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**CAPE ELIZABETH DEPARTMENT OF  
FACILITIES & TRANSPORTATION  
DONALD RICHARDS POOL  
EVALUATION  
*Cape Elizabeth, Maine*  
PROJECT #15441**

September 16, 2015

FINAL REPORT



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## **DONALD RICHARDS POOL EVALUATION**

### **EXECUTIVE SUMMARY**

Harriman has completed a comprehensive review of the existing heating, cooling, pumping, treatment and dehumidification systems associated with the Donald Richards Pool located at 345 Ocean House Road, Cape Elizabeth, Maine. The evaluation provides a condition report of the following systems:

- The existing Dectron Unit.
- The existing direct vent gas water heating systems.
- The existing pool and spa heat exchangers.
- The existing pumping and chemical treatment systems.

As part of the evaluation process, Harriman has contacted the following organizations regarding their experience with saltwater pools in order to provide a better understanding of expected maintenance and any benefits or drawbacks that they have experienced:

- South Shore Gunitite Pool and Spa, Inc.
- Briggs Equipment Sales



## DONALD RICHARDS POOL EVALUATION

### EVALUATION

#### *Dectron Unit*

During our project kickoff meeting on July 7, 2015, Harriman was informed that the evaporator coils in the existing Dectron unit are falling apart and the existing unit controls do not have the capability of interfacing with the updated building management system (BMS). On July 14, 2015, Harriman performed a site evaluation of the equipment and the following is a summary of notable items.

The filter access door of the Dectron unit was open to the mechanical room with the air filters on the floor.



*Dectron Unit Filter Access Door*

There are signs of rusting on the exterior of the unit, most probably from water has pooled within the unit and leaked on the floor in the past. Due to the nature of the pool environment, the water is more corrosive than typical condensate from an air handler cooling coil. It is important to note that during the site visit there was not any visible water on the floor.



## DONALD RICHARDS POOL EVALUATION



*Dectron Unit Exterior Rust*

It was not apparent from the outside of the unit, however the fact that the coils are failing is the largest red flag for the unit. Harriman consulted with the manufacturer of the equipment and was informed that once the coils begin to fail it becomes cost prohibitive to repair the equipment. The unit was constructed in October of 1999 and is approaching 18 years of service at this point.

The Dectron unit supply duct passes through the wall of the mechanical room and communicates directly with the natatorium. In order to prevent very humid air from entering the mechanical room and wall cavity, the gaps around the supply duct should be sealed airtight.



*Dectron Unit Supply Duct Wall Penetration*

## *Direct Vent Gas Water Heating System*

The propane gas fired boilers were installed as part of the boiler plant upgrade project during the summer of 2011. This means that they are only four years old at this point. During the project kickoff meeting Harriman was informed that the boilers are capable of maintaining the pool;



## DONALD RICHARDS POOL EVALUATION

however they struggle to maintain the spa. Due to the condition of the spa heat exchanger, it is necessary to provide 180 degree heating water in order to maintain 102 degrees within the spa. As a corrective measure to address heating of the spa, the Owner is in the process of installing a propane gas fired heater dedicated exclusively to the spa. This measure will effectively reduce the load on the existing boilers and should help extend the life of the equipment overall.

According to the approved submittal for the boilers, the heat exchangers include a 5 year warranty for commercial and hydronic applications. According to the manufacturer's representative, the life expectancy of these boilers used for this application should be 10-15 years.



*Direct Vent Gas Water Heaters*

During the site evaluation it was noted that the covers are removed from the boilers. Also, there are signs of past water leakage with rust on the piping and wall that the boilers are mounted to.

### *Pool and Spa Heat Exchangers*

The existing heat exchanger for the pool is located within the mezzanine mechanical space. It appears to be in very good condition. There are no signs of water leaking around the bronze head or on the floor below the heat exchanger from any attached piping. As noted during our kickoff meeting, this heat exchanger appears to be operating well.



## DONALD RICHARDS POOL EVALUATION



*Pool Heat Exchanger*

Additionally, Harriman was informed that the existing heat exchanger was re-connected to the main boiler plant for the high school so that the pool can be heated from that plant during the heating season. Harriman understands that the main reason for the change was to reduce the loading on the propane gas fired boilers along with improving the overall system efficiency during the heating season.



*Pool Heat Exchanger Cross-Connection to Boiler Loop*



## DONALD RICHARDS POOL EVALUATION

The existing heat exchanger for the spa is reportedly in poor condition. As stated previously, it is necessary for the Owner to deliver 180 degree heating water to the heat exchanger in order to maintain 102 degrees within the spa. The heat exchanger is located within the lower mechanical pump room and is showing signs of corrosion due to leaking water.

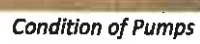
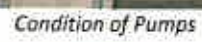
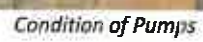


### Spa Heat Exchanger

### Pumping and Chemical Treatment Systems

All of the pumps associated with circulation and filtration for the pool and spa are located inside the lower mechanical pump room. There is visible surface rust on the pump housings and at their bases. The motors were all recently replaced with premium efficiency inverter duty motors and are controlled by variable speed drives. Harriman has provided a schematic diagram of the existing pumps and piping system within the appendix.







## DONALD RICHARDS POOL EVALUATION



*Condition of Pump Base*

It is important to note that there were no visible signs of water leakage at any of the pumps, despite the surface rust. Additionally, all of the pumps that were operating sounded very quiet and appeared to be operating very well. There are signs of surface corrosion on copper and brass fittings exposed to the humid chlorine filled atmosphere. The strainer below has surface corrosion, but does not appear to be leaking.



*Strainer*

The double flow check shown in the following picture has surface corrosion and is leaking at the carbon steel valve packing nut.



## DONALD RICHARDS POOL EVALUATION



*Double Flow Check*

Within the pump room there is a balancing valve that is showing signs of surface corrosion along with a fair amount of corrosion at the connections to the plastic piping.



*Corroding Balancing Valve and Connections*

Within the mechanical space above the pump room there is a solenoid valve where the carbon steel is showing signs of surface rust. There is a minimal amount of surface rust and the valve appears to be operating properly.

The chlorine injection system for the pool is an Accu-Tab model 3075 Chlorinator. This system appears to be operating properly; although it is understood that Owner would like to explore alternative chemical treatment systems.



The chlorine is dispensed directly into the pool skimmer. The pool skimmer is operating properly and can remain regardless of the type of chemical treatment system that is decided upon.

## DONALD RICHARDS POOL EVALUATION



*Pool Skimmer*



*Pool Skimmer*

As part of the chemical treatment system, liquid carbon dioxide is injected to control the pH of the water instead of using muriatic acid. The use of CO<sub>2</sub> raises the alkalinity of the water by combining with the water to form mild carbonic acid that creates a natural buffer against sudden drops in pH. Additionally, it is safer overall by eliminating the need for acid feed pumps and reducing mechanical room fumes and corrosion due to mixing chlorine vapor and acid. This system appears to be working properly and is in very good condition.





## DONALD RICHARDS POOL EVALUATION



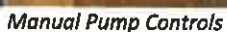
*Liquid Carbon Dioxide System*

The water chemistry of the pool is constantly monitored and automatically adjusted through an existing system of programmable controllers.

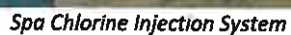


*Programmable Pool Controllers*

The pumping and filtration systems for both the pool and spa are manually controlled through existing panels with two position switches.



The chlorine injection system for the spa is an Accu-Tab model 3015 Chlorinator. This system appears to be operating properly. Again, it is understood that Owner would like to explore alternative chemical treatment systems.



As with the pool, chlorine is dispensed directly into the spa skimmer which is operating properly and can remain regardless of the type of chemical treatment system that is decided upon.





## DONALD RICHARDS POOL EVALUATION



*Spa Skimmer*

Water chemistry of the spa is constantly monitored and automatically adjusted through an existing system of programmable controllers.



*Programmable Spa Controllers*



## DONALD RICHARDS POOL EVALUATION

### RECOMMENDATIONS

#### *Dectron Unit*

Due to the age and condition of the existing Dectron unit, it is recommended to replace the unit as part of a renovation project next summer. Unfortunately, the existing Dectron unit is at the end of its useful life. Harriman consulted with the manufacturer's representative and was informed that once the coils begin to fall apart it becomes cost prohibitive to replace the coils and continue maintaining the unit.

