

A PRACTICAL GUIDE TO KUUL CONTROL COMFORT™ EVAPORATIVE COOLING MEDIA MAINTENANCE AND SERVICE

KUUL CONTROL COMFORT™
EVAPORATIVE COOLING MEDIA

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This maintenance guide is intended to provide Kuul Control Comfort™ evaporative media users with practical steps for proper product maintenance. Proper maintenance will ensure maximum efficiency and extended media lifespan.

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1 INTRODUCTION TO EVAPORATIVE COOLING

1.1 The evaporative cooling process

When water evaporates into the air, the heat required to change water from a liquid to a gas is extracted from the air. The absorption of energy in the form of heat coincides with the natural law where energy cannot be created or destroyed. The natural process of evaporation removes heat from the air, which results in cooler and more humid air.

The unique design of Kuul Control Comfort™ evaporative media, combined with superior materials, allows water evaporation to be maximized in the smallest space and shortest time.

Ideally, the air to be cooled is pulled evenly through the evaporative media.

Water should be pumped to the top of the evaporative media and distributed evenly across the top of the evaporative media. With the assistance of gravity, the water is pulled downward and flows through the media. The evaporative media will absorb the water and, in turn, facilitate water molecule evaporation into the air.

More water than is required for evaporation (cooling) is pumped to the top of the media for even distribution. This extra water is used for cleaning the media and will return to the reservoir to be recirculated.

1.2 High efficiency and low pressure drop

Kuul evaporative media utilizes unique design to ensure low air-pressure drop when air is pulled through the media. This has substantial benefits in reduced fan energy consumption.

In addition to the low pressure drop, higher performance from a smaller system is possible with Kuul evaporative media. The high evaporation efficiency allows engineers and system designers to reduce the size of the evaporative system used.

Good maintenance is required to keep both of these important attributes performing as they should.

While Kuul evaporative media has proven to be extremely tough and resilient over decades of use, good maintenance is key for a long lifespan.

Poor water quality, chemicals in the water and lack of cleaning may damage the media's performance.



2 GOOD INSTALLATION PRACTICES – FACTORS INFLUENCING A LONG, USABLE LIFESPAN

1.2 Preventing algae growth on evaporative media

Using the following tips will assist in keeping your evaporative media free from algae:

- Always keep the correct amount of rinsing/washing water flowing over the evaporative media.
- Watch for and avoid dry streaks. Every dry streak allows hot air through the evaporative media and into the stream of cool air. Not only do dry-streaks reduce performance, they also mean there is no water available for washing in those areas. This results in scale formation and dirt and residue deposits. These areas form the base at which algae and scale build-up can occur.
- Always keep evaporative media clean. Practice the recommended monthly maintenance detailed hereafter.
- Allow your evaporative media to dry completely once every 24 hours. Portacool, LLC recommends turning the pump off approximately 15 minutes before shutting the fan down each day to allow the media to dry all the way through.
- Keep your evaporative cooler in the shade, if possible, without inhibiting airflow. Sunshine is a necessary component for algae photosynthesis. Shading your evaporative media will discourage algae growth.
- Flush and clean the evaporative cooler reservoir regularly. It is vital to ensure monthly maintenance activities are carried out. This preventative maintenance regimen ensures the well-being of your evaporative media and promotes longevity.

3 TREATMENT OF OLD EVAPORATIVE MEDIA – CLEANING AND MAINTENANCE

The following methods may be employed to remove organic growth and calcium salt deposits to rejuvenate older evaporative media.

3.1 Algae treatment

To remove severe old algae build-up:

- Ensure the fan is switched off and there is no air being pulled through the evaporative media.
- With the reservoir full with clean water, switch off the supply water.
- Select the proper shock-dose for your reservoir using the chart below.

Evaporative cooler	Size of reservoir (gallons)	Household bleach
Cyclone 110	8	1/2 Tablespoon
Cyclone 120	10	1/2 Tablespoon
Cyclone 130	16	1 Tablespoon
Cyclone 140	40	2 ½ Tablespoon
Cyclone 160	40	2 ½ Tablespoon
Jetstream 220	20	1 1/4 Tablespoons
Jetstream 230	30	1 oz
Jetstream 240	50	1.5 oz
Jetstream 250	55	1.5 oz
Jetstream 260	60	1.75 oz
Jetstream 270	65	2 oz
Hurricane 360	70	2 oz
Hurricane 370	75	2.25 oz

Note: Reservoir water must be between 6.5 and 7.5 pH for the chemistry to work properly.

