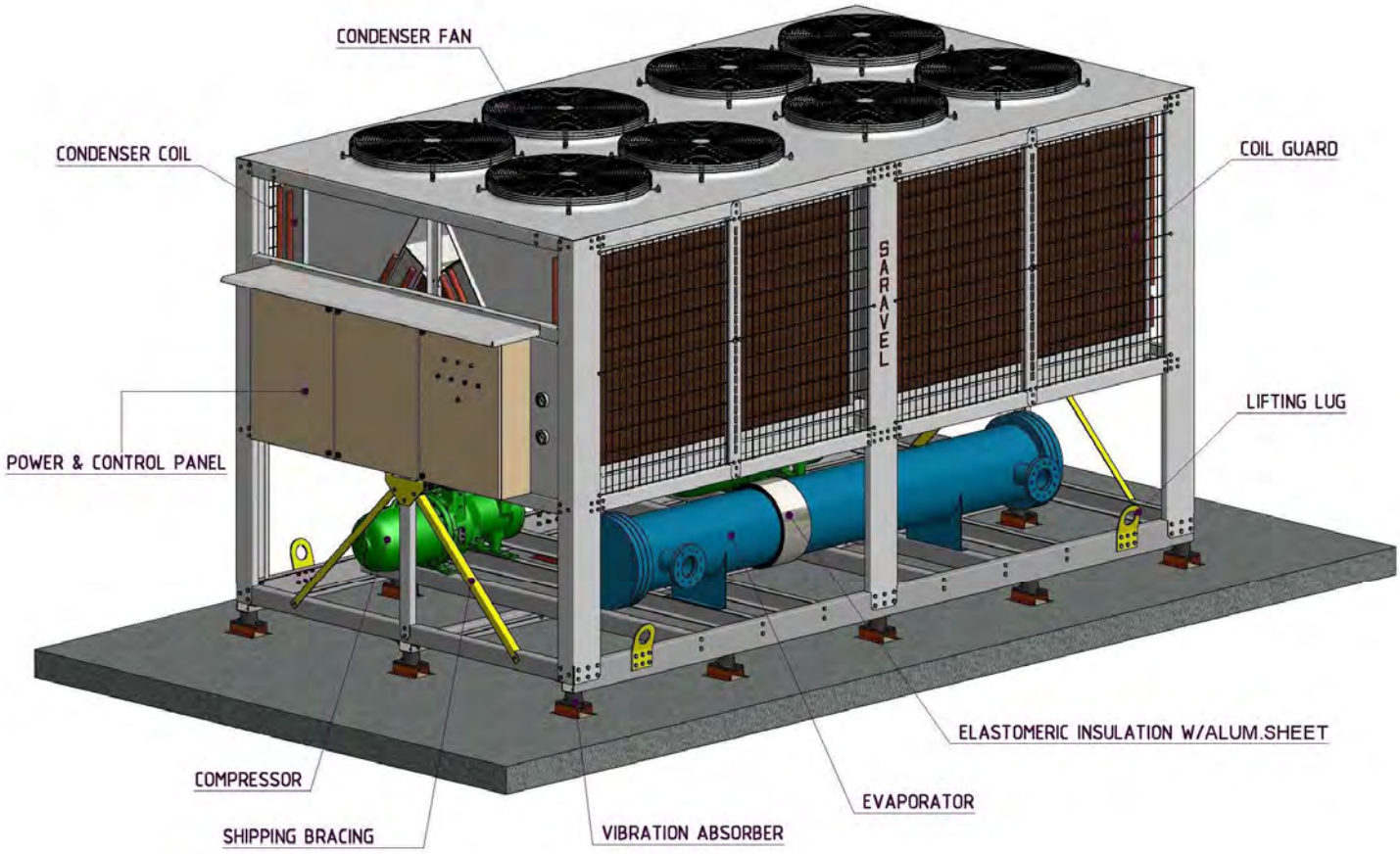
CAT-SPLCSC-2020

SARAVEL PACKAGED AIR-COOLED SCREW CHILLERS

50 TO 280 TONS
(175 TO 985 KW)


CONDENSER FAN
CONDENSER COIL
COIL GUARD
SARAVEL
LIFTING LUG
POWER & CONTROL PANEL
ELASTOMERIC INSULATION W/ALUM.SHEET
COMPRESSOR
EVAPORATOR
SHIPPING BRACING
VIBRATION ABSORBER

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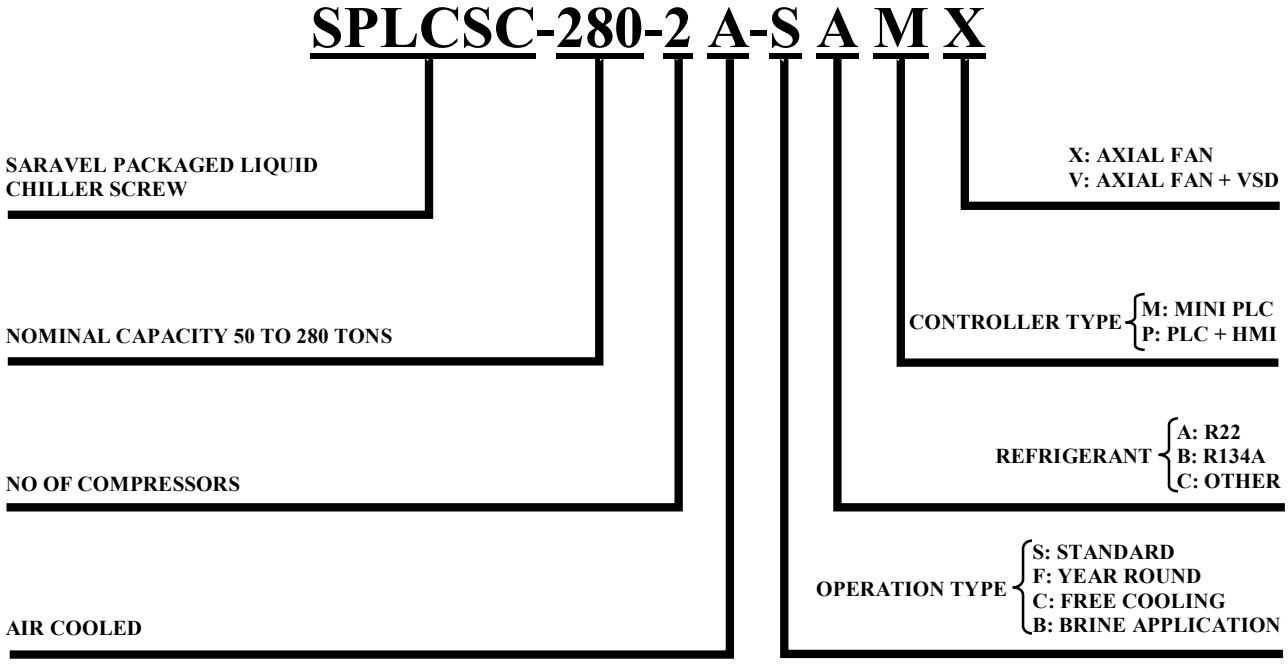
NOMENCLATURE



NOTE: SARAVEL reserves the right to make changes to design and construction, without notice.

INTRODUCTION 2

INTRODUCTION

SARAVEL Air-cooled screw chillers provide chilled water for air handling and terminal units in commercial and residential air conditioning applications. Units can be configured to flow and load requirements for brine, light process, and thermal storage applications. All units are completely self-contained and are designed for outdoor (roof or ground level) installation. Each unit includes semi hermetic screw compressors, evaporator, air cooled condenser, a charge of refrigerant R22/R134A, and a weather resistant power and microprocessor control panel, all mounted on a rugged, formed-steel base.

GENERAL

The 50-280 TR (175 - 985 KW) models are shipped in a complete package from the factory ready for installation and use.

The unit is inert gas pressure-tested, evacuated, and fully charged with R22/R-134A and includes an initial oil charge. After assembly, a full shift, complete operational test (Factory Acceptance Test) is performed with water flowing through the evaporator to assure performance to design conditions with run data logs and factory set points documented.

Units are constructed of heavy gauge galvanized fabricated steel profiles assembled on structural steel and are coated with epoxy paint. Units are provided with lifting eyes and suited for base rail mounting. Neoprene rubber vibration isolators are supplied to reduce transmitted sound and vibration to building structure.

The refrigerant circuit piping is pre-designed for die formed tube bending where only terminal connections are brazed, in order to minimize refrigerant leakage possibilities.

COMPRESSORS

The semi hermetic-rotary compressors incorporate two asymmetric helical screw profile rotors directly driven by a motor. The motor is cooled by 100% of the suction gas flow. A large internal oil sump is fitted with off cycle electric heater element to ensure oil adequate oil lubrication properties on startup. The compressor terminal box is IP-65 protected. Suction and discharge service shut off valves are provided for unit isolation and refrigerant recovery. The 2-pole motors (2900 RPM) are designed to run on 380V-3PH-50HZ electricity and are fitted with motor overcurrent protection and thermistors.

EVAPORATOR

The multi circuit Direct Expansion (DX) cooler is designed for optimum efficiency. The refrigerant is fed through an Electronic Expansion Valve (EEV), and a series of baffles direct water over the refrigerant tubes in crossflow configuration. There is one independent refrigerant circuit per compressor.

The evaporator shell and low temperature lines are completely protected with closed-cell rubber foam fire retardant insulation with aluminum covering, for thermal insulation, condensation prevention, and vapor seal.

Shell side and tube sides are pressure tested to 1.5 X Design Working Pressure (DWP) with inert gas following fabrication.

CONDENSER

Coils – Fin and tube condenser coils of seamless, copper tubes are arranged in staggered rows, mechanically expanded into aluminum fins. Tube supports are die formed from galvanized steel sheet. The coils consist of 5/8” or 3/8” OD in 3 or 4 rows deep arrangement with fin spacing of 10 FPI (Fins Per Inch). The test pressure of the coils is 450 PSIG (30 barg) for R22 and 350 PSIG (23 barg) for R134A.

Post Coated Fin Condenser Coils

Fin materials include aluminum and copper.
For corrosive environments the system designer can specify coil coating that protects fins and exposed copper tubes. SARAVEL offers Blygold® coil protection with extended 5-year warranty.

Refrigerant Circuit

There is one independent refrigerant circuit per compressor consisting of suction, discharge, and liquid lines. All copper refrigerant piping is routed using die formed bending that necessitate brazing only at terminal points thereby minimizing fitting and leakage paths.

The liquid line consists of high adsorption removable filter drier core, full port service shut off valve, charging valve, and fused sight glass with moisture indicator.

