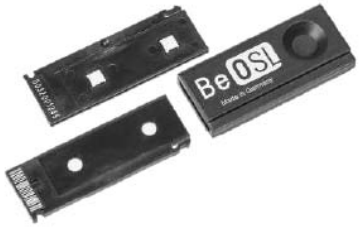
1. ¿QUÉ ES LA DOSIMETRÍA OSL?

La dosimetría **OSL** ("***Optical Stimulated Luminiscence***") o dosimetría de luminiscencia ópticamente estimulada, se fundamenta en que los electrones de los planos cristalinos para ciertos materiales pueden quedar atrapados entre la banda de valencia y la banda de conducción tras una excitación provocada por la radiación ionizante. De tal manera que, al exponer el material a la luz visible después del campo ionizante, los electrones atrapados se promocionan a la banda de conducción para después regresar a la banda de valencia emitiendo un fotón. Finalmente, la intensidad de este fotón emitido es directamente proporcional a la cantidad de cargas atrapadas en el material, por lo que puedes ser usado como una técnica de medida de la exposición a la radiación ionizante; esencialmente, un método novedoso de medición dosimétrica.





El material OSL más conocido para el uso dosimétrico es el óxido de berilio. Se trata de un material cerámico con estructura de wurtzita hexagonal que posee, naturalmente, defectos en su estructura cristalina, gracias a los cuales atrapan los electrones liberados por la exposición a la radiación. Posteriormente, debido a la estimulación con luz, el óxido de berilio libera la energía almacenada entre su banda de valencia y su banda de conducción emitiendo un fotón, el cual es medible con un simple fotomultiplicador. Al tratarse de un material cerámico, el óxido de berilio tiene un elevado punto de fusión, por lo que es muy estable térmicamente y no se ve alterada la emisión del fotón por el calor; como ocurre con los dosímetros de termoluminiscencia (TLD) y sobre lo cual se fundamenta su funcionamiento.

2. ¿ OSL / TLD ?

Las principales ventajas de la dosimetría OSL frene a la TLD son:

- No es necesario calentar la muestra como en el caso de los TLD.
- **No existe la radiación del cuerpo negro** que ocurre a altas temperaturas con los TLD.
- En los TLD existe una probabilidad relativamente alta de perder la señal por efectos térmicos.
- Es menos probable el efecto de sensibilización que ocurre en los TLD.
- **La pérdida de la señal por fading o desvanecimiento es menor al 10%** por año mientras que en los TLD es del 20% en tres meses.
- Las medidas en los **OSL no se eliminan instantáneamente después de la lectura del dosímetro**.
- **Alta velocidad de lectura de los dosímetros OSL** al fundamentarse la técnica en la emisión fotónica por un haz de luz.
- Mayor durabilidad en el rango activo de funcionamiento que los TLD.

3. EQUIPOS DE DOSIMETRICS – MIRION

DOSIMETRICS comenzó en 2013 como un spin-off de Helmholtz Zentrum Munich, un centro de investigación alemán para la salud ambiental. El exclusivo sistema BeOSL fue desarrollado por el Grupo de Física de la Radiación de la Universidad Técnica de Dresde con Auswertungsstelle de Helmholtz Zentrum Munich, que es el servicio oficial de dosimetría de personal para Baviera y otros cuatro estados alemanes. Con casi 2 millones de mediciones al año, Auswertungsstelle es el mayor proveedor de servicios de dosimetría de Europa.

A fines de 2020, DOSIMETRICS se une a MIRION TECHNOLOGIES. En junio de 2021, se fusionan con MIRION Technologies (AWST) GmbH, pasando a formar parte de la División de Servicios de Dosimetría (DSD) de MIRION.

Desde TECNASA, con la intención de cubrir las necesidades en el área de la dosimetría mediante la técnica de luminiscencia por estimulación óptica, ofrecemos los dosímetros OSL de la marca DOSIMETRICS – MIRION. Dichos sistema de dosimetría abarca un amplio rango de productos, así como de accesorios opcionales, que convierten al conjunto dosimétrico en un estándar de fiabilidad, robustez, perfecto funcionamiento, fácil manejo, gran versatilidad e increíble durabilidad.

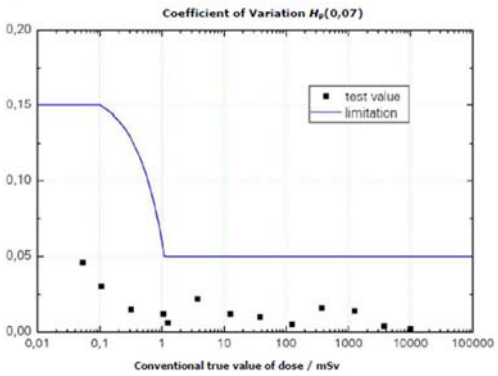
A continuación, os mostramos los equipos más significativos de DOSIMETRICS – MIRION comercializables desde TECNASA.

3.1. Dosímetro BeOSL.

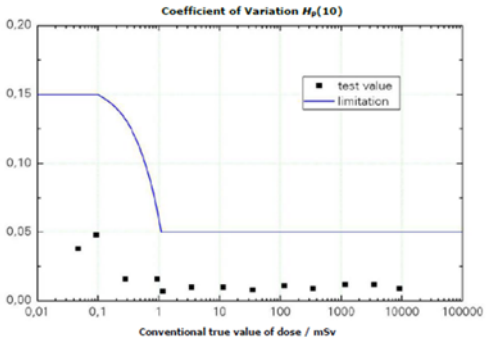
Características:

