Air Hoses: A Closer Look
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We received a few questions about what may exacerbate hose failure. Factors such as age, sun exposure, oxidation inside the hose and cleaning solutions used. Although cleaning the inside of hoses is uncommon, some readers indicated that they do so using warm, clean water. Please note that if the water contains any microorganisms, this practice could very easily lead to accelerated hose degradation and formation of the yellow crystals. Some repair centers insert the metal end-fittings into ultrasonic baths to remove verdigris and other forms of surface discoloration, but they must ensure that the cleaning solutions used in these baths are sanitary.

In our ongoing effort to learn more about these hose failures, we consulted the manufacturers. A major supplier expressed great concern about the reports and asked that we share as much information with them as possible. It is important to note that some hoses being exposed to decay in less than a year. This result is consistent with the hose-failure reports DAN has collected. Hoses made of or lined with thermoplastic polyester-polyurethane (polyether-TPU) or, on the other hand, did not fail. DAN has always used polyether-TPU, since 2008 has required its materials supplier to certify its polyether-TPU hose linings.

The decay product, a yellow crystalline-looking substance, is softer than it appears and feels waxy when squeezed. We previously referred to this substance as the product of “polymorphic crystallization,” but the reaction in question is actually hydrolysis, which, as its name implies, requires the presence of water. Elevated temperature promotes accelerated degradation or hydrolysis of the polyester-TPU. It is hard to predict the time required for a polyester-TPU liner to decay, but available information suggests that at 86°F and high humidity, exposed hoses could decay in less than a year. To reduce the likelihood of such degradation, divers should keep hoses dry when not in use and minimize hoses’ exposure to high temperatures and humidity.

When buying a hose, determine the composition of its lining — you want it to be a polyether-TPU, not a polyester-TPU. If in doubt, do not purchase the hose. Buy your hoses and other life-support equipment from well-known manufacturers that clearly indicate the type of liner material used. Gear manufacturers have been informed about this phenomenon and have carefully investigated their existing suppliers and implemented improved means of materials verification and quality assurance. Please keep sending us your comments and questions. DAN is committed to providing the diving public with as much technical safety information as possible.