The suction line is fabricated from Electric Resistance Weld (ERSW) steel pipe using SMAW welding process with closed cell rubber foam insulation with aluminum foil covering.

The discharge line is fabricated from die formed tube bending specifically shaped and routed to absorb discharge gas pulsations.

Fans

Condenser fan tray panels have smooth radius outlet orifices to assure high efficiency and low noise level. All fans are recessed within bell mouth and have externally (or internally) driven electrical motor. The high efficiency and low noise fans used in units are covered with fan guards made from coated steel wire. Complete fan units are accessible and removable from the top of the chiller unit without any disturbance to the condenser coil space, for cleaning and service purposes.

Motors

The fan motors are Totally Enclosed Air-Over, squirrel-cage type, current protected. It features ball bearings that are double-sealed and permanently lubricated. Standard control of condenser fan motors is ON/OFF cycling according to discharge pressure stages. Alternatively, variable speed drive for fan speed control is offered for energy savings and year round operations.

All condenser fan motors are 380V-3PH-50HZ run at 950RPM and thermally insulated at Class F with IP-55 degree of protection.

CONTROLS

SARAVEL air cooled screw chillers utilize an IP-54 rated panel enclosure that includes power and control panels with gasketed door. All panel enclosures are ventilated by 24VDC fan. The panel enclosure is fabricated of galvanized steel sheet and painted with air dried enamel. VSD section of the control panel includes a dedicated inverter for condenser fans.

Power Panel – Includes:

- Main fused disconnect switch
- Compressor power terminals
- Compressor motor starting contactors
- Fan contactors and overload current protection

The power wiring is fully contained inside the unit and secured in place.

Standard Control Panel

All control panels are factory mounted and wired with control transformer that will supply all unit control voltage from the main unit power supply. SARAVEL also offers microprocessor controller with a two-line Liquid Crystal Display (LCD) panel that monitors and displays the following:

- Number of compressors running
- Day, date, and time
- Anti-recycle timer (compressor start cycle time)
- Phase control status
- Return and leaving liquid temperatures
- Flow status
- Freeze protection status
- Low suction pressure cutout status
- High discharge pressure cutout status
- History of fault shutdown data for up to the last six fault shutdown conditions
- Operating data logging
- English or metric data

The operating program is stored on non-volatile memory to enable chiller start after AC power failure. Programmed set points are stored in the memory for up to 2 years with power off.
With network connection adaptability through Ethernet, the microprocessor controller can easily be integrated within Building Management Systems (BMS).

HMI Control Panel

Human Machine Interface is the next generation of machine controls offered in SARAVEL line of air-cooled chiller products. The full functional capabilities of a standard control panel are incorporated into a fully graphic, menu-driven touch panel. Ethernet type and other network communication allow FTP, e-mail, VCN remote monitoring, and NTP (Network Time Protocols). These features allow remote monitoring of the chillers and full adaptation to building BMS.

A full color, high resolution LCD touchscreen backlit with LED, allows operations, diagnostics, and monitoring of all chiller operating parameters. The display panel is protected by a sun shield in addition to a gasketed and hinged panel door to prevent water ingress. The language selections are English and Persian.
Full power monitoring of compressor and condenser fans through menu driven navigation is featured in the HMI panel. In addition, if VSD driven condenser fans are utilized, individual fan speeds and drawn power are also displayed.

SELECTION EXAMPLES 4

SELECTION GUIDE

Capacity ratings for the SARAVEL Packaged Air-Cooled Liquid Chillers, shown on tables 5 through 30 cover the entire range of comfort air conditioning applications and are based on AHRI-550/590 Standard. For special applications like year round industrial process cooling, please consult with SARAVEL CORP. Sales Office.

A liquid chiller is selected to deliver a required flow of chilled water at a certain temperature with a specified range temperature range, for a given cooling load. In selecting packaged air cooled chiller units, the designer must be familiar with the following terms and definitions:

Saturated Condensing Temperature (°F):
Saturated discharge temperature corresponding to the discharge pressure at the outlet of the compressors or the temperature at which the refrigerant vapor condenses.

Capacity (TR): Chiller actual cooling capacity in Tons of Refrigeration (1 TR = 12000 BTU/Hr) and it should usually be equal or slightly higher than the required cooling load demand.

Input Power (KW): Input power consumed by compressors at design conditions.

Chilled water flow rate (GPM): Volumetric flow rate of water expressed in Gallons Per Minute required to satisfy the cooling load. In special year round operations like industrial process cooling or operations during winter, to prevent freeze up in the evaporator, brine solutions (ethylene glycol or propylene glycol) are used and consequently correction factors should be applied to ratings.

Total Heat Rejection (MBH): The sum total of building heat absorbed in the evaporator and the heat of compression that is expelled by the air cooled condenser into the ambient air, it the Total Heat Rejection of the chiller unit.

THR = [CAPACITY (TR) × 12] + [(KW) × 3.413]

Air Cooled Condenser Temperature Difference (TD) in °F: To transfer THR from the high temperature discharge gas, into the ambient air, the Temperature Difference is the driving motive and expressed as follows:

TD (°F) = Saturated Condensing Temperature – Ambient Air Temperature

Based on AHRI-550/590 standard allowable TD range for air cooled condensers is 10°F to 40°F and TD=20°F (11°C) is commonly used in air cooled chiller rating conditions. Corresponding ambient (air on condenser) temperature according to the standard is 95°F (35°C) resulting in saturated condensing temperature of 115°F (46°C).

Chilled Water ΔT (Range in °F): The difference between the entering and leaving water temperatures flowing throw the evaporator.

ΔP Water Side Pressure Drop (Ft of H_2O). The pressure drop of fluid flowing through the evaporator. This in addition to piping, valves, and terminal unit losses is used in calculating the required pump head for the chiller.

Saravel Screw liquid chiller rating data presented on tables 5 through 30 indicate the capacity of the chiller at the conditions listed below:

• Chiller water flow rate based on 2.4 GPM per Ton assuming 10 °F chilled water temperature range.

• Pure water as primary coolant that is cooled in evaporator.

• Refrigerant R-22 / R-134A.

NOTE: Interpolation is allowed within tabulated values but never extrapolate

SELECTION EXAMPLES 5

To select a Saravel Packaged Air-Cooled Liquid Chiller, the following data must be known:

1. Design capacity in tons of refrigeration (TR).
2. Entering and leaving chilled water temperatures.
3. Ambient air temperature in °F. (from local design condition codes)
4. GPM of chilled liquid.

Determine capacity requirements from the following formula:

$$GPM = \frac{TR \times 24}{\Delta T(°F)}$$

Brine Correction Factors – The following factors are to be applied to the standard ratings for chillers cooling ethylene / propylene glycol TABLES A, B.

TABLE A
ETHYLENE GLYCOL CORRECTON FACTORS

WEIGHT %	TONS	POWER KW	GPM °F / TON	FREEZING POINT(°F)
10	0.996	0.999	24.3	26.2
20	0.991	0.998	25.1	17.9
30	0.984	0.997	25.9	6.7
40	0.976	0.995	26.9	-8.1
50	0.968	0.994	28	-28.9

TABLE B
PROPYLENE GLYCOL CORRECTON FACTORS

WEIGHT %	TONS	POWER KW	GPM °F / TON	FREEZING POINT(°F)
10	0.995	0.999	24	26
20	0.984	0.997	24.3	19
30	0.973	0.994	24.9	9
40	0.960	0.992	25.6	-6
50	0.943	0.989	26.6	-28

EXAMPLES 6

EXAMPLE 1:

1. Given: Provide a capacity of 48 TR at 46°F leaving chilled water at 10°F range, 95°F air on the condenser, refrigerant R-22 and aluminum fin material.

2. Find: Unit Size, KW Input

3. Select: From TABLE 7 **(SPLCSC-70-1A)** with R-22 refrigerant

At 46°F leaving chilled water temperature, with ambient air temperature = 95°F:
Chiller cooling capacity = 51.4 TR
Input power = 65.4 KW
Chilled water flow rate = 123 GPM
Evaporator water side pressure drop = 2.3 FT.H_2O

EXAMPLE 2:

1. Given: Provide a capacity of 130 tons cooling, 30% by weight Ethylene Glycol from 54°F to 44°F, 105°F air on the condenser,

R-134A refrigerant and copper fin material.

2. Determine:

a. Unit Size

b. KW Input

c. Ethylene Glycol GPM

d. Evaporator water side Pressure Drop

Ethylene Glycol Correction Factors, for 30% by weight ethylene glycol from TABLE A are:
0.984 Tons Factor

0.997 Comp. KW factor

25.9 Gal °F/ Min / Tons Factor

Chiller cooling capacity at standard conditions = 130 × 0.984= 127.9 TR

From the TABLE 28 at 44°F leaving chilled water temperature, with ambient air temperature = 105°F, model (**SPLCSC-220-2A)** with the following standard rating conditions can be selected:

Chiller cooling capacity = 139.1 TR
Input power = 171.2 KW
Chilled water flow rate = 334 GPM
Evaporator water side pressure drop (pure water) = 9.5 FT.H_2O

Chiller compressors power input at actual conditions = (171.2) ÷ (0.997 × 0.95) = 180.7KW
Calculate chilled water flow rate at actual condition as follow:

$$GPM = \frac{Ton \times Gal°F/\min/TonFactor}{RANGE(°F)}$$

GPM = 138.8 × 25.9 / 10 = 359.5 GPM
Evaporator water side pressure drop (from page 17) = 12 FT.H_2O

UNIT PHYSICAL DATA 7

TABLE 1. R22

Model		50-1	60-1	70-1	80-1	90-1	100-2	120-2	140-2	160-2	180-2	220-2	250-2	280-2
Compressor	No. of Compressors	1	1	1	1	1	2	2	2	2	2	2	2	2
	Motor HP (each comp)	50	60	70	80	90	50	60	70	80	90	110	125	140
	Capacity Control Steps %	3	3	3	3	3	6	6	6	6	6	6	6	6
Evaporator	No. of evaporators	1	1	1	1	1	1	1	1	1	1	1	1	1
	Shell Outer Diameter (inch)	12	16	16	16	16	16	16	16	18	18	18	18	18
	Water in & out Flange (in)	3	3	4	4	4	4	5	5	5	5	6	6	8
Condenser	No. of Coils	4	4	4	4	4	8	8	8	8	8	8	8	8
	No. of Fans	6	6	6	6	8	8	8	8	12	12	12	12	12
	Fan Model	710	710	800	800	800	800	800	800	800	800	800	910	910
	Coil Rows	3	3	3	3	3	3	3	4	4	4	4	4	4
	Fin Per Inch	10	10	10	10	10	10	10	10	10	10	10	10	10
	Fin type	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL	AL
Operating Charges	Oil (liters)	10	10	16	16	20	20	20	32	32	32	46	46	46
	Refrigerant (kg)	75	90	105	120	135	150	180	210	240	270	330	375	420
Overall Dimension	L (Length) mm	3100	3100	3400	3400	4600	4600	5600	5600	6600	6600	6900	7500	7500
	W (Width) mm	2400	2400	2500	2500	2500	2500	2500	2500	2500	2500	2600	2600	2600
	H (Height) mm	2600	2600	2600	2600	2700	2700	2700	2800	2800	2800	3200	3300	3300
Operating Weight	Total Operating Weight (kg)	2400	2500	2800	2800	3400	3500	4800	5000	5800	6000	8000	8800	9000

