

# envir



## LEAD



# 2iM


International Industrial Metals Ltd

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## Our Mission Statement

To Continue manufacturing and distributing an industry known base material from a totally recycled and sustainable source.

To Constantly strive to develop and expand the 2im business in its trading and market sectors through investments, performance and quality.

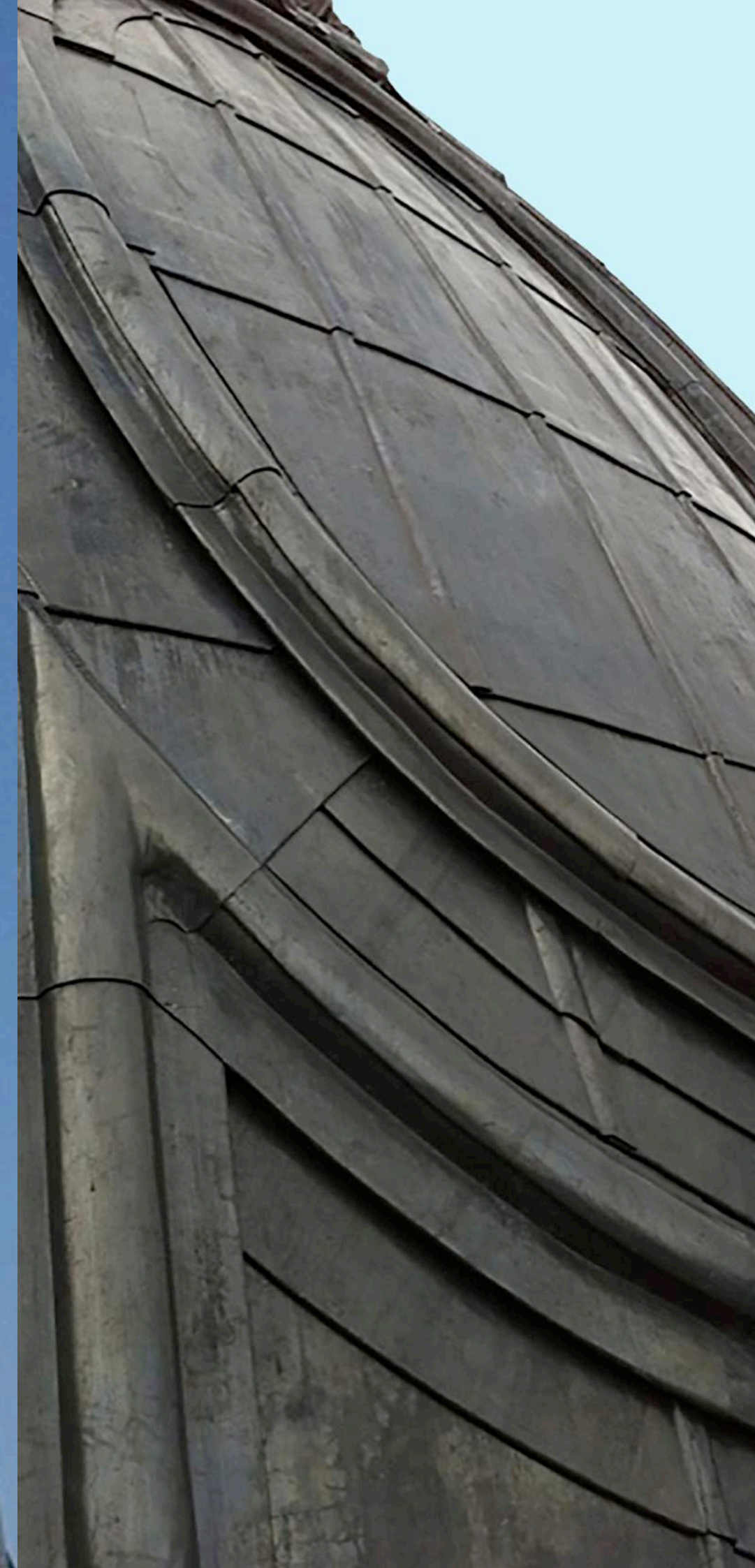
A photograph of a large, ornate building with a lead roof. The roof is made of dark grey lead sheets with prominent ridges. At the top of the building is a white, multi-tiered dome structure with a small spire on top. The sky is overcast and grey. The image is used as a background for the text on the right side of the page.

