



COBBAUGE

NBS SPECIFICATION

Photo: Plymouth University, CobBauge project

www.cobbauge.eu



E20

Formwork for CobBauge

F50 CobBauge Walling Systems

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General/ preparation

110 Loadings

1. **Requirement:** Design and construct formwork and associated tools to withstand the worst combination of the following:
 - 1.1. Total weight of formwork and CobBauge.
 - 1.2. Construction loads including dynamic effects of placing, compacting and construction traffic.
 - 1.3. Wind and rain loads.

120 Formwork details

1. **Description:** Formwork to be formed in accordance with details set out in the CobBauge Outline Methodology Statement. Comprises of two sections of open grid mesh framework spaced to suit thickness of wall build up required. Faces in contact with CobBauge material to be lined with wire mesh as clause E20/410. To be held in place with metal threaded rods as clause E20/350.
2. **Material:** Timber, steel or aluminum framing. Contractors choice.
3. **Sourcing of materials:** xxxx
4. **Size:** Formwork sized to suit single CobBauge lift.
 - 4.1. Length : individual formwork sections not to exceed 2m. Sized to suit perimeter of building. Sections can abut to form continuous perimeter of formwork.
 - 4.2. Height: Sized to suit single lift of CobBauge: 0.5m – 0.6m nominally.
 - 4.3. Panel size: Framework centers to be maximum 500mm to limit deflection of mesh lining. Centres should reflect the deflection of the chosen mesh material.
5. **Provide the following:** Surface of form, form liners and other means of obtaining specified wall build up. Where multiple formwork sections abut, Contractor can clamp sections together to ensure a smooth transition if required.
6. **Additional requirements:** Placement tool as clause 380 and compaction tool.

178 Openings in composite CobBauge Walls

1. **Generally:** Except as otherwise agreed, box out for openings in CobBauge.
2. **Forming holes:**
 - 2.1. **Timing:** Prior to lift of CobBauge section / or when Cob reaches relevant height
 - 2.2. **Method:** Formed with timber / aluminum framing, lined with wire mesh as clause E20/410.
3. **Sizing:** See CobBauge Outline Methodology document for sizing of opening formwork taking shrinkage into account.
4. **Additional Requirements:** To be easily removed, with open, mesh lined sides to allow CobBauge layers to dry.

Construction

310 Accuracy

1. **General requirement for formwork:** Accurately and robustly constructed to produce finished CobBauge in the required positions and to the required dimensions.
2. **Formed surfaces:** Free from twist, bow and racking (other than any required cambers).
3. **Intersections, lines and angles:** Square, plumb and true.
4. **Spacing:** Pre-formed spacing block to maintain thickness and position of formwork frames if a uniform finish is required.

320 Joints in forms

1. Requirements including joints in form linings and between forms and completed work
 - 1.1. Prevent loss of Cob, tightly abutting adjacent formwork, using seals where necessary.
 - 1.2. Prevent formation of steps. Secure formwork tight against adjacent CobBauge lifts / sections.

330 Inserts, holes and chases

1. **Description:** Formwork and associated tools to allow for the following embedded items: Structural lintels, door and window casings and/or frame reveals and timber features for externally fixed items.
2. Positions and details
 - 2.1. **Dimensioned on drawings provided on behalf of the Employer:** Do not change without consent.
 - 2.2. **Non dimensioned or from other sources:** Submit proposals.
3. **Positioning relative to formwork:** Give notice of any conflicts well in advance of placing CobBauge.
4. **Method of forming:** Fix inserts or box out as required. Do not cut hardened CobBauge without approval.

350 Form ties

1. **Description:** Threaded bar or long rods to suit formwork size. To be fixed in place with easily removable fixings.
2. **Tie manufacturer:** DYWIDAG-Systems or similar
 - 2.1. **Type:** Grade 8.8 or above threaded bar with flange nuts with penny and spring washers or nyloc nuts.
 - 2.2. **Product reference:** <https://www.dywidag-formties.com/products/threadbars/> or similar.
 - 2.2.1. **Size:** Length of metal rods to be long enough to be passed between two sections of formwork, with at least 100mm extension on each side ready for nut. Diameter of rod: M10 – M16
3. **Other Requirements:** Ensure ends of rods are protected to protect workers from harm on site. Allow for plastic former around rods in cob.