TABLE 2. R134A

Model		50-1	60-1	70-1	80-1	90-1	100-2	120-2	140-2	160-2	180-2	220-2	250-2	280-2
Compressor	No. of Compressors	1	1	1	1	1	2	2	2	2	2	2	2	2
	Motor HP (each comp)	50	60	70	80	90	50	60	70	80	90	110	125	140
	Capacity Control Steps %	3	3	3	3	3	6	6	6	6	6	6	6	6
Evaporator	No. of evaporators	1	1	1	1	1	1	1	1	1	1	1	1	1
	Shell Outer Diameter (inch)	12	12	16	16	16	16	16	16	18	18	18	18	18
	Water in & out Flange (in)	3	3	4	4	4	4	4	4	5	5	5	5	6
Condenser	No. of Coils	4	4	4	4	8	8	8	8	8	8	8	8	8
	No. of Fans	6	6	6	6	6	8	8	8	8	12	12	12	12
	Fan Model	710	710	710	800	800	800	800	800	800	800	800	800	910
	Coil Rows	3	3	3	3	3	3	3	3	4	4	4	4	4
	Fin Per Inch	10	10	10	10	12	12	10	10	10	10	10	10	10
	Fin type	Al	Al	AL	AL	AL	Al	Al	Al	Al	Al	Al	Al	Al
Operating Charges	Oil (liters)	10	10	16	16	16	20	20	32	32	32	46	46	46
	Refrigerant (kg)	75	90	105	120	135	150	180	210	240	270	330	375	420
Overall Dimension	L (Length) mm	3100	3100	3100	3400	3400	4600	4600	5600	5600	6600	6900	7500	7500
	W (Width) mm	2400	2400	2400	2500	2500	2500	2500	2500	2500	2500	2600	2600	2600
	H (Height) mm	2600	2600	2600	2600	2600	2700	2700	2700	2800	2800	3200	3300	3300
Operating Weight	Total Operating Weight (kg)	2400	2500	2500	2800	2800	3500	3500	4800	5000	6000	8000	8800	9000

UNIT ELECTRICAL DATA 8

TABLE 3. R22

Model		50-1	60-1	70-1	80-1	90-1	100-2	120-2	140-2	160-2	180-2	220-2	250-2	280-2
Compressor	No of Compressors	1	1	1	1	1	2	2	2	2	2	2	2	2
	Max. Power Input (kW)	52	65	78	88	96	104	130	156	176	192	224	264	300
	Max. Operating Current (Amps)	86	108	128	144	162	172	216	256	288	324	370	432	492
	Locked Rotor Current (Amps)	411	508	485	585	686	822	1016	970	1170	1372	1602	1886	2046
Fan	No of Fan	6	6	6	6	8	8	8	8	8	12	12	12	12
	Max. Power Input (kW)	10	10	14	14	19	19	19	19	19	28	28	30	30
	Max. Operating Current (Amps)	17	17	29	29	39	39	39	39	39	58	58	62	62
System	Max. Power Input (kW)	62	75	92	102	115	123	149	175	195	220	252	294	330
	Max. Operating Current (Amps)	103	125	157	173	201	211	255	295	327	382	428	494	554
	Max. Operating Current (Amps)	243	294	334	394	481	494	596	638	758	933	1127	1317	1423
Wire Sizing Required (Amps)		145	160	185	220	235	255	295	350	400	460	515	585	635

TABLE 4. R134A

Model		50-1	60-1	70-1	80-1	90-1	100-2	120-2	140-2	160-2	180-2	220-2	250-2	280-2
Compressor	No of Compressors	1	1	1	1	1	2	2	2	2	2	2	2	2
	Max. Power Input (kW)	52	65	78	88	96	104	130	156	176	192	220	240	262
	Max. Operating Current (Amps)	79	98	124	144	155	158	196	248	288	310	364	392	428
	Locked Rotor Current (Amps)	355	449	485	606	675	710	898	970	1212	1350	1602	1886	2046
Fan	No of Fan	6	6	6	6	6	8	8	8	8	12	12	12	12
	Max. Power Input (kW)	10	10	10	14	14	19	19	19	19	28	28	30	30
	Max. Operating Current (Amps)	17	17	17	29	29	39	39	39	39	58	58	62	62
System	Max. Power Input (kW)	62	75	88	102	110	123	149	175	195	220	248	270	292
	Max. Operating Current (Amps)	96	115	141	173	184	197	235	287	327	368	422	454	490
	Max. Starting Current (Amps)	231	292	315	404	439	470	592	638	846	965	1127	1317	1423
Wire Sizing Required (Amps)		130	165	185	210	230	250	280	315	375	420	485	525	590

TABLE 5. SPLCSC-50-1A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	35	35.7	83	3.0	33.7	37.3	81	2.9	32.6	39.1	78	2.7	31.5	40.9	76	2.5	30.5	42.9	73	2.4
44	36	35.9	87	3.3	35.0	37.6	84	3.1	**34.0**	**39.4**	**81**	**2.9**	32.9	41.3	79	2.7	31.7	43.3	76	2.5
45	37	36.0	88	3.4	35.7	37.7	86	3.2	34.6	39.5	83	3.0	33.5	41.4	80	2.8	32.4	43.5	78	2.7
46	38	36.1	90	3.5	36.5	37.9	87	3.3	35.3	39.7	85	3.1	34.2	41.6	82	3.0	33.1	43.7	79	2.8

COP = 3.03 (@AHRI Standard 550/590 conditions)

TABLE 6. SPLCSC-60-1A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	44	43.1	105	3.1	42.2	45.1	101	2.9	40.9	47.3	98	2.8	39.6	49.5	95	2.6	38.2	52.0	92	2.4
44	45	43.3	109	3.4	44.0	45.4	106	3.2	**42.6**	**47.6**	**102**	**3.0**	41.2	50.0	99	2.8	39.9	52.5	96	2.6
45	46	43.5	111	3.5	44.8	45.6	108	3.3	43.5	47.8	104	3.1	42.1	50.2	101	2.9	40.7	52.7	98	2.7
46	47	43.6	113	3.6	45.7	45.8	110	3.4	44.3	48.0	106	3.2	42.9	50.4	103	3.0	41.5	53.0	100	2.8

COP = 3.15 (@AHRI Standard 550/590 conditions)

TABLE 7. SPLCSC-70-1A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	51	59.6	122	2.3	49.3	62.0	118	2.1	47.5	64.5	114	2.0	45.6	67.2	109	1.8	43.6	70.1	105	1.7
44	53	60.0	127	2.5	51.3	62.4	123	2.3	**49.4**	**64.9**	**119**	**2.2**	47.5	67.6	114	2.0	45.5	70.5	109	1.8
45	54	60.2	130	2.6	52.3	62.6	125	2.4	50.4	65.2	121	2.2	48.5	67.9	116	2.1	46.4	70.7	111	1.9
46	55	60.4	132	2.7	53.3	62.8	128	2.5	51.4	65.4	123	2.3	49.4	68.1	119	2.2	47.4	70.9	114	2.0

COP = 2.68 (@AHRI Standard 550/590 conditions)

TABLE 8. SPLCSC-80-1A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	59	70.2	142	3.1	57.1	72.7	137	2.9	54.9	75.5	132	2.7	52.6	78.4	126	2.4	50.3	81.4	121	2.2
44	62	70.6	148	3.3	59.4	73.2	143	3.1	**57.2**	**76.0**	**137**	**2.9**	54.8	78.9	132	2.7	52.4	81.9	126	2.4
45	63	70.9	151	3.5	60.6	73.4	145	3.2	58.3	76.2	140	3.0	55.9	79.1	134	2.8	53.5	82.2	128	2.5
46	64	71.1	154	3.6	61.8	73.7	148	3.3	59.5	76.5	143	3.1	57.1	79.4	137	2.9	54.6	82.4	131	2.6

COP = 2.64 (@AHRI Standard 550/590 conditions)

TABLE 9. SPLCSC-90-1A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	71	77.9	171	4.4	68.8	80.9	165	4.1	66.4	84.2	159	3.8	64.0	87.7	154	3.6	61.4	91.3	147	3.3
44	74	78.3	177	4.7	71.5	81.4	172	4.4	**69.0**	**84.7**	**166**	**4.1**	66.5	88.2	160	3.9	63.9	91.8	153	3.6
45	75	78.6	180	4.9	72.8	81.6	175	4.6	70.4	84.9	169	4.3	67.8	88.4	163	4.0	65.2	92.1	156	3.7
46	77	78.8	184	5.1	74.2	81.9	178	4.8	71.7	85.2	172	4.5	69.2	88.7	166	4.2	66.5	92.4	159	3.8

COP = 2.87 (@AHRI Standard 550/590 conditions)

Bold face highlighted ratings are AHRI Standard 550/590 conditions.

For brine and free cooling or part load ratings, contact SARAVEL Corp. Sales Office.

