



Water Treatment Guide



Table of Contents



1. Introduction
2. Why Water Treatment?
3. Water Quality
4. Water Hygiene
5. Condair RO Systems
6. Water and Humidification
7. Sizing Reference Chart
8. Additional Resources

Introduction

Even if it appears clear and pure and is perfectly suitable for use as drinking water, untreated water may still be unsuitable for use with your Condair humidification system. This guide will help support your water treatment for humidification needs.

We at Condair are passionate about humidification and are constantly looking toward new and innovative technologies to help our customers achieve total success.

A major part of this success is the emphasis we put on hygiene and water quality. By positioning ourselves as 'water experts', our customers have peace of mind with access to the industry's best technology and technicians, ensuring absolute system hygiene and reliability.

Why Water Treatment?

Your water may be safe for drinking, but without water treatment may lead to scaling or bacteria build-up in your humidification systems as well as dusting within applications.



When paired with humidification systems, water treatment is used for:

	Scale Management	Hygiene
Isothermal	• Preventing scaling within the boiling system • Reducing maintenance frequency and costs • Improving operation efficiency, reduced energy costs	• Isothermal systems that boil water provide clean atmospheric steam without the requirement for water treatment
Adiabatic	• Preventing scaling and corrosion of media, nozzles and other components • Preventing application dusting due to carryover of particles and contaminants • Reducing maintenance frequency and costs	• Eliminating bacteria content in the water which can be carried over into the air during humidification.

Water Quality



Component	What is it?	Difficulties Caused
Hardness	Ca and Mg scales, CaCO3	Scale
pH	Hydrogen ion concentration	Corrosion
Chloride	Cl-	Adds to scale, Corrosion
Silica	SiO2	Hard Scale
Conductivity	Dissolved solids	Affects performance of electrodes, nozzles
Total Disolved Solids (TDS)	Minerals and Organics	Foaming
Silt Density Index (SDI)	Scaling potential of suspended solids in water	Scale
Carbon Dioxide	CO2	Corrosion
Oxygen	O2	Corrosion

Filtration Spectrum

Silt

Silt Filters (3μ, 5μ, etc.)

Chlorine

Carbon Filter

Hardness

Softener

Minerals

Reverse Osmosis

Ions

De-Ionization





Water Hygiene

Every Condair adiabatic humidification system is equipped with features and functions that ensure absolute system hygiene and sanitation. Working in three steps, pre-treatment, treatment, and hygiene and sanitation, our systems can be customized to the needs of any application.



Our Three Steps to Success

1

Pre-Treatment

During pre-treatment water goes through a dechlorination and softening process. An activated carbon filter eliminates chlorine in the water, and is then treated with a duplex softening system.

2

Treatment

During the treatment cycles, water is treated through reverse osmosis and deionization filters. Reverse osmosis membranes remove up to 95% of all minerals from the water. If further deionization is required, an additional filter can be added to remove remaining minerals, resulting in ultra-pure water.

3

Absolute Hygiene

Condair products include features and functions that focus solely on the sanitation of your system and the hygiene of your water, from automatic dosing of disinfectant, UV lighting, silver ion dosing, to automatic flush cycles.

Condair Hygiene Services



Bactiquant (BQ) Testing

BQ testing, done by a Condair trained technician, is a robust testing method to determine the total bacterial load in a water sample. Results are fast, reducing any down-time.

Condair RO Systems



Condair RO-H

Compact and Economic RO System

The Condair RO-H pure water system removes over 95% of all salts and minerals contained in tap water. Models available: RO-HB and RO-HM.

Technical Data

Permeate Output 59°F (15°C)	158 (26)	gpd (lph)
Humidification capacity (max.)	40	lb/hr
Storage Tank	2.5, 3.8, 6 (8,12,18)	gal (l)
Power	120V/1/60	75W
Size		
Height	18.7 (471)	in
Width	15.2 (386)	(mm)
Depth	9.8 (250)	
Standard Accessories	carbon filter, 5µ filter, tank	
Recommended Pre-treatment	None	



Condair RO-E(+)

Compact and Integrated RO System

The Condair RO-E & RO-E+ pure water systems can pair seamlessly with the Condair RS resistive steam and Condair DL hybrid humidifier through the integrated controller or have it's own controller for standalone operation.

Technical Data

Permeate Output 59°F (15°C)	621 - 3254 (98 - 513)	gpd (lph)
Humidification capacity (max.)	1130	lb/hr
Storage Tank	6.6-119 (25-450)	gal (l)
Power	120/230/1/60	600W
Size		
Height	31.3 (795)	in
Width	23.1 (587)	(mm)
Depth	19.1 (487)	
Standard Accessories	5µ filter, tank, cover, pump pressure gauge	
Recommended Pre-treatment	carbon filter, softener	



Condair MLRO

Industrial RO system

The Condair MLRO standalone pure water system is ideal for large isothermal or any adiabatic applications. This system provides RO water from pre-treated water to achieve optimal water quality.