- Medición de **dosis equivalente $H_p(10)$ y $H_p(0.07)$ en Sievert (Sv)**.
- Versatilidad del equipo, **pudiendo ser de 2 o de 4 elementos**.
- El material del detector es óxido de berilio (BeO),
- El tipo de radiación medible es la radiación fotónica y la radiación beta a partir del Sr/Y-90.
- Largo rango dinámico de medida:
  - 0.1 mSv ≤ $H_p(10)$ ≤ 10 Sv
  - 16 keV ≤ $E_{fotón}$ ≤ 7 MeV
  - 0° ≤ α ≤ ±60°

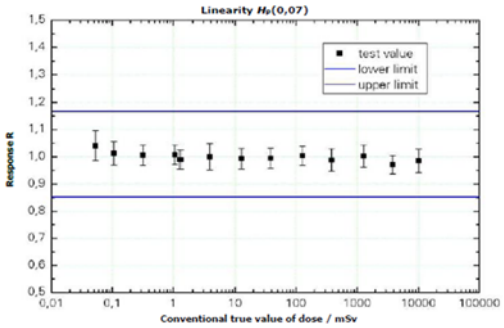
High Accuracy and Precision



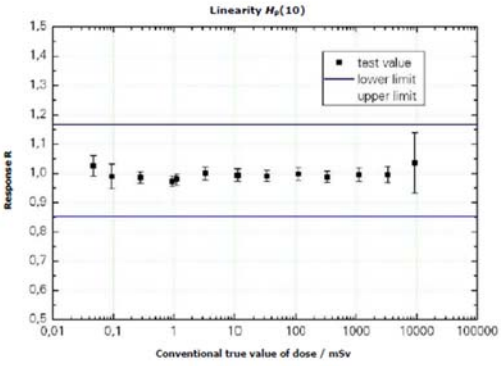
High Accuracy and Precision (continued)



Linearity of Signal with Dose over a Wide Range



Linearity of Signal with Dose over a Wide Range (continued)



3.2. Lector de dosímetros BeOSL (BeOSL Reader)

BeOSL Reader es un componente esencial de cada sistema BeOSL. **El BeOSL Reader mide la exposición a la radiación utilizando tecnología puntera de luminiscencia ópticamente estimulada (OSL)**. Durante el proceso de lectura, el material se expone a la luz de un emisor diodo (LED). Este estímulo provoca la emisión de luz instantánea de los detectores BeO que se mide mediante tubos fotomultiplicadores. De tal manera, que la cantidad de luz liberada coincide proporcionalmente con la dosis de radiación a la que se expuso el dosímetro.

Además, **BeOSL Reader ofrece una velocidad de trabajo superior a otros sistemas**. Para la lectura se extrae automáticamente la tarjeta con los elementos detectores del dosímetro, empujándolo hacia atrás después de la lectura. Tiene dos modos de trabajo; en el modo rápido, el tiempo corto de lectura permite al operador procesar 240 dosímetros por hora o más, y en modo estándar se pueden procesar 100 dosímetros.

Características:

- Cumple con la norma IEC 62387.
- Lecturas extremadamente rápidas.
- Fácil de usar, aprender y mantener.
- Sin necesidad de nitrógeno.

3.3. Borrador de dosímetros BeOSL (BeOSL Eraser)

BeOSL Eraser es la tercera herramienta esencial por excelencia del sistema BeOSL. **El borrador BeOSL elimina permanentemente toda la información de la dosis contenida en el dosímetro**, lo cual permite al usuario volver a reutilizar los dosímetros BeOSL y asignar un nuevo usuario nuevo al mismo. BeOSL Eraser ofrece un borrado en tiempo dinámico para adaptarse a las necesidades del usuario. El procesamiento de borrado es rápido y permite al usuario ahorrar costes económicos y tiempo, incrementando la productividad del flujo de trabajo.

Además, gracias a su alta capacidad de borrado el BeOSL Eraser puede llegar a borrar 100 dosímetros por hora.

Características:

- Fácil de usar, aprender y mantener.
- Lector interno de Código de barras.
- Tiempo de borrado dependiente de la dosis para la optimización del rendimiento.

3.4. Control de calidad de dosímetros BeOSL (BeOSL QA)

El dosímetro de control de calidad BeOSL QA es un elemento esencial para garantizar la calibración óptima del lector. El control de calidad es fácil de llevar a cabo proporcionando la recalibración de detectores para sus usuarios. Combinado con el software de lectura, la calibración del lector puede realizarse rápidamente con gran precisión y en poco tiempo. El etiquetado especial del BeOSL QA permite ser leído por más tiempo para alcanzar el máximo de precisión, lo cual facilita que los dosímetros QA no se vean afectados por efectos de desvanecimiento o del propio fondo. En este sentido, se incrementa mucho la precisión y se garantiza una mejor verificación de calibración.

Características:

- Calibración del lector de control para asegurar la calidad y precisión más altas posibles.
- Fácilmente manejable por el usuario.
- Recalibración automática.

3.5. Dosímetros de anillo: BeOSL Finger Ring.

Cuando las mediciones de la dosis en todo el cuerpo no son suficientes, el ***BeOSL Finger Ring*** **garantiza mediciones precisas de la dosis en el dedo y/o la mano**. El anillo de dedo BeOSL es de pequeño tamaño pero muy sensible y seguro. Contiene un detector llamado *BeOSL ezClip*. Este detector viene completamente calibrado y debe encajar en el anillo de dedo BeOSL. El *ezClip* se inserta en el anillo de dedo BeOSL con un dispositivo de ensamblaje neumático o manual. Una vez que el *ezClip* se coloca en el anillo de dedo BeOSL, el usuario puede ajustar el anillo para que se ajuste exactamente a su tamaño.