TABLE 10. SPLCSC-100-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	69	79.7	167	4.7	67.3	83.0	162	4.5	65.2	86.4	157	4.2	63.1	90.1	151	3.9	60.9	94.1	146	3.7
44	72	80.1	173	5.1	70.1	83.5	168	4.8	**67.9**	**87.1**	**163**	**4.5**	65.7	90.9	158	4.3	63.5	94.8	152	4.0
45	74	80.4	177	5.3	71.5	83.8	172	5.0	69.3	87.4	166	4.7	67.1	91.2	161	4.4	64.8	95.2	156	4.1
46	75	80.6	180	5.5	72.9	84.0	175	5.2	70.7	87.7	170	4.9	68.4	91.5	164	4.6	66.2	95.6	159	4.3

COP = 2.74 (@AHRI Standard 550/590 conditions)

TABLE 11. SPLCSC-120-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	87	94.4	209	6.1	84.5	98.5	203	5.8	81.8	102.8	196	5.4	79.2	107.4	190	5.1	76.5	112.3	183	4.8
44	91	95.0	218	6.6	87.9	99.2	211	6.3	**85.2**	**103.6**	**205**	**5.9**	82.5	108.3	198	5.5	79.7	113.3	191	5.2
45	92	95.3	222	6.9	89.7	99.5	215	6.5	86.9	104.0	209	6.1	84.2	108.7	202	5.7	81.4	113.7	195	5.4
46	94	95.5	226	7.2	91.5	99.8	220	6.8	88.7	104.4	213	6.4	85.9	109.2	206	6.0	83.0	114.2	199	5.6

COP = 2.89 (@AHRI Standard 550/590 conditions)

TABLE 12. SPLCSC-140-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	102	110.1	245	8.4	98.5	114.8	236	7.8	94.9	119.8	228	7.3	91.2	125.2	219	6.7	87.3	130.9	209	6.2
44	106	110.8	254	9.0	102.5	115.6	246	8.5	**98.8**	**120.7**	**237**	**7.9**	95.0	126.1	228	7.3	90.9	131.8	218	6.7
45	108	111.2	259	9.4	104.5	116.0	251	8.8	100.8	121.1	242	8.2	96.9	126.5	233	7.6	92.8	132.2	223	7.0
46	110	111.6	264	9.7	106.6	116.4	256	9.1	102.8	121.5	247	8.5	98.9	127.0	237	7.9	94.8	132.7	227	7.2

COP = 2.88 (@AHRI Standard 550/590 conditions)

TABLE 13. SPLCSC-160-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	118	121.9	284	6.3	114.2	127.1	274	5.9	109.8	132.5	264	5.4	105.3	138.3	253	5.0	100.5	144.5	241	4.6
44	123	122.9	296	6.8	118.8	128.0	285	6.3	**114.3**	**133.5**	**274**	**5.9**	109.6	139.3	263	5.4	104.8	145.4	251	4.9
45	126	123.3	301	7.0	121.1	128.5	291	6.6	116.6	134.0	280	6.1	111.9	139.8	268	5.6	106.9	145.9	257	5.2
46	128	123.8	307	7.3	123.5	129.0	296	6.8	118.9	134.5	285	6.3	114.1	140.3	274	5.8	109.1	146.5	262	5.4

COP = 3.01 (@AHRI Standard 550/590 conditions)

TABLE 14. SPLCSC-180-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	142	146.6	341	9.9	137.6	152.7	330	9.3	132.9	159.2	319	8.7	127.9	166.1	307	8.1	122.8	173.4	295	7.5
44	148	147.5	354	10.7	142.9	153.6	343	10.0	**138.1**	**160.2**	**331**	**9.4**	133.1	167.1	319	8.7	127.8	174.4	307	8.1
45	150	147.9	361	11.1	145.7	154.1	350	10.4	140.8	160.7	338	9.7	135.7	167.6	326	9.1	130.3	175.0	313	8.4
46	153	148.4	368	11.5	148.4	154.6	356	10.8	143.5	161.2	344	10.1	138.3	168.1	332	9.4	132.9	175.5	319	8.7

COP = 3.03 (@AHRI Standard 550/590 conditions)

Bold face highlighted ratings are AHRI Standard 550/590 conditions.

For brine and free cooling or part load ratings, contact SARAVEL Corp. Sales Office.

TABLE 15. SPLCSC-220-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	170	170.2	408	14.0	163.9	177.3	393	13.1	157.8	185.2	379	12.1	151.5	193.9	364	11.2	145.1	203.6	348	10.3
44	177	171.9	424	15.1	170.6	178.7	410	14.1	**164.3**	**186.5**	**394**	**13.1**	157.9	195.1	379	12.1	151.2	204.7	363	11.2
45	180	172.8	433	15.7	174.1	179.5	418	14.7	167.7	187.2	402	13.6	161.1	195.8	387	12.6	154.3	205.3	370	11.6
46	184	173.7	441	19.5	177.5	180.3	426	15.2	171.0	187.9	410	14.2	164.4	196.5	394	13.1	157.5	205.9	378	12.1

COP = 3.1 (@AHRI Standard 550/590 conditions)

TABLE 16. SPLCSC-250-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	194	192.3	465	24.1	186.8	200.3	448	22.5	179.9	209.3	432	17.0	172.7	219.3	414	15.7	165.4	230.3	397	14.5
44	201	194.2	484	26.1	194.5	202.0	467	24.3	**187.3**	**210.8**	**449**	**22.6**	179.9	220.7	432	17.0	172.3	231.6	414	15.7
45	205	195.2	493	27.1	198.4	202.9	476	25.3	191.1	211.6	459	23.5	183.6	221.4	441	21.8	175.9	232.3	422	16.3
46	210	196.3	503	28.1	202.3	203.8	486	26.3	194.9	212.5	468	24.5	187.3	222.2	450	22.6	179.5	233.0	431	16.9

COP = 3.13 (@AHRI Standard 550/590 conditions)

TABLE 17. SPLCSC-280-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	228	229.8	546	33.0	220.9	238.9	530	31.1	213.8	248.7	513	29.2	206.1	259.1	495	27.3	197.9	270.1	475	25.2
44	236	231.8	566	35.4	229.3	240.9	550	33.5	**222.1**	**250.6**	**533**	**31.5**	214.4	261.0	515	29.4	206.1	272.0	495	27.2
45	240	232.8	577	36.7	233.6	241.9	561	34.7	226.4	251.6	543	32.7	218.6	261.9	525	30.5	210.3	272.9	505	28.3
46	245	233.9	587	38.0	237.9	242.9	571	36.0	230.7	252.6	554	33.9	222.9	262.9	535	31.7	214.5	273.9	515	29.4

COP = 3.13 (@AHRI Standard 550/590 conditions)

Bold face highlighted ratings are AHRI Standard 550/590 conditions.

For brine and free cooling or part load ratings, contact SARAVEL Corp. Sales Office.

UNIT RATING – R134A

TABLE 18. SPLCSC-50-1A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	35	32.8	83	3.0	33.3	34.3	80	2.8	32.0	35.9	77	2.6	30.7	37.6	74	2.4	29.4	39.5	70	2.2
44	36	33.0	87	3.3	34.9	34.5	84	3.1	**33.6**	**36.2**	**81**	**2.8**	32.2	37.9	77	2.6	30.8	39.8	74	2.4
45	37	33.2	89	3.4	35.7	34.7	86	3.2	34.4	36.3	83	3.0	33.0	38.0	79	2.8	31.6	39.9	76	2.5
46	38	33.3	91	3.6	36.6	34.8	88	3.4	35.2	36.4	85	3.1	33.8	38.2	81	2.9	32.4	40.0	78	2.6

COP = 3.26 (@AHRI Standard 550/590 conditions)

TABLE 19. SPLCSC-60-1A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	41	37.0	98	2.7	39.2	38.7	94	2.5	37.8	40.6	91	2.3	36.2	42.6	87	2.2	34.6	44.8	83	2.0
44	43	37.3	102	3.0	41.1	39.0	99	2.8	**39.6**	**40.9**	**95**	**2.6**	38.0	42.9	91	2.4	36.4	45.0	87	2.2
45	44	37.5	105	3.1	42.1	39.2	101	2.9	40.5	41.0	97	2.7	38.9	43.0	93	2.5	37.3	45.2	89	2.3
46	45	37.6	107	3.3	43.1	39.3	103	3.0	41.5	41.2	100	2.8	39.9	43.2	96	2.6	38.2	45.3	92	2.4

COP =3.4 (@AHRI Standard 550/590 conditions)

TABLE 20. SPLCSC-70-1A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	47	50.1	112	1.9	45.1	52.1	108	1.8	43.4	54.2	104	1.7	41.6	56.5	100	1.5	39.8	58.9	96	1.4
44	49	50.5	118	2.1	47.3	52.4	113	2.0	**45.5**	**54.6**	**109**	**1.8**	43.7	56.8	105	1.7	41.8	59.3	100	1.6
45	50	50.7	120	2.2	48.4	52.6	116	2.1	46.6	54.7	112	1.9	44.7	57.0	107	1.8	42.8	59.4	103	1.6
46	51	50.8	123	2.3	49.5	52.8	119	2.2	47.7	54.9	114	2.0	45.8	57.2	110	1.9	43.9	59.6	105	1.7

COP = 2.93 (@AHRI Standard 550/590 conditions)

TABLE 21. SPLCSC-80-1A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	56	62.6	136	2.8	54.7	65.0	131	2.6	52.9	67.6	127	2.5	51.1	70.4	123	2.3	49.2	73.5	118	2.1
44	59	63.0	142	3.1	57.3	65.4	137	2.9	**55.4**	**68.0**	**133**	**2.7**	53.5	70.8	128	2.5	51.6	73.8	124	2.4
45	60	63.2	145	3.2	58.6	65.6	141	3.0	56.7	68.2	136	2.8	54.8	71.0	131	2.6	52.8	74.0	127	2.5
46	62	63.4	148	3.3	59.9	65.8	144	3.2	58.0	68.3	139	3.0	56.1	71.2	135	2.8	54.1	74.2	130	2.6

COP = 2.87 (@AHRI Standard 550/590 conditions)

TABLE 22. SPLCSC-90-1A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	65	68.8	156	3.7	63.1	71.5	151	3.5	61.0	74.5	146	3.3	58.9	77.7	141	3.0	56.7	81.2	136	2.8
44	68	69.2	163	4.0	66.0	71.9	158	3.8	**63.9**	**74.9**	**153**	**3.6**	61.7	78.1	148	3.3	59.5	81.6	143	3.1
45	70	69.5	167	4.2	67.5	72.2	162	4.0	65.3	75.1	157	3.7	63.1	78.3	152	3.5	60.9	81.8	146	3.2
46	71	69.7	171	4.4	69.0	72.4	166	4.1	66.8	75.3	160	3.9	64.6	78.5	155	3.6	62.3	82.0	150	3.4

COP = 3 (@AHRI Standard 550/590 conditions)

Bold face highlighted ratings are AHRI Standard 550/590 conditions.

For brine and free cooling or part load ratings, contact SARAVEL Corp. Sales Office.

