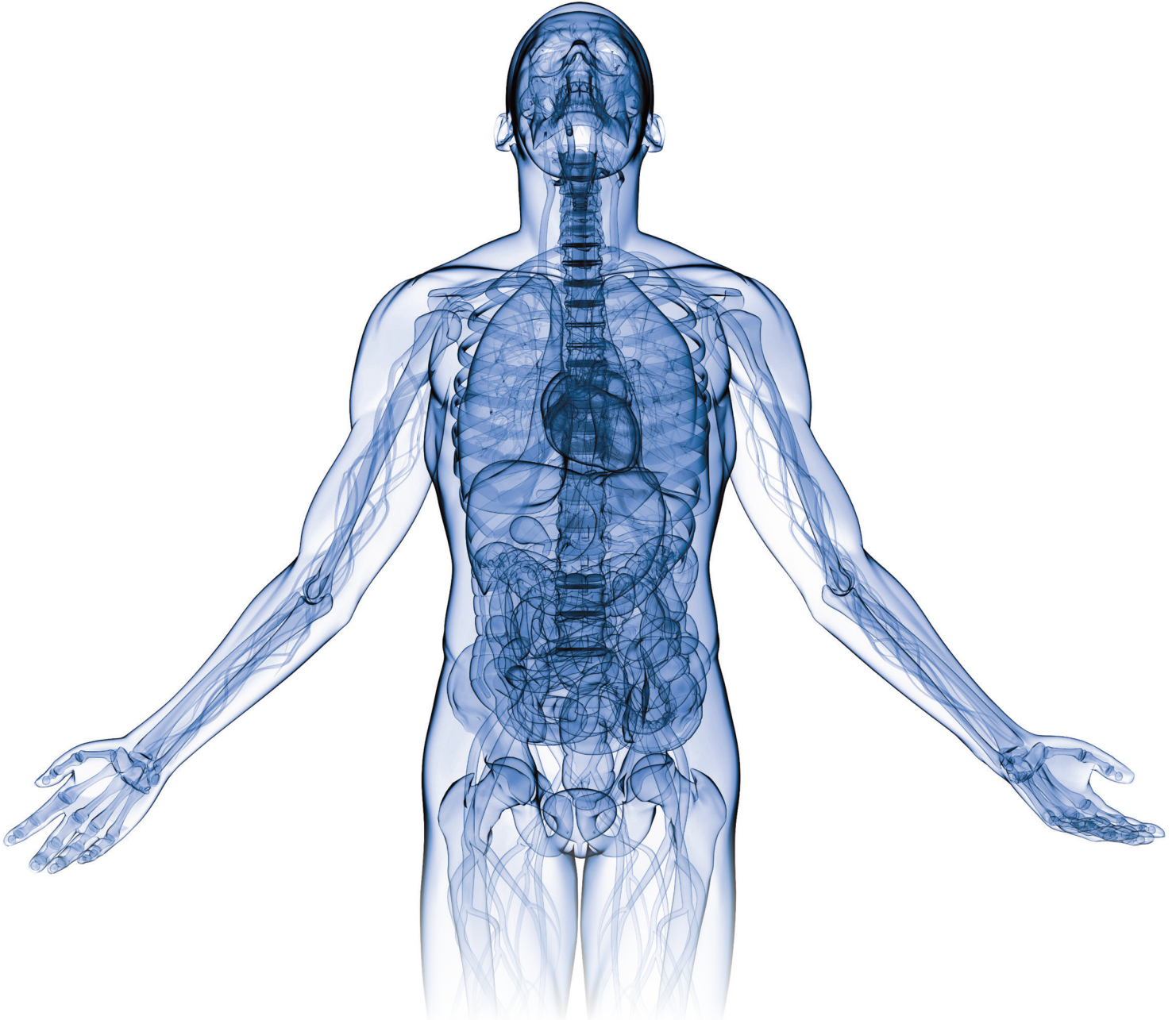


# Healthcare Shielding Systems

Protecting Operators and Patients





# Healthcare Shielding Systems

Calder Healthcare is the leading designer, manufacturer and installer of radiation and X-ray shielding solutions for the UK's healthcare sector

We are part of Calder Group, Europe's largest producer of lead sheet and lead-based technical products.

