Jean François Boyer, P.E.

Jeff holds a bachelor degree in electrical engineering from Quebec university—school for technology (ETS– Montreal). Jeff is passionate about forward-thinking solutions using the best of electronic and embedded software. He joined steamOvap at its early beginning, and is the co-inventor and developer of our IER electric steam humidifier. He has since developed some of the very unique features making our products ahead from the competition.

Eric Landry, Msc science

Eric holds a Master degree in mechanical engineering, which is the development of an algorithm for predicting the non-wetting distance when injecting saturated vapor into an air flow. Making him one of the few experts in steam humidification in north America. Eric is an ASHRAE fellow. He is the co-founder of steamOvap and brings strong knowledge in humidification as well as in product design. He believes in robustness and reliability and will never be satisfied by other than the safest and best solution for the customer.

Bernard Saint-Yves

Bernard brings a broad experience from several previous careers in North America and Europe, from large multinational companies to very small organizations. He is an expert in Quality and Productivity. Bernard is passionate for innovation and by excellence. He believes in the extraordinary power of teams. He has co-founded steamOvap with the objective to bring innovation and true dedication to customer satisfaction in the humidification market with the best team in the world.

Our first mission is to supply our clients with proper humidity level for best indoor quality using sustainable solutions.
OUR VALUES

Customer satisfaction
We succeed through satisfied customers. We are proactive and easy to work with.

Expertise & practical solutions
We offer expert knowledge and practical solutions. We deliver on our promises.

Excellence
We deliver quality and excellence in all we do.

Integrity
We act with honesty, fairness, respect and safety, furthering a culture of unquestioned integrity.

Team work
We foster a culture that promotes excellence, teamwork, inclusion, leadership and growth for our employees and business partners.

Innovation
We believe there is always a better way. We encourage change and innovation and seek the opportunities it offers.

Sustainable
We behave responsibly as a corporate citizen. Through our products, services, operations and community involvement, we promote the efficient use of resources to benefit all people and our planet.
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STEAM HUMIDIFIERS

ISOTHERMAL
IER humidifier by steamOvap is an electric steam generator that uses water immersed resistive heating elements to produce pure and sterile steam that is easy to distribute in air handling unit or ventilation duct.

IER humidifier can be supplied with tap or treated water such as softened or reverse osmosis water. When tap water is used, the scale will come off the heating elements by the natural contraction and expansion of the tube heaters. Scale pieces then accumulate at the bottom of the cylinder without the risk of clogging the drain outlet.

Unlike electrode boiler humidifiers, steam production of the IER humidifier is not altered by the electrodes or water conditions, it will not change over time and it is fully proportional from 1 to 100% and constant.

- Produces pure & sterile steam
- Capacities from 6 to 185lb/h [2.8 à 84kg/h].
- Constant and precise steam production +/-1%RH.
- Permanent stainless steel cylinder.
- Supplied with Modbus RTU (RS485)
- Suitable for tap or RO water without additional option.
- Optional BACnet MS-TP (RS485)
- Board computer and 7” touch screen.
- Polymeric access door.
- Guide & lock approach system (patent pending).
- Very robust heating elements with extra low watt density.

**BEST CHOICE FOR ENGINEERS**

- Resistive immersed heaters technology - no plastic canister going to waste.
- Thermally insulated cylinder.
- Energy consumption displayed in real time.
- Robust - lowest watt density of the industry.

**INNOVATION**

- EcoEnerSmart® patented function saving energy and water.
- Resistive immersed heaters technology - no plastic canister going to waste.
- WiFi remote access with your phone or tablet.
- Internal hydraulic circuit without check valve prone to block in open or closed position.

**PREFERRED BY CONTRACTORS**

*Easiest to install*
- Smallest & lightest electric humidifier of the industry.

*Easiest to set-up and start-up*
- Unique 7in large touch screen.

*Easiest to service*
- Done in minutes & absolutely no spare parts required.

**DESIGN & PRODUCTION**

Proudly designed and made in Canada by a dedicated team combining more than 35 years of experience in humidification.

**3 YEARS WARRANTY**

Industry longest!

Condition: start-up report without non-conformance done by authorized steamOvap local representative.
### TECHNICAL DATA

<table>
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<tr>
<th>Model</th>
<th>IER02</th>
<th>IER04</th>
<th>IER05</th>
<th>IER09</th>
<th>IER12</th>
<th>IER17</th>
<th>IER22</th>
<th>IER24</th>
<th>IER31</th>
<th>IER34</th>
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<td>Power (kW)</td>
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<td>3.3</td>
<td>5.0</td>
<td>8.3</td>
<td>11.7</td>
<td>16.7</td>
<td>21.7</td>
<td>23.4</td>
<td>30.9</td>
<td>33.4</td>
<td>43.3</td>
<td>61.7</td>
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<td>Voltage (Vac) / Phase</td>
<td>208/3</td>
<td>208/3</td>
<td>208/1</td>
<td>240/1</td>
<td>240/3</td>
<td>240/3</td>
<td>240/1</td>
<td>240/3</td>
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</tr>
</tbody>
</table>

### TECHNICAL DRAWINGS

![Technical Drawings](image)

### NOMENCLATURE

- **Type & Model**
- **Nominal Voltage**
- **Nb of Phase**
- **Options**
- **MB Mounting Bracket**
- **B BACnet RS 485**
- **FS Floor Stand**
- **RT Roof Top enclosure**

**IER 05 - 240 / 1 - B**

### LIST OF OPTIONS

- Built-in or remote mounting Space blower
- Mounting bracket for easy wall mounting
- Floor mounting rack
- Roof top, weather proof enclosure (IP65)
- BACnet RS485
ISE steam exchange humidifier by steamOvap is using energy from a central boiler steam to produce pure and sterile steam that is easy to distribute in air handling unit or ventilation duct.

ISE humidifier can be supplied with tap or treated water such as softened or reverse osmosis water. When tap water is used, the scale will come off the heat exchanger by the natural contraction and expansion of the tube. Scale pieces then accumulate at the bottom of the cylinder without the risk of clogging the drain outlet.

Unique and patent pending design of the ISE is making it the most efficient, and smallest footprint of the industry, and is it the only one truly easy to service as simple by one person with no need for tools and in few minutes.

- Produces pure & sterile steam
- Full and linear modulation from 1 to 100%
- Capacities from 4 to 400lb/h [1.8 to 182kg/h].
- Constant and precise steam production +/-1%RH.
- Permanent stainless steel cylinder.
- Supplied with Modbus RTU (RS485)
- Suitable for tap or RO water without additional option.
- Optional BACnet MS-TP (RS485)
- Board computer and 7" touch screen.
- Smallest foot print of the industry
- Self clean vertical heat exchanger with coil shape (patent pending).
- Thermally insulated cylinder

### BEST CHOICE FOR ENGINEERS
- Very efficient and safe design, as condensate cannot flood heat exchanger.
- Thermally insulated cylinder.
- Easy and versatile integration to steam network; left or right hand side connexion and standard wall mount.
- Self cleaning vertical heat exchanger.

### INNOVATION
- EcoEnerSmart® patented function saving energy and water.
- Unique vertical heat exchanger—patent pending
- WIFI remote access with your phone or tablet.
- Internal hydraulic circuit without check valve prone to block in open or closed position.

