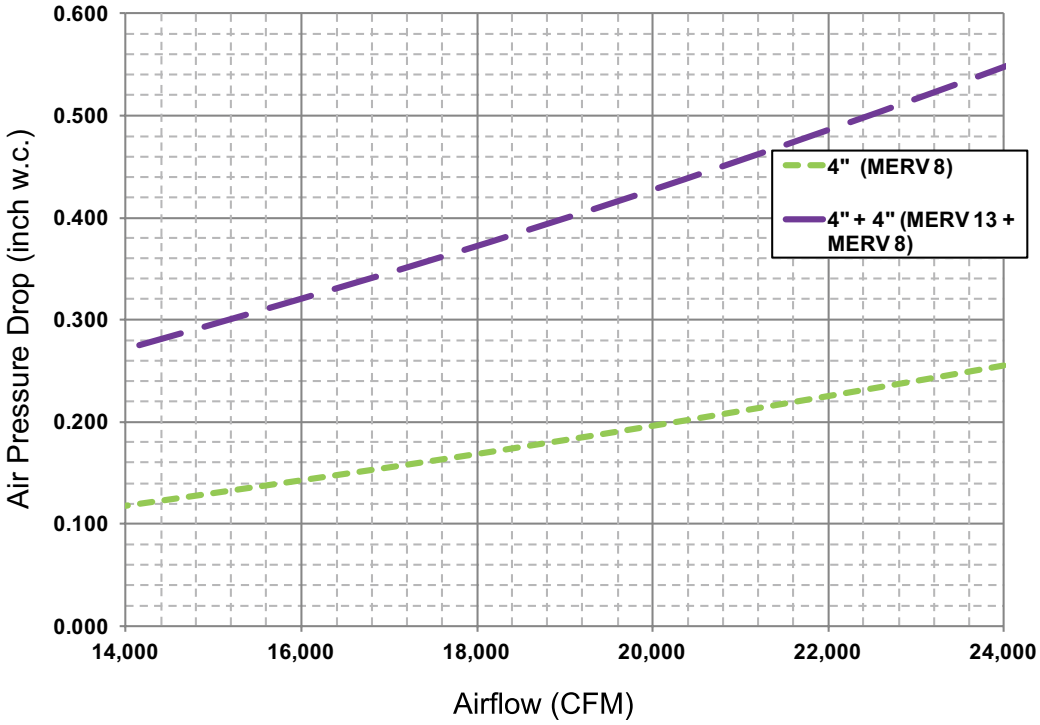


Air Pressure Drops (Cont'd)

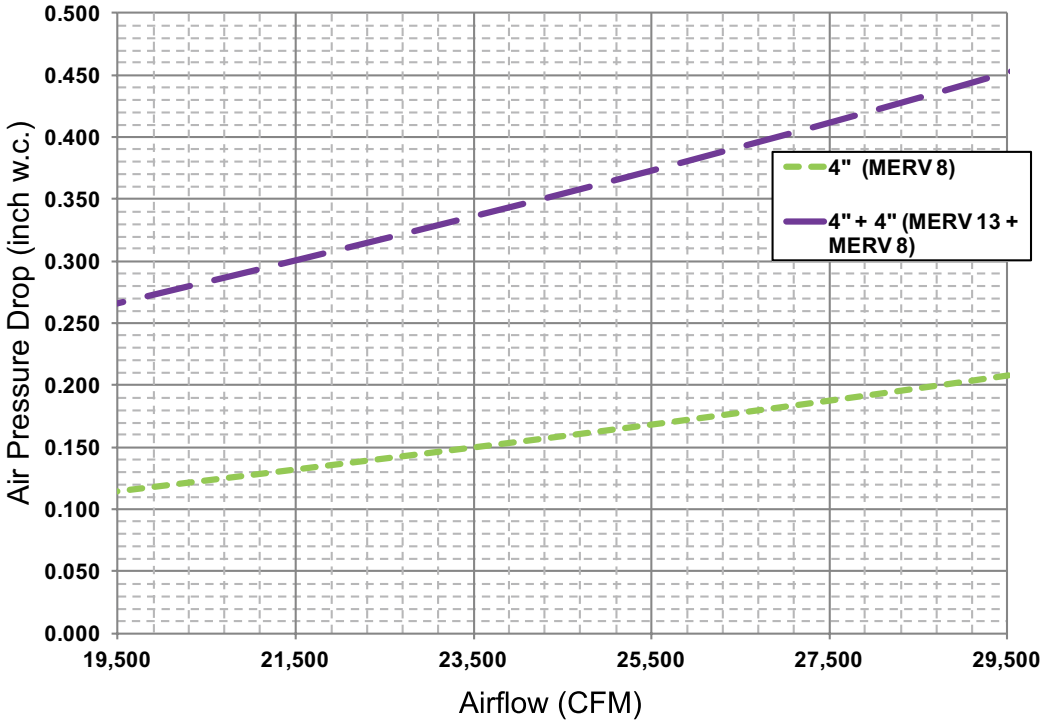
LSW_050 Air Pressure Drops Across Clean Filters



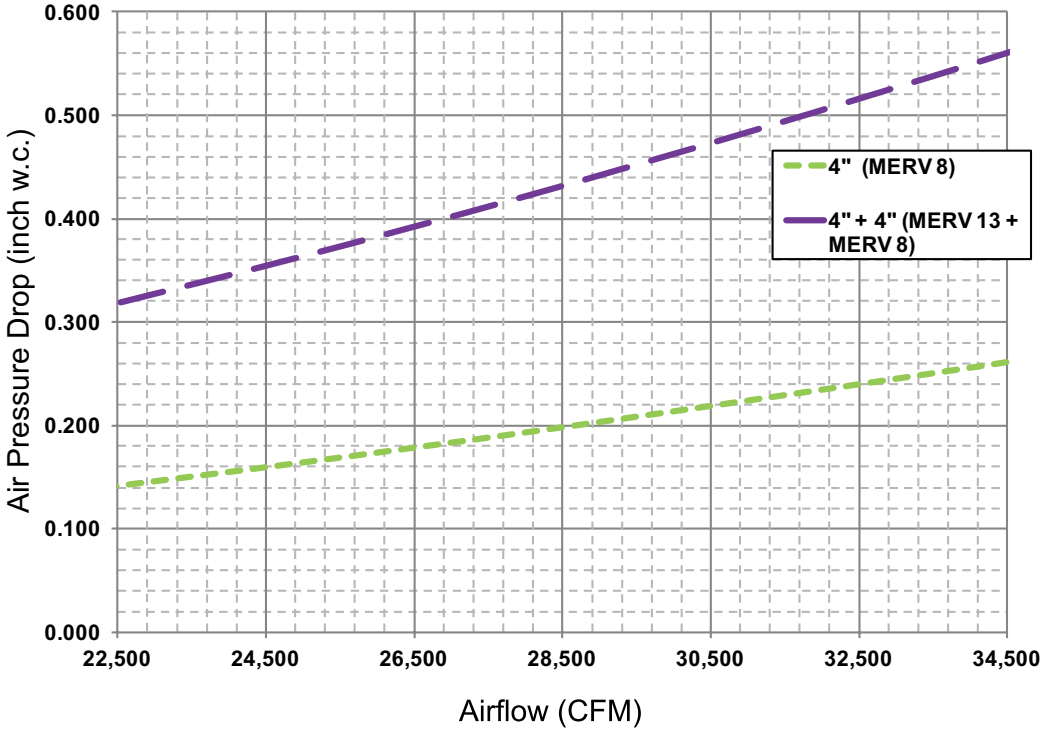
LSW_060 Air Pressure Drops Across Clean Filters



