RES – RESIDENTIAL ELECTRIC STEAM HUMIDIFIER

Submittal (generic)

Date:	
Revision:	*1.0*
Project name:	
Engineer name:	
Engineering firm:	
steamOvap agent:	
Purchase Order No:	
Purchase Order Date:	
Date required:	
Comments:	

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Description

Description & Intended use

RES electric steam humidifier is an electric steam generator that uses water immersed resistive heating elements to produce pure and sterile steam at atmospheric pressure that is distributed in air handling unit or ventilation duct, or directly into space.
RES humidifier can be supplied with tap or treated water such as reverse osmosis water water without alteration or additional required option.
When tap water is used, the scale will come off the heating elements by the natural contraction and expansion of the tube heaters having a coil shape. Scale pieces then accumulate at the bottom of the cylinder without the risk of clogging the drain outlet.
Regular maintenance consists in opening and removing the cylinder and cleaning the accumulated scale off. It is a simple, safe and proven technology and solution that requires no consumable and uses no unreliable plastic component.

RES electric steam humidifier is intended exclusively to produce steam from water at atmospheric pressure for air humidification.

Main features

- Very accurate +/-1% and constant steam production whatever water condition.
- Fully modulating humidifier.
- Drain water automatically cooled down at 140°F [60°C].
- Permanent stainless steel cylinder with thermal insulation.
- Easy and quick regular maintenance with no tool required.
- Modbus RTU remote communication
- Three year warranty (when installation is commissioned by steamOvap authorized service representative)
- Certified as per UL998 safety standard for North America by TUV-SUD

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Product designation

steamOres product designation & name plate

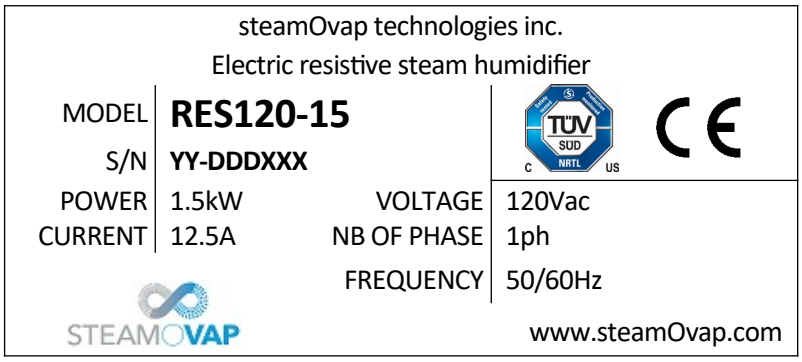
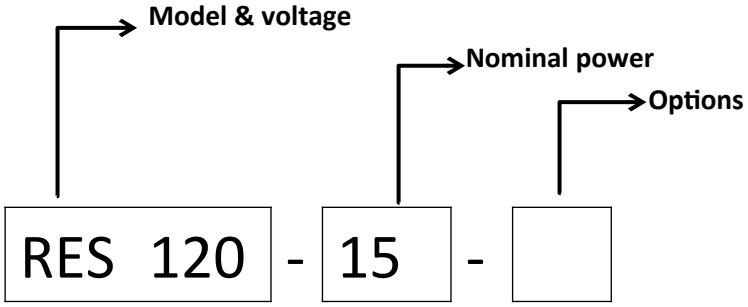


Figure 1 – steamOres Name plate

Model designation and options codification



steamOres electrical rating

Model	Voltage	Power	Current	Steam Capacity
RES120-06	120Vac 1ph	0.6kW	5.2A	1.9lb/h (0.86kg/h)
RES120-08		0.8kW	6.7A	2.4lb/h (1.09kg/h)
RES120-11		1.1kW	9.4A	3.4lb/h (1.5kg/h)
RES120-15		1.5kW	12.5A	4.5lb/h (2.0kg/h)
RES208-19	208Vac 1ph	1.9kW	9.1A	5.6lb/h (2.5kg/h)
RES208-24		2.4kW	11.6A	7.2lb/h (3.3kg/h)
RES208-34		3.4kW	16.3A	10.1lb/h (4.6kg/h)
RES208-45		4.5kW	21.7A	13.5lb/h (6.1kg/h)
RES240-25	240Vac/1ph	2.5kW	10.4	7.5lb/h (3.4kg/h)
RES240-32		3.2kW	13.3A	9.6lb/h (4.4kg/h)
RES240-45		4.5kW	18.8A	13.5lb/h (6.1kg/h)