### PREFERRED BY CONTRACTORS
*Easiest to install*
- Smallest & lightest steam exchange humidifier of the industry.
*Easiest to set-up and start-up*
- Unique 7in large touch screen.
*Easiest to service*
- Done in minutes with no tools & absolutely no spare parts required.

### DESIGN & PRODUCTION
Proudly designed and made in Canada by a dedicated team combining more than 35 years of experience in humidification.

### 3 YEARS WARRANTY
Industry longest!

*Condition: start-up report without non-conformance done by authorized steamOvap local representative.*
### TECHNICAL DATA

<table>
<thead>
<tr>
<th>Model</th>
<th>ISE30</th>
<th>ISE60</th>
<th>ISE100</th>
<th>ISE150</th>
<th>ISE200</th>
<th>ISE300</th>
<th>ISE400</th>
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<tbody>
<tr>
<td>5PSI [34kPa]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity (lb/h) [kg/h]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10PSI [69kPa]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15PSI [103kPa]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steam Outlet Qty &amp; Diam. (in) [mm]</td>
<td>1x 1-1/2in [DN40]</td>
<td>2x 2in [DN50]</td>
<td>1x 2-1/2in [DN65]</td>
<td>1x 3in [DN80]</td>
<td>1x 3-12in [DN90]</td>
<td>2x 3in [DN80]</td>
<td>2x 3-12in [DN90]</td>
</tr>
</tbody>
</table>

Supplied with electric control modulating actuated valve (24Vac, signal 0-10Vdc) with fail safe, and F&T condensate trap. Supply voltage 120Vac/1ph or 240Vac/1ph, 50/60Hz, 2.2Amp. Wall mounting bracket included.

### TECHNICAL DRAWINGS

**NOMENCLATURE**

- **Type & Model**
  - ISE60 - 15 - FS

- **Steam supply pressure**
  - Option:
    - B BACnet RS 485
    - FS Floor Stand
    - RT Roof top enclosure

### List of options

- Built-in or remote mounting Space blower (available on models ISE30 to 200)
- Floor mounting rack
- BACnet RS485
- Roof top enclosure
STEAM DISTRIBUTION RAMPS

SRS - STEAM RAMP

SRS - Steam ramp without dedicated condensate return

Condensate is returned in same steam pipe, with the 5° slope. Simpler to install, but not recommended when large quantity of condensate is produced, in case of long steam line run or large duct with low air temperature.

SRS model can be made for horizontal or vertical low (suffix V) but is not available for round duct.

SRC - STEAM RAMP

SRC - Steam ramp with dedicated condensate return

Condensate is returned in a dedicated pipe. This allow to carry more steam in steam line.

This design avoids any possible trouble due to condensate flowing against the steam flow inside steam line. A condensate line must be installed and connected to drain or returned to humidifier.

SRC model is available for any configuration: horizontal or vertical flow (suffix V), round (suffix R) or rectangular duct.

OPTION X

SRSX or SRCX - single steam ramps with 2 rows of nozzles

This option allows for more steam capacity for the steam ramps.

It reduces the required quantity of steam ramps when one ramps not enough to distribute the steam capacity.

Reduction of non wetting distance (NWD) is not significant compared to single row of nozzle ramps.

SOS - MULTI-RAMPS

SOSX - single steam ramps with 2 rows of nozzles

This option allows for more steam capacity for the steam ramps.

It reduces the required quantity of steam ramps when one ramps not enough to distribute the steam capacity.

Reduction of non wetting distance (NWD) is not significant compared to single row of nozzle ramps.

SOS-H + SOS-R - steamOsorb multi-ramps headers and vertical ramps.

This model allows for more steam capacity and even steam distribution through a grid of nozzles covering most of the duct section area.

SOS is to be used when single ramps cannot accepts the total capacity to distribute or if a specific and short non wetting distance is required.

TECHNICAL DATA

<table>
<thead>
<tr>
<th>Model</th>
<th>SRS</th>
<th>SRC</th>
<th>SOS</th>
<th>SOE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter (in) [mm]</td>
<td>Horizontal with slope</td>
<td>Horizontal with dedicated condensate return</td>
<td>Vertical multi-ramp standard</td>
<td>Vertical multi-ramp high efficiency</td>
</tr>
<tr>
<td>Capacity (lb/h) [kg/h]</td>
<td>1 to 65 [2 to 30]</td>
<td>4 to 84 [2 to 38]</td>
<td>4 to 3300 [2 to 1500]</td>
<td>4 to 3300 [2 to 1500]</td>
</tr>
<tr>
<td>Distance between ramps (in) [mm]</td>
<td>As per duct height &amp; qty, min. 3 [76]</td>
<td>As per duct height &amp; qty, min. 3 [76]</td>
<td>As per duct width and required NWD, minimum 3 [76]</td>
<td>As per duct width and required NWD, minimum 3 [76]</td>
</tr>
</tbody>
</table>
**High Efficiency Steam Distribution**

**High Efficiency** steam ramps with thermal insulation - **option E** - is available on any steam ramp model, single ramp, model **SRS**, or **SRC**, or steamOsorb multi-ramps, model **SO**.

This solution combines two very efficient and robust insulation materials in hollow sleeve with no longitudinal joint. It is covering all parts in contact with cold air. This thin thermal insulation is allowing to significantly increase efficiency by reducing condensing. It is a proven and affordable design.

Insulation material is rated for direct contact with flame and a 500°F [260°C] continuous operation, UL rated, certified to ASTM E84 (equivalent to UL723) and bearing more safety certifications than any others.

- Dramatically reduces condensate losses in steam ramp. Up to 80% increased efficiency.
- Allow very short absorption distance of steam.
- Excellent thermal resistance Calculated R value = 0.33
- Thin insulation 0.142in [3.6mm].
- Available for atmospheric steam or live steam and for single or multi ramps.
- Higher steam capacity per ramp.
- Rated for 500°F [260°C] continuous operation.
- Minimal pressure drop, no obstruction in duct.
- Resistant to molten metal, flames, abrasion, corrosive atmosphere, moisture, chemicals and more.
- Certified to ASTM E84 (equivalent to UL723).
- Drip free nozzles made of polymer.
- No risk of damage during installation or during the life of the humidifier.
- 3 years warranty.

**Save Energy - Save Money**

- Reduce wasted energy from steam condensation up to 80% = less energy required for same designed steam capacity = saving money for operation.
- More capacity allowed for steam ramp = shorter and/or fewer steam ramps for same steam capacity = saving money for acquisition.
- Reduced heat gain of air upon free cooling season = reduced amount of cold outdoor dry air = reduced required humidification load = saving money for operation.

**Robust Design - No Thermal Bridge**

**steamOvap** high efficiency thermal insulation is made of two components:

- Fiberglass braided hollow sleeve offering optimal thermal resistance with steam ramp.
- Iron oxide red silicone rubber outer shell with exceptional chemical, abrasion, UV and moisture resistance, ensuring robust and risk free damage during onsite installation.

Unless all of the other solutions offered today to the HVAC industry, **steamOvap** high efficiency thermal insulation is a round sleeve which do not have longitudinal joint causing thermal bridge and premature degradation.
### STEAM DISTRIBUTION

#### SB - Space Blower

SB - Space Blower allows for direct in-space steam distribution. When no ventilation duct is present or for humidification at a very specific location.

Space blower can be factory installed built-in on the IER or ISE humidifier or on-site installed remotely from the humidifier.

