



DEGASSING (GAS STABILIZATION) SYSTEMS

Degassing or gas stabilization systems are utilized to improve the environment for the organisms being raised. The systems are also used to avoid gas bubble disease that results when total dissolved gas levels are over 100% in relation to atmospheric pressures (Supersaturation). Supersaturation is a condition when water (at a given temperature) and pressure contains more gas than it would hold normally if the water and atmosphere were in equilibrium. This frequently happens where water is heated or heated water is brought in as source water to be used in a system.

DE-GASSING APPLICATIONS

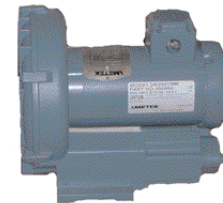
- Aquaculture Facilities
- Laboratories
- Wastewater Operations
- Zoo/Aquarium Facilities

The four (4) gases important in many systems are *Oxygen*, *Carbon Dioxide*, *Nitrogen*, and *Argon*. Most often, only oxygen and carbon dioxide will need to be controlled. Oxygen is the gas that must be diffused into the water as a replacement to the oxygen utilized by both fish and biofilter.

Oxygen is required to maintain saturated conditions and *Carbon Dioxide* is produced by organisms and must be diffused **out** of the water. If not removed, the net result is toxic levels which can lead to fish kills, etc.. Carbon Dioxide is very soluble in water, but is very difficult to force out of solution.

In production systems, supersaturation can occur as a result of several situations which may include:

- *Incoming Water (Specifically Well Water) Is Most Often Supersaturated With Nitrogen,*
- *Result Of The Suction Side Of A Pressurized Water Line Not Being Sealed Properly, Thus Allowing Air To Leak Into The Water Stream,*
- *Cold, Saturated Water Being Heated*



ROTRON REGENERATIVE BLOWERS

Several options exist to control supersaturation. Which method **or** methods to use are dependent on the configuration of the facility. In this paper, we will discuss *De-Gassing Systems* and some oxygenation. Most common is of course Aeration Systems using **Rotron Regenerative Blowers** and **'Pro-Glass' II Fused Alumina Diffusers**. If the gas transfer produced by the diffusers is enough to maintain dissolved oxygen near saturation, then this will also remove CO₂ effectively. **Diffused Aeration Systems** should always be designed specifically for each client based on loading, etc.



MOISTURE SEPARATOR

The systems usually work with one or more degassing towers. These towers will vary based on the volume of the system, flow rates, etc. The water will be brought into the towers and then a vacuum will be pulled on the towers using a **Rotron Regenerative Blower**. If the pressure requirement(s) become too high, a **'Modern Air' Rotary Vane Compressor** or a **'Modern Air' Rotary Lobe Blower** may be utilized.

To put these systems in perspective, I will discuss an actual operation at a Hatchery in Anchorage, AK. In this de-gassing system, the Hatchery utilizes heated water effluent from a power generation plant. The hatchery then mixes heated water with the cold creek water for rearing salmon and trout. The hatchery experiences high levels of gas supersaturation (total dissolved gas over 100%) as a result of the mixing. The heated water (20°C) is usually around 117% supersaturated at atmospheric percentages and the creek water is near 100%. The mixed "first pass" water has 108% TDG. The mixed "second pass" water is around 112%.

The hatchery uses 8' tall open screen deck towers. These towers reduce the super-saturation to a range of 101-102.5%. To improve the environment, the water had to be de-gassed indoors prior to mixing because the mixing takes place outdoors in very cold weather - which would ice up the towers. The towers are 2' by 3' and 9' tall. The open bottom of the tower is sealed by the water level in the treated sump. **Rotron Regenerative Blowers** Models DR202 and DR353 are used in this facility to apply a vacuum to the two towers. A **Moisture Separator** is also installed inline to the blower. In addition, a 3/4" valve is installed on each tower to regulate incoming air. The vacuum is applied at the top of the tower. The system worked extremely well in decreasing the *Total Dissolved Gasses* of the outgoing water as long as the air volume ratio is kept below 20gpm/scfm.

This is just one version of our **De-Gassing Systems** that can be utilized. An AREA *Technical Representative* is always available to design and/or incorporate our equipment needed to de-gass your operation. Our design assistance is provided free of charge to ensure that our clients receive the most efficient and cost effective equipment/systems. With over 350 models of **Rotron Regenerative Blowers** to choose from and a full-line of *Rotary Vane Compressors* and *Rotary Lobe Blowers* to choose from - AREA has the equipment needed to meet every application.