TABLE 23. SPLCSC-100-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	69	73.9	166	4.7	66.6	76.9	160	4.4	64.1	80.1	154	4.1	61.4	83.6	147	3.7	58.7	87.3	141	3.4
44	72	74.4	174	5.1	69.8	77.4	168	4.8	**67.2**	**80.6**	**161**	**4.4**	64.5	84.1	155	4.1	61.7	87.8	148	3.8
45	74	74.7	178	5.4	71.5	77.7	172	5.0	68.8	80.9	165	4.7	66.0	84.4	158	4.3	63.2	88.1	152	3.9
46	76	74.9	182	5.6	73.2	77.9	176	5.3	70.4	81.2	169	4.9	67.6	84.6	162	4.5	64.7	88.4	155	4.1

COP = 2.93 (@AHRI Standard 550/590 conditions)

TABLE 24. SPLCSC-120-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	81	82.4	195	5.4	78.5	85.8	188	5.0	75.5	89.5	181	4.6	72.4	93.5	174	4.3	69.3	97.8	166	3.9
44	85	82.9	205	5.9	82.3	86.4	197	5.5	**79.2**	**90.1**	**190**	**5.1**	76.0	94.1	182	4.7	72.8	98.4	175	4.3
45	87	83.2	209	6.2	84.2	86.7	202	5.7	81.1	90.4	195	5.3	77.8	94.4	187	4.9	74.5	98.7	179	4.5
46	89	83.6	214	6.4	86.2	87.0	207	6.0	83.0	90.7	199	5.6	79.7	94.7	191	5.2	76.3	99.0	183	4.7

COP = 3.09 (@AHRI Standard 550/590 conditions)

TABLE 25. SPLCSC-140-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	94	91.1	224	7.1	90.2	95.0	216	6.6	86.8	99.2	208	6.1	83.3	103.8	200	5.6	79.7	108.7	191	5.2
44	98	91.8	235	7.7	94.5	95.7	227	7.2	**91.0**	**99.9**	**218**	**6.7**	87.4	104.5	210	6.2	83.6	109.3	201	5.7
45	100	92.1	241	8.1	96.8	96.0	232	7.6	93.2	100.2	224	7.0	89.5	104.8	215	6.5	85.7	109.7	206	5.9
46	103	92.5	246	8.5	99.0	96.4	238	7.9	95.4	100.6	229	7.3	91.6	105.1	220	6.8	87.8	110.0	211	6.2

COP = 3.2 (@AHRI Standard 550/590 conditions)

TABLE 26. SPLCSC-160-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. $FT.H_2O$)			FLOW (GPM)	P.D. $FT.H_2O$)			FLOW (GPM)	P.D. $FT.H_2O$)			FLOW (GPM)	P.D. $FT.H_2O$)			FLOW (GPM)	P.D. $FT.H_2O$)
42	113	106.9	271	5.7	109.5	111.6	263	5.4	105.9	116.8	254	5.1	102.2	122.4	245	4.7	98.4	128.6	236	4.4
44	118	107.6	284	6.3	114.5	112.4	275	5.9	**110.8**	**117.5**	**266**	**5.5**	107.1	123.2	257	5.2	103.2	129.3	248	4.8
45	121	108.0	290	6.5	117.1	112.7	281	6.2	113.4	117.9	272	5.8	109.6	123.5	263	5.4	105.7	129.7	254	5.0
46	123	108.4	296	6.8	119.8	113.1	288	6.4	116.0	118.3	278	6.0	112.1	123.9	269	5.6	108.1	130.0	260	5.3

COP = 3.32 (@AHRI Standard 550/590 conditions)

TABLE 27. SPLCSC-180-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	130	128.4	312	8.4	126.1	133.8	303	7.9	122.0	139.8	293	7.4	117.8	146.2	283	6.9	113.5	153.2	272	6.4
44	136	129.3	327	9.1	132.0	134.7	317	8.6	**127.7**	**140.6**	**307**	**8.1**	123.4	147.0	296	7.5	118.9	154.0	285	7.0
45	139	129.7	334	9.5	135.0	135.1	324	9.0	130.7	141.0	314	8.4	126.3	147.4	303	7.9	121.8	154.4	292	7.3
46	142	130.2	341	9.9	138.0	135.6	331	9.4	133.7	141.4	321	8.8	129.2	147.8	310	8.2	124.6	154.8	299	7.7

COP = 3.2 (@AHRI Standard 550/590 conditions)

Bold face highlighted ratings are AHRI Standard 550/590 conditions.

For brine and free cooling or part load ratings, contact SARAVEL Corp. Sales Office.

TABLE 28. SPLCSC-220-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	154	142.1	369	11.5	148.7	148.3	357	10.8	143.5	155.0	344	10.1	138.2	162.3	332	9.4	132.8	170.3	319	8.7
44	161	143.1	386	12.6	155.6	149.3	373	11.8	**150.2**	**156.0**	**361**	**11.0**	144.8	163.3	347	10.3	139.1	171.2	334	9.5
45	164	143.6	394	13.1	159.1	149.8	382	12.3	153.7	156.4	369	11.5	148.1	163.7	355	10.7	142.4	171.7	342	10.0
46	168	144.1	403	13.7	162.7	150.2	390	12.9	157.2	156.9	377	12.1	151.5	164.2	364	11.2	145.7	172.2	350	10.4

COP = 3.38 (@AHRI Standard 550/590 conditions)

TABLE 29. SPLCSC-250-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	170	158.5	407	15.2	164.0	165.5	394	14.3	158.4	173.0	380	13.3	152.8	181.2	367	12.4	147.0	190.1	353	11.6
44	177	159.6	425	16.5	171.6	166.5	412	15.5	**165.8**	**174.1**	**398**	**14.6**	159.9	182.3	384	13.6	153.9	191.2	369	12.6
45	181	160.2	435	21.2	175.4	167.1	421	16.2	169.6	174.6	407	15.2	163.6	182.8	393	14.2	157.5	191.7	378	13.2
46	185	160.7	444	22.1	179.4	167.6	430	16.9	173.4	175.2	416	15.9	167.3	183.3	402	14.8	161.1	192.3	387	13.8

COP = 3.35 (@AHRI Standard 550/590 conditions)

TABLE 30. SPLCSC-280-2A

OUTLET CHILLED WATER TEMP. (°F)	AIR OVER CONDENSER (Ambient °F)																			
	85				90				95				100				105			
	CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER		CAP. [TONS]	POWER [KW]	CHILLED WATER	
			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)			FLOW (GPM)	P.D. ($FT.H_2O$)
42	193	176.3	463	24.0	186.7	184.2	448	22.5	180.4	192.8	433	17.1	173.9	202.2	417	15.9	167.3	212.3	401	14.8
44	202	177.6	484	26.1	195.3	185.5	469	24.5	**188.7**	**194.0**	**453**	**23.0**	182.0	203.4	437	21.4	175.2	213.5	421	16.2
45	206	178.2	495	27.3	199.7	186.1	479	25.6	193.0	194.6	463	24.0	186.2	204.0	447	22.4	179.3	214.1	430	16.9
46	211	178.9	506	28.5	204.2	186.7	490	26.7	197.4	195.3	474	25.1	190.5	204.6	457	23.4	183.4	214.7	440	21.7

COP = 3.42 (@AHRI Standard 550/590 conditions)

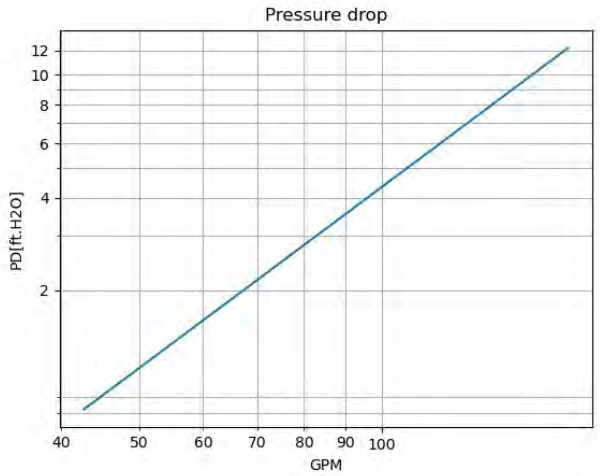
Bold face highlighted ratings are AHRI Standard 550/590 conditions.

For brine and free cooling or part load ratings, contact SARAVEL Corp. Sales Office.

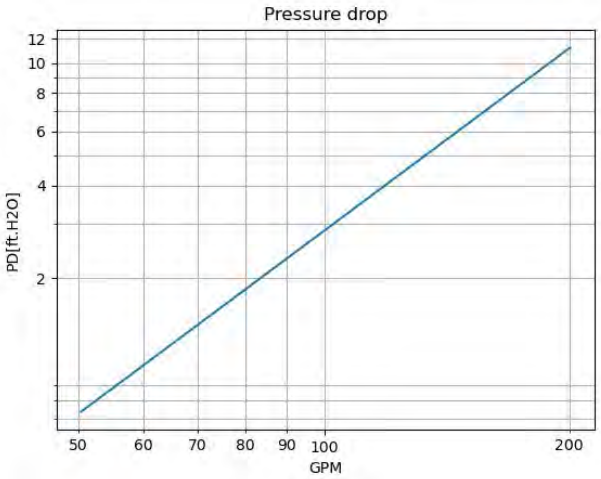
PRESSURE DROP CURVES 15

Use these curves to obtain pressure drop for flow rates of chilled water passing through the evaporator. The values should be added to piping, fitting, valve, and the head at the pump discharge.