As discussed, Seresco provides an exceptional dehumidification unit for consideration as a replacement to the Dectron unit. It is understood that large equipment access in and out of the existing mechanical room is very difficult; therefore the proposed unit would be mounted on the roof of the mechanical room instead of within the room. The unit would be mounted on a roof curb with downflow ductwork that would tie back into the existing supply and return mains. In addition to ease of equipment servicing, locating the unit on the roof would also help with project phasing since the existing Dectron unit can remain in place while the new unit is being installed on the roof. The proposed Seresco unit includes the following features:

- Use of dry cooler to reduce refrigerant charge by up to 85% compared to similar equipment from other manufacturers. This feature also allows for modulating reheat for extremely stable supply air temperature control.
- Roof mounted 2" double wall packaged unit with downflow curb.
- Full epoxy dipped coils as opposed to only epoxy coated fins.
- Mechanical vestibule within unit to separate critical components from corrosive airstream.
- Direct driven, backward inclined airfoil plenum fans powered by either ECM motors or motors with VFDs, depending upon the motor sizes. Fan wheels are polymer anti-corrosion construction.
- Glycol coils for energy recovery between exhaust air and outside air streams.
- Unit mounted hot water coil with modulating control valve.
- Corrosion resistant finish on cabinet and components.
- Energy recycling systems to provide either free pool water heating or ventilation air heating depending upon the system requirements.
- Warranty to include: 2 years drive line, 5 years for compressors and 10 years on coils.
- Factory start-up assistance from Seresco factory technician.
- WebSentry Technology as a standard feature which includes the following features:
  - Robust online reporting of real-time performance data.
  - 24/7 Performance monitoring.
  - Factory supervised startup and support via the internet.
  - Automated maintenance and system alerts by email.
  - Browser-based and smart phone access and control.

As an add alternate, Harriman was asked to explore incorporating an updated controls package that could interface with a building management system (BMS). Seresco provides an interface card which can communicate with a BMS through BACnet or LonWorks. Within the Appendix we have included brochures for Seresco products overall, the proposed Seresco NP Series and the WebSentry where you can find additional information. Additionally, Harriman has included in the

Appendix a construction cost budget estimate for replacement of the existing Dectron unit. Lastly, we have also included a preliminary equipment selection within the Appendix.

Harriman understands that the propane gas fired boilers were pushed very hard to maintain the pool/spa water temperatures and struggled particularly with maintaining the spa. Measures have been taken to reduce load on the boilers, including installation of a dedicated spa heater and tying the pool heat exchanger into the main boiler loop. As discussed, it is recommended to replace the propane gas fired boilers with new boilers of similar size and capacity.

Given the condition of the pool heat exchanger, it is recommended to keep this unit in operation for at least the next 5-10 years. After that period an evaluation should be made to determine if replacement is necessary.

It is understood that the spa heat exchanger is in poor condition. If this heat exchanger was not replaced when the new spa heater was installed, it should be replaced as soon as possible.

As stated previously within the evaluation, there is surface rust on the pump housings and some of the bases. However, all of the pumps have been upgraded to variable frequency drives and appear to be operating very well. Therefore, given their condition it is recommended to continue operation of the pumps and maintain/repair as necessary through routine maintenance.

As noted in the evaluation, there are some pipe fittings and accessories that show signs of corrosion. It is recommended to replace any fittings or accessories that are corroded and either leaking or in disrepair. This will increase the life of the system and help minimize maintenance in the future.

The skimmers for the pool and spa have no moving parts and are in very good condition; therefore it is recommended that they remain in operation moving forward.

Use of liquid carbon dioxide instead of muriatic acid is an excellent choice in terms of safety for pool maintenance staff and reduction of fumes and corrosion. As previously stated, this system appears to be working properly and is recommended to be maintained.

The controllers which monitor and automatically adjust pool and spa water chemistry appear to be working properly. It is recommended to maintain these systems unless there have been issues with maintaining the water chemistry. In the event that an alternate pool/spa water treatment system is decided upon, adjustments will need to be made to the pool and spa controllers to ensure proper maintenance of water chemistry.

Use of manual switches for control of the pool and spa pumping systems appears to be working properly; however, as with the Dectron unit, it is recommended to include an alternate for automating the pumping systems through the BMS.



## DONALD RICHARDS POOL EVALUATION

### *Chlorine vs. Salt Water*

Harriman was asked to investigate the benefits and drawbacks associated with purchased chlorine versus salt water to assist the Owner in deciding which method is preferable moving forward.

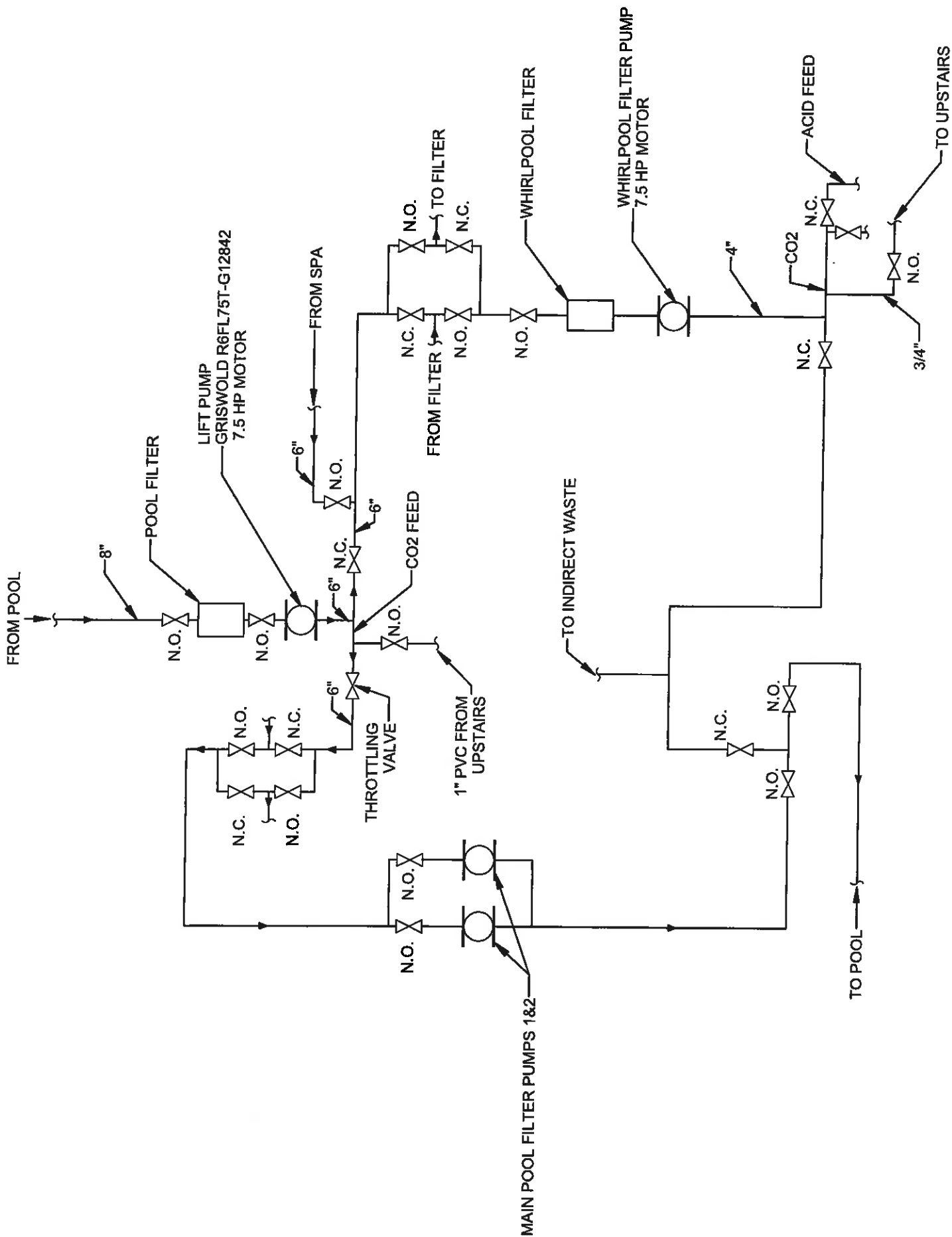
The first step is to gain a better understanding of how chlorine actually conditions the water in a pool or spa. The primary task of chlorine is sanitization, which reduces the level of microorganisms in the water to safe levels, usually 99.9% or more. There is also a secondary purpose called oxidation, which essentially “burns up” organic contaminants. These organic contaminants include body oil, perspiration, urine and sunscreen. With a pool conditioned by purchased chlorine, there are adequate levels of chlorine to both sanitize and oxidize, which alleviates the need for additional conditioning systems.

