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HyPoxy® Coated Coils
DRY-O-TRON® Quality
DRY-O-TRON® for the ultimate indoor pool environment
Congratulations!

With Dectron’s Indoor Pool Design and Dehumidification brochure, you have taken the first step towards creating a state-of-the-art indoor pool environment.

Dectron, a HVAC industry leader, has been manufacturing innovative dehumidification equipment that recycles energy and conserves pool water for nearly 40 years. Saving costs and protecting the environment have been Dectron’s guiding philosophies from the day the first DRY-O-TRON®, the original energy recycling dehumidifier, was designed.

A TRUE LEADER

Dectron has been pioneering advances in natatorium design and dehumidification since its first installation in 1977. The company’s direct involvement with the engineering community through ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) has led to major upgrades in ASHRAE natatorium design guidelines. In fact, Evaporation Rates are now calculated based on the model developed by Dectron. The company has also worked to help develop an industry standard for dehumidifier performance.

This brochure contains valuable design guidelines based on Dectron’s extensive knowledge and experience in solving humidity control problems in over 40,000 indoor pool installations worldwide. Dectron Inc., the company that invented the DRY-O-TRON®, is dedicated to providing state-of-the-art design, engineering and quality products.

QUALITY CONTROL

Dectron has set the industry’s Quality Control standard. Every DRY-O-TRON® is fully tested in one of the company’s four test chambers, which can generate the same amount of moisture as any pool environment. Under these full load conditions, the units are performance tested and adjusted to operate at the exact conditions of your facility. No other manufacturer in the industry can give you this assurance and peace of mind. Furthermore, a copy of each test report is available for review by the customer at any time. In fact, Dectron welcomes visits from customers interested in witnessing the testing of their unit.

ALL SOLUTIONS

Dectron has long established itself as the company that can do it all. Its ability to offer the widest selection of unit sizes and configurations in the industry explains why the DRY-O-TRON® brand name has become synonymous with quality, reliability and energy savings. All other manufacturers combined do not offer the selection available from Dectron.

The DRY-O-TRON® is only one of several key components in the natatorium environment control system. In order for a pool enclosure to be comfortable and condensation free, the following areas must be addressed by the owners, together with the contractor, engineer and architectural design team:

- Humidity Control
- Pool Activity Levels
- Indoor Air Quality
- Air Distribution
- Duct Design
- Chemical-storage facility
- Exhaust Air Requirements
- Heating Requirements
- Cooling Requirements
- Condensation Protection
- Pool Water Chemistry
- Outdoor Air Requirements

A dehumidifier alone isn’t enough!

The DRY-O-TRON® line of products encompasses an extensive array of standard systems for industrial, commercial and residential applications.

Dectron also offers the services of its skilled sales, engineering, manufacturing and technical staff for custom engineered projects. All Dectron indoor pool products incorporate the company’s latest high-tech advances, such as microprocessor control, specially painted enclosures and HyPoxy® coated coils.

DRY-O-TRON®’s special HyPoxy® coated coils accelerate the draining process of entrained moisture and also act as a protective barrier for the finned surface. The HyPoxy® coating also enhances performance and extends coil longevity.
Since 1976, Dectron has been involved in all aspects of indoor pool design. An indoor pool is truly a unique facility in that its level of end-user satisfaction is inversely proportional to the number of compromises made in the design. A good design will have better overall performance and lower operating costs over the facility’s lifecycle.

Why do it right?

Simple. It is the most cost effective method of pool design and the only way to ensure 100% customer satisfaction. To do this, the following issues must be addressed by the design team:

- **AIR QUALITY**
- **MOLD, MILDEW AND CORROSION**
- **COMFORT**
- **OPERATING COSTS**

Indoor air quality is affected by several key factors including relative humidity, air distribution, outdoor air, chemical-storage and water chemistry. The type of building being designed to house the pool will have an impact on each of these factors.

The relationship between relative humidity and indoor air quality is well documented. High relative humidity levels inside a building are well-known for their destructive effects on building components and can pose serious health concerns. They facilitate the growth of mold and mildew which, in addition to being unsightly, can attack wall, floor and ceiling coverings, while their spores can adversely impact the air quality. Condensation can also degrade many building materials.

Human comfort levels are very sensitive to relative humidity. Fluctuation of relative humidity outside the 40%-60% range can result in increased levels of bacteria, viruses, fungi and other factors that reduce air quality and lead to respiratory problems. (See ‘Health Factors Vary with Relative Humidity’ chart on this page).

The consequences of high humidity in indoor pools can be catastrophic. Besides being detrimental to health, there are many incidents on record of major damage, including roof collapse, as a result of the corrosive effects of water condensing within a building’s support structure.

The operating costs of an indoor pool facility are most impacted by three factors:

- **OPERATING TEMPERATURES**
- **BUILDING CONSTRUCTION**
- **AIR VELOCITY ON THE POOL WATER**

The water temperature, air temperature and relative humidity desired by an owner will determine the size of the DRY-O-TRON® and the heating/cooling needs of the facility. A typical indoor pool is kept warmer than a regular room.

Consequently the heating requirements are greater than average while the cooling requirements are slightly less.

The type of building chosen to house the pool will significantly impact the cost of the mechanical system. An all-glass structure is the most expensive to heat and cool due to the poor insulation characteristics of glass, while a windowless room is less costly. Additionally, a large number of windows requires great care in the air distribution system to keep them condensation-free in cold weather.

The relationship between air velocity and the evaporation rate varies. To remove chloramines, air speed over the water’s surface should be between 10 and 50 fpm. Excess air speed over the water’s surface can raise the evaporation rate above design value. A balance must be established in order to maintain desirable air quality at the water’s surface while not generating too much load for the dehumidification system.

One of the best solutions is to use the DRY-O-TRON® Environment Control System, in which the specialized mechanical dehumidification system is tailored to the specific application.

A well-designed dehumidification system will not only control humidity, but will recycle energy efficiently. Every DRY-O-TRON® features patented energy recycling, which provides simultaneous energy recovery and energy recycling for pool water and air heating.

Dectron’s products and expertise can help the green building projects applying for the following LEED rating systems:

- **LEED 2009 for New Construction and Major Renovations (NC).**
- **LEED 2009 for Core and Shell Development (CS).**
- **LEED 2009 for Schools New Construction and Major Renovations (Sch)**

Dectron can support 5 prerequisites and 15 credits which total more than 20 points in Energy and Atmosphere, Indoor Environmental Quality, and Innovation in Design categories. Find more details in the Dectron LEED Support Guide.
**SUSPENDED CEILINGS**

*Why are suspended ceilings not recommended?*

They create an unconditioned space that is prone to condensation and corrosion problems. Pools with suspended ceilings are notorious for corroded hardware (‘T’ bars and hangers) and condensation-soaked tiles falling into the pool.

**SKYLIGHTS**

*Why are skylights not recommended?*

They are prone to condensation problems in colder weather. The quantity of supply air (3-5 CFM per ft² or 15-25 l/s per m² of glass) required for condensation control is sufficient to blanket the entire skylight. Visible ductwork may be required to supply this air to the skylight and can cause concerns about aesthetics with the owner.

**DUCT DESIGN**

*How important is duct layout?*

It is absolutely vital. The total quantity of supply air must be sufficient to provide four to eight air changes per hour (as recommended by ASHRAE) to prevent stagnation and air stratification. Care must be taken to ensure the entire space receives the required amount of air flow and to prevent supply air from short-circuiting to the return inlet. Air speeds of 10-50 FPM are recommended across the pool surface and in the direction of the return grille(s).