380 Placement tool

1. **Description:** Contractor to construct placement tool to allow accurate placement of cob layers within the formwork. Comprises of two angled timber surfaces, formed in plywood as set out in the CobBauge Outline Methodology Statement. To be formed to withstand weight of CobBauge and construction loads, including dynamic effects of placing and compacting materials.
2. **Size:** To be sized to allow for manual lifting and removal.

410 Expanded steel mesh formwork lining

1. **Manufacturer:**
 - 1.1. **Description:** Wire mesh secured to inner face of formwork frames.
 - 1.2. **Product reference:** Contractors choice
2. **Requirements:** Size of mesh to allow for visual inspection of drying process and compaction. To be 25 x 25mm square. Excess material compressed through the wire mesh to be carefully removed / scraped away while wet to prevent formwork mesh becoming trapped within the CobBauge mixes.

Striking

510 Striking formwork

1. **Timing:** Prevent any disturbance, damage or overloading of the permanent structure.

521 Minimum period for retaining formwork/ temporary supports in position

1. **CobBauge strength at time of formwork removal (minimum):** Formwork to be held in place for until CobBauge material reaches the minimum moisture content for removal as set out in CobBauge Outline Methodology Statement. Alternatively, formwork to be left in place for minimum 2-3 weeks before being relocated to next lift if it is not possible for Contractor to check moisture levels of CobBauge mix. Subsequent lifts should not be undertaken for a minimum of 4 weeks unless moisture levels have reached minimum levels set out in the CobBauge Outline Methodology Document.
2. **Assumptions:**
 - 2.1. **Before removing formwork:** Submit proposals if assumptions will not be realised.
3. **Method to be used in assessing readiness of CobBauge:** Ramin timber sensors should be installed as outlined in the CobBauge Outline methodology Document and checked before the next lift is placed on top.

522 Repositioning Formwork

1. **Description:** Connecting bolts or threaded rods to be placed on top of previous lift before raising formwork frames. Formwork to be raised and connected to bolts to support framework with suitable spacer added to maintain wall thickness.
2. **Timing:** First lift to be left in place for 2 weeks prior to laying second. The first lift of formwork should be left in place during the positioning and use of the next lift of formwork.
3. **Additional Requirements:** Buried rods to be carefully removed from wall while still wet. Hole left must be backfilled with sheep's wool with a plug of relevant CobBauge material according to side.

Formed finishes

613 Ordinary finish

1. **Location:** To be agreed.
2. **Finish:** Faces fully compacted. Formed surfaces free from major blemishes and honeycombing. Steps at joints to be less than 5 mm.

F50 CobBauge Walling Systems

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General requirements/ preparatory work

This specification relates to the procurement and construction of CobBauge walling. The specification is to be read in conjunction with E20 Formwork for CobBauge, to be adapted to suit individual project requirements.

The Contractor shall be entirely and exclusively responsible for ensuring that the Specialist Cladding Contract Works comply with this Performance Specification and the requirements of the Contract.

The Scope of the CobBauge walling Works includes but is not limited to:

- site survey
- design
- drawing and scheduling
- production of sample wall / walls
- submission of proposals and technical substantiation / evidence of testing for comment by the Employer's Team
- incorporation of comments

Approvals – Evidence of testing of materials to be submitted for approval prior to construction / procurement of materials . Approved by third party / architect with CobBauge training.

1 Timber Procurement Generally

1. **Timber** (including timber for wood based products): Obtained from well managed forests/ plantations in accordance with:
 - 1.1. The laws governing forest management in the producer country or countries.
 - 1.2. International agreements such as the Convention on International Trade in Endangered Species of wild fauna and flora (CITES).
2. **Documentation:** Provide either:
 - 2.1. Documentary evidence (which has been or can be independently verified) regarding the provenance of all timber supplied, or
 - 2.2. Evidence that suppliers have adopted and are implementing a formal environmental purchasing policy for timber and wood based products.