In a salt water pool, a chlorine generator uses electrolysis to create chlorine using the salt water solution. The chlorine generator can provide acceptable amounts of chlorine for sanitization; however, oxidation needs to be handled by either adding a small amount of purchased chlorine or introducing a UV disinfection system. The main advantage of a salt water pool is that you can significantly reduce the need to purchase and handle chlorine, or eliminate it altogether by incorporating a UV disinfection system. From an operating cost perspective, it appears that salt water pools are generally more expensive to operate than pools conditioned with purchased chlorine. In our research it was discovered that algae problems are more prevalent in salt water pools and that the salt water generators tend to run the pH up high, which requires more chemical adjustment. The most important thing to realize is that salt water pools do not address chloramines, which occur when human waste interacts with chlorine. This is identified as the typical “chlorine smell” that people associate with a chlorinated pool. So in fact, you actually smell chloramines, not the dissolved chlorine in the water. The chloramines will continue to exist regardless of whether the pool uses salt water or purchased chlorine. Additionally, our research has identified that pool installers typically ask clients to sign disclaimers when a salt water pool is installed due to premature failure of some equipment.

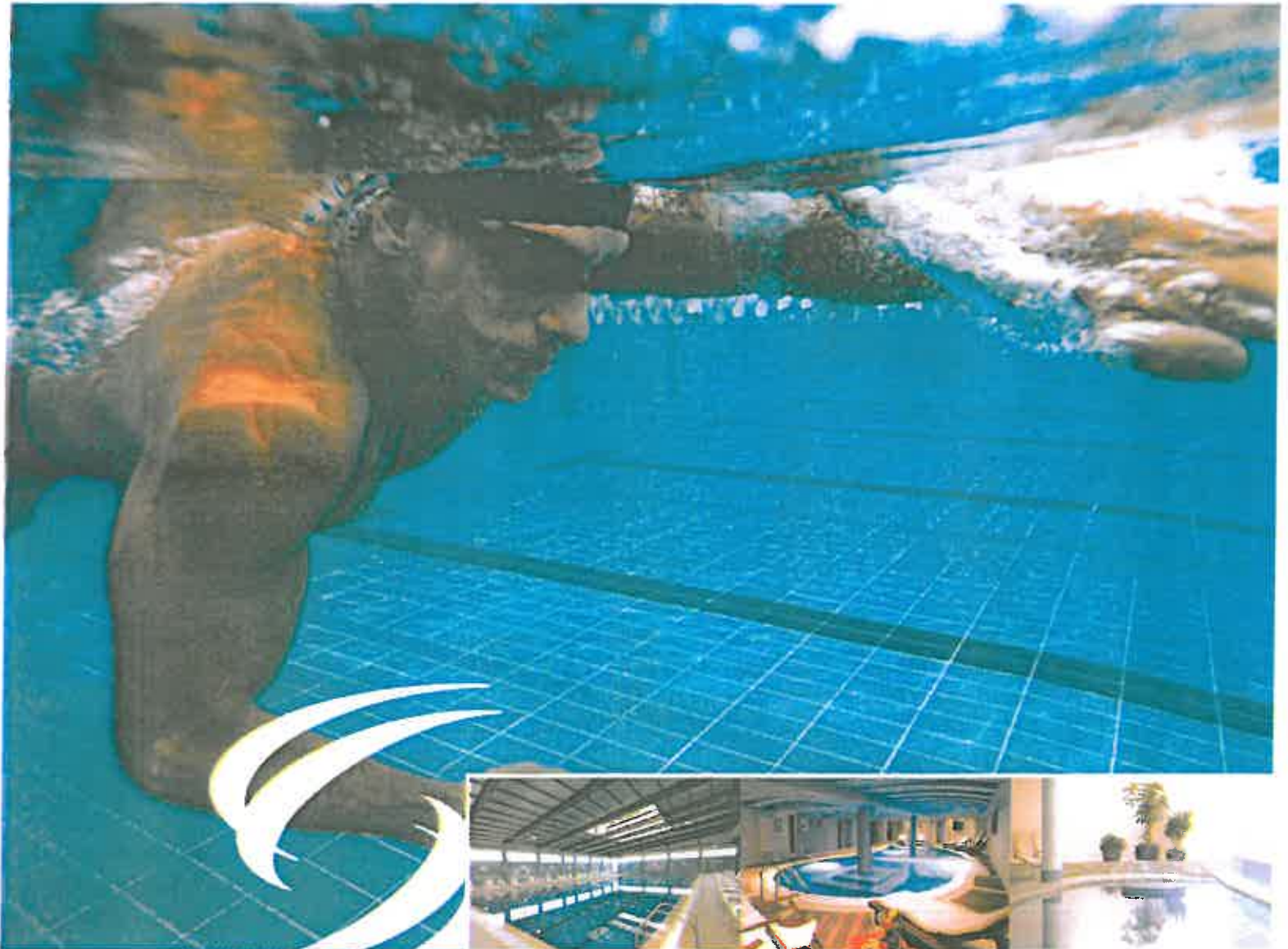
There are some applications where a salt water pool is better than others, particularly if the pool is outside. Harriman spoke with one hotel on the coast that actually pumps filtered sea water directly into an outside pool and reportedly has no major issues. It gets more complicated when the pool is indoors instead of outdoors. Harriman spoke with the Dectron representative and found out that a new unit was having operational issues after a month of operation in a salt water pool. When the service technician arrived onsite, it was discovered that the inside of the unit was completely covered in a white powder that was determined to be salt. It turns out that the pool maintenance staff had been adding salt into the system in the same general area as the return grille for the Dectron unit. Apparently, it was quite a mess to clean up and there are no real guarantees that it won't happen again.

Taking everything into consideration, Harriman would not recommend a salt water pool for your particular application. Our research has shown that more than 60% of modern aquatic centers utilize UV disinfection systems with small quantities of purchased chlorine. The UV disinfection system destroys more than 99% of organic matter in the water and the chlorine levels can be reduced by 80-90%. Typically the chlorine levels can be lowered to 0.5 ppm which is about the









**Seresco**  
**Indoor Pool Dehumidifiers**  
Unrivalled Performance, Reliability and Value



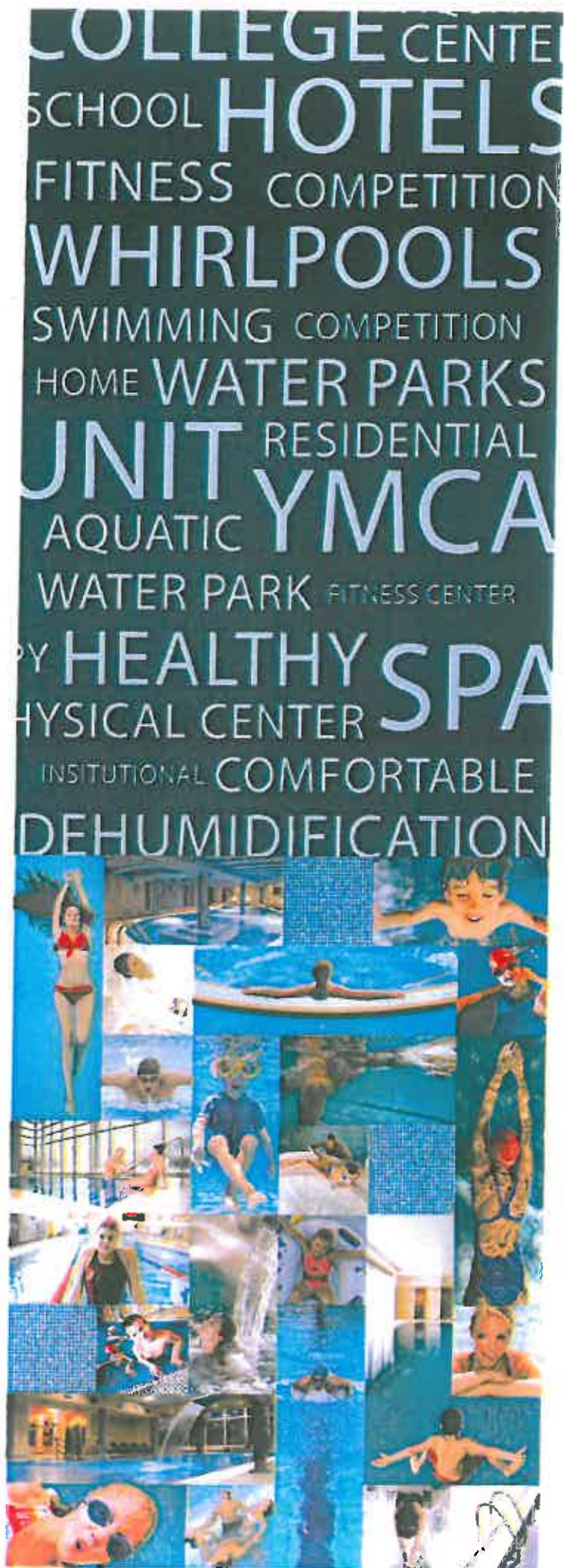
## Dehumidification is Serious Business

Natatorium environment control is a complex business with serious energy, comfort, health, and safety considerations. Heat, humidity and chemicals in pools combine to create harsh environments that are hard on buildings and hard on equipment.