**HEATING SPAS and WHIRLPOOLS**

*Can a DRY-O-TRON® be used to heat a whirlpool?*

The economics of this option make it a good investment, but only for larger spas/whirlpools that represent more than 25 percent of the total evaporation from all pools.

**SWIM MEETS**

*What special design concerns must be addressed?*

A pool that will host swim meets has essentially two modes of operation: normal and swim-meet. A swim meet generally has a very large spectator load while the pool swimmer density is less than during normal operations. The Activity Factor for a swim meet should be 0.65 whereas in normal operation it would be 0.8-1.0, (as per the “Activity Factor” table on page 17). The designer should review computer models of each mode to ensure that the size of the selected unit is appropriate for both.

**POOL COVERS**

*Are they recommended for daily use?*

Experience shows that unless a pool cover is automatic, it will not be routinely used. A pool cover is important to have at a facility in the event of a power failure when the DRY-O-TRON® is not able to run. The use of a pool cover, however, does not affect the size of the DRY-O-TRON® required since it is sized for the load presented by the pool when in use.

**CONDENSATE**

*What should be done with the condensate that comes from the unit?*

The amount of condensate a DRY-O-TRON® recovers in a year is approximately the equivalent of one entire pool fill. The condensate from DECTRON’s HyPox® coated coils is drinking-water quality and can be returned to the pool where local codes permit. It is usually reintroduced upstream of the filter or into the skimmer.

**COOLING**

*What if more cooling is required than the unit can provide?*

If the DRY-O-TRON® selected has a capacity close to the minimum required, a unit one size larger would be the most cost effective solution. If the cooling requirement is significantly more than the selected DRY-O-TRON® supplies, the difference can be made up by a separate cooling circuit added to the DRY-O-TRON®, or a separate system by others (controlled by DRY-O-TRON®) with separate ducts.

**AIR DIRECTION**

*Should air blow at the water surface?*

Excess air movement at the water surface increases the evaporation rate. The U.S. Olympic Committee (USOC) does however recommend some air movement at the water surface for its facilities because a slightly higher concentration of chloramines (compared to the rest to the space) tends to remain there.

**RETURN AIR**

*Should the return air inlet be near the spa?*

This is not recommended. The air around the spa has the highest concentration of chloramines and can be the most corrosive air in the space. This could reduce the lifespan of the ductwork and equipment. A separate exhaust fan near the spa is recommended.

**WET DECK**

*Why use wet deck area in lieu of total deck area to calculate the outdoor air requirement?*

The purpose of outdoor air is to dilute the chemicals evaporating from the pool water. A section of deck that will never get wet does not contribute to air quality issues. As outdoor air is expensive to heat, cool and dehumidify, designing the outdoor air requirement to match the wet areas is a means of reducing the operating costs of the facility. Refer to ASHRAE 62.1 for recommended OA ventilation volumes for Wet and Dry deck area.

**DUCT MATERIAL**

*What duct material is recommended?*

The recommended duct material is standard galvanized sheet metal, aluminum, 316-grade stainless steel or fabric duct. Painted galvanized spiral ductwork is popular when the duct is exposed. Where pool-water chemistry or pool-chemical storage may not be as recommended, all metal duct should be protected by paint or coating. The entire ductwork system must be designed to be dry at all times, and all seams must be sealed with an approved duct sealant. If a below-grade duct system is used, non-metallic or PVC-coated round metal ductwork should be used.

**DUCT INSULATION**

*Is it required?*

If the temperature of the air surrounding ductwork might go below the dew point of the ducted air, or if the dew point of the surrounding air might go above the temperature of the ducted air, the duct should be insulated with at least two-inch (5 cm) fiberglass duct wrap on the outside of the duct, with a vapor-retarder. This will prevent condensation and heat gain/loss. Acoustic duct liner or fiber insulation should not be used inside the duct.

**SMALL ROOMS**

*What is recommended for a room with only a therapy pool or whirlpool?*

These smaller rooms are common in hotels and physical therapy clinics. The small dehumidification load and lower air flow requirement is an ideal application for Dectron’s MAM Series.

Contact your local representative for additional information.
Typical Installations

HOTEL/RESIDENTIAL

INSTITUTIONAL ROOFTOP
Proper air distribution in a natatorium is critical to ensuring proper system performance and space conditions.

KEY TO PAGE 6

1. DRY-O-TRON®
   Good air starts here. Proper selection and location of the DRY-O-TRON® ensures ideal system performance. There are many styles and options to choose from in order to allow the designer the best solution for the facility’s specific needs.

2. OUTDOOR CONDENSER
   The condenser should be located as close as possible to the DRY-O-TRON®. Water-cooled and glycol-cooled configurations are also available to reduce total system refrigerant charge.

3. RETURN AIR
   The location of the return-air grille should optimize the overall air flow pattern of the facility. The goal is to ensure all areas receive enough air movement.

4. SUPPLY DUCT
   Air distribution must be arranged to ensure all areas of the room receive proper air turnover. If overhead ductwork is used, ensure the air reaches the deck level to avoid stratification. All exterior glass must be fully covered by supply air, or must be heated by other means to maintain its temperature above natatorium-air dew point.

5. LINEAR DIFFUSERS
   Supply air should be focused on exterior surfaces prone to condensation. 3-5 CFM per ft² (15-25 l/s per m²) of exterior glass is a good rule of thumb. The diffuser should be designed to fully cover the entire surface of all exterior windows.

6. EXHAUST FAN
   DRY-O-TRON® units have two types of exhaust: minimum exhaust and purge exhaust. The location of the exhaust fan is flexible. It can be mounted in the DRY-O-TRON® or in the space. However, when the space has a spa or whirlpool, the exhaust fan should be by others and should be located directly above it. This expels the most chlorine-laden air before it can diffuse into the space and negatively impact the room air quality.

7. OUTDOOR AIR
   The DRY-O-TRON® is configured to have outdoor air introduced at a factory-supplied opening ONLY. Units can have an outdoor air opening with a filter and balancing damper. Motorized dampers and time clocks are available to control damper operation.

8. MICROPROCESSOR
   The remote operator panel should be located where the operator has easy access. Some operator panels can be located in the natatorium.

9. EXTERIOR WINDOWS
   Windows and glass doors on an indoor pool’s exterior walls present a special challenge to the natatorium designer. Exterior glass is especially susceptible to condensation when the outdoor temperature is low (see pages 12 & 15).

NOTE: Never compromise the return air duct connection as it negatively affects the performance of the entire unit. The supply air duct connection affects the performance of the blower. (See Industrial Ventilation, American Conference of Governmental Industrial Hygienists, section: Fans-systems effects.)