Dimensions

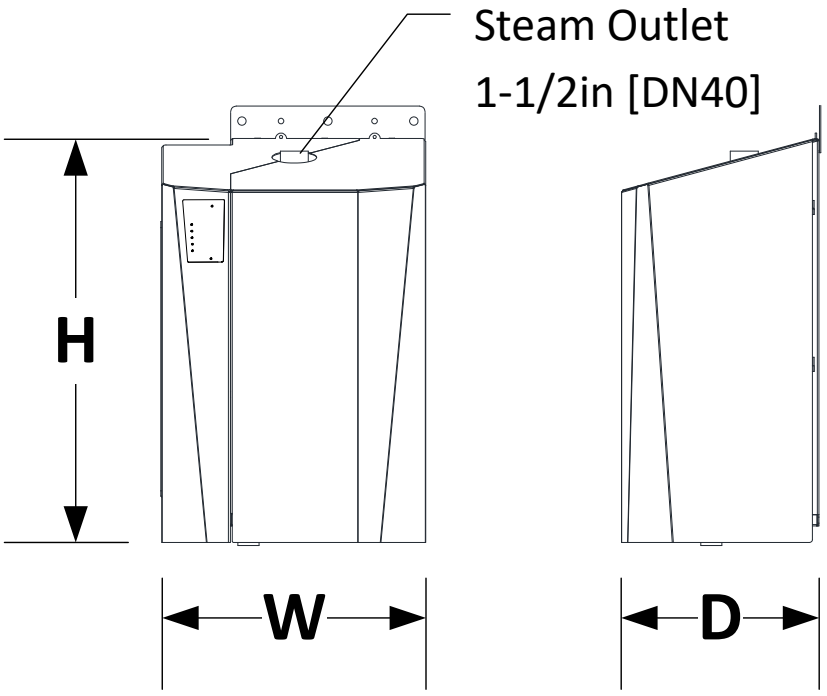


Figure 2 – steamOres dimensions

Model	Dimensions			Qty Steam Outlet + Ø	Net weight
	W	H	D		
RES120-06 to 15 **RES208-19 to 45** **RES240-25 to 45**	12in (30cm)	18in (45cm)	10in (25cm)	1x 1-1/2in (x1 DN40)	22lb (10kg)

Installation overview

General

1. Installation of this humidifier should be carried out by trained and qualified personnel.
2. Any work related to installation of this humidifier must comply with local code and regulation regarding safety and prevention of accidents.

WARNING. Risk of electric shock.
Power supply must be disconnected during installation.
Main power should be connected only after all installation steps have been completed and properly verified.

In duct typical installation

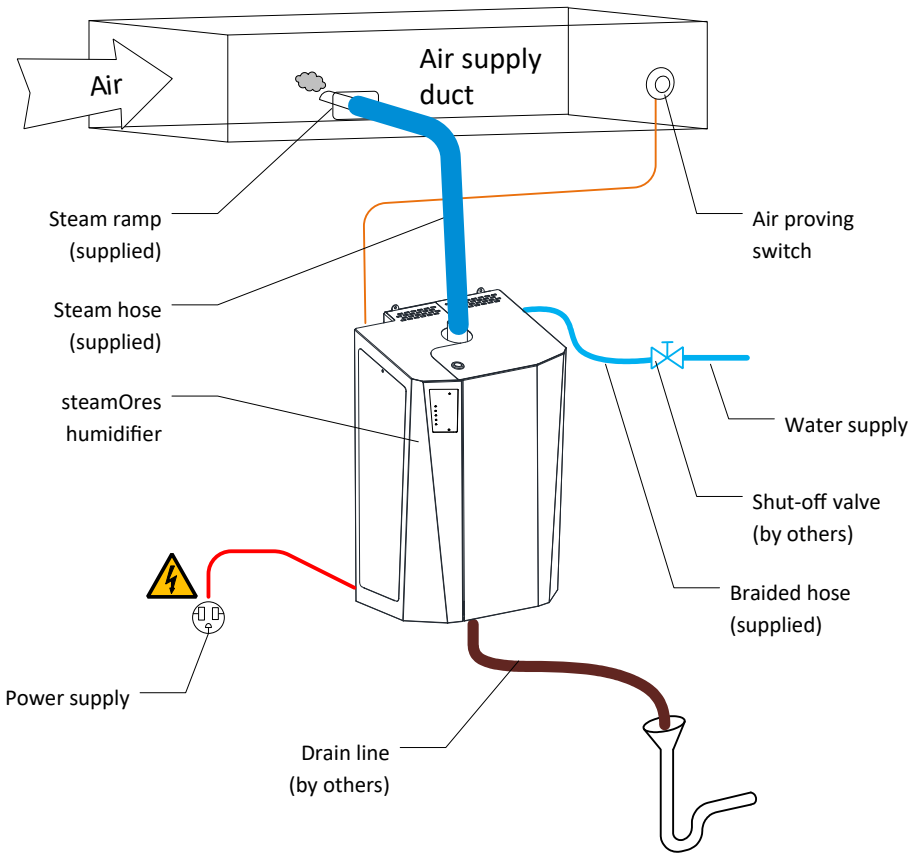


Figure 3 – installation overview with steam distribution in duct

Installation steps :

1. Positioning & mounting of steamOres steam humidifier
2. Water supply installation
3. Drain installation
4. Steam line installation for duct humidification
5. Power supply installation
6. Safety & RH% control installation

Positioning & Mounting

General guidelines for positioning

RES electric steam humidifier should be positioned so that:

1. Length of the steam line (or hose) is as short as possible,
2. In case steam hose is used, the bend radius of 12in [300mm] is ensured
3. Humidifier is easily accessible for service

CAUTION. Risk of malfunction due to vibration. Do Not mount RES electric steam humidifier directly on ventilation duct**.**

CAUTION. Risk of flooding. Ensure that the local where steamOres steam humidifier will be installed is equipped **with floor drain.**

In case of no floor drain is available; installation of a water leak detector is required in order to prevent any flooding in case of abnormal operation or service.

steamOres steam humidifier should be installed in a well-ventilated and dry environment.
If local is subject to below freezing point temperature, activation of ant freezing function of the steamOres steam humidifier is required.
For outdoor installation please contact your steamOvap representative to order and install special outdoor optional enclosure for RES.

