# EDGE BILAYER

Rothband
Your Partner in Medical Imaging

## Passing IEC 61331-1:2014, DIN 6857-1 and ASTM F2547-06 at the lowest weight.

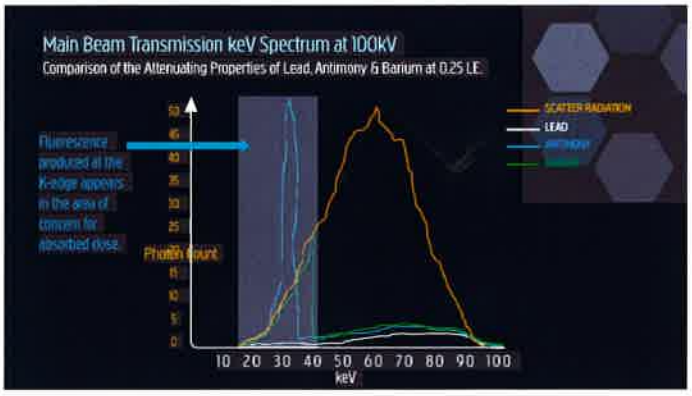
**EDGE BILAYER, is a unique methodology that is the single biggest advancement in flexible radiation protection materials for medical environments, for more than a generation.**

**The technical advantages of the bilayer approach in terms of safety, weight and comfort, enable protective aprons, skirts and accessories to provide up to 20% reduction in absorbed dose than competitors' Lead composite materials and 40% better performance than Lead-free alternatives at comparable LE.***

## EDGE BILAYER: Conquering the K-Edge

Edge Bilayer takes advantage of the physics associated with using individual layers of specific materials to provide the maximum attenuation by eliminating the scatter and fluorescence associated with the low atomic weight metals typically used in lead-free or low-Lead composites.

All lead free materials use a combination of heavy elements and always utlise an element named antimony which exhibits similar attenuation characteristics as lead, making it a good choice for an alternative, lightweight alternative for x-ray protection apparel.




However, unlike lead, antimony has a k-edge at the lower energy levels (fig1.) The presence of the K-Edge effectivley allows the transmission of photons through the protective material at these lower energy levels. The concern, is that this energy is likely to be absorbed by the operator.

In the past, the relevent standards have always assessed radition protective materials with narrow beam spectroscopy between a range of 80-150 KeV. The new IEC 61331-1:2014 standard, looks at a materials effectiveness at lower energy levels using broad beam spectroscopy.

## The principle of Bilayer

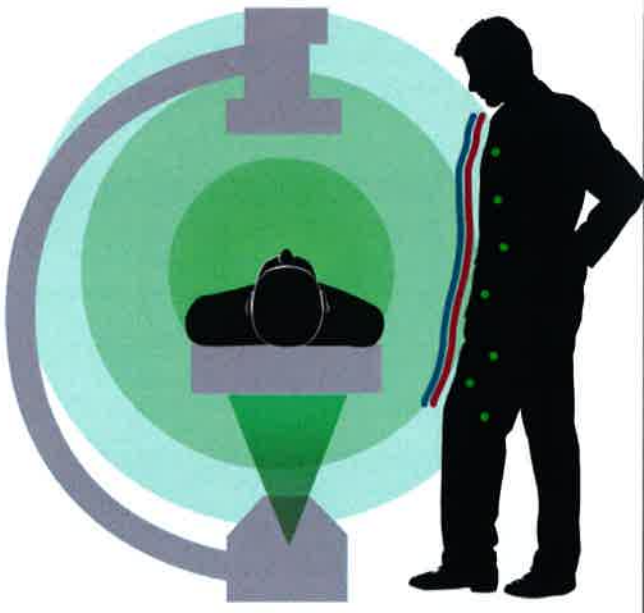
Edge Bilayer, takes a different approach to core material consruction.

Rather than building the protective composite as a mixture, the manufacturing process actually layers the Antimony with Bismuth.

| | | |
|---|---|---|
| Sb | Antimony | 51 (low atomic weight element) |
| Bi | Bismuth | 83 (high atomic-weight element) |

The Bismuth acts as a backstop and prevents the lower energy photons passing through the material onto the wearer.

By utilising this construction method, we are able to provide a better level of protection, by preventing the passage of low energy photons through the protective garment.

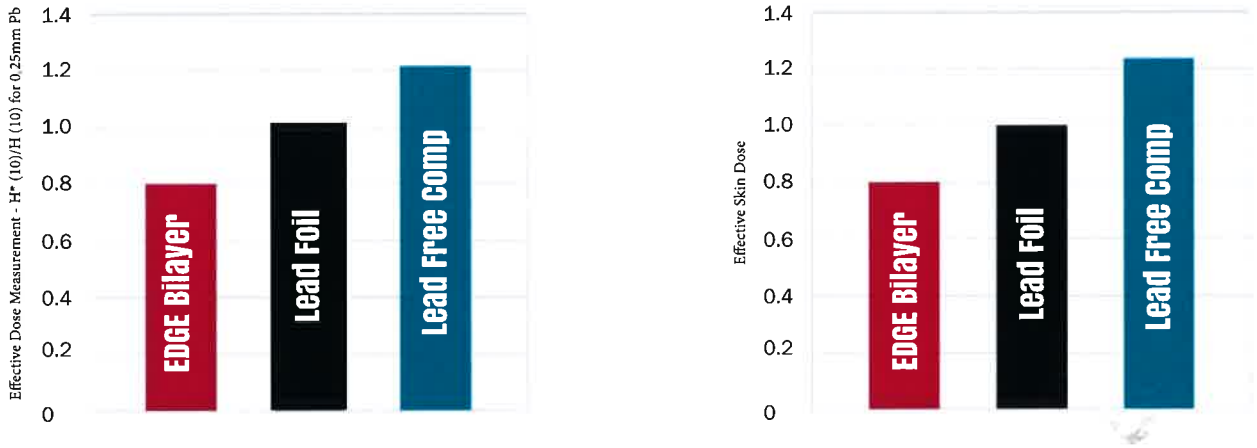


*Independent Studies

ASTM INTERNATIONAL IEC DIN

## The Effectiveness of Bilayer

> The results suggest that using the bilayer material with Antimony at the tube side, can result in a reduction in the effective dose of up to 20% compared with 0.25 lead foil.
>
> The lead free composite, was found to increase effective dose by 20% compared with 0.25 lead foil.




Independent test results show that the Edge Bilayer material (0.25LE) provides a reduction in effective skin, and absorbed dose of 20% compared with 0.25 LE lead foil. And in excess of 40% when tested against industry standard lead free composites.

**20%** GREATER PROTECTION AGAINST ABSORBED DOSE WHEN COMPARED TO STANDARD LEAD PRODUCTS.

**40%** GREATER PROTECTION AGAINST ABSORBED DOSE WHEN COMPARED TO LEAD-FREE, OR LOW-LEAD COMPOSITES.

## A Matter of Weight

Below is a comparison of target weights between our key materials. as you can see the Edge Bilayer comes in at a whopping 23.91% lighter. According to our research, our nearest competitor weighs in at 3.8Kg per m2.

| Weight per $M^2$ | Lightweight Lead | No Lead | Edge Bilayer |
|---|---|---|---|
| **0.25 LE** | 3.3 Kg | 3 Kg | 2.65 Kg |
| **0.35 LE** | 4.6 Kg | 4.2 Kg | 3.5 Kg |

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