

## POSITIVE PRESSURE VERSUS--- NON-POSITIVE PRESSURE

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Diving Systems International receives calls from time to time from customers and dealers asking why DSI does not offer a full-face mask (In particular an EXO model) that can operate as a positive pressure mask for contaminated water diving. First and foremost, DSI would like everyone to understand that we do not recommend the use of **ANY** full-face mask for contaminated water diving. If the water is contaminated with chemicals or biologics that can be dangerous to the diver, (other than just a short term irritation nuisance which is not considered health threatening), the diver should not believe a full face mask will protect him/her regardless whether it is positive pressure or not. The diver must assume that the interior of the mask will be contaminated during the dive. A full face mask is better than a half mask and demand regulator mouthpiece that subjects the diver to immediate and full contamination, but it is not enough protection in our opinion.

Certain agencies have stated that only masks with positive pressure capabilities should be used for contaminated water diving. DSI contends that positive pressure on a full-face mask in most cases will result in a wetter dive than a properly fitted non-positive pressure mask.

DSI has looked into the validity of maintaining a positive pressure inside the mask and has found that during peak inhalations at even moderate work loads true positive pressure does not exist. The original intention of maintaining a slight positive pressure within full-face masks was to help keep firefighters and mine safety workers masks clear of smoke and contaminants in an air/gas environment. When this concept is used in a water environment, it doesn't quite work the same and cannot totally keep water from entering the mask. In certain diver positions, such as a head down, demand regulator at the highest part of the mask, the water column pressure is greater than the "positive pressure" provided by a spring loaded diaphragm/exhaust valve. Any displacement of the mask seal will cause inflow of water. Anytime gas exits

around the mask skirt from a "burp off", a small area of skin becomes wetted. The more the mask burps off the wetter the mask gets. Over the course of the dive the accumulation of water inside the mask can be considerable. This can happen with positive pressure masks as well as non-positive pressure masks that seal to the face or a hood. For this reason DSI does not recommend the use of any of our current full-face masks including the KMB-18/28 for contaminated diving. Persons involved with contaminated water diving must be properly trained and knowledgeable with respect to all aspects of contaminated diving.

Many older divers remember the Desco™ and Jack Brown free flow masks that were used for many years and some are still in use today. This type of mask had no compliant volume and would lift away from the face in between breaths if the air supply was slightly higher than the than the divers could use and/or the exhaust valve could exhaust. Each time the mask lifted away from the face, some water would enter and on the next breath the water would spray around inside mask. The water that entered the mask entered as a result of the mask seal lifting away in the form of a burp off. This burp off was a result of positive pressure within the mask and is exactly what happens when a positive pressure face mask momentarily burps off.

For a positive pressure diving mask to effectively keep contaminated water out, the interior positive pressure of the mask must increase to a pressure that could be potentially dangerous to the diver. Needless to say, this should be avoided and should not be considered as a path to diver protection from polluted water.