Systems

110 Unframed CobBauge walling system

1. **Description** Twin layer composite construction to be formed in accordance with details set out in the CobBauge Outline Methodology Statement and Quality Assurance Document.
 - 1.1. **Outer layer:** 300mm nom thick thermal, low density cob. Structural Cob layer comprising of suitable mix of sub-soil as clause F30/320 and fibre as clause F30/325
 - 1.2. **Inner layer:** 300mm nom thick structural, high density cob. Thermal Cob layer comprising of suitable mix of sub-soil as clause F30/320 and fibre as clause F30/330.
 - 1.3. **Overall thickness:** minimum 600mm thick walls.
 - 1.4. **Lifts:** CobBauge lifts to be formed in layers as clause F50/620
2. **Footings:** Footings should support the entire width of the CobBauge wall (600mm+). Footings should allow all CobBauge to be a minimum of 150mm from ground level. CobBauge should not come into contact with the DPC. All footings should be at a suitable depth and strength for the weight of CobBauge wall to be placed on top and be made from resistant materials as per SE. specification
 - 2.1. Structural Cob to be fully supported on blockwork or in-situ concrete wall built off concrete strip foundation / footings to Structural Engineers design.
 - 2.2. Outer face of Thermal Cob to be supported on masonry wall, back filled with suitable insulation
3. **Formwork:** Formwork and bespoke tools as section E20
4. **Window and door openings:** Formed with lintels as clause F50/340. Refer to CobBauge standard details for typical window and door opening details.
5. **Accessories:** Fixing frames for external fittings as Clause F50/615
6. **Internal finishes:** Clay plaster as F30/355
7. **External finishes:** Lime render as F30/350
8. **Additional Requirements:** Materials and mix of CobBauge layers to be tested and approved prior to ordering and construction on site. Detailed testing requirements outlined in section 900.

System Performance

220 Structural Performance

1. **CobBauge walling:** To resist wind loads, dead loads and design live loads.
2. Detailed calculations (in addition to any testing required) shall be undertaken and submitted by an appropriately qualified Structural Engineer to demonstrate structural performance.

240 Weathertightness

3. **CobBauge walling:** Secure, free draining and weathertight. Wind and watertight at wind pressures up to and equal to the design wind pressure with allowance made for deflection and other movements.

250 Durability

1. **Design life (minimum):** 60 years

260 Thermal performance

1. Required U-values (maxima)
 - 1.1. **Walls:** $0.30\text{W/m}^2\text{K}$.
2. Minimum thickness of Thermal Cob to be maintained during construction to maintain u-value.

270 Vapor Permeability

1. Finishes to CobBauge wall to be vapor permeable to maintain hygroscopic properties.

Products

320 Sub-soil

1. **Type:** Clay soil with clay content of minimum 12% for structural mix and 60% for insulative mix.
2. **Quality:** To be devoid of organic matter.
3. **Testing:** Samples to be tested in accordance with F50/505 and 510
4. **Other Requirements:** Soil from site to be tested for suitability. Top soil to be removed and suitably disposed of.

325 Organic Binder to Structural Cob

1. **Description:** Wheat straw used to bind sub-soil mix to form Structural Cob
2. **Quality:** Fresh, dry, no decomposition. Clean, free of seed heads, roots, leaves, flowers, insects, grasses and other contaminants.
3. **Length of fibers:** No requirement to cut straw for use in structural layer as indicated in the Outline Methodology Document.

330 Organic Binder to Thermal Cob

1. **Description:** Hemp shiv mixed with high clay sub-soil to form Thermal Cob
2. **Quality:** Fresh, dry, no decomposition. Clean, free of seed heads, roots, leaves, flowers, insects, grasses and other contaminants.
3. **Length of fibers:** To be sourced pre-cut for use in thermal cob layers as indicated in the Outline Methodology Document.

335 Binding Layer between CobBauge Lifts and Sub-lifts

1. **Description:** layer of hemp straw used to reduce risk of cracking between lifts.
2. **Quality:** Fresh, dry, no decomposition. Clean, free of seed heads, roots, leaves, flowers, insects, grasses and other contaminants.
3. **Length of fibers:** Straws to be cut to required length as indicated in the Outline Methodology Document.

340 Lintels to Windows and Doors

1. **Manufacturer:** Contractors choice.
2. **Material:** Timber lintels with plywood framing or prefabricated concrete to suit opening requirements.
3. **Size:** To Structural Engineers design and specification to suit opening requirements.
4. **Length at jambs:** Lintels to overhang / span over jamb by 200mm on either side of opening.
5. **Construction:** Lintels to be formed within and bearing on Structural CobBauge and thermal CobBauge as outlined in the Outline Methodology Document
6. **Additional requirements:** Refer to typical details.

