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Peter Larson

Report on Comparison Testing of Klarity™ Immobilization Material with Aquaplast

K&S Associates, Inc. performed four tests for the purpose of comparing thin plates of Klarity with Aquaplast in terms of their effects on ionizing radiation. Larson Products supplied three non-perforated samples of Klarity labeled 20507-1, 20507-2 and 20215. WFR Aquaplast Corp. supplied three non-perforated samples of Aquaplast labeled A-1, A-2 and A-3 by K&S.

Mass Density: Dimensions and weights of samples were measured.

Sample	Thickness (mm)	density (gm/cm^3)
A-1	3.13	1.12
A-2	3.16	1.10
A-3	3.17	1.11
20507-1	3.32	1.12
20507-2	3.29	1.12
20215	3.35	1.13

The Klarity is 5% thicker than the Aquaplast. Density is the same within the laboratory's ability to measure.

Transmission of radiation: Attenuation of a photon beam by the samples was tested with a reference quality ionization chamber under conditions of narrow-beam geometry at two beam energies: Co-60 (1.25 MeV) and a filtered x-ray beam of 80 kVp. Listed below for each beam is the ratio of exposure with the samples attenuating the beam (long dimension perpendicular to beam direction) to exposure with no attenuator.

Sample	Co-60	80 kVp
A-1	0.977	0.899
A-2	0.977	0.898
A-3	0.977	0.899
20507-1	0.975	0.892
20507-2	0.976	0.893
20215	0.975	0.896

Transmission of the 80 kVp beam was 0.5% less through the Klarity than through the Aquaplast. That fact is explained by its greater linear thickness, ie. calculated linear attenuation coefficients were the same to within the laboratory's ability to measure.

Bolus Effect: Each plate sample was placed flush against the entrance window of a thin-window ionization chamber during irradiation in the Co-60 beam. Since the chamber's bare window is one third of a millimeter of acrylic (density 1.18), the material provides the electron equilibrium (buildup) for the chamber. Below are the relative responses of the chamber to the radiation beam.

Sample	norm. response
A-1	1.001
A-2	0.999
A-3	1.000
20507-1	1.001
20507-2	1.001
20215	0.999

Doses to chamber at depth of one third of one millimeter of near tissue equivalent material are the same to within the laboratory's ability to measure.

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