**Envirolead...** The future of truly sustainable low carbon lead as a product at the heart of UK construction is beyond doubt and its place as a roofing, flashing, rainscreen and heritage material is secure. Perhaps surprisingly, around twice as much material is now used in contemporary architecture and house building as conservation and restoration. For all types of project, however, long design life, sustainability and lead's malleability have combined in its favour, enabling it to be used for the most intricate detailing and decorative ornaments. Lead enjoys an enviable record in terms of recycling and embodied energy, so much so, that it has a BRE Green Guide A+ rating. Even so, in terms of the route to market for rolled lead sheet the existence of a British Standard, BS EN 12588, means that supply and procurement has traditionally been commodity driven. However, while the Standard provides a defined measure of quality, it doesn't differentiate between the source of raw materials or proportion of recycled material used.


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Scrap lead recovered from building projects is straightforward to recycle, but the process is more complex in other industries. This is particularly so with car batteries for which, though disposal facilities are becoming more widespread, the economics of lead's extraction are far less favourable. To put some perspective on the problem, lead accounts for 58% of a battery but around 80% of lead produced worldwide is used in their production. Building projects account for just 6%. Traditionally, therefore, the tonnage of unrecoverable material sent to landfill has been and seemed set to continue to pose a huge problem for local authorities. Thankfully, this need no longer be the case due to an initiative by Envirowales, a 2IM Group company which not only reuses lead from batteries but recovers around 96% of their constituent parts. These include its casing and electrolyte fluid (mainly sulphuric acid), the 'splitting' process extracting metal solids, sulphurised paste and polypropylene leaving only polyethylene which accounts for around 4%. This too is the focus of a research programme to find a viable means of re-processing. For the rest, desulphurisation enables sodium sulphate salt to be extracted for use as a bulking agent in detergents, glass manufacture and even animal feed under a Feed Materials Assurance Scheme (FEMAS).







With the high demand for products in construction which demonstrate high sustainability 2IM and Envirowales have taken the unprecedented step of marketing the 'Envirolead' brand as a specifiable product. It carries all of the benefits of standard rolled lead and is manufactured no differently but, critically, it has an unprecedented chain of custody and no reliance on ore extraction. This gives architects an opportunity for the first time to capitalise on one of the most efficient forms of recycling while guaranteeing that the product chosen has the lowest possible environmental impact. The scale of extraction is large, in a 5 day week we process 300 tonnes a day with all recycled content being distributed nationally and internationally.

Reclaimed material along with mill waste and scrap is smelted and refined before being cast into slabs. The resultant slabs are rolled into Envirolead and supplied to a nationwide network of builders' and roofing merchants through 2IM Group distribution centres, Associated Lead Mills Ltd and Jamestown Metals Ltd. Additionally the Group provides lead for use in batteries, construction, and through its engineered products division Royston Lead specialist applications. Royston products include anodes for the mining industry, radiation shields in the nuclear and medical environments, ballast for offshore applications and air gun ammunition as well as the more usual cast materials and window sash weights.

Recycling of lead enables the metal to be produced using only around one third of the energy needed to produce from ore.