350 External Render

1. **Description:** To be lime or earth render to provide vapor permeability as F50/270
2. **Preparation:** Surfaces to be prepared in line with F50/645
3. **Coat:** Minimum coat to suit selected render – to manufacturers recommendations
4. **Additional requirements:** Moisture content of thermal layer as clause F50/625. Gypsum and cement based renders not permitted.

355 Internal Plaster

1. **Description:** To be clay plaster to provide vapor permeability as F50/270
2. **Preparation:** Surfaces to be prepared in line with F50/645
3. **Coat:** Minimum coat to suit selected render – to manufacturers recommendations
4. **Additional requirements:** Moisture content of thermal layer as clause F50/625. Gypsum and cement based plasters not permitted.

360 Paint internally

1. **Description:** to be lime or clay based.
2. **Additional requirements:** Latex and acrylic based paints not permitted.

370 Paint external

1. **Description:** to be lime based.
2. **Additional requirements:** Latex and acrylic based paints not permitted.

Making CobBauge

400 Control Sample

1. **Location:** To be located on site or off-site in open, outdoor environment. Sheltered from rain where necessary
2. **Approval:** To be approved by member of team with CobBauge ECVET level 4 or higher training.
3. **Timing:** To be built prior to construction of main walls, allowing sufficient time for drying and defects. Allow for 4 weeks drying time.
4. **Description:** Placing, compaction, drying, delamination and accuracy of the CobBauge is identical to that proposed for the element or part of the building.
5. **Inspection of samples:** Give notice.
6. **Commencement of related parts of the Works:** Do not proceed until instructed by approved member of team.

420 Structural Cob

1. **Methodology:** To be read in conjunction with CobBauge Outline Methodology Statement.
2. **Type:** Structural Cob comprising of:
 - 2.1. Sub-soil – clay content and silt fraction to be determined and tested for suitability for use, prior to placing order. Testing to determine requirement for additional material.
 - 2.2. Fibre reinforcement – wheat straw as clause E20/325
3. **Thickness:** 300mm minimum. Slenderness ratio of 7.5 – 1 maximum when measured with the thermal cob component.
4. **Site mixing:** To be either machine or hand mixed on site. Sub-soil to be mixed with water to achieve correct consistency in accordance with Drop Ball Test as clause F50/515. Fiber to be added slowly and in small quantities to ensure fiber is well mixed prior to use on site.
5. **Mix ratio (approximate):** 2.5% fibre by dry weight of soil (1:1 bucket ratio) – to be determined following testing for specific soils.
6. **Compaction:** Compacted on site into formwork using placement tool as section E20.
7. **Testing requirements:** Proposed sub-soil sample to be tested by Contractor as clause F50/505. Laboratory tested as clause F50/510. Consistency of sub-soil prior to mixing with fiber to be tested with Drop Ball Test as clause F50/520

430 Thermal Cob

1. **Methodology:** To be read in conjunction with CobBauge Outline Methodology Statement.
2. **Type:** Thermal Cob comprising of:
 - 2.1. Sub-soil - clay content and silt fraction to be determined and tested for suitability for use, prior to placing order. Testing to determine requirement for additional material. Clay should be tested by a geotechnical engineer as described in the Outline Methodology Document.
 - 2.2. Fibre reinforcement – hemp shiv as clause F50/330
3. **Thickness:** 300mm average to meet thermal performance requirements as F50/260
4. **Site mixing:** To be either machine or hand mixed on site. Soil-slip to be formed mixing clay rich sub-soil with water to form viscous consistency. Mixture to be sieved and prepared in accordance with CobBauge Outline Methodology Statement. Consistency to be tested using Puddle Test as clause F50/525. Fibre to be added slowly and in small quantities to ensure fibre is well mixed prior to use on site.
5. **Mix ratio (approximate) :** 1:3 bucket ratio sub soil to fibre

6. **Compaction:** Compacted on site into formwork using tamper (F50/810)
7. **Other requirements:** Proposed sub-soil sample to be tested by Contractor as clause F50/505. Laboratory tested as clause F50/510. Consistency of sub-soil prior to mixing with fiber to be tested with Puddle Test as clause F50/525.