3.6. Dosímetros de ojo: Eye - lens

El **dosímetro de lente ocular BeOSL es la mejor solución para el control de la dosis ocular.** Se puede integrar sin problemas en los sistemas BeOSL nuevos y existentes. Al igual que otros dosímetros de cuerpo parcial BeOSL, el dosímetro de lente ocular BeOSL funciona con el BeOSL ezClip. Este pequeño detector viene completamente calibrado y encaja perfectamente en el dosímetro de lente ocular para una medición precisa y segura. Hay dispositivos manuales y automáticos disponibles para insertar y quitar el ezClip del dosímetro de lente ocular BeOSL. Cuando el ezClip se coloca en el dosímetro de lente ocular BeOSL, hay dos opciones diferentes para usar los dosímetros: un adaptador de banda para la cabeza o gafas de radiación.

3.7. Software de manejo del BeOSL (BeOSL Software)

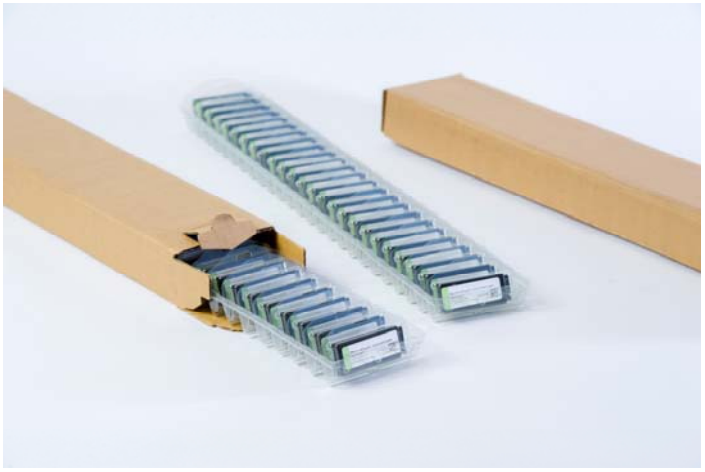
El **BeOSL Software está diseñado para ayudar al usuario, es fácil de usar, versátil y está adaptado a servicios de monitoreo para sistemas manuales o automáticos de dosímetros BeOSL**. El software específicamente está concebido para guiar y asistir al operador en cada fase del proceso.

El software puede incluir diferentes opciones de controladores y servicios:

- Controlador del BeOSL Reader versión full o versión light
- Software LabClient para la gestión de las medidas de dosis y sistema manual integrado con el controlador del BeOSL Reader.
- Opciones disponibles para sistemas manuales o automáticos.
- Servicios de mantenimiento y actualizaciones disponibles.

3.8. Automatización: Mesa robótica.

La mesa robótica es la mejora perfecta para servicios de monitorización de mayor tamaño. Es innovador, inteligente y permite al usuario tener un máximo nivel de automatización. **Se pueden manejar hasta 5.000 dosímetros BeOSL a la vez** como carga a granel. **Además, no se requiere supervisión; la mesa robótica puede asumir turnos nocturnos y de fin de semana. Durante este tiempo, no se requieren recursos humanos**. La Mesa Robótica es versátil y ofrece modularidad para sus usuarios. Se pueden operar varias mesas robóticas al mismo tiempo con hasta cinco dispositivos BeOSL a elección del usuario por mesa.



La Mesa Robótica presenta mejoras para sus usuarios:

- El panel de la PC está montado en el brazo lo que permite al operador moverlo libremente.
- Tiene tres puertas. Esto significa que el usuario tiene acceso a los dispositivos en todas las posiciones posibles.
- Con estructura mejorada para una mayor cantidad de almacenamiento.

4. INFORMACIÓN ADICIONAL

Para cualquier información o cualquier duda no dude en contactar con TECNASA, a través de:

comercial@tecnasa.es

www.tecnasa.es

ANEXOS

- Dosimetros BeOSL
- Lector (Reader)
- Borrador (Eraser)
- Dosímetro de anillo
- Dosímetro de cristalino
- BeOSL Software
- Automatizacíón Mesa Robótica

DOSImetrics

BeOSL

Be Smart. Be Safe. BeOSL.

Our modern world can be complicated – so you should keep your dosimetry easy. We are your one-source solution. Our core technology, BeOSL is a state-of-the-art personnel dosimetry system that grows with your business. To meet all of your needs, we have a wide range of software solutions, options for automation and logistic concepts.

BeOSL

OPTICALLY STIMULATED LUMINESCENCE (OSL) BASED ON BERYLLIUM OXIDE (BEO)

BeOSL

Your Partner for Future Tasks

Dosimetrics is ready to be your partner in dosimetry. Our focus is on you. We see ourselves as a service-oriented company. Other companies offer concepts, we have solutions. We can assure a superior level of quality for our customers with our ISO 9001 accreditation.

The Dosimetry System that Grows with Your Business

Our core technology, the BeOSL System, is simple and flexible. Whether your dosimetry service is small, large or something in between, our system can be seamlessly integrated. It allows the user to run the system from a small manual solution up to a fully automated robotic system which can be fed up to 5,000 dosimeters as bulk cargo. Also, whenever you are ready for the next step, you are able to add more BeOSL Equipment or solutions such as automation and logistics. We offer accessories, software and services.

Highest Quality

Our BeOSL Equipment is versatile and sustainable. Our exceptional engineering and design, high-end components, and local manufacturing in Germany ensure millions of readouts with as little downtime as possible.

MADE IN GERMANY

BeOSL Technology is used by leading dosimetry services around the world!

OUR PRODUCTS

- BeOSL Dosimeters
- BeOSL Partial Body Dosimeters
- BeOSL Reader
- BeOSL Eraser
- BeOSL Irradiator
- BeOSL Quality Assurance
- Automation
- Accessories
- Software
- Services

MIRION TECHNOLOGIES (AWST) GMBH

DOSIMETRICS

OTTO-HAHN-RING 6

81739 MÜNCHEN, GERMANY

WWW.DOSIMETRICS.DE

INFO@DOSIMETRICS.DE

Version 1.1

DOSImetrics

Be Smart. Be Safe. BeOSL.