LSW_070 Air Pressure Drops Across Clean Filters

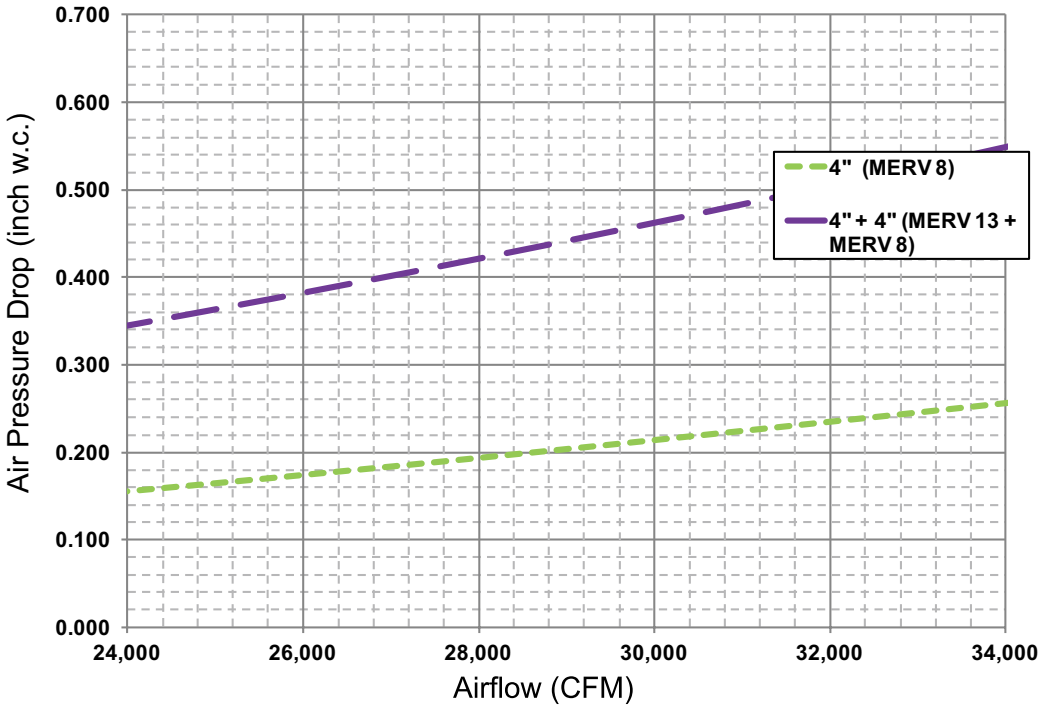


LSW_080 Air Pressure Drops Across Clean Filters

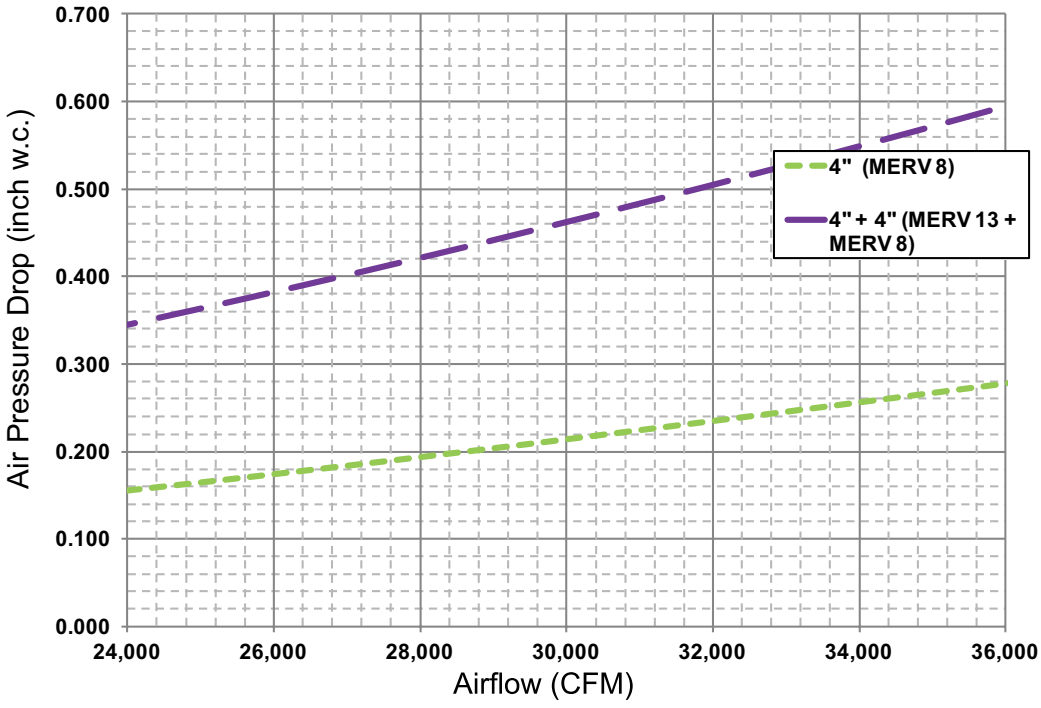


Air Pressure Drops (Cont'd)

LSW_095 Air Pressure Drops Across Clean Filters



LSW_105 Air Pressure Drops Across Clean Filters



Supply Fan Data

LSW_025–040

TABLE 21 - COMEFRI 25” FAN: LSW_025–040

CFM	TOTAL STATIC PRESSURE (INCHES OF WATER COLUMN)									
	2.0		3.0		4.0		5.0		6.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
4,000	819	1.58	818.8	1.6	818.8	1.6	818.8	1.6	818.8	1.6
6,000	1002.7	3.1	1168.7	4.7	1228.2	5.3	1228.2	5.3	1228.2	5.3
8,000	1124.3	4.5	1264.2	6.4	1393.7	8.3	1517.7	10.4	1637.6	12.6
10,000	1268.3	6.4	1390.6	8.6	1505.1	10.8	1613.4	13.2	1716.7	15.6
12,000	1428.5	8.9	1534.3	11.4	1636.7	14.0	1734.7	16.6	1828.3	19.4
14,000	1601.9	12.3	1691.4	14.9	1782.7	17.8	1870.6	20.8	1957.0	23.9

TABLE 22 - COMEFRI 28” FAN: LSW_035–040

CFM	TOTAL STATIC PRESSURE (INCHES OF WATER COLUMN)									
	2.0		3.0		4.0		5.0		6.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
8,000	906	4.31	1044.6	6.3	1177.3	8.6	1216.0	9.3	1216.0	9.3
10,000	993.8	5.8	1118.2	8.1	1231.5	10.5	1339.3	13.1	1444.5	16.0
12,000	1095.3	7.7	1205.6	10.4	1309.7	13.1	1407.2	16.0	1499.6	18.9
14,000	1207.1	10.2	1305.0	13.1	1398.8	16.2	1489.2	19.4	1575.7	22.7
16,000	1327.6	13.3	1413.4	16.5	1498.2	19.9	1580.3	23.4	1660.7	27.0
18,000	1454.2	17.1	1528.5	20.5	1605.6	24.2	1680.8	28.0	*Consult Factory*	

LSW_050–060

TABLE 23 - COMEFRI 32” FAN: LSW_050–060

CFM	TOTAL STATIC PRESSURE (INCHES OF WATER COLUMN)									
	2.0		3.0		4.0		5.0		6.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
12,000	1095	7.72	1205.6	10.4	1309.7	13.1	1407.2	16.0	1499.6	18.9
14,000	1207.1	10.2	1305.0	13.1	1398.8	16.2	1489.2	19.4	1575.7	22.7
16,000	1327.6	13.3	1413.4	16.5	1498.2	19.9	1580.3	23.4	1660.7	27.0
18,000	1454.2	17.1	1528.5	20.5	1605.6	24.2	1680.8	28.0	*Consult Factory*	
20,000	1583.4	21.8	1651.3	25.4	*Consult Factory*		*Consult Factory*		*Consult Factory*	

TABLE 24 - COMEFRI 36” FAN: LSW_050–060

CFM	TOTAL STATIC PRESSURE (INCHES OF WATER COLUMN)									
	2.0		3.0		4.0		5.0		6.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
14,000	753	7.36	859.5	10.6	957.5	14.0	1044.8	17.5	1044.8	17.5
16,000	796.6	8.8	898.8	12.4	989.5	16.1	1075.2	20.0	1160.7	24.2
18,000	844.0	10.4	940.9	14.4	1028.3	18.5	1108.3	22.7	1184.9	27.0
20,000	895.8	12.3	984.9	16.6	1069.6	21.1	1147.1	25.7	1219.3	30.3
22,000	950.8	14.5	1032.6	19.1	1112.5	23.9	1188.2	28.9	1258.5	33.9
24,000	1008.5	17.1	1083.9	21.8	1158.5	27.0	1231.0	32.3	1299.4	37.8

Supply Fan Data (Cont'd)