NOTE: Top or bottom air discharge is also available on all units.
## State-of-the-Art Configurations for All Facilities

DRY-O-TRON® FEATURE CHART

<table>
<thead>
<tr>
<th>CONFIGURATION</th>
<th>EXHAUST AIR</th>
<th>OUTDOOR AIR</th>
<th>HEAT RECOVERY</th>
<th>INITIAL COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONVENTIONAL</td>
<td>REMOTE</td>
<td>MINIMUM</td>
<td>COMPRESSOR</td>
<td>LOWEST</td>
</tr>
<tr>
<td>DECTRON PURGE™</td>
<td>MIN./100%</td>
<td>MIN./100%</td>
<td>COMPRESSOR</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>ECONOSAVER</td>
<td>MINIMUM</td>
<td>MINIMUM</td>
<td>COMPRESSOR</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>ECONOMIZER</td>
<td>MIN./100%</td>
<td>MIN./100%</td>
<td>COMPRESSOR</td>
<td>HIGH</td>
</tr>
<tr>
<td>SMART SAVER</td>
<td>MINIMUM</td>
<td>MINIMUM</td>
<td>COILS &amp; COMPRESSOR</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

### Conventional Unit

1. Ideal for hotels, therapy pools and residential pools.

2. Outdoor air opening sized for minimum code requirement. Filter and manual balancing dampers standard, with optional motorized dampers and 7-day time clock available (size: 040 and up).

3. Remote exhaust fan (over whirlpool, where applicable).

### Dectron Purge™ Mode

1. Ideal for facilities requiring frequent water shocking (superchlorination).

2. Exhaust fans can be unit mounted or remote.

3. MODE | EF1 | EF2 | OA | FACE & BYPASS
         |     |    |    |               
         | Normal | On | Off | Min. | Open |
         | Purge  | On | On  | 100% | Closed |

4. Motorized control of outdoor air, and face and bypass dampers.

5. EconoPurge economizer mode will operate whenever outdoor conditions permit and will override cooling mode compressor operation.
1. Ideal for colder climates where significant reduction in space heating is realized from heat recovery option.


3. Recovers heat even when compressor is off.

4. Can be combined with Dectron Purge™ mode.

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**Economizer**

1. Ideal for areas with weather mild enough for Economizer operation.

2. Unit has ability for full Dectron Purge™ mode.

3. Standard 7-day time clock, exhaust damper, mixed air damper and return air damper.

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**Econosaver**

1. Ideal for systems requiring unit mounted air exhaust.

2. Heat recovery is accomplished with a compressor. Air is exhausted before or after the evaporator as seasonally appropriate.
Gas Boiler Package for Space and Water Heating

Dectron has the industry’s best solution for gas heating in a natatorium. The boiler package ensures absolute protection from cross-contamination and corrosion from flue gases. The boiler heats a secondary fluid circuit which circulates to a unit-mounted space heating coil and/or the auxiliary pool water heater resulting in a complete packaged environmental control solution.

OUTDOOR CONFIGURATION DRY-O-TRON®

[Diagram of the outdoor configuration with labels for each component: Gas Boiler, Expansion Tank, Circulating Pump, 3-Way Valve, Water to Pool, Water from Pool, Outdoor Dry-O-Tron, Space Heating Coil, Pool Water Heated by Compressor, Pool Water Heated by Boiler.]

SPLIT/INDOOR CONFIGURATION DRY-O-TRON®

[Diagram of the split/indoor configuration with labels for each component: Outside Wall, Expansion Tank, Boiler, Circulating Pump, Water to Pool, Water from Pool.]
Pool water quality concerns not only human health and comfort, but also affects the space air quality and performance of the mechanical equipment.

The owner/operator of the natatorium is responsible for maintaining proper pool water chemistry.

Failure to maintain proper pool water chemistry will result in several on-site problems:

- AIR QUALITY COMPLAINTS
- CORROSION
- COSTLY MAINTENANCE
- REDUCED EQUIPMENT LIFE

Codes require that a separate, continuously ventilated space MUST be provided to store pool chemicals.

DO NOT STORE POOL CHEMICALS IN THE MECHANICAL EQUIPMENT ROOM OR IN ANY SPACE WHERE AIR MIGHT LEAK INTO THE MECHANICAL EQUIPMENT ROOM OR INTO THE NATATORIUM!

Foul Odors in the Pool Area
The powerful, stinging smell that is often associated with indoor pools is not the smell of excess chlorine in the water, but of chloramines. They are a product of insufficient chlorine and can result in high levels of bacteria, fungi, viruses, etc. in the pool.

Maintaining proper chlorine levels and constant pH levels will eliminate the foul odors.

Airborne chloramines also have a strong affinity to pure water such as condensate. Stagnant condensate in walls and on windows can accumulate considerable amounts of chloramines, which can make the condensate acidic and corrosive. The prevention of condensate coupled with proper pool water treatment will reduce this problem.

pH Levels
High pH levels (>8.0) encourage scale formation which damages pool water heaters. With low pH levels, the water is acidic and corrosive, and may damage the metal parts in pumps and water heaters.

Maintaining pH levels between 7.4 and 7.6 will ensure a long life for your pool and pool equipment.

Testing Water Chemistry

Compliance with ANSI/APSP standards for pool-water chemistry is essential for health, air quality, and corrosion protection. Proper testing is part of this.

Pool-water test kits must be used so as to determine accurately:

- pH LEVELS
- TOTAL ALKALINITY
- FREE CHLORINE
- COMBINED CHLORINE
- DISSOLVED SOLIDS
- TOTAL HARDNESS

Corrosion
Unbalanced pool-water chemistry leads to health problems and the deterioration of the pool building and equipment. Conversely, a well maintained pool with proper water treatment and sufficient make-up air offers a healthy environment that will not cause damage to the users, mechanical equipment or the structure.

Although it stands to reason that every pool operator does the utmost to create and maintain an optimum environment for patrons and equipment, mishaps do occur. Both swimmers and equipment have been endangered by exposure to abnormal chemical levels as a result of inaccurate pool chemical treatment or improper chemical storage.

Dectron has taken all possible commercially feasible precautions to protect its DRY-O-TRON® units against the corrosion caused by accidentally high chemical levels. This means that the equipment is resistant to unbalanced pool water (high or low pH levels) and airborne oxidizing agents, such as chloramines, for a short period of time.

Major corrosion protection features include:
- Vented cupro-nickel heat exchanger water heater circuit
- HyPoxy® coated fins on dehumidifying and reheat coils
- Coating of exposed copper tubing and steel parts, such as the blower shaft
- Use of plastic, cadmium-plated steel, brass and/or stainless steel hardware wherever possible
- High-quality painted cabinet

<table>
<thead>
<tr>
<th></th>
<th><strong>POOLS</strong></th>
<th><strong>WHIRLPOOLS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>pH</strong></td>
<td>DESIRABLE RANGE</td>
<td>ACTION LEVEL</td>
</tr>
<tr>
<td></td>
<td>7.4 - 7.6</td>
<td>N/A</td>
</tr>
<tr>
<td>Alkalinity</td>
<td>80 - 100 PPM</td>
<td>N/A</td>
</tr>
<tr>
<td>Free Chlorine</td>
<td>2.0 - 4.0 PPM</td>
<td>N/A</td>
</tr>
<tr>
<td>Combined Chlorine</td>
<td>0 PPM</td>
<td>0.2</td>
</tr>
<tr>
<td>Dissolved Solids (above new water)</td>
<td>100 - 300 PPM</td>
<td>1500</td>
</tr>
<tr>
<td>Total Hardness</td>
<td>225 - 250 PPM</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Association of Pool and Spa Professionals
The architect and contractor must coordinate with each other to make certain the building is appropriate to enclose an indoor pool. Suitable materials and construction are crucial to ensuring the building envelope will perform properly.