The BeOSL Dosimeter is the essential component for whole body personal dosimetry measurements. This dosimeter measures the personal dose equivalents $H_p(10)$ and $H_p(0,07)$ in Sievert (Sv). The detector material beryllium oxide (BeO) readout is via optically stimulated luminescence (OSL). BeOSL Dosimeters are available in either a two-element and four-element-version. The BeOSL Dosimeter is versatile and can be used in many applications making it the best solution for whole body dosimetry measurements.

BeOSL Dosimeter

Key Features:

- MANUFACTURER CALIBRATED
- MULTIPLE READOUTS
- VERSATILE AND SUSTAINABLE DESIGN
- SMALL AND LIGHT FOR EASY HANDLING AND WEARING

BeOSL Dosimeter

Our cutting-edge BeOSL technology provides users with multiple dosimeter readouts (i.e., rereads) for dose result verification.

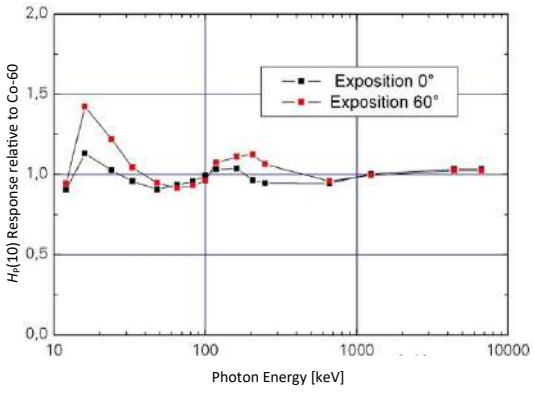
With its durable and sleek design, the BeOSL Dosimeter is custom-made and manufactured in Germany. The BeOSL Dosimeter is comprised of high quality components to ensure the most accurate readouts possible for a high rate of wearing periods. Also, its detectors are always protected against environmental influences as the detector tray is extracted from the dosimeter only inside the BeOSL Equipment.

The BeOSL Dosimeter is available in both two-element or four-element versions which means it carries either two or four BeO detectors. With its excellent ceramic tissue equivalency of the BeO material, the two-element BeOSL Dosimeter uses only one detector for each quantity ($H_p(10)$ and $H_p(0,07)$).

The two-element version covers the $H_p(10)$ detector with a filter made of Teflon. The $H_p(0,07)$ detector is covered by a thin plastic layer. This dosimeter version is smaller and lighter for easier handling and wearing.

The four-element dosimeter has two additional detectors; one is covered with copper and the other one with lead. These detectors receive information on energy. This means our algorithm can deliver a higher accuracy and clearer information on the irradiated radiation quality compared to other dosimeters.

BeOSL Four-Element Dosimeter: Energy and Angular Response



As the manufacturer, we deliver only calibrated dosimeters. Also, each BeO detector in every BeOSL dosimeter is individually calibrated. Because of this, we receive exceptional dose precisions even for rereads. The BeOSL Dosimeters are designed to keep our customers' lives simple; a calibration file is delivered with all the dosimeters. For additional information including pricing, please contact the Sales team at sales@dosimetrics.de.

BeOSL Technology is used by leading dosimetry services around the world!

MADE IN GERMANY

TECHNICAL SPECIFICATIONS

Dosimeter Identification:
Bar Code (Code 128 C),
Internal RFID Chip on Request

Detector Material:
Beryllium Oxide

Radiation Type:
Photon Radiation and Beta Radiation from Sr/Y-90

Nominal Range:
0,1 mSv ≤ $H_p(10)$ ≤ 10 Sv
16 keV ≤ E_{ph} ≤ 7MeV
0° ≤ α ≤ ±60°

Mechanical Resistance:
No Effect for Drop Heights up to 2 m/6.5 ft

Dimensions (2-Element):
LxWxH 58x23x9 mm /
2.3x0.9x0.4 in
Weight: 10 g

Dimensions (4-Element):
LxWxH: 71x23x9 mm /
2.8x0.9x0.4 in
Weight: 16 g

COMPONENTS

Article Number	Description
1001	BeOSL Two-Element Dosimeter
1002	BeOSL Four-Element Dosimeter

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INFO@DOSIMETRICS.DE

Version 1.2

DOSImetrics

Be Smart. Be Safe. BeOSL.

The BeOSL Reader is an essential component of every BeOSL System. The BeOSL Reader measures radiation exposure using state-of-the-art technology, optically stimulated luminescence (OSL). During the readout process, the material is exposed to light from a light emitting diode (LED). This stimulus causes instantaneous light emission from the BeO detectors which is measured by photomultiplier tubes (PMT). The amount of released light matches proportionally with the radiation dose to which the dosimeter was exposed.

BeOSL Reader

Key Features

- COMPLIANT TO IEC 62387
- EXTREMELY FAST READOUTS
- EASY TO USE, LEARN AND MAINTAIN
- NO NEED FOR NITROGEN

BeOSL Reader

TECHNICAL SPECIFICATIONS

The BeOSL Reader is a fundamental part of the BeOSL System. Our BeOSL technology provides multiple dosimeter readouts (i.e., rereads) for dose result verification. The BeOSL Reader's exceptional engineering and design, high-end components, and local manufacturing in Germany ensure millions of readouts with as little downtime as possible.

The BeOSL Reader can be operated in two different ways: either manually or combined with automatic solutions. It is designed to read two- and four-element BeOSL Dosimeters. The two-element version measures $H_p(10)$ and $H_p(0,07)$ simultaneously within the limits of IEC 62387. The dose algorithms are linear and not based on a distinction of cases.

Our Reader goes above and beyond international standards. It is CE compliant and part of a dosimetry system that is PTB type tested (*Physikalisch-Technische Bundesanstalt* of Braunschweig, Germany) under reference number 23.52 11.01.