Technical Data

Permeate Output 59°F (15°C)	1744-24726 (275-3900)	gpd (lph)
Humidification capacity (max.)	8600	lb/hr
Storage Tank	13-264 (50-1000)	gal (l)
Power	208-480V/3/60	
Size		
Height	63 (1600)	in
Width	28 (711)	(mm)
Depth	34-55 (864-1397)	
Standard Accessories	5µ filter, tank, uv light	
Recommended Pre-treatment	carbon filter, softener	

Water and Humidification



Each Condair Humidification system has it's own specific requirements for inlet water quality.
Below is a summary for common products:

Technology									
	EL Series	RS Series	GS Series	SE Series	ME/MC Series	ML/HP Series	DL Series	JS Series	PH1000 PRO
Products									
Water Compatibility	Potable	Potable RO DI	Potable RO DI	Potable RO DI	Potable RO	RO	RO DI	Potable RO	Potable RO
Why Water Treatment?	Cylinder Lifecycle	Maintenance Operation Efficiency	Maintenance Operation Efficiency	Maintenance Operation Efficiency	Hygiene Operation Efficiency Media Lifecycle	Hygiene Nozzle Performance Dusting Reduction	Hygiene Nozzle Performance Maintenance	Hygiene Nozzle Performance Dusting Reduction	Hygiene Media Life Cycle
Compatible RO Systems?	N/A*	RO-H RO-E MLRO +DI	RO-E MLRO +DI	RO-E MLRO +DI	RO-E MLRO	RO-E+ HPRO MLRO	RO-E+ MLRODL +DI	RO-E+	RO-H RO-E+

**Contact factory if water quality is outside of range.*

Water and Humidification



Water quality requirement quick guide* for key products:

*Refer to product IOM for full water installation and water quality requirements.



Product	EL Series		RS Series	GS Series		SE Series	
Water Type	Potable		Potable/DI/RO	Potable	RO/DI	Potable	RO/DI
Temperature	34-104°F (1-40°C)		34-77°F (1-25°C)	34-77°F (1-25°C)		34-77°F (1-25°C)	
Conductivity	150-1200 µS/cm		1-1500 µS/cm	1-1500 µS/cm	1-100 µS/cm	1-1500 µS/cm	1-100 µS/cm
pH	7 - 7.5		6.5-7.5	6.5-8.5	7-7.5	6.5 - 7.5	7 - 7.5
Hardness	0-3 gpg	0-12 gpg	0-12 gpg	0-20 gpg	0-1 gpg	0 - 12 gpg	0 - 1 gpg
Silica (SiO ₂)	4-14 mg/l	0-4 mg/l	0-12 mg/l	0-14 mg/l	0-1 mg/l	0 - 14 mg/l	0 -1 mg/l
Chloride			0-50 mg/l	0 - 40 mg/l	0 - 40 mg/l	0 - 25 mg/l	0 - 25 mg/l



	ME/MC Series	DL Series	HP Series - HP	HP Series - HP RO	JS Series	PH1000 Pro
Water Type	Potable/RO	RO-DI	RO/DI	Potable	Potable/RO/DI	Potable/RO
Temperature	< 68°F (20°C)	< 68°F (20°C)	< 59°F (15°C)		< 59°F (15°C)	< 59°F (15°C)
Conductivity	< 650 µS/cm	0.5 - 15 µS/cm	5 - 50 µS/cm	250 - 1000 µS/cm	250 - 1000 µS/cm	250 - 1000 µS/cm
pH	6.5 - 9.5	6.0 - 8.0	6.0 - 8.0	6.0 - 8.0	6.0 - 8.0	6.0 - 8.0
Hardness	< 14 gpg	< 1 gpg	< 1 gpg	< 20 gpg*	< 12 gpg	< 14 gpg
Silica (SiO ₂)	< 5 mg/l	< 1 mg/l	< 5 mg/l	< 1 mg/l	< 12 mg/l	< 5 mg/l
Chloride	< 300 mg/l	< 5 mg/l	< 20 mg/l	< 200 mg/l	< 5 mg/l	< 300 mg/l
Ammonium (NH ₄ ⁺)	< 0.50 mg/l	< 0.50 mg/l	< 0.50 mg/l	< 0.50 mg/l	< 0.50 mg/l	< 0.50 mg/l
Calcium (Ca)	< 300 mg/l	< 7 mg/l	<10 mg/l	< 150 mg/l	< 7 mg/l	< 300 mg/l
Copper (Cu)	< 1 mg/l	< 1 mg/l	< 1 mg/l	< 1 mg/l	< 1 mg/l	< 1 mg/l
Free Chlorine (Cl ⁻)	< 1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l	< 0.1 mg/l
Iron (Fe)	< 0.5 mg/l	< 0.2 mg/l	< 0.2 mg/l	< 0.2 mg/l	< 0.2 mg/l	< 0.2 mg/l
Manganese (Mn)	< 0.1 mg/l	< 0.1 mg/l	< 0.05 mg/l	< 0.05 mg/l	< 0.05 mg/l	< 0.1 mg/l
Potassium Permanganate (KMnO ₄)	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l	< 10 mg/l
Silt Index	< 5.0	< 3.0	< 5.0	< 3.0	< 3.0	< 5.0
Sulphates	< 250 mg/l	< 9 mg/l	< 30 mg/l	< 200 mg/l	< 9 mg/l	< 9 mg/l
Total Dissolved Solids (TDS)	< 400 mg/l	< 9 mg/L	< 35 mg/l	< 625 mg/l	< 9 mg/L	< 400 mg/L
Turbidity	< 5 NTU	< 1 NTU	< 1 NTU	< 1 NTU	< 2 NTU	< 1 NTU
Colony Forming Units (CFU)	< 1000 CFU/ml	< 100 CFU/ml	< 200 CFU/ml	< 200 CFU/ml	< 100 CFU/ml	< 100 CFU/ml