Providing a safe, healthy and comfortable pool environment while minimizing operating costs and delivering the best possible air quality is no simple task.

The system design and equipment must perform reliably, day in and day out, with minimum energy consumption and maximum energy recovery to provide precision control of the environment, no matter what the ambient temperatures or pool activity level.

That's why Seresco has become the #1 choice of discriminating engineers, contractors and pool owners.



# Not Just Another Dehumidifier

From engineering and design support, to building the toughest, most sophisticated and energy efficient products in the world, Seresco provides clients with end-to-end solutions that deliver outstanding performance, value—and the absolute lowest cost of ownership in the industry.

Each of our product lines is uniquely engineered for peak performance in a particular environment or geographic location. And only Seresco provides our revolutionary WebSentry® Technology to remotely monitor and control your dehumidifier performance 24-7 via the internet. That's how we ensure peak performance long after our equipment leaves our factory. It's also why we can back every unit with the best warranty in the industry.

No other dehumidifier company even comes close! See for yourself at **[SerescoDehumidifiers.com](http://SerescoDehumidifiers.com)**



## Dehumidifiers Designed Specifically for Every Size of Pool and Every Climate

Seresco builds four unique product lines that deliver peak performance for every size pool, in every climate zone. With unit performance capacities ranging from 10 to 840 lbs/hr of moisture removal and 650 to 70,000 CFM of air handling, you'll find Seresco in water parks, Olympic pools, universities, YMCAs, schools, hotels, motels, spas and homes, from coast to coast, throughout North America.

Our dehumidifier designs incorporate the latest technological advancements in fan design, corrosion protection and precision control systems. We offer a wide range of options including heat recovery and pool water heating as smart ways to recycle energy. Each unit is also built to the highest standards in the industry, with a long and impressive list of standard features that beat the competition hands down.



# The Broadest Product Line in the Industry



## NE NE Series Dehumidifiers



Our NE series dehumidifier is what launched Seresco to the forefront of dehumidifier manufacturers. We were determined to build not just an improved dehumidifier, but a dehumidifier that was better in every way possible – and we did! From the smallest details that others overlook to the most critical aspects of engineering and component selection, our NE dehumidifiers truly set the industry standard for performance, reliability and value.

**Moisture Removal:**  
10 to 100 lbs/hr

**Air Handling:**  
650 to 8,000 CFM

See details, videos and our NE brochure at:  
**SerescoDehumidifiers.com/NEseries**

## NE 200 Series Dehumidifiers



Our NE 200 series is pure genius. Designed specifically for retrofit and restricted space installations, they are double-decker units that pack twice the dehumidification in the same footprint as a regular unit. Not only do we pack twice the dehumidification capacity into our already small footprint, but we also created a fully redundant system, with split installation capability and serious energy savings derived from scalable load management.

**Moisture Removal:**  
45 to 200 lbs/hr

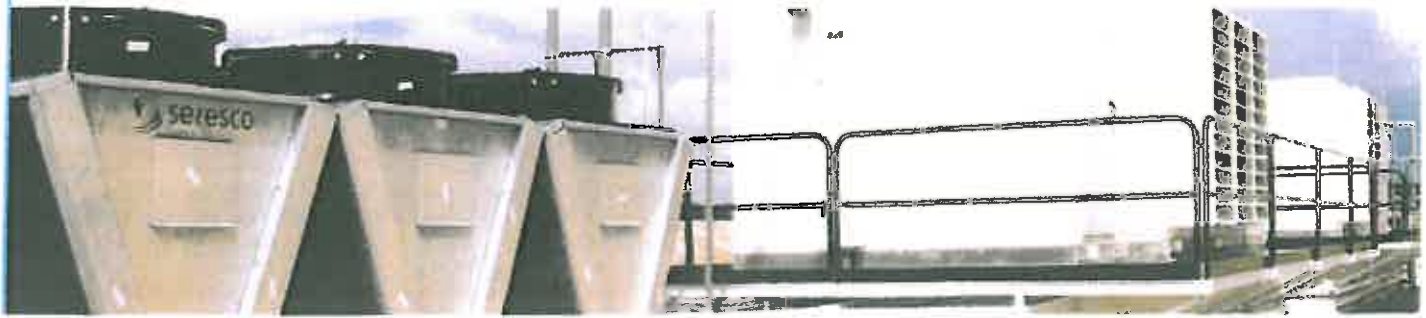
**Air Handling:**  
3,000 to 16,000 CFM

See details, videos and our NE 200 brochure at:  
**SerescoDehumidifiers.com/NE200series**





# For Every Size of Pool in Every Climate



## **NP** NP Series Dehumidifiers



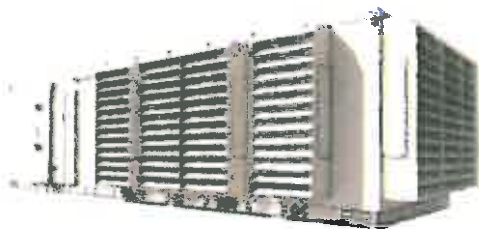
Our revolutionary NP or Protocol series is the future of dehumidification. The biggest innovation our industry has seen to date, this environment-friendly, energy efficient powerhouse provides superior humidity control and exceptional reliability with as little as 1/6<sup>th</sup> the traditional refrigerant charge. It also completely resolves all the design and operational issues related to traditional refrigerant based units and eliminates on-site refrigeration work.

**Moisture Removal:**  
100 to 840 lbs/hr

**Air Handling:**  
6,800 to 70,000 CFM

See details, videos and  
our NP brochure at:  
**[SerescoDehumidifiers.com/  
NPseries](http://SerescoDehumidifiers.com/NPseries)**

## **NV** NV Series Dehumidifiers



Our NV product line is designed specifically for applications where humidity control using outdoor ventilation air is desired. The NV series enjoys all the technology, quality and design innovations of our NP series, but without compressors. Seresco's innovative approach to heat recovery makes our NV series the most energy efficient, compact and lightweight units available for outdoor ventilation humidity control.

**Moisture Removal:**  
Weather dependent

**Air Handling:**  
4,000 to 70,000 CFM

See details, videos and  
our NV brochure at:  
**[SerescoDehumidifiers.com/  
NVseries](http://SerescoDehumidifiers.com/NVseries)**





**WebSentry®**  
SAFEGUARDING YOUR DEHUMIDIFIER



## WebSentry® for Ultimate Peace of Mind

There's no better way to ensure peak performance, low cost of ownership and years of trouble-free service than with our revolutionary WebSentry® Technology.

WebSentry® is your dehumidifier's umbilical cord back to our factory via the internet. It allows the same engineers and technicians who built your dehumidifier to remotely monitor, control and fine tune its performance long after it leaves our factory. Even more impressive, WebSentry® uses sophisticated computer programs to

record and analyze your dehumidifier performance every 60 seconds, 24 hours a day, to monitor and diagnose any hints of trouble long before they turn into potential problems.

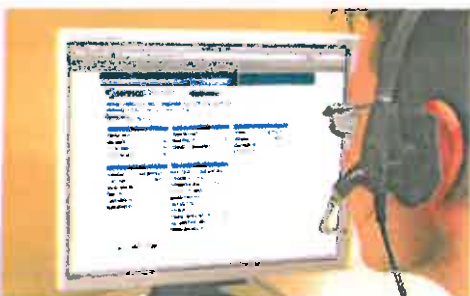
At any sign of trouble, your designated service technicians receive an automated email alert that allows immediate intervention and remote control from any web enabled device, including smart phones. And the best part? WebSentry® Technology is installed, at no additional cost on every dehumidifier we build.