As manufacturers of lead sheet to BS EN 12588, Calder are also the UK's leading supplier of engineered products in lead, with a wide product portfolio covering nuclear power, nuclear medicine, X-ray, electronics, transport, defence, construction and many other industries.

As an established and well respected supplier of radiation shielding solutions to the National Health Service and their supply chain; Calder are one of the major installers of lead chevrons for radiotherapy bunkers and lead lined board for lower levels of radiation shielding.

We offer a total X-ray shielding solution package that includes shielding for walls, ceilings and floors. Also, lead lined door sets, lead glass observation windows and lead lined protective screens (fixed or mobile) for the following medical procedures and departments:

- X-ray
- Dental X-ray
- CT scanner
- Gamma Camera
- Fluoroscopy
- Endoscopy
- Theatres
- OPG
- Mammography
- Angiography
- Cath Labs
- Nuclear Medicine



**No other UK organisation can offer the same comprehensive level of service or technical expertise. From initial discussions, through to design, manufacture and installation, a dedicated Calder Project Manager will work with you to ensure your shielding project is on time, within budget and to your exacting specifications.**

An investment in engineering excellence underpins our commitment to providing a comprehensive service to architects, hospital trusts, building contractors and manufacturers of radiotherapy and radiology equipment. With our comprehensive range of X-ray protection products; Calder will continue to help protect healthcare workers and patients alike.

## Why Choose Calder Healthcare?

- We are already an established and respected supplier of radiation shielding solutions to the NHS
- We have a team of highly skilled, dedicated and experienced designers, project managers and installers working to exacting quality standards
- We are ISO 9001:2015, 14001:2015 and OHSAS 18001:2007 certified and Achilles registered
- We have an exceptional reputation for delivering what is required, within budget and on time

# Chevron Rail For High Energy Radiation Shielding

The high energy X-rays used in radiotherapy and oncology demand heavy duty lead shielding

A major advantage of using lead instead of steel and concrete shielding, is that it can be quickly and cleanly assembled and just as easily disassembled when decommissioned. The lead can then be either reused in another bunker or room or sold as it is a valuable commodity.

Calder Healthcare is the European market leader in the design, manufacture and installation of radiation shielding for healthcare applications. Our chevron rail system is the industry standard, offering heavy duty lead shielding for high energy radiation used in radiotherapy, oncology and PET/CT facilities and brachytherapy suites.

The lead chevrons interlink to form a complete shielding solution with the elimination of any shine paths. The lead thicknesses range from 10 mm to 50 mm in lengths between 450 mm and 900 mm long and are 100 mm high. The maximum weight per chevron is 26 kg for ease of installation. Where very high energy shielding is required the chevrons can be used to create a freestanding shield structure to any required thickness.



The chevron rails provide additional flexibility, as they can be fixed to existing brick or block walls, or used to create a free-standing shield structure to whatever thickness is required.



# Chevron Rail For High Energy Radiation Shielding

Ideal for both temporary and permanent applications

## Existing Facilities

Where an existing radiotherapy facility is being upgraded, this System ensures minimal intrusion into the room environment. This is particularly important where space is at a premium or installation access is restricted.

### Typical examples would be:

- Upgrade to a higher energy machine
- Re-alignment of the Isocentre
- Revised Radiation Protection criteria
- Local conservation rules
- Existing building restrictions

Calder's chevron rail is also very effective where additional shielding is required within existing operational facilities. Installation time can be kept to a minimum and is an ideal alternative to concrete & steel walls which will impact on space.

## New Build

During the planning and design stage of new bunkers and treatment rooms, space and layout can be optimised and conventional long maze type entrances which require additional floor space can be avoided. Construction, installation and overall civil engineering costs can also be kept to a minimum. Similarly, small confined lobbies combined with sliding or swing shielded doors can greatly improve access and general room ergonomics.

Where higher beam energies are required, a full neutron shielding service is available using Monte Carlo based calculations through to the installation of advanced neutron shielding materials.

Installation techniques will vary depending on thickness and weight. Further details are available on request.



# Lead Lined Board Shielding For Lower Energy X-rays

Calder Healthcare offer the total shielding package

It is very important to specify the correct thickness of lead for radiation shielding. A Radiation Protection Advisor or other shielding expert will usually do this, and when specifying the thickness of lead required where X-rays are being used for radiology and radiotherapy the RPA usually refers to the British Standard code numbers shown below.

