H71 LEAD SHEET COVERINGS/ FLASHINGS

To be read with Preliminaries/General Conditions and Sections AA/31 and AA/90.
Items in this section to Contractor's Design as shown.

GENERAL

100 INSTALLER:
- Installation to be by a subcontractor currently registered with the Lead Contractors Association (01622 872432 www.lca.gb.com) and assessed to vetting grade *"Excellent"*.

TYPES OF LEADWORK

110 ROOFING TO NEW LIBRARY EXTENSION:
Include in Contractor's Designed Portion for Leadwork

Rev C1
- Drawing reference: 597-12204, 597-41213, 597-41225, 597-41242, 597-41243 & 597-41244.
- Substrate: Birch plywood (18 mm/ 13 plies) as G20/311.
  - Preparation: Not required.
- Underlay: 220 g/m² needle punched geotextile.
- Type of lead: Sand-cast lead sheet as H71/520.
  - Thickness: 2.65 mm (Code 6 equivalent).
- Pretreatment:

Rev C6
- Visible Areas: Apply chalk slurry coat to underside of lead and allow to dry before laying, followed by chalk paste coat after bossing but before final fixing.
- Areas Below Stone: coat both sides with a thick coat of spirit-based cold-applied bitumen paint.

- Joints in direction of fall: Wood cored rolls with splashlap as clause H71/845.
  - Spacing: 600 mm.
- Eaves detail: Cut off roll with welded apron.
- Cross joints: Lapped, with two copper or stainless steel clips as H71/715 to each bay.

Rev C4 Lap cover: North pitch (~~34~~ 35°): 150 mm.
Rev C4 East pitch (~~27~~ 28°): 220 mm.
Rev C4 West pitch (~~27~~ 28°): 220 mm.
South pitch (12°): 400 mm.

- Spacing: Regular, not more than 2000 mm.
- Alignment: Half-staggered and in line on alternate bays.
- Intermediate fixings: Not required (TBC)..
- Ridge/ Hip detail: Capped roll as H71/310.
- Accessories:
  - Ventilators: (TBC) Refer to drawings.

112 ROOFING TO NEW SUBSTATION:
Include in Contractor's Designed Portion for Leadwork

Rev C1
- Drawing reference: 597-12103, 597-15001, 597-15002, 597-41000, 597-41001 & 597-41002.
- Substrate: Birch plywood (18 mm/ 13 plies) as G20/311.
  - Preparation: Not required.
- Underlay: 220 g/m² needle punched geotextile.
- Type of lead: Sand-cast lead sheet as H71/520.
  - Thickness: 2.65 mm (Code 6 equivalent).
- Pretreatment: Apply chalk slurry coat to underside of lead and allow to dry before laying, followed by chalk paste coat after bossing but before final fixing.
- Joints in direction of fall: Wood cored rolls with splashlap as clause H71/740.

Rev C3
- Spacing: 675 mm.
- Eaves detail: Cut off roll with welded apron.

Rev C3
- Cross joints: Drip abutted by rolls ~~Lapped, with two copper or stainless steel clips as H71/715 to each bay.~~

Rev C3 Drip height: As drawings. Not less than 55mm. ~~Lap cover: To suit pitch; 220 mm nominal (TBC)~~

~~- Spacing: Regular, not more than 2000 mm.~~

~~- Alignment: Half-staggered and in line on alternate bays.~~
- Intermediate fixings: Not required (TBC).

Rev C3 - ~~Ridge/ Hip detail: Capped roll as H71/310.~~

- Accessories:
  - Ventilators: (TBC) .

115 ROOFING / CAPPING TO VENTILATION COWLS TO SOUTH TERRACE:
Include in Contractor's Designed Portion for Leadwork

Rev C1
- Drawing reference: 597-12102, 597-15006, 597-15007 & 597-17060.
- Based structure: New steel framing as Structural Engineer's drawings and specification with steel stud infill as GG10/170.
- Substrate: Birch plywood (18 mm/ 13 plies) as G20/311.
  - Preparation: Not required.
- Underlay: 220 g/m² needle punched geotextile.
- Type of lead: Sand-cast lead sheet as H71/520.
  - Thickness: 2.65 mm (Code 6 equivalent).
- Pretreatment: Apply chalk slurry coat to underside of lead and allow to dry before laying, followed by chalk paste coat after bossing but before final fixing.
- Joints in direction of fall: Wood cored rolls with splashlap as clause H71/740.
  - Spacing: 600 mm.
- Eaves detail (all edges): Cut off roll with welded apron.
- Cross joints: Lapped, with two copper or stainless steel clips as H71/715 to each bay.
  Lap cover: To suit pitch; 220 mm nominal (TBC)
  - Spacing: Regular, not more than 2000 mm.
  - Alignment: Half-staggered and in line on alternate bays.
- Intermediate fixings: Not required (TBC).