LSW_070–105

TABLE 25 - TWIN CITY 36" FAN: LSW_070–105

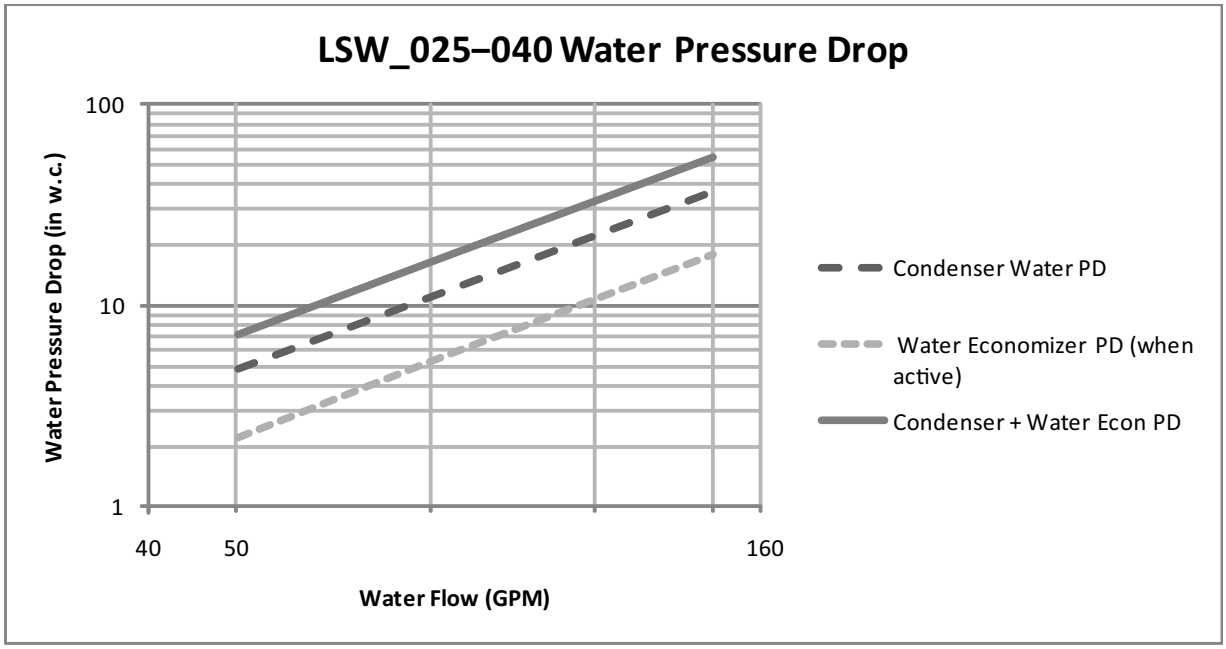
CFM	TOTAL STATIC PRESSURE (INCHES OF WATER COLUMN)									
	2.0		3.0		4.0		5.0		6.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
16,000	822.1	7.2	921.4	10.3	1015.1	13.6	1107.5	17.4	1195.8	21.4
18,000	875.4	8.5	967.6	11.9	1053.3	15.3	1136.8	19.1	1219.0	23.3
20,000	931.8	10.0	1017.1	13.7	1098.8	17.4	1174.9	21.3	1250.2	25.5
22,000	990.4	11.7	1070.9	15.6	1146.9	19.7	1220.1	23.9	1289.1	28.1
24,000	1050.1	13.6	1127.2	17.8	1197.9	22.2	1267.6	26.7	1334.3	31.2
26,000	1110.8	15.7	1185.0	20.3	1253.2	24.9	1317.7	29.7	1381.5	34.6
28,000	1172.6	18.0	1244.3	22.9	1309.7	27.9	1371.4	32.9	1431.2	38.1
30,000	1235.5	20.5	1304.4	25.8	1367.6	31.2	1427.3	36.5	*Consult Factory*	
32,000	1299.6	23.3	1365.3	29.0	1426.9	34.7	*Consult Factory*		*Consult Factory*	
34,000	1364.6	26.5	1427.0	32.5	*Consult Factory*		*Consult Factory*		*Consult Factory*	

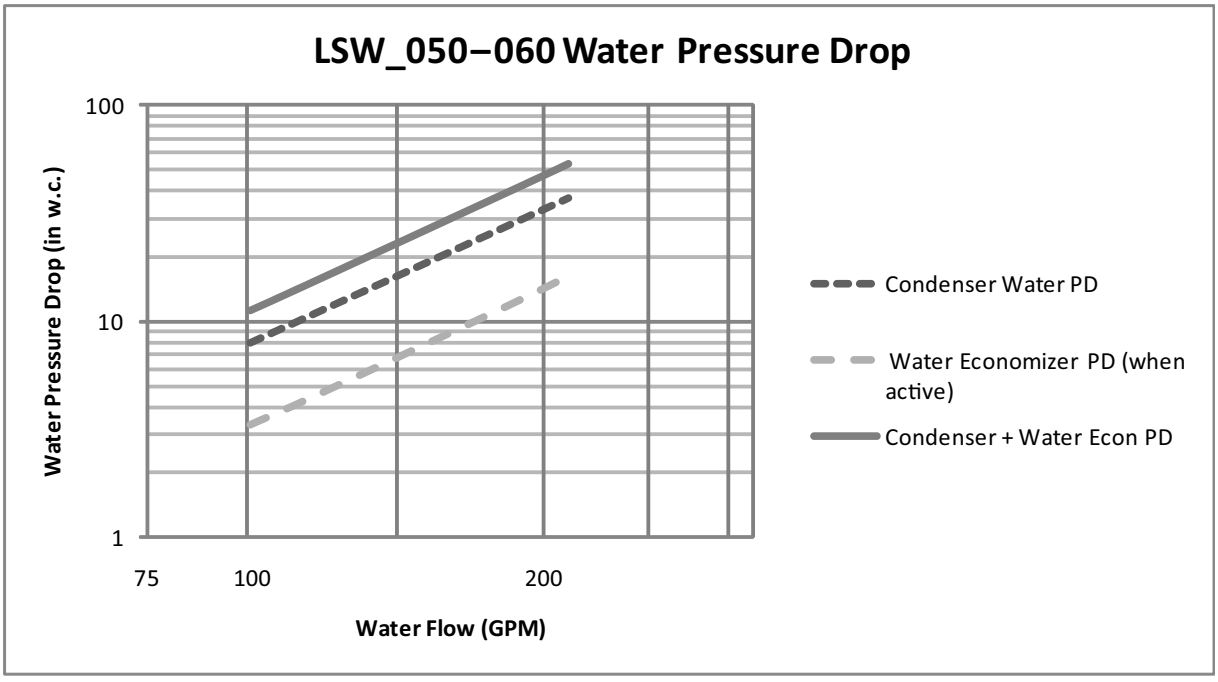
TABLE 26 - TWIN CITY 40" FAN: LSW_095–105

CFM	TOTAL STATIC PRESSURE (INCHES OF WATER COLUMN)									
	2.0		3.0		4.0		5.0		6.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
16,000	735.8	7.8	846.7	12.3	943.4	16.9	1037.9	21.7	1066.7	23.3
18,000	770.3	8.5	875.4	13.5	971.4	18.6	1056.1	23.7	1140.2	29.1
20,000	806.7	9.3	908.2	14.6	998.1	20.1	1084.4	25.9	1160.3	31.5
22,000	845.6	10.0	942.8	15.7	1030.4	21.6	1110.6	27.7	1189.1	34.2
24,000	883.7	10.7	977.8	16.7	1064.8	23.2	1142.6	29.7	1215.2	36.3
26,000	922.8	11.4	1017.8	17.9	1097.9	24.5	1175.7	31.6	1247.0	38.7
28,000	962.9	12.4	1055.6	18.9	1134.9	25.9	1210.6	33.5	1279.4	40.9
30,000	1004.2	13.7	1094.1	19.9	1174.8	27.6	1243.1	34.9	1314.7	43.3
32,000	1046.5	15.3	1133.3	21.0	1212.6	28.9	1283.2	37.0	1347.1	45.1
34,000	1089.8	17.5	1173.4	22.5	1250.9	30.2	1322.2	38.9	*Consult Factory*	
36,000	1134.2	20.2	1214.4	24.3	1289.9	31.6	*Consult Factory*		*Consult Factory*	

