

TECHNICAL

S Y S T E M S

DIVISION RAE CORPORATION

Series 35

Evaporative Cooled Chillers



- *Built-to-order*
- *Compact footprint*
- *Acoustic packages*
- *Reduces operating costs*
- *Capacities from 50-500 tons in a single package*
- *IBC Certified*
- *Full factory run test*



Intertek

Engineered Solutions for Value Driven Customers

Increased Efficiency & Reduced Installation Costs

Technical Systems Evaporative Condenser Chillers are able to dramatically reduce your energy and installation costs. Series 35E2 chillers are 30-40% more energy efficient than air cooled chillers, yet because they are a single piece package, they do not have the high installation costs of traditional water cooled systems.

By including both high efficiency operation and a built to order factory tested solution, 35E2 Chillers reduce your utility costs, are easier and faster to install, and provide the best return on your investment.



Smaller electrical feeds reduce project costs. The image above shows wiring options for a 190 ton chiller. Left: Air Cooled (210 kW - MCM 600). Right: 35E2 Chiller (160kW - MCM300).

The traditional approach to chiller systems...

Air Cooled

- Low energy efficiency
- Low maintenance
- Low installed costs
- Single piece package by one manufacturer
- Single point power supply to one location
- Entire chiller system factory tested before shipment
- Self contained unit controls

Water Cooled

- High energy efficiency
- High maintenance
- High installed costs
- Chiller, tower and pumps all provided by different vendors and field installed
- Multiple feeds to individual parts in different locations
- Components are not tested together as a system until startup
- Reliance on BAS to control individual components together

new approach...

Evaporative Cooled Chillers

Our Series 35 Chillers are the perfect balance between high efficiency and low project cost!

- 30-40% less energy than air cooled chillers
- Easier to install and less costly than water cooled central plants
- Factory testing means assurance of proper operation **before** installation
- Built-to-order chiller system designed and built by one manufacturer with one warranty
- Self-contained unit controls reduce reliance on BAS for system operation

Low Sound Solutions Offer Flexibility & Savings

In today's market, finding effective cooling solutions is often complicated by noise. Local sound codes and property lines limit where equipment can be placed or may require expensive sound walls to be installed in the field.

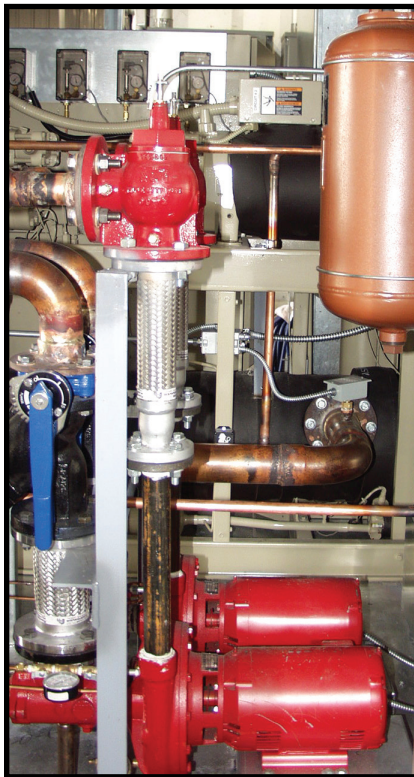
By using evaporative condensing technology, 35E2 Series chillers require only 25-30% of the airflow of air cooled equipment. Forward curved fan wheels with low airflow speed result in extremely quiet fan operation. Compressors are housed within a vestibule with optional acoustical insulation. By addressing both compressor and fan noise, the 35E2 chillers provide lower sound than any traditional air cooled product.

Providing acoustically sensitive equipment can allow the Design Engineer to be much more flexible and save the owner costly field attenuation.