Quick Reference Sizing Chart

Isothermal Humidifier RO-E Sizing Chart



Technology	Unit Size	Supply Water at 5°C (41°F)	Supply Water at 15°C (59°F)
GS	50	RO-E 40 & up	RO-E 40 & up
GS	100	RO-E 100 & up	RO-E 40 & up
GS	150	RO-E 200 & up	RO-E 100 & up
GS	200	RO-E 200 & up	RO-E 200 & up
GS	300	RO-E 300 & up	RO-E 200 & up
GS	450	MLRO 500 & up	RO-E 300 & up
GS	600	MLRO 500 & up	RO-E 300 & up
SETC	50	RO-E 40 & up	RO-E 40 & up
SETC	100	RO-E 100 & up	RO-E 40 & up
SETC	175	RO-E 200 & up	RO-E 100 & up
SETC	250	RO-E 300 & up	RO-E 200 & up
SETC	375	MLRO 500 & up	RO-E 200 & up
SETC	525	MLRO 500 & up	RO-E 300 & up
SETC	750	MLRO 800 & up	MLRO 800 & up
SETC	1050	MLRO 1000 & up	MLRO 800 & up

Technology	Unit Size	Supply Water at 5°C (41°F)	Supply Water at 15°C (59°F)
RS	10	RO-H & up	RO-H & up
RS	15	RO-H & up	RO-H & up
RS	20	RO-H & up	RO-H & up
RS	30	RO-E 40 & up	RO-E 40 & up
RS	45	RO-E 40 & up	RO-E 40 & up
RS	65	RO-E 40 & up	RO-E 40 & up
RS 208, 220-240V	90	RO-E 100 & up	RO-E 40 & up
RS	130	RO-E 100 & up	RO-E 40 & up
RS	180	RO-E 200 & up	RO-E 100 & up

Quick Reference Sizing Chart

Adiabatic Humidifier RO-E+ Sizing Chart



Technology	Unit Size	Supply Water at 5°C (41°F)	Supply Water at 15°C (59°F)
DL	0 - 60 lbs/hr	RO-E+ 40	RO-E+ 40
DL	60 - 115 lbs/hr	RO-E+ 100	RO-E+ 40
DL	115 - 210 lbs/hr	RO-E+ 200	RO-E+ 100
DL	210 - 290 lbs/hr	RO-E+ 300	RO-E+ 200
DL	290 - 370 lbs/hr	MLRODL	RO-E+ 200
DL	370 - 529 lbs/hr	MLRODL	RO-E+ 300
DL	290 - 2200 lbs/hr	MLRODL	MLRODL
HP/MLP	100 - 800	HPRO/MLPRO	HPRO/MLPRO
HP/MLP	1000 - 3000	MLRO 1000 & up	MLRO 1000 & up
JetSpray	Any Size	RO-E+ 40	RO-E+ 40
ME	Any Size	Sizing Available, Contact Condair Application Engineering for Support	
PH1000	Manual / Auto Fill	RO-H	RO-H

Resources

Hygiene plays an important role in humidification. Current rules and regulations such as VDI 6022 give useful information about design, planning, manufacturing and system operation. On the one hand, humidification is indispensable in regards to indoor air quality in buildings and, on the other, fundamental microbiological relationships come into play. These resources should illuminate the requirements for hygienic humidification equipment and illustrate important planning criteria.



WHITE PAPER - ASHRAE 188-2021 Legionellosis: Risk Management for Building Water Systems

The ASHRAE standard, ASHRAE 188-2021 was created with the intention to prevent the risk for Legionellosis, from water systems in any building, new or existing.



Hygiene Criteria | Planning Guidelines for Humidification

Proper planning guidelines for humidification is a five hygiene criteria method to promote a flawless hygienic humidification system. This guide is the quintessential hygiene mitigation guide for new and old humidifier projects.



WHITE PAPER - Water Hygiene for Adiabatic Humidifiers

When dealing with Adiabatic, or Evaporative, humidifiers extra precaution must be used to mitigate biological growth in the water, and limit the spread of bacteria in the air. This document outlines proper guidance, instructions, considerations, commissioning, and preventative maintenance do's and don'ts for cold water systems.



Scan to download these great resources.



USA 1021 6th Street, Racine, WI 53403

Canada 2740 Fenton Rd, Ottawa, Ontario K1T 3T7

Tel 1.866.667.8321 Email na.info@condair.com Website condair.com