Also, the BeOSL Reader offers more than other systems can; it automatically extracts the card with the detector elements from the dosimeter assembly and pushes it back after the readout. In fast mode, the short readout time allows the operator to process 240 dosimeters per hour or more and in standard mode, 100 dosimeters can be processed.

The BeOSL Reader is paired with its own very intuitive and user-friendly operational software, LabClient. It leads the user through the entire process with on-screen messages and self-explanatory pictographs. The Reader also controls the reader calibration and numerous quality management functions. More information about our software's functions can be found in the *LabClient Manual*.

Our IT and Customer Support Team is always ready to assist with any technical questions or inquiries the user may come across when operating any of our BeOSL equipment. With the BeOSL Reader, our expert staff are able to remotely access a customer's system (subject to the customer's permission) for monitoring and servicing any issues. The Dosimetrics' Team ensures both high quality service and products – we are ready to be your partner in providing a best dosimetry system possible to your clients.

MADE IN GERMANY

Throughput:
240/hour in fast mode
100/hour in standard mode

Dosimeter Identification:
Internal bar code reader (Code 128 C), internal RFID reader on request

Nominal Range (Dose):
30 µSv - 10 Sv

Nominal Range (Energy, Angle):
16 keV - 7 MeV
0° - ±60°

Repeatability:
σ < 3% for 1 mSv of Cs-137

Size:
Width: 20.5 cm / 8.1 in
Height without optional handle: 20.6 cm / 8.1 in
Length, drawer closed: 47.9 cm / 18.9 in
Length, drawer open: 57.5 cm / 22.6 in
Weight: 18.6 kg / 41 lbs

Electrical Supply Data:
100 - 240 V, 50 - 60 Hz

Maximum nominal power:
30 VA @ 100 V,
40 VA @ 240 V

IP 41

COMPONENTS

Article Number	Description
1001	BeOSL Two-Element Dosimeter
1002	BeOSL Four-Element Dosimeter
2001	BeOSL Reader
2002	BeOSL Eraser
2003	BeOSL Irradiator
2012-0001	Reader Control PC (full)
2012-0002	Reader Control PC (light)

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INFO@DOSIMETRICS.DE

Version 1.2

DOSImetrics

Be Smart. Be Safe. BeOSL.

BeOSL Eraser and BeOSL Reader are the quintessential combination in the BeOSL System. The BeOSL Eraser permanently removes all dose information from the dosimeter. The BeOSL Eraser offers dynamic erasing time to fit the needs of the user. The quick processing time allows the user to save both money and time.

BeOSL Eraser

Key Features

- EASY TO LEARN, USE AND MAINTAIN
- INTERNAL BAR CODE READER
- DOSE DEPENDENT ERASING TIME FOR THROUGHPUT OPTIMIZATION

BeOSL Eraser

TECHNICAL SPECIFICATIONS

The BeOSL Eraser is like all the other BeOSL Equipment distinguished by its exceptional engineering, high-end components and local manufacturing in Germany.

The BeOSL Eraser can be operated in two different ways: either manually or combined with automatic solutions. It is designed to erase two- and four-element BeOSL Dosimeters.

All international standards are met with the BeOSL Eraser. It is CE compliant and part of a dosimetry system that is PTB type tested (*Physikalisch-Technische Bundesanstalt* of Braunschweig, Germany) under reference number 23.52 11.01.

It is simple; users save time and money in their dosimetry process with the BeOSL Eraser. Just like the BeOSL Reader, the BeOSL Eraser automatically extracts the card with the detector elements from the dosimeter assembly and pushes it back after erasing. Also, with its high capacity erasing stimulus, the dosimeter identification and variable erasing times, a manually operated BeOSL Eraser can process 100 dosimeters per hour or more.

The dose that was applied to a dosimeter can be completely removed by the BeOSL Eraser. This allows the user opportunity to use the BeOSL Dosimeters multiple times. The dosimeter can be returned to its dosimeter pool and can be assigned to a new or the same user again in the future.

BeOSL Technology is used by leading dosimetry services around the world!

MADE IN GERMANY

Dosimeter Identification:
internal bar code reader (Code 128 C)

Erasing Time:
typically 13 s for a dose of 0.5 mSv

Throughput:
100/hour in manual operation

Size:
Width: 20.5 cm / 8.1 in
Height without optional handle: 20.6 cm / 8.1 in Length, drawer closed: 47.9 cm / 18.9 in
Length, drawer open: 57.5 cm / 22.6 in

Weight:
15.5 kg / 34.2 lbs

Electrical Supply Data:
100 - 240 V, 50 - 60 Hz

Maximum nominal power:
30 VA @ 100 V,
40 VA @ 240 V

IP 41

COMPONENTS

Article Number	Description
1001	BeOSL Two-Element Dosimeter
1002	BeOSL Four-Element Dosimeter
2001	BeOSL Reader
2002	BeOSL Eraser
2003	BeOSL Irradiator
2012-0001	Reader Control PC (full)
2012-0002	Reader Control PC (light)

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Version 1.2

DOSImetrics

Be Smart. Be Safe. BeOSL.

Partial body dosimeters ensure accurate dose measurements for various appendages. The BeOSL Finger Ring provides precise finger and/or hand dose measurements. Its small and lightweight size provides the wearer a maximum amount of comfort. The BeOSL Finger Ring can be adjusted and custom-sized to fit the user's finger. Its smooth handling allows the user to take on routine tasks while securely wearing the dosimeter.

BeOSL Finger Ring

FEATURES

- PRECISE FINGER AND/OR HAND DOSE MEASUREMENTS
- MAXIMUM COMFORT AND EXTREMELY LIGHTWEIGHT
- COMPATIBLE WITH BEOSL EZCLIP

BeOSL Finger Ring

TECHNICAL SPECIFICATIONS

The BeOSL Finger Ring greatly enhances the BeOSL System. When whole body dose measurements are not enough, the BeOSL Finger Ring ensures accurate finger and/or hand dose measurements.