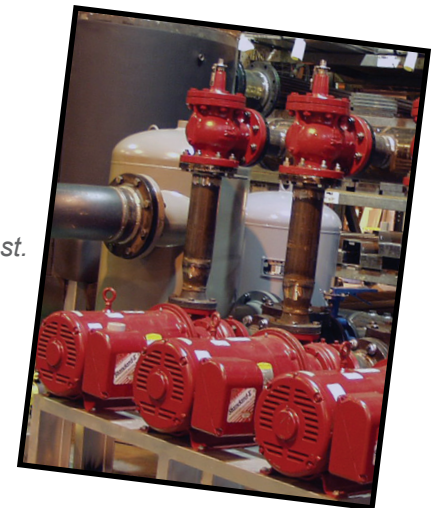
Inlet/outlet sound attenuators can be provided to achieve desired sound levels for noise sensitive applications.

Comprehensive Pumping & Hydronic Systems



All 35E2 Series chillers are available with a fully integrated pumping package. Chiller pumps, storage tanks, and trim components can all be provided within the chiller cabinetry for single point power and water connections.

- *Single piece construction can eliminate an indoor mechanical room providing that space back to the owner for more profitable use.*
- *Significantly reduce the mechanical engineer's need to coordinate between multiple trades and vendors resulting in lower engineering time and cost.*
- *Factory testing provides assurance of proper performance and leak testing before arriving on site.*
- *A pre-manufactured system will allow a contractor to complete their installation quickly and cost effectively.*



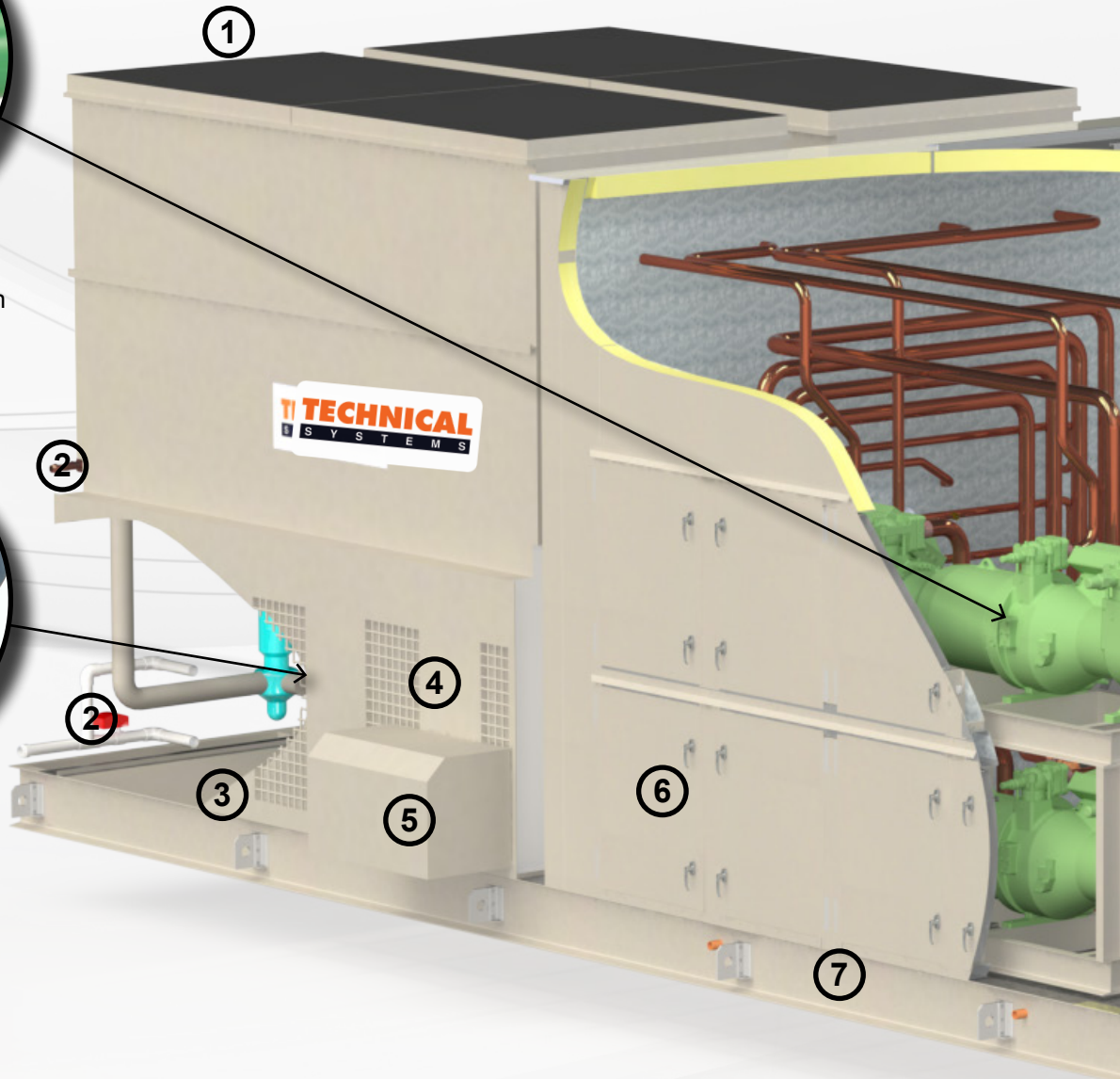
Single, dual, and multiple pump systems are available in both primary and secondary (primary/variable) configurations. The onboard microprocessor controller will enable and stage pumps for automatic changeover, lead/lag, and weekly rotation schedule. Air separation, expansion tanks, and fluid storage tanks are also available for a comprehensive hydronic package.