We recommend the use of British Standard BS EN 12588 rolled sheet lead. Other globally recognised sheet lead standards can be supplied on request.

If required we can provide clients with the services of totally independent professional RPAs as part of our scope of supply.

When specifying the thickness of lead required to shield a facility where X-rays are being used for radiology or radiotherapy the hospitals RPA usually uses the British Standard code number (see table below)

CODE	3	4	5	6	7	8
THICKNESS	1.32	1.80	2.24	2.65	3.15	3.55
COLOUR CODE	GREEN	BLUE	RED	BLACK	WHITE	ORANGE
WEIGHT (Kg/m <sup>2</sup> )	15.0	20.4	25.4	30.1	35.7	40.3

*Although only milled lead manufactured to BS EN 12588 uses this thickness coding and colour system, it is always best to also refer to the British Standard when specifying sheet lead.*

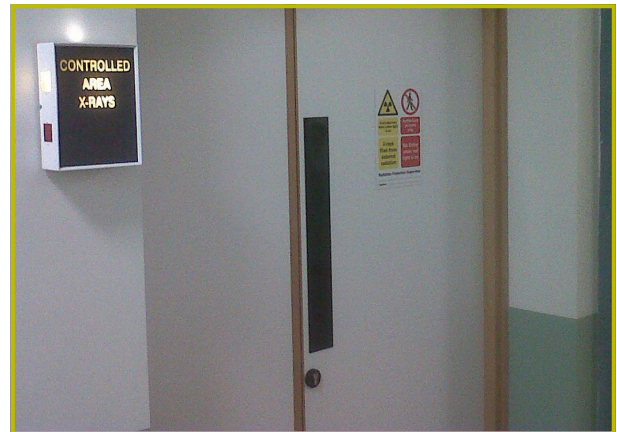
## Wall Shielding

Calder's standard panel sizes are 600 mm wide by 2400 mm in length. They are manufactured by bonding under pressure BS EN 12588 lead to plasterboard or plywood. During installation, the panels are mechanically fastened to either an existing wall or stud partition. When installing to an existing wall, a leaded batten is fastened to the wall at 600 mm centres, which the lead panels are then fixed to. On a stud partition a lead strip is bonded to all the vertical studs, before the panels are fixed.

Leaded battens and lead strips are introduced to cover the butt joints of the panels, stopping leakage between the panel edges.

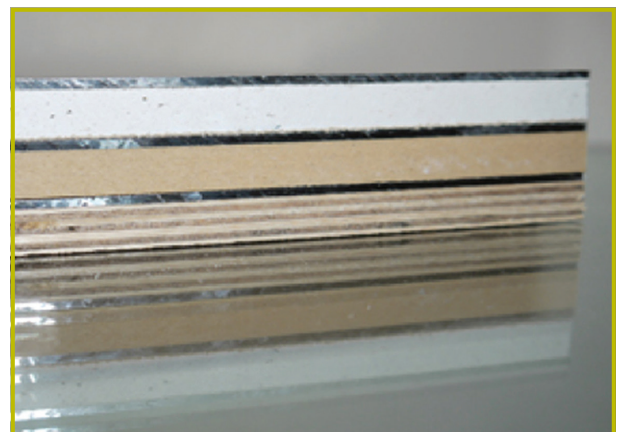
For shielding above 2400 mm in length, a horizontal leaded batten or lead strip is installed, which covers the joint between the panels. These are also used when fixings/penetrations are needed to be shielded.

Calder's lead lined panels can be supplied for install by others or we offer a guaranteed leak free, on-site installation carried out by our experienced installation technicians.



## Floors and Ceilings

For shielding on floors and ceilings, panels are manufactured using plywood (normally 12 mm) as this provides added strength. For ceiling installations, panel sizes are reduced so that the weight is easier to handle.



# X-ray Protective Doors

## Fully customisable for radiation protection

Our doorsets are all bespoke to your specific requirements, with a range of types available:

- Single doorset – built to suit a clear opening with oversized leaves available for wheelchair or trolley access
- Double or Leaf & Half doorsets – double doors are made for openings up to 2000mm wide access
- Sliding doors – an ideal alternative to swing doors, and can be manually or automatically operated. The design allows doors to be supplied in any lead equivalence, with concealed running gear

### Options

Offering maximum protection combined with an attractive look, our purpose-built lead lined and non lead lined door sets are available in a choice of real wood veneer, primed or plastic laminate finish. Each set is craftsman-manufactured and extra door furniture can be factory-fitted in advance. Frames are made from hardwoods including walnut, ash, mahogany, koto, beech, oak sapele or maple, and supplied in a variety of finishes for easy, hygienic cleaning and maintenance.