### WebSentry® Technology Advantages

- Installed at no cost on every unit
- Provides the longest parts and labor warranty in the business
- Allows the factory or authorized technicians to remotely monitor and fine tune unit performance via the internet
- Automated computer performance monitoring with trouble alerts sent by email
- Remote access to any unit from internet enabled devices

Learn all the details and see it in action at:

**[SerescoDehumidifiers.com/WebSentryTechnology](http://SerescoDehumidifiers.com/WebSentryTechnology)**



## Seresco's Online Pool Design Resources

Looking for natatorium design insights, tips and checklists? Seresco's Natatorium Design Guide is available online for instant reference as well as in a downloadable PDF format from our website.

Seresco also provides a non-commercial, professional development training video on natatorium design that allows those who watch to earn a PDH certificate.

For valuable pool design resources and our PDH training video visit:  
**[SerescoDehumidifiers.com/Engineers](http://SerescoDehumidifiers.com/Engineers)**



# Features

|   | NE 002-003 | NE 004-007 | NE 008-016 | NE 200 Series | NP Series | NV Series |  | NE 002-003 | NE 004-007 | NE 008-016 | NE 200 Series | NP Series | NV Series |
|---|------------|------------|------------|---------------|-----------|-----------|--|------------|------------|------------|---------------|-----------|-----------|
| <b>Superior System Design</b>               |            |            |            |               |           |           | <b>Greater Energy Efficiency</b>         |            |            |            |               |           |           |
| <b>Evaporator Design</b>                    |            |            |            |               |           |           | Pool water heating                       | •          | •          | •          | •             | •         | •         |
| Enhanced tube coils                         | •          | •          | •          | •             | •         | •         | Variable frequency drives/EC motors      | •          | •          | •          | •             | •         | •         |
| Split evaporator coils                      |            |            |            |               | •         | •         | Backward inclined plenum blowers         | •          | •          | •          | •             | •         | •         |
| Intermediate drain pans                     |            |            |            |               | •         | •         | Direct drive motors (no belts)           | •          | •          | •          | •             | •         | •         |
| Multiple TX valves                          |            |            |            |               | •         | •         | Heat recovery on exhaust and outdoor air |            | •          | •          | •             | •         | •         |
| <b>Fan Design</b>                           |            |            |            |               |           |           | Sickle blade exhaust fans                |            | •          | •          | •             | •         | •         |
| Direct drive plenum fans                    | •          | •          | •          | •             | •         | •         | Owl wing blade OACC/fluid cooler fans    |            |            | •          | •             | •         | •         |
| Fan vibration isolation base and cone       |            |            |            |               | •         | •         | Dual speed OACC/fluid cooler fans        |            |            | •          | •             | •         | •         |
| Field selectable supply air locations       | •          | •          | •          | •             | •         | •         | <b>Advanced Control Systems</b>          |            |            |            |               |           |           |
| <b>Compressor Protection</b>                |            |            |            |               |           |           | WebSentry® Technology                    | •          | •          | •          | •             | •         | •         |
| Up to 85% less refrigerant charge           |            |            |            |               | •         | •         | 24/7 Internet monitoring & protection    | •          | •          | •          | •             | •         | •         |
| Pump down & crankcase heaters               | •          | •          | •          | •             | •         | •         | CommandCenter® Controller                | •          | •          | •          | •             | •         | •         |
| Oil monitoring sensors                      |            |            | •          | •             | •         | •         | Advanced touch screen operator panel     | •          | •          | •          | •             | •         | •         |
| Oil separators & suction accumulators       |            |            | •          | •             | •         | •         | Refrigerant pressure transducers         | •          | •          | •          | •             | •         | •         |
| Voltage monitors                            | •          | •          | •          | •             | •         | •         | Refrigerant temperature sensors          | •          | •          | •          | •             | •         | •         |
| Factory sealed refrigerant charge           | •          | •          | •          | •             | •         | •         | Flow switch on pool water                | •          | •          | •          | •             | •         | •         |
| <b>Door Design</b>                          |            |            |            |               |           |           | Remote operator panel                    | •          | •          | •          | •             | •         | •         |
| Auto grade door gaskets                     |            | •          | •          | •             | •         | •         | BACnet, BACnet IP, LonWorks, Modbus      | •          | •          | •          | •             | •         | •         |
| Compression latches on doors                |            | •          | •          | •             | •         | •         | <b>Optimal Corrosion Resistance</b>      |            |            |            |               |           |           |
| Hinged doors with door stops                |            |            |            |               | •         | •         | Service vestibule out of air stream      | •          | •          | •          | •             | •         | •         |
| Rain guards over doors (outdoor units)      | •          | •          | •          | •             | •         | •         | Fully coated airside coils               | •          | •          | •          | •             | •         | •         |
| <b>Other Great Features</b>                 |            |            |            |               |           |           | Silicone-polyester enclosure paint       | •          | •          | •          | •             | •         | •         |
| Packaged outdoor units                      |            | •          | •          | •             | •         | •         | Coated copper pipes                      | •          | •          | •          | •             | •         | •         |
| Air heating (hot water, gas, electric)      | •          | •          | •          | •             | •         | •         | Corrosion resistant fans                 | •          | •          | •          | •             | •         | •         |
| A/C options (air cooled, fluid cooled)      | •          | •          | •          | •             | •         | •         | Cambered roof                            |            | •          | •          | •             | •         | •         |
| Purge/Economizer mode                       |            |            | •          | •             | •         | •         | Cupronickel coaxial heat exchanger       | •          | •          | •          | •             | •         | •         |
| Two inch double-walled units - outdoor      | •          | •          | •          | •             | •         | •         | Rust proof bird screens                  |            | •          | •          | •             | •         | •         |
| Two inch double-walled units - indoor       | •          | •          | •          | •             | •         | •         | PVC piping for water circuits            | •          | •          | •          | •             | •         | •         |
| Outdoor air connection                      | •          | •          | •          | •             | •         | •         | <b>Easy to Service</b>                   |            |            |            |               |           |           |
| Minor access configurations                 |            | •          | •          | •             | •         | •         | WebSentry® premium labor warranty        | •          | •          | •          | •             | •         | •         |
| Small footprint systems                     | •          | •          | •          | •             | •         | •         | Superior service access                  | •          | •          | •          | •             | •         | •         |
| Retrofit friendly                           | •          | •          | •          | •             | •         | •         | Mechanical vestibule outside airstream   | •          | •          | •          | •             | •         | •         |
| Compound sloped drains                      | •          | •          | •          | •             | •         | •         | Serviceable RH sensor                    | •          | •          | •          | •             | •         | •         |
| Floor grates protect air openings           |            |            |            |               | •         | •         | Control wires numbered for tracing       | •          | •          | •          | •             | •         | •         |
| 2 inch pleated filters, 4 inch optional     | •          | •          | •          | •             | •         | •         | Shut off valves to isolate refrigerant   | •          | •          | •          | •             | •         | •         |
| Insulated dampers, silicon side seals       | •          | •          | •          | •             | •         | •         | Manual stem on solenoid valves           |            | •          | •          | •             | •         | •         |
| Modulating gas heaters                      | •          | •          | •          | •             | •         | •         | Receiver sight glasses                   | •          | •          | •          | •             | •         | •         |
| Precision outdoor air balancer              |            | •          | •          | •             | •         | •         | Removable, oversized core filter driers  |            | •          | •          | •             | •         | •         |
| Standard solenoid valves                    | •          | •          | •          | •             | •         | •         | Rotolock connections on compressor       |            | •          | •          | •             | •         | •         |
| Motorized vertical evaporator bypass damper |            | •          | •          | •             | •         | •         | Touch screen help information            | •          | •          | •          | •             | •         | •         |
| Fit through 32 inch door frame              | •          | •          | •          | •             | •         | •         |  |            |            |            |               |           |           |
| Motorized outdoor air dampers               | •          | •          | •          | •             | •         | •         |  |            |            |            |               |           |           |

• = standard    ◦ = optional  
(some model exceptions, see unit specifications)

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(some model exceptions, see unit specifications)



# Renowned Industry Leading Technology & Innovation

**Seresco** builds each and every dehumidifier with technology and features that set the industry standard for performance, reliability and value. For applications ranging from small indoor spas to massive waterparks, we manufacture the largest, most comprehensive product line available. Compare us to the competition and you'll see instantly why we're the #1 choice for discriminating customers!