Rev C2
- ~~Ridge/ Hip detail: Capped roll as H71/310.~~ Single slope @ 1:80.
- Cladding to cheeks of cowls:
  - Lead sheet on plywood substrate as above, with welted joints as H71/880.
  - Perimeter box gutter lining as H71/210.
  - Rainwater outlets dressed into existing drain connections (TBC).

Rev C2
  - Dressed and sealed to fixed steel louvres (L10/658, L10/552).
- Other requirements.
  - Soffit insulation: As P10/460 to underside of plywood to diffuse warm extract air.

Rev C2 117 ROOFING TO SOUTH TERRACE LIGHTWELL:
Include in Contractor's Designed Portion for Leadwork
- Drawing reference: 597-15006, 15007.
- Substrate: Birch plywood (18 mm/ 13 plies) as G20/311.
  - Preparation: Not required.
- Underlay: 220 g/m² needle punched geotextile.

Rev C5
- Type of lead: Sand-cast lead sheet as H71/520, **Patinated as H71/970.**
  - Thickness: 2.65 mm (Code 6 equivalent).
- Pretreatment: Apply chalk slurry coat to underside of lead and allow to dry before laying, followed by chalk paste coat after bossing but before final fixing.
- Joints in direction of fall: Wood cored rolls with splashlap as clause H71/845.
  - Spacing: 600 mm.

210 LIBRARY EXTENSION GUTTER LINING WITH PROPRIETARY EXPANSION JOINTS
Include in Contractor's Designed Portion for Leadwork

Rev C4
- Drawing reference: 597-41225 / 41235 / 41213 / 41222.
- Substrate: Birch plywood (18 mm/ 13 plies) as G20/311 on treated softwood framing as G20/210.
  - Preparation: Not required.
- Underlay: 220 g/m² needle punched geotextile.
- Type of lead: Sand-cast lead sheet as H71/520.
  - Thickness: 2.65 mm (Code 6 equivalent).
- Pretreatment: Apply chalk slurry coat to underside of lead and allow to dry before laying, followed by chalk paste coat after bossing but before final fixing.

Rev C6
- Areas In contact with Mortar: coat both sides with a thick coat of spirit-based cold-applied bitumen paint.

- Proprietary expansion joints: EPDM and lead.
  Manufacturer and reference: Calder Industrial Materials Ltd (01244 390093).
  http://www.calderlead.co.uk
  Gutter Expansion Joint
  - Spacing: Within 1000 mm of each corner and maximum centres of 2000 mm.
  - Weld to gutter linings.
- Outlets:

Rev C2
  - ~~Chute outlet to external hopper and downpipe as H71/499.~~ Side outlet connection to concealed RWP

Rev C6
- Leadwelded flashing into overflow / warning pipe with 50mm invert level, passing through perimeter steel web, see SK-0782.

Rev C2 - Accessories:
  - Bespoke stainless steel wire leaf guard to rainwater outlet.

Rev C4 254 CAPPINGS TO ROOF PERIMETER UPSTANDS - LIBRARY EXTENSION:
Include in Contractor's Designed Portion for Leadwork

- Drawing reference: 597-41225 / 41235 / 41213 / 41222 / 41249 / 40224.

Rev C4
- Background support: ~~In-situ concrete, blockwork and~~ brickwork & timber framing
  Substrate: Birch plywood (18 mm/ 13 plies) as G20/311 on treated softwood battens (50 x ~~38~~ 50mm) as G20/210.
  Bearing width: Fully supported.
  - Preparation: Downstand to outside edge to support drip flashing.
- Underlay: 220 g/m² needle punched geotextile.
- Type of lead: Sand-cast lead sheet as H71/520.
  - Thickness: 2.65 mm (Code 6 equivalent).
- Pretreatment: Apply chalk slurry coat to underside of lead and allow to dry before laying, followed by chalk paste coat after bossing but before final fixing.