### Ironmongery

All our doorsets feature heavy duty hinges to cope with the weight of lead lined doors while offering easy fitting and maintenance. Door closers, handles, kick plates and other ironmongery can be factory fitted to meet any specification.

### Finishes

Calder doorsets can be supplied unfinished, primed, lacquered or finished in any laminate from a UK manufacturer. For additional impact and hygiene protection we offer a Acrovyn or PVC finish.

### Vision & Privacy Panels

Vision panels can be incorporated into any door, with the equivalent lead protection where necessary, and can be fire-rated, toughened, acoustic, tinted, contain an integral blind and be single or double glazed.



### LCD Switchable Glass

Ideal for rooms where patient and staff privacy is vital, liquid crystal glass is the latest innovation; changing from completely transparent to opaque when an electric current passes through it. It can be operated remotely from anywhere in the room, and is far more hygienic than traditional blinds.

### Fire Doors

We can supply fire-rated doorsets complete with vision panels.

### Summary

- Lead lined and non lead lined door sets manufactured to the latest NHS HTM infection control regulations
- Approved by UK Radiation Protection Advisors
- Choice of finishes to match existing decor
- Finish choices include impact-resistant and antibacterial
- Available as an off-the-shelf kit or fully bespoke
- Fast delivery

# X-ray Protective Windows

Calder window sets are available lead lined and non lead lined, and are custom-made for any radiation environment

Our window sets comprise a lead core hardwood frame with lead glass and hardwood leaded architraves.

Each window set can be specified to any size or shape – the maximum glass size is 2400 mm x 1100 mm, with larger openings jointed with a lead lined mullion.

Lead glass up to 3.55 mm Pb equivalence per sheet is available, with higher values achieved by layering panes together to form a multi-ply panel.

## Frame Finishes

Our hardwood window frames are supplied unfinished, primed or lacquered (antibacterial lacquer also available). Acrovyn or PVC wrapped frames offer even greater impact and hygiene protection.

We also supply steel window frames painted in a choice of RAL colours.

## Glazing

Incorporating lead glass into double and triple glazed units gives the window additional fire, sound and impact resistance, plus shatter and laser proof options.

## Privacy

For patient and operator privacy, glass can be layered with a choice of films. Alternatively, liquid crystal glass can change from completely transparent to opaque at the flick of a switch. Operated remotely from anywhere in the room, LCD switchable glass is far more hygienic than traditional blinds.



## Summary

- Approved by UK Radiation Protection Advisors
- Variety of privacy options available
- Choice of finishes to match existing decor
- Finish choices include impact-resistant and antibacterial
- Pre-built for a perfect fit to minimise problems on-site





# Fixed and Mobile X-ray Operator Screens

Calder's X-ray protective screens consist of a lead core to the customer's specified lead thickness

## Fixed Operator Screens

Standard sizes are 1 mm to 3.5 mm lead sheet sandwiched between solid material with a plastic laminate finish and aluminium frame.

Manufactured to comply with BS 7671, each custom-built screen incorporates lead glass vision panels for uninterrupted viewing of the patient while providing full radiation protection.

We also offer a range of bespoke furniture using the same materials to complement the room decor, with options including worktops, cassette storage, shelves, cupboards and drawers.

## Screen Options Include:

- Straight - a single screen fixed to a wall at one end or to the ceiling
- Single-winged – a fixed winged panel at one end, usually angled at 135°
- 90° winged - with a fixed winged panel at right angles to the main screen

- Winged with return-double-winged, with two corners for improved visibility
- Hinged wing - fixed main screen with a hinged wing that can be moved through 90° - ideal for tight spaces
- Double winged freestanding - a wing either side, for maximum visibility in large or double X-ray rooms



## Mobile Operator Screens

Constructed from solid material either side of a lead core to the required thickness (as determined by an RPA) and mounted on sturdy, heavy duty castors, our mobile screens offer a versatile and reliable solution to radiation protection.

