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Abstract

Parts like human eyes are necessary for underwater vehicle to investigate and work under high pressure. Pressure-resistant optical windows are used for underwater cameras equipped in a Remotely Operated Vehicle (ROV) and Autonomous Underwater Vehicle (AUV) in deep sea. A glass dome type lens is often used for this purpose. However, this lens has a great problem when it broke; an internal camera was flooded and broken.

A conical trapezoid lens called, below viewport, makes up the fault.

Acrylic glass view ports were mainly developed, and the standard for design of acrylic glass viewports are established through a detailed experiments. However, there are needs to get clear images of the deep sea with a high vision camera. For this needs, Borosilicate glass (BK7) has better quality than acrylic glass on the physical characteristics. There were few report about BK7 viewports especially in pressure proof test. Here we carried out high pressure tests for the BK7 viewport. and measured strains. From the test result, we derived a thickness of the most suitable BK7 viewport, and suggested an empirical formula for the optical design of this viewport thickness