SB is robust and unique to the industry as the stainless steel steam distributor is thermally insulated in order to reduce condensate loss and optimize steam output, it is also reducing temperature of all the internal components during operation increasing the life expectancy of the electrical motor fan.

<table>
<thead>
<tr>
<th>Model</th>
<th>SBS</th>
<th>SBM</th>
<th>SBL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam inlet Diam. (in) [mm]</td>
<td>1-1/2 [DN40]</td>
<td>2 [DN50]</td>
<td>2-1/2 [DN65]</td>
</tr>
<tr>
<td>Max capacity (lb/h) [kg/h]</td>
<td>26 [12]</td>
<td>65 [29]</td>
<td>96 [44]</td>
</tr>
<tr>
<td>Dimensions WxHxD (in) [cm]</td>
<td>9-1/4x7x9 [23x18x23]</td>
<td>11-1/4x9/12 [29x23x30]</td>
<td>11-1/4x9/12 [29x23x30]</td>
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</table>

#### STEAM DISTRIBUTION DECISION TREE

<table>
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<tr>
<th>In space</th>
<th>SB</th>
<th>SBS, SBM or SBL depending on max capacity and humidifier model</th>
<th>Built-in or remote mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>SR</td>
<td>SRS - with slope (no dedicated condensate return)</td>
<td>SRS - 1 row of nozzle</td>
<td>SRS - Non insulated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SRSX - 2 rows of nozzles</td>
<td>SRSE - with thermal insulation</td>
</tr>
<tr>
<td></td>
<td>SRS - Non insulated</td>
<td>SRSX - Non insulated</td>
<td>SRSXE - with thermal insulation</td>
</tr>
<tr>
<td></td>
<td>SRC - horizontal with dedicated condensate return</td>
<td>SRC - 1 row of nozzle</td>
<td>SRC - Non insulated</td>
</tr>
<tr>
<td>SRCX - 2 rows of nozzles</td>
<td>SRC - Non insulated</td>
<td>SRCX - Non insulated</td>
<td>SRCXE - with thermal insulation</td>
</tr>
<tr>
<td>SO</td>
<td>SOS - steamOsorb vertical multi-ramp</td>
<td>Made of horizontal header and vertical ramps. Qty of ramps will affect NWD</td>
<td>Not suitable for round duct</td>
</tr>
<tr>
<td>SOE - steamOsorb vertical multi-ramp with thermal insulation</td>
<td>Duct min dimensions: 18x12in [25x30cm]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ILS humidifier by steamOvap uses steam from a central steam boiler as a source of humidity for air duct or air handling unit.

The ILS includes all the components required for the treatment and conditioning of low pressure steam. Its integral stainless steel construction of grade 304 and its robust design makes the ILS the humidifier by excellence in its category. When low pressure clean steam is available on site it is the most economical and effective way to provide humidification meeting any capacity requirement.

**ILS HUMIDIFIER OVERVIEW**

steamOvap is offering a full and complete range of Live steam humidifier solutions:

- **ILS-P** is our pre-heated jacket model. Where steam is circulating into the jacketed tube before to pass through the steam separator and being distributed into AHU or the air duct. **ILS-P** is declined in 3 types:
  - Single ramp
  - Mini rack (factory assembled)
  - Horizontal Multi-ramp (on-site assembly)

- **ILS-SO** is our steamOsorb vertical multi-ramp model.
- **ILS-SE** is the high efficiency steamOsorb vertical multi-ramp model.

With any of the ILS model you are ensured to get a superior and robust solution that will be easy to select, install and operate for many years to come.

**STEAM COMPONENTS SUPPLIED**

- Bronze body control valve with brass or S/S trim or optional full S/S construction
- Electric (24Vac) fully modulating (2-10 or 0-10Vdc) actuator with fail safe
- S/S steam separator
- Cast iron body with S/S strainer
- Cast iron body with S/S trim Float & Thermostatic steam trap, H type
- Steam jacketed steam ramp made of stainless steel

**LIST OF OPTIONS**

- S/S body control valve, S/S body strainer
- Thermo contact for F&T steam trap
- Manual or actuated shut-off valve for steam supply
- Electronic controller with LCD display
- Modbus and/or BACnet remote communication

**GENERAL BENEFITS**

- Capacities from 4 to 3300lb/h [2 to 1500kg/h].
- Cost effective humidification for medium to large load.
- Designed to use steam from boiler operating with DI, RO or tap water.
- Drip free steam guaranteed, and very short non wetting distance
- Supplied with strainer, separator, fully modulating electric actuated valve with fail safe and Float & thermostatic steam trap.
- Optional thermo-contact for F&T steam trap

**3 YEARS WARRANTY**

Industry longest!

*Condition: start-up report without non-conformance done by authorized steamOvap local representative.*
**ILS-P**

**LIVE STEAM HUMIDIFIER (JACKETED)**

ILS-P humidifier by steamOvap is using steam ramp with a pre-heated jacket. Steam is circulating into the jacketed tube before to pass through the steam separator and being distributed into AHU or the air duct.

The ILS-P includes the following components: strainer, separator, actuated control valve. steam ramps with pre-heated jacket and F & T condensate trap.

This old technology is still the best suited solution when clean steam from central boiler is available on site and humidification requirement correspond to the heating season, as the huge heat gain from the steam jacket will contribute to air heating. Steam injection against the air flow is ensuring a very short non wetting distance.

- Capacities from 4 to 3300lb/h [2 to 1500kg/h].
- Very cost effective humidification for medium to large load.
- Designed to use steam from boiler operating with DI, RO or tap water.
- Drip free steam guaranteed, and very short non wetting distance
- All configurations are available: Single or Mini kit and horizontal Multi-ramp.
- Supplied with fully modulating electric actuated valve (24vac, signal 0-10 or 2-10Vdc)
- Optional thermo-contact for F&T steam trap
- Optional electronic controller.

**SINGLE RAMP**

*Single ramp* type provides lowest initial investment cost for steam humidification.

**MINI-KIT**

*Mini kit* (factory assembled) provides a compact design. Capacity from 4 to 84lb/h [2 to 38kg/h].

**MULTI-RAMPS (HORIZONTAL)**

*Horizontal multi-ramp* (on-site assembly) is the best option for large AHU. Capacity from 4 to 3300lb/h [2 to 1500kg/h].
ILS-SO humidifier by steamOvap is using vertical steam ramp. Any condensate forming in the steam ramp will fall and collect into the large horizontal header, before to be directed to the drain or re-pressurized with pressure motive pump. Drip free steam distribution is ensured by the special design of the nozzles. It is a simple and very cost effective way to humidify when pressurized clean steam is available on site and humidification requirement correspond to the heating season, as the huge heat gain from the steam ramps will contribute to air heating.

- Capacities from 4 to 3300lb/h [2 to 1500kg/h].
- Very simple to install and cost effective humidification for small to large load. AHU manufactured preferred.
- Designed to use steam from boiler operating with DI, RO or tap water.
- Atmospheric or pressurized condensate return available.
- Supplied with fully modulating electric actuated valve (24vac, signal 0-10 or 2-10Vdc)
- Optional thermo-contact for F&T steam trap
- Optional electronic controller.

Condensate is atmospheric and returned to main drain of the building.