Rev C6
  - Areas In contact with Mortar: coat both sides with a thick coat of spirit-based cold-applied bitumen paint.

- Fixing: Clips as H71/715 and H71/716 to suit exposure.
- Joints: Welted as H71/880.
  - Spacing: 1500 mm maximum.
- Edge details:

Rev C4
  - Lapped flashing to box gutter as H71/470 & H71/125

Rev C4
  - Welted drip to front edge: ~~75~~ 25 mm ~~downstand~~.

- Corner details: Prefabricated leadwelded units.

Rev C4 255 ~~CAPPINGS TO ROOFLIGHT UPSTAND~~ INFILL LIGHTWELL LEAD ROOF - LIBRARY EXTENSION:
Include in Contractor's Designed Portion for Leadwork

Rev C4
- Drawing reference: 597-41211 / 41252 / 41256 / 41250 / 41251 / 41257 / 40222.

Rev C4
- Background support: Timber roof construction on steel frame.
  Substrate: Two Layers Birch plywood (18 mm/ 13 plies) as G20/311 on treated softwood battens (50x100mm) as G20/210.
  Bearing width: Fully supported.
- Underlay: 220 g/m² needle punched geotextile.

Rev C5
- Type of lead: Sand-cast lead sheet as H71/520. Patinated as H71/970.
  - Thickness: 2.65 mm (Code 6 equivalent).
- Pretreatment: Apply chalk slurry coat to underside of lead and allow to dry before laying, followed by chalk paste coat after bossing but before final fixing.
- Fixing: Continuous clips as H71/716 to suit exposure.
- Joints: Welted as H71/880.
  - Spacing: 1500 mm maximum. see drawings.
- Edge details:

Rev C4 Rev C5
  - Interface flashing detail with rooflight ~~perimeter frame.~~ Flashing laid over rooflight EPDM along all glass sides, terminated over S/S plate bonded to EPDM / infill roof – see drawings.
  - Lead dressed over Aluminium gutter along bottom edge of rooflight
  - lead dressed into existing stone plinth as drawings & H71/790
  - ~~Cover flashing to front edge: Varying height over roofing upstand to suit roof pitch.~~

- Corner details: Prefabricated leadwelded units.

- Special requirements: Top of upstand to align with top of ridge roll of east roof pitch.

Rev C4 - Incorporation of rainwater hoppers to existing lead downpipes, as drawings.

Rev C1 256 LEAD ROOF TO STONE PIER - LIBRARY EXTENSION:
Include in Contractor's Designed Portion for Leadwork

Rev C4 - Drawing reference: 597- 41221 / 41265 .
- Background support: Timber roof construction on steel frame.

Rev C4 Substrate: Birch plywood (18 mm/ 13 plies) as G20/311 on treated softwood battens (50x25mm) as G20/210.
Bearing width: Fully supported.

- Underlay: 220 g/m² needle punched geotextile.
- Type of lead: Sand-cast lead sheet as H71/520.
- Thickness: 2.65 mm (Code 6 equivalent).
- Pretreatment: Apply chalk slurry coat to underside of lead and allow to dry before laying, followed by chalk paste coat after bossing but before final fixing.
- Fixing: Continuous clips as H71/716 to suit exposure.
- Joints: Welted as H71/880.
- Spacing: 1500 mm maximum.
- Edge details:

Rev C4 - Interface flashing detail with ~~rooflight perimeter frame~~ existing building; dressed into existing brickwork and oversized to enable settlement – refer to S.E for allowances.
~~- Cover flashing to front edge: Varying height over roofing upstand to suit roof pitch.~~
- Roof flashing dressed down onto structural glass roof as drawings.

- Corner details: Prefabricated leadwelded units.

Rev C4 257 ROOFLIGHT UPSTANDS: LIBRARY EXTENSION – LE.RF.M.01 & LE.RF.R.01
Include in Contractor's Designed Portion for Leadwork

- Drawing reference: 597-15205 / 597-15206.
- Background support: Birch plywood (18 mm/ 13 plies) as G20/311 on Timber roof construction & steel frame.
Substrate: Softwood as G20/210.
Bearing width: Fully supported.
- Underlay: 220 g/m² needle punched geotextile.