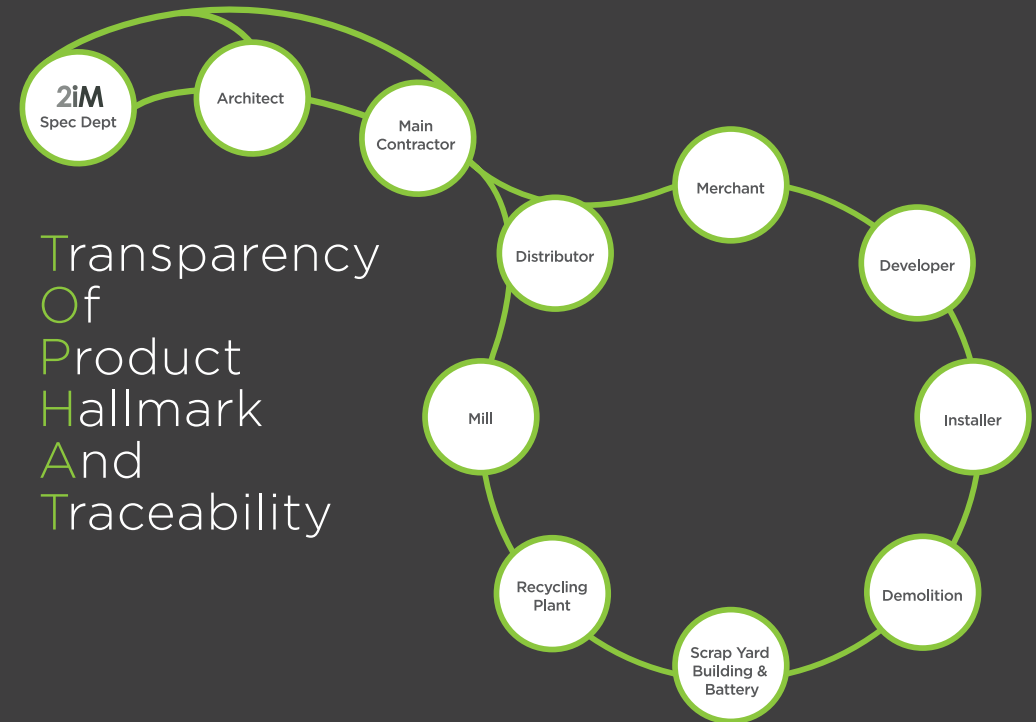
Around 20% of existing demand is still supplied as new lead but car production worldwide is forecast to continue its upward trend so current energy saving projections is likely to be exceeded.

Specification clauses for Envirolead are already available through NBS Plus and a RIBA Approved CPD presentation has been produced to highlight the benefits of specifying lead manufactured exclusively from such a tightly controlled resource. With an almost limitless supply of batteries for re-use, the supply chain for lead's use in construction is set for a major and what seems likely to be permanent shift for the benefit of the environment.



## TOPHAT

Our position as a recycler, manufacturer, processor and distributor of pristine rolled lead to BS EN 12588 is what makes us unique...



The sustainable recycled content and unbroken chain of custody make our material one of the most desirable on the market. For these reasons 2iM introduced the TOPHAT initiative. Working together in a Positive Partnership, Guaranteeing the Guarantee.



An accredited member of the 2iM TOPHAT initiative

## 2iM – CPD Information

2iM is able to provide a RIBA Approved, Core Curriculum CPD presentation on the recycling and use of Sheet and Cast Lead in the construction industry and Historic Buildings, entitled: Lead – Uniquely recycled for a better informed decision, this Seminar lasts around one hour.

This presentation is free of charge, with complimentary online access to the LSA's 'Rolled Lead Sheet – The Complete Manual' is also provided to the practice. After the presentation technical advice and guidance can be offered on any projects you may be working on where Rolled Lead Sheet or DM Cast Lead is being specified.

## 2iM – Factory Tour Information.

Our recycling facility is a UK & European first and presents to our visitors a totally unique process, viewable at every stage of this process through to the manufacturing of rolled lead sheet. A RIBA approved CPD will also be part of your experience and will be delivered after the tour.

Your day will start with a tour of our unique recycling centre and rolled lead sheet manufacturing facilities. As stated previously the facility at Envirowales based at Ebbw Vale, South Wales is a UK & European first and presents to our visitors a totally unique process, viewable at every stage of this process through to the manufacturing of rolled lead sheet. A RIBA approved CPD presentation will follow this tour to conclude your visit, both are totally free of charge.

## Aims of the Seminar:

To provide an introduction to 2iM, its associate companies, it's products and our unique recycling process. To give our visitors a more informative view of how lead is recycled and manufactured to BSEN 12588:2006, or 'DM' Cast Lead to BBA certification. To offer guidance on the use of Rolled Lead sheet and DM Cast Lead and how to specify it correctly.