Condensate collected in the header is re-pressurized with pressure motive pump and returned to the boiler. 0 waste to drain.
ILS-SE humidifier by steamOvap is using thermally insulated vertical steam ramps. This model combines the proven and simple Live steam humidification with latest sustainable developments. The very few condensate forming in the steam ramp will fall and collect into the large horizontal header, before to be directed to the drain or re-pressurized with pressure motive pump. Drip free steam distribution is ensured by the special design of the nozzles. Heat gain to air flow is minimal so it is a good humidification solution for year round humidification requirement.

- Capacities from 4 to 3300lb/h [2 to 1500kg/h].
- High efficiency with robust very thin thermal insulation covering all parts in contact with air.
- Rated for 500°F [260°C] continuous operation & certified ASTM E84 (eq. UL723)
- Atmospheric or pressurized condensate return available
- Supplied with fully modulating electric actuated valve (24vac, signal 0-10 or 2-10Vdc)
- Optional thermo-contact for F&T steam trap
- Optional electronic controller.

Condensate is atmospheric and returned to main drain of the building.

Condensate collected in the header is re-pressurized with pressure motive pump and returned to the boiler. 0 waste to drain.
### TECHNICAL DATA

<table>
<thead>
<tr>
<th>Model</th>
<th>ILS-P single ramp</th>
<th>ILS-P mini-kit</th>
<th>ILS-P multi-ramp</th>
<th>ILS-SO</th>
<th>ILS-SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity (lb/h) [kg/h]</td>
<td>4 to 150 [2 to 68]</td>
<td>4 to 84 [2 to 38]</td>
<td>4 to 3300 [2 to 1500]</td>
<td>4 to 3300 [2 to 1500]</td>
<td>4 to 3300 [2 to 1500]</td>
</tr>
<tr>
<td>Steam pressure (PSI) [kPa]</td>
<td>1.8 to 15 [13 to 103]</td>
<td>1.8 to 15 [13 to 103]</td>
<td>1.8 to 15 [13 to 103]</td>
<td>1.8 to 15 [13 to 103]</td>
<td>1.8 to 15 [13 to 103]</td>
</tr>
<tr>
<td>Distance between ramps (in) [mm]</td>
<td>n/a</td>
<td>3 [76]</td>
<td>6 [150]</td>
<td>3 [76]</td>
<td>3 [76]</td>
</tr>
<tr>
<td>Actuated valve (voltage &amp; signal)</td>
<td>24Vac 0-10Vdc</td>
<td>24Vac 0-10Vdc</td>
<td>24Vac 0-10Vdc</td>
<td>24Vac 0-10Vdc</td>
<td>24Vac 0-10Vdc</td>
</tr>
</tbody>
</table>

### NOMENCLATURE ILS-P

- **Type & Model**: ILS-P
- **Nb of ramp**: 1
- **Duct dimensions**: 24x18
- **Options**:
  - SV Stainless steel valve
  - TC safety thermo-contact
  - EC Electronic controller
  - B BACnet

### NOMENCLATURE ILS-SO/SE

- **Type & Model**: ILS-SO
- **Nb of ramp**: 9
- **Duct dimensions**: 24x18
- **Options**:
  - SV Stainless steel valve
  - TC safety thermo-contact
  - PM Pressure motive pump
  - EC Electronic controller
  - B BACnet

### CONFIGURATIONS & STEAM COMPONENTS

1. Steam source
2. Shut-off valve (by others)
3. Strainer (supplied)
4. Electric modulating actuated valve (supplied)
5. Steam jacketed ramp (supplied)
6. Separator: (supplied)
7. F&T steam trap (supplied)
8. Pressure motive pump (optional)
ENGINEERED SOLUTIONS

STAND ALONE HUMIDIFIER WITH RO FILTRATION

This solution is ideal for Marijuana growing rooms or application where the need for humidification is temporary.

It is including on a floor stand easy to move:

- **IER** electric steam humidifier
- Built-in **SB** space blower
- **WRO** water filtration with storage tank.
- **RHS** humidity sensor

With this integrated solution installation of the humidifier has never been so simple: connect water supply to RO filter, drain connection and electrical connection with a single point of connexion.

In some marijuana growing facility where the plants are not moved from one room to the others depending on the stage of growth have to plan for very different air conditions to adapt to the development of their plants.

They need to add-on humidity in the air at the early stage of the growing. Then when the plants are mature enough there is no more need for humidifying but rather to de-humify the air. Our stand alone unit can then be moved away to another room.

RT - WEATHER PROOF ENCLOSURE

RT weather proof enclosure for **IER** or **ISE** humidifier has been designed to be very robust and versatile. It is including the following features:

- **IP65** ingress protection rating (equivalent to NEMA type 4).
- Made of **stainless steel** - there is no risk of rust or ageing over time. Stainless steel is also reflecting the sun radiation in hot climate region.
- Designed for installation on a **roof curb** or a **stand** or **wall** mounting without any additional option or special order or change on site.
- Connections for steam outlet, water supply and drain can be in the back or side of the enclosure.
- Thermally insulated, **heated** and **ventilated** enclosure to protect for extreme outside conditions.
- All access for regular service from the **removable front door**.
- 7in touch screen control panel built-in on the side or remote (typically inside the building).
- WiFi remote access allows you to control or check operation of the humidifier without climbing on the roof.

Contact us if you have a specific application or a problem related to humidity level to maintain.

info@steamovap.com
ADIABATIC HUMIDIFIERS & AIR COOLERS
AEM evaporative humidifier and cooler using media is designed to be installed in Air Handling Unit (AHU) or ventilation duct. Water is circulated in the evaporative media, as hot air is passing through the wet media, water is evaporated by the latent energy of the air. As a result, the air gets cooled off up to 21°F [12°C] and humidified at the same time.

Evaporation efficiency is a function of the media design and its thickness; higher the surface contact between the air and wetted media is, better the evaporation efficiency will be and as a consequence higher the pressure drop will be too.

AEM evaporative humidifier and cooler is ideal for installation in AHU with heat recovery heat exchanger:

- Very low energy consumption, less than 100W
- Evaporation efficiency up to 99% (at 200 FPM)
- Inorganic ceramic evaporative media material.
- Very low pressure drop across evaporation media
- Suitable for tap or RO water without additional option.
- Integral stainless steel construction.
- Innovative pulse to demand control minimal water loss.
- GLASdek® evaporative media by Munters.
- UL900 Class1 certified evaporative media & GREEN-GUARD Gold Certified by UL

**BEST IN-DUCT SOLUTION**

- Why spraying in a duct? If it is resulting in the need for a droplet catcher, long absorption distance, risk of water aerosol in the air and the need for pure water, all this at more cost?
- Unlike any other evaporative humidifier on the market:
  - **AEM** is not use recirculation pump! So there is absolutely no stagnant water and no bacterial risk associated. And is not wasting water to drain.
  - **AEM** does not need pure water to operate! It can operate fine with tap water with no dust or residue in the air.
  - **AEM** provides the lowest pressure drop of the industry, and does not require “wet” duct section!
  - **AEM** uses less than 100W of power to operate.

**INNOVATION**

- Unique pulse to demand water flow, ensures:
  - No stagnant water.
  - No water loss.
  - Accurate & modulating control.
  - No unsafe live electrical submerged or closed to water.
  - WIFI remote access with your phone or tablet.

**Design & Production**

Proudly designed and made in Canada by a dedicated team combining more than 35 years of experience in humidification.