- Type of lead: Sand-cast lead sheet as H71/520.
- Thickness: 2.65 mm (Code 6 equivalent).
- Pretreatment: Apply chalk slurry coat to underside of lead and allow to dry before laying, followed by chalk paste coat after bossing but before final fixing.
- Fixing: Continuous clips as H71/716 to suit exposure.
- Joints: Welted as H71/880. -
- Spacing: 1500 mm maximum.
- Edge details:
- Interface flashing detail with rooflight perimeter frame
- Cover flashing to front edge: Varying height over roofing upstand to suit roof pitch.
- Corner details: Prefabricated leadwelded units.

Rev C4 258 BAY WINDOW CAPPING: LIBRARY EXTENSION
Include in Contractor's Designed Portion for Leadwork

- Drawing reference: 597-41225 / 41235
- Background support: Birch plywood (18 mm/ 13 plies) as G20/311 on Timber roof construction & steel frame.
Substrate: Softwood as G20/210.
Bearing width: Fully supported.
- Underlay: 220 g/m² needle punched geotextile.
- Type of lead: Sand-cast lead sheet as H71/520.
- Thickness: 2.65 mm (Code 6 equivalent).
- Pretreatment: Apply chalk slurry coat to underside of lead and allow to dry before laying, followed by chalk paste coat after bossing but before final fixing.
- Fixing: Continuous clips as H71/716 to suit exposure.
- Joints: Welted as H71/880.
- Spacing: Refer to drawings.

- Edge details:
  - Dressed into stone and external brick leaf

Rev C5 259 ROOFLIGHT UPSTANDS: EAST TERRACE – ET.RF.G.01 TO ET.RF.G.04
Include in Contractor's Designed Portion for Leadwork
- Drawing reference: 597-15106, 597-41157, 597-41158, 597-41159 & 597-41198
- Background support: Birch plywood (18 mm/ 13 plies) as G20/311 on Timber roof construction & steel frame.
  Substrate: Softwood as G20/210.
  Bearing width: Fully supported.
- Underlay: 220 g/m² needle punched geotextile.
- Type of lead: Sand-cast lead sheet as H71/520. Patinated as H71/970.
- Thickness: 2.65 mm (Code 6 equivalent).
- Pretreatment: Apply chalk slurry coat to underside of lead and allow to dry before laying, followed by chalk paste coat after bossing but before final fixing.
- Fixing: Continuous clips as H71/716 to suit exposure.
- Joints: Welted as H71/880.
- Spacing: 1500 mm maximum.
- Edge details:
  - Interface flashing detail with rooflight – Leadwork terminated over S/S plate bonded to EPDM/ infill roof and mechanically fixed back to timber roof framework.
  - Interface flashing detail chased into existing stonework.
  - Cover flashing to front edge of rooflight: Varying height over roofing upstand to suit roof pitch.
  - Cover flashing to front edge of buttress: Varying height over roofing upstand to suit roof pitch.
  - Corner details: Prefabricated leadwelded units, as details.

260 WEATHERINGS GENERALLY:
- Substrate: Birch plywood (18 mm/ 13 plies) as G20/311.
- Underlay/ slip membrane: 220 g/m² needle punched geotextile.
- Type of lead: Sand-cast lead sheet as H71/520.
  - Thickness: 2.65 mm (Code 6 equivalent).
- Fixings, welted joints, clips, etc : Generally as H71/255.
- Cover flashings: As H71/420.

310 RIDGE/ HIP ROLLS TO LEAD ROOFS
- Core: Rounded timber.
  - Size: 70 x 45 mm.
  - Shape: Tapered to a flat base 30 mm wide.
  - Fixing: To ridge/ hip board with brass or stainless steel countersunk screws at not more than 600 mm centres.
- Roof covering: Dress roofing sheets up roll to form 50 mm upstand.
  - Fixing: Nail each sheet at underlapping end.
- Lead capping:
  - Thickness: As roof covering.
  - Lengths: Not more than 1500 mm on hips.
  - Wings: Extend not less than 75 mm on to roof.
  - Laps in length: Not less than 150 mm for ridges, 100 mm for hips.
  - Fixing: Secure wings with one copper or stainless steel clip per roofing bay and at each lap.

410 APRON FLASHINGS GENERALLY
- Lead: Sand-cast lead sheet as H71/520.
  - Thickness: 2.65 mm (Code 6 equivalent).
- Dimensions:
  - Lengths: Not more than 1500 mm.
  - End to end joints: Laps of not less than 100 mm.
  - Upstand: Not less than 75 mm.
  - Cover to abutment: Not less than 150 mm.