Water Pressure Drop

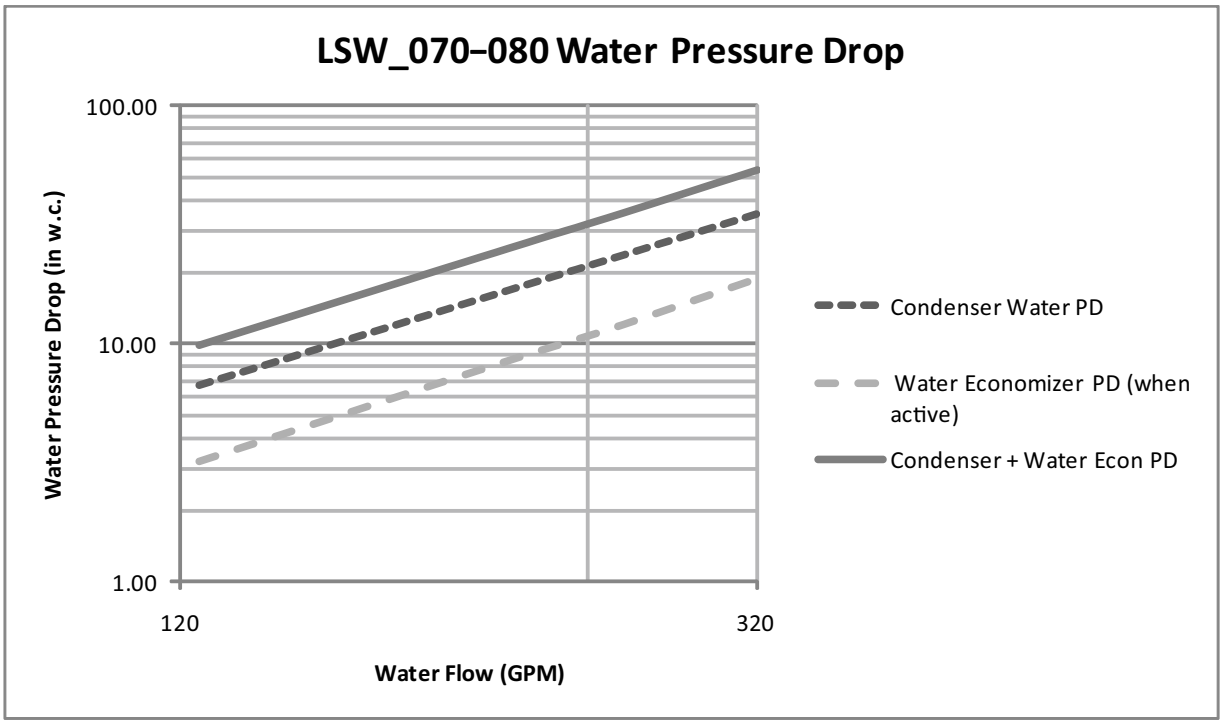
CONDENSER WATER PRESSURE DROPS (INCHES W.C.)

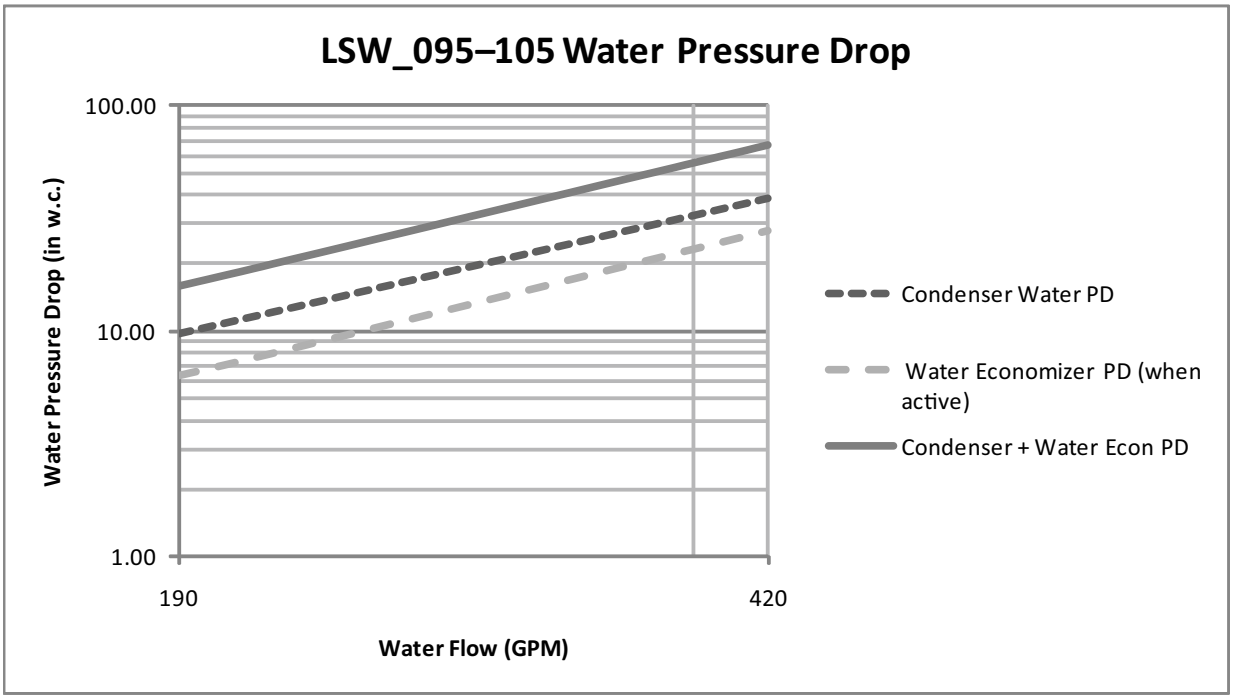




Water Pressure Drop (Cont'd)

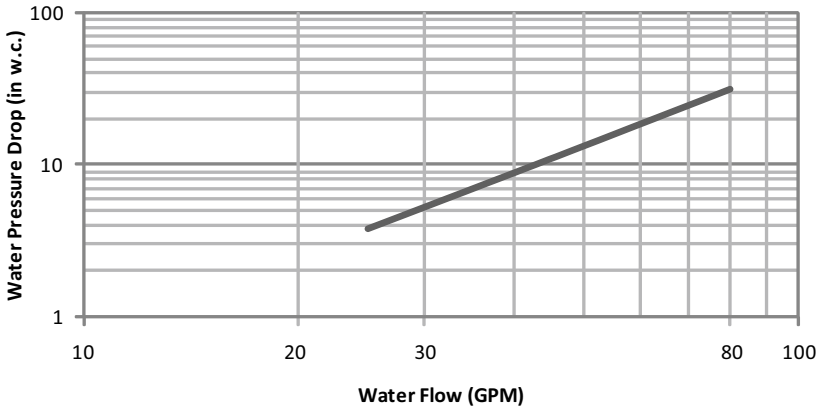
CONDENSER WATER PRESSURE DROPS (INCHES W.C.)



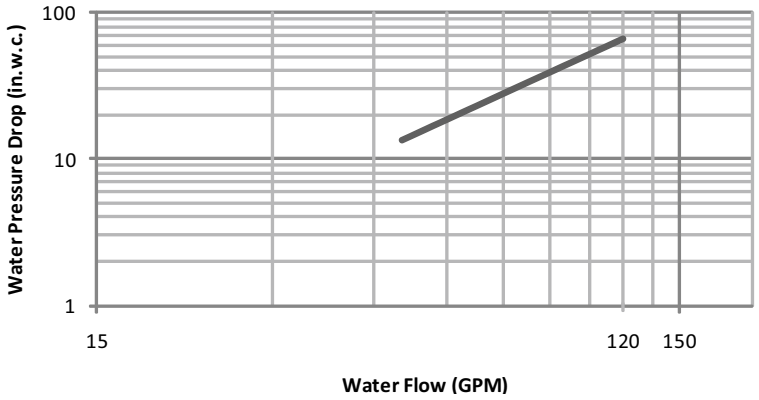


HOT WATER PRESSURE DROPS (INCHES W.C.)