High efficiency rotary screw compressors with R-134a refrigerant



TEFC Sump Duty Recirculating Pump



Evaporative Cooled Chiller Legend

① UV Resistant mist eliminators to limit water carryover

② Water makeup and drain connections with optional control valves for automatic winterization

③ Heavy gauge sump with optional stainless steel construction available

④ Forced draft condenser with low RPM forward curved fans for extremely quiet operation

⑤ Fan motors are placed in the dry entering air stream for longer life and reliability

⑥ Hinged compressor service doors with locking handles

⑦ Full floor with drain piped to exterior

⑧ High efficiency shell and tube evaporator

⑨ Weatherproof vestibule can also be insulated for further sound reduction or indoor temperature control

⑩ Walk-in vestibule with major components housed within a protected indoor environment for safety and long life

Both chemical and non-chemical water treatment systems available with factory mounted components and controls



All fan motors are variable speed controlled for optimal part load performance



Refrigerant monitor and ventilation fan as required by ASHRAE 15 for personnel safety.



Optional cabinetry heating and cooling available

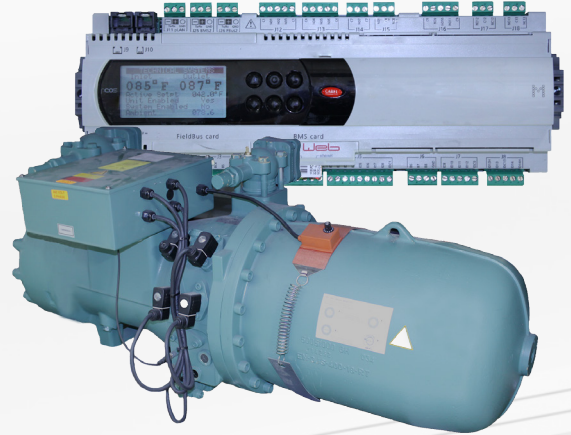
Optional pumps, tanks, and hydronics can be included for a complete single piece packaged chiller solution



Features & Options

Standard Features

- ETL certified unit label
- NEMA 3R panel with UL 508 label
- Initial operating charge of R-134a refrigerant and POE oil
- Digital microprocessor controller with display screen and keypad
- Electrical phase failure and over / under voltage protection
- Refrigerant leak detector and ventilation system per ASHRAE 15
- Forced draft low sound condenser fans
- Variable speed fan motor control for part load efficiency
- High efficiency rotary screw compressors optimized for evaporative condensing
- Heavy gauge steel cabinetry with primed and painted exterior
- Factory verification testing under applied artificial load