The pool enclosure must be suitable for year round operation at 50% to 60% relative humidity and built per the latest building codes.

**DEW POINT**
The designer must establish the space dew point temperature to know where to locate the vapor retarder in the wall. From the table below one can see that a typical pool design of 82° to 86°F (28°-30°C), 50 to 60% has a dew-point range of 62° to 71°F (17°-22°C). Any surface with a temperature below the dew point will condense moisture (e.g. condensation forms on a can of soda because the can’s surface temperature is below the air’s dew point).

**VAPOR RETARDER**
The purpose of vapor retarder is to block moisture from penetrating into a wall or ceiling where it will encounter a temperature below the dew point and condense. The vapor retarder is one of the most important components in protecting a building from moisture damage. Failure to install the vapor retarder at the proper locations will result in condensation forming in the structure and all its consequential damage, including the possibility of structural decay and roof collapse. The vapor retarder must be sealed (taped) at all its seams and around all electrical outlets.

**WINDOW DESIGN**
Special attention should also be paid to exterior-glass components such as windows and patio doors. Due to their low insulation values, windows are usually the building element with the lowest inside surface temperature. Even a triple pane window can have an inside surface temperature below the room’s dew point. Warm supply air or other heating means must be used to maintain the window and frame above dew point.

**THERMAL BRIDGING**
All other building elements that create thermal bridges must be avoided or be blanketed with warm supply air or other heating means to prevent condensation damage. Skylights are especially vulnerable to condensation because direct air supply to them is very difficult to achieve. Window frames and fire doors are also subject to thermal bridging.

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### Dew Point Temperatures at Various Room Conditions*

<table>
<thead>
<tr>
<th>RELATIVE HUMIDITY %</th>
<th>74°F (23°C)</th>
<th>76°F (24°C)</th>
<th>78°F (26°C)</th>
<th>80°F (28°C)</th>
<th>82°F (29°C)</th>
<th>84°F (30°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>48 (9)</td>
<td>50 (10)</td>
<td>52 (11)</td>
<td>54 (12)</td>
<td>55 (13)</td>
<td>57 (14)</td>
</tr>
<tr>
<td>50</td>
<td>54 (12)</td>
<td>56 (13)</td>
<td>58 (14)</td>
<td>60 (16)</td>
<td>61 (16)</td>
<td>63 (17)</td>
</tr>
<tr>
<td>60</td>
<td>59 (15)</td>
<td>61 (16)</td>
<td>63 (17)</td>
<td>65 (18)</td>
<td>67 (19)</td>
<td>68 (20)</td>
</tr>
</tbody>
</table>

* It is recommended that space surface temperatures should never be allowed to approach to within 5°F (3°C) of the dew point.
Dew Point: The designer must know where it can occur

THE VAPOR RETARDER MUST BE INSTALLED ON THE WARM SIDE OF THE DEW POINT TEMPERATURE.

CONSIDERATION WILL OCCUR ON GLASS UNLESS WARM AIR IS BLOWN AGAINST IT.
A THERMAL FLYWHEEL OCCURS WHEN THE ENERGY LOST THROUGH EVAPORATION IS RETURNED BACK INTO THE POOL WATER.

The energy a pool loses through evaporation represents approximately 95% of its annual water heating requirement. The DRY-O-TRON® captures this heat as a by-product of the dehumidification process.

Use the DRY-O-TRON® to heat your pool water whenever possible. It’s free heat!

Two unit configurations are available:

- **DS SERIES**
  - can recycle heat to the pool water and to the room air.

- **DA5 SERIES**
  - can recycle heat to the room air.

Both units consume the same amount of electricity annually to control space conditions. Consequently, it makes good economic sense to recycle the heat from pool water evaporation and return it to the water when feasible. Occasionally there are job site restrictions that make a water pipe connection to the unit impractical. The DA5 series is ideal for these types of applications. Whenever possible however, it makes sense to heat the pool water with the DRY-O-TRON® DS series. The payback period for piping, pumps and associated work is typically 2 to 3 years - an excellent investment.

**How the DRY-O-TRON® Works**

All DRY-O-TRON® units have been specifically designed to offer an all-round solution for natatorium environment control. They use a mechanical refrigeration system to dehumidify the moist air.

This results in:

- Comfortable, dry air.
- Energy savings in water heating. (An auxiliary pool water heater is required for fast temperature recovery after backwash and turbidity reduction).
- Energy savings in space heating. (A space heating coil must be available year-round to maintain the space temperature).

This process’s energy cycle is 100% efficient since all the latent heat of the moisture is converted into sensible heat for recycling. Furthermore, the electrical energy required to operate the system is also converted into sensible heat and contributes to space heating. The whole system’s energy is recycled!

In the DRY-O-TRON®, warm humid air passes through the dehumidifying coil and is cooled to below its dew point, thereby condensing moisture. The heat captured by this process is combined with the heat generated by the compressor’s power consumption. These two forms of recovered heat are then available for recycling.

The DRY-O-TRON® has the capability of simultaneously and continuously recycling heat to air and water. This ensures that a more stable natatorium environment is maintained.

**The Thermal Flywheel**

**Standard Operating Temperatures °F (°C)**

<table>
<thead>
<tr>
<th>OPERATING MODE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dehumidification</td>
<td>50 (10)</td>
<td>82 (28)</td>
<td>66 (19)</td>
<td>102 (39)</td>
<td>95 (35)</td>
<td>84 (29)</td>
</tr>
<tr>
<td>Pool Water Heating</td>
<td>47 (8)</td>
<td>82 (28)</td>
<td>65 (18)</td>
<td>N/A</td>
<td>82 (28)</td>
<td>96 (36)</td>
</tr>
<tr>
<td>Air Conditioning</td>
<td>50 (10)</td>
<td>82 (28)</td>
<td>66 (19)</td>
<td>67 (20)</td>
<td>67 (20)</td>
<td>84 (29)</td>
</tr>
<tr>
<td>A/C plus Pool Heating</td>
<td>47 (8)</td>
<td>82 (28)</td>
<td>65 (18)</td>
<td>N/A</td>
<td>66 (19)</td>
<td>96 (36)</td>
</tr>
</tbody>
</table>
**Pool water heating by the DRY-O-TRON®, a huge bonus!**