steamOres maximum ambient conditions:
Temperature: 41 to 113°F [+5 to +45°C]
Relative Humidity: 90%RH max (non condensing)

Ingress Protection for **steamOres** standard enclosure: IP30

Clearances

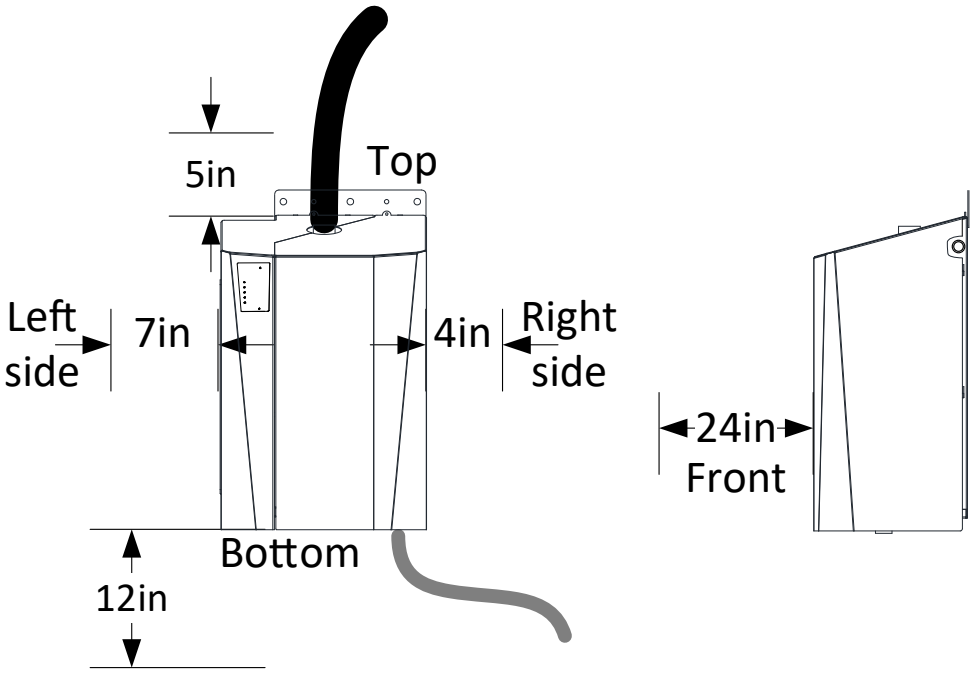


Figure 4 – minimum clearances

Clearance guidelines

There is no minimum clearance on both side of the **steamOres** humidifier, but it is a good practice to have a clearance of 6.8in [17cm] on left hand side and 4in [10cm] on right hand side of the humidifier to ease of installation and service.
Allow a minimum clearance of 12in [30cm] with floor to allow for proper drain slope and drain pipe column.
Front clearance of 24in [60cm] is required for access to the **steamOres** humidifier.
Top clearance is required of 4.8in [12cm] for access and proper steam connection.

Water supply specification

Water supply specification & quality:

Water supply pressure: 15 to 80PSI [1 to 5bar]
Water supply temperature: 37 to 105°F [3 to 40°C]

RES electric steam humidifier can accept a wide range of water quality.
Untreated water will lead to scale deposits that will need to be regularly removed from steam chamber.
Use of additives such as scale inhibitor or corrosion inhibitors, disinfectants or other can impair the normal operation of the humidifier and are not allowed.
Water supply conductivity: 1 to 1500µS/cm
Water supply hardness: 0 to 16grains/gallon [0 to 15°gH][268mg $CaCO_3$/l]
Water supply PH: 6.5 to 7.5
Water supply chloride content: 0 to 50ppm