The BeOSL Finger Ring is small in size but very powerful and secure. It holds a detector called the BeOSL ezClip. This detector comes fully calibrated and has to be fit into the BeOSL Finger Ring. The ezClip is inserted into the BeOSL Finger Ring with either a pneumatic or manual assembly device. Once the ezClip is fit into the BeOSL Finger Ring, the user is able to adjust the ring to fit exactly to his/her size.

BeOSL Finger Ring

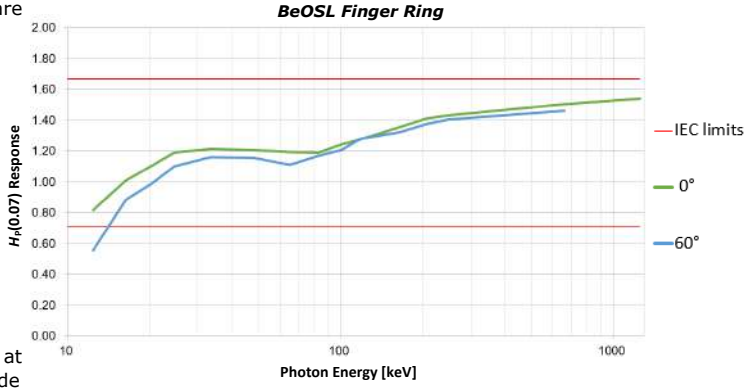
After the BeOSL Finger Ring has been used, it can be opened and the contained ezClip can be removed for further processing. The ezClip has its own reusable case that like looks very similar to the BeOSL Two-Element Dosimeter; this is called the ezCase. When fit into the ezCase, the ezClip is read, erased and processed in the BeOSL Reader and Eraser. It can even be used with our automatic options including Cartridge Based Automation and the Robotic Table. This solution allows existing BeOSL equipment to be utilized and avoids the need for another dosimetry system.

ezCase and ezClip

Our LabClient and Workflow software are ready to assist any dosimetry service to ensure smooth accuracy and compliance. Our software seamlessly assists the user to assemble the barcode of the ezClip to its dosimeter and readout badge (via the ezCase). This is done with our Detector Mapping Station offerings; there are both manual and semi-automatic options available. The Detector Mapping Station paired with our software provide the user more flexibility in handling his or her own detectors.

More information including pricing, technical data and catalog pages are available upon request. Please contact the Sales team at sales@dosimetrics.de for more information.

BeOSL Finger Ring



BeOSL Technology is used by leading dosimetry services around the world!

MADE IN GERMANY

Dosimeter Identification:
QR code and human readable number

Detector Material:
Beryllium Oxide

Radiation Type:
Photon radiation and Beta radiation from Sr/Y-90

Nominal Range:
30 µSv - 10 Sv
≥ 16 keV
0° ≤ α ≤ ±60°

COMPONENTS

Article Number	Description
1003	ezClip
2007	Manual Assembly and Disassembly Device
2008	Pneumatic Assembly and Disassembly Device
2009	Detector Mapping Station (Semi-Automatic)
2013	Detector Mapping Station (Manual)
4004	ezCase
4010	BeOSL Finger Ring

MIRION TECHNOLOGIES (AWST) GMBH
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Version 1.1

DOSImetrics

Be Smart. Be Safe. BeOSL.

Partial body dose measurements including the eyes are critical and important compliances to meet. When measuring goes beyond whole body doses, the pairing of the BeOSL ezClip and the BeOSL Eye Lens Dosimeter keeps the user secure while assuring standards. The dosimeter's small size lends to its versatility and provide the user with comfort and ease when taking on routine tasks.

BeOSL Eye Lens Dosimeter

FEATURES

- WORN WITH VARIOUS ADAPTERS OR RADIATION PROTECTION GOGGLES
- SMALL SIZE FOR EASY HANDLING
- COMPATIBLE WITH BEOSL EZCLIP

BeOSL
Eye Lens Dosimeter

TECHNICAL SPECIFICATIONS

Dosimeter Identification:
QR code and human readable number

Detector Material:
Beryllium Oxide

Radiation Type:
Photon radiation and Beta radiation from Sr/Y-90

Nominal Range:
30 µSv - 10 Sv
≥ 16 keV
0° ≤ α ≤ ±60°

The BeOSL Eye Lens Dosimeter is the best solution for eye dose monitoring and can be smoothly integrated into both new and existing BeOSL Systems. Like other BeOSL Partial Body Dosimeters, the BeOSL Eye Lens Dosimeter functions with the BeOSL ezClip. This tiny detector comes fully calibrated and fits perfectly into the Eye Lens Dosimeter for accurate and secure measuring. The ezClip is available with or without an ID number. There are both manual and automatic devices available for inserting and removing the ezClip from the BeOSL Eye Lens Dosimeter. When the ezClip is fit into the BeOSL Eye Lens Dosimeter, there are two different options for wearing the dosimeters:

a: Headband
b: Headband Adapter
c: BeOSL Eye Lens Dosimeter
d:ezClip
e:Eye Lens Dosimeter Mounting Tool

Headband Adapter

Firstly, there is the Headband Adapter (b — featured in the photo to the left) option which securely holds the BeOSL Eye Lens Dosimeter with our Headband. The Eye Lens Dosimeter Mounting Tool (e — featured in the photo to the left) provides assistance in fitting the dosimeter into the adapter. The Headband Adapter is available in various colors to help with group allocation and routine schedules.

