

**OZONE AQUATIC LIFE SUPPORT SYSTEMS**

# **PRESERVING THE NATURAL BALANCE**

Ozone is safe, reliable, and highly effective as a disinfection and oxidation method to improve water quality and clarity; providing and maintaining healthy water for aquatic life.

  
DEL **ozone**<sup>™</sup>  
advanced sanitation solutions

# SETTING THE STANDARD

Reliable equipment means a healthy habitat. We understand that, and that's why DEL Ozone has been setting the standard for ozone integration into aquatic life support facilities for nearly 20 years. Trusted by Life Support Designers, Facility Operators and Animal Husbandry professionals, our innovative systems are designed to operate under vacuum, utilizing on-board oxygen concentrators and fully-automated PLC Controllers. A properly sized and installed DEL Ozone system will provide safe, reliable sanitation with minimum maintenance. **Systems are UL listed (large systems are built to UL standards) and NSF/ANSI Standard 50 validated and listed for antimicrobial efficacy, animal safety and equipment longevity.**

## OUR APPROACH

All DEL Ozone systems utilize on-board (or adjacent, on larger systems) oxygen concentrators to provide optimal performance in a smaller package, while enabling the highest ozone mass-transfer. All DEL systems produce ozone under vacuum, not only for safety, but to assist in the optimum performance of the injection system. After all, ozone that doesn't dissolve in the water is wasted. This approach outperforms that of a pressurized, air-fed ozone system and is safe and more effective. We've got the science to prove it.



**“ Unlike our people-pools the aquarium inhabitants live in and breathe the water - no sanitizing chemicals allowed, so some decades ago the aquarium industry turned to ozone as the primary sanitizer & oxidizer ”**

- Allen Clawson, Cloward H2O



“**Brookfield Zoo has two DEL Ozone Systems that have been performing perfectly for over 16 years. They are simple to operate, and maintenance is extremely easy. DEL’s service department is the best in the business!**”

– Dave Derk, Lead Life Support, Brookfield Zoo

## THE SCIENCE

### VACUUM vs. PRESSURE

#### Safety

An ozone generator that produces and delivers ozone gas under pressure runs the risk of releasing ozone into an inhabited area if a leak develops. In a vacuum generated ozone system, a leak in the system lets air in, the loss of vacuum is detected and the generator shuts down isolating the ozone chamber so ozone cannot leak from the system.

#### Efficacy

The mass-transfer performance of the injector is optimized when it is pulling against a vacuum, in lieu of trying to balance a pressurized system to convert to vacuum. This optimization is even greater when the injector is pulling against a slight restriction. Vacuum systems using venturi injection have an ozone mass-transfer of greater than 95%.

#### Overall Performance

Only dissolved ozone gas performs readily as an antimicrobial oxidizer, while providing oxidation of organic and inorganic contaminants in the water. It further provides flocculation, which enhances filter performance, with or without a foam fractionator.

### OXYGEN vs. DRIED AIR

- Oxygen-fed systems provide twice the amount of ozone in grams/hour (lbs/day)
- Oxygen-fed systems provide at least double the amount of concentration of ozone gas (in % by weight)
- When the concentration is doubled, the mass-transfer of ozone is doubled
- When the mass-transfer is doubled the ozone off-gas is cut in half
- Injectors used with oxygen-produced ozone are half the size
- Oxygen-produced ozone will have only trace amounts of dissolved nitrogen in the water, which makes the water healthier for aquatic animals.
- Far less ozone system maintenance is required when using an oxygen concentrator vs. an air dryer.

The use of oxygen-fed ozone systems offers more controlled mass-transfer, more manageable operation of the entire system, a smaller footprint for injector assemblies, smaller de-gas systems, and easier maintenance of the ozone system.



Atlantis, Paradise Island – Bahamas

## EXPERIENCE

DEL has been entrusted with maintaining healthy water for some of the most prestigious facilities in the world.

- Alaska SeaLife Center – Seward, AK
- Atlantis, Paradise Island – Bahamas
- Atlantis, The Palm – Dubai
- Audubon Zoo – New Orleans, LA
- Beijing Aquarium – China
- Brookfield Zoo - Chicago, IL
- Calgary Zoo – Alberta, Canada
- Cleveland Metropark Zoo – Cleveland, OH
- Granby Zoo – Quebec, Canada
- Houston Zoo – Houston, TX
- Miami Metro Zoo – Miami, FL
- Oregon Coast Aquarium – Newport, OR
- Riverbanks Zoo – Columbia, SC
- San Diego Zoo – San Diego, CA
- Sea Life Aquarium – Mall of America, MN
- Seattle Aquarium – Seattle, WA
- Silverton Casino – Las Vegas, NV
- Toronto Zoo – Ontario, Canada
- uShaka Marine World – South Africa
- Woodland Park Zoo – Seattle, WA

# DEL SYSTEMS

## OZONE GENERATOR

DEL Ozone's exclusive system designs incorporate many standard features such as multiple safety interlocks, backflow prevention devices, external control interfaces, 4-20 mA capability, 0-100% adjustability, complete isolation during shut-down, PLC controllers (on most models), oxygen monitors with low level protection and integrated ORP Controller/Monitors. These features provide the end-user with a system that protects and corrects itself in any situation.