- Fixing: Lead wedges into bed joint or cut chase, or clips to lead upstand, at laps and 500 mm centres, unless otherwise described.

430 COVER FLASHINGS GENERALLY:
- Lead: Sand-cast lead sheet as H71/520.
  - Thickness: 2.65 mm (Code 6 equivalent).
- Dimensions:
  - Lengths: Not more than 1500 mm.
  - End to end joints: Laps of not less than 100 mm.
  - Overlap to upstand: Not less than 50 mm.
  - Cover to roof: Not less than 75 mm.
- Fixing: Lead wedges into bed joint or cut chase, or clips to lead upstand, at laps and 500 mm centres, unless otherwise described.

460 CHANGE OF ROOF PITCH FLASHINGS
- Lead: Sand-cast lead sheet as H71/520.
  - Thickness: 2.65 mm (Code 6 equivalent).).
- Dimensions:
  - Lengths: Not more than 1500 mm.
  - End to end joints: Laps of not less than 150 mm.
  - Under course of slates/ tiles above: Not less than 150 mm.
  - Over course of slates/ tiles below: Not less than 150 mm.
- Fixing: Nail top edge at 150 mm centres and welt edge. Clip bottom edge at laps and 500 mm centres.

470 FLASHINGS GENERALLY:
- Lead: Sand-cast lead sheet as H71/520.
  - Thickness: 2.65 mm (Code 6 equivalent).
- Dimensions:
  - Lengths: Not more than 1500mm.
  - End to end joints: Laps of not less than 100 mm.
- Fixing: Lead wedges into bed joint or cut chase, or clips to lead upstand, at laps and 500 mm centres.

ANCILLARY PRODUCTS:

Rev C7 499 CAST LEAD RAINWATER GOODS - ~~LIBRARY EXTENSION &~~ EAST TERRACE **HOPPERS**:
Include in Contractor's Designed Portion for Leadwork
- Drawing reference: 597-**15102, 15104, 15115, 41163, 41165, 41168, 41174, 41307**.
- Material: Sand-cast lead sheet, generally as H71/520.
  Thickness: Code 10 equivalent.
- Products:
  - Hopper: ~~Library Extension: Rectangular (400w x 250d x 300h mm nominal - TBC).~~
    East Terrace (South): Rectangular (**850w** ~~600w~~ x **275d** ~~250d~~ x **560h** ~~360h~~ mm ~~nominal - TBC~~)
    East Terrace (North): Rectangular (**625w** ~~550w~~ x **275d** ~~250d~~ x **275h** ~~360h~~ mm ~~nominal - TBC~~)
  - Downpipe: **East Terrace (South): 2no. 150mm dia. stainless steel drainage connection pipes. Hopper to include stainless steel spigot connections to drainage connection pipes. Drainage connection pipes to connect to Below Ground Engineer's manhole connection pipes as details. Spigot connection pipe below ET.SD.01X to extend into hopper to provide segregated drainage collection as detail 41168.**
    East Terrace (North): 1no. 100x 200mm stainless steel box section to Below Ground Drainage Engineer's design & specification. Hopper to include stainless steel spigot connection to box section.
    ~~Square (110 x 110 mm nominal - TBC).~~
  - Spigot joints.
  - Shoe outlet.

- Manufacturer and reference: English Leadworks (01732 860447)
  http://www.englishleadworks.com
  Hoppers & Downpipes
- Accessories:
  - Fixing brackets: **Stainless steel gallows brackets to primary reinforced concrete frame as details** ~~Sand-cast lead sheet~~.
  - Fixings: Stainless steel coach bolts with washers and anchors ~~and lead cappings.~~
  - Bespoke stainless steel mesh and support brackets to hopper to act as leaf guard. (Rev C1)
  - ~~Stainless steel leaf guard – Ancon Staifix Wire Balloon~~ (~~Rev C1~~)
- Other requirements:
  1. ~~Repairs to existing lead rainwater pipes to Great Hall. Extent to be agreed.~~
  2. ~~Reconfiguration, including extension, to base of existing RWPs to accommodate new works (East Terrace).~~
  3. **Openings at rear of hoppers to accept drainage connections from the East Terrace as indicated on section details.**
  4. **Fascia of hopper to extend over fixing brackets as indicated in Architect's details.**