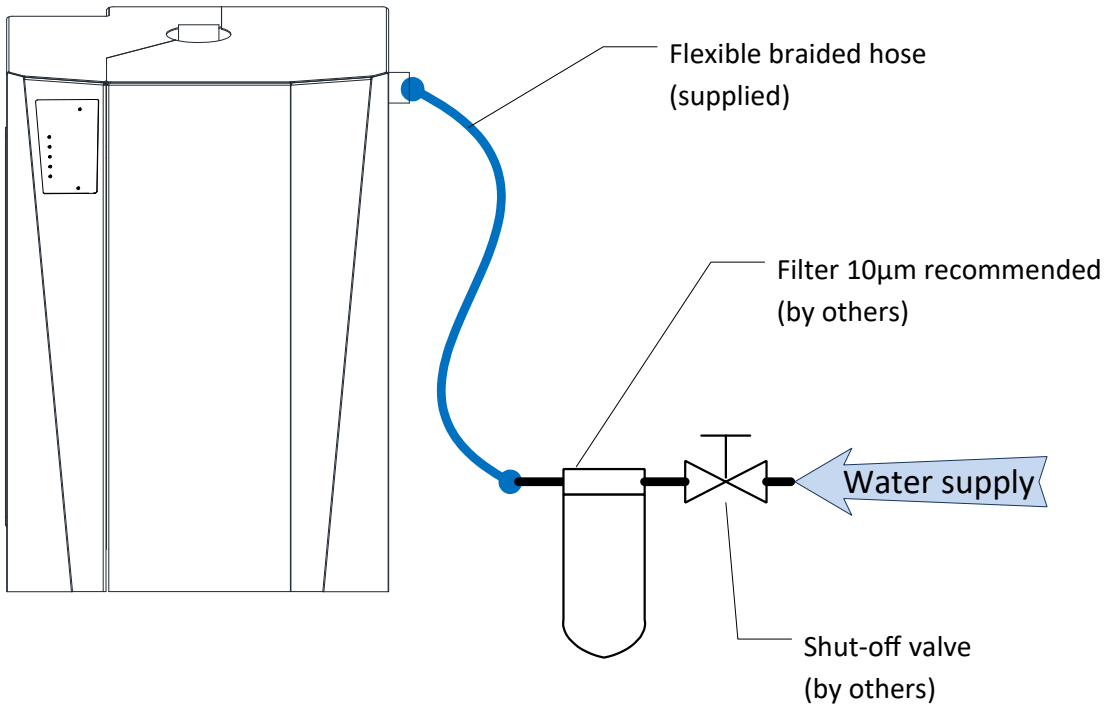


Figure 5 – water supply connection

Drain specification

Water drained specification:

Drained water maximum temperature: 140°F [60°C] (*when supplied with cold water supply)*
Drained water flow rate: 2.6 GPM [10 L/min]
Drain outlet dimension: 1in [DN25]

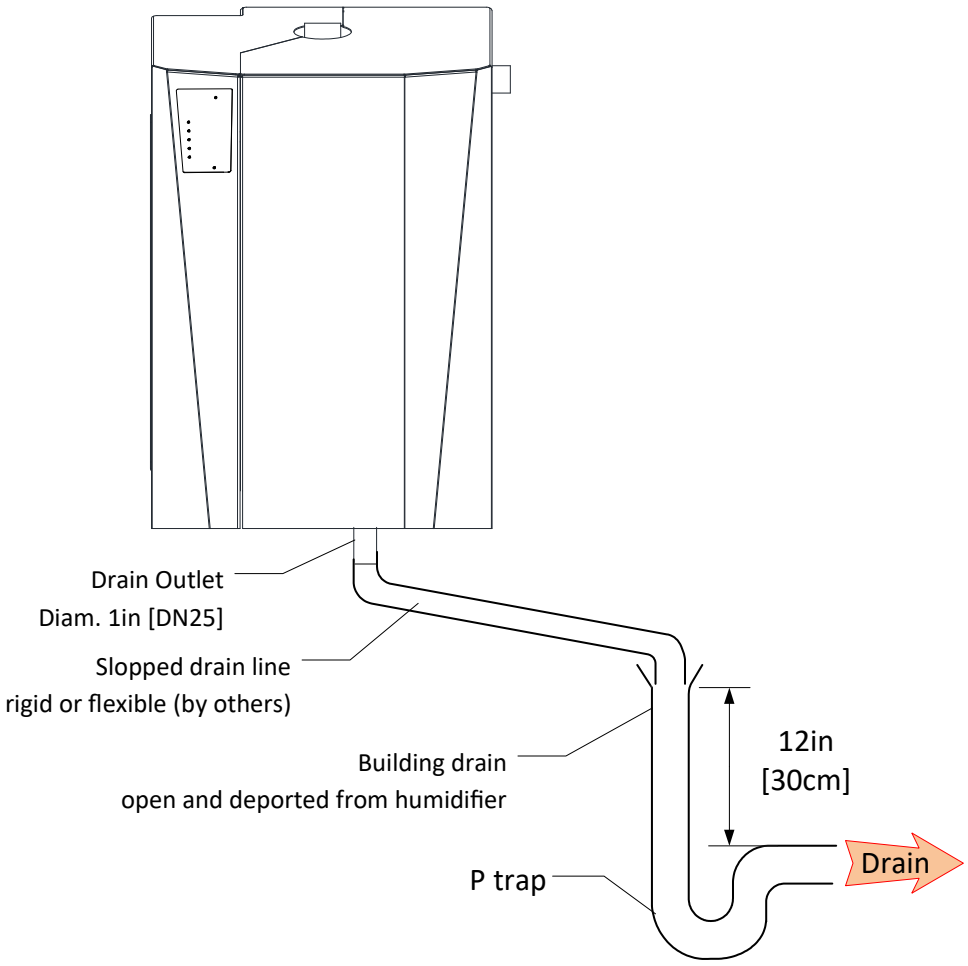


Figure 6 – water drain connection

Steam distribution

Duct humidification

steamOres steam humidifier is supplied with 1m of steam hose and steam ramp.
Standard steam ramp mounting bracket is designed for installation on rectangular ventilation duct (with flat surface).
Make sure to indicate your need for steam ramp for round duct in case your ventilation is round, mounting bracket will adapt to the rounded surface of the duct.

