



Radiation Shielding

Royston
Specialist Lead Products

Lead is a stable element with a high atomic number, it forms in a dense crystalline structure with a high electron density and is particularly suited to dissipating both x-ray and gamma radiation. It has a relatively low melting point which allows it to be shaped easily and whilst in its pure form lead is soft and prone to creep it can be alloyed with antimony to produce clean creep resistant finish.

Radiation exposure can cause damage to any material, for example cell damage and mutations in animals and humans. Silicon chips in complex computer systems or CCTV cameras can be especially susceptible and even Lead itself will degrade under extreme fields after an extended exposure time. Shielding can be used to mitigate such damage and protect a wide variety of biological or inorganic materials. Lead is used in hospital x-ray facilities to protect radiographers and patients from excessive or unwanted exposure, in NDT facilities to shield x-ray sources used in weld inspection as well as in nuclear power plants and reprocessing facilities to protect personnel and equipment.



Radiation Shielding

It can be found in treatment room walls, mobile and static shielding screens, protective clothing and isotope storage flasks as well as a variety of heavy industrial applications. It can be poured into a vessel or used in isolation, it can be machined, cast, rolled or extruded. It can be painted or coated, is insoluble and resistant to a variety of chemicals.

Lead-lined fibre board, plaster board or plywood is used in X-ray, radiotherapy and scanning rooms as well as some laboratories. It can also be used to provide highly effective sound attenuation in floors, walls and ceilings. Lead chevron bricks of interlocking profile can also be used where bulk shielding is required. Lead angles are designed to be easy to install and provide leak-proof shielding in situations where cut-outs or penetrations are a facet of the design. For more complex geometries lead filling or lead shot can be used.

Royston Lead provides a comprehensive range of products to the healthcare and nuclear shielding sector and assists in the design, production and testing of purpose-built research, storage and testing facilities. Our experience in the design, manufacture and installation of lead-lined boards, bricks and vessels ensures that they are fully durable and will fulfil their intended design life. Whilst our manufacturing facility is able to manage assemblies weighing 20 tonnes or more.



Forms of lead used for radiation shielding

- Lead bricks
- Lead sheet
- Lead wool - for filling deep cracks in a radiation barrier
- Lead-lined / lead-clad pipes - to shield passage of radioactive and corrosive liquids
- Lead powder - can be dispersed in rubber or plastic or mixed with concrete and cement

Radioactive materials in laboratories and hospitals are usually handled by remote control from a position of safety behind a wall of lead bricks while X-ray machines are normally installed in rooms lined with lead sheet. Lead compounds are also a constituent of the glass used in shielding partitions (to permit safe viewing) and lead powder is incorporated into plastic and rubber sheeting as a material in protective clothing.



Royston Lead manufactures material of the highest purity to protect patients, staff and medical equipment as well as to encapsulate vessels and pipes containing hazardous and corrosive substances.

Factors such as the required level of attenuation, material thickness, weight and structural implications must be considered. Other metals can provide protection but lead has long been considered the most effective, practical (in terms of space utilisation) and cost-effective. With more than 90 years' experience of lead manufacturing, Royston Lead has the expertise, personnel and machinery to provide the right solution no matter what the environment.



Quality

Royston Lead takes pride in having achieved key standards of certification for quality assurance including:

ISOQAR ISO:9001 – Quality management system for the manufacture and sale of lead products

ISOQAR ISO14001:2004 Environmental management systems for the manufacture and sale of lead products and production of milled lead sheet

ISOQAR BS OHSAS 18001:2007 – Health and safety management systems for the manufacture and sale of lead products and milled lead sheet

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