



Addendum 7 – Health Physics Northwest X-Rok, ASTM certified X-ray shielding results: This 5-year old report includes ASTM approval for use of X-Rok as the only known/ASTM certified replacement for the carcinogenic lead currently used in medical/industrial x-ray examination systems.



Health Physics Northwest

July 27, 2009

Judd Hamilton
Co-Operation Inc.
3033 California Avenue SW, Suite 116
Seattle, Washington 98116

Dear Judd:

Enclosed are the attenuation and lead equivalency results for the eleven samples that were recently submitted to Health Physics Northwest. At your request, a single layer of each sample was evaluated in accordance with ASTM test Method F 2547-06 at an off-site location on July 23 and 24, 2009. The following table details the characteristics of the X-ray tube used to perform this testing at settings of 60, 80, 100, and 140 kVp:

| | 60 kVp | 80 kVp | 100 kVp | 140 kVp |
|-------------------------|--------|--------|---------|---------|
| Actual kVp | 60.0 | 80.0 | 99.7 | 139.6 |
| Half-Value Layer (mmAl) | 3.0 | 4.0 | 5.1 | 7.2 |

The test results for these samples are given in the tables on the following pages. If you have any questions or would like to discuss these results, please don't hesitate to contact our office.

Sincerely,

Matt Brien, BS
Physics Associate

Encl.

| Number of Layers | Sample Designation | Attenuation | | | |
|------------------|--------------------|-------------|---------|---------|---------|
| | | 60 kVp | 80 kVp | 100 kVp | 140 kVp |
| 1 | XL-Bi-4 | * | * | * | * |
| 1 | XL-Bi-5 | 98.01 % | 94.08 % | 89.94 % | 85.04 % |
| 1 | XL-Bi-8 | 99.32 % | 97.20 % | 94.48 % | 91.81 % |
| 1 | XBAR-2 | * | 99.97 % | 99.89 % | 99.20 % |
| 1 | XCO-1 | * | * | * | 99.86 % |
| 1 | XH | 99.59 % | 98.32 % | 96.09 % | 91.40 % |
| 1 | XH-6 | * | * | * | * |
| 1 | XL-2L | * | * | * | 99.92 % |
| 1 | XBaBi-5 | * | * | * | 99.90 % |
| 1 | XL-BA-6A | * | * | * | 99.75 % |
| 1 | XBi-WS 2 | 98.89 % | 95.67 % | 92.00 % | 88.05 % |

*Radiation at this tube potential is fully attenuated.

| Number of Layers | Sample Designation | Lead Equivalency (mm Pb) | | | |
|------------------|--------------------|--------------------------|--------|---------|---------|
| | | 60 kVp | 80 kVp | 100 kVp | 140 kVp |
| 1 | XL-Bi-4 | ** | ** | ** | ** |
| 1 | XL-Bi-5 | 0.278 | 0.301 | 0.301 | 0.300 |
| 1 | XL-Bi-8 | 0.400 | 0.437 | 0.439 | 0.439 |
| 1 | XBAR-2 | ** | 1.580 | 1.720 | 1.100 |
| 1 | XCO-1 | ** | ** | ** | 1.750 |
| 1 | XH | 0.461 | 0.538 | 0.538 | 0.425 |
| 1 | XH-6 | ** | ** | ** | ** |
| 1 | XL-2L | ** | ** | ** | > 1.980 |
| 1 | XBaBi-5 | ** | ** | ** | 1.900 |
| 1 | XL-BA-6A | ** | ** | ** | 1.530 |
| 1 | XBi-WS 2 | 0.338 | 0.358 | 0.350 | 0.350 |

**Due to the high attenuation of this sample lead equivalency cannot be determined at this tube potential.