Models up to 45 grams per hour utilize DEL's exclusive **Genesis Advanced Cell Technology™** for many years of consistent performance with no replacement or cleaning required. Larger models utilize self-fusing cold-cathode, gas filled glass electrodes for long-lasting, impeccable performance with minimal annual cleaning.

Our turnkey ozone packages include:

- Ozone generators (with oxygen concentrator & compressor)
- Injector Manifold Assemblies
- Flow Splitters
- Reaction Tanks
- Degas Valves
- Thermal/Catalytic Ozone Destruct Systems
- ORP Monitor-Controllers
- Ambient Ozone Monitor-Controllers

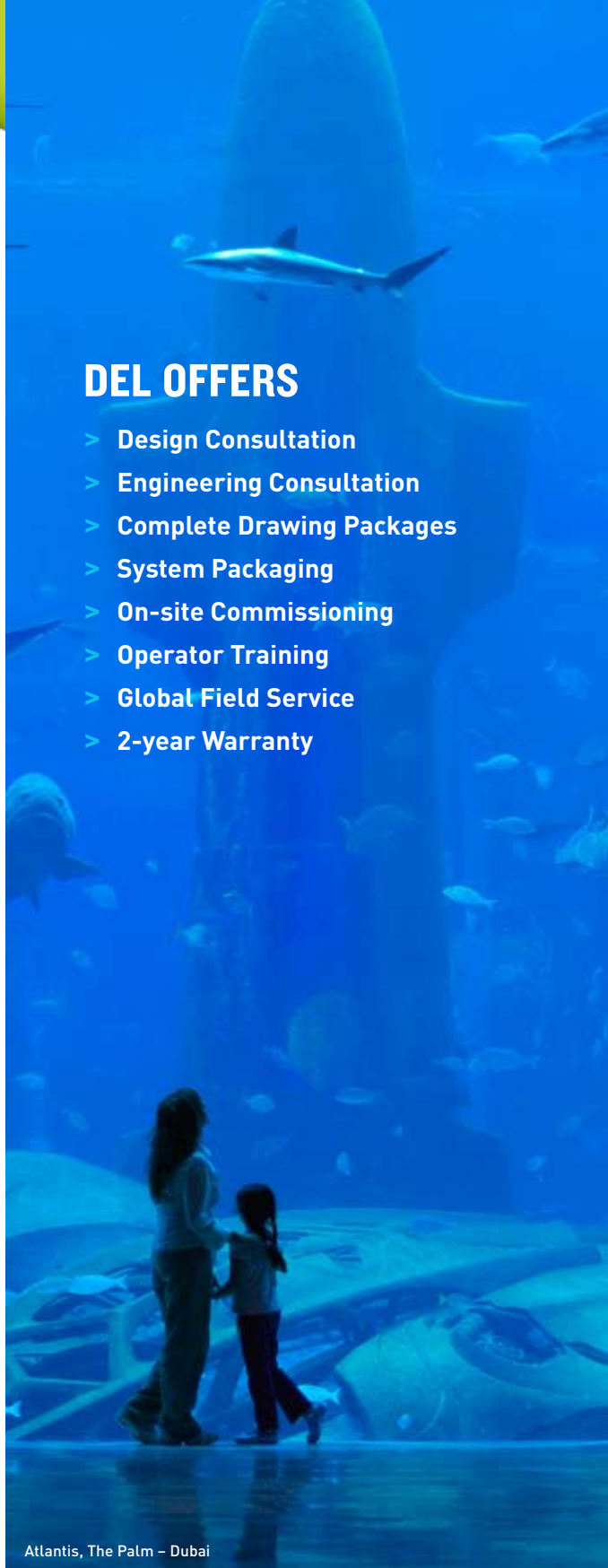


Quantum CD-1200 (1200 grams/hour)



## DEL OFFERS

- > Design Consultation
- > Engineering Consultation
- > Complete Drawing Packages
- > System Packaging
- > On-site Commissioning
- > Operator Training
- > Global Field Service
- > 2-year Warranty



Atlantis, The Palm – Dubai



[www.delozone.com](http://www.delozone.com)