Available in many different formats, the screens feature a plastic laminate finish with a choice of colours to match any existing decoration and can incorporate large windows or small viewing port using lead glass.

Optional features can be built-in to larger screens for use as a mobile work station, including:

- Full, part length or drop-down shelving
- White boards
- Hanging storage boxes
- Worktops
- Drawers and cupboards
- Privacy panels
- Vision panels
- Apron hangers
- Soap, apron or glove dispensers

Being completely bespoke, our mobile screens can be specified to various lengths to suit every situation from restricted spaces to shielding beds or equipment.

Our mobile screens have a standard height of approximately 2000 mm, with a length of up to 3000 mm for optimum protection and flexibility.



# Nuclear Medicine

Calder manufacture a range of products for radioisotopes

## Isotope Pots

Calder Healthcare is a market leader in the design and manufacture of lead pots, to safely store and transport radioactive isotopes used for diagnosis, treatment & research.

Using the latest technology we produce them in our dedicated manufacturing robot cell, enabling us to produce the high volumes required quickly and cost effectively. Our pots can be supplied painted, unpainted or plastic coated.



## Pipe Shielding

Calder's comprehensive lead casting and extrusion facilities enable the manufacture of bespoke pipe, penetration and cyclotron trench shielding in healthcare facilities.

Each segment of pipe shielding has specially profiled mating faces to prevent shine paths forming. Once joined together onsite, the segments produce a complete radiation barrier around active pipe runs.

## Hot Cells

Working in conjunction with our sister company Aquila Nuclear; Calder Healthcare is a leading designer and manufacturer of shielded hot cells used in the production of radiopharmaceuticals, for nuclear medicine departments within major radiotherapy and radiology healthcare facilities.



# The Calder Cycle Of Service

No other lead manufacturer offers such a one-stop solution

Calder Healthcare is unique in offering an in-house service encompassing design, machining, fabrication, assembly work, project management and on site installation of all our lead healthcare shielding products. Every lead product is manufactured and custom made in-house. No other lead manufacturer offers such a one-stop solution. At each stage our engineers and designers work closely with our clients to ensure quality, cost and delivery are precisely managed.

**Calder offers a complete start to finish lead shielding solution. From initial discussions, through design and manufacture to installation, a Calder Project Manager will ensure your project is on time, within budget and to your exacting specifications.**

Our investment in engineering excellence, underpins our commitment to providing a comprehensive service to architects, hospital trusts, building contractors and radiotherapy and radiology OEMs. Calder is certified to ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2007 and Achilles registered.

## Consultation

At the very earliest stage of a project, our specialist team will provide guidance on the issues to be considered, when planning the shielding of a medical radiation facility. Many years of experience have helped us define best practice, in this highly technical process.

## Project Management

An experienced Project Manager is assigned to each Calder project. From initial consultation to final installation, there will be one point of contact, who will work closely with you and other involved parties, to ensure the successful design, supply and installation of your project.



## Solution

Each shielding project presents its own individual design and installation challenges. The scope and complexity of radiotherapy and oncology equipment is always increasing. Identifying the best solution to an unexpected problem is vital to the performance of a treatment room. We will use our knowledge to overcome any shielding challenges.

## Design

Integrating powerful medical equipment into a safe, functional and effective treatment suite, while accommodating real world constraints, can be time consuming and complex. Our Project Managers' invaluable expertise will help to simplify this crucial task.

## Manufacture

Over 260 years of specialist lead manufacturing has made Calder one of the leading European producers of radiation shielding. Our dedicated Project Management Team will ensure that all components are manufactured to the precise specification required.

## Installation

Our installation teams are highly skilled in the on-site fabrication of radiation and X-ray shielding in healthcare facilities. They recognise the critical nature of what they do and that the health and safety of both staff and patients depends on the quality of their work.

Our technical staff are always pleased to discuss your particular project and offer advice on the most effective method of shielding.

Contact them at  
**healthcare@calderlead.co.uk**

For any sales enquiries please contact our dedicated team on  
**+44 (0) 1244 393739**



Calder Healthcare  
Jupiter Drive,  
Chester. CH1 4EX  
England, UK



Tel: +44 (0) 1244 390093  
Fax: +44 (0) 1244 389191



healthcare@calderlead.co.uk  
www.calderlead.co.uk