Horizontal duct

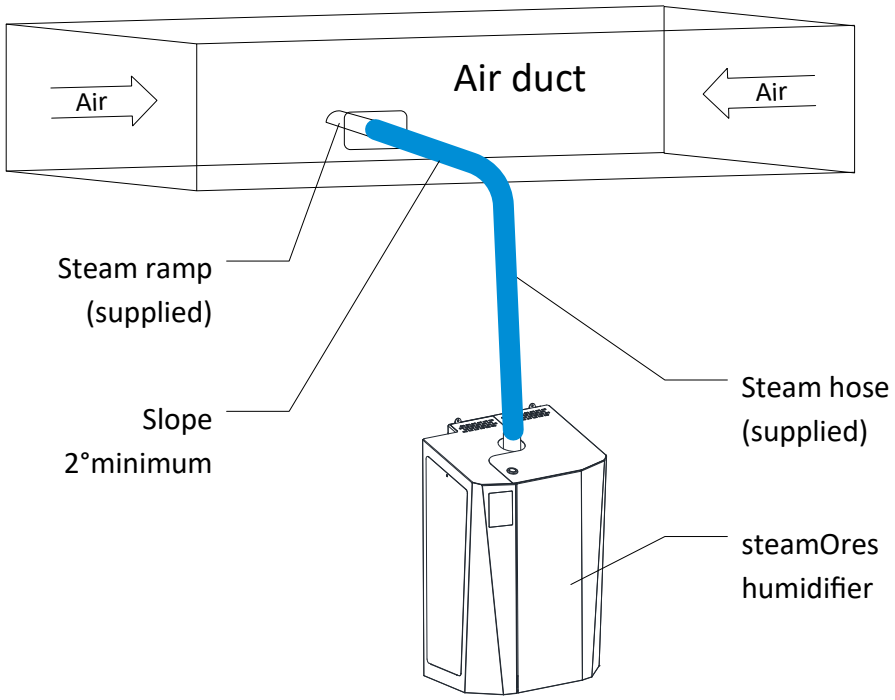


Figure 7 – Horizontal rectangular duct

Round duct

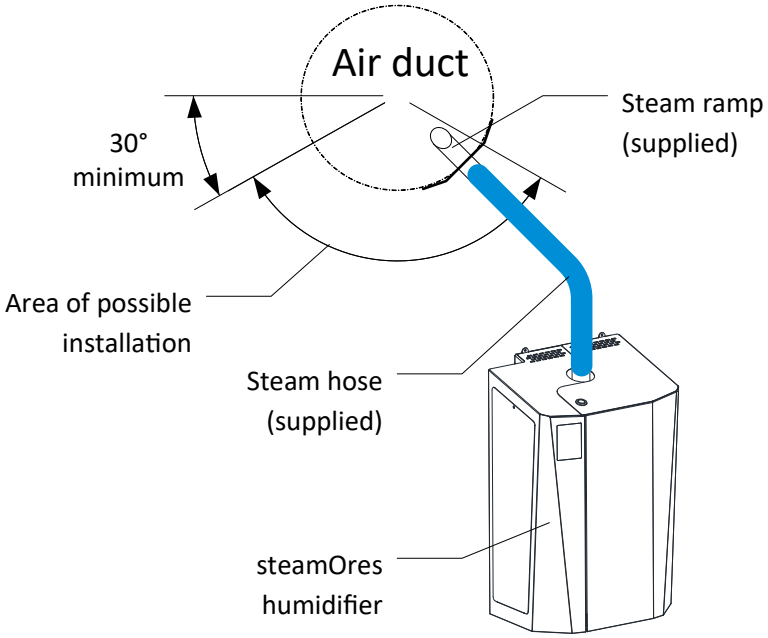


Figure 8 – Horizontal round duct

Verical duct

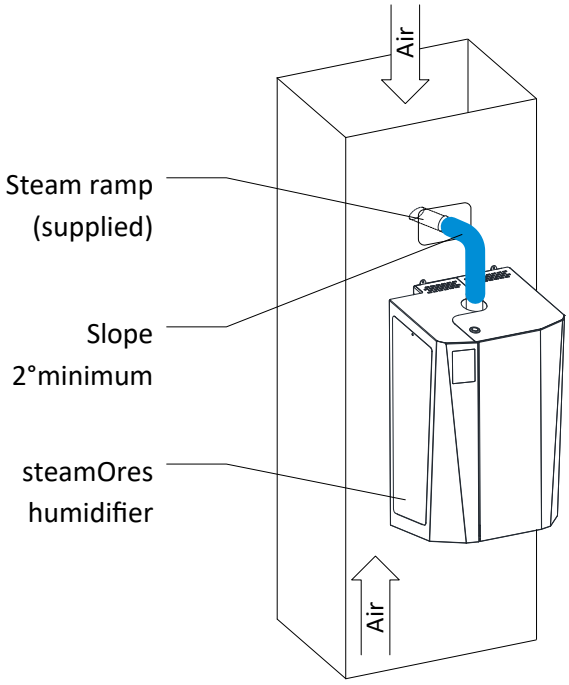


Figure 9 – vertical rectangular duct

Steam line

Caution: **Risk of burnt or flooding or malfunction.**
Any obstruction in the steam hose can result in injuries and/or damage.
Ensure that there is no **kink** or **sag** in the steam hose and that this one if well maintained and attach