## Superior System Design

### Protocol Series with up to 85% Less Refrigerant Charge

- Smoothest, most stable room control in the industry
- Easiest and most cost effective installation possible
- Lowest operating and maintenance costs
- Longest lifetime expectancy of any pool dehumidifier

### Ultra Compact Designs

- Twice the capacity in half the footprint (200 Series)
- Retrofit designs for on-site assembly
- Flexible cabinet designs for air supply and service access
- Packaged or split system options

### Superior Compressor Performance

- Advanced refrigeration pressure monitoring and control technologies, unique to Seresco, ensure optimum compressor operation and protection



## Advanced Control Systems

### WebSentry® Technology

- Robust online reporting of real-time performance data
- 24/7 Performance monitoring
- Factory supervised startup and support via the Internet
- Automated maintenance and system alerts by email
- Browser-based and smart phone access and control

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(Conditions apply, see Warranty Statement for details)

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## Exceptional Energy Efficiency

### Direct Driven, Backward

#### Inclined Airfoil Plenum Fans

- Powerful, quiet, efficient, reliable
- No belts to adjust, wear out or replace
- ECM motors or VFD
- Allows for factory installed auxiliary air heating

### Energy Recycling Systems

- Free pool water heating with recycled energy
- Heat recovery on ventilation air



## Maximum Corrosion Resistance

### Separate Mechanical Vestibule

- Virtually all components are out of the corrosive air stream

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### Corrosion Resistant Design, Finishes & Components



## Easy to Service

### Mechanical Vestibule Outside Air Stream

- On air units
- Easy to service even during unit operation

### WebSentry® Remote Analysis & Control

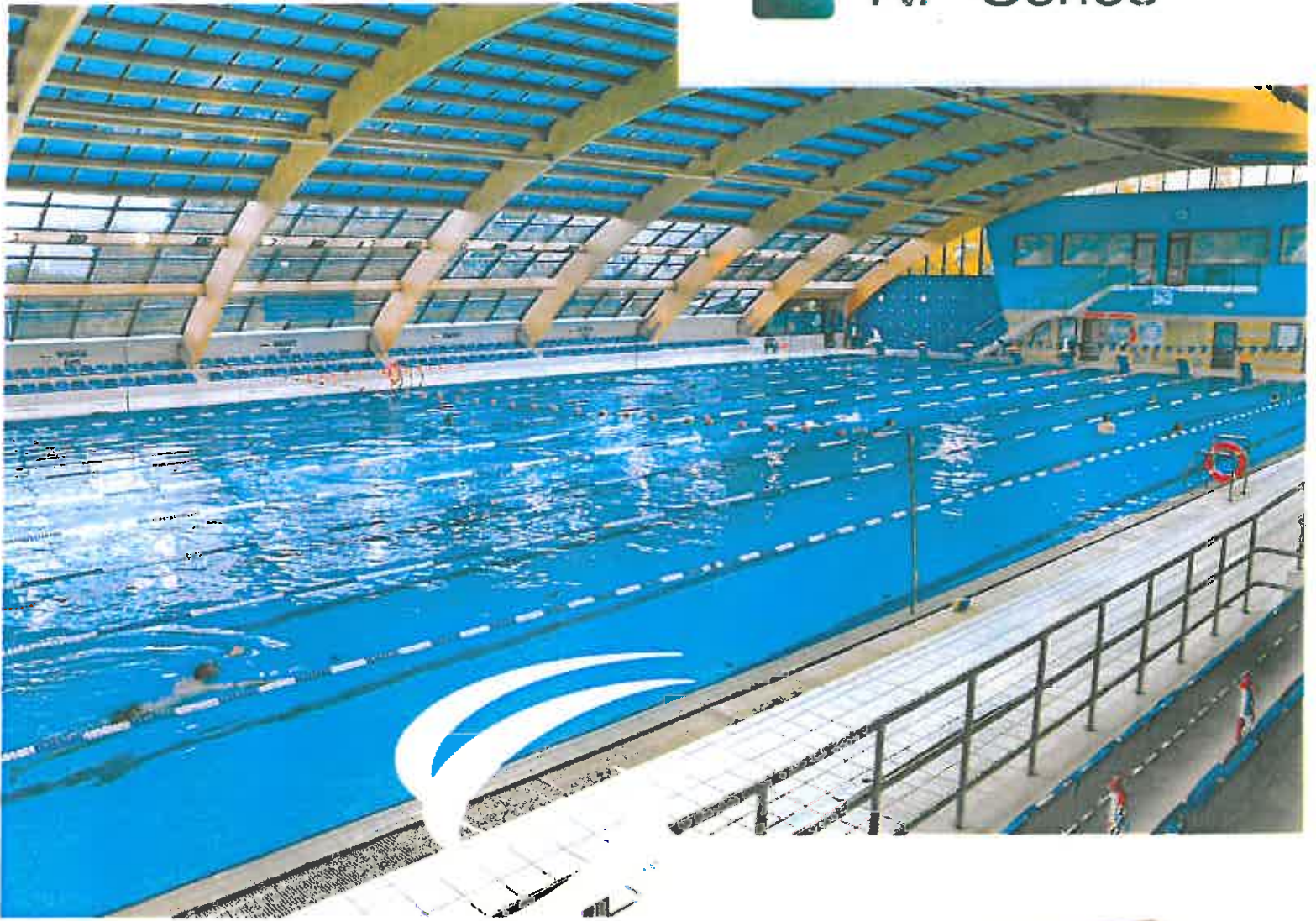
- Instant factory analysis and service capability via the Internet
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# NP Series



**Seresco's NP Series Dehumidifiers**  
The Evolution of Dehumidifier Technology



 **seresco** | Advanced Dehumidifiers  
WebSentry® Technology

"Our dream was to build a dehumidifier that solved the industry's most challenging issues"

## Imagine

- ...a dehumidifier that uses only a fraction of the refrigerant charge required in traditional systems
- ...factory sealed refrigeration even on split systems
- ...the most stable room conditions, smoothest operating performance and peak energy efficiency
- ...no limitations on the remote AC cooler location
- ...the longest lasting and most reliable dehumidifier in the industry

*That's what we imagined  
...when we created Protocol Technology*

## NP Series Dehumidifiers

Our revolutionary NP or Natatorium Protocol series is the biggest industry innovation in 20 years and the future of dehumidification.

A traditional natatorium dehumidifier requires a large refrigerant charge that is not just expensive, but also leads to oil and refrigerant migration control challenges that can impact compressor reliability. Traditional split systems also severely limit the distance between the unit and its remote AC condenser.

Through the use of a secondary heat exchange fluid, our ingenious NP Series overcomes both of these issues and more. Our NP series also provides superior humidity control, exceptional reliability and lower operating costs, with as little as 1/6th the traditional refrigerant charge.

For applications requiring 100 to 840 lbs/hr hour of moisture removal or 6,800 CFM to 70,000 CFM of air handling, our NP Series beats the competition hands down – in every design consideration – every time!

## Seresco's Online Pool Design Resources

Looking for natatorium design insights, tips and checklists? Seresco's Natatorium Design Guide is available online for instant reference as well as in a downloadable PDF format from our website.

Seresco also provides a non-commercial, professional development training video on natatorium design that allows those who watch to earn a PDH certificate.

For valuable pool design resources and our PDH training video visit:  
**[SerescoDehumidifiers.com/Engineers](http://SerescoDehumidifiers.com/Engineers)**







## Protocol Advantages



## NP Series

- The ultimate in stable indoor air conditions through fully modulating reheat
- Tried and proven technology – dry coolers have been used in the precision air conditioning industry for decades
  - Seresco's innovations make this available for natatorium dehumidification
- Factory sealed refrigeration circuit – no expensive site refrigeration work
- Greatly reduced cost of ownership
  - Up to 85% less refrigerant charge!
  - Significantly less cost to install and maintain compared to alternative refrigerant systems
  - Compliant with ASHRAE Standards 15 & 34
  - Less refrigerant means lower environmental risk and additional LEEDs points
- Energy efficient: Seresco's proprietary heat rejection design makes the Protocol series 5-7% more efficient compared to all traditional DX systems throughout the year
- All seasonal refrigerant and oil migration issues to the outdoor condenser are totally eliminated
  - Decreased risk of compressor damage
  - Lower maintenance costs
- Air cooled AC heat exchanger uses only one set of PVC pipes instead of a copper line set for each compressor
  - Greatly simplified installation
  - Reduced labor and material costs
  - Threat of copper pipe theft is eliminated
- Air cooled AC heat exchanger can be located a considerable distance from the unit
  - Greater installation flexibility for split system configurations
- Available as indoor split or outdoor packaged (or split) system
- Can be equipped with auxiliary air heating, and a variety of ventilation options including purge, air conditioning and heat recovery
- Fully compatible with Paddock Evacuator™



See details, videos and more at:  
[SerescoDehumidifiers.com/NPseries](http://SerescoDehumidifiers.com/NPseries)



## WebSentry® for Ultimate Peace of Mind

Our WebSentry® Monitoring technology redefines the concept of service and support by remotely monitoring, analyzing and reporting on all the critical functions of your dehumidifier 24/7 – in real time via the Internet. Should maintenance be required or trouble alerts occur, WebSentry® will email your designated service personnel who have immediate, secure remote online access to your unit. Should your service technicians require assistance, Seresco's factory service experts are ready to help.