Pre-Engineered Options

- BMS communication connection via Bacnet or Modbus protocols
- Acoustical compressor and condenser fan attenuation options
- Optional condenser construction with stainless steel wetted surfaces
- Double wall insulated vestibule with optional heating and cooling
- Sump heaters and optional drain valves for automatic winterization
- Chemical water treatment pumps and controls
- Electrical disconnects and features



Factory Supported Options

- Premium or custom acoustic packages selected to meet your requirements
- Integral hydronic packages including pumps, storage tanks, and accessories
- Waterside economizer systems for energy savings during winter
- Non-chemical water treatment systems and controls
- Special coatings or treatments for any corrosive environment
- Copper or stainless steel condenser coil construction
- Custom paint colors picked to match surrounding equipment or structures

Serviceability Options

- 3 valve bypass kits: Allow the liquid driers to be bypassed and changed without shutting off compressors
- Open door latch assemblies: Hold the electrical panel doors into the fully open position in windy conditions
- Door latch with key locks: Provide electrical panels with easy access handles and key locks

IBC Certification



Many states have now adopted standards requiring manufacturers to have certification showing that their equipment will continue to function after a seismic event. All Technical Systems 35E2 Chillers are available with this optional Seismic Withstand rating. The certification includes the chiller system as well as optional integral pumping and hydronic packages. Code compliance is with International Building Code 2009, referencing ASCE 7-05.

Fully Integrated and Factory Tested Systems

All Technical Systems products are subjected to a strenuous quality control and testing procedure. Water piping and hydronics are checked with an air pressure leak test. All refrigerant piping receives a 500 micron evacuation test before charging with refrigerant and oil. Electrical systems are checked for proper wiring and tight connections. The completed chiller is then filled with water and operated under an applied artificial load to verify proper operation.

“Technical Systems provides assurance that the refrigeration system has been verified before delivery to the site.”

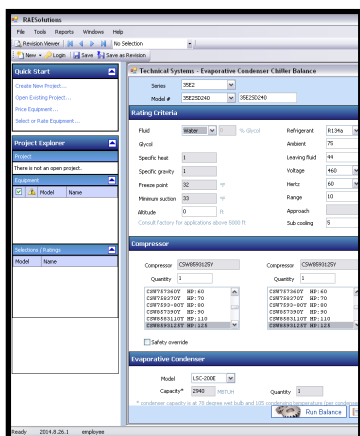
Traditional water cooled chiller components (chillers, towers, pumps, controls, etc.) are often provided in multiple pieces by different manufacturers. They do not operate together as a system until startup and commissioning, which makes correcting problems costly. Technical Systems provides a single source, factory tested, packaged chiller with assurance that the refrigeration system has been verified before delivery to the site.



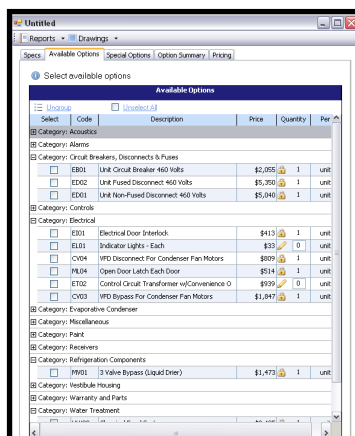
Our expansive quality control space allows us to fully run test our units for verified operation.

Software & Support

All 35E2 Chillers are available through our RAE Solutions selection software. Your local Technical Systems representative can help fine tune your chiller solution to optimize for the highest efficiency possible under your specific conditions. Ratings, pricing, technical information and CAD format drawings are all available quickly and easily. RAE Solutions allows you the quick response of a comprehensive design tool, yet still provides flexibility to change components to match your specific conditions.



With some initial project criteria, RAE Solutions allows you to select a system sized according to your requirements.



RAE Solutions allows you to choose from a wide array of available options.

