Cylindrical Ceramic High-Pressure Diffusers Installation Guide

(Part Nos. DYCHP12–DYCHP4)

One of the simplest ways to dissolve gases such as oxygen, carbon dioxide or air in water is to introduce the gas as small bubbles—the smaller the bubbles, the more efficient the transfer of the gas will be. The micron-sized bubbles produced by the ultra-fine bubble diffuser ensure a very high gas transfer efficiency.

Typical Applications

Aquaculture: For supplemental oxygen to boost fish densities and for emergency backup. For fish transport by truck, barge, boat or plane.

Anesthetizing using carbon dioxide: For fish handling and processing.

Waste water and effluent treatment: Injection of oxygen to reduce BOD and COD in ponds, channels and large ponds.

Ozone injection: Efficient and effective injection of ozone into water.

General Description

The ultra-fine bubble diffuser is a simple, easy-to-install device that produces bubbles 100 and 800 microns in size. The bubbles are produced over the entire porous area and are uniform in size. Made from nontoxic materials and safe for aquaculture use, it lies on the bottom of a tank under its own weight.

Installation

Locating the diffuser(s) in the water is a site-specific decision. The diffuser(s) should be located to give the best distribution of dissolved oxygen; use a D.O. meter to insure there are no "dead spots." When deciding on location, the following should be kept in mind:

- The deeper the diffuser is placed the more effective it will be.
- The bubble cloud should have an unobstructed path in which to rise. Protective screens placed above the diffuser may cause the bubbles to coalesce.
- Moving water will assist with the distribution of D.O. and improve performance.

Any number of diffusers can be corrected in parallel to a common gas supply. If the ultra-fine bubble diffuser is to be used for dissolving oxygen, as is usually the case, ensure that all upstream gas lines, metering devices and instruments are cleaned for oxygen service (oil- and gas-free). We recommend that flow of gas be controlled by flow meter and that a preset pressure regulator be used, set at the flow meter's operating pressure—usually 50 psig (345 kPa). If an adjustable regulator is used, a safety relief valve should be reinstalled in the line, preferably upstream of the flow meter(s). The pressure setting of the relief valve should be such that the differential pressure across the diffuser cannot exceed 60 psi (413 kPa). Usual setting is between 50 and 65 psi (345 and 450 kPa).

The diffuser should be installed in a horizontal position to avoid bubble coalescence.

Operation

If a manually adjusted pressure regulator is used, be sure that it is in the closed position (adjustment fully screwed out) before turning on the gas supply. Turn the gas on and slowly adjust the pressure to the desired level, usually 20 to 30 psi (138 to 207 kPa) if a flow meter is not being used. If a flow meter is connected to the regulator, set regulator pressure to calibration pressure of flow meter, usually 50 psi (345 kPa), and adjust flow via flow meter. Check the line for leaks and allow a few minutes to blow out any water that may have seeped into the diffuser's air plenum. Do not exceed 60 psi (413 kPa) differential pressure across the diffuser.

Note: The diffuser produces the best bubble pattern after it has been wetted. A dry diffuser may display a patchy bubble pattern at first, but as the diffuser gets wet, the bubbles will become finer and evenly spread out.

For best results, soak the diffuser in water for a minute or so, then shake out any water that has collected in the diffuser before applying pressure.

Maintenance and Care

The ultra-fine bubble diffusers are easy to maintain. To prevent buildup of algae growth and other deposits, the diffuser should be routinely scrubbed with a hard bristle brush or hosed off with a water jet. If there is a noticeable decrease in flow due to fouling, the diffuser con be cleaned by allowing the ceramic to dry out and then sanding it with coarse sandpaper. To disinfect the diffuser soak it in disinfectant. This may stain the ceramic but will not affect performance. Shake out any disinfectant that may have gotten in the diffuser's air plenum before putting back into service.

- DO NOT exceed 60 psi (413 kPa) differential pressure across the diffuser.
- Only pressurize when diffuser is submerged.
- Avoid physical shock.
- Do not allow the diffuser to become contaminated with oil.

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WARNING

Oil, grease and other hydrocarbons, when combined with oxygen, will become highly combustible and should never be used on any part of the oxygen cylinder, valve, regulator, diffuser fitting or other equipment used with oxygen.

Ultra-Fine Bubble Diffusers Data

Bubble Size

100 to 800 microns

Oxygen Transfer Efficiency

40 to 50% over recommended operating range and depth of 3' (1 m)

Materials of Construction

Porous ceramic diffuser

Gas Inlet Connection

$^{3}/_{8}$" FTP

Specifications

Part No.	*Diffusing Area (In.)*	*Bubbling Pressure*	*Max Pressure*	*Max Flow (cfm / lpm)*
DYCHP12	11.81 x 1.97	20 to 30 psig (138 to 207 kPa)	85 psi	0.12/3
DYCHP8	7.87 x 1.97			0.07/2
DYCHP6	5.91 x 1.97			0.06/1.5
DYCHP4	3.94 x 1.97			0.04/1

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