Testing

500 General

1. **Requirement:** Soil characteristics to be determined and approved before proceeding with Structural and Thermal CobBauge mixes.
2. **Approval:** To be approved by member of team with CobBauge ECVET level 4 or higher training.
3. **Testing:** To be carried out in accordance with Quality Assurance Document and the Outline Methodology Statement.

505 Project testing of sub-soil – Suitability Test

1. **Testing:** Prior to undertaking laboratory tests, the Contractor should carry out the following tests to determine the suitability of selected soil. To be carried out in accordance with Quality Assurance Document and the CobBauge Outline Methodology Document.
2. **Recording:** Maintain complete correlated records of the following tests:
 - 2.1. Cigar Test
 - 2.2. Clay disk test
 - 2.3. Clay jar expansion test
 - 2.4. Plate test
3. **Outcome:** Suitability of sub-soil to be determined by Contractor prior to undertaking Laboratory Tests.

510 Project testing of sub-soil – Laboratory Test

1. **Testing:** Following suitability tests, sub-soil intended for use should to be sent to a laboratory to determine its clay content and silt fraction with the following tests. To be carried out in accordance with Quality Assurance Document and the Outline Methodology Document.
 - 1.1. Particle distribution test.
 - 1.2. Methylene blue test
 - 1.3. Structural testing using compressive load testing apparatus
2. **Laboratory:** To be carried out by Geotechnical engineer with a suitably equipped laboratory.
3. **Results:** To be interpreted and reviewed using the CobBauge Outline Methodology Document.
 - 3.1. Confirmation of suitability of test soil
 - 3.2. Laboratory results should determine proportion of additional ballast and or clay required to create suitable CobBauge mixes.
4. **Outcome:** Ratios provided by Laboratory to be used to balance sub-soil.

520 Drop Ball Test

1. **Testing:** On site test to determine the suitability of Structural Cob sub-soil mix, testing should be conducted at every lift even if the same batch of soil is used.
2. **Mix:** Verified sub-soil to be mixed with water to appropriate consistency. (without fibers)
3. **Method:** Refer to the Outline Methodology Document.
 - 3.1. **Non-conformity:** Water content to be adjusted until consistency meets parameters of test.

525 Puddle Test

4. **Testing:** On site test to determine the suitability of Thermal Cob soil-slip mix.
5. **Mix:** Verified sub-soil to be mixed with water to appropriate consistency. (without fibres)
6. **Method:** Refer to outline Methodology Statement.
 - 6.1. **Non-conformity:** Water content to be adjusted until consistency meets parameters of test.

550 Records for each type of mix

1. **Requirements:** Contractor to correlate and maintain records for:
 - 1.1. **Mix designs:** Composition and moisture content of Thermal Cob and Structural Cob mixes.
 - 1.2. **Laboratory** testing reports and recommendations.
2. **Review:** To be reviewed and approved by member of team with CobBauge ECVET level 4 or higher training.

560 Temperature records

1. **Requirement:** Throughout period of CobBauge construction record:
 - 1.1. **Daily:** Minimum daily temperature to be recorded.
 - 1.2. **Minimum temperature for commencement of construction:** Refer to clause F50/830
 - 1.3. **Under adverse temperature conditions:** Construction of CobBauge walls to be paused during adverse temperature conditions. Refer to clause F50/840
2. **Equipment:**
 - 2.1. **Location:** In the shade, close to the structure.

Execution

610 Temporary work

1. **Requirement:** Provide temporary formwork to construct CobBauge as section E20.

615 Building in

1. **Embedded items:** As construction proceeds, build the following into walls:
 - 1.1. Structural lintels.
 - 1.2. Timber features for externally fixed items such as downpipe brackets.
 - 1.3. Wall plates
2. **Requirements:** Refer to typical details.

620 CobBauge Lifts

1. **Moisture content at laying:** Suitability to be determined by Drop Ball Test as clause F50/520
2. **Moisture content for duration of lift:** Moisture content to be measured using embedded moisture sensors. Locations and maximum readings described within the CobBauge Outline Methodology Document.
3. **Weather conditions / temperature at laying:** Do not start lift if anticipated temperatures expected to fall below 5 degree