

# PureBox™ DLX

## Self-Contained Portable Desalination System

The RODI Systems PureBox™ DLX desalination systems are built inside intermodal dry cargo shipping containers that have been specifically modified for water treatment applications. This results in a fully self-contained, fully functional desalination system that can be delivered to a site and put into operation with a minimum of site preparation. The PureBox™ DLX is one of several versions of the PureBox™ product and is designed to treat seawater for the production of potable water or purified process water. The PureBox™ DLX is suitable for a number of applications:

- **Emergency Relief**
- **Small Communities**
- **Remote Work Camps**
- **Military Facilities**
- **Hotels and Resorts**
- **Housing Developments**
- **Campgrounds**

### Benefits

The PureBox™ Desal treatment system offers a number of benefits that makes it an excellent choice for your desalination application.

**Portability** — The system is completely self-contained in an intermodal shipping container. Simply unload the container, make piping and electrical connections, and start treating water.

**Flexibility** — As your water treatment needs change, PureBox™ systems may be added or changed easily.

**Security** — The lockable containers provide excellent security for the water treatment equipment.

**Quality** — PureBox™ is designed and built by RODI Systems Corp., a leader in the construction of portable water treatment systems.

**Dependability** — RODI's portable systems are serving as dependable sources of clean water around the world.

**Low Cost** — The PureBox™ DLX cost of ownership is one of the lowest in the industry due to its high energy efficiency and low cost of operation.

### General Features

The PureBox™ DLX incorporates a number of features that make it a cost-effective way to produce pure water from seawater.

**A System for Any Budget** — Our standard PureBox™ DLX system offers a large number of features not typically found on low-cost systems. However, for clients on a tight budget, RODI can eliminate certain features that may not be required for a given application. This allows our clients to have a high quality system while staying in budget.



**State-of-the-Art Technology** — RODI's desalination systems feature state-of-the-art technologies to provide high quality permeate at the lowest possible cost. The PureBox™ DLX systems utilize Danfoss APP pumps which are some of the most efficient positive displacement pumps available. Even more efficiency is achieved with a Danfoss iSave or APM energy recovery unit. RODI's systems use only high quality thin film membrane elements from manufacturers such as Koch Membrane Systems, Dow Filmtec, Hydranautics, and Toray. All DLX systems include an integrated membrane cleaning system. A modern electronic control system ensures safe and efficient operation of the system, even while unattended.

**Technical Support and Training** — All of RODI's PureBox™ systems are supported by a well-trained and highly experienced group of technical and administrative professionals. Whether by email, telephone, or an on-site visit, RODI's staff is dedicated to supporting each and every product manufactured by RODI Systems.

The RODI Systems PureBox™ DLX desalination systems incorporate a number of specifications which make them a high quality choice for your desalination application.

**Container** — The system is totally self-contained inside a modified ISO dry cargo shipping container. Only new “One Trip” containers are used for our systems. This means the container has only been exposed to one ocean voyage before being modified for use in housing the treatment system.

**Construction** — All of the Pure-Box™ systems are constructed of new, industrial quality materials. Piping, vessels, and other system components are supported inside the container with fiberglass structural members.

**Piping** — All low pressure piping is Schedule 80 PVC or other non-metallic materials. High pressure piping utilizes 316L and duplex stainless steel alloys. Welded joints are used wherever possible and threaded joints are avoided as much as possible to prevent leaks. All valves and fittings are of industrial quality.

**Pressure Vessels** — Membrane pressure vessels are filament wound using fiberglass roving and sealed with an epoxy resin. This results in a corrosion-proof vessel that will last for years with little or no maintenance.

**Membrane Elements** — All systems utilize spiral wound membrane elements with thin film composite membrane. This results in high quality permeate with only a single pass, low operating pressures, and a long service life.

**High Pressure Pump** — All systems utilize Danfoss Axial Piston Principle (APP) pumps. These pumps are chosen for their efficiency, dependability, and compact size. The APP pump is lubricated by the seawater it pumps and requires no oil. It generates insignificant pulsations in the discharge line. Wetted pump materials are duplex and super duplex stainless steels and carbon-reinforced PEEK.

**Electrical** — Each container is equipped with interior lighting. All electrical construction is done to recognized standards. Rigid or flexible PVC conduit and PVC junction boxes are used to prevent corrosion. Only NEMA 4X non-metallic

enclosures are used on systems that require large control or electrical enclosures. All electrical systems are thoroughly tested before the treatment system is shipped to the client.

**Documentation** — All systems are provided with a complete set of documentation which includes component O&M manuals and wiring diagrams.