Evaporative Condenser Chiller Balance

Model Number: 35E20240
 Condenser: (1) LSC-20E
 Evaporator: TCC2024 - Rating = 0001
 Compressor: (1) CSW850125V134 -- (1) CSW850125V134
 Fluid: Water
 Refrigerant: R134a
 Name: B134a
 Altitude: 0 ft

Chiller	Evap. Flow (GPM)	Evap. Temp (°F)	Condenser Temp (°F)	Capacity (Tons)	Unit (Tons)	Comp (Tons)	CHW Flow (GPM)	CHW Temp (°F)	Cond. Flow (GPM)	Cond. Temp (°F)	Unit (Tons)	Unit (kW/Ton)
C1	100	45.0	100.0	100.0	100.0	100.0	100.0	55.0	100.0	100.0	100.0	1.0
C2	100	45.0	100.0	100.0	100.0	100.0	100.0	55.0	100.0	100.0	100.0	1.0
C3	100	45.0	100.0	100.0	100.0	100.0	100.0	55.0	100.0	100.0	100.0	1.0
C4	100	45.0	100.0	100.0	100.0	100.0	100.0	55.0	100.0	100.0	100.0	1.0
C5	100	45.0	100.0	100.0	100.0	100.0	100.0	55.0	100.0	100.0	100.0	1.0
C6	100	45.0	100.0	100.0	100.0	100.0	100.0	55.0	100.0	100.0	100.0	1.0
C7	100	45.0	100.0	100.0	100.0	100.0	100.0	55.0	100.0	100.0	100.0	1.0
C8	100	45.0	100.0	100.0	100.0	100.0	100.0	55.0	100.0	100.0	100.0	1.0
C9	100	45.0	100.0	100.0	100.0	100.0	100.0	55.0	100.0	100.0	100.0	1.0
C10	100	45.0	100.0	100.0	100.0	100.0	100.0	55.0	100.0	100.0	100.0	1.0

Points include operating range ambient.
 Calculations based on 10°F Range
 8°F Evaporator 2,678.381 BTU/Hr
 10°F Evaporator 3,340.385 BTU/Hr
 Condenser @ 25°F TD 2940 BTU/Hr
 Discharge Line Loss 1°F
 Suction Line Loss 1°F

A balance document is generated to provide operating points based on your project.

Model Series - 35E2	SS								SD		
	50	60	70	80	90	110	120	140	100	120	140
Capacity and Physical Information											
Nominal Capacity (TONS) <small>(based on AHRI 550/590 - 54" EWT to 44" LWT at 75°F Wet Bulb)</small>	40.4	53.9	60.1	70.8	87.4	95.3	107.2	119.9	82.2	106.7	121.2
Unit kW / Ton (Total Unit Efficiency)	0.99	0.87	0.92	0.87	0.87	0.83	0.86	0.79	0.95	0.88	0.9
Standard Unit Shipping Weight (lbs)	8,402	9,163	9,668	10,064	10,535	13,896	13,939	15,491	11,779	14,198	16,090
Standard Unit Operating Weight (lbs)	9,710	10,339	10,868	11,264	11,826	15,772	15,964	17,604	13,124	17,604	18,203
Unit Length (inches)	120	120	120	120	120	168	168	168	120	168	168
Unit Width (inches)	120	120	120	120	120	120	120	120	120	120	120
Unit Height (inches)	90	96	96	106	112	104	104	111	104	104	105
Component Information											
Refrigerant Circuits	1	1	1	1	1	1	1	1	2	2	2
Compressor Quantity / HP each	1 / 50	1 / 60	1 / 70	1 / 80	1 / 90	1 / 110	1 / 120	1 / 140	2 / 50	2 / 60	2 / 70
Fan Quantity / HP each	1 / 5	1 / 3	1 / 5	1 / 5	1 / 5	1 / 5	1 / 7.5	1 / 10	1 / 7.5	1 / 7.5	1 / 10
Spray Pump / HP each	1 / 0.75	1 / 0.75	1 / 0.75	1 / 0.75	1 / 0.75	1 / 1	1 / 1	1 / 1	1 / 0.75	1 / 1	1 / 1
Evaporation Rate (gph)	58	78	87	102	126	137	154	173	118	154	175
Electrical Data											
Unit RLA	98	101	111	110	128	144	173	188	176	188	205
Unit MCA - Single Point Power	116	121	133	132	154	174	209	227	194	208	227
Unit MCA -Dual Point Power	*CF	*CF	*CF	*CF	*CF	*CF	*CF	*CF	*CF	*CF	*CF
Sound Data (based on dBA @10ft*)											
Unit Sound Pressure Level	72	72	74	74	74	74	76	78	76	76	78

