

## HD Q-PAC® Media for Aquarium Water Treatment in Life Support System: pH, Dissolved Oxygen, and Turbidity Improved Significantly

David LaBonne - LaBonne MER, Boston, MA  
 Jeff Gibula - Newport Aquarium, Newport, KY  
 Katy Fitzgerald - Lantec Products, Norwood, MA

### Introduction

The Newport Aquarium needed to improve the clarity and quality of sea water in its large fish exhibit. After evaluating alternatives with independent consultant Dave LaBonne, Jeff Gibula (Husbandry Operations Manager) decided to use HD Q-PAC® media in his one of his life support systems. HD Q-PAC® is considered an excellent choice for use in aquarium water treatment, both for newly constructed systems, as well as for replacement of corrugated media in existing systems.



HD Q-PAC® (pictured left) has the following characteristics, making it ideally suited for aquarium and aquaculture applications:

- 132 ft<sup>2</sup>/ft<sup>3</sup> specific surface area (up to 300 ft<sup>2</sup>/ft<sup>3</sup> effective surface area)
- 75,000 drip points per ft<sup>3</sup> form additional droplet surface
- durable, easy to handle 1 ft<sup>3</sup> blocks, rigid enough to walk on
- excellent resistance to fouling and plugging
- none of the harmful extractables found in PVC and CPVC media
- rounded surfaces support active growth
- good distribution of applied water

In October 2003, it was decided that HD Q-PAC® would be installed in the existing protein skimmer sump of a large fish exhibit. The block media was easily cut to fit the round tower, and was installed on top of a fibergrate sub-floor. On Nov. 14, 2003, Mr. Gibula and his team started recording new data points for the following system parameters: pH, dissolved oxygen, turbidity, coliform count, and nitrite and nitrate concentrations. The results were excellent.

### The Display

The HD Q-PAC® media was installed as an upgrade to the treatment system connected to the 385,000 gallon, saltwater Surrounded by Sharks exhibit. The depth of the exhibit ranged from 10 to 24 feet. It contained seven large sharks (6 - 9 ft), 11 small sharks (2 - 5 ft), two large loggerhead sea turtles (150+ lbs each), three large southern stingrays (4 - 5 ft), 500 jacks (1 - 3 ft), 100 Atlantic blue tangs (8 - 10 inches), 150 spade fish (5 - 8 inches), 300 grunt species (6 - 12 inches), one Goliath grouper (4 ft), two red groupers (2 ft), 1 Nassau grouper (3 ft), one moray eel (5 ft), and one red drum (3 ft).

The life support system contained no dedicated biological filtration system other than an 8" thick under-gravel filter. Mechanical filtration consisted of seven rapid sand filters, and contact/degasification chambers for ozone injection. The system upgrade added three ozone injected protein skimmers, with HD Q-PAC® as the degasification and biological treatment media. The HD Q-PAC® media was installed to a depth of 1 foot.



## Results

The below chart reflects data collected from the system over the course of several months, from mid November 2003 to mid May 2004. The addition of HD Q-PAC® significantly improved the treatment operation.

Parameter	Goal	Previous	w/ <b>HD Q-PAC</b>	Comments
pH	> 8.0	7.96	<b>7.99</b>	Consistent gain with HD Q-PAC.
DO	6.8 mg/L, or 90 – 100%	6.59 mg/L, 94%	<b>6.63 mg/L, 94.6%</b>	DO concentration expected to continue increasing as organic load decreases.
Turbidity	Reduction of NTU value	0.7 – 1.2 NTU	<b>0.20 NTU, less fluctuation</b>	Reduction in turbidity is especially important, since it relates to the clarity and viewer enjoyment of the exhibit.
Coliforms	< 100 cfu	Inconsistent	<b>41 cfu</b>	Except for major variations likely due to other testing, the coliform value has stabilized near 41 cfu.
Nitrate Conc.	< 50 ppm	78.33 ppm	<b>76.29 ppm</b>	This parameter is expected to decrease further over time.
Nitrite Conc.	< 0.04 ppm	0.05 ppm	<b>0.04 ppm</b>	This parameter is expected to decrease further over time.

The Newport Aquarium has been so pleased with the results of the HD Q-PAC® installation, they've since installed the media in two additional systems: the sump downstream of the ozone contactor chamber for the otter display, and the bio-tower for one of the snake displays.

## Conclusion

HD Q-PAC® media is ideal for use in aquarium and aquaculture water treatment applications. It is a marked improvement over the current media being used in bio-towers, and in degasification systems for protein skimmer and ozone contact chamber sumps. HD Q-PAC® has the highest effective surface area of any bio-media on the market (132 - 300 ft<sup>2</sup>/ft<sup>3</sup>), and by far the highest number of drip points (75,000/ft<sup>3</sup>). Its unique air-liquid interface design allows for excellent aeration and contaminant removal performance. With its open construction and rounded rod structure, HD Q-PAC® exhibits low pressure drop and excellent support of microorganisms.

## Contact Lantec

HD Q-PAC® prices are comparable to competitive bio-media, so the decision to use HD Q-PAC® in aquarium and aquaculture water treatment applications is a no-brainer! Please contact Lantec Products for a quote...

E-mail: [sales@lantecp.com](mailto:sales@lantecp.com)