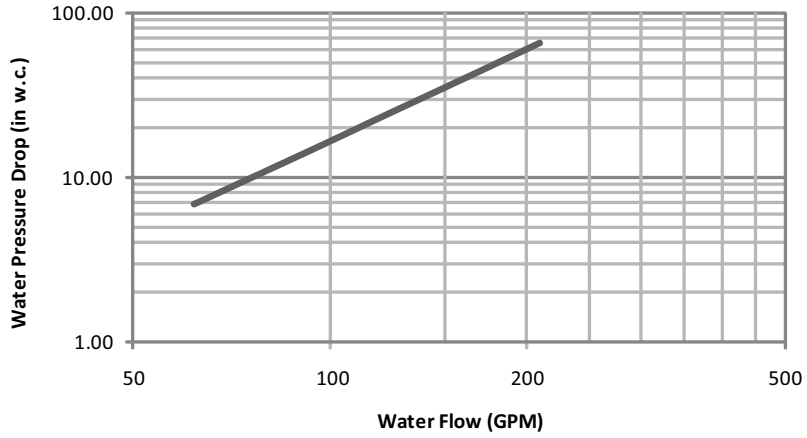
LSW_025–040 Hot Water Pressure Drop



LSW_050–060 Hot Water Pressure Drop



LSW_070–105 Hot Water Pressure Drop



Electrical Data

TABLE 27 - FAN MOTOR DATA

ODP PREMIUM EFFICIENCY

HORSEPOWER	208/3/60	230/3/60	460/3/60	575/3/60
	FLA	FLA	FLA	FLA
5 HP	14	12.7	6.33	5.06
7.5 HP	20.5	18.5	9.25	7.4
10 HP	27.4	24.8	12.4	9.92
15 HP	41.1	37.2	18.6	14.9
20 HP	55.3	50	25	20
25 HP	66.1	59.8	29.9	23.9
30 HP	78.3	70.8	35.4	28.3
40 HP	107	96.4	48.2	38.6
50 HP	132	120	59.9	47.9
60 HP	155	140	69.9	55.9

TEFC PREMIUM EFFICIENCY

HORSEPOWER	208/60/3	230/60/3	460/3/60	575/3/60
	FLA	FLA	FLA	FLA
5 HP	14.4	13	6.49	5.19
7.5 HP	20.1	18.1	9.07	7.26
10 HP	27	24.4	12.2	9.76
15 HP	40.3	36.4	18.2	14.6
20 HP	54.6	49.4	24.7	19.8
25 HP	65.2	59	29.5	23.6
30 HP	77.6	70.2	35.1	28.1
40 HP	107	96.4	48.2	38.6
50 HP	131	118	59.2	47.4
60 HP	151	137	68.3	54.6

TABLE 28 - COMPRESSOR MOTOR DATA

NOMINAL HORSEPOWER	208/3/60		230/3/60		460/3/60		575/3/60	
	RLA	LRA	RLA	LRA	RLA	LRA	RLA	LRA
10	31.0	239	28	239	14	125	10.9	80
11	33.4	245	30.2	245	15.1	125	12.7	100
13	39.8	300	36	300	18	150	15.6	109
15	47	340	42.5	340	21.2	110	18.6	132

TABLE 29 - ELECTRIC HEAT CAPACITY, MBH

ELECTRIC HEAT KW	UNIT SUPPLY VOLTAGE			
	208/3/60	230/3/60	460/3/60	575/3/60
17.5	36.5	40.3	20.2	16.1
35	73.0	80.7	40.3	32.3
52.5	109.5	121.0	60.5	48.4
70	145.9	161.4	80.7	64.6

Operating Weights

TABLE 30 - OPERATING WEIGHTS (LBS) - LSW_025–060

MODEL	025		032		035		040		050		060	
Compressor Section												
		H2O Weight		*H2O Weight*		*H2O Weight*		*H2O Weight*		*H2O Weight*		*H2O Weight*
Compressor-Standard	1832	72	1890	72	1941	72	2032	72	3392	144	3512	144
Compressor-High Efficiency	1852	72	1915	72	1971	72	2077	72	3462	144	3592	144
Water Economy Coil	265	55	317	61	374	68	374	68	575	136	575	136
Hot Water Heat	133	25	147	27	160	30	160	30	240	60	240	60
Fan Section												
Supply Fan	984		984		984		984		1380		1380	
25 Inch Class II	273		273		273		273		-		-	
28 Inch Class II	358		358		358		358		-		-	
32 Inch Class II	-		-		-		-		428		428	
36 Inch Class II	-		-		-		-		583		583	
Supply Fan Motor												
ODP	*Prem Eff*		*Prem Eff*		*Prem Eff*		*Prem Eff*		*Prem Eff*		*Prem Eff*	
5HP	175		175		175		175		-		-	
7.5HP	207		207		207		207		-		-	
10HP	238		238		238		238		-		-	
15HP	327		327		327		327		327		327	
20HP	367		367		367		367		367		367	
25HP	470		470		470		470		470		470	
30HP	-		-		-		-		512		512	
40HP	-		-		-		-		614		614	
50HP	-		-		-		-		622		622	
TEFC	*Prem Eff*		*Prem Eff*		*Prem Eff*		*Prem Eff*		*Prem Eff*		*Prem Eff*	
5HP	199		199		199		199		-		-	
7.5HP	260		260		260		260		-		-	
10HP	341		341		341		341		-		-	
15HP	365		365		365		365		365		365	
20HP	421		421		421		421		421		421	
25HP	538		538		538		538		538		538	
30HP	-		-		-		-		573		573	
40HP	-		-		-		-		742		742	
50HP	-		-		-		-		900		900	
Variable Frequency Drive (VFD)												
Variable Air Volume (VAV) & VAV w/ Bypass												
5HP	61		61		61		61		-		-	
7.5HP	81		81		81		81		-		-	
10HP	81		81		81		81		-		-	
15HP	96		96		96		96		96		96	
20HP	96		96		96		96		96		96	
25HP	115		115		115		115		115		115	
30HP	115		115		115		115		115		115	
40HP	115		115		115		115		115		115	
50HP	190		190		190		190		190		190	
Filter Section												
4 inch 30-35% Efficiency (MERV 8)	156		156		156		156		205		205	
4 inch 80–85% Efficiency + 4 inch 30–35% Efficiency Prefilter (MERV 13 + 8)	288		288		288		288		391		391	
Plenums												
Inlet Plenum - Sound Attenuating	246		246		246		246		290		290	
Outlet Plenum - Half	295		295		295		295		415		415	
Outlet Plenum - Full	386		386		386		386		355		355	
Inlet Plenum - Air Economy	678		678		678		678		866		866	
Electric Heat Section												
Fan	89		89		89		89		129		129	

**Weights shown represent approximate operating weights and they have a ±10% accuracy.

Operating Weights (Cont'd)

TABLE 31 - OPERATING WEIGHTS (LBS) - LSW_070–105

MODEL	070		080		095		105	
Compressor Section								
		H2O Weight		*H2O Weight*		*H2O Weight*		*H2O Weight*
Compressor-Standard	4316	231	4456	231	5331	231	5442	231
Compressor-High Efficiency	4376	231	4542	231	5441	231	5562	231
Water Economy Coil	783	240	989	240	1036	240	1036	240
Hot Water Heat	288	70	320	70	320	70	320	70
Fan Section								
Supply Fan	2040		2040		2040		2040	
36 Inch Class II	685		685		685		685	
40 Inch Class II	920		920		920		920	
40 Inch Class III	1065		1065		1065		1065	
Supply Fan Motor								
ODP	*Prem Eff*		*Prem Eff*		*Prem Eff*		*Prem Eff*	
15HP	327		327		327		327	
20HP	367		367		367		367	
25HP	470		470		470		470	
30HP	512		512		512		512	
40HP	614		614		614		614	
50HP	622		622		622		622	
TEFC	*Prem Eff*		*Prem Eff*		*Prem Eff*		*Prem Eff*	
15HP	365		365		365		365	
20HP	421		421		421		421	
25HP	538		538		538		538	
30HP	573		573		573		573	
40HP	742		742		742		742	
50HP	900		900		900		900	
Variable Frequency Drive (VFD)								
Variable Air Volume (VAV) & VAV w/ Bypass								
15HP	96		96		96		96	
20HP	96		96		96		96	
25HP	115		115		115		115	
30HP	115		115		115		115	
40HP	115		115		115		115	
50HP	190		190		190		190	
Filter Section								
4 inch 30-35% Efficiency (MERV 8)	257		257		257		257	
4 inch 80–85% Efficiency + 4 inch 30–35% Efficiency Prefilter (MERV 13 + 8)	487		487		487		487	
Plenums								
Inlet Plenum - Sound Attenuating	439		439		439		439	
Outlet Plenum - Half	415		415		415		415	
Outlet Plenum - Full	556		556		556		556	
Inlet Plenum - Air Economy	1540		1540		1540		1540	
Electric Heat Section								
Fan	161		161		161		161	

**Weights shown represent approximate operating weights, and they have a ±10% accuracy.

Guide Specifications

CABINET CONSTRUCTION

Each unit shall be completely factory assembled and shipped in one piece or in multiple pieces if required. Unit base shall be constructed out of formed 10-gauge galvanized steel frame and 16-gauge bottom welded together for superior strength. Lifting brackets shall be bolted on the unit base with and shall accept hooks.