**3 Years Warranty**

Best warranty of the industry!

*Condition: start-up report without non-conformance done by authorized steamOvap local representative (evaporative media excluded).*
TECHNICAL DATA

Components supplied
- Electronic controller with 7in touch screen and WiFi access point.
- 2 stages water filters 1micron + anti-bacterial silver ions cartridge
- Electric water valve(s) (24vac)
- Power supply (120/24 Vac)
- Water hoses

Note: Installation of droplet separator is required when air velocity is above 600FPM [3.0m/s]

NOMENCLATURE
- Model: AEM
- Media thickness: 100 B
- Duct dimensions: 24x18
- Without (-) or with droplet separator (D)
- BACnet

COMPONENTS SUPPLIED
- Electronic controller with 7in touch screen and WiFi access point.
- 2 stages water filters 1micron + anti-bacterial silver ions cartridge
- Electric water valve(s) (24vac)
- Power supply (120/24 Vac)
- Water hoses
ACA dry fog atomizer are supplied with water and compressed air. Atomizer’s patented acceleration chamber creates an airflow pattern reaching supersonic speeds. The airflow sucks in water from a venturi column. The impact between the supersonic flow of air and the water generates shock waves, which produce the micro-droplets. The “solid con” jet of micro droplets forms a uniform “dry fog” which evaporates quickly into the air.

This atomizer producing a very fine mist (2 to 4µm) is the ideal humidification solution for cold storage as droplets are not freezing up even at very low temperature such as 32°F [0°C].

ACA atomizer is robust and can accept untreated water up to 100ppm TDS or RO treated water.

- Dry fog producing 2 to 4µm water droplets.
- Low energy consumption.
- Capacity from 13 to 1040lb/h [ 6 to 472kg/h].
- Low compressed air pressure required (87Psi).
- Original patented venturi atomizer.
- Atomizer with non clogging large orifice & maintenance free.
- Accepts untreated water.
- Operate at very low temperature .
- High accuracy +/-1%RH. & high humidity: up to 96%RH.
- Electronic Controller handling 1 or 2 zones or more.

## DIRECT IN SPACE ATOMIZING

In direct in-room configuration the ACA humidifiers consists of the following components:

- Atomizing box with 2 or 4 atomizers easy to install on the wall,
- Electronic controller,
- RH% & temperature sensors,

Direct in-room atomizing is ideal for printing woodworking shop of for cold storage.

## IN DUCT ATOMIZING

For In-duct configuration the ACA atomizer will be pre-installed on ramps at the factory.

- Atomizing ramps, grid and support are made up to the dimension of the duct,
- Droplet separator will be provided.
- A wet duct section should be provided (by others)

In duct atomizing is used for data center, server room.

## INNOVATION

ACA Atomizer’s patented venturi design makes it the most robust atomizer on the market, with no moving part or internal spring and a large orifice allowing for:

- No clogging
- Maintenance free
- Use of untreated water ( up to 100ppm TDS ).

## LIFE TIME Warranty

steamOvap offer a life time warranty on the atomizer.

A 3 year warranty is granted to the rest of the ACA components.

This is the best warranty of the industry!

**Condition:** start-up report without non-conformance done by authorized steamOvap local representative.
**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Model</th>
<th>ACA-S2</th>
<th>ACA-S4</th>
<th>ACA-S6</th>
<th>ACA-Dx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air pressure (PSI) [kPa]</td>
<td>87 to 116 [600 to 800]</td>
<td>87 to 116 [600 to 800]</td>
<td>87 to 116 [600 to 800]</td>
<td>87 to 116 [600 to 800]</td>
</tr>
<tr>
<td>Air consumption (cfm)[l/min]</td>
<td>4 @ 87PSI [120 @ 600kPa]</td>
<td>8 @ 87PSI [240 @ 600kPa]</td>
<td>12 @ 87PSI [360 @ 600kPa]</td>
<td>2 @ 87PSI per atomizer [120 @ 600kPa per atomizer]</td>
</tr>
<tr>
<td>Water pressure (PSI) [kPa]</td>
<td>40 to 60 [275 to 415]</td>
<td>40 to 60 [275 to 415]</td>
<td>40 to 60 [275 to 415]</td>
<td>40 to 60 [275 to 415]</td>
</tr>
<tr>
<td>Total Dissolved Solids (ppm)</td>
<td>100ppm max</td>
<td>100ppm max</td>
<td>100ppm max</td>
<td>100ppm max</td>
</tr>
<tr>
<td>Voltage (Vac)</td>
<td>100 to 250Vac</td>
<td>100 to 250Vac</td>
<td>100 to 250Vac</td>
<td>100 to 250Vac</td>
</tr>
<tr>
<td>Power (W)</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15 to 200</td>
</tr>
</tbody>
</table>

**TECHNICAL DRAWINGS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Designation</th>
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</thead>
<tbody>
<tr>
<td>ACA-S2</td>
<td>ACA in space 2 nozzles</td>
</tr>
<tr>
<td>ACA-S4</td>
<td>ACA in space 4 nozzles</td>
</tr>
<tr>
<td>ACA-S6</td>
<td>ACA in space 6 nozzles</td>
</tr>
<tr>
<td>ACA-DHPP</td>
<td>ACA Distribution panel (1 to 6 atomizers)</td>
</tr>
<tr>
<td>ACA-NOZZ6</td>
<td>Nozzle only</td>
</tr>
<tr>
<td>ACA-OCUX</td>
<td>Control panel (X = 1 or 2 zones)</td>
</tr>
</tbody>
</table>

**COMPONENTS SUPPLIED**

- Electronic controller for 1 or 2 zones control
- RH% & Temperature sensor.
- Power supply (120/24 Vac)
- 2 stages water filters 1micron + antibacterial silver ions cartridge
- Water & air hoses
SAFETY CONTROLS

**DHL**

**DUCT HI-LIMIT HUMIDISTAT**

_DHL_ is used as High limit humidistat safety when humidifying in duct. It is suitable for steam or adiabatic humidification.

- **Control mode:** ON/OFF
- **Set point range:** 15 to 95%RH
- **Long term stability:** +/-1.5%RH

_DHL_ is used as High limit humidistat safety when humidifying in duct. It is suitable for steam or adiabatic humidification.

- **Contacts type & rating:** NO & NC SPDT potential free contacts maximum 5A at 24Vac or Vdc
- **Switching differential:** 4%RH

**DAP**

**DUCT AIR PROVING SWITCH**

_DAP_ is used as Air proving safety switch when humidifying in duct. It will prevent from operating humidifier in case there is no air flow.

- **Control mode:** ON/OFF
- **Set point range:** 0.08 to 1.2in w.c. [20 to 300Pa]
- **Max pressure:** 30in w.c. [7500Pa]

_DAP_ is used as Air proving safety switch when humidifying in duct. It will prevent from operating humidifier in case there is no air flow.

- **Contacts type & rating:** NO & NC SPDT potential free contacts maximum 2A at 250Vac or 1A at 30Vdc
- **Max Switching frequency:** 6 cycles / min

**FLS**

**FLOOR LEAK SWITCH**

_FLS_ is used to detect any water accumulation on the floor of a room or duct, it is used to prevent from any water damage.

- **Control mode:** ON/OFF
- **Supply voltage:** 11 to 27Vac or Vdc
- **Max pressure:** 30in w.c. [7500Pa]

_FLS_ is used to detect any water accumulation on the floor of a room or duct, it is used to prevent from any water damage.