Learn all the details and see it in action at:

[SerescoDehumidifiers.com/WebSentryTechnology](http://SerescoDehumidifiers.com/WebSentryTechnology)

- Robust online reporting of real-time performance data
- Standard on every Seresco dehumidifier at no extra cost
- Simple plug and play Ethernet connection, optional WiFi/cellular
- Secure access and control via computer, tablet or smart phone
- Connection activates premium extended 1<sup>st</sup> year labor warranty (Conditions apply, see Warranty Statement for details)
- Factory or authorized service technicians fine tune unit performance remotely
- Automated performance monitoring with trouble alerts, service reminders and performance data sent by email

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**Real-Time Internet  
Monitoring & Control**  
Safeguarding Your Dehumidifier 24/7





"Our dream was to ensure our customers got perfect performance and a lifetime of reliable service from our dehumidifiers long after they left our factory"

## Imagine

- ...the same engineers who designed and built your dehumidifier having the ability to remotely observe, control and fine tune its performance during and after installation
- ...our servers monitoring, recording and analyzing your dehumidifier performance every 60 seconds, 24 hours a day, 7 days a week with real time online data access for operators and authorized service technicians
- ...technology that sends automated maintenance reminders and system alerts to prevent problems long before they happen
- ...this technology installed and ready to use on your dehumidifier at no additional cost

*That's what we imagined  
...when we created WebSentry® Technology*

## WebSentry® Truly is a Game Changer

Through a simple Ethernet connection (Wi-Fi and cellular network options also available), this incredible innovation allows factory engineers to remotely monitor, analyze, fine-tune or troubleshoot over 100 critical dehumidifier functions via the Internet to deliver truly exceptional product performance and reliability.

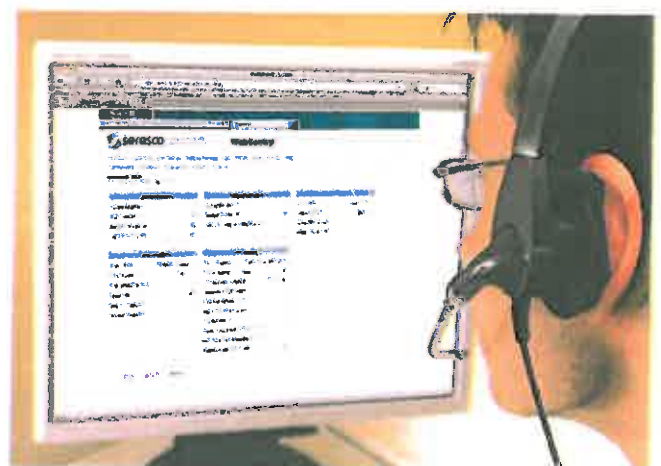
WebSentry® is Seresco's revolutionary approach to ensuring peak dehumidifier performance and the absolute lowest overall cost of ownership in the industry. It's also one of the reasons Seresco is the #1 choice for discriminating engineers, contractors, owners and service technicians.

## WebSentry® Extended Warranty

One of the most important factors in assuring a lifetime of service and reliability with sophisticated dehumidification equipment is expert installation, start-up and commissioning.

When your installing contractor takes advantage of Seresco's web-assisted start-up service, it's like having Seresco working side-by-side with them, every step of the way. That's why when WebSentry® is connected at start-up we automatically provide you and your contractor with a **premium, one year extended labor warranty**.

[ Conditions apply, see Warranty Statement for details ]



## WebSentry® Remote Monitoring

Our ongoing WebSentry® Monitoring service redefines the concept of factory service and support by remotely tracking all the critical functions of your dehumidifier 24/7 – in real time. Stored securely in our central server, all the daily performance metrics of your dehumidifier are captured and analyzed using complex computer algorithms.

Should anomalies of any nature arise, the system will automatically generate notifications by email to specified emergency contacts, including your service and maintenance personnel. Should it be required, a factory-trained technician can also be contacted for additional support.

24/7 Internet  
Monitoring & Protection

## WebSentry® Advantages

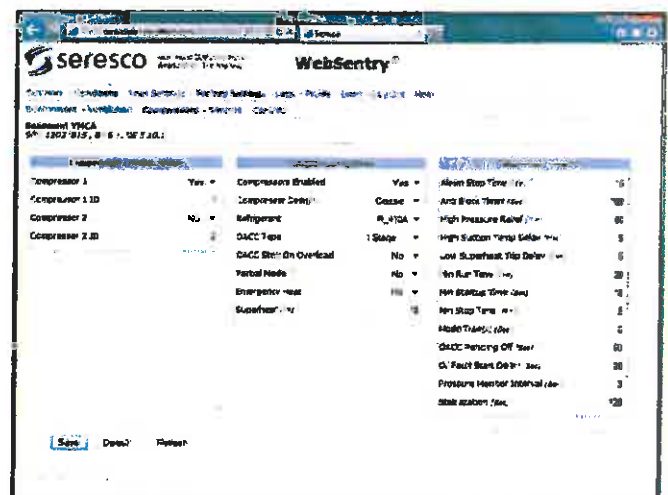
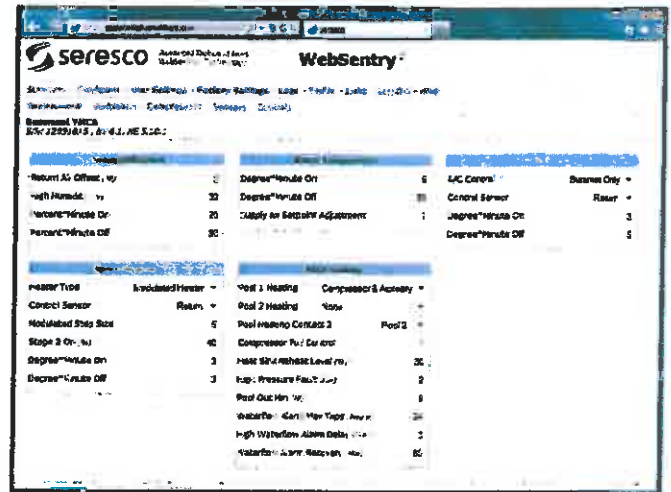
- Real peace of mind – 24/7 unit monitoring for life
- Robust online reporting of real-time performance data
- A standard feature on every Seresco unit
- Simple plug and play Ethernet connection
- Optional WiFi and cellular connections available
- Works in parallel with BACnet, LonWorks and Modbus
- Secure access and control via computer, tablet or smart phone
- Connection activates premium extended 1<sup>st</sup> year labor warranty
- Allows remote assisted unit startup
- Authorized technicians fine tune unit performance remotely
- Real-time monitoring of all sensors including refrigeration pressures
- Historical operating data logs on Seresco servers
- Remote access and control for authorized service personnel

## WebSentry® Monitoring

- Performance analysis using sophisticated computer algorithms
- Performance logging and analysis reports by email
- Scheduled service and maintenance reminders by email
- Alarm service with automated emails to registered emergency service contacts



**WebSentry®**  
SAFEGUARDING YOUR DEHUMIDIFIER



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- Heat recovery on exhaust air to preheat outdoor air