**SYMBOl**

<table>
<thead>
<tr>
<th>Step</th>
<th>Symbol</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( T_p )</td>
<td>Pool Water Temperature ( ^\circ \text{F} (\text{C}) )</td>
<td>80( ^\circ \text{F} ) (27( ^\circ \text{C} ))</td>
</tr>
<tr>
<td>2</td>
<td>( T_a )</td>
<td>Air Temperature ( ^\circ \text{F} (\text{C}) )</td>
<td>82( ^\circ \text{F} ) (28( ^\circ \text{C} ))</td>
</tr>
<tr>
<td>3</td>
<td>ERF60</td>
<td>Evaporation Rate Factor, Active Hours (from table on page 17, use 60% RH)</td>
<td>( \text{lb/h} \cdot \text{ft}^2 ) (kg/h\cdot m(^2))</td>
</tr>
<tr>
<td>4</td>
<td>ERF50</td>
<td>Evaporation Rate Factor, Non-Active Hours (from table on page 17, use 50% RH)</td>
<td>( \text{lb/h} \cdot \text{ft}^2 ) (kg/h\cdot m(^2))</td>
</tr>
<tr>
<td>5</td>
<td>H60</td>
<td>Number of Active Hours Per Day</td>
<td>10 h</td>
</tr>
<tr>
<td>6</td>
<td>H50</td>
<td>Number of Non-Active Hours Per Day</td>
<td>14 h</td>
</tr>
<tr>
<td>7</td>
<td>AF</td>
<td>Activity Factor (see table on page 17)</td>
<td>0.65</td>
</tr>
<tr>
<td>8</td>
<td>ERF(_{\text{avg}})</td>
<td>Average Evaporation Rate Factor ((H60 \times ERF60 \times AF + H50 \times ERF50 \times 0.5) + 24 = \text{lb/h} \cdot \text{ft}^2 ) (kg/h\cdot m(^2))</td>
<td>.024 ( \text{lb/h} \cdot \text{ft}^2 ) (0.116 kg/h\cdot m(^2))</td>
</tr>
<tr>
<td>9</td>
<td>( A_p )</td>
<td>Pool Water Surface Area ( \text{ft}^2 ) (m(^2))</td>
<td>2,250 ( \text{ft}^2 ) (209 ( \text{m}^2 ))</td>
</tr>
<tr>
<td>10</td>
<td>ER</td>
<td>Pool Evaporation Rate ( \text{Ap} \times \text{ERF}_{\text{avg}} ) = ( \text{lb/h} ) (kg/h)</td>
<td>54 ( \text{lb/h} ) (24.5 kg/h)</td>
</tr>
<tr>
<td>11</td>
<td>EC(_p)</td>
<td>Energy Consumption to Heat Pool Water ( \text{ER} \times \text{AP} \times \text{AF} ) = ( \text{Btu/hr} ) (kWh/hr)</td>
<td>520,344,000 Btu/hr (152,460 kWh/hr)</td>
</tr>
<tr>
<td>12</td>
<td>$$$</td>
<td>Convert Pool Energy Usage into Annual Heating Cost</td>
<td></td>
</tr>
</tbody>
</table>

**EXAMPLE**

**Annual Savings $540 / HP**

Heat Pool Using Gas (@ $0.90/CCF, $0.031 kWh)

\[
\text{EC}_p = 100,000 \text{ Btu/Therm} + 75\% \text{ efficiency} \times \$/\text{CCF} = \text{D\-O\-TRON}^\text{®} \text{ saves 80\% of this cost.}
\]

$6,246 per year - $4,995 !!

**Annual Savings $1,400 / HP**

Heat Pool Using Electricity (@ $0.12/kWh)

\[
\text{EC}_p = 3,413 \text{ Btu/kWh} \times \$/\text{kWh} = \text{D\-O\-TRON}^\text{®} \text{ saves 80\% of this cost.}
\]

$18,300 per year - $14,640 !!

Thanks to the DRY-O-TRON®, the annual savings derived from pool water heating are significant.

**ESTIMATED ANNUAL SAVINGS FROM DRY-O-TRON®’S WATER HEATING**

| MODEL | 10 | 15 | 20 | 30 | 40/42 | 50 | 60/62 | 80/82 | 100/102 | 120/122 | 150/152 | 162/164 | 182/184 | 202/204 | 242/244 | 282/284 | 322/324 | 362/364 | 402/404 | 482/484 | 562/564 | 804/808 |
|-------|----|----|----|----|-------|----|-------|-------|----------|----------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Nominal Comp. HP | 2.0 | 2.5 | 3.5 | 5.0 | 8.0 | 10.0 | 12.5 | 15.0 | 20.0 | 25.0 | 30.0 | 40.0 | 50.0 | 60.0 | 70.0 | 80.0 | 90.0 | 100.0 | 120.0 | 180.0 |
| Gas    | $1,080 | $1,350 | $1,890 | $2,700 | $4,320 | $5,400 | $6,750 | $8,000 | $10,800 | $13,500 | $16,200 | $18,900 | $21,600 | $23,760 | $27,000 | $32,400 | $37,800 | $43,200 | $48,600 | $54,000 | $64,800 | $81,200 |
| Electricity | $2,800 | $3,500 | $4,900 | $7,010 | $11,200 | $14,000 | $17,500 | $21,000 | $28,000 | $35,000 | $42,000 | $49,000 | $56,000 | $61,000 | $70,000 | $84,000 | $98,000 | $126,000 | $140,000 | $168,000 | $252,000 |

* 75% Eff. gas @ $0.90/CCF ($0.031 kWh) and electricity @ $0.12/kWh
Dectron has developed the only load calculation program (DOTS) in the industry that can model a system’s entire performance. In addition to pool water evaporation, DOTS also includes the impact of spectators and outdoor air on an indoor environment. The DOTS load estimation program incorporates all the key design parameters, including ASHRAE ventilation requirements, to help guide the designer in meeting the necessary codes.

Simply fill out the data form below and send it to your local Dectron representative. They are eager to show you DOTS’s capability and help engineer the system to satisfy your natatorium environmental control needs.

### Project Information

- **Project Name**
- **Project Address**
- **Equipment Tag**

### Natatorium Data

<table>
<thead>
<tr>
<th>Indoor Air Design Dry Bulb</th>
<th>°F (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor Air Design Relative Humidity</td>
<td>50-60% RH</td>
</tr>
<tr>
<td>Pool Wet Deck Area</td>
<td>ft² (m²)</td>
</tr>
<tr>
<td>Outdoor Air for Ventilation</td>
<td>CFM (l/s)</td>
</tr>
<tr>
<td>Desired Air Changes/hour</td>
<td>4</td>
</tr>
<tr>
<td>Summer Design Dry Bulb</td>
<td>°F (°C)</td>
</tr>
<tr>
<td>Summer Design Wet Bulb</td>
<td>°F (°C)</td>
</tr>
<tr>
<td>Winter Design Dry Bulb</td>
<td>°F (°C)</td>
</tr>
</tbody>
</table>

### Pool Data

<table>
<thead>
<tr>
<th>Pool Surface Area</th>
<th>ft² (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pool Water Temperature</td>
<td>°F (°C)</td>
</tr>
<tr>
<td>Type of Pool (private, hotel, whirlpool, etc.)</td>
<td></td>
</tr>
<tr>
<td>Activity Factor</td>
<td></td>
</tr>
<tr>
<td>Water Heated by DRY-O-TRON®?</td>
<td></td>
</tr>
</tbody>
</table>

### Air Conditioning Data

<table>
<thead>
<tr>
<th>Cooling Load (including Outdoor Air)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air on Condenser/Dry Cooler</td>
</tr>
<tr>
<td>Distance to Condenser/Dry Cooler</td>
</tr>
<tr>
<td>Condenser/Dry Cooler</td>
</tr>
<tr>
<td>Water Cooled</td>
</tr>
<tr>
<td>Cooling Tower</td>
</tr>
<tr>
<td>Indoor Unit</td>
</tr>
<tr>
<td>Purge Mode</td>
</tr>
<tr>
<td>Vertical</td>
</tr>
</tbody>
</table>

### Heating Data

<table>
<thead>
<tr>
<th>Heating Load (including Outdoor Air)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Mounted</td>
</tr>
<tr>
<td>Electric</td>
</tr>
<tr>
<td>Stages</td>
</tr>
<tr>
<td>Hot Water Coil</td>
</tr>
<tr>
<td>Steam Coil</td>
</tr>
<tr>
<td>Gas Boiler</td>
</tr>
<tr>
<td>Exhaust Fan</td>
</tr>
<tr>
<td>Air Discharge</td>
</tr>
<tr>
<td>Air Return</td>
</tr>
</tbody>
</table>
**Computerized Model Selection**

