Lead Alternative Shield

Utilising advanced 3D Design and 3D Printing innovations, Evamed has been able to develop a streamlined, additive manufacturing process that takes an accurate map of a patients required radiation therapy treatment area to create a customised radiation shield. Allowing therapists to deliver highly focused radiation therapy whilst minimising exposure to healthy tissue. Evamed eCutout is a Tungsten Carbide composite Shield in a 3D printed plastic frame with the precise aperture printed into the shield device. The shield frame is filled with an attenuating material, in this case, Tungsten Carbide composite. The material is non-toxic, able to be physically handled and is reclaimable. Evamed has implemented a manufacturing process capable of a high degree of accuracy, to produce on demand, custom, beam-shaping radiation shield devices for individualised patient treatment. This completely automated production process allows for quick and efficient production and delivery via our online orders portal along with the use of our purposely designed GUI for offset, labelling and orientating purposes.

Tungsten Carbide Powder

Introduction

To ensure that the Evamed eCutout was as effective, as it was innovative, it needed to be capable of replacing the long-standing method of radiation shielding, which uses toxic, low melting point alloys (LMPA) like Cerrobend.

Clinical Validation

The Evamed R&D team, undertook extensive preclinical testing and trial at the Radiation Oncology Mater Centre which gave us what we had hoped for with our innovative design and manufacturing model. Dosimetry of the Evamed eCutout was characterised by measuring transmission, relative dosimetry (percentage depth doses and profiles) and insert factors for all electron energies (6, 9 , 12, 15, 18 MeV) at both 100cm and 110cm Source to Surface Distance (SSD) on a Varian Clinac iX for a range of square cut-out Dimensions (3cm-25cm). The transmission test showed the Evamed eCutout attenuating material is equivalent of the LMPA for 6-18 MeV to within ± 0.5%. Most importantly, it was clear that, dosimetrically, the Evamed eCutout could be used as an alternative to LMPA.

Clinical Use

In stark contract, the Evamed eCutout uses non-lead radiation shielding powder in a 3D printed frame which fits into a specific LINAC applicator. This change in block out material combined with the use of 3D printed, Biodegradable Poly-Lactic acid (PLA) plastic frames means that the Evamed eCutout shield is non-toxic to personnel, patient's and environmentally recyclable.

Lead & Cadmium Free

Existing shield devices most commonly use LMPA electron block material, which is toxic and hazardous. The use of lead containing materials at room temperature, let alone melting point, is a serious health concern for the hospital workers and patients when it is placed onto radiotherapy machines for patient treatment. Special rooms and handling procedures have been developed to manage the risk but this comes at a high operating cost to the hospitals. Unfortunately, this does not eliminate the risk as lead is still toxic even in final form ready for use. Evamed has utilised a manufacturing process which is rigorously tested and is guaranteed 100% lead and cadmium free.

R&D

Evamed has invested over $1 Million in R&D specifically to design an environmentally friendly material that can be used as a replacement for LMPA traditionally used within the Varian and Elekta LINACS.

Lead Time

Evamed's advanced technology allows for **same day dispatch** on orders placed before 9am.

eCutout Unique Features

- A Superior alternative to traditional lead radiation shield devices
- Laser etched labelling
- Non-hazardous
- Superficial & Orthovoltage use
- Improved accuracy of all eCutout water jet cut apertures
- Significant reduction in preparation time
- Environmentally friendly

1) Vedang Vyas, Lisa Palmer, Ray Mudge, et al. On bolus for megavoltage photon and electron radiation therapy Medical Dosimetry 38 (2013) 268–273
2) Yizhou Zhao, Kathryn Moran, Mammo Yewondwossen, Clinical applications of 3-dimensional printing in radiation therapy. Medical Dosimetry 42 (2017) 150–155
3) Burleson S, Baker J, Hsia AT, et al. Use of 3D printers to create a patient-specific 3D bolus for external beam therapy. J Appl Clin Med Phys. 2015;16:166–178
4) Park S-Y, Choi CH, Park JM, et al. A Patient-Specific Polylactic Acid Bolus Made by a 3D Printer for Breast Cancer Radiation Therapy. Deutsch E, ed. PLoS ONE. 2016;11:e0168063.
5) Robar James L., Moran Kathryn, Allan James, Clancey James, Joseph Tami, Chytyk-Praznik Krista, MacDonald R. Lee, Lincoln John, Sadeghi Parisa, Rutledge Robert, Intra-patient study comparing 3D printed bolus versus standard vinyl gel sheet bolus for postmastectomy chest wall radiation therapy, Practical Radiation Oncology (2017)
6) A. Dubey, A.M. Sharma, D. Sasaki, et al. Perception and Time Effectiveness of Utilizing 3D Printer Technology to Create Rigid Bolus for Radiation Therapy. Int J Radiat Oncol Biol Phys 2017 99;2:413-414

Testimonials

"We recently investigated and then commissioned Evamed's Electron cutouts for use with our Elekta machines. The team was excited to have an option which would remove our need for a mould room and the cutouts meet all our expectations. They interfaced well with the linacs, were dosimetrically equivalent to the Cerrobend cutouts we have traditionally used, and were appreciated by the RT's for their easy handling. Throughout the commissioning process, the team at Evamed were always extremely responsive and helpful to our requests. They adjusted their online ordering process to ensure the ordering fit with our local systems and dealt with any issues had in a positive and constructive manner."
- *Christchurch Hospital, New Zealand*

"The team at Evamed actively engage in customising their products to our departmental needs. They show eagerness in investigating improvements and thoughtful design modifications are offered frequently. Exciting things have been made possible for us!"
- *Waikato Hospital, New Zealand*

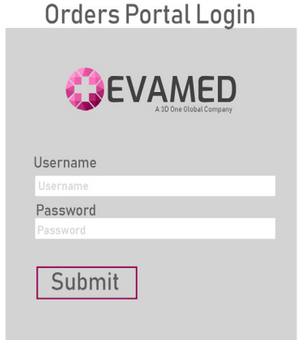
Technical Specifications	
Density (g/cc)	> 9 (Equivalent to LMPA)
Size (cm)	**Varian:** 6x6, 10x10, 15x15, 20x20, 25x25 **Elekta**: 6x6, 10x10, 14x14, 20x20, 25x25
Working Temp (°C)	< 50 °C
Materials	Tungsten Carbide Polylactic Acid

High quality, accurate, patient specific radiation shield

NON TOXIC · TUNGSTEN CARBIDE · LEAD ALTERNATIVE · WAND Registered · TGA Registered

TGA Registeration no: 299710

Orders Portal Login



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Our unique Orders Portal https://portal.evamed-global.com/users/login allows our registered clients to upload paitents redacted files in various formats such as .DAT, .CSV, .STL or .DCM

Varian & Elekta Compatible

eCutout

- NonToxic
- Tungsten Carbide material
- Patient specific capabilities
- Reclaimable & Recyclable