Radiation Goggles

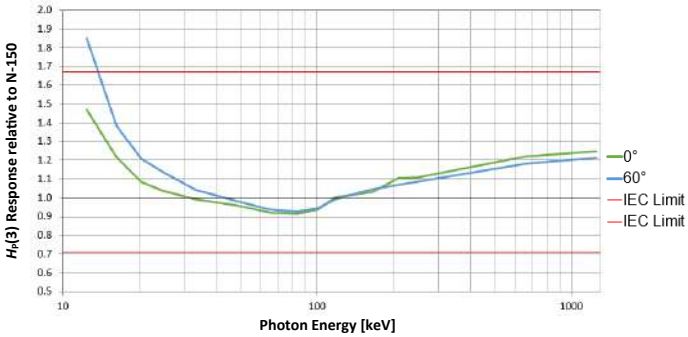
The second option for wearing the BeOSL Eye Lens Dosimeter is with radiation goggles. The goggles work best with our Adhesive Adapter; this allows the user to place and glue the BeOSL Eye Lens Dosimeter safely into the radiation goggles. It is also designed to be paired with Mavig* radiation goggles.

When the measuring is completed, the BeOSL Eye Lens Dosimeter can be removed for further processing. The ezClip has its own reusable case that like looks very similar to the BeOSL Two-Element Dosimeter; this is called the ezCase. When fit into the ezCase, the ezClip is read, erased and processed in existing BeOSL Reader and Eraser. It can even be used with our automatic options including Cartridge Based Automation and the Robotic Table.

Our BeOSL software options, LabClient and WorkFlow, provide accuracy and assure compliance.

For technical data, catalog pages and pricing, please contact the Sales team at sales@dosimetrics.de.

BeOSL Eye Lens Dosimeter



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MADE IN GERMANY

*Can be purchased from: https://mavig.com/products/x-ray-protection/eyeprotection/

COMPONENTS

Article Number	Description
1003	ezClip
2007	Manual Assembly and Disassembly Device
2008	Pneumatic Assembly and Disassembly Device
2009	Detector Mapping Station (Semi-Automatic)
2013	Detector Mapping Station (Manual)
4004	ezCase
4014	Headband Adapter for Eye Lens Dosimeter
4018	BeOSL Eye Lens Dosimeter
4019	Headband
4020	Eye Lens Dosimeter Mounting Tool
4021	Adhesive Adapter for Eye Lens Dosimeter

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DOSImetrics

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Our software ensures consistent and precise measurements. There are many factors that go into having accurate dose measurements which is exactly why BeOSL Software is designed to aid the user with ease and flexibility. The software is versatile and designed to fit with various sized monitoring services. Whether the user has a manual or automatic system – the BeOSL Software options are ready to guide and assist.

BeOSL Software

Key Features

- OPTIONS AVAILABLE FOR BOTH MANUAL OR AUTOMATIC SYSTEMS
- EASY TO USE
- MAINTENANCE AND UPDATE SERVICES AVAILABLE

BeOSL Software

Every BeOSL System comes equipped with a software package that fits with the exact size and needs of a dosimetry service. Our different options of software and services include the following:

LabClient

LabClient is a management software for both dose measurements and handling the manual system. It comes user-ready with the Reader Control PC. With its on-screen messages and self-explanatory images, LabClient leads the user through the entire process of reading, erasing and preparing the dosimeters. Also, the software enables a fully automatic recalibration of the Reader. LabClient has the option to save and export results. All of the software's functions are detailed in the *LabClient Manual* which is included with every manual BeOSL Reader.

Web Frontend

Web Frontend is an automated operational software for both dose measurement and dosimeter handling. Web Frontend pairs seamlessly with our automatic solutions including the Robotic Table and Cartridge Based Automation. Both of these automatic options are connected to a work flow control software. This provides the user with setting adjustments and options. The Robotic Table and Cartridge Based Automation are ready to be customized to fit any routine. They give the users quick results and dosimeters are tracked with ease. This allows for an optimal work routine. Web Frontend's Expert Mode allows the user to retrieve raw data and information which assures excellent and precise processes. It also provides many features to export and mine data. The best part is that Web Frontend's smart features are able to be utilized as an Export Mode for LabClient users.

Software Services & Maintenance Plans

We also offer a variety of software services including maintenance, software development and software updates. Our IT and Support teams can provide software integration into third party products as well. Our maintenance plans give the user with options to ensure topnotch support service. As every monitoring service is different, various plans are available to be sure that the user's needs for support services are met.

For further information including pricing, please contact the Sales team at sales@dosimetrics.de.

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COMPONENTS

Article	Description
2012-0001	Reader Control PC (full)
2012-0002	Reader Control PC (light)
3001	LabClient Software
3002	Software Update / Upgrade
3009	Maintenance Fee Basic
3011	Maintenance Fee Module S
5116	Web Frontend Server