**Evaporation Rate Factor**  
\[ \text{Evaporation Rate Factor} = \frac{\text{lb/h} \times \text{sq.ft.}}{\text{kg/h} \times \text{m}^2} \]

**Pool Water Temp.**  
\[ 86^\circ \text{F} (30^\circ \text{C}) \]

**Air Temperature °F (°C)**  
\[ 80^\circ \text{F} (27^\circ \text{C}) \]

**Relative Humidity 50% / 60%**  
\[ 50% / 60% \]

**Natatorium Design Conditions °F (°C)**

<table>
<thead>
<tr>
<th>TYPE OF POOL</th>
<th>AIR TEMPERATURE</th>
<th>WATER TEMPERATURE</th>
<th>RELATIVE HUMIDITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreational</td>
<td>75 - 85 (24-29)</td>
<td>75 - 85 (24-29)</td>
<td>50 to 60%</td>
</tr>
<tr>
<td>Therapeutic</td>
<td>80 - 85 (27-29)</td>
<td>85 - 85 (29-35)</td>
<td>50 to 60%</td>
</tr>
<tr>
<td>Competition</td>
<td>78 - 85 (26-29)</td>
<td>76 - 82 (24-28)</td>
<td>50 to 60%</td>
</tr>
<tr>
<td>Diving</td>
<td>80 - 85 (27-29)</td>
<td>80 - 90 (27-32)</td>
<td>50 to 60%</td>
</tr>
<tr>
<td>Elderly Swimmers</td>
<td>84 - 90 (29-32)</td>
<td>85 - 90 (29-32)</td>
<td>50 to 60%</td>
</tr>
<tr>
<td>Hotel</td>
<td>82 - 85 (28-29)</td>
<td>82 - 86 (28-30)</td>
<td>50 to 60%</td>
</tr>
<tr>
<td>Whirlpool / Spa</td>
<td>80 - 85 (27-29)</td>
<td>97-104 (36-40)</td>
<td>50 to 60%</td>
</tr>
</tbody>
</table>

Actual operating temperatures and relative humidity conditions should be established before design. How the area will be used usually dictates design (table above). Source: 2011 ASHRAE Handbook HVAC Applications

**Activity Factor (AF)**

<table>
<thead>
<tr>
<th>TYPE OF POOL</th>
<th>ACTIVITY FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>0.5</td>
</tr>
<tr>
<td>Fitness Club/Condominium</td>
<td>0.65</td>
</tr>
<tr>
<td>Therapy/Aquafit/Elderly Swim</td>
<td>0.65</td>
</tr>
<tr>
<td>Hotel</td>
<td>0.8</td>
</tr>
<tr>
<td>Institutional (School)</td>
<td>0.8</td>
</tr>
<tr>
<td>Public Pools (with family programs)</td>
<td>1.0</td>
</tr>
<tr>
<td>Spas and Whirlpools</td>
<td>1.0</td>
</tr>
<tr>
<td>Water Slides, Wave Pools, Water Cannons, Fountains</td>
<td>Contact Dectron Representative</td>
</tr>
</tbody>
</table>

**Evaporation Rate Calculation**

\[ \text{Evaporation Rate} = \text{ERF} \times \text{AF} \times \text{Pool Water Surface Area ft}^2 (\text{m}^2) \]

*Based on Equation (2), Chapter 5 of 2011 ASHRAE Handbook HVAC Applications

** Proper equipment sizing depends on the accuracy of design condition data since water evaporation from the pool surface increases when:  
- Pool water temperature increases  
- Room air temperature decreases  
- Room air relative humidity decreases  
- Water agitation and splashing increases  
- Wet deck area increases

Proper calculation of the Evaporation Rate depends on the correct evaluation of the Activity Factor. The difference in the rate of evaporation between a private pool and an active public pool is more than 100%.

Through extensive field experience Dectron has developed Evaporation Rate tables for various operating conditions. Dectron also invented the Activity Factor table of measurement, which has become the industry standard and has been adopted by all manufacturers in the industry. The Activity Factor is extremely important in determining pool water evaporation as it evaluates the change in evaporation rate due to the activity in and around the pool.

Using the right Activity Factor ensures that a DRY-O-TRON® unit will maintain the humidity level at 50% during non-active periods and will not exceed 60% during active periods. Special purpose projects, such as water slides and wave pools, require careful unit selection. Contact your local Dectron representative for assistance.
AQUAFIT PROGRAMS tend to have warmer water temperatures despite being an exercise application. Water temperatures can range from 84°F - 88°F (29°C - 31°C) with an Activity Factor of 0.65.

WATER SLIDES are usually included as part of an attraction. There are two types (open and covered) and each has the Evaporation Rate calculated in a different manner. Contact the factory for additional help.

OPEN SLIDES are calculated based on the wet area, which is generally half the circumference. The Activity Factor is normally 1.5.

COVERED SLIDES or tubes discharge saturated air at a velocity of 500 ft./min (2.54 m/s) from the tube outlet. The load to the space is calculated based on the area of the tube opening.

WATER CANNONS, WATER FOUNTAINS, WATER MUSHROOMS AND WATER ARCHES are special applications and the factory should be contacted to help calculate their Evaporation Rates.

WATER FALLS are very popular in hotels and residences. It is important to accurately calculate the total exposed surface area of water (as sometimes both sides are exposed to air). The Activity Factor is normally 1.5.

WAVE POOLS are another popular pool type, although no published information exists to scientifically establish Evaporation Rates. Fortunately, Dectron’s experience will help the designer to develop a load based on previous successful projects.

PRIVATE POOLS are usually classified as family pools. Desired water temperatures range between 82°F - 85°F (28°C - 29°C) with corresponding air temperatures of 78°F - 80°F (26°C - 27°C). If the pool area serves other purposes (e.g. receptions), there may be a need for cooler air temperatures at these times.

WHIRLPOOLS AND SPAS have water temperatures ranging from 102°F - 104°F (39°C - 40°C) and an Activity Factor of 1.0 due to the agitation caused by the bubblers.

HOTEL POOLS are used for pleasure swimming. Here the water temperature is usually kept near 84°F (29°C). The air temperature can vary however, since the enclosure may also be used as a lobby, restaurant, bar, etc. The Activity Factor is normally 0.8.

THERAPY POOLS generally have warm water temperatures to keep the patient from being cold. Water temperatures are typically 88°F - 94°F (31°C - 35°C) with an Activity Factor of 0.65.
DRY-O-TRON® — The quality benchmark for energy recycling dehumidifiers and pool water heaters

Dectron uses state-of-the-art computer design and model selection programs that incorporate ASHRAE ventilation requirements, to design the right DRY-O-TRON® system for every application.

Dectron’s impressive double-walled enclosures comprise of:

- Welded ‘C’ beam frame
- Twelve-gauge base and 14-gauge enclosure
- Double-wall construction with a painted inner liner
- Hinged doors
- Double doors on the electrical panel
- Continuous raised compression gasket door seals
- Adjustable tension cam latches
- Leakproof roof with specially designed inverted ‘U’ channel snap seams
- Completely weatherproof
- Stainless steel hardware
- Two-inch (51 mm) insulation
- Powder-coat paint process with 1,000 hours ASTM B117 Salt Spray Test

STANDARD CASING
Heaviest gauge satin-coated steel casing construction in the industry. Electrostatically applied baked powder or epoxy paint inside and outside.