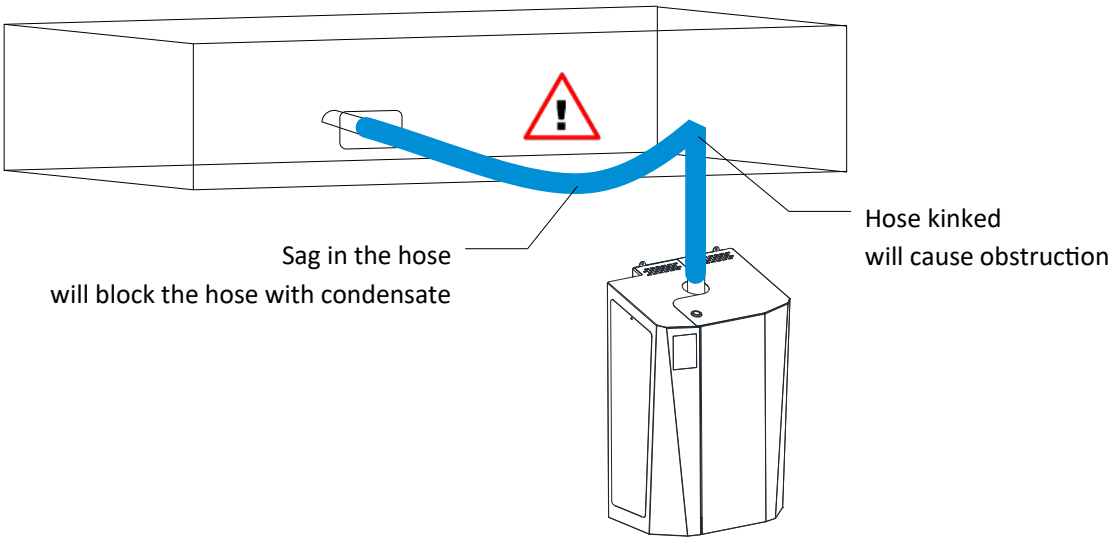


Figure 10 – Wrong steam hose installation

Power supply installation

steamOres electrical rating

Model	Voltage	Steam Capacity	Power	Current	Power supply connection
RES120-06	120Vac/1ph	1.9lb/h (0.86kg/h)	0.6kW	5.2A	Supplied with power cord & standard plug
RES120-08		2.4lb/h (1.09kg/h)	0.8kW	6.7A	
RES120-11		3.4lb/h (1.5kg/h)	1.1kW	9.4A	
RES120-15		4.5lb/h (2.0kg/h)	1.5kW	12.5A	
RES208-19	208Vac/1ph	5.6lb/h (2.5kg/h)	1.9kW	9.1A	To be wired by Qualified electrician
RES208-24		7.2lb/h (3.3kg/h)	2.4kW	11.6A	
RES208-34		10.1lb/h (4.6kg/h)	3.4kW	16.3A	
RES208-45		13.5lb/h (6.1kg/h)	4.5kW	21.7A	
RES240-25	240Vac/1ph	7.5lb/h (3.4kg/h)	2.5kW	10.4A	
RES240-32		9.6lb/h (4.4kg/h)	3.2kW	13.3A	
RES240-45		13.5lb/h (6.1kg/h)	4.5kW	18.8A	

General guidelines for power supply installation

Refer to the above current rated to determine the appropriate wire sizes as well as conduit size and fused disconnect requirements based on above electrical rating.
The earth must be made by solid metal to metal connections. Ground wire should be same size as power wiring.

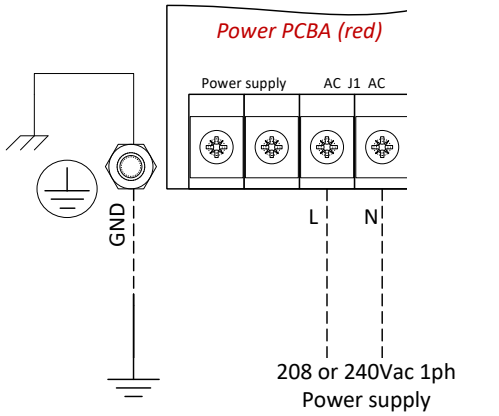
Model	Connection
RES120-06 RES120-08 RES120-11 RES120-15	Connect **steamOres** steam humidifier to a standard 120Vac 1phase electrical outlet
RES208-19 RES208-24 RES208-34 RES208-45 RES240-25 RES240-32 RES240-45	

Figure 11 – Power su 208 or 240Vac/1ph (by others)

Control specification

General guidelines for control installation

It is a good practice to install the following safety controls:

- An air proving switch (APS) (supplied with **steamOres)** in the same duct as the humidifier's steam ramp so that it will prevent humidifier from producing steam in case there is no air flow.

1. When the in-duct air supply temperature is below 68°F [20°C], a high limit humidistat can be installed downstream of the steam ramp so that it can prevent any over humidity or condensing in the duct (not included in the **steamOres** package, to be ordered separately).
   High limit humidistat is usually provided by an on-off switch its set point should be 75 to 85%RH.
   High limit humidistat should be placed at least at 10ft [3m] from the steam ramp.
2. An enable dry contact can also be wired to switch the humidifier ON or OFF, this enable contact can be used either as a third safety control or as a way to control the humidifier ON and OFF, although **steamOres** humidifier is fully modulating.