- **Contacts type & rating:** NO & NC SPDT potential free contacts maximum 1A at 24Vac or Vdc or 0.5A at 120vac
- **Power consumption**
  - DC: 10mA typical, 30mA max
  - AC: 30mA typical, 70mA max
**RH% SENSORS & CONTROLLER**

**DHS**

**DUCT RH% SENSOR**

DHS is used as RH% sensor when humidifying in duct. It is suitable for steam or adiabatic humidification. It should be installed in returned air duct for best reading.

- **Range:** 0-100%RH
- **Output:**
  - standard 0-10Vdc
  - optional 4-20mA (suffix 420)
- **Supply voltage:** 15 to 28Vac or 15 to 36Vdc
- **Accuracy:**
  - ≤±/−3%RH (at 25°C, 20 to 80%RH)
  - optional ≤±/−2%RH
- **Hysteresis:** ≤±/−1%RH
- **Response time:** ≤10s (25°C)
- **Drift:** ≤±/−0.5%RH

**Options:**
- LCD display
- Additional SPDT relays

**RHS**

**ROOM RH% SENSOR**

RHS is used as room RH% sensor. It is suitable for steam or adiabatic humidification.

- **Range:** 0-100%RH
- **Output:**
  - standard 0-10Vdc
  - optional 4-20mA (suffix 420)
- **Supply voltage:** 15 to 28Vac or 15 to 36Vdc
- **Accuracy:**
  - ≤±/−3%RH (at 25°C, 20 to 80%RH)
  - optional ≤±/−2%RH
- **Hysteresis:** ≤±/−1%RH
- **Response time:** ≤10s (25°C)
- **Drift:** ≤±/−0.5%RH

**Options:**
- LCD display
- Additional SPDT relays

**RHC**

**ROOM RH% CONTROLLER**

RHC is used as room RH% sensor. It is suitable for steam or adiabatic humidification.

- **Range:** 0-95%RH,
- **Humidification set point range:**
  - 10% RH to 90% RH
- **Supply voltage:** 19 to 30Vac
- **Accuracy:**
  - ±5% RH (at 10 to 32°C, 20 to 95%RH)
WATER FILTER & CONDITIONERS

WF-105

2 STAGES WATER FILTERS 10 + 5 MICRONS

WF-105 is recommended to be installed on the city water supply line to any steam humidifiers, such as IER or ISE.

2 stages filtration:
- 1st stage: 10 micron sediment
- 2nd stage: 5 microns PP

Cartridges size: 10in

Inlet & outlet diam.: 1/2in NPT
Max pressure: 200PSI [1400kPa]
Flow: 70GPM

WF-1S

2 STAGES WATER FILTERS 1 MICRON + SILVER IONS

WF-1S is included with AEM or ACA humidifier, it is a basic water filtration for any adiabatic humidifier preventing foreign particle and disinfecting incoming water.

2 stages filtration:
- 1st stage: 1micron PP
- 2nd stage: antibacterial, silver ions cartridge

Cartridges size: 10in

Inlet & outlet diam.: 1/2in NPT
Max pressure: 200PSI [1400kPa]
Flow: 70GPM

WS-MG

WATER CONDITIONER CATALYTIC

WS-MG is a 3 stages water filters and conditioner to avoid large scale accumulation when steam humidifiers such as IER or ISE are supplied with hard water.

It is a good alternative to ions exchange water softener replacing calcium and magnesium by sodium making boiling water prone to foam, resulting is big waste of water and energy due to frequent or constant drain.

3 stages filtration:
- 1st stage: 10 micron sediment
- 2nd stage: Carbon filter
- 3rd stage: hard water conditioner

Cartridges size: 10in

Inlet diam.: 1/2in NPT
Outlet diam.: 3/8in compression
Max pressure: 100PSI [700kPa]
Flow: 0.7GPM [2.7l/min]
REVERSE OSMOSIS WATER FILTER

WRO-150
4 STAGES RO FILTRATION - 150GPD

WRO-100 is reverse osmosis filtration station able to treat up to 150GPD (52lb/h) [23l/h] of water. It will remove 95% of the dissolved solids contained in water.

4 stages filtration:
- 1st stage: 5 micron PP
- 2nd & 3rd stage: Carbon filter
- 4th stage: 2 RO membranes

Cartridges size: 20in

Inlet & outlet diam.: 1/2in NPT
Max pressure: 80PSI [550kPa]
Storage tank: 5Gal [19l]

WRO-200
4 STAGES RO FILTRATION - 200GPD

WRO-100 is reverse osmosis filtration station able to treat up to 200GPD (69lb/h) [31l/h] of water. It will remove 95% of the dissolved solids contained in water.

4 stages filtration:
- 1st stage: 5 micron PP
- 2nd & 3rd stage: Carbon filter
- 4th stage: 2 RO membranes

Cartridges size: 20in

Inlet & outlet diam.: 1/2in NPT
Max pressure: 80PSI [550kPa]
Storage tank: 10Gal [38l]

WRO-400
4 STAGES RO FILTRATION - 400GPD

WRO-400 is reverse osmosis filtration station able to treat up to 400GPD (139lb/h) [63l/h] of water. It will remove 95% of the dissolved solids contained in water.

4 stages filtration:
- 1st stage: 5 micron PP
- 2nd & 3rd stage: Carbon filter
- 4th stage: 2 RO membranes

Cartridges size: 20in

Inlet & outlet diam.: 1/2in NPT
Max pressure: 80PSI [550kPa]
Storage tank: 20Gal [76l]
steamOcalc is a web application available on line as part of steamOvap.com website. It is absolutely free to use it, no login or password are required to access it or to use it.

It allows anyone to calculate steam humidification load based on the common design parameters for heating (winter) or economizer (free cooling) modes.

You simply have to enter in-space desired conditions, duct dimensions and air flow information, as well as outside air conditions. steamOcalc will calculate the required humidification load, will suggest a steam humidifier model and offer a list of options for the in-duct steam distribution.

Non wetting distance is estimated and will help you proceed to the best steam distribution option for your project.

If you need to compare calculation made by steamOcalc with an alternative calculation method. Click on “display calculated value” box and all of the data that have been generated by the program will be indicated.

You can enter information about your project, zone and date, and if you need to keep record, press the print button to transfer the results on a piece of paper or into a pdf file or other format.

steamOcalc is a tool made for you so use it as often as you need, and do not hesitate to share with us feed back on your experience.

steamOcalc will constantly evolve to include more features.
RESEARCH & DEVELOPMENT

Since its foundation steamOvap has invested large amount of resources and effort in developing new products and technologies.

We already hold a patent for the invention brought with the IER humidifier in 2017.

Our mid term strategy is to be able to develop full range of products covering all of the popular technologies used today in commercial and industrial HVAC. For this reason our plan is to develop and put to market the following humidifiers:

2020 - ISE Steam exchange humidifier
2021 - IGE Gas fired humidifier

These new humidifiers will bring new inventions that will make them apart form the crowd.

Our R&D team of young and fearless engineers benefit from the support of local university such as ETS Montreal as well as partners such as our manufacturer representative and local suppliers.

“The best way to predict the future is to invent it.” (Alan Kay).

