



I n n e r S p a c e S y s t e m s  
C o r p

Correspondence: Shipping:  
P.O. Box 449 1714 Midway Court  
Centralia, WA 98531 USA Centralia, WA 98531 USA  
Phone: (+001)360.330.9018 FAX: (+001)360.330.9019

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Product testing announcement on Golem Gear BOV.

InnerSpace Systems Corp contracted Dive Lab a branch of Kirby Morgan and Diving Systems International to conduct an independent third party work of breathing (WOB) testing using an ANSTI breathing simulator.

The purpose of the test it to evaluate the performance of the Golem BOV as Golem Gear Inc sells their BOV as an **upgrade** to the current Megalodon DSV and a deep water technical bailout regulator. The BOV, built by Golem Gear, is the **primary** DSV and bailout system used in the Juergensen Marine Hammerhead CCR.

The testing criteria are the evaluation of the Golem BOV Check valves for the rebreathing loop and demand regulator for **emergency** bailout.

Testing shall be done in accordance with U.S. Navy Experimental Diving Unit Technical Manual No. 01-94 U.S. Navy Unmanned Test Methods and Performance goals for Underwater Breathing apparatus. Rating is for Category 1 Demand UBA.

The test settings are the following: Ventilation of 62.5 RMV, Tidal volume of 2.5 liters, and breathing frequency of 25 bpm, at a depth of 40 msw (132 fsw) or deeper with a max depth for CAT 1 of 60.7 meters (198 fsw) Test goal for WOB is 1.37 J/l.

Results: The Golem BOV was tested at a ventilation rate of 49.5 RMV, breathing frequency of 19.81 bpm, and 2.50 lpm tidal volume, depth of 50 meters (165 fsw) and air as the breathing gas. The BOV **exceeded** the WOB at 2.07 J/l. The WOB max for CAT 1 demand UBA for all depths to 40 meters and deeper are not to exceed 1.37 J/l.

The Golem BOV **fails** to meet the U.S. Navy's Class A CAT 1 UBA list. For a regulator to make the ANU list it must have a WOB no higher than 1.37 J/l to a depth of 60.7 msw (198 fsw).

In comparison to existing regulators, the Scuba Pro MK2+ R380 meets and exceed the U.S. Navy Class A category, and even tests up to 75 RMV @ 60.7 msw (198 fsw).

The Golem BOV one way check valves were tested at 1 ata in the ANSTI simulator using the above test ventilation of 62.5 RMV, 2.5 l Vt, 25 bpm. Test date 12/15/07 the WOB on just the check valves were .55 J/l or over half a Joule!

Valves were tested at a depth of 21.7 msw (71.9 fsw), and 50 msw (165 fsw) respectively, and results are 1.02 J/l, and 1.5 J/l. In comparison to the Golem BOV, testing conducted by Dive Lab date 5-10-03 the Meg DSV with tee partition and breathing hoses measured a .25 J/l at a ventilation of 62.5. At a ventilation of 40 RMV, the Meg DSV was .15 J/l. The MK-16 DSV which is the standard in the US military measures a .12 J/l.

Recommendation: Golem should change the check valves and test.

Further note: ISC looked up the availability of the Golem BOV one-way valves and found the price to be for one pair \$34.00 USD! ISC high performance proprietary valves that have been tested are \$8.00 for a pair.

Safety note: The Golem uses an Interspiro diaphragm that incorporates the exhaust valve in the diaphragm. If not properly reassembled during an annual overhaul, the diaphragm may separate from the retaining ring and the diaphragm retention slot. Should this occur on a forceful exhalation, the BOV may flood, thus losing total bailout capability. FMECA review should be conducted.

The Golem BOV retails for \$970.00 USD.

Test results are posted on the ISC web site.