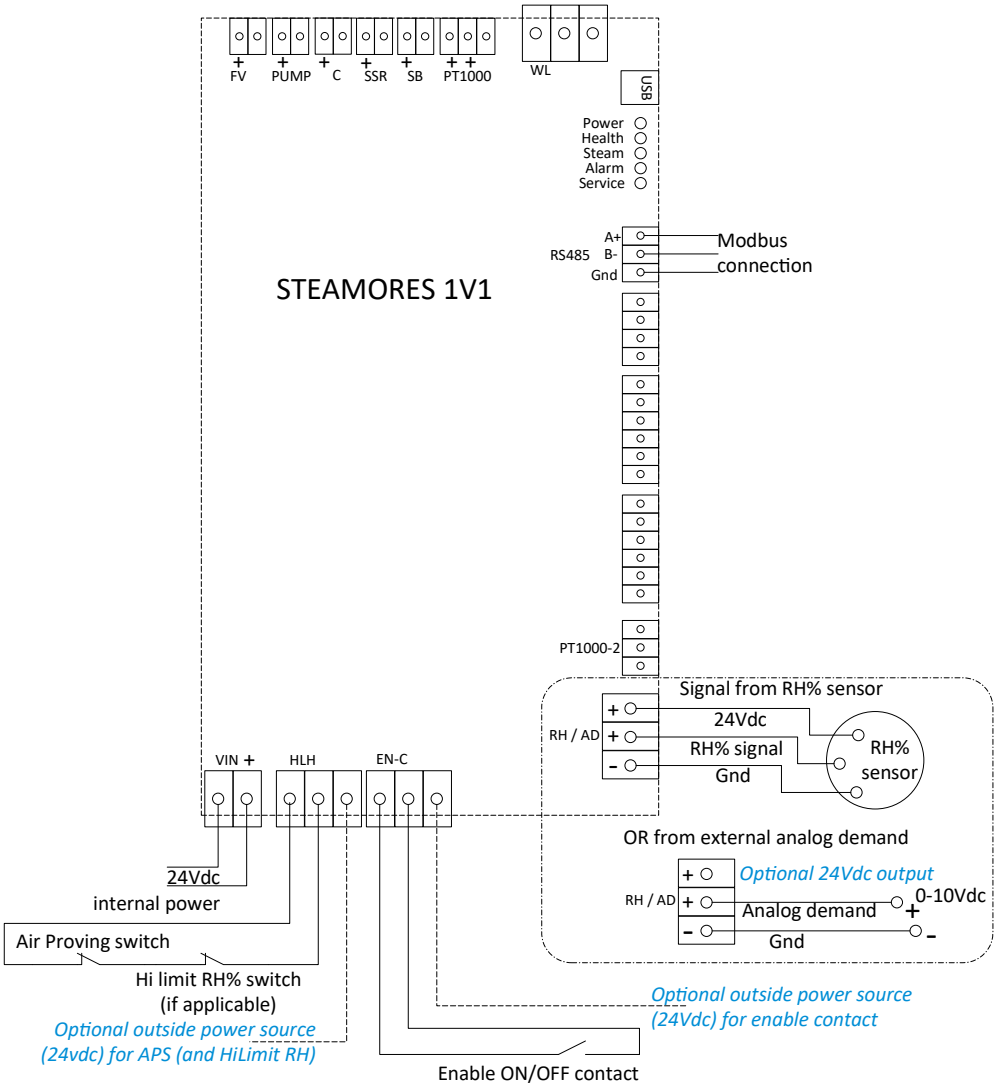


Figure 12 – Control connexion

steamOres humidifier is factory preset for external 0-10Vdc control signal.
Control source and signal can be set through the modbus connection or by your local **steamOvap** representative when ordering.

- Ensure that Air proving switch (APS) and (if applicable) Hi limit humidistat for safety are connected to the terminals HLH as represented in above wiring diagram.
- On/Off control with dry contact should be connected to terminals En-C
- External analog (modulating) signal should be connected to terminals RH/AD
- Before to connect a RH% sensor (in room or in duct) for modulating control, make sure that **steamOres** humidifier as been set accordingly and connect RH% sensor to terminals RH/AD as represented in above wiring diagram.

Accessories

List of accessories to be delivered with the humidifier

A. Electrical safeties & Controls

Figure 13 – DAP

DAP specifications

Pressure range : 0.2 to 2 inH2O
Contact SPDT 2A, 250Vac

Figure 14 – DHL

DHL specifications

Set point range : 15 to 95%RH
Contact 5A, 24Vac/Vdc

Figure 15 – DHS

DHS specifications

Range : 0 to 100%RH
Output: 0-10VDC
Accuracy: ≤3%RH (at 25°C, 20 to 80%RH)
Hysteresis: ≤+/-1%RH
Response time: : ≤10s (25°C no air movement)
Drift: ≤+/-0.5%RH
Voltage: 15 to 28Vac or 15 to 36Vdc

Figure 16 – RHS

RHS specifications

Range : 0 to 100%RH
Output: 0-10VDC
Accuracy: ≤3%RH (at 25°C, 20 to 80%RH)
Hysteresis: ≤+/-1%RH
Response time: : ≤10s (25°C no air movement)
Drift: ≤+/-0.5%RH
Voltage: 15 to 28Vac or 15 to 36Vdc

B. Water treatment

Figure 17 – WF-105

WF 105 specifications

1st stage : 10 microns sediment
2nd stage : 5 microns sediment
Cartridge Dimensions: 10in
Water flow : 1GPM
Max pressure : 100 PSI
Fittings: ½''NPT

Specifications (template)

Section 23 84 13 – Humidifiers

Part 1 - General

1.1 SUMMARY

.1 Section includes:

.1 Materials and installation for direct steam injection, packaged electrode steam generating, steam-to-steam, electric self-contained humidifiers and accessories.