- Pour the selected quantity of household bleach (Sodium Hypochlorite - NaClO) into the system sump/ reservoir taking care not to spill it on yourself or clothing. Refer to the SDS of the household bleach.
- Do not overdose the system. Use only the recommended dosage.
- Turn on the water pump and allow the dosed water to flow over the evaporative media for a period of six hours. Ensure the fans remain off during this entire process.
- After six hours, switch off the pump. Flush the sump and refill with fresh water.



- Ensure the pump is turned **off** and no water is being distributed across the evaporative media, then, with the evaporative cooler in an open, outdoor environment, turn the fan on to allow the evaporative media to completely dry during a hot day for two to three hours. This will allow the dead algae to lift and curl away from the evaporative media surface. Once the algae has dried, use a soft bristle brush to gently brush the surface of the evaporative media in a downwards direction, allowing the larger algae pieces to be brushed away.
- Wet the evaporative media with a gentle flow of water from a hose and repeat the process of using the brush to brush away the smaller pieces of algae.
- With the media now clean, allow the pump to run with the fan turned off to wash all the bleach from the media. Drain the reservoir and refill with fresh water. Your media should now be ready to use.

3.2 Treatment for scale/calcium deposit

The method of removing scale/calcium deposits can be done as follows:

- Ensure the fan is switched off and there is no air being pulled through the media.
- With the reservoir full with clean water, switch off the supply water.
- Using the information below, select the proper dosage amount to shock-dose your product.

Evaporative cooler	Size of reservoir (gallons)	Household white vinegar
Cyclone 110	8	5.5 oz
Cyclone 120	10	7 oz
Cyclone 130	16	11 oz
Cyclone 140	40	28 oz
Cyclone 160	40	28 oz
Jetstream 220	20	14 oz
Jetstream 230	30	21 oz
Jetstream 240	50	35 oz
Jetstream 250	55	38.5 oz
Jetstream 260	60	42 oz
Jetstream 270	65	45.5 oz
Hurricane 360	70	49 oz
Hurricane 370	75	52.5 oz

Note: Reservoir water must be between 6.5 and 7.5 pH for the chemistry to work properly.

- Pour the selected quantity of household white vinegar (Acetic Acid - CH_3COOH) into the reservoir taking care not to spill it on yourself or clothing.
- Do not overdose the system. Use only the recommended dosage.



- Turn on the water pump and allow the dosed water to flow over the evaporative media for a period of six hours. Ensure the fans remain off during this process.
- After six hours, with the pump still on use a soft bristle brush to gently brush the surface of the evaporative media in a downwards direction, allowing the calcium scale crystals to dissolve with the flow of the water and the use of the soft brush. Continue brushing until all scale has been removed.
- With the evaporative media now clean, flush out the reservoir thoroughly and refill with fresh water. Your evaporative cooler is now ready to use again.
- To prevent future scale build-up, Portacool Hard Water Treatment may be used to treat the reservoir water. Simply drop a single treatment stick in the reservoir. Each treatment stick lasts approximately 30 days.

4 AGGRESSIVE AND TOXIC CLEANING AGENTS

Many chemicals available in the market to clean evaporative media is harmful to the evaporative media, as well as the environment.

Cleaning your Kuul Control Comfort™ evaporative media with a chemical not recommended by Portacool, LLC may seriously harm the longevity of the evaporative media, softening the evaporative media to the point of collapse. This weakening will lead to the evaporative media needing to be replaced.

Additionally, many chemicals on the market are also highly corrosive, which may not only damage the evaporative media but can damage other components in your evaporative cooler.

At Portacool, LLC the preservation of our environment is important. We carefully select cleaning materials that biodegrade and are safe to the environment.



5 RECOMMENDATIONS FOR YOUR KUUL CONTROL COMFORT™ EVAPORATIVE MEDIA SYSTEMS

DO



- Always ensure you have good water distribution over your evaporative media.
- Avoid dry streaks on your evaporative media.
- Allow your evaporative media to dry out completely once every 24 hours.
- Check your water quality and analyze for high pH and scaling properties.
- Maintain your evaporative media regularly and shock-dose with household bleach (Sodium Hypochlorite - NaClO) for algae and/or household white vinegar (Acetic Acid - CH₃COOH) for lime descaling if necessary.
- Drain your reservoir weekly to control salt concentration in order to prevent scaling.
- Use in-line water filters if necessary.
- Shade your evaporative media from the sun if possible.

DON'T



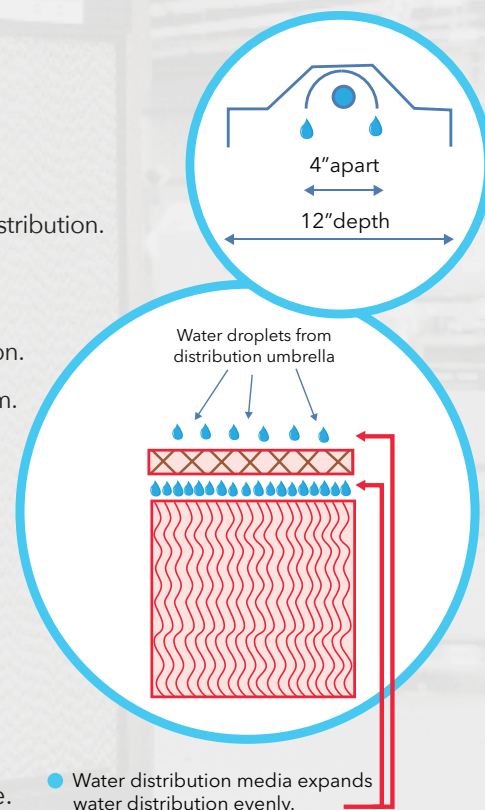
- Don't use chemicals that are harmful to the evaporative media and environment. Only use Portacool, LLC recommendations.
- Don't use frequent on-off water cycles on the evaporative media.
- Don't allow heavy algae growth and scale deposits to form. Conduct preventative measures regularly.
- Don't miss monthly maintenance cycles.

6 WATER DISTRIBUTION BEST PRACTICES

Good water distribution practice Kuul™ Media

The focus of good water distribution is to ensure even water distribution over the top surface area. This avoids overloading part of the media and starving the balance of the area.

1. Divide depth of media equally to position the header in the center. Zone A=B=C.
2. The header or umbrella for 12" deep media section should therefore be 4" deep.
3. Ensure umbrella distributes on each of its edges, front and back, 4" apart.
4. Umbrella pipe must always face upwards to ensure holes do not get blocked.
5. Umbrella pipe holes must not jet water downwards as this forces uneven water distribution.
6. Umbrella pipe holes should be no more than 3" apart, at no less than 1/8" in diameter.
7. Use water distribution media to assist with distribution in the left to right orientation.
8. Ensure the media orientation is correct with the steeper angle facing the air stream.
9. Ensure the pump capacity is correct with the correct head pressure calculation.



The purpose of the water distribution media

1. To evenly distribute the drops from the distribution header umbrella.
2. To slow down heavy flow and distribute water left to right in the media.
3. To ensure no dry streaks occur if a hole is blocked in the header.
4. Even water distribution assists with good media washing and maintenance.

Distribution of water through media



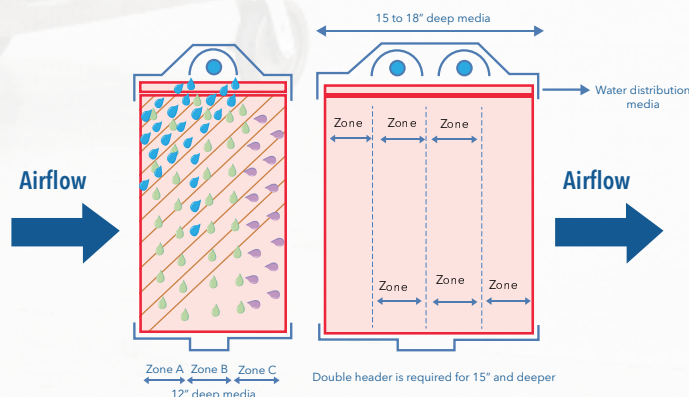
Zone A: Initial water flows down 45 degree to air on edge, for cleaning and counter flow supply.



Zone B: Water down 45 moves downward at flute contact points and then spreads inside media paper, through internal fiber transport.



Zone C: Finally water flows through media in media fiber internally to outside edge, assisted also with air flow.





Kuul® evaporative media is a product of Portacool, LLC and is designed and manufactured in Center, Texas.

Kuul Control Comfort™ evaporative media is designed exclusively to meet the rigorous performance requirements of Portacool portable evaporative coolers. Made in our Center, Texas, United States manufacturing facility, this media features an exclusive mix high quality plant-based fiber materials and a proprietary application of geometrical, intelligent design to create the optimal cooling experience. Kuul Control Comfort™ evaporative media is the driving force behind our superior cooling performance.

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