

Key Terms for Water Circularity

TERM	ABBREVIATION	DEFINITION
Aeration or Agitation		A process used to increase dissolved oxygen levels in the irrigation water in hydroponics.
Alkalinity		A measure of the dissolved carbonates and bicarbonates.
Anaerobic		The lack of oxygen.
Biofilms		Floating bacteria attach to a surface and begin to exude sugars, nucleic acids, and proteins to hold it in place. This matrix protects the bacteria and becomes a host to other microorganisms, including fungi, algae, yeasts, protozoa, and debris. The bacteria grows and releases more floating cells that start the cycle all over again downstream.
Biological remediation or bioremediation		An engineered technology that combines natural physical, biological, and chemical processes to remove contaminants from the environment.
Bleed-off		Water used to prevent the build-up of minerals on evaporative cooling pads.
Blowdown Water		Water used to prevent the build-up of minerals from equipment like cooling towers and boilers.
Brine Solution		Concentrated nutrients and contaminants created by membrane filtration.
Buffering Capacity		A measure of the ability of a solution to resist a change in pH when, for example, acidic fertilizer or other chemistry dissolved in fertigation formulations is added.
Cascade Cropping Systems		The practice of reusing water from waste streams in your facility for irrigation of other crops rather than draining the water to waste.
Colony Forming Units	CFUs	A measure of the number of microorganisms present in water.
Constructed Wetland		An excavated basin(s) filled with substrate (inorganic and organic media), often planted with wetland vegetation, and including microorganisms. Designed to treat wastewater through a number of physical, biological, and chemical treatment pathways.
Contact Water		Water that has come in contact with compost in some way.
Container Capacity		The maximum volume of water the root medium can retain against gravity.
Daily Light Inegral	DLI	Total accumulation of light across a crop canopy from all light sources over a single day's photoperiod.

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Day Tank		A container that holds the volume of one day's worth of water.
Deionization		The process of removing positively and negatively charged ions from water to result in water with a high purity.
Demineralization or Water Softening		A process that removes the calcium, magnesium, and iron that are present in hard water by exchanging them with other positively charged ions via a cation exchange resin bed.
Dissolved Oxygen	DO	A measure of the amount of oxygen present in water.
Drip Irrigation		An irrigation system that consists of tubing and drip emitters that apply water directly to the root zone of crops.
Electrical Conductivity	EC	A measure of total dissolved salt ions.
Evaporative Pad and Exhaust Fan System		A cooling system for greenhouses that consists of exhaust fans and a pad (a cross-fluted cellulose pad is most common) which water is passed through. When the warm air is pulled through the pad by the exhaust fans, it is cooled through evaporation.
Evaporators		A process that uses heat to vaporize wastewater and reduces large volumes of liquid waste to small volumes of solid waste.
Evapotranspiration	ET	The sum of water lost through transpiration through the leaf pores and water lost by evaporation from the root substrate.
Floating Treatment Wetlands		Floating rafts planted with wetland vegetation.
Foaming Equipment		Spraying equipment used to apply disinfectants.
Gravimetrics		The practice of determining the irrigation needs of a plant by the weight of the container it is in.
Gray Water		Wastewater that contains surfactants. Soaps, detergents, sanitizers, etc.
Green Infrastructure		An approach to water management that incorporates natural and engineered systems to protect, restore, or mimic the natural water cycle. Most commonly used in reference to stormwater management.
Heat Pasteurization		The act of heating water to a high temperature to kill off harmful organisms like pathogens or parasites.
HVAC condensate		Water that forms on the chilled coils of air conditioners or dehumidifiers.
Hybrid Treatment System	HTS	A system consisting of multiple cells filled with selected media where water flows vertically through each cell. At least one cell in hybrid treatment systems is reserved to be filled with a carbon source media (Commonly woodchips) to act as a denitrification bioreactor.