1.2 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 35 29.06 – Health and Safety Requirements

.3 Section 01 45 00 – Quality Control.

.4 Section 01 74 21 – Construction/Demolition Waste Management and Disposal

.5 Section 01 78 00 – Closeout Submittals.

.6 Section 01 91 13 – General Commissioning (Cx) Requirements.

.7 Section 23 31 13.01 – Metal Ducts – Low Pressure to 500 Pa.

1.3 REFERENCES

.1 Air-Conditioning and Refrigeration Institute (ARI) ARI 640, Performance Rating of Commercial and Industrial Humidifiers

1.4 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product data:

.1 Submit manufacturer's printed product literature, specifications and datasheet for heating, ventilation and air conditioning distribution piping and ductwork.

.3 Shop drawings:

.1 Submit shop drawings to indicate project layout, dimensions, and extent of humidification system.

.4 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.

.5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.6 Instructions: submit manufacturer's installation instructions.

.7 Manufacturer's field reports specified.

.8 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 QUALITY ASSURANCE

.1 Pre-Installation Meetings:

.1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 DELIVERY STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal, paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).

.4 Separate for reuse and recycling and place in designated containers steel, metal, plastic waste in accordance with Waste Management Plan (WMP).

.5 Divert unused metal materials from landfill to metal recycling facility as approved by Owner's Representative.

1.7 MAINTENANCE

.1 Extra materials:

.1 Provide maintenance materials in accordance with Section 01 78 00 – Closeout Submittals.

.2 Furnish list of individual manufacturer's recommended spare parts for equipment, addresses of suppliers, and list of specialized tools necessary for adjusting, repairing or replacing, for inclusion into operating manual.

.3 Provide following: one complete set of renewable evaporator media.

PART2 - PRODUCTS

2.1 Electric self-contained humidifier

.1 The humidifier shall be certified as per UL998 by a Nationally Recognized Laboratory (NRTL).

.2 Boiling chamber, cover and fittings constructed from series 300 stainless steel.

.3 Boiling chamber provided with thermal insulation. Thermal insulation shall not be able to loose thermal properties when in contact with water.

.4 Immersion heaters INCOLOY alloy-sheathed resistance type.

.5 Humidifier to have the following safety protection features:

.1 Hi-limit temperature switch

.2 Electronic continuous water level sensor.

.3 Evaporation rate control algorithm.

.6 Humidifier shall be able to be supplied with tap or treated water such as softened or reverse osmosis (RO) water without alteration or add-on option.

.7 Removal of boiling chamber cylinder for regular maintenance shall be done quick release latch giving full access to heating elements and allowing for cleaning and removal of scale without the use of tooling.

.8 Humidifier to provide full modulation using integrated SCR control.

.9 Humidifier shall include an automatic wasted water drain cooling device ensuring a maximum water drained temperature of 140°F (60°C).

.10 Humidifier to be provided Modbus communication protocol.

.11 Accessories

.1 Air flow proving switch.

.2 High limit switch humidistat.

.3 Electronic RH% sensor for duct or space.

.5 Stand metal frame for floor installation.

PART3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 INSTALLATION

.1 Install in accordance with manufacturer's instructions.

.2 Humidifier and evaporator media to be new and clean when project is accepted.

.3 Install humidistat in accessible location.

.4 Water service overflow drain: as indicated and to manufacturers' recommendation.

.5 Install access doors or panels in adjacent ducting.

.6 When installing in ducting, provide waterproof duct up and downstream in accordance with Section 23 31 13.01: Metal Ducts – Low Pressure to 500 Pa.

.7 Install capped drain connection at low point in duct.

3.3 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Have manufacturer's representative of products, supplied under this Section, review work involved in the handling, installation/application, protection and cleaning, of its products and submit written reports, in acceptable format, to verify compliance of work with Contract.

.2 Manufacturer's Field Services: provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review work, at stages listed:

.1 After delivery and storage of products, and when preparatory work, or other work, on which the work of this Section depends, is complete but before installation begins.

.2 Twice during progress of work at 25% and 60% complete.

.3 Upon completion of the work, after cleaning is carried out.

.4 Obtain reports, within three (3) working days of review, and submit, immediately, to Owner's Representative.

.2 Performance Verification (PV):

.1 General: in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: General Requirements, supplemented as specified.

.2 Timing:

.1 After TAB of ducted air systems.

.2 At same time as PV of related air handling units.

.3 Start-up:

.1 General: in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: General Requirements, supplemented as specified.

.2 Verify:

.1 Steam lines are sloped to ensure steam condensate is drained away from the humidifier.

.2 Vapour lines and manifolds are sloped to ensure condensate is drained away from the duct system.

.3 Visually check distribution manifold to ensure:

.1 Even distribution of vapour.

.2 Freedom from water deposits.

.4 Commissioning Reports:

.1 General: in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: reports, supplemented as specified. Include:

.1 PV results on approved PV Report Forms.

.2 Product Information Report Forms.

3.4 DEMONSTRATION

.1 Training: in accordance with Section 01 91 13- General Commissioning (Cx) Requirements: Training of O&M Personnel.

3.5 CLEANING

.1 Perform cleaning operations as specified in Section 01 74 11 – Cleaning and in accordance with manufacturer's recommendations.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION