



Flow Basics  
World Wide Corals



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# About Coral Lab

EcoTech Coral Lab aims to become a clear, practical, and unified resource for reef keeping enthusiasts. Performing research and studying existing hobby and industry success, the goal of Corallab is to share this information with the community to maximize the health and beauty of the home aquarium.

Aquariums are unique and what works for one may not work for all. However, identifying common methodology in successful reef systems is a great starting point for the new hobbyist and a valuable resource for the experienced reef keeper.



*The WWC Inferno Chalice.*

## World Wide Corals

A reefer's visit to Orlando, FL is not complete without a stop at World Wide Corals (WWC). Run by the ever-energetic Victor, Lou, and Ryan, WWC has been providing the hobbyist community with a stunning selection of LPS and SPS corals for over a decade.

In the room behind WWC's well-stocked sales tanks, is an extensive coral system where WWC aquacultures a mind-blowing number of different coral species. The aquaculture runs provide stock for WWC's WYSIWYG online business and for the sales tanks in the showroom.

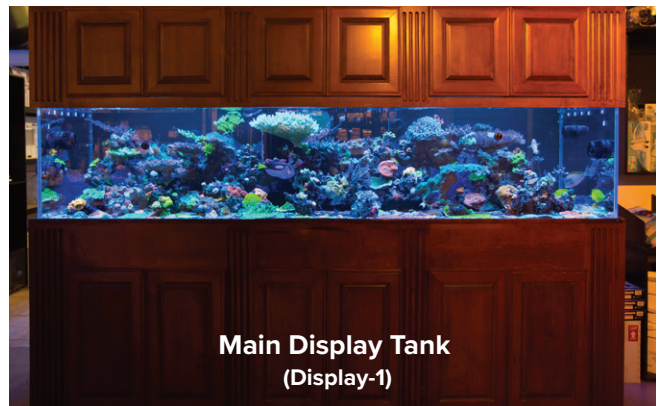
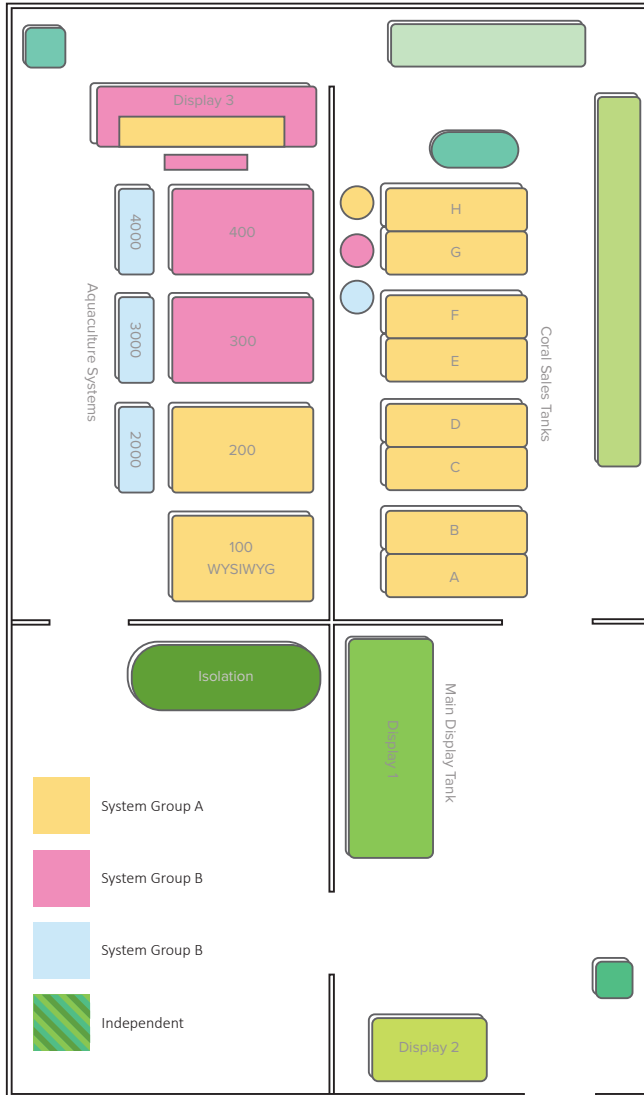
Observing lighting and flow in their display and aquaculture systems provides useful insight into success in the home aquarium.



*WWC aquaculture expert Josh assists in taking coral lab PAR readings.*

# The WWC Facility

Over the years, World Wide Corals has grown. In addition to their original retail space WWC has expanded to include several large aquaculture systems.



WWC tests for water parameters weekly with the following parameter goals.\*

Salinity: 1.025

Temp: 77-78 degrees Fahrenheit

Ca: 450

Alk: 8.6

Mg:1400

Nitrate: 10-20 ppm

Phosphates: .03-.08 ppm

Calcium is added using Calcium Reactors (Geosreef.com)

Carbon is run periodically on all systems. Additional supplemental dosing is done occasionally, however not consistently. A system-wide 5% water change is done weekly with salt water made from RODI.

**Salt Used:** Instant Ocean, buffered with Brightwell Calcion-P and Brightwell Magnesium-P.

**Bioload:** WWC maintains a significant fish population in all systems. They favor beneficial species of fish e.g. Yellow and Bristle Nose tangs for algae eating and one or two wrasses per system for pest control.

**Feeding:** WWC feeds their fish a variety of frozen and dried foods as appropriate for the number and type of fish in their systems.

\*All information in this Coral Lab current as of 4/16/16

# WWC Flow



Victor of WWC sees flow as an incredibly important part of achieving the color and growth crucial to his business: "Flow is the most important attribute of keeping coral healthy after basic water parameters – more important than lighting, more important than dosing."



***"We've always liked the VorTech pumps, they're easy to set up, easy to move and easy to clean, the flow... Amazing!" - Victor***

When taking a tour of WWC, it is easy to see this commitment to flow. Water circulation pumps from a number of manufactures are prominent on their systems. WWC however, is particularly fond of the VorTech line and the majority of their showroom SPS tanks are powered by VorTech MP40 and MP60 pumps. WWC uses both the current QD and the previous ES versions of the pumps.



*Snowdrop Acropora enjoying the flow*

With two or more pumps on each tank, WWC aims to produce a combination of good overall flow with a random element to keep detritus from building up. The majority of their sales tanks are 180 gallons (72"W 24"D, 24"H) and contain various species of SPS corals. These systems are running an MP40 at 100% in Constant mode and an MP60 running Reefcrest random at 60-80%. That, combined with the return system, is generating around 10,000 gph of flow or 50+X tank volume turnover.



*There is no shortage of VorTechs on tanks at WWC*

# WWC Flow (continued)

Using VorTechs makes generating optimal flow within an aquarium easy. Thanks to the capabilities of the VorTech product line there are several ways to accomplish the flow patterns which WWC employs.

It is important to note that WWC employs high water turn-over (30-50x tank volume) on all of their systems, both SPS and LPS.

Turnover = (In Tank Flow + Return Flow) / Tank Volume\*  
\*Not including sump volume.

## WWC Flow With One VorTech

Because SPS coral needs high and varied flow, their preferred choices of single pump operation are Reefcrest Random or Short Pulse Mode.



### Reef Crest Random

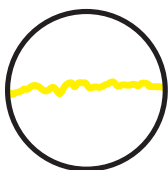
Reef Crest Random Mode simulates a high-energy reef environment. The pump will change speed frequently and drastically to simulate crashing waves and surging tide. This is a favorite of SPS coral.



### Short Pulse

Short Pulse Mode creates a flow pattern consisting of uniform high and low flow levels pulsing at a selected interval between 0.2 seconds and two seconds.

On a LPS system that requires more gentle flow, good choices would be Lagoon Random or Gyre mode.



### Lagoon Random

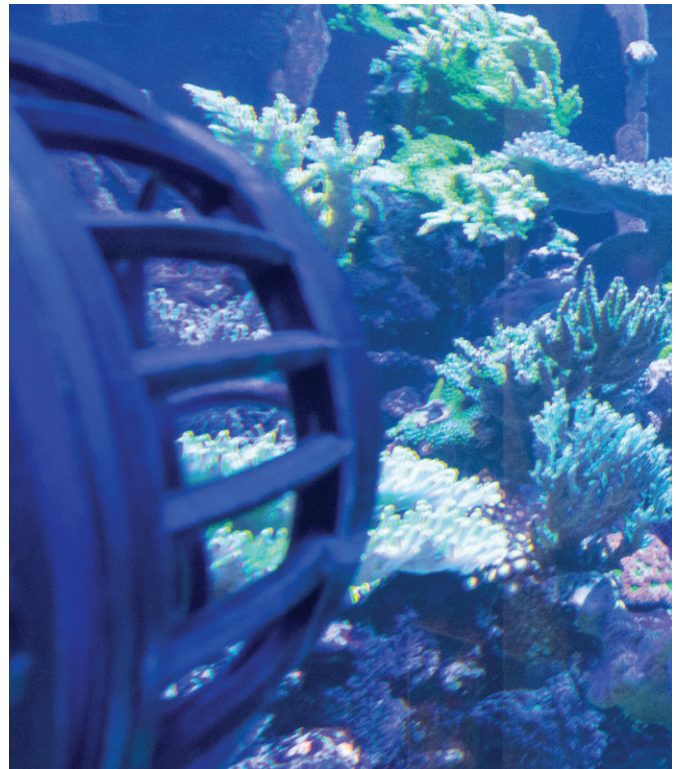
Lagoon Random Mode simulates a low-energy lagoon environment. The speed of the pump is changed slowly to recreate the gentle currents of a lagoon.



### Gyre

Gyre Mode creates a flow pattern consisting of uniform clockwise and counterclockwise flow levels pulsing at a selected interval between two seconds and two hours.

Enabling Night Mode with any other modes will provide for a more calm flow period during the specified "night time". WWC does not utilize Night Mode on their systems.



## WWC Flow With Two VorTechs

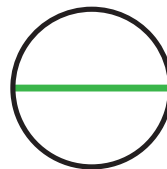
The majority of WWC's 180 gallon sales tanks utilize two VorTechs, an MP40 and MP60.

The MP40 is set in Reefcrest Random mode and the MP60 is set in a reduced Constant mode (60%).



### Reef Crest Random

Reef Crest Random Mode simulates a high-energy reef environment. The pump will change speed frequently and drastically to simulate crashing waves and surging tide. This is a favorite of SPS coral.



### Constant Speed

Constant Speed mode is the default mode of the Vectra, this makes the pump produce flow at a constant speed that is determined by the position of the dial.

If two or more VorTechs are being used together, another way to achieve a mixture of constant and varied flow is to use one of the multi-pump EcoSmart modes, such as Tidal Swell or Nutrient Transport mode.

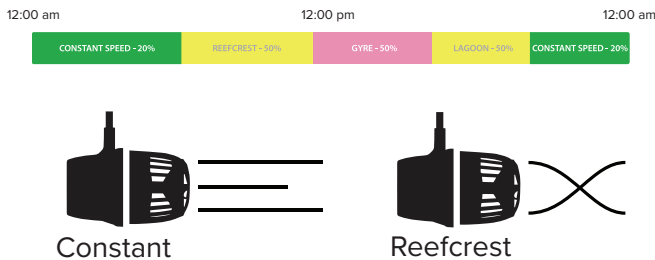
# WWC Flow (continued)

## EcoSmart Live and ReefLink

When adding a ReefLink for control of VorTech pumps through EcoSmart Live you unlock the ability to create an even more advanced version of the WWC flow blueprint.

### Program for one VorTech

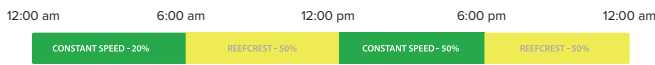
A single pump programmed through EcoSmart Live can run multiple operational modes in a 24hr period. If only running one VorTech, the WWC flow pattern can be created by alternating the pump between Constant and Lagoon mode over time.



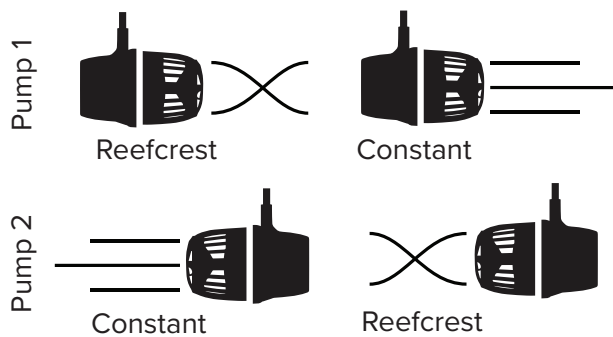
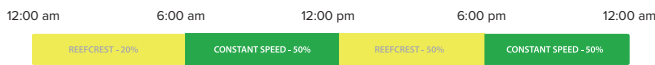
### Program for two VorTechs

When using multiple pumps with a ReefLink, the previously described mix of Constant and Random flow can be further augmented by reversing the pumps roles through the course of the day.

#### Pump 1



#### Pump 2



## WWC Flow Tips

WWC's philosophy on flow is simple: *adequate flow is critical for successful reef keeping, particularly with SPS*. They employ as much flow as can be provided without damaging or causing growth deformity – preferably alternating between constant and random movement patterns.

- **Adequate total flow.**

As much as possible without damaging or causing growth deformity.

WWC utilizes 30-50x turnover in their systems.

- **Unobstructed pump placement.**

Placing pumps on the ends of the aquarium with as little rock obstruction as possible will produce better flow than placing pumps on the back or aimed directly at live-rock.

- **Combination of Constant and Random flow.**

Promotes coral health, color and growth.



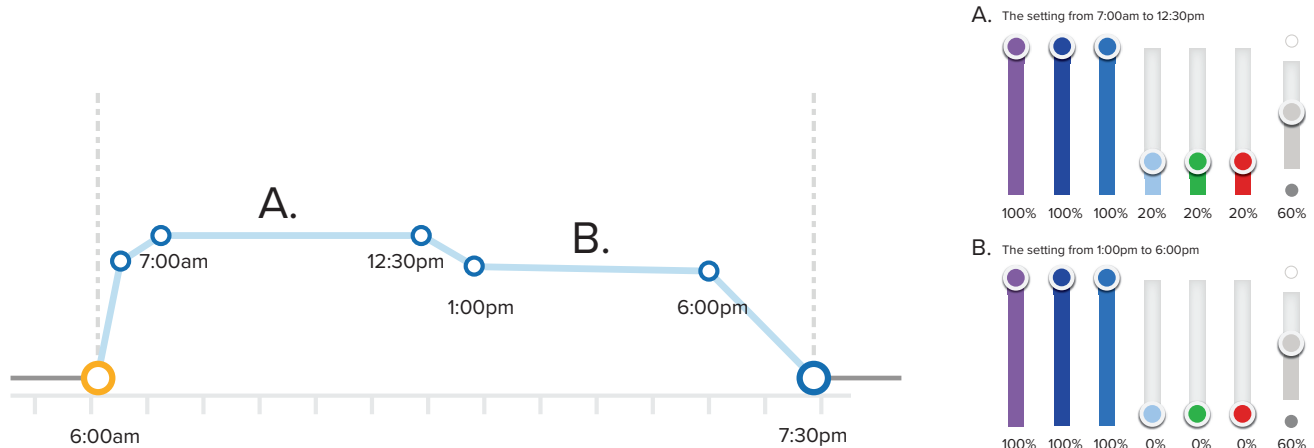
***“Flow is the most important attribute of keeping coral healthy after basic water parameters - more important than lighting, more important than dosing” - Victor***

# WWC Lighting



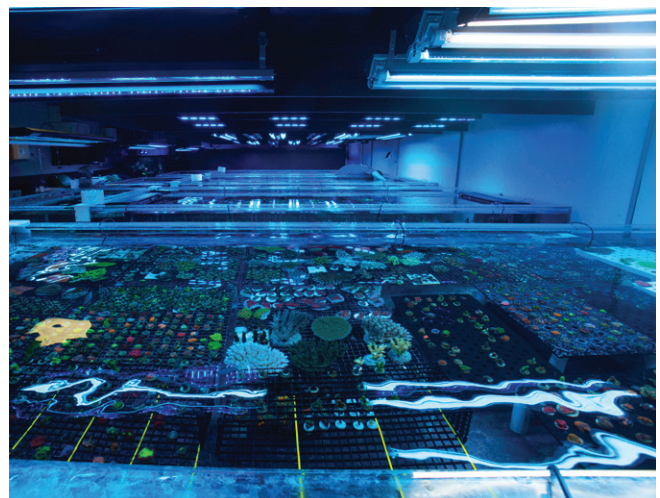
World Wide Corals uses LED alone and in combination with halide and T5 lighting technologies.

The WWC sales tanks use both XR30wG2Pro and XR30wG3Pro lights. They run the following program on their systems:



WWC's Radion schedule is unique because it is designed to provide lighting for the duration of business hours. In order to prevent over-lighting due to the extended photoperiod, the overall intensity is set lower than what would be required for a shorter photoperiod.

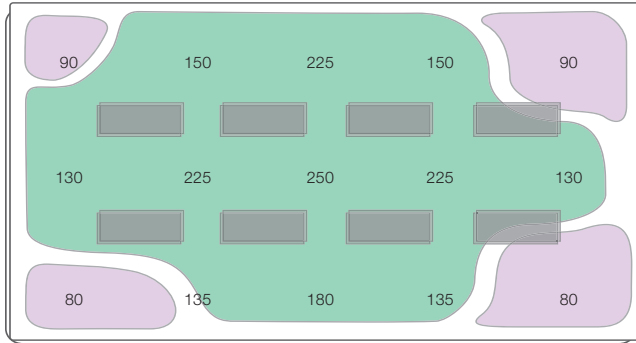
In the Aquaculture Facility, WWC uses Aqualllumination Hydra 52HD units on their SPS run. On their other troughs which are largely soft corals, LPS and deep water SPS, they use T5 ATI Aqua Blue Specials and Blue Plus bulbs at a ratio of 3:1 per fixture. In most cases a Reef Brite HXL strip is used to supplement the T5s. The SPS aquaculture run using AI Hydra lighting receives PAR exposure in the 250-275 range, the LPS and Deep Water corals under the T5 lighting receives 80-140 PAR. The color channel settings used on the Hydra 52HD aquaculture run results in a spectrum similar to the Blue Plus template available on EcoSmart Live for Radion fixtures.





# WWC Lighting (continued)

## PAR Readings and Coral Placement on the WWC SPS Run Lit with Hydra52HDs



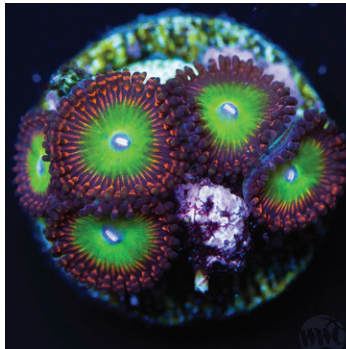
System 200 - 11' x 5' x 1.5'

Looking at WWC's SPS aquaculture run, lit by Aquallumination Hydra 52HDs, another fundamental concept in reef tank lighting can be observed. Due to the light placement over the trough and the corresponding PAR levels, WWC places different species accordingly. For example, shallow water Acroporas which have the highest lighting requirements are placed centrally where they are receiving the most PAR. In the corners where PAR is lower WWC cultivates their brilliantly colored Zoanthids.

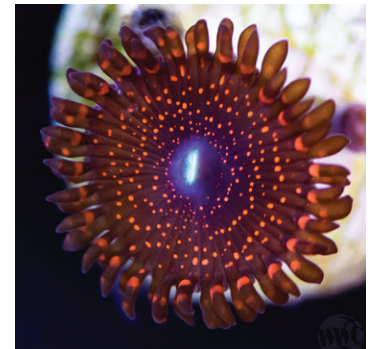
Notice that the PAR is lower than what is usually considered adequate for high light SPS. This is due to the photoperiod being several hours longer than the 8-10 hours typically run by most hobbyists.



Kedds Reds Zoanthids  
70-90 PAR  
14hr Photoperiod



Candy Apple Reds Zoanthids  
70-90 PAR  
14hr Photoperiod



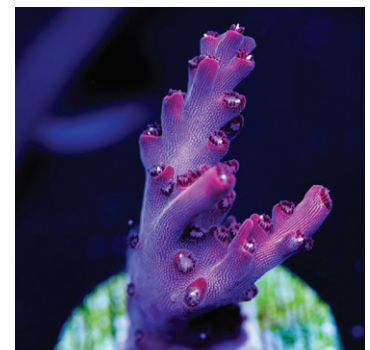
Illuminati Zoanthid  
70-90 PAR  
14hr Photoperiod



Castells Banana Table Acropora  
130-250 PAR  
14hr Photoperiod



Snowdrop Acropora  
130-250 PAR  
14hr Photoperiod



Red Robin Acropora  
130-250 PAR  
14hr Photoperiod

# Conclusion

Touring the WWC showroom and aquaculture facility provides insight into the success that can be achieved from a flow and lighting perspective. WWC proves that amazing results can be accomplished in a coral system by simply adhering to the fundamentals of good reef keeping; high flow, combined with appropriate light, stable water parameters and adequate bio load. The system water volume and highly experienced staff at WWC simplify this task, however their stunning stand-alone displays are similar to a typical hobbyist's setup. Additionally WWC maintains these tanks identically to their aquaculture operation, showing that following the core principles of reef keeping can yield amazing results regardless of aquarium size.