## PureBox™ DLX Desal General Specifications

| Production (Gal/Day) <sup>1</sup>        | 20,000          | 40,000           | 60,000            | 100,000         |
|--|-----------------|------------------|-------------------|-----------------|
| Container Dimensions (L x W x H) (ft)    | 20 x 8 x 8.5    | 40 x 8 x 8.5     | 40 x 8 x 8.5      | 40 x 8 x 8.5    |
| Vessel Array (Number of Elements/Vessel) | 1:1<br>(3)      | 2<br>(6)         | 3<br>(6)          | 5<br>(6)        |
| Pump Model (HP) <sup>2</sup>             | APP10.2<br>(20) | APP7.2<br>(27.5) | APP10.2<br>(37.5) | APP21<br>(67.5) |
| ERD Model                                | APM6.5          | iSave21          | iSave21           | iSave21         |

<sup>1</sup> Assuming a flux rate of 7.6 gallons per day per square foot of membrane surface area.

<sup>2</sup> Includes energy recovery.

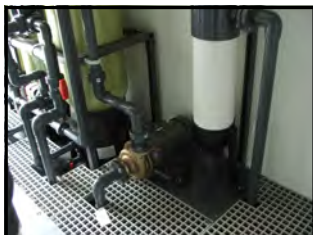
The RODI Systems PureBox™ DLX systems are equipped with a number of features not typically found on low-cost desalination systems.

### High Performance Pretreatment

— Proper pretreatment is critical in the RO design to insure that the RO membrane elements do not foul excessively. The DLX system utilizes a two stage filter design. The primary filters consists of a bag filter element to remove larger suspended solids. The secondary filter consists of a media filtration system that uses a high performance zeolite filter media. This type of filter out performs typical sand filters in particle removal efficiency and reduced backwash volume.



**Filter Aid Injection** — A chemical injection system is provided to inject a filter aid (coagulant) into the system feed line before the media filter. This chemical addition assists in the removal of small suspended solids.



**Raised Floor** — The system is equipped with a raised floor consisting of fiberglass grating supported six inches above the container floor. This protects the floor of the container and provides a neat and safe environment

inside the container since the piping runs beneath the raised floor.

**Scale Inhibitor Injection** — A chemical injection system is provided to inject a chemical scale inhibitor into the system feed line. This chemical addition assists in the prevention of scale formation in the membrane elements.

**Climate Control** — The container housing the system is equipped with approximately 3 inches of solid foam insulation covered with rigid waterproof plastic. Depending upon the climate of the destination, the container can be equipped with an air conditioner or heater.



**Variable Frequency Drives (VFDs)** — All pumps are equipped with a variable speed drives (VFD) allowing the pump to operate at a proper speed. This prolongs the life of the pump and allows for soft starts and stops.

**Instrumentation and Controls** — The advanced control system includes a color touch screen operator interface with data logging. The control system also includes a complete set of electronic sensors for conductivity, flow, temperature, and pressure. A number of optional analyzers can be provided to assist the client in monitoring the quality of both inlet and outlet of the system. Optional instrumentation includes pH, ORP, chlorine, turbidity, and silt density index.

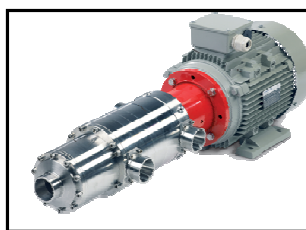


**Permeate Rinse/Cleaning System** — This feature allows the system to automatically rinse with permeate upon shutdown thus preventing excessive permeate conductivity upon startup. This feature may also be used as a membrane element clean-in-place (CIP) system for routine chemical cleaning of the membrane elements.

**Post-treatment** — Various post-treatment steps are available to condition the permeate. This includes calcite filters for remineralization and UV units for disinfection. The use of calcite and UV for post-treatment eliminates the need for hazardous chemicals on site.



**Energy Recovery** — This feature saves power by recovering energy from the high pressure brine exiting the system.



The energy recovery option offered on smaller systems consists of a reverse running pump (Danfoss APM) connected to the shaft of the motor powering the high pressure pump. Energy from the brine pressure assists the motor in pressurizing the feed water to the system. On larger systems, a Danfoss iSave unit is used for energy recovery.

**Remote Monitoring** — This optional feature allows the system to be monitored remotely via the cellular phone network or satellite.

**Operator Training** — Training is available at RODI's facility for those individuals responsible for operating and maintaining the PureBox™ systems. Training and technical support are also available on-site for most locations.



## RODI systems

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