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Hypoxia		The lack of sufficient oxygen.
In-Line Flow Meters		A meter located in the irrigation line used to monitor water usage.
Irrigation Pause		The practice of programming irrigation events in two halves with a pause between them lasting a few minutes to improve absorption and lateral movement of the solution.
Leach Fraction		The fraction of leachate to the total amount of water or nutrient solution applied.
Microbial Community		An assemblage of microorganisms (e.g., Bacteria, algae, fungi) occurring together in a space.
Microfiltration	MF	A pressurized membrane purification system.
Microorganisms or Microbes		Microscopic organisms. Examples include bacteria, fungi, and algae.
Nanofiltration	NF	A pressurized membrane purification system.
National Pollution Discharge Elimination System (NPDES)	NPDES	A national EPA program that regulates point sources of pollution by requiring a federal permit for facilities that drain their wastewater into surface water.
Oxidation-Reduction Potential Meter	ORP	A meter used to measure the electrical potential of a redox reaction in a solution.
Particulate Filtration		A filter used in irrigation systems to remove particles such as sand, silt, and algae, as some examples.
pH		A measure of the concentration of free hydrogen and hydroxyl ions. It is a measure of the acidity or basicity of water or substrate.
Phytotoxicity		Adverse effects on plants that can be caused by exposure to substances that are harmful to the plant.
Reject Water		A concentrated brine that accumulates and fouls the membrane unless it is routinely rinsed away.
Reverse Osmosis	RO	A pressurized membrane purification system.
Schmutzdecke		(German for “dirty skin” or “dirt layer”). It is a layer of bacteria, algae, fungi, protozoa, and many more organisms that build up over time and can provide pathogen removal.
Sedimentation		The removal of solids suspended in water by settling.

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Slow Sand Filters	SSF	A container filled with filter media (sand) in which water flows vertically downward through the sand and is treated through physical, biological, and chemical treatment pathways.
Sorption		Includes adsorption, the adhering of a nutrient to a solid, and absorption, the diffusion of a nutrient into another liquid or solid.
Source Water		Where the water is pulled from for use. E.g., surface waters, groundwater, and well water.
Spray Booms		An irrigation system that is suspended over the canopy area and delivers water through multiple spray nozzles to plants as it moves along a track.
Subsurface-flow Constructed Wetland		A constructed wetland where the water flows below the surface of the media. Depending on the system, water can flow horizontally or vertically through the media.
Surface-flow Constructed Wetland		A constructed wetland where the water flows horizontally and is maintained above the media surface.
Tempering		The act of mixing hot and cold water sources to result in an optimal temperature.
Total Dissolved Solids	TDS	The total amount of dissolved particles in water, less than two microns in size.
Total Suspended Solids	TSS	The total amount of undissolved particles in water, greater than two microns in size.
Transpiration		The loss of water through plant pores.
Ultra-low Volume Sprayer or Cold fogger		Spraying equipment used to apply pesticides.
Ultrafiltration	UF	A pressurized membrane purification system.
Ultrasonic Flow Meters		A meter located on the outside of the irrigation line used to monitor water usage.
Vapor Pressure Deficit	VPD	The difference between the vapor pressure measured at the surface of the leaf and the vapor pressure of the air measured in your grow space. Also referred to as Vapor Pressure Differential.
Variable Frequency Drive	VFD	A technology that can save energy use of a motor by controlling (increasing or decreasing) its speed in response to the requirements of the system.

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Variable Speed Irrigation Pumps		An irrigation pump that utilizes a variable frequency drive to control the speed of the motor controlling the pump in response to the requirements of the system.
Vegetative Bioaccumulation		The uptake of pollutants into the biomass of wetland vegetation.
Volumetric Water Content	VWC	A measurement of the ratio of the water volume to the substrate volume.
Washdown Water		Water used to disinfect and or sanitize equipment.
Water Hardness		A measure of the sum of dissolved calcium and magnesium.
Water Scarcity		The lack of available freshwater to meet demands.
<u>Woodchip Bioreactor</u>		A tank or lined basin filled with woodchips where the water flows vertically down through the system. The woodchips act as a carbon source to promote microbial growth for the removal of pollutants.