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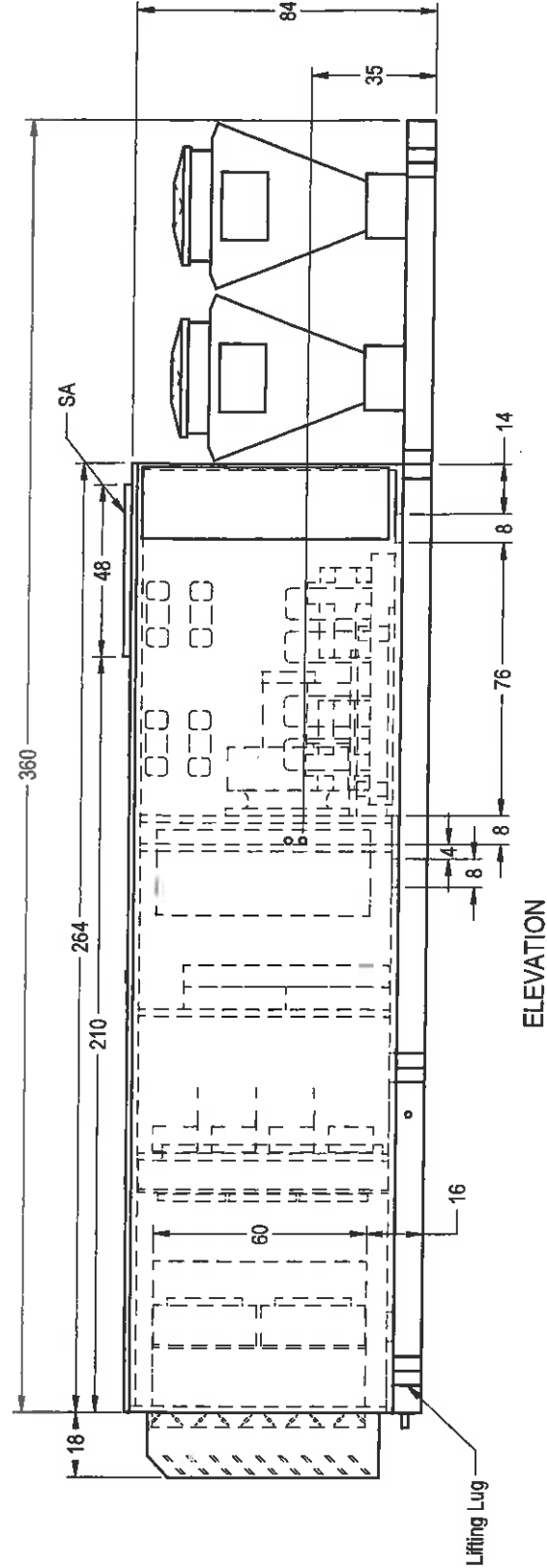
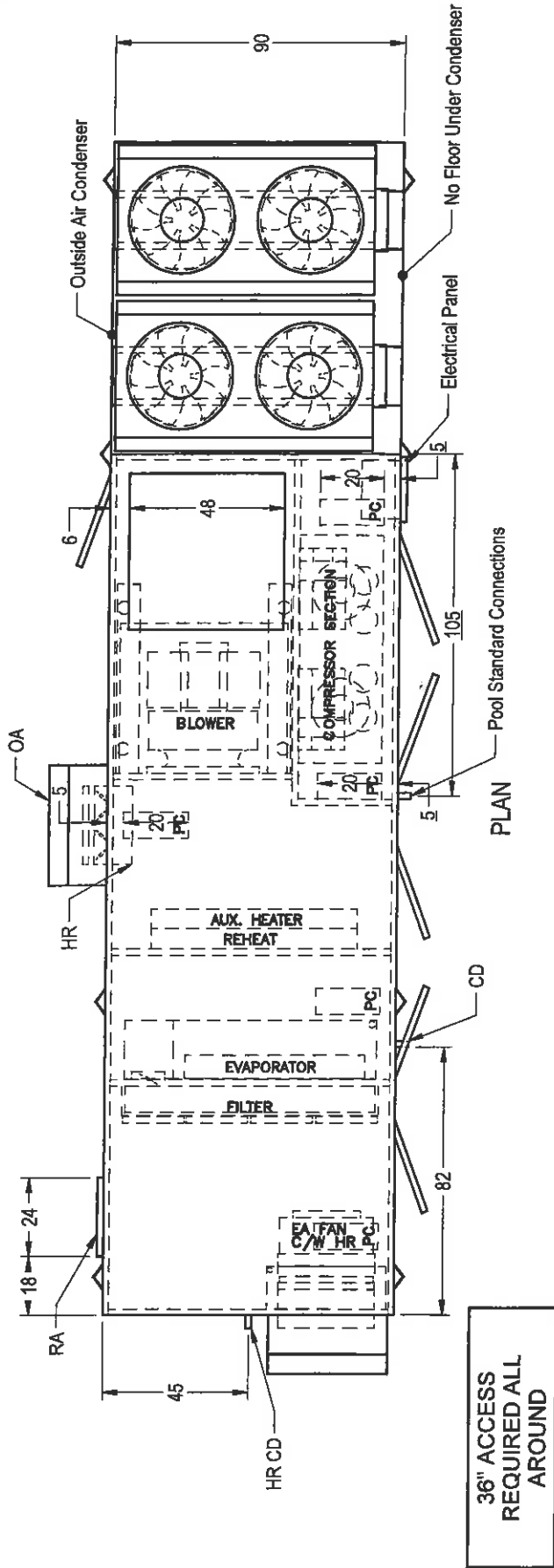
**seresco**

Advanced Dehumidifiers  
WebSentry® Technology

|  |  |  |  |
|--|--|--|--|
|  |  | CAD FILE BBX-SLT-P/H2P0 2VC<br>DATE 02/13/15<br>DRW/REV BY Duc Tran<br>REV 0<br>SHEET 1 OF 1 |  |
| DESCRIPTION<br><b>NP-036_040 OUTDOOR (HR+2VC)</b>                                |  |  |  |

| LEGEND |                  | SELECT OPTIONS |                   |
|--------|------------------|----------------|-------------------|
| AP     | Access Pannel    | PEA            | Purge Exhaust Air |
| CD     | Condensate Drain | PC             | Pipe Chase        |
| EA     | Exhaust Air      | POA            | Purge Outside Air |
| HR     | Heat Recovery    | RA             | Return Air        |
| OA     | Outside Air      | SA             | Supply Air        |

|   |
|---|
| <input type="checkbox"/> Disconnect<br><input type="checkbox"/> Side Condensate Drain<br><input type="checkbox"/> Roof Curb (Installed by others) |
|---|



UNIT OPERATING WEIGHT: 13 300 LBS

**Opinion of Probable Costs - Schematic Design****Donald Richards Pool Dehumidification Unit Replacement**

HA Project No. 15441

9/16/2015

**A. CONSTRUCTION COST****1. GENERAL REQUIREMENTS**

|                                      |                 |
|--------------------------------------|-----------------|
| General Requirements (18%)           | \$75,528        |
| Contractor Mobilization              | \$10,000        |
| <b>General Requirements Subtotal</b> | <b>\$85,528</b> |

**2. ARCHITECTURAL**

|   |                |
|---|----------------|
| Penetration Firestopping - Piping       | \$2,000        |
| Penetration Firestopping - Ductwork     | \$2,000        |
| Paint - 1 Finish Coat at Existing Walls | \$2,000        |
| <b>Architectural Subtotal</b>           | <b>\$6,000</b> |

**3. STRUCTURAL**

|                                    |                 |
|------------------------------------|-----------------|
| Potential Structural Scope of Work | \$50,000        |
| <b>Structural Subtotal</b>         | <b>\$50,000</b> |

**4. MECHANICAL**

|   |                  |
|---|------------------|
| Rigging to Install HVAC Equipment               | \$10,000         |
| Mechanical Demolition of Ductwork and Equipment | \$10,000         |
| Heating Hot Water Piping and Accessories        | \$10,000         |
| Sheet Metal Duct                                | \$20,000         |
| Grilles & Diffusers                             | \$10,000         |
| Duct Insulation                                 | \$5,000          |
| Piping Insulation                               | \$3,000          |
| Seresco Model NP-06                             | \$175,000        |
| Replacement of Condensing Gas Fired Boilers     | \$20,000         |
| Installation of Seresco Unit                    | \$10,000         |
| Testing and Balancing                           | \$10,000         |
| Alternate to Tie Seresco Unit into BMS          | \$5,000          |
| Temperature Controls Interface                  | \$10,000         |
| <b>Mechanical Subtotal</b>                      | <b>\$298,000</b> |

**5. ELECTRICAL**

|   |                 |
|---|-----------------|
| New Panelboard if Necessary                           | \$20,000        |
| HVAC Equipment Power                                  | \$20,000        |
| Lights within Equipment & Receptacles - Building Roof | \$600           |
| Miscellaneous Demolition                              | \$10,000        |
| Miscellaneous Materials                               | \$15,000        |
| <b>Electrical Subtotal</b>                            | <b>\$65,600</b> |

**B. TOTAL CONSTRUCTION COST****\$505,128****C. ADMINISTRATIVE COST & RESERVE**

|   |                 |
|---|-----------------|
| Estimating Contingency (5%)               | \$25,256        |
| Construction Contingency (5%)             | \$25,256        |
| <b>Admin. Cost &amp; Reserve Subtotal</b> | <b>\$50,513</b> |

**D. TOTAL PROJECT COST (EXCLUDES DESIGN FEES)****\$555,641****Estimated Design Fee ( \$48,000)**

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207.784.5100

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207.775.0053

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