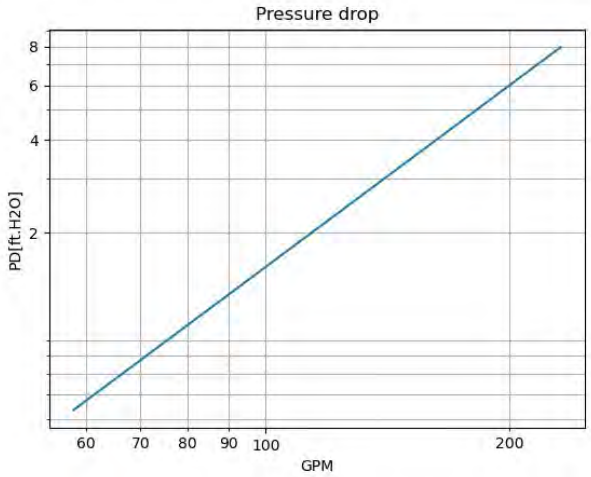
Chilled Water Pressure Drop Curves



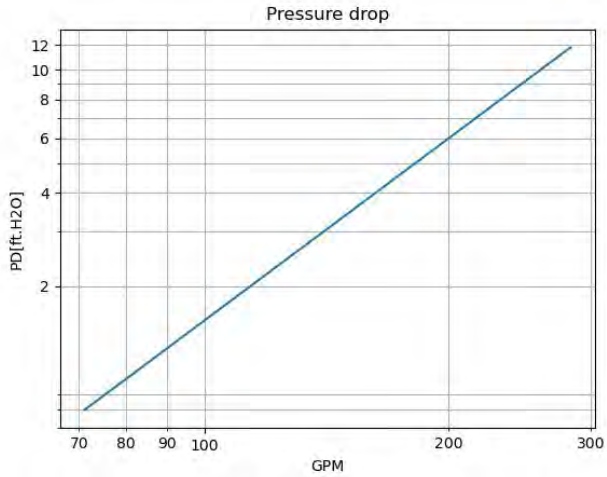
SPLCSC-50-1



SPLCSC-60-1A

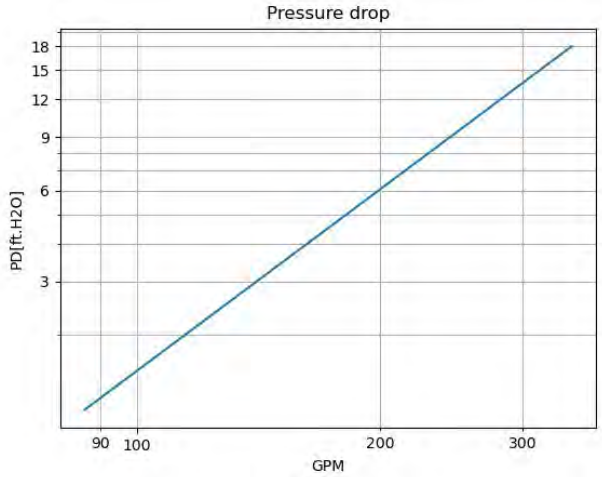


SPLCSC-70-1A

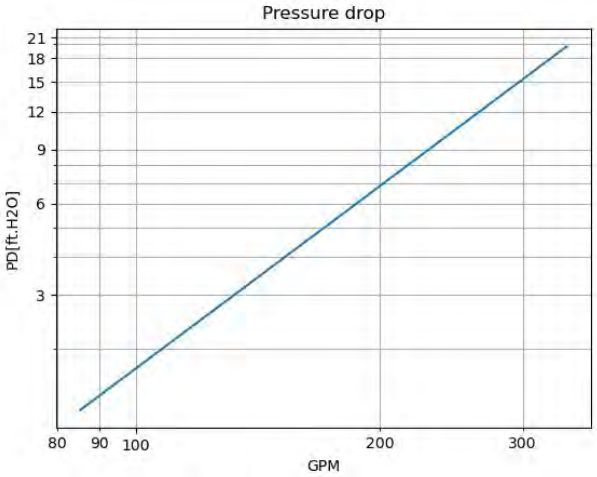


SPLCSC-80-1A

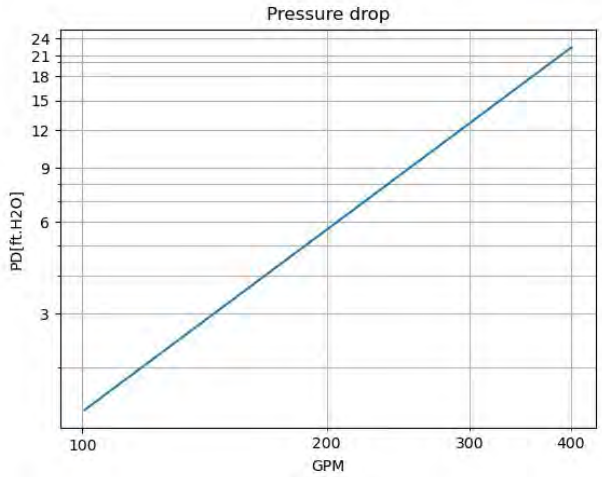
PRESSURE DROP CURVES 16



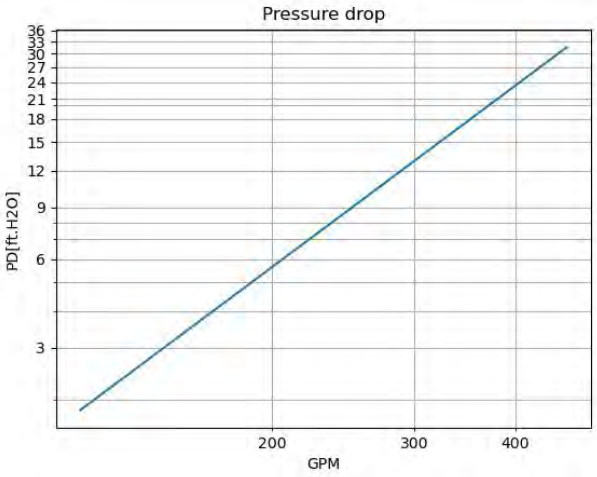
SPLCSC-90-1A



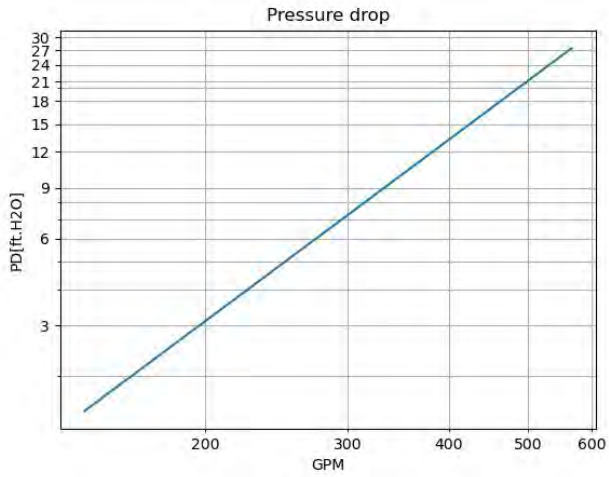
SPLCSC-100-2A



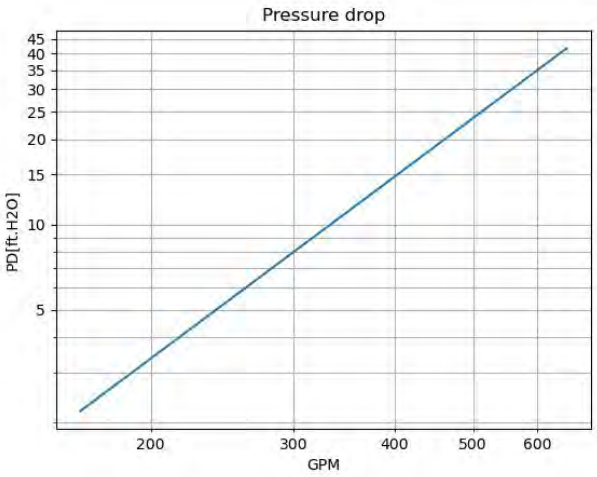
SPLCSC-120-2A



SPLCSC-140-2A

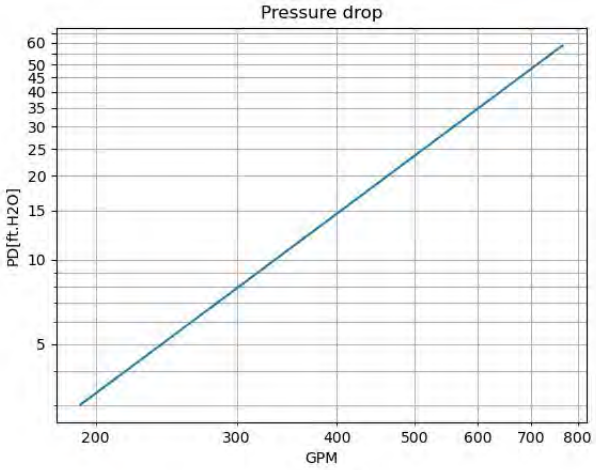


SPLCSC-160-2A



SPLCSC-180-2A

PRESSURE DROP CURVES 17



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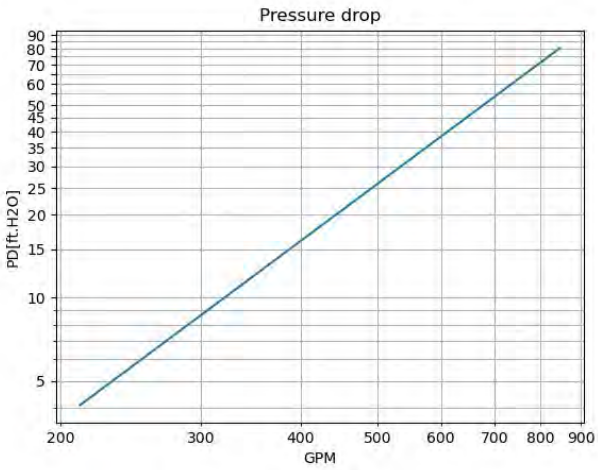
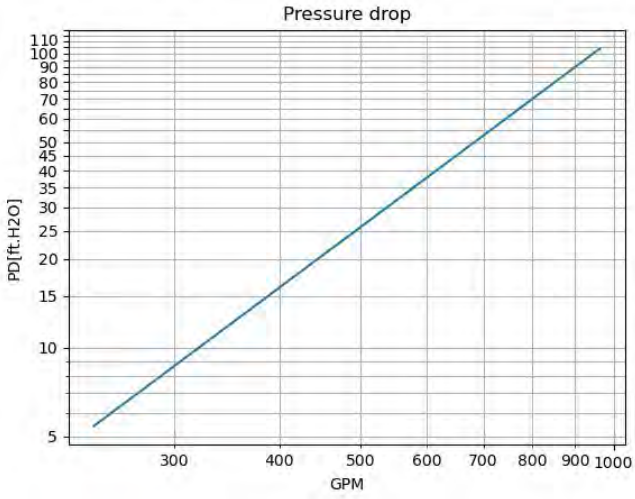


