BIOMEDICAL SYSTEMS

ENVIROGUARD 64 ™ FOR USE WITH ACRYLIC MONOPLACE HYPERBARIC CHAMBERS TEST.

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INTRODUCTION: The hyperbaric medical industry has relied on research conducted by Jerry D. Stachiw, Ph.D. for the identification of disinfectants compatible with the acrylic cylinders of monoplace hyperbaric chambers[1]. Since Dr. Stachiw's passing in 1997, however, new types of disinfectant products have become available, and a number of Stachiw-tested disinfectants have been discontinued by their manufacturers. In addition, new and highly resistant microorganisms have entered the hospital area. Consequently, it is important to hyperbaric medical practice to identify new disinfectant products and/or alternatives to determine what is best for use with PVHO acrylic windows.

TEST MATERIALS AND METHODS: Testing was conducted with the methods detailed by Stachiw [1]. Cast acrylic sheet (MIL-P-5425 specification) 0.25" (6-mm) thick was cut into strips, 2" wide and 22.5" long. All test strips were heat treated at 90°C for 2 hours in a conditioning oven and then allowed to cool to room temperature. After the strips cooled, the specimens were held at 23°C and 50% RH for 8 days prior to any testing. A test jig was assembled with a fulcrum point 7" from the tension end of the strip. A 1" diameter piece of No. 1 Whatman filter paper was secured to the longitudinal centerline of the test strip and directly over the fulcrum of the test jig. A weight was applied to the acrylic test strip ensuring that a 2000 lb outer fiber stress was maintained. Enviroguard 64 ™ and a control were applied to the Whatman filter paper. The paper was maintained wet with disinfectant for a total time of eight hours. Each sample was examined for crazing every 10 minutes for the first hour, every 15 minutes for the second hour, and every 30 minutes for the next two hours. Each piece of acrylic was then examined hourly for the balance of the test.

Enviroguard 64 ™ disinfectant sample was mixed according to the concentrations noted on the label.

DISINFECTANTS AND CONTROL SUBSTANCE: Enviroguard 64 TM and , distilled water was used as control.

RESULTS: Three samples of Enviroguard 64 ™ and one distilled water control was tested using the above procedure. No crazing developed during the 8-hour testing.

[1] Stachiw Jerry D., *Handbook of Acrylics for Submersibles Hyperbaric Chambers and Aquaria,* (Flagstaff: Best publishing, 2003).

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Table 1 shows the acrylic sample identifier, dimensions of the acrylic test sample and the solution utilized for that specific run. A successful / passing run was one that did not develop crazing or cracking over the 8-hour period while maintaining a 2000 lb outer fiber stress.

Table 1 Summary of tested Solutions

Sample #	Width	Thickness	Solution used	Crazing (Y) (N)	Time Crazing appeared
84	1.984	0.251	Enviroguard 64 ™	N	
86	1.970	0.249	Enviroguard 64 ™	N	
87	1.978	0.250	Enviroguard 64 ™	N	
88	1.985	0.251	Distilled water	N	

CONCLUSION: Disinfectants and cleaners should be tested under stress prior to use on acrylic hyperbaric chambers to ensure patient safety and preserve the service life of the acrylic tube. Enviroguard 64 ™ has been identified acceptable for use on acrylic hyperbaric chambers using this testing method.

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