## Carbon Footprint and Green Guide Ratings for Comparable External Wall Specifications

Specification	Green Guide Rating	Kg of CO2 eq
Code 5 Lead Sheet	A+	42 - 76
GRP	A	110
Copper	A	110
Coated Aluminium	A	110

## Carbon Footprint and Green Guide Ratings for Comparable Roofing Specifications

Specification	Green Guide Rating	Kg of CO2 eq
Code 5 Lead Sheet	A+	4.5 - 27
EPDM	A+	21
PVC	A+	31
TPO Single Ply	A+	33

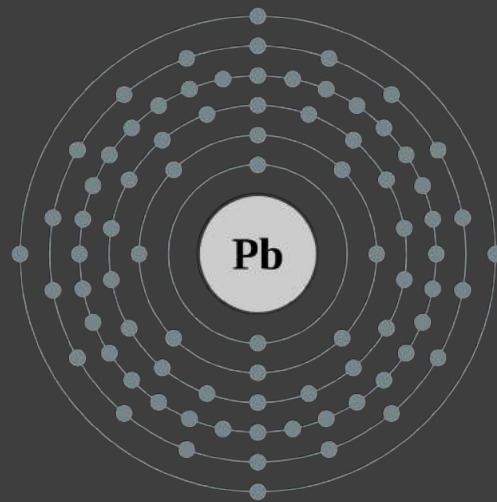
The graphics shown offers an indication of how lead compares against some of the popular products used in construction today. For wall cladding, Lead has a carbon footprint between just 30 and 76kgCo2 per kg of material. For flat or pitch roofing this range falls to as low as 4 and 58kgCo2 which is considerably lower than COPPER, ZINC and Stainless Steel.

# Lead

Lead is used in building construction, lead-acid batteries, bullets and shot, weights, as part of solders, pewters, fusible alloys, and as radiation shielding. Lead has the highest atomic number of all of the stable elements, although the next higher element, bismuth, has one isotope with a half-life that is so long (over one billion times the estimated age of the universe) that it can be considered stable. Lead's four stable isotopes have 82 protons, a magic number in the nuclear shell model of atomic nuclei. The isotope lead-208 also has 126 neutrons, another magic number, and is hence double magic, a property that grants it enhanced stability: lead-208 is the heaviest known stable isotope.

## Lead (Pb)

Energy levels: 6  
Protons: 82  
Neutrons: 125  
Electrons: 82



When considering the overall cost and wider environmental impact of a building, Lead for roofing and cladding truly is an environmentally friendly material. Being naturally available and requiring low to no maintenance over its lifetime, there are very few, if any, ongoing costs to consider once correctly installed. (speak to ALM or Jamestown Metals to ensure you have a quality installer).

Lead has a very low melting point and from a carbon footprint perspective, Lead creates far less CO<sub>2</sub> than alternative metals or man-made GRP replacement products. Replacement of these products will also be required far sooner than lead.

Lead's malleability allows the metal to be formed onsite in all conditions. From a cost perspective and the ongoing maintenance of a building, whether you plan to keep the building or sell it on, the appearance plays a big part of its total worth to the buyer. Having a lead roof or façade installed ensures you a hassle free existence and will offer any buyer peace of mind that a quality, long lasting, low maintenance material protects the envelope



Investment has been our top priority with regard to recycling. Our recycling plant at Ebbw Vale 'Envirowales' is not only unique in the UK, but throughout the rest of Europe. We not only produce high quality BSEN lead here, but highly regarded bi products which we sell on to other industries

£50m recycling plant at Ebbw Vale, South Wales

Rolled Lead Sheet - BSEN 12588

Ingots - (DM) Cast Lead

Salt - Detergent and Glass Industry

Animal Feed 'FEMAS' Approved

High Grade Polypropylene Pellets





# The Envirolead process for battery breaking and separation of all elements

Our processes all begin with...



## Battery Breaking



The batteries are collected from the specially designed safe storage zone using a large grab which collects 300 batteries per pass (approximately 4 Ton). The batteries are placed into a huge hopper which vibrates and separates the batteries into a single line. They are conveyed into the breaking area where the various components are separated

## Battery Breaker - Plastics Separation



During the separation process the recyclable polypropylene is identified, separated and stored in a 40 yard skip, this is then sent to the plastics recycling area.