COILS
HyPoxy® coils, specifically designed and developed for DRY-O-TRON® units, accelerate the draining of entrained moisture and also act as a protective barrier for the aluminum fin e surface. The HyPoxy® coating enhances performance and extends the life of the coils.

CONTROLS
The industry’s most sophisticated controls are standard on all DRY-O-TRON® units. Intricate unit-mounted sensors monitor all aspects of unit performance as well as maintain optimum space and water temperatures.

THE FEATURES
- Patented simultaneous energy recycling for smooth environment control
- Standard microprocessor control with calibrated and tested unit-mounted sensors
- Guaranteed space and pool temperature conditions - in writing!
- Designed to easily provide make-up air as per ASHRAE Standard 62.1
- Self-compensating water heating control, regardless of water flow, complete with high temperature safety interlock
- Remote operator panels
- Man Machine Ethernet Interface (MMI)
- BMS Interface (BACnet™ / MODBUS / LonWorks™)
- Fully factory tested at design conditions
- CSA certified and ETL listed
- Self-test diagnostics
- Occupied/unoccupied period program
- Corrosion-proof, sanitary drip pan
- Vented CuNi pool water heater
- Water Smart Design feature
Quality Control

Each DRY-O-TRON® undergoes the most comprehensive quality control tests in the industry. In addition to a full performance test of all components and all modes at design conditions, each unit undergoes a 16-point design review and a 60-point quality control inspection. Dectron’s extensive pre-usage testing guarantees that every DRY-O-TRON® functions at optimum conditions throughout the year.

Quality Control Acceptance Report

Dectron’s uncompromising quality and performance standards extend to its after-sales service. Its 24-hour Service Support Hotline, together with its North American network of dedicated factory-certified technicians, guarantees immediate solutions to any problems that may arise.

Operational Data

<table>
<thead>
<tr>
<th>For 2 compressor units</th>
<th>A/C &amp; Pool Heating</th>
<th>Dehumidification</th>
<th>Whirlpool Heating</th>
<th>A/C Only</th>
<th>A/C &amp; Pool Heating</th>
<th>Whirlpool Heating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entering Air Temperature °F</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
</tr>
<tr>
<td>Leaving Air Temperature °F</td>
<td>82</td>
<td>95</td>
<td>82</td>
<td>67</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>Entering Water Temperature °F</td>
<td>80</td>
<td>80</td>
<td>102</td>
<td>80</td>
<td>80</td>
<td>102</td>
</tr>
<tr>
<td>Leaving Water Temperature °F</td>
<td>96</td>
<td>85</td>
<td>116</td>
<td>85</td>
<td>116</td>
<td>116</td>
</tr>
<tr>
<td>Pool Heater Water Flow GPM</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Whirlpool Heater Water Flow GPM</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Room Relative Humidity %</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>High Pressure PSIG</td>
<td>265</td>
<td>265</td>
<td>225</td>
<td>225</td>
<td>225</td>
<td>225</td>
</tr>
<tr>
<td>Suction Pressure PSIG</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Oil Pressure PSIG</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td>Sight Glass Clear (Y/N)</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Bulb Temperature TX Valve °F</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>Compressor Discharge Temp °F</td>
<td>195</td>
<td>195</td>
<td>195</td>
<td>195</td>
<td>195</td>
<td>195</td>
</tr>
<tr>
<td>Air Leaving Evaporator Temp °F</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

Installation and Service Certification Training School

At the industry’s first dehumidifier training school, DRY-O-TRON® experts hold comprehensive intensive seminars on state-of-the-art design, visual applications and hands-on dehumidifier training. Programs, with varying curriculums, are tailored to satisfy the specific needs of technical and service people as well as facility managers.

Dectron Rep Training

Representative sales training seminars are held periodically for incoming and veteran Dectron sales reps providing innovative technological advancements.
Every DRY-O-TRON® has four basic modes of operation:

DEHUMIDIFICATION

Every DRY-O-TRON® unit’s compressor automatically starts dehumidification operation when the relative humidity of the space is above the set point. Hot gas from the compressor is directed to the reheat coil unless cooling or water heating is required.

POOL WATER HEATING (UNIT WITH AUXILIARY POOL WATER HEATER)

If the compressor is already operating (dehumidification or air conditioning), its hot gas is directed to the pool water heater. If the space humidity level is BELOW set point, the auxiliary pool water heater is given a signal to maintain the water temperature.

SPACE HEATING

When space heating is required, the DRY-O-TRON®’s proprietary microprocessor engages the space heating system and maintains the space temperature.

AIR CONDITIONING (OPTIONAL)

When the space temperature is above the set point, the compressor operates for cooling. The A/C solenoid valve is energized and diverts the hot gas to the outdoor condenser (or cooling tower/cooling tower/fluid cooler). The unit can still heat the pool water in A/C mode.
THE BRAIN OF EVERY DRY-O-TRON® IS A POWERFUL MICROPROCESSOR

SUPERVISAIRE® Controller

- Factory installed and tested.
- All sensors are factory-installed on the unit
- Backlit user-friendly interface
- Multiple language selection for menus
- Remote operator panels available
- BACnet™, LonWorks™ and MODBUS™ compatible
- Built-in local area networking capability for multiple-unit DRY-O-TRON® installations
- Graphics display optional on remote supervisory panel
- High capacity event savings and alarm log
- Factory programmable for custom applications
- Expandable design can accommodate any requirement
- Built-in diagnostics and optional data logging for easy service
- High program execution speed and efficient real time management
- Password protection provided for security purposes
- Remote BMS access to all functions available
- Self-extinguishing plastic case
HT800 Controller

- Simple installation, no other controls required
- Control panel can be remote mounted up to 1000 feet (300 m) away
- User-friendly with simple 5-key operation
- Highly reliable, precise automatic control
- Built-in diagnostics for easy service
- Controls and monitors humidity, water temperature, air temperature (heating and cooling) and ventilation
- Obtains status of all sensors and safety cut-outs
- Unit-mounted sensors

Remote access to the DRY-O-TRON® by your service company!

Dectron and its North American network of certified technicians offer 24-hour-a-day monitoring and service support from their central terminal.
DRY-O-TRON® Energy Recycling Indoor Pool Environment Control

BUILDING CONSTRUCTION MUST ACCOMMODATE THE ARRANGEMENTS BELOW.

POOL WATER DRY-O-TRON® must come from bottom of filter-loop pipe, to reduce bubbles in the circulation DRY-O-TRON® loop.

CONTACT FACTORY IF THE PUMP OPERATES ON A TIMER

Never install chemical feeder here.

OPTIONAL AIR CONDITIONING
A) AIR-COOLED (SHOWN)
B) WATER-COOLED (NOT SHOWN)
C) HEAT PUMP LOOP (NOT SHOWN)
D) FLUID COOLER WITH PUMP KIT (NOT SHOWN)

Cable to remote condenser

Do not exceed maximum tube length shown on name plate. Hot gas risers must have P-traps at least every 20 ft of vertical rise.