SPLCSC-250-2A



SPLCSC-280-2A

DIMENSIONS

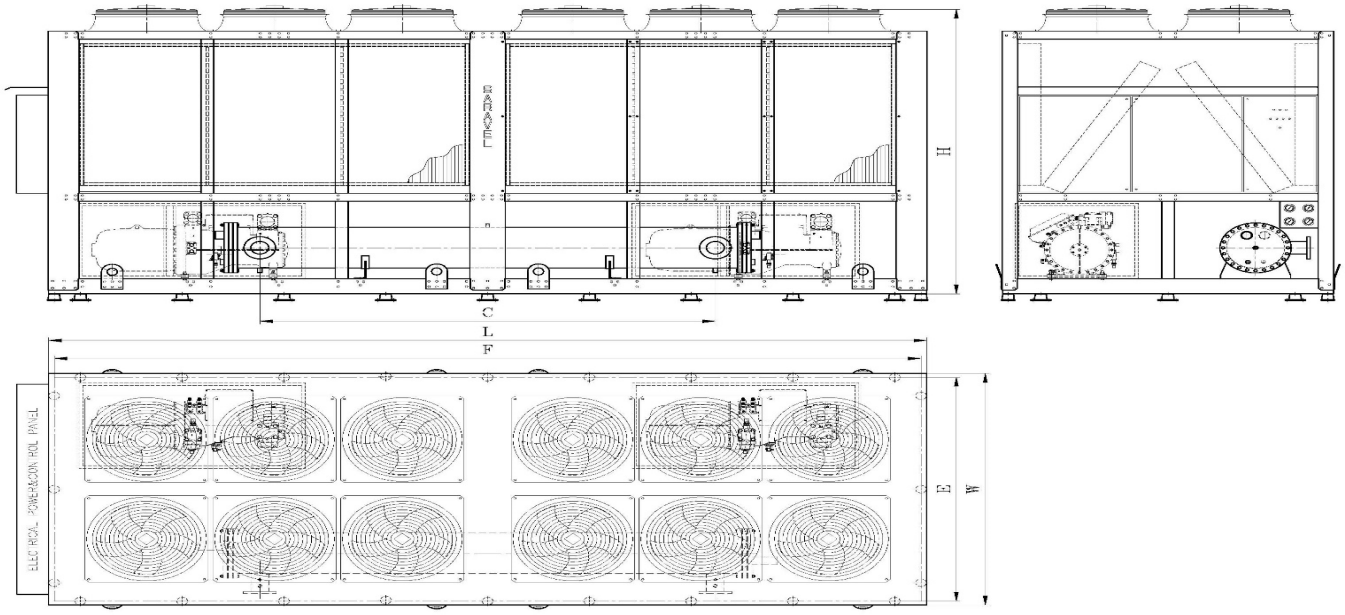
Refrigerant : R-22

MODEL	L	W	H	C	F	E
SPLCSC-50-1A	3100	2400	2600	1690	3012	2312
SPLCSC-60-1A	3400	2400	2600	1800	3312	2312
SPLCSC-70-1A	3400	2500	2600	1800	3312	2412
SPLCSC-80-1A	3400	2500	2600	1800	3312	2412
SPLCSC-90-1A	4600	2500	2700	2100	4512	2412
SPLCSC-100-2A	4600	2500	2700	2630	4512	2412
SPLCSC-120-2A	5600	2500	2700	2630	5512	2412
SPLCSC-140-2A	5600	2500	2800	2630	5512	2412
SPLCSC-160-2A	6600	2500	2800	2080	6512	2412
SPLCSC-180-2A	6600	2500	2800	2580	6512	2412
SPLCSC-220-2A	6900	2600	3200	2580	6812	2512
SPLCSC-250-2A	7500	2600	3300	3000	7412	2512
SPLCSC-280-2A	7500	2600	3300	3500	7412	2512

L = LENGTH
W = WIDTH
H = HEIGHT
C = EVAPORATOR FLANGES CENTER TO CENTER DISTANCE
F/E = STRUCTURAL BASE INERTIAL AXES

Refrigerant : R134a

MODEL	L	W	H	C	F	E
SPLCSC-50-1A	3100	2400	2600	1690	3012	2312
SPLCSC-60-1A	3100	2400	2600	1800	3012	2312
SPLCSC-70-1A	3100	2400	2600	1800	3012	2312
SPLCSC-80-1A	3400	2500	2600	1800	3312	2412
SPLCSC-90-1A	3400	2500	2600	2100	3312	2412
SPLCSC-100-2A	4600	2500	2700	2630	4512	2412
SPLCSC-120-2A	4600	2500	2700	2630	4512	2412
SPLCSC-140-2A	5600	2500	2700	2630	5512	2412
SPLCSC-160-2A	5600	2500	2800	2080	5512	2412
SPLCSC-180-2A	6600	2500	2800	2580	6512	2412
SPLCSC-220-2A	6900	2600	3200	2580	6812	2512
SPLCSC-250-2A	7500	2600	3300	3000	7412	2512
SPLCSC-280-2A	7500	2600	3300	3500	7412	2512



INSTALLATION RECOMMENDATIONS 19

SPACE AND LOCATION REQUIREMENTS

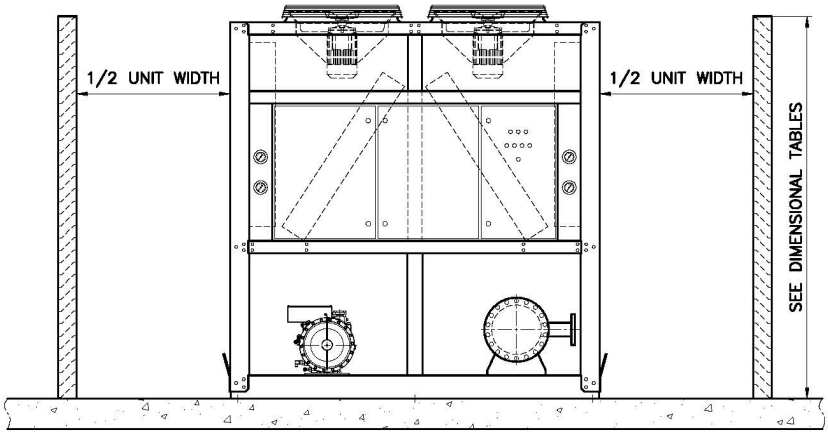
The most important consideration when selecting the Location of air cooled liquid chiller, is the provision for A supply of ambient air to the condenser, and removal of the heated air from the condenser coils for this purpose *SARAVEL* recommends the minimum space requirements illustrated below. Failure to adhere to these requirements will result in higher condensing temperature, which can cause unsafe operation of the condenser and the possible failure of the compressor. Units must not be located in the vicinity of steam, hot air or fume exhausts. Another important consideration is that the unit should be mounted away from noise sensitive spaces and must have adequate support to prevent vibration and noise transmission into the building. Units can be installed over corridors, utility areas, rest rooms and other auxiliary areas where high levels of sound are not an important factor.

WALLS OR OBSTRUCTIONS

Units should be located so that air may circulate freely and not be recirculated. For proper air flow and access, all sides of the units must be ½ unit width away from any wall or obstructions.

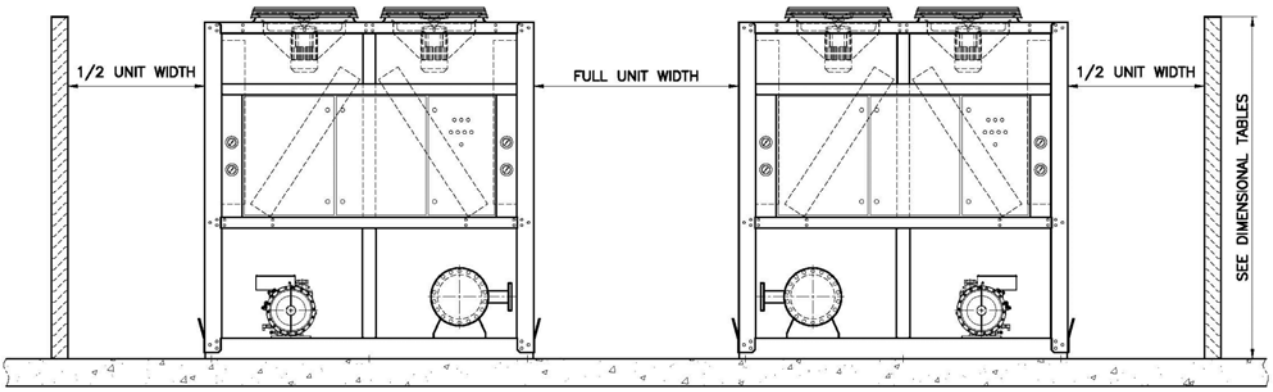
It is preferred that this distance be longer whenever possible.

Sufficient room should be left for maintenance work through access doors and panels.



MULTIPLE UNITS

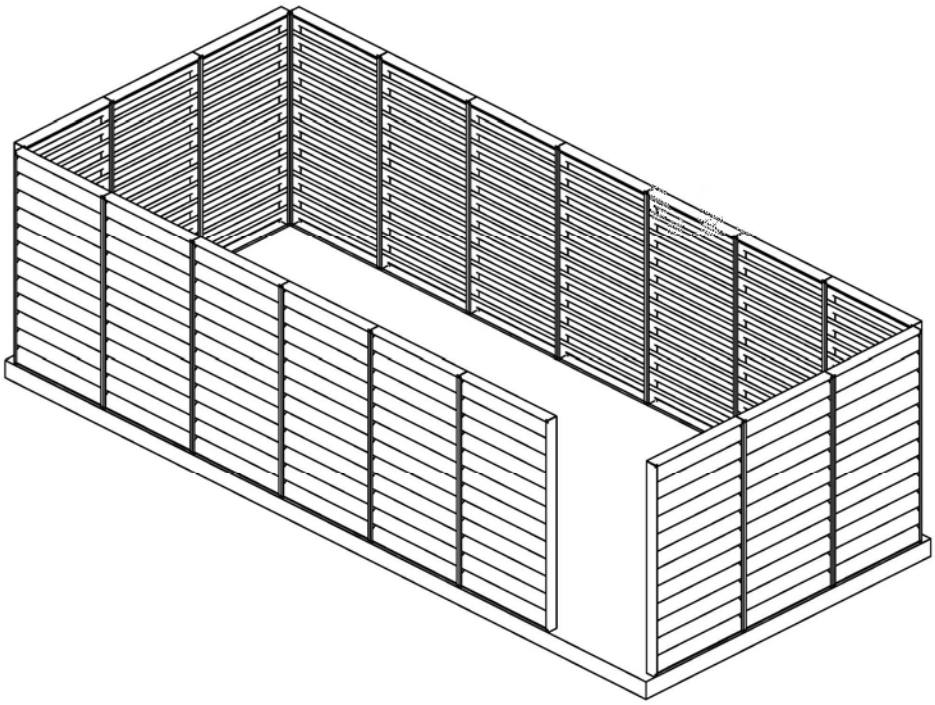
For units placed side by side, the minimum distance between units must be full unit width.

