Use of medical grade Sofnolime® in Diving Applications

January 2010

There appears to be a practice in some countries to favour using medical grade Sofnolime® in diving rebreather applications. It is apparent that the prime driver for this practice is cost of the material. This is both false economy and unsafe.

Molecular Products Ltd Sofnolime® is manufactured in several grades, each appropriately designed and tested to exceed the minimum specification for the application and its specific requirements.

Medical grade Sofnolime® 2550 USP meets the medical standard for compounds in low flow anaesthesia applications and is optimised to minimise the pressure drop across the absorber. These applications by their nature are at standard atmospheric pressure and temperatures around 30 degrees C.

Diving grades of Sofnolime®; 1025, 2050 CD are designed for applications where flow rates are variable and can be high in a closed (or semi closed) system depending on the diver workload and thus respiration rate. In-use temperature can be significantly below normal room temperature and pressures significantly above atmospheric (nominally 1 bar). Ambient pressure at depth increases by approx. 1 bar per 10 metres depth. Operating pressure at 50 metres is thus 6 bar. As the air is delivered at ambient pressure within a rebreather, at depth it will be significantly denser, high flow rate and thus the absorber material is working under significantly different operating conditions than low flow medical applications.

Molecular Products diving grade Sofnolime® or SofnoDive® 797 is thus designed to work optimally under these conditions, is smaller particle size and shape, and is tested to much more stringent levels to offer the CO_2 absorbing performance and useful dive time demands placed upon it. These are the only grades that Molecular Products Ltd will recommend for diving applications and MPL cannot accept any responsibility for the use of inappropriate grades in any application.

From the above it should be apparent why diving grade Sofnolime® is more expensive than medical grade. While a medical grade product may apparently work in a diving system, its performance will be significantly degraded compared to diving grade. This includes but is not limited to failing to maintain post scrubber CO_2 levels below the safe limit under demand conditions and a significantly reduced time to exhaustion (practical capacity). The latter is not readily quantifiable.

Molecular Products Ltd has worked closely with a number of major diving equipment manufacturers and users both commercial and military to ensure its diving grades of Sofnolime® meet the specific requirements of the equipment. Please contact our Sales team if you need advice on the appropriate grade for your application.

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