Resistive vs. Electrode Selection Guide

DRI-STEEM
The humidification experts

Selecting a resistive or electrode humidifier

There are many factors to consider when selecting a humidifier technology. This selection guide explains the differences between resistive and electrode humidifiers. DRI-STEEM can provide additional help selecting a technology for your specific application. See the contact information on the next page.

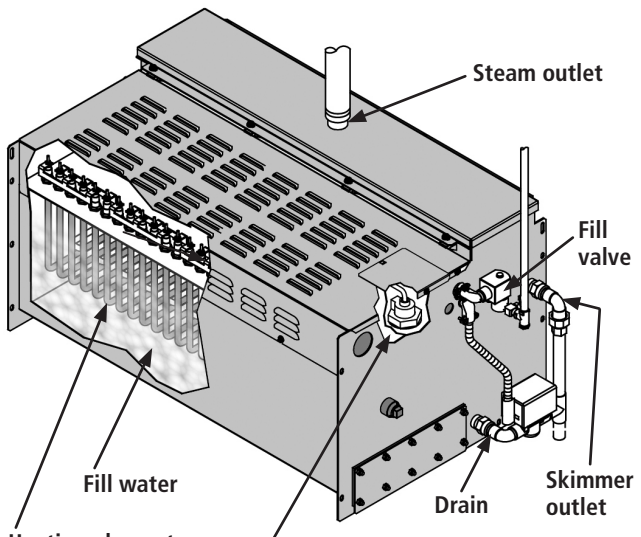
Three important factors are explained below. See the next page for comprehensive comparison information.

- ***Installed cost:*** Installed cost is purchase cost and installation cost combined. Electrode humidifiers cost less to purchase than resistive heating element humidifiers, while installation costs for both humidifier types are comparable.
- ***Maintenance cost:*** Consider both time and money when comparing maintenance costs.
  - Resistive humidifier maintenance depends a great deal on the make-up water: Reverse-osmosis or deionized (RO/DI) water could allow for continual operation with no cleaning. Hard water causes mineral accumulation in the tank; the harder the water, the more accumulation and the more cleaning. Softened water significantly reduces mineral accumulation in the tank.
  - Electrode humidifier maintenance involves replacing the disposable steam cylinder, with frequency depending on the water quality. Minimal maintenance time is needed to replace a cylinder.
- ***Performance requirements:*** Resistive humidifiers are likely the most appropriate choice for high demand and consistent output and accuracy supporting process-critical applications. On the other hand, electrode humidifiers could be the most cost-effective option for comfort humidification and other applications where highly accurate or consistent output are not required.

The main differences between resistive and electrode humidifiers are how they heat fill water and how they control water levels, as illustrated below.

Resistive heating element humidifier

Heat caused by electrical resistance in submerged heating elements boils fill water into steam. Water level is controlled by means of conductivity probes or a float valve, depending on water type.

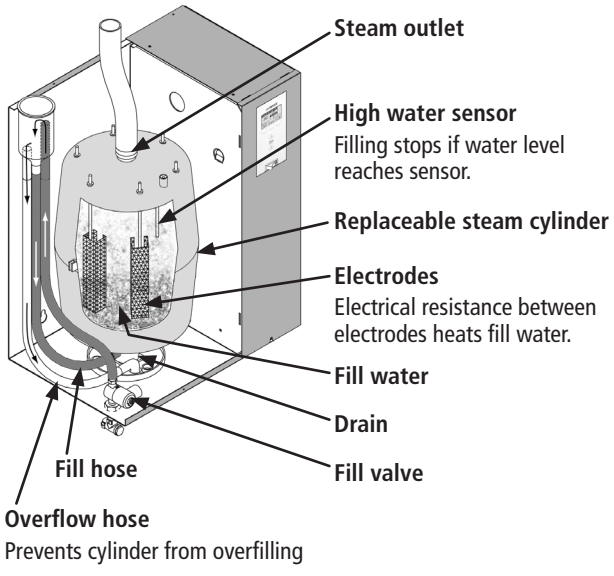


VLC-OM-002

[Click here](#) for details about resistive heating element technology.

Electrode humidifier

Heat caused by electrical resistance in conductive fill water between submerged electrodes boils fill water into steam. Auto tuned drain/fill cycles keep electrical current within demand parameters, based on water conditions and steam production.



OM-7661X

[Click here](#) for details about electrode technology.

Resistive and electrode humidifier comparison			
	Water types	**Resistive**	**Electrode**
Installed cost	—	Higher	Lower
Maintenance cost	Tap	Lower (clean tank 1x /year or more)	Higher (replace disposable cylinder 1x /year or more)
	Softened	Lower (clean tank less frequently than 1x /year)	Higher (replace disposable cylinder 1x /year or less)
	RO/DI	Minimal with properly maintained RO/DI system (clean tank rarely, if ever)	not applicable
Control capability **Note:** Several factors (i.e., air changes per hour, temperature variations, sensor placement, etc.) may affect the humidifier's ability to control space/duct RH to set point.	Tap / softened	± 3 to 5%	± 5% (varies with frequency of drain/fill cycles)
	RO/DI	± 1 to 3%	not applicable
Interruptibility on a scale of 1 to 5 * 1 = no interruptions 5 = more interruptions	Tap	3	4 (frequent drain/fill cycles)
	Softened	2	5 (frequent drain/fill cycles)
	RO/DI	1	not applicable
Drain/fill cycles on a scale of 1 to 5 * 1 = no drain/fill cycles 5 = more drain/fill cycles **Note:** Frequency of drain/fill cycles depends on tank size, humidifier capacity, and water hardness.	Tap	3	4
	Softened	2	5
	RO/DI	1	not applicable
Water usage on a scale of 1 to 5 * 1 = uses the least water 5 = uses the most water	Tap	3	4
	Softened	2	5
	RO/DI	1	not applicable
Water types	Tap	Yes	Yes, with conductivity from 125 to 1250 µS/cm (roughly comparable to water hardness of 3 to 36 grains per gallon)
	Softened	Yes	
	RO/DI	Yes	No
Advantages	—	Precise control, installation flexibility, outdoor installation, all dispersion options, all water types (tap, softened, RO, and DI), able to tolerate higher back pressures caused by longer steam runs	Low installed cost, easy to install, easy to maintain, compact
Typical application examples	—	Pharmaceutical, mission-critical manufacturing, critical care applications, etc.	Residential and other comfort applications where highly accurate, consistent output is not required
* Provided as a basis for comparison, scales are not linear.			

For more information, see the product catalogs on the **Literature** tab of our website.

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