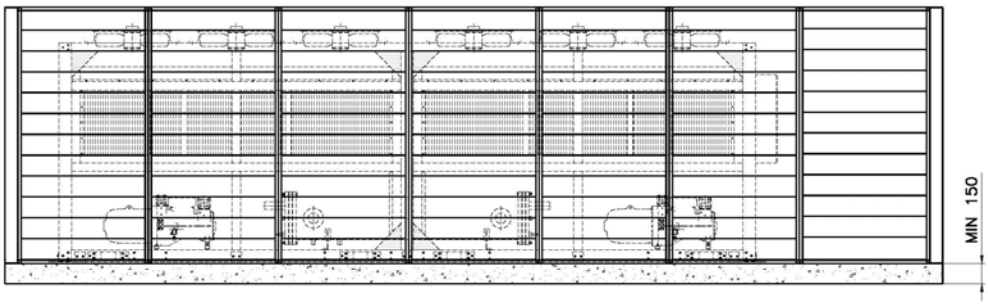


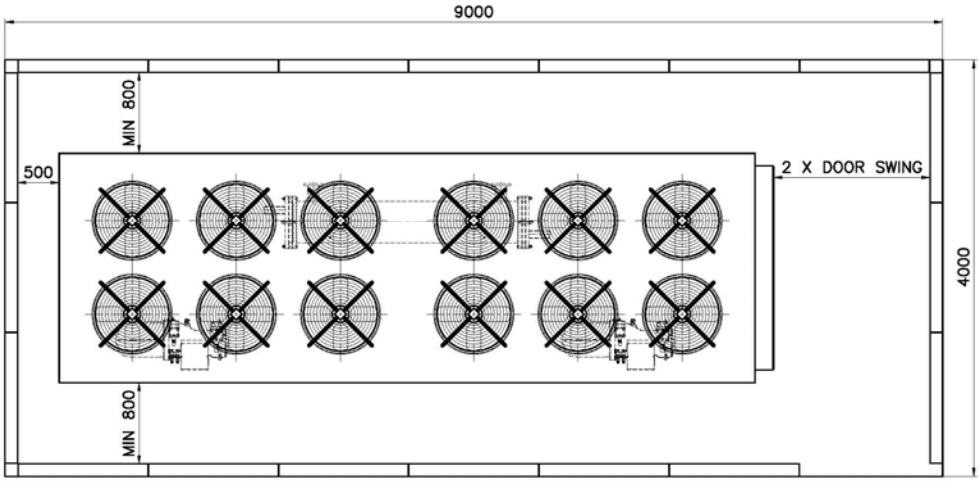
INSTALLATION RECOMMENDATIONS 20

Louvered Ground Level Installation

This is recommended for a courtyard level, open area dedicated to chiller installation, whereby a louvered enclosure is designed for the unit. See side elevation and plan views.



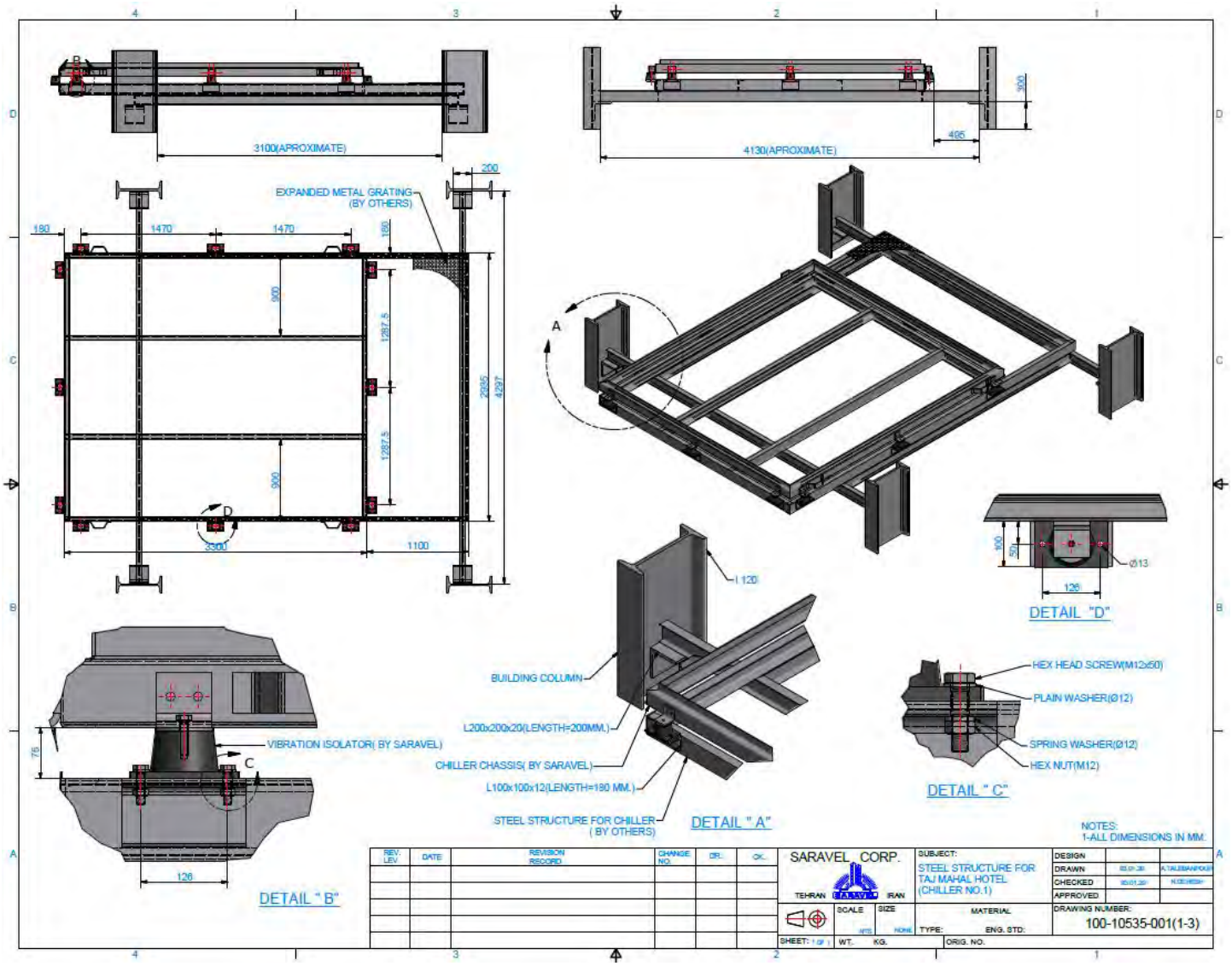




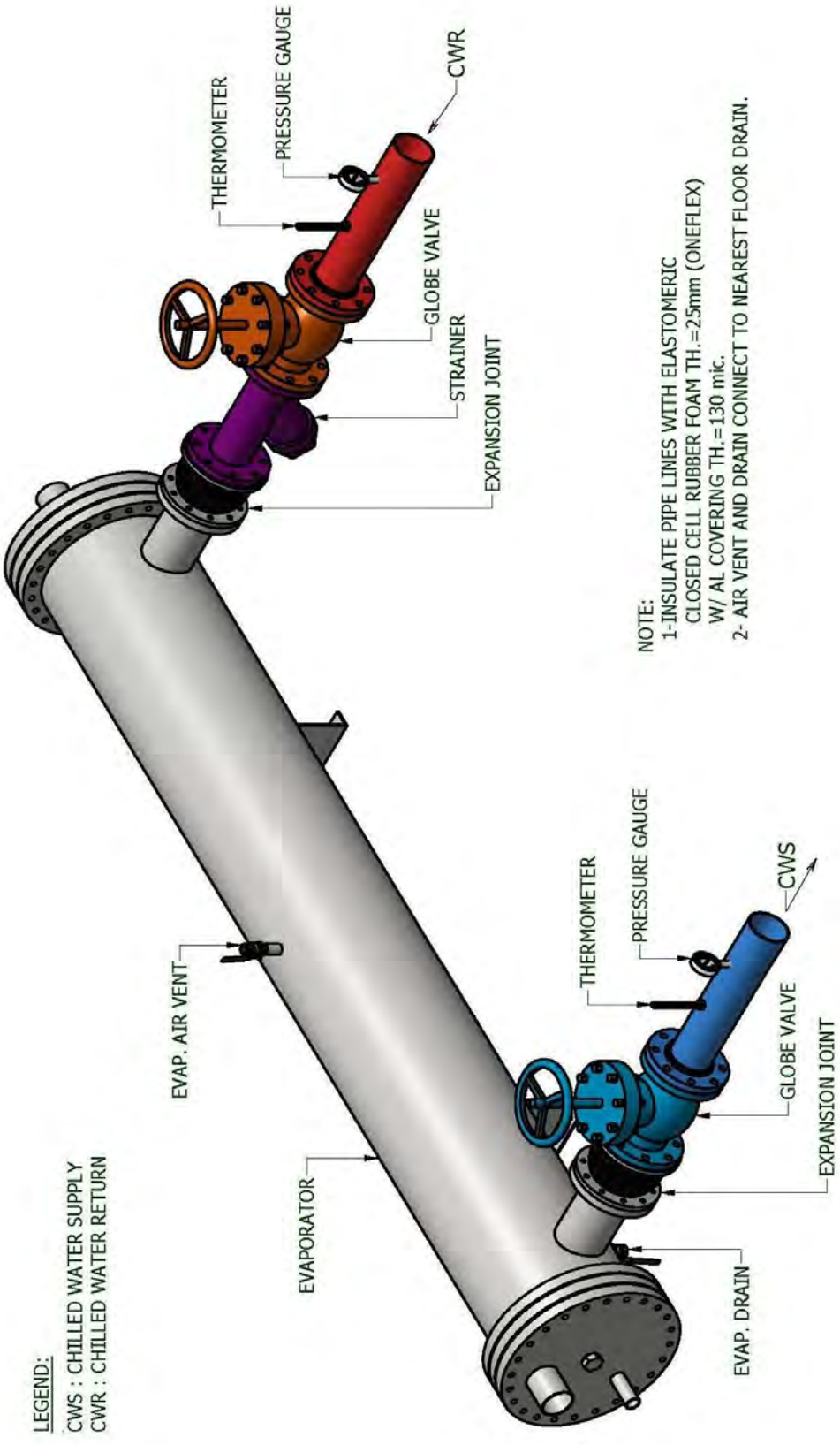
INSTALLATION RECOMMENDATIONS 21

Rooftop Installation

Units selected for rooftop installation must be supported by structural steel members as shown in sample drawing below. It is essential to mount the unit on vibration isolators to prevent structural transmission of sound and vibrations. Units will be supplied with neoprene vibration isolators. Allow clearance and safety guard rails around the unit for access and service work. The platform should be expanded metal grating and provide firm and slip proof flooring for service technician. Consult with structural engineers for detailed chassis design to be supported by structural columns as shown in the sample drawing below.



Evaporator Piping Detail



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August 2020

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