Unit framework shall be fabricated from formed galvanized steel members of 12-gauge and 16-gauge pre-painted galvanized steel. Exterior cabinet component and access panels shall be constructed of a minimum of 18-gauge pre-painted galvanized steel. Access panels for electrical compartment and compressors and refrigeration specialties shall be hinged. All the refrigerant specialties like thermodynamic expansion valves, sight glass, pressure transducers, high pressure switches shall be out of the conditioned air stream. All access panels shall be 2-inch deep and insulated with 2-inch thick, 1.5 lb/cu ft density matt faced fiberglass insulation where necessary. Walls separating compressor compartment from conditioned space shall be insulated with fiberglass. Fan section shall have an insulated double walled hinged walk-in door with glass window to access fan and drive components. This door shall have pressure release safety latch to protect service personnel in case the fan section is pressurized when opening the door. Matt faced insulation in fan section roof and left and right sides shall be covered with 20-gauge perforated galvanized sheet metal to provide additional sound attenuation.

Installation manual, start-up form, operating bulletin, maintenance bulletin, and a hard copy of the electrical wiring diagrams are supplied inside each unit. Units shall have labels to indicate caution areas for servicing the unit. The data plate (nameplate) is permanently attached to the unit on the external panel next to the user interface panel on the front of the unit.

FILTRATION

The filters shall be face-loading (removable from the back of the unit). For servicing the filters when return air is ducted, hinged and latched access door shall be provided on Left side of the unit. To improve indoor air quality and reduce filter changes, 4-inch thick filters shall be provided with a maximum face velocity of 500 FPM. The minimum efficiency shall be MERV 8 (efficiency 30%). Optionally, MERV 13 filters shall be provided. The construction of the filter shall have media resistant to water consisting of mini pleats. When filters with rating higher than MERV 8 are used, filter section shall be house 4-inch thick, MERV 8 pre-filters. The pre-filters shall be upstream of the higher efficiency filters. All filters shall be Class II.

COOLING COIL

Direct Expansion (DX)

DX cooling coils shall be constructed of seamless 0.375-inch outside diameter copper tubing with a minimum wall thickness of 0.012-inches. The copper tubes shall be mechanically expanded to the aluminum fins. Coils shall be a minimum of 4 rows, with minimum 12 fins per inch. An adjustable thermal expansion valve (TXV) including an external equalizer shall feed each circuit. The TXV shall be sized to operate with minimum entering condenser water temperatures of 55.0°F. The coil shall be leak tested with high-pressure nitrogen in a warm water bath.

Guide Specifications (Cont'd)

Condensate Management

The coil section shall include an integral drain pan constructed of 16-gauge, type 304 stainless steel with a minimum depth of 2 inches. The drain pan shall be sloped in all directions towards a single condensate drain connection to provide positive drainage, and shall comply fully with ASHRAE 62.1.

The unit shall include a factory installed drain line including drain trap with a cleanout, to ensure adequate access to the trap. The condensate line shall be made out of schedule 40 PVC pipes. Copper drain lines shall be insulated with a minimum of ½ inch closed cell pipe insulation to avoid sweating. No external drain trap shall be required.

WATERSIDE ECONOMIZER

Waterside economizer cooling coil shall be constructed of seamless 0.50-inch outside diameter copper tubing with a wall thickness of 0.016-inches. The copper tubes shall be mechanically expanded to the aluminum fins. Coils shall be a minimum of 4 rows, with a minimum of 11 fins per inch. The circuiting of the coil shall be such to allow the lowest water pressure drop. Waterside economizer water coils shall have a vent and drain. The coil shall be provided to be chemically [optionally mechanically] cleanable. The coil shall be leak tested with high-pressure air in a warm water bath. The complete economizer package, including the coil, valves, and piping shall be rated for 300 psig waterside working pressure.

To control the condenser water flow through the coil, a factory installed modulating control valve package shall be provided. A valve package includes the valve(s), actuator(s), wiring, and piping internal to the unit. The condenser water piping connections shall be located inside, close to the exterior of the unit, located for easy connection to the building risers. One set of connections (one for inlet and one for outlet) is needed for each unit.

Economizer operation shall be controlled to maximize free cooling operation as the entering condenser water is colder than the entering air (mixed air = outdoor air + return air) temperature to the unit. If the condenser water is suitable for cooling, the economizer valve shall modulate to maintain temperature set point. If the cold condenser water cannot satisfy the cooling load, mechanical cooling shall assist the pre-cooling to achieve temperature set point. To maximize energy savings, the economizer shall pre-cool until disabled when the condenser water becomes too warm compared to the entering air temperature. When the economizer is disabled, the economizer valve shall shut and the condenser valve shall open to allow 100% water flow through the condenser.

When the unit is not in operation, the economizer is disabled and the economizer valve is always closed. The condenser valve can be set to either close or 100% open. If the condenser valve is closed, the system water flow shall be reduced, thus saving pumping energy. If the condenser valve is set to close in the unit is not in operation, the valves shall be controlled to work independent of the economizer valve. If the condenser valve is set to be 100% when the unit is not in operation, the valves shall work in reverse acting.

[A non-averaging type freezestat shall be factory installed. When the freezestat senses the entering air temperature is below the set point, the unit shall be put into the unoccupied mode and the economizer valve shall be driven to 100% open and the condenser valve shall be driven closed.]

HEATING (OPTIONAL)

Hot Water

Optional hot water heating shall include hot water coil installed in the coil section on the leaving air side of the evaporator coil, and hot water piping and a motorized valve.

Hot water heating coils shall be constructed of seamless 0.50-inch outside diameter copper tubing with a wall thickness of 0.016-inches. The copper tubes shall be mechanically expanded to the aluminum fins. Coils shall be a 1 row with up to 12 fins per inch. The circuiting of the coil shall be such to allow the lowest water pressure drop. Hot water coils shall have a vent and drain. The coil shall be leak tested with high pressure air in a warm water bath. Convenient access to the coil for inspection and cleaning shall be from both sides of the unit. The coil shall be installed on the leaving side of the direct expansion coil, in a draw-through position.

To control the water flow through the coil, a factory installed two-way modulating valve package shall be provided. A valve package includes the valve, actuator, wiring, and piping internal to the unit. The piping connections shall be protruding through the unit roof, located for easy connection to the building risers.

[A non-averaging type freezestat shall be factory installed. When the freezestat senses the entering air temperature is below the set point, the unit shall be put into the unoccupied mode and the hot water valve shall be signaled to drive 100% open.]

Electric Heat

Electric heat shall consist of electric heater located inside the unit at the unit supply air outlet, electric power control components, and necessary controls. Each stage of electric heat shall not exceed 17.5 kW.

Electric heater shall be in an 18-guage sheet metal frame and shall be made out of nickel chromium resistance wire. The heater shall be protected by automatic thermal cutout and manual thermal cutout. The cutouts and heater electrical connection shall be enclosed in a junction box with a hinged cover.

Heater shall be protected by fuses not larger than 45 amps and complete with contactors. The electric heater shall be controlled by the unit controller and staged as necessary.

Electric heat shall be enabled when none of the compressors are energized. Simultaneous operation of compressors and electric heat shall not be permitted.

FAN SECTION

Supply Air Fan

A single supply fan shall be provided comprised of a medium pressure, single width, and single-inlet (SWSI) centrifugal plenum fan wheel with airfoil blades. The fan wheel shall be a minimum of Class II construction to handle over 6.0" total static pressure. The fan wheel and blades shall be constructed of painted steel. The fan shall be secured to a ground and polished solid steel shaft coated with rust inhibitor. The shaft shall be secured and supported by two heavy-duty pillow-block type grease lubricated bearings. Bearing diameter shall be the same size as the main shaft diameter. Bearings shall be sized to provide an L-50 life at 200,000 hours. The fan bearings shall have extended grease lines to a common location.