WARRANTY & RETURN POLICY

RETURN POLICY - A Return Material Authorization (“RMA”) is required prior to returning products for any reason. No merchandise shall be returned without a written authorization from the SteamOvap, in its sole discretion may reject any non-warranty return requests. Non-warranty returns of unused and resalable products for credit will be subject to steamOvap’s return policies in effect at the time, including applicable restocking charges and other conditions of return. Return requests of incorrectly ordered items will only be accepted against a restocking charge of 10% within ninety (90) days after delivery. Products returned must be properly packed and shipped to SteamOvap specified locations. All shipping containers must be clearly marked per steamOvap’s instruction. Buyer will be responsible for all costs and expenses associated with any returns of products (other than products returned at steamOvap’s request pursuant to Limited Warranty here below) and will bear the risk of loss or damage of all returned products, unless SteamOvap agrees otherwise in writing. SteamOvap, in its sole discretion may reject any return of product not approved by SteamOvap in accordance with this paragraph or otherwise not returned in accordance with steamOvap’s then current return policies.

LIMITED WARRANTY – SteamOvap warrants that the products sold hereunder will be free from any defects in parts and workmanship for a period of three (3) years after start-up, except for ACA atomizers that are granted a life time warranty (15 years), provided that a start-up report with no installation non-conformance has been done and signed by the authorized steamOvap local representative. Otherwise the warranty period is reduced to eighteen (18) months from date of shipment. SteamOvap’s obligations and liabilities under this warranty are limited to supply replacement parts or replace the products free or charge, or at steamOvap’s sole discretion refund Buyer the price of the products (or a proportionate part thereto), providing that the defective part(s) or product is returned in accordance with steamOvap’s return policy section.

Parts used for repairs are warranted for the balance of the term of the warranty on the original product or ninety (90) days, whichever is longer.

Visit our website : steamovap.com for more information.
<table>
<thead>
<tr>
<th>Process or areas</th>
<th>Temperature °C</th>
<th>°F</th>
<th>Humidity level (RH%)</th>
<th>Recommended humidifier</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>People</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home / Residence</td>
<td>21-23</td>
<td>70-74</td>
<td>30-40%</td>
<td>IER electric steam</td>
</tr>
<tr>
<td>Office / Commercial buildings</td>
<td>21-23</td>
<td>70-74</td>
<td>30-40%</td>
<td>IER electric steam</td>
</tr>
<tr>
<td>Hotel</td>
<td>21-23</td>
<td>70-74</td>
<td>30-40%</td>
<td>IER electric steam</td>
</tr>
<tr>
<td>School</td>
<td>21-23</td>
<td>70-74</td>
<td>30-40%</td>
<td>IER electric steam</td>
</tr>
<tr>
<td>Hospitals &amp; Health Care</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing home</td>
<td>21-22</td>
<td>70-72</td>
<td>40-60%</td>
<td>IER, ISE or ILS steam</td>
</tr>
<tr>
<td>General clinical areas</td>
<td>21-24</td>
<td>68-76</td>
<td>50-60%</td>
<td>IER or ISE steam</td>
</tr>
<tr>
<td>Surgical areas</td>
<td>20-24</td>
<td>68-76</td>
<td>50-60%</td>
<td>IER or ISE steam</td>
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<tr>
<td>Obstetrical areas</td>
<td>24-27</td>
<td>75-80</td>
<td>40-60%</td>
<td>IER or ISE steam</td>
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<tr>
<td><strong>Wellness</strong></td>
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</tr>
<tr>
<td>Hammam</td>
<td>40-50</td>
<td>104-122</td>
<td>100%</td>
<td>IER electric steam</td>
</tr>
<tr>
<td>Spa</td>
<td>22-24</td>
<td>72-75</td>
<td>30-60%</td>
<td>IER electric steam</td>
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<tr>
<td><strong>Art</strong></td>
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<tr>
<td>Art galleries</td>
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<tr>
<td>Concert hall</td>
<td>20-22</td>
<td>68-72</td>
<td>45-60%</td>
<td>ISE or ILS steam or AEM evaporative</td>
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<tr>
<td>Art conservation</td>
<td>17-22</td>
<td>65-72</td>
<td>45-55%</td>
<td>IER, ISE or ILS steam</td>
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<tr>
<td>Stuffed fur animals &amp; Fur garment storage</td>
<td>4-10</td>
<td>40-50</td>
<td>55-65%</td>
<td>IER, ISE or ILS steam</td>
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<tr>
<td><strong>Industry</strong></td>
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<tr>
<td>Agri food</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meat conservation</td>
<td>0-1</td>
<td>32-34</td>
<td>90-95%</td>
<td>ACA atomizing</td>
</tr>
<tr>
<td>Fruit Cold storage</td>
<td>4-7</td>
<td>39-45</td>
<td>95%</td>
<td>ACA atomizing</td>
</tr>
<tr>
<td>Egg hatchery</td>
<td>37-39</td>
<td>99-102</td>
<td>&gt;60%</td>
<td>IER or ILS steam</td>
</tr>
<tr>
<td>Mushrooms</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Spawn added</td>
<td>16-22</td>
<td>60-72</td>
<td>&gt;95%</td>
<td>ACA or AEM evaporative</td>
</tr>
<tr>
<td>Growing period</td>
<td>10-16</td>
<td>50-60</td>
<td>80-85%</td>
<td>ACA or AEM evaporative</td>
</tr>
<tr>
<td>Storage</td>
<td>0-2</td>
<td>32-35</td>
<td>80-85%</td>
<td>ACA or AEM evaporative</td>
</tr>
<tr>
<td>Tea packaging</td>
<td>17-20</td>
<td>62-68</td>
<td>60-70%</td>
<td>ACA atomizing</td>
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<tr>
<td>Cereal packaging</td>
<td>24-27</td>
<td>75-80</td>
<td>45-50%</td>
<td>ILS steam or ACA atomizing</td>
</tr>
<tr>
<td>Wine making &amp; distillery / ageing</td>
<td>10-16</td>
<td>50-61</td>
<td>90-95%</td>
<td>ACA atomizing</td>
</tr>
<tr>
<td>Bread proofing</td>
<td>27-32</td>
<td>80-90</td>
<td>&gt;80%</td>
<td>IER or ILS steam</td>
</tr>
<tr>
<td>Tobacco</td>
<td></td>
<td></td>
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<tr>
<td>Cigar &amp; cigarette making</td>
<td>21-24</td>
<td>70-75</td>
<td>55-65%</td>
<td>IER or ILS steam</td>
</tr>
<tr>
<td>Softening</td>
<td>29-32</td>
<td>85-90</td>
<td>85-88%</td>
<td>IER or ILS steam</td>
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<tr>
<td>Stemming &amp; stripping</td>
<td>24-29</td>
<td>75-85</td>
<td>70-75%</td>
<td>IER or ILS steam</td>
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<tr>
<td>Filler tobacco conditioning</td>
<td>21-24</td>
<td>70-75</td>
<td>75-80%</td>
<td>IER or ILS steam</td>
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<tr>
<td>Wrapper tobacco conditioning &amp; storage</td>
<td>24-29</td>
<td>75-85</td>
<td>75-80%</td>
<td>IER or ILS steam</td>
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</table>
# APPLICATIONS GUIDE