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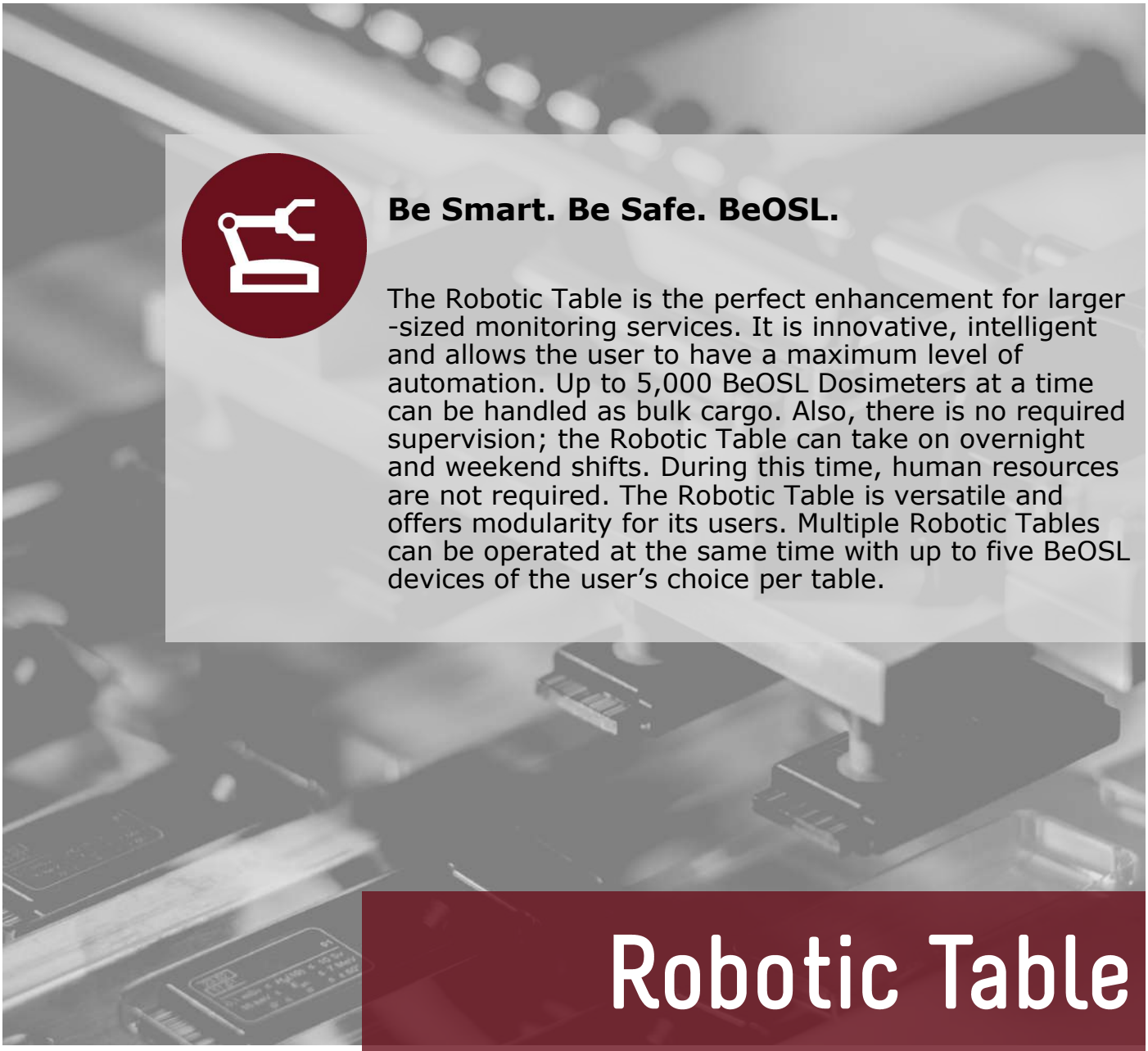


Be Smart. Be Safe. BeOSL.

The Robotic Table is the perfect enhancement for larger -sized monitoring services. It is innovative, intelligent and allows the user to have a maximum level of automation. Up to 5,000 BeOSL Dosimeters at a time can be handled as bulk cargo. Also, there is no required supervision; the Robotic Table can take on overnight and weekend shifts. During this time, human resources are not required. The Robotic Table is versatile and offers modularity for its users. Multiple Robotic Tables can be operated at the same time with up to five BeOSL devices of the user's choice per table.

Robotic Table

Key Features

- INPUT CAPACITY OF UP TO 5,000 DOSIMETERS
- UNATTENDED NIGHT AND WEEKEND OPERATION
- MODULAR SYSTEM
- MAXIMUM THROUGHPUT

Robotic Table

TECHNICAL SPECIFICATIONS

Dimensions:
2.2 m x 2.3 m /
7 ft 2 in x 7 ft 7 in (table)
40 cm / 15.6 in (monitor)

Weight:
~600 kg

Power Supply:
230 V AC,
fuse: 16A;
P (max) < 3600 W

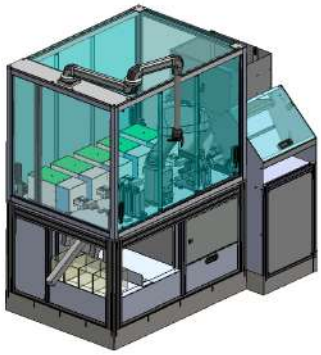
Air pressure:
6 bar

The Robotic Table consists of the dosimeter input and an acrylic glass housed safety cabinet for dosimeter processing with a base plate and the electrical cabinet contains an Industry PC (IPC) to control the mechanics. The baseplate carries the dosimeter orientation unit, the robot, the devices (five per table), the buffer trays and various dosimeter outputs. To assure a smooth and trouble-free work routine, the Robotic Table is equipped with a cooling unit and a UPS system.

The ratio of readers to erasers is on principle arbitrary and depending on the customer's definition of processes and equipment. The standard configuration is two BeOSL Readers, two BeOSL Erasers and one BeOSL Irradiator.

The Robotic Table is the peak of modularity, as the user can operate one or more Robotic Tables at once. The BeOSL devices operating on the table maintains their individual functions which is very helpful. For example, in the case of an unexpected incident with one of the BeOSL devices, the Robotic Table does not stop; it manages all of the other devices so they continue functioning. This means more machine hours and more handled dosimeters for the user.

The Robotic Table is connected to a work flow control software. This provides the user with setting adjustments and options. The Robotic Table can be customized to fit any routine! Users quickly see results, track their dosimeters and optimize their work routine. It also allows many features to export and mine data.



NEW! The Robotic Table has fresh improvements for its users:

1. The PC panel is now mounted on the arm and can move freely to its position for the operator.
2. There are now three doors. This means the user has access to the devices in all positions possible.
3. There is an improved structure for a larger amount of storage.

COMPONENTS

Article Number	Description
2006	Robotic Table
1001	BeOSL Two-Element Dosimeter
1002	BeOSL Four-Element Dosimeter
2001	BeOSL Reader
2002	BeOSL Eraser
2003	BeOSL Irradiator

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