Guide Specifications (Cont'd)

Fan Motor

Fan motor shall be heavy-duty 1750 rpm open drip-proof (ODP) type with grease lubricated ball bearings. The motors shall meet applicable EPACT efficiency requirements. Optionally, TEFC motor shall meet applicable EPACT efficiency requirements. Motors shall be mounted on a heavy-duty adjustable base that provides for proper alignment and belt tension adjustment. The minimum service factor shall be 1.15 fixed pitch V-belt drives with a minimum of two belts shall be provided. Drive shall be selected at a service factor of 1.15. Optionally, the Drive shall be selected at a service factor of 1.5.

Completed fan assembly, including fan, drive, motor assembly, and framework, shall be statically and dynamically balanced at the factory. Entire fan assembly shall be mounted on 2-inch nominal deflection spring isolators. Optionally, 2-inch nominal deflection spring isolators with seismic restraints shall be available. The inlet to the fan assembly shall be isolated from the unit with a flexible connection. The entire fan assembly shall be isolated within the unit, thus eliminating external spring isolation. Use of standard waffle pads between the bottom of the unit and the concrete housekeeping pad is sufficient. Fan section ceiling and walls directly facing the fan outlet air will have double wall construction with 20-gauge perforated galvanized steel.

Variable Frequency Drives (VFD)

Airflow modulation and static pressure control shall be achieved by increasing or decreasing the speed of the variable frequency drive (VFD). The VFD shall be approved for plenum duty applications. In event of VFD failure, the bypass contactor shall be energized using operator interface. In the bypass mode, the fan shall operate at full design airflow and the VFD can be removed for service. The compressors shall be staged to meet the discharge air temperature set point.

The supply air fan drive output shall be controlled by the factory-installed unit control system. The VFD status and operating speed shall be monitored and displayed at the unit control panel. A factory mounted, field adjustable duct high-limit safety control shall be available to protect ductwork from excessive duct pressure. The installer shall provide and install sensor tubing from [a single unit mounted sensor] [two unit mounted sensors] to the duct location(s).

Optional VFD and bypass contactor shall be completely wired and run tested at the factory. Motor overload relay is sized to protect the motor during bypass mode.

COMPRESSORS

Each unit shall have multiple high-efficiency; heavy-duty, suction-cooled scroll compressors. The compressors shall be single speed operating at 3450 rpm at 60 Hz. A refrigerant pressure transducer shall be installed on the discharge and suction side of each compressor. These sensors shall be used to indicate high pressure, low pressure, motor protection, and identify other conditions that could frost the DX coil. A high pressure switch sensing refrigerant pressure at the compressor discharge will disable compressor by opening contactor circuit in case of high refrigerant pressure. Each compressor shall include motor overload protection, and a minimum three-minute interstage timer to prevent short cycling. The compressors shall be isolated internal to the unit by rubber in shear isolators. Each refrigerant circuit shall be charged with POE oil and Refrigerant HFC-410A. The compressors shall be independently protected for overload using circuit breakers/manual starters. Each compressor will have individual refrigerant circuit. Compressor RLA will not exceed 21.2 Amps at 460 Volts or 47 Amps at 208 Volts. Compressors shall be 15 nominal horsepower or lower.

For units with less than four compressors, one modulating compressor with a minimum of three stages shall be provided for proper operation at low loads. Unit shall have a minimum of two compressors.

CONDENSERS

Water-Cooled condensers shall utilize high-efficiency, compact, mechanically cleanable shell and tube design. The condenser shall have removable water heads to clean tubes. The condenser shall be constructed of enhanced, heavy-walled 5/8-inch OD copper tubes. The condenser shall have independent refrigerant circuits with a common water supply. Condensers shall be rated for 560 psig refrigerant and 300 psig *[400 psig]* water-side working pressure. Valve package shall be factory piped and completed condenser and piping assembly shall be leak tested at the factory.

UNIT EFFICIENCY

Provide Water-Cooled Self-Contained units to meet the scheduled efficiency levels with a minimum EER of 12.6.

CONTROLS

The unit shall be controlled by a stand-alone 32 bit microprocessor based controller. The controller along with all applicable sensors, transducers, and end devices shall be factory packaged, installed, and fully tested before shipment to insure reliable operation.

The control system shall include a keypad with 36 keys and 2 line x 40 character LCD display to be used as operator interface. All text and messages displayed shall be in plain English. The user interface shall provide, at a minimum, the following information:

Setpoints

- Supply Air Temperature
- Morning Warm up / Occupied Heating Temperature
- Unoccupied Heating Temperature
- Duct Pressure
- Supply Air Temperature Reset via Outside Air Temperature
- Supply Air Temperature Reset via Return Air Temperature
- Supply Air Temperature Reset via VFD Speed (variable air volume (VAV) only)
- Supply Air Temperature Reset Limits

Safeties

- Low Suction Pressure (1 per compressor)
- High Discharge Pressure (1 per compressor)
- Compressor Motor Overload (1 per compressor)
- Supply Fan Fail
- Low Entering Air Temperature
- Low Entering Water Temperature
- Excessive Duct Pressure

Guide Specifications (Cont'd)

Operating Modes

- Unoccupied Heating
- Unoccupied Standby
- Unoccupied Cooling
- Morning Warm-Up
- Occupied Heating
- Occupied Standby
- Occupied Cooling
- Local Stop

Alarms / Warnings

- Compressor Safety
- Excessive Duct Pressure
- Water Freeze
- Low Suction Pressure
- Supply Air Temperature Sensor Failure
- Supply Fan
- Return Air Temperature Sensor Failure
- Zone Temperature Sensor Failure
- Dirty Filter
- Suction Pressure Transducer Failure
- Discharge Pressure Transducer Failure
- Outside Air Temperature Sensor Failure (Units with Airside Economizer)
- Outside Air Humidity Sensor Failure (Units with Airside Economizer)
- Return Air Humidity Sensor Failure (Units with Airside Economizer)
- Duct Pressure Transducer Failure
- Low Water Flow (Units with Water Flow Switch)
- Low Water Temperature
- Entering Water Temperature Sensor Failure
- Leaving Water Temperature Sensor Failure

Field Wiring Inputs and Outputs

- Unit Shut Down (Emergency Stop) Input
- Occupancy Input

- Zone Temperature Input
- VAV Heat Relay Output
- Occupancy Indication Output
- Alarm Output
- Pump Start Output

Standard Control Sequences

- Unit can be indexed between Occupied and Unoccupied via four methods:
  1. Manually via OFF-AUTO-ON switch
  2. Remotely via Field Wiring Input
  3. Remotely via Building Automation System (BAS) (BACnet® or Modbus™)
  4. Automatically via internal scheduling
- Control sequences for constant volume (CV), VAV, and Flexsys™ (Underfloor VAV) built in.
- For VAV operation, four Supply Air Temperature setpoint reset sequences can be selected:
  1. No Reset, fixed Supply Air Temperature setpoint
  2. Reset via Return/Zone Temperature
  3. Reset via Outside Air Temperature
  4. Reset via VFD Speed
- Occupied Heating
- Unoccupied Heating (Night Set Back)
- Morning Warm-up
- Economizer Sequences Built-In
  1. Waterside Economizer with Adjustable Approach setpoint
  2. Airside Dry Bulb (Units Equipped with Mixing Box)
  3. Airside Single Enthalpy (Units Equipped with Mixing Box)
  4. Airside Dual Enthalpy (Units Equipped with Mixing Box)

  Note: Economizer sequences allow for economizing with mechanical cooling when economizer alone is insufficient for load.
- Condenser Water Control Sequences Built-In
  1. No Condenser Valves
  2. Condenser Valve Only – No Bypass

Guide Specifications (Cont'd)

3. Condenser Valve With Bypass Valve
4. Condenser Valve With Water Economizer Valve

- Hot Water or Steam Control Sequences (Proportional)
- Staged Heat Sequences (4 Stages)

AUXILIARY CONTROL OPTIONS

Non-Fused Disconnect

A factory installed non-fused disconnect switch shall be provided for disconnecting electrical power at the unit. The switch shall be located at the front of the unit, visible and accessible without removing any access panels.