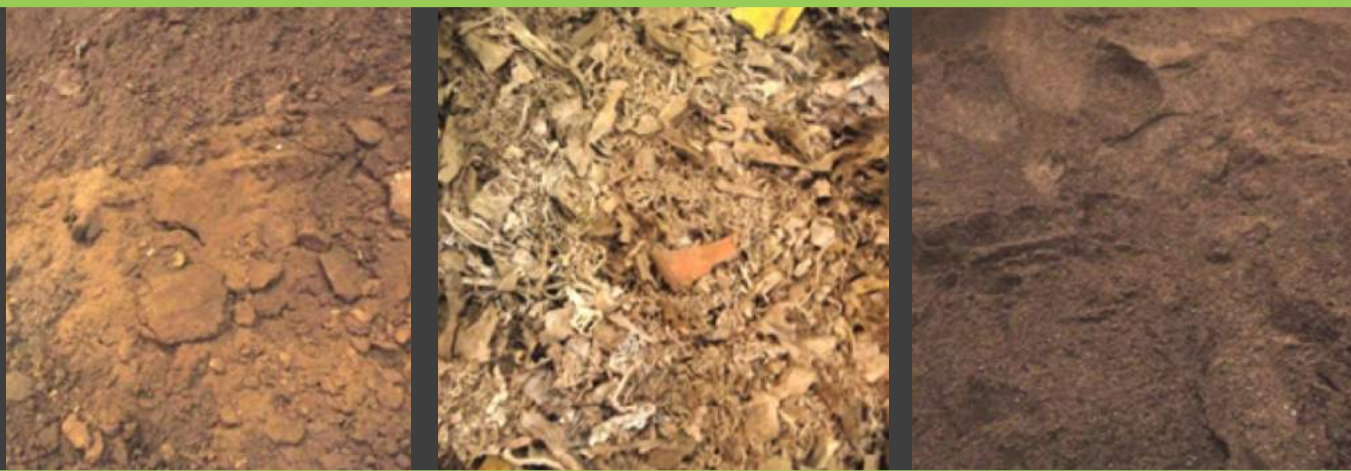
The current unusable heavy plastic Polyethylene (only 4% of the total Battery) is also identified, separated and sent to a holding area for future research.



## Separating the elements



The first material to be dealt with is the plastic casing. The different types of plastic, high grade polypropylene and Polyethylene are separated. High grade polypropylene is sought after and easily reused whereas polythene (4% of the battery) is a heavy plastic with fewer secondary uses. Our researchers however are very close to finding a source which will take the battery content to 100% recycled.



Lead paste from the battery

Metal fraction of the battery

Reducing agents for the smelting process

Next are the metal elements. At this stage of the process, the metallics head toward the smelter. These include the Desulphurised Paste and the metal element itself. The images also show fluxes that are added (Coal & Iron) which act as a reducing agent

## Lead Smelting



The furnaces are then charged by an overhead crane with a spoon attachment... and heated to 1000c.

Next Fluxes are loaded into a 'spoon' which is then positioned in front of the smelting furnace, the spoon slides forward and enters. The rear of the spoon seals against the furnace door before the spoon rotates to discharging the fluxes into the mixture of Desulphurised Paste and metallics. The temperature is taken up to 1000c and after a period of time the oven door is opened and the unrefined lead bullion is discharged into large metal containers known as bogies. The dross plug is removed from the bogie and any waste is sent back to the smelter. The bogie is then re heated and transported by overhead crane to the refinery where the lead is poured into a refining kettle





## Filtration of smelting gases

Exhaust gases from the smelter are filtered through two 70,000m<sup>3</sup>/hr filter houses. These exhaust gases are analysed by a continuous monitoring system. All equipment used conforms to European standards.

Envirowales & Natural Resource Wales work tirelessly together to ensure ALL relative health and safety measures are all closely adhered to at all times. At this point, 2im Envirolead is formed into ingots consisting of different alloys for different areas of business.



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## Forming the Ingots

Sash Mould  
Window Sash Weight



The image above shows an ingot used specifically for the sash weight industry. 2im sell sash weight ingots direct to manufacturers but mainly sell to Royston Specialist Cast, a group member of 2im who manufacture the sash weights in house and supply out to various companies.

8.4 Tonne Slab  
Rolled Lead Sheet



DM Mould  
Continuous Cast Lead

DM Cast Lead Ingots are for specialist industries and Architectural Features. The image above shows the type of ingot used for continuous cast lead. Royston Specialist Cast, part of the 2im Group,



use them to manufacture cast lead rolls using the Direct Method. These days there are more modern and precise techniques in line with the more stringent quality standards required. This said, it does offer a different surface aspect and when it comes to replacing like for like, there is still a need for cast lead rolls and sheet. Aside from architectural products, the main purpose for the cast ingots are the Specialist products made for industries such as Nuclear, Medical, Ballast, Acoustic, Chemical and Anodes. **Royston Lead** are world leaders in the production and manufacture of various "specialist industry" standard materials with the ability to meet client requirements in respect of off plan design, budgets and time constraints.

The image to the left shows an ingot that's specifically for the architectural sector. The difference between this ingot and the previous 2, is this ingot is manufactured to BS EN 12588 rolled quality standard. Within this alloy more copper is introduced, taken from the batteries, to assist with expansion and creep as well as preventing brittleness when being worked, especially when the ambient temperature is low. Further to this requirement, BS EN 12588 also ensures that the thickness of material is kept within the strict tolerance set out by British Standards.



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## Man-made Alternatives

With regard to man-made alternatives and Lead, there are few available statistics as the materials haven't existed long enough to get a true answer. The stats are based on accelerated testing which is always questionable. With regard to Eco Points. Using lead for roofing and cladding can generate between 0.5 and 0.66.

	Lead	Zinc	Copper	Stainless Steel
Melting Point	327c	419c	1083c	1083c
Recyclable Source	95%	30%	75%	75%
Material Guarantee	50 Yrs (underwritten)	10 Yrs	10 Yrs	10 Yrs
Installation	25 Years Insurance Backed Through the LCA	20 Years Insurance Backed Through FTMRC	20 Years Insurance Backed Through FTMRC	20 Years Insurance Backed Through FTMRC

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## What percentage of recycled materials do we get from the battery?

Recycling everyday Batteries

5% Polypropylene

12% Sulphuric Acid

50% Desulphurised Paste

29% Metallic Lead

# 96% Recycled

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# Rolled Lead Theoretical Weights Chart / Kg

Width (mm)	Nearest Imperial (inch)	Code 3		Code 4		Code 5		Code 6		Code 7		Code 8	
		3m	6m	3m	6m	3m	6m	3m	6m	3m	6m	3m	6m
150	6	7	13	9	18	11	23	14	27	16	32	18	36
180	7	8	16	11	22	14	27	16	32	19	39	22	43
210	8	9	19	13	26	16	32	19	38	23	45	25	51
240	9	11	22	15	29	18	37	22	43	26	51	29	58
300	12	13	27	18	37	23	46	27	54	32	64	36	72
360	14	16	32	22	44	27	55	32	65	39	77	43	87
390	15	18	35	24	48	30	59	35	70	42	84	47	94
450	18	20	40	28	55	34	69	41	81	48	96	54	109
510	20	23	46	31	62	39	78	46	92	55	109	62	123
600	24	27	54	37	73	46	91	54	108	64	129	72	145
760	30	34	68	47	93	58	116	69	137	81	163	92	184
800	32	36	72	49	98	61	122	72	144	86	171	97	193
850	34	38	76	52	104	65	130	77	153	91	182	103	205
914	36	41	82	56	112	70	139	82	165	98	196	110	221
1000	39	45	90	61	122	76	152	90	180	107	214	121	242
1200	48	54	108	73	147	91	183	108	216	129	257	145	290
1600	63	72	144	98	196	122	244	144	288	171	343	193	386
2400	96	-	-	147	294	183	366	216	433	257	514	290	580
Thickness (mm)		1.32		1.80		2.24		2.65		3.15		3.55	
Kg/m <sup>2</sup>		14.97		20.41		25.40		30.05		35.72		40.26	

## How can a specifier ensure that Envirolead and Premium Roofing Products are used?

Both Jamestown Metals and Associated Lead Mills are NBS ready with specifications and details available for download via the National Building Specification website. We can also provide specifications in NBS format if this is preferred.

### Envirolead is BIM ready

Envirolead is BIM ready – Envirolead rolled lead sheet architectural specifications are available upon request comprising of Ventilated Cold and Warm Roofs. Our new Envirolead BIM 'object' is also available for ease of specification on your BIM projects. When specifying our material, BS EN 12588 Envirolead must be stated, preferably with contact details...

Associated Lead Mills Ltd 01992 444 100

Jamestown Metals Ltd 01992 801 910

Product portfolio is found in the NBS plus software, specification 'clauses' are free and available to download.

Specialist Cast Lead materials for the Nuclear, Medical, Ballast, Acoustic, Chemical and Anode sectors should clearly state contact details within the specification.

Royston Specialist Cast 01226 770110

Further to Premium Roofing Products, ALM / JML and Royston also manufacture and supply complimentary Ridges, Valleys and Soakers. Please refer to our standard range.



# Lead Accessories



Patination Oil, Lead Slates, Flexislates, ARS Nails, Wood Cored Roll, Underlays, Expansion Joint, Lead Restorers, Flashpoint Sealant, Nail Clips.

To ensure that guarantees are upheld for Envirolead EN 12588 Rolled Lead, LSA approved Premium Roofing Ancillary Products range MUST be used. This is the only way the 50yr guarantee will stand.

For BBA Approved Royston Specialist Cast Rolled lead, Premium Roofing Products should also be used to ensure a quality fit with maximum life expectancy

## Architectural Lead

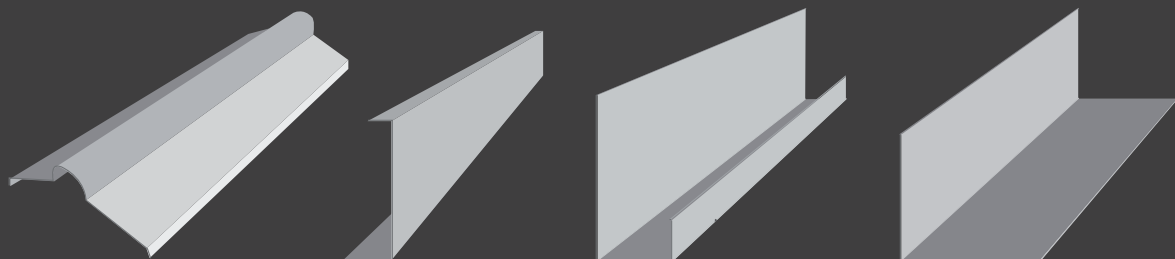
It has been common practice in the UK to use numerical codes when specifying or ordering lead sheet of nominal thickness. Inset is a guide to where the different codes should be used. Use of this can be combined with our weights charts on the following pages.

Type of application	Sheltered to moderate exposure	Moderate to severe exposure	Listed or pre- 1919 buildings
Type of application	BS EN 12588 code no	BS EN 12588 code no	BS EN 12588 code no
Flat Roofing	5 or 6	6 or 7	6, 7 or 8
Parapet, box and tapered valley gutters	5 or 6	6 or 7	6, 7 or 8
Pitched roofs	5 or 6	6 or 7	6, 7 or 8
Vertical cladding	4 or 5	5 or 6	6 or 7
Dormer cheeks	4 or 5	5 or 6	5, 6 or 7
Dormer roofs	4 or 5	5 or 6	6, 7 or 8
Chimney flashings: back gutters, front aprons	4 or 5	5 or 6	5 or 6
Lead slates	4 or 5	5 or 6	5 or 6
Hip and ridge flashings	4 or 5	5 or 6	6, 7 or 8
Pitched valley gutters	4 or 5	5 or 6	6 or 7
Weatherings to cornices, parapets walls and projections	4 or 5	5 or 6	6 or 7
Damp-proof courses (DPCs)	4 or 5	5 or 6	4 or 5
Apron and cover flashings	4 or 5	5 or 6	5, 6 or 7
Soakers	3	3	3 or 4



## Zinc & Aluminium Fabrications

PremiumRoofing.net



## Specialist Lead Products

Further to manufacturing the leading brand of rolled lead for the building industry, within the 2IM Group we also manufacture Specialist Lead Products for industries such as Medical, Nuclear, Mining and Chemical. Furthermore we manufacture products for ballast and acoustic applications and we are capable of providing totally bespoke requirements upon detailed request.



The source of lead for our specialist products is from the same totally recycled source with the same unique chain of custody. The difference being that products such as these are always formed and finished by using either a casting, machine or extruding process. Due to the process of manufacture, the lead used cannot be called BS EN 12588. This relates to milled lead only for the roofing industry.



**2iM**

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