<table>
<thead>
<tr>
<th>Process or areas</th>
<th>Temperature (°C)</th>
<th>Temperature (°F)</th>
<th>Humidity Level (RH%)</th>
<th>Recommended Humidifier</th>
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<tbody>
<tr>
<td><strong>Marijuana growing</strong></td>
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<td></td>
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<tr>
<td>Cloning</td>
<td>23-25</td>
<td>74-77</td>
<td>70-80%</td>
<td>IER steam or ACA</td>
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<tr>
<td>Seeding</td>
<td>26</td>
<td>78</td>
<td>65-70%</td>
<td>IER steam or ACA</td>
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<tr>
<td>Vegetative growth</td>
<td>21-29</td>
<td>70-85</td>
<td>40-70%</td>
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<tr>
<td>Flowering</td>
<td>20-25</td>
<td>68-77</td>
<td>30-50%</td>
<td>IER steam or ACA</td>
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<tr>
<td>Drying</td>
<td>18-24</td>
<td>65-75</td>
<td>40-50%</td>
<td>IER electric steam</td>
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<tr>
<td><strong>Data centers &amp; Server rooms</strong></td>
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<tr>
<td><strong>Electronics production</strong></td>
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<tr>
<td>Laboratories &amp; Clean rooms</td>
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<tr>
<td>Static Electricity Control</td>
<td>-</td>
<td>-</td>
<td>&gt;55%</td>
<td>IER, ILS, ACA or AEM</td>
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<tr>
<td>Textiles, paper, electronic, explosive process</td>
<td>20-22</td>
<td>68-72</td>
<td>55-60%</td>
<td>IER, ILS, ACA or AEM</td>
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<tr>
<td>Packaging</td>
<td>20-22</td>
<td>68-72</td>
<td>40-45%</td>
<td>ACA or AEM evaporative</td>
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<tr>
<td>Painting</td>
<td>16-32</td>
<td>60-90</td>
<td>50-80%</td>
<td>IER, ILS or AEM</td>
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<tr>
<td><strong>Pharmaceutical</strong></td>
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<tr>
<td>Colloids</td>
<td>24</td>
<td>75</td>
<td>30-50%</td>
<td>IER, ISE or ILS steam</td>
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<tr>
<td>Cough drops</td>
<td>24</td>
<td>75</td>
<td>40%</td>
<td>IER, ISE or ILS steam</td>
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<tr>
<td>Ampoule manufacturing</td>
<td>24</td>
<td>75</td>
<td>35-50%</td>
<td>IER, ISE or ILS steam</td>
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<tr>
<td>Microanalysis</td>
<td>24</td>
<td>75</td>
<td>50%</td>
<td>IER, ISE or ILS steam</td>
</tr>
<tr>
<td>Serums</td>
<td>24</td>
<td>75</td>
<td>50%</td>
<td>IER, ISE or ILS steam</td>
</tr>
<tr>
<td>Animal rooms</td>
<td>24-27</td>
<td>75-80</td>
<td>50%</td>
<td>IER, ISE or ILS steam</td>
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<tr>
<td><strong>Printing</strong></td>
<td>24-27</td>
<td>76-80</td>
<td>45-50%</td>
<td>ACA atomizing</td>
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<tr>
<td>Textile</td>
<td>24-27</td>
<td>76-80</td>
<td>&gt;55%</td>
<td>ACA atomizing</td>
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<tr>
<td><strong>Woodworking</strong></td>
<td>24-27</td>
<td>76-80</td>
<td>&gt;55%</td>
<td>ACA atomizing</td>
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<tr>
<td>Plywood hot pressing</td>
<td>32</td>
<td>90</td>
<td>60%</td>
<td>IER or ILS steam</td>
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<tr>
<td><strong>Photographic Processing</strong></td>
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<tr>
<td><strong>Lenses (Optical)</strong></td>
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<tr>
<td>Fusing</td>
<td>23-24</td>
<td>74-76</td>
<td>40-50%</td>
<td>IER or ILS steam</td>
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<tr>
<td>Grinding</td>
<td>26-27</td>
<td>79-81</td>
<td>75-85%</td>
<td>IER or ILS steam</td>
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<tr>
<td><strong>Plastics</strong></td>
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<tr>
<td>Cellophane wrapping</td>
<td>24-27</td>
<td>75-80</td>
<td>45-65%</td>
<td>ILS steam</td>
</tr>
<tr>
<td><strong>Paper Processing</strong></td>
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<td></td>
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</tr>
<tr>
<td>Finishing area</td>
<td>21-24</td>
<td>70-75</td>
<td>40-45%</td>
<td>ACA atomizing</td>
</tr>
</tbody>
</table>
USEFUL FORMULAS & CONVERSIONS

Power to produce steam
970Btu are required to bring 1lb of water to steam (at sea level)

Current calculation
1 phase: I(A)=Power(W)/Voltage(V)
3 phases: I(A) =Power(W)/Voltage(V)\times 1.732

Power conversion
1kW = 3412Btu
1Btu = 0.0002928kW

Air flow conversion
1CFM = 1.699 m³/sec
1m³/sec = 0.58857CFM

Air velocity conversion
1FPM = 0.471/sec
1l/sec = 2.12FPM

Pressure conversion
1PSI = 6.89kPa
1kPa = 0.145PSI
1in w.c. = 249Pa
1Pa = 0.004in w.c.

Temperature conversion
F=(C\times 1.8)+32
C=(F-32)/1.8

Weight conversion
1lb = 0.45kg
1kg = 2.2lb

CROSS REFERENCE TABLE

<table>
<thead>
<tr>
<th>NORTEC/CONDAIR</th>
<th>DRISTEEM</th>
<th>NEPTRONIC</th>
<th>steamOvap</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>EL series electrode boiler</td>
<td>XT electrode boiler</td>
<td>-</td>
<td>IER electric resistive</td>
<td>Resistive type is superior to electrode boiler: better control and no plastic waste.</td>
</tr>
<tr>
<td>RS series resistive</td>
<td>Vaporstream or CRUV or Vapormist or Humiditech electric resistive</td>
<td>SK300 or SKE4 or SKR electric resistive</td>
<td>IER electric resistive</td>
<td>Serviceability does matter.</td>
</tr>
<tr>
<td>SE series steam exchange</td>
<td>STS steam exchange</td>
<td>SKS4 steam to steam</td>
<td>ISE steam exchange</td>
<td></td>
</tr>
<tr>
<td>LS series live steam</td>
<td>Mini bank, single tube or multiple tube steam injection</td>
<td>SKD direct steam</td>
<td>ILS-P Live steam</td>
<td>Jacketed type live steam.</td>
</tr>
<tr>
<td>SAME pressurized steam</td>
<td>Ultrasorb MP, LV, LH or XV pressurized steam</td>
<td>SKD direct steam</td>
<td>ILS-SO or ILS-SE Live steam</td>
<td>Live steam with vertical ramp High efficiency &amp; no condensate to drain.</td>
</tr>
<tr>
<td>ME series or DL series hybrid evaporative</td>
<td>Wetted media system</td>
<td>SKV evaporative</td>
<td>AEM evaporative</td>
<td></td>
</tr>
<tr>
<td>AF22,AF series or, Draabe series compressed air, HP series High pressure in-duct or ML series direct room systems</td>
<td>High pressure system</td>
<td>SKH High pressure atomizing</td>
<td>ACA atomizing</td>
<td>Water droplet size does matter: (droplets from high pressure atomizers are 10 times bigger than ACA).</td>
</tr>
</tbody>
</table>