Model Series - 35E2	SD (cont.)					SM					
	160	180	220	240	280	200	240	280	320	360	440
Capacity and Physical Information											
Nominal Capacity (TONS) <small>(based on AHRI 550/590 - 54" EWT to 44" LWT at 75°F Wet Bulb)</small>	140.1	172.2	189	219.7	231.1	165.4	216.8	249.9	284.9	354.7	381.4
Unit kW / Ton (Total Unit Efficiency)	0.86	0.86	0.88	0.85	0.81	0.95	0.88	0.88	0.85	0.85	0.87
Standard Unit Shipping Weight (lbs)	16,224	18,840	23,194	23,287	25,290	21,881	25,625	29,010	31,245	31,819	40,735
Standard Unit Operating Weight (lbs)	18,337	21,840	26,726	26,820	29,240	24,666	29,467	33,163	36,647	37,387	48,095
Unit Length (inches)	168	204	204	204	204	232	267	284	320	320	320
Unit Width (inches)	120	120	120	140	140	120	120	120	120	120	120
Unit Height (inches)	105	111	111	125	136	115	106	115	107	115	115
Component Information											
Refrigerant Circuits	2	2	2	2	2	4	4	4	4	4	4
Compressor Quantity / HP each	2 / 80	2 / 90	2 / 110	2 / 120	2 / 140	4 / 50	4 / 60	4 / 70	4 / 80	4 / 90	4 / 110
Fan QTY / HP each	1 / 10	1 / 10	1 / 15	1 / 15	1 / 15	2 / 7.5	2 / 5	2 / 10	2 / 10	2 / 10	2 / 15
Spray Pump / HP each	1 / 1.5	1 / 1.5	1 / 1.5	1 / 2	1 / 2	2 / 0.75	2 / 1	2 / 1	2 / 1.5	2 / 1.5	2 / 1.5
Evaporation Rate	202	248	272	316	333	238	312	360	410	511	549
Electrical Data											
Unit RLA	204	240	377	329	353	336	354	395	393	465	539
Unit MCA - Single Point Power	226	266	307	365	*CF	354	374	*CF	*CF	*CF	*CF
Unit MCA -Dual Point Power	*CF	*CF	*CF	*CF	235 / 196	*CF	*CF	227 / 212	226 / 211	266 / 251	307 / 292
Sound Data (based on dBA @10ft*)											
Unit Sound Pressure Level	78	78	80	80	80	78	78	80	82	82	82

*CF = Contact factory for availability

ETHYLENE GLYCOL	
Glycol Percentage	Capacity Correction Factor
10%	0.991
15%	0.985
20%	0.979
25%	0.972
30%	0.965
35%	0.958
40%	0.951

PROPYLENE GLYCOL	
Glycol Percentage	Capacity Correction Factor
10%	0.968
15%	0.977
20%	0.969
25%	0.958
30%	0.944
35%	0.906
40%	0.910

AMBIENT CORRECTION	
Ambient Temp °F Wet Bulb	Capacity Correction Factor
80	0.981
78	0.989
75	1.000
73	1.008
70	1.019
68	1.026
65	1.037

NOTE: Multiply the given capacity from the above tables by the appropriate Correction Factor to calculate your corrected capacity.

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