AbstractID: 8094 Title: Comparison of Diagnostic Ultrasound Exposure Values in Water and Tissue-Mimicking Liquid

We have created an automated system for comparing ultrasonic exposure measurements in a tissue-mimicking (TM) liquid to linearly derated measurements in water using AIUM/NEMA guidelines. The TM liquid exhibits a propagation speed of 1540 m/s, attenuation of 0.3 dB/cm/MHz and B/A of about 7. The ultrasonic properties of the TM Liquid have been stable for six months. It is sealed in a flexible plastic-coated-aluminum bag within a water tank, allowing continuous path-length variation. Approximately 3 mm of water exist between the bag and the 0.4-mm-diameter active element of the membrane hydrophone. Water derating used the TM liquid attenuation coefficient at the pulse center frequency. Initial results for this system have been obtained for six configurations. The pulse intensity integral (PII) and peak rarefractional pressure (pr) were measured as a function of depth along a transmit line for three Doppler and three M-mode configurations using late model ATL and Acuson scanners. The results obtained in a TM liquid are significantly greater than the derated results obtained in water. The ratio of the maximum PII in TM liquid to that in derated water ranged from 1.5 to 2.6 and the ratio for maximum pr ranged from 1.3 to 1.6. Similar assessment of about 100 more wide-ranging configurations are planned. This work may encourage re-examination of exposure measurement standards.

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