Dual Power Block

Factory installed two power terminal blocks shall power the supply fan and controls from one power distribution block and power compressors and optional electric heat from a second power distribution block. This arrangement shall allow operation of fan only when that power distribution block is energized.

Dual Non-Fused Disconnects

Two factory installed non-fused disconnect switches shall be provided for disconnecting electrical power at the unit. One shall be sized for the controls and supply air fan motor. The other shall be sized for all the compressors. The switches shall be located at the front of the unit, visible and accessible without removing any access panels.

Phase Failure/Under Voltage Protection

A phase failure/under voltage protection device shall be provided to protect three-phase motors from damage due to single phasing, phase reversal and low voltage conditions.

Freezstat

A non-averaging type freezstat is factory mounted at the unit's entering face of the coil. When a temperature is sensed on any 18" of the freezestat below 38.0°F, an alarm signal shall be generated, the fan will shut down, and the waterside economizer [heating] [waterside economizer and heating] valve shall be driven to 100% open to allow full flow. This alarm requires a manual reset.

Head Pressure Control with One Two-Way Valve

When the entering condenser water temperature is below 55.0°F and/or the use of waterside economizer is not available, a factory installed and controlled modulating head pressure control two-way valve shall be provided. The valve actuator shall be controlled through the factory installed main unit control system to maintain refrigerant head pressure by reducing the water flow as necessary to allow proper functioning of thermostatic expansion valves.

Head Pressure Control with Two Two-Way Valves

When the entering condenser water temperature is below 55 ºF and/or the use of water-side economizer is not available, two factory installed and controlled modulating head pressure control two-way valves shall be provided. Valve actuators shall be controlled through the factory installed main unit control system to maintain refrigerant head pressure by reducing the water flow as necessary through to allow proper functioning of thermostatic expansion valves. The second two valve shall open to divert condenser water to the unit outlet, minimizing the fluctuations in total water flow.

Condenser Water Flow Switch

When unit is the mechanical cooling mode, compressors shall be enabled when the condenser water switch is made. Mechanical cooling shall be disabled when the condenser water flow switch opens during the operation for longer than 10 seconds, and all compressors shall be turned off.

Dirty Filter Switch

A factory installed and wired pressure switch senses the air pressure differential across the filters. When the differential pressure exceeds 1.0 iwg (adjustable), the normally open contacts close. This signals the unit controller that the filters are loaded and are in need of a change.

Duct High Pressure Limit Switch

Factory installed and wired pressure switch senses the air pressure differential between the unit inlet and fan outlet. When the differential exceeds the set point for safe operation of the duct system and the unit, the unit is shut off and an alarm is generated.

Duct Static Pressure Sensor

Factory installed and wired pressure switch senses the air pressure differential between static pressure inside the duct and outside the duct at the same location. Two pneumatic tubes from the inside and outside of the duct are to be field installed. The duct static pressure sensor will then control optional VFD speed. Additional duct static pressure sensor will be available with accompanying logic if the duct static pressures at two different locations are to be monitored and used to control the VFD speed.

FACTORY TEST

Each unit shall undergo a rigorous factory-run test prior to shipment and factory test sheets shall be available upon request. The factory test shall include dynamic balancing of the completed fan assembly, a compressor run check, a complete run test of all electrical components and safeties, a leak check of all refrigerant circuits, a leak check of all water circuits, and a final unit inspection.

AGENCY LISTING

The unit shall have ETL US/Canada listed by Intertek Testing Services, Inc.

Guide Specifications (Cont'd)

SERVICE CLEARANCE REQUIREMENTS

Service Clearance requirements on all four sides shall be indicated clearly on the submittal drawings. Optionally, Unit shall require NO MORE THAN 3 inches of clearance on two sides so that the unit may be placed in a corner.

OPTIONAL SHIPMENT IN MULTIPLE SECTIONS

The unit shall be shipped in sections. Assembly in the mechanical room shall not require interconnection of refrigerant or condenser water piping between sections. All control wiring connections between sections shall be through connector plugs. Should unit dismantling and reassembly be required, the contractor shall bear the cost for this work and ensure the manufacturer's warranty is not voided.

BUILDING AUTOMATION SYSTEM (BAS) INTERFACE

BACnet® MS/TP communication protocol shall be available.

Common Alarm Output

This binary output signal is used to indicate an alarm signal. When the unit controller has processed an alarm condition, the normally closed dry contacts shall open. When the alarm has been cleared, the contacts shall return to the normal closed position.

Outdoor Air Damper Output

Occupied/Unoccupied output signal on/off signal is used to control the outdoor air damper. Off corresponds with a closed damper and open with a fully open damper for outdoor air.

VAV Box/Heat

This binary output signal is used to put the VAV box in a heating or cooling mode. When the normally open contacts are closed, this represents a heating mode, and the VAV box should be at the maximum position. When the normally open contacts are open, this represents a cooling mode, and the VAV box should be in the cooling mode and maintaining the space/zone temperature. Voltage for the device(s) connected to the output needs to be provided from another source.

External Stop (Fan Stop)

This binary input signal is used to shut the unit down in an emergency. When the signal is open, the unit is in the shut down emergency mode. Thus, the unit is in the unoccupied mode. When the signal is closed, the unit shall be operating in the typical. After the unit has been in the emergency mode, when the signal is closed, the unit shall be controlled in the normal manner. Reset is not needed unless an alarm condition has occurred.

Cool/Heat Enable

The keypad shall be used to enable or disable cooling and heating and allow the unit to be in the fan on mode. In the fan on mode for VAV units, the unit shall control duct static pressure.

OPTIONAL ACCESSORIES

Discharge Plenum

Units shall be provided with an optional acoustical discharge plenum shipped loose for field installation. The duct opening(s) in the discharge plenum shall be located for horizontal duct connection(s). Single [Multiple] duct opening size(s) and location(s) shall be coordinated with the factory. Duct openings for the discharge plenum shall not require field cutting or modifications.

The discharge plenum shall be constructed of formed 16-gauge pre-painted galvanized steel. The exterior panels shall be fabricated from 18-gauge pre-painted galvanized steel. The plenum wall shall be insulated with 3-inch, 3.0 pcf density fiberglass acoustical insulation. For acoustical purposes, the interior walls of the plenum shall be lined with 20-gauge, galvanized steel, perforated liner.

Closed cell gasket and clear silicon caulking shall be placed between the unit and the discharge plenum to prevent air leakage. Brackets anchored with bolts shall attach the plenum to the unit. When the plenum is to be shipped loose, mounting hardware including bolts, brackets, gasket and caulking shall be provided from the factory. It shall be shipped inside the plenum.

Airside Economizer Inlet Plenum

For air economizer applications, an inlet plenum with integral low leak dampers shall be provided. This section shall be shipped separate from the unit for field installation. The inlet plenum panels shall be made from 18-gauge painted galvanized steel. The frame casing shall be constructed of 16-gauge galvanized steel. The section shall include dampers for the return and outdoor air. Dampers shall be airfoil shaped, and sealed by vinyl gasket along the edges for low leakage. The dampers shall be fabricated from 16-gauge galvanized steel and rotate on nylon bearings.

The return and outdoor air opening locations will be back and top respectively. Control actuator with linkages for the return air dampers and another for the outdoor air dampers shall be factory installed. The dampers actuator shall modulate in response to the cooling load during the economizer mode. The outdoor air damper and return air damper shall be controlled in a reverse-acting fashion by the unit controller.

Economizer operation shall be controlled to maximize free cooling operation based on outdoor air conditions. If outdoor air is suitable for cooling, the outdoor air dampers shall modulate to maintain temperature set point. If the outdoor air cannot satisfy the cooling load, mechanical cooling shall assist the pre-cooling to achieve temperature set point. To maximize energy savings, the economizer shall pre-cool until disabled by the enthalpy or temperature. When the economizer is disabled, the outdoor air dampers shall be set to the minimum position of 15% (keypad adjustable).

This option is available only when waterside economizer is not chosen.

Sound Attenuating Inlet Plenum

For additional sound attenuation, a field installed inlet plenum shall be provided. Inlet plenum will have return air access from both sides and shall be made out of 4-inch 3-lbs/lb density fiberglass with black facing that contains flame retardant and biocide, and 20-gauge galvanized steel perforated metal liner. The plenum shall be available on the units without low service clearance units.

This option is available only when airside economizer is not chosen.