

NATIONAL PHYSICAL LABORATORY

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Certificate of Calibration

Determination of the shielding properties of Lead-free vinyl samples

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FOR:

Kemmetech Ltd
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TN12 5HE


DESCRIPTION:

Determination of Lead equivalence of Lead-free vinyl samples in accordance with BS EN 61331-1:2002

DATE OF MEASUREMENTS: 4 June 2013

Reference: 2013070243-7

Date of Issue: 15 July 2013

Checked by: 



Signed: 

Name: G A Bass

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(Authorised signatory)

on behalf of NPLML

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Continuation Sheet

CONDITIONS:

Distance from x-ray tube to target sample: 0.5m
Distance from x-ray tube to detector: 1.1m
Ionisation chamber used: TS100M

All equipment associated with the measurements performed in this report has direct traceability to UK national standards or UKAS accredited calibration facilities. The samples were circular in cross section with a diameter of approximately 110mm.

Table I
61331-1:2002 X-ray beam qualities

<u>X-ray Tube Voltage</u> kV	<u>Additional filtration</u> mmCu
80	0.15
100	0.25

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RESULTS:

Table II

Lead-free vinyl sheet, 0.125mm nominal Lead equivalent

<u>kV</u>	<u>Equivalent Lead thickness</u> mm	<u>Attenuation</u> %
80	0.1482	79.6
100	0.1561	66.7

Table III

Lead-free vinyl sheet, 0.175mm nominal Lead equivalent

<u>kV</u>	<u>Equivalent Lead thickness</u> mm	<u>Attenuation</u> %
80	0.2081	86.7
100	0.2093	75.0

Table IV

Lead-free vinyl sheet, 0.25mm nominal Lead equivalent

<u>kV</u>	<u>Equivalent Lead thickness</u> mm	<u>Attenuation</u> %
80	0.2946	92.0
100	0.2863	82.5

Attenuation = $1 - \text{attenuated/un-attenuated} \times 100$

UNCERTAINTIES

The uncertainty in the Lead equivalence is 5%. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

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