Pool water DRY-O-TRON® must come from bottom of filter-loop pipe, to reduce bubbles in the circulation DRY-O-TRON® loop.
1. OUTDOOR AIR FILTER AND MANUAL DAMPER
   • Optional motorized damper actuator
   • Seven-day time clock
2. POOL WATER ISOLATION VALVES (BY OTHERS)
3. P-TRAP AND CONDENSATE DRAIN (BY OTHERS)
   • Must be installed and filled with water
   • Failure to install the P-trap will cause the drip pan to overflow and flood areas beneath the DRY-O-TRON®
   • Condensate to be returned to the pool via the skimmer (consult local codes)
   • Optional side connection available
4. WATER FLOW METER (BY OTHERS)
5. POOL WATER CONNECTION (BY OTHERS)
   • Water circuit components must be of non-corrosive material
   • Schedule 40 thermoplastic pipe
   • Pool water piping must be the same size as the connection on the DRY-O-TRON®
   • Increase the pipe size if the DRY-O-TRON® and the bypass (throttling) valve are more than 10 feet apart
6. AIR CONDITIONING (OPTIONAL)
   • Pipe must be the same size as the connection on the DRY-O-TRON®
   • Optional water-cooled or dry-cooler heat rejection
   • Pipe must be supported so as to prevent torques or axial or radial forces from being applied to the unit tube stubs or the condenser tube stubs. Other code requirements may also apply
7. PRESSURE/TEMPERATURE PORTS (BY OTHERS)
   • Ideal for measuring pressure drop across the water heater
   • Remote mount sensors (optional)
8. FLEXIBLE DUCT CONNECTION (BY OTHERS)
   • For vibration isolation
   • For attenuation of sound due to vibration
   • Required on any return, supply, outdoor air and exhaust connections to the DRY-O-TRON®
9. DUCT HEATER (BY OTHERS)
   • Size to cover the pool enclosure heat losses and the outdoor air load
   • Optional unit-mounted hot water, steam or electric heat
   • Controlled by the DRY-O-TRON®’s microprocessor
10. OPERATOR PANEL
    • Mounted on the electrical panel door
    • Optional remote mounting (by others)
11. REFRIGERANT ACCESS VALVES
    • Service gauge connection
    • Top valve is head pressure
    • Bottom valve is suction pressure
12. AUTOMATIC CHEMICAL FEEDER (BY OTHERS)
    • Must be located in the main pool return line downstream of the DRY-O-TRON® and all auxiliary equipment to prevent corrosion and equipment deterioration
13. AUXILIARY WATER HEATER (BY OTHERS) CONTROLLED BY DRY-O-TRON®
    • Should be located downstream of the DRY-O-TRON® and before the automatic chemical feeder
    NOTE: An auxiliary pool-water heater is recommended for all installations.
    NOTE: An auxiliary pool-water heater is required for natatoriums with DRY-O-TRON® units having more than 15% make-up air or having the Economizer, Intelligent Energy Saver, or EconoPurge options.
    NOTE: An auxiliary pool-water heater is required for pools in which
    (a) the water is exposed to outdoor conditions (such as a swim-through pool), or
    (b) The water is kept at a higher temperature than the room air, or
    (c) uninsulated pool walls are exposed to outdoor conditions
14. THROTTLING BALL VALVE (CIRCUIT SETTER, BY OTHERS)
    • Install at lowest point in the discharge line
    • Adjust water flow until the outlet water temperature is 12 to 20°F above the inlet water temperature during water heating.
15. WATER PRESSURE SWITCH (UNIT-MOUNTED IN MODELS 60 AND LARGER)
    • Inhibits water heating mode during main filter backwash or in case of insufficient water flow
16. BYPASS VALVE (BY OTHERS)
    • Throttle to force water through the DRY-O-TRON® when the recommended secondary circulating pump is not used
17. SECONDARY CIRCULATING PUMP (BY OTHERS)
    • Must be suitable for pool water
    • Secondary circulating pump selection for an OPEN system and:
      a) DRY-O-TRON® flow rate
      b) Total pressure drop including:
        DRY-O-TRON®, external piping, valve pressure drop and elevation difference between the pool water surface and the DRY-O-TRON®
    • Use dielectric couplings for water pump connections
    • Pump must stop during backwash
18. WATER PRESSURE SWITCH (BY OTHERS)
    • Stops the secondary circulating pump
      (a) During main filter backwash
      (b) In case of insufficient water flow in the pool water filter loop
19. MAIN FILTER PUMP (BY OTHERS)
    • Usually sized for pool water filtration and sanitation only
    • CAUTION: Secondary circulating pump is required if the main filter pump cannot produce the additional flow required by the DRY-O-TRON® at the necessary pressure
    • Pumps controlled by timers: contact factory for suggested piping details
Service Access Horizontal Units

Mechanical room temperature must be 60°F - 90°F (16°C - 32°C) to prevent excessive heat loss or gain. Only rooftop RS and RB units are designed to be located in unheated spaces. Units in attics and unconditioned spaces require extra insulation.

**Horizontal Units**

**Minimum Service Access** ft (m)  1  2b  3  4
010 through 030  2 (0.6)  3 (1)  2 (0.6)  3 (1)
040 through 062  3 (1)  3 (1)  3 (1)  3 (1)
080 through 088  5 (1.5)  3 (1)  4 (1.2)  3 (1)

a Access doors must be able to open to at least 90°
b (Canada) 1 meter
(USA) 3 ft for 230V, 3.5 ft for 460V units or per NEC Table 110.26(A)(1), whichever is greater.

**Vertical Units**

**Minimum Service Access** ft (m)  1b  3  4
010 through 030  3 (1)  1.5 (0.5)
040 through 062  3 (1)  2 (.6)
080 through 152  4 (1.2)  3 (1)

a Access doors must be able to open to at least 90°
b (Canada) 1 meter
(USA) 3 ft for 230V, 3.5 ft for 460V units or per NEC Table 110.26(A)(1), whichever is greater.
c Recommended

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**Dimensional Data and Weights**

<table>
<thead>
<tr>
<th>Plenum Model</th>
<th>Dimensions (Footprint)</th>
<th>DSV/DVS Net Weight</th>
<th>DS/DSH Net Weight</th>
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<td>L x W x H (in.)</td>
<td>lb.</td>
<td>lb.</td>
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<td>410</td>
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<tr>
<td>080</td>
<td>72 x 46 x 103</td>
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<td>3,000</td>
</tr>
</tbody>
</table>

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1. Certain options require larger enclosures.
2. Add 18 inches for removable filter section to: "inches" for overall width.
3. Height includes removable plenum fan section.
4. For basic unit with air-cooled air conditioning. For other options, please contact factory.
Connection to an Outdoor Air-Cooled Condenser

Not to be used for installation. Refer to unit owners manual for planning and installation instructions.

Tube sizes and maximum length found on name plate.
For hot-gas tube use P-traps to break lift into steps of no more than 20Ft.

Maximum Lift = 50 Ft.

Note: Line lengths to the condenser should be minimized to reduce system refrigerant charges. Line lengths over 100 linear feet (30 m) must use the dry cooler configuration (see below).

[ NOTE: APPLICABLE FOR MCC SERIES ONLY ]

Connection to a Water Loop
(Cooling Tower, Geothermal, Heat Pump or Chilled Water)

Units can be ordered for constant flow or modulating flow.

OUTDOOR CONDENSERS AND DRY COOLERS
Allow 2W free area around the entire perimeter of the unit.