(Rev C4) 500 CAST LEAD RAINWATER GOODS - SUBSTATION:
Include in Contractor's Designed Portion for Leadwork

- Drawing reference: 597-15002, 41022.
- Material: Sand-cast lead sheet, generally as H71/520.
  Thickness: Code 10 equivalent.
- Products:
  - Downpipe: Round, 75mm dia.
    - Spigot joints.
    - Shoe outlet.
- Manufacturer and reference: English Leadworks (01732 860447)
  http://www.englishleadworks.com
  Hoppers & Downpipes
- Accessories:
  - Fixing brackets: Sand -cast lead sheet.
  - Fixings: Stainless steel coach bolts with washers and anchors and lead cappings.
  - Gully: Aco EG150 (part no. 97304) TELE vertical outlet SS 316 with foul air trap.

(Rev C8) 501 CAST LEAD RAINWATER GOODS - LIBRARY EXTENSION HOPPERS & DOWNPIPES:
Include in Contractor's Designed Portion for Leadwork

- Drawing reference: 597-15215, 40227, 40239, 41213.
- Material: Sand-cast lead sheet, generally as H71/520.
  Thickness: Code 10 equivalent.
- Products:
  - Hopper: Library Extension: Rectangular (400w x 250d x 350h mm nominal).
  - Downpipe: Square (110 x 110 mm nominal).
    - Spigot joints.
    - Shoe outlet.
- Manufacturer and reference: English Leadworks (01732 860447)
  http://www.englishleadworks.com
  Hoppers & Downpipes
- Accessories:
  - Hopper Fixing brackets: Concealed Stainless steel brackets to masonry cavity wall.
    - Fixings: Stainless steel coach bolts with washers and anchors.
    - Bespoke stainless steel mesh and support brackets to hopper to act as leaf guard.
  - Downpipe Fixing Brackets: Concealed Stainless steel brackets to support downpipe, with offset connection and fixings concealed behind pipe, fixings to be covered with lead domed caps.
    - Fixings: Stainless steel coach bolts with washers and anchors
    - Square fascia to conceal connection between square downpipe and circular stainless steel drainage pipes.
- Other requirements:

1. Openings at rear of hoppers to accept drainage connections from the concealed gutter as indicated on section details, penetration around pipe to be sealed.

Rev C7 **502 CAST LEAD RAINWATER GOODS – GREAT HALL DOWNPIPES:**
Include in Contractor's Designed Portion for Leadwork

- **Drawing reference: 597-41300.**
- **Material: Sand-cast lead sheet, generally as H71/520.**
  Thickness: Code 10 equivalent.
- **Products:**
  - **Downpipe: Rectangular (size to match existing - 160 x 110 mm nominal).**
    - **Spigot joints.**
    - **Shoe outlet.**
- **Manufacturer and reference: English Leadworks (01732 860447)**
  http://www.englishleadworks.com
  Downpipes
- **Accessories:**
  - **Fixing brackets: Sand-cast lead sheet.**
  - **Fixings: Stainless steel coach bolts with washers and anchors and lead cappings.**
- **Other requirements:**
  1. **Repairs to existing lead rainwater pipes to Great Hall. Extent to be agreed.**
  2. **Reconfiguration, including extension, to base of existing RWPs to accommodate new works.**

GENERAL REQUIREMENTS/ PREPARATORY WORK

510 WORKMANSHIP GENERALLY

- Standard: To BS 6915 and general recommendations applicable to sand-cast lead sheet of the Lead Sheet Association (LSA - http://www.leadsheetassociation.org.uk/), particularly the current edition of *"Rolled Lead Sheet – The Complete Manual"* (LSA).
- Fabrication and fixing: To provide a secure, free draining and completely weathertight installation.
- Operatives: Trained in the application of lead coverings/ flashings. Submit records of experience on request.
- Preforming: Measure, mark, cut and form lead prior to assembly wherever possible.
- Marking out: With pencil, chalk of crayon. Do no use scribers or other sharp instruments without approval.
- Bossing and forming: Straight and regular bends, leaving sheets free from ripples, kinks, buckling and cracks.
- Solder: Use only where specified.
- Sharp metal edges: Fold under or remove as work proceeds.
- Finished work: Fully supported, adequately fixed to resist wind uplift but also able to accommodate thermal movement without distortion or stress.
  - Protection: Prevent staining, discolouration and damage by subsequent works.

516 LEADWELDING

- In situ leadwelding: Is permitted, subject to completion of a "Hot Work Permit" form and compliance with its requirements.

520 LEAD SHEET

- Production method:
  - Rolled, to BS EN 12588, or
  - Machine cast, Agrément certified and to code thicknesses with a tolerance (by weight) of ±5%, or
  - Sand cast, from lead free from bitumen, solder, other impurities, inclusions, laminations, cracks, air, pinholes and blowholes; to code thicknesses but with a tolerance (by weight) of ±10%.
    - Manufacturer: Midland Lead Ltd

http://www.midlandlead.co.uk

- Identification: Labelled to show thickness/ code, weight and type.

555 LAYOUT
- Setting out of longitudinal and cross joints: Submit proposals.

560 CONTROL SAMPLES
- General: Complete areas of the finished work, and obtain approval of appearance before proceeding:
- Size: TBC.
- Location:TBC.

610 SUITABILITY OF SUBSTRATES
- Condition: Dry and free of dust, debris, grease and other deleterious matter.

620 PREPARATION OF EXISTING TIMBER SUBSTRATES
- Remedial work: Adjust boards to level and securely fix. Punch in protruding fasteners and plane or sand to achieve an even surface.
- Defective boards: Give notice.
- Moisture content: Not more than 22% at time of covering. Give notice if greater than 16%.

640 TIMBER FOR USE WITH LEADWORK:
- Quality: Planed, free from wane, pitch pockets, decay and insect attack (ambrosia beetle excepted).
- Moisture content: Not more than 22% at time of fixing and covering. Give notice if greater than 16%.
- Preservative treatment: Organic solvent as section Z12 and Wood Protection Association Commodity Specification C8.

650 UNDERLAY
- Manufacturer and reference: Contractor's choice.
- Handling: Prevent tears and punctures.
- Laying: Butt or overlap jointed onto a dry substrate.
  - Fixing edges: With copper or stainless steel staples or clout nails.
  - Do not lay over roof edges but do turn up at abutments.
  - Wood core rolls: Fixed over underlay.
  - Protection: Keep dry and cover with lead at the earliest opportunity.

FIXING LEAD

705 HEAD FIXING LEAD SHEET
- Top edge: Secured with two rows of fixings, 25 mm and 50 mm from top edge of sheet, at 75 mm centres in each row, evenly spaced and staggered.
- Sheets less than 500 mm deep: May be secured with one row of fixings, 25 mm from top edge of sheet and evenly spaced at 50 mm centres.

710 FIXINGS
- Nails to timber substrates: Copper clout nails to BS 1202-2, or stainless steel (austenitic) clout nails to BS 1202-1.
  - Shank type: Annular ringed, helical threaded or serrated.
  - Shank diameter: Not less than 2.65 mm for light duty or 3.35 mm for heavy duty.
  - Length: Not less than 20 mm or equal to substrate thickness.
- Screws to concrete or masonry substrates: Brass or stainless steel to BS 1210, tables 3 or 4.
  - Diameter: Not less than 3.35 mm.
  - Length: Not less than 19 mm.
  - Washers and plastic plugs: Compatible with screws and lead.

715 CLIPS
- Manufacturer: Fabricated on site.

- Material:
  - Lead clips: Cut from sheets of same thickness/ code as sheet being secured. Use only in sheltered conditions.
  - Copper clips:
    Thickness: 0.70 mm.
    Temper: BS EN 1172, designation R220 in welts, seams and rolls, R240 elsewhere; dipped in solder where exposed to view.
  - Stainless steel clips:
    Thickness: 0.40 mm.
    Grade: BS EN 10088, 1.4301(304) terne-coated where exposed to view.
- Dimensions:
  - Width: 50 mm where not continuous.
  - Length: To suit detail.
- Fixing clips: Secure each to substrate with either two screw or three nail fixings not more than 50 mm from edge of lead sheet. Use additional fixings where lead downstands exceed 75 mm.
  - Clip centres: 300mm maximum.
- Fixing lead sheet: Welt clips around edges and turn over 25 mm.

760 CONTINUOUS CLIPS

- Material:
  - Copper continuous clips:
  - Thickness: 0.70 mm.
  - Temper: BS EN 1172, designation R220 in welts, seams and rolls, R240 elsewhere.
  - Stainless steel continuous clips:
    Thickness: 0.040 mm.
    Grade: BS EN 10088, 1.4301(304).
- Dimensions:
  - Width: To suit detail.
- Fixing clips: Secure at 200mm maximum centres..
- Fixing lead sheet: Welt edge around continuous clip and dress down.

765 CONTINUOUS CLIPS FOR CROSS JOINTS IN ROOFING

- Lead continuous clips: 50 mm wide, cut from sheets of same thickness/ code as sheet being secured.
- Fixing clips: Leadweld top edge of clips to underlap sheet, 50 mm from lower edge of overlap.
- Fixing lead sheet: Welt edge around continuous clip and dress down.

770 WEDGE FIXING INTO JOINTS/ CHASES

- Joint/ chase: Rake out to a depth of not less than 25 mm.
- Lead: Dress into joint/chase.
  - Fixing: Lead wedges at not more than 450 mm centres, at every change of direction and with at least two for each piece of lead.
- Sealant:
  Manufacturer and reference: Calder Industrial Materials Ltd (01244 390093)
  http://www.calderlead.co.uk
  Lead Sheet Sealant
  Colour: Lead grey.
  - Application: As section Z22.

780 WEDGE FIXING INTO DAMP PROOF COURSE JOINTS

- Joint: Rake/ cut out under damp proof course to a depth of not less than 25 mm.
- Lead: Dress lead into joint.
  - Fixing: Lead wedges at not more than 450 mm centres, at every change of direction and with at least two for each piece of lead.
- Sealant:
  Manufacturer and reference: Calder Industrial Materials Ltd (01244 390093)
  http://www.calderlead.co.uk
  Lead Sheet Sealant
  Colour: Lead grey.
  - Application: As section Z22.

790 SCREW FIXING INTO JOINTS/ CHASES
- Joint/ chase: Rake out to a depth of not less than 25 mm.
- Lead: Dress into joint/ chase and up back face.
- Fixing: Into back face with stainless steel screws and washers and plastics plugs at not more than 450 mm centres, at every change of direction, and with at least two fixings for each piece of lead.
- Sealant:

  Manufacturer and reference: Calder Industrial Materials Ltd (01244 390093)
  http://www.calderlead.co.uk
  Lead Sheet Sealant

  Colour: Lead grey.
  - Application: As section Z22.

JOINTING LEAD

810 FORMING DETAILS
- Method: Bossing or leadwelding except where bossing is specifically required.
- Leadwelded seams: Neatly and consistently formed.
  - Seams: Do not undercut or reduce sheet thickness.
  - Filler strips: Of the same composition as the sheets being joined.
  - Butt joints: Formed to a thickness one third more than the sheets being joined.
  - Lap joints: Formed with 25 mm laps and two loadings to the edge of the overlap.
- Bossing: Carried out without thinning, cutting or otherwise splitting the lead sheet.
  - Details where bossing must be used: Roll ends.

840 WOOD CORED ROLL JOINTS WITHOUT SPLASH LAP
- Wood core:
  - Size: 45 x 45 mm round tapering to a flat base 25 mm wide.
  - Fixing to substrate: Brass or stainless steel countersunk screws at not more than 300 mm centres.
- Undercloak: Dress half way around core.
- Copper or stainless steel clips. Fix to core at not more than 450 mm centres. Do not restrict thermal movement of the undercloak.
- Overcloak: Dress around core with edge welted around ends of clips, finishing 5 mm clear of main surface.

845 WOOD CORED ROLL JOINTS WITH SPLASH LAP
- Wood core:
  - Size: 45 x 45 mm round tapering to a flat base 25 mm wide.
  - Fixing to substrate: Brass or stainless steel countersunk screws at not more than 300 mm centres.
- Undercloak: Dress three quarters around core.
  - Fixing: Nail to core at 150 mm centres for one third length of the sheet starting from the head.
- Overcloak: Dress around core and extend on to main surface to form a 40 mm splash lap.

880 WELTED JOINTS
- Joint allowance: 50 mm overlap and 25 mm underlap.
- Copper or stainless steel clips: Fix to substrate at not more than 450 mm centres.
- Overlap: Welt around underlap and clips and lightly dress down.

FINISHING

970 PATINATION OIL
- Manufacturer and reference: Contractor's choice.
- Location: All exposed lead surfaces.
- Application: As soon as practical, apply a smear coating to lead, evenly in one direction and in dry conditions.