

Why Does a Mask Fog?

The crystal clear water feels warm on a beautiful sunny day. You look around at the stunning island scenery before you slowly descend below the calm surface. Excitement grows as you anticipate the vivid colors and active sea life.

You continue descending and begin to make out the shape of the reef. This is going to be a great dive...

Suddenly, your mask fogs up. Uh-oh.

"Did I rub on the drops?"

"Did I spit with enough phlegm?"

"Maybe I rinsed twice instead of once?"

"Did I rinse too aggressively?"

"Did I turn in a circle twice while rubbing my stomach and waiving my mask in a figure eight while praying to the fog gods?"

You frantically search your brain for what you did or did not do to deserve your hour-long fate. Sadly, you resign yourself to a dive with periodic mask rinsing.

Mask Fog

We have all been there. An otherwise great dive, while not quite ruined, dampened a bit from mask fog issues.

Personally, I find it helpful to understand *why* something happens rather than just being given the cure. Hearing, "just spit in your mask", is more helpful when you know what the spit is actually supposed to do.

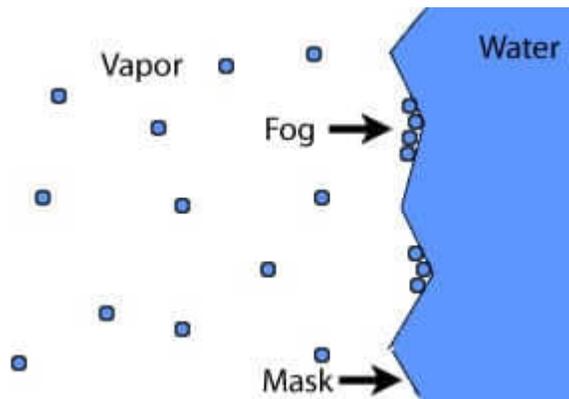
The Condensation Culprit

The physical effect at work with fogging is called *condensation*. Air, even what we might call dry air, is full of water vapor, or basically water in the form of a gas. Lots of water vapor gives the feeling we describe as *humid*. All air has some water vapor, including the air in your scuba mask.

You know how when liquid water gets cold enough it turns into a solid, a.k.a., ice? When water vapor cools down, it turns into liquid water.

What does this have to do with foggy masks? The lenses on your mask are in contact with the water outside, which compared to the air inside, is quite cool, even in the tropics. The water vapor molecules are constantly bouncing around in your mask, so when they hit the

cool mask lens, they in turn cool down and turn back into liquid. This process is called *condensing*.



While your mask looks clear and smooth, it is actually full of teeny tiny imperfections, not to mention dirt and dust that collects. The recently cooled water droplets use these to hang on to your mask and block your view as fog.

The Cure

With this information, you can think of two possible cures: 1) warm up the mask so that condensation never occurs, or 2) create a super smooth, slick surface that water cannot hang on to.

The first does not directly lead to any practical solutions (that I am aware of), but the second has many options. Basically, we need some kind of slick substance with which we can coat the lens. Then, when the vapor condenses (it will still condense), it has no way to "grip" on to the surface and will slide right down to the bottom and form a little puddle.

Now you can understand the reasoning behind the typical cures: spit, dish detergent, etc. These are pretty slippery liquids. It also explains why you have to be super careful with rinsing: if you rinse too much or too aggressively, the coating will come right off. This is also why letting water into your mask during a dive can then cause fogging.

There is nothing particularly special about anti-fog drops, just that they are more consistently slippery than spit (not to mention more sanitary) and less likely to irritate than soap.

Now that you know *why* the problem occurs, you can apply the solutions more effectively. Use something slick to cover the lens (if using spit, you want it nice and gooey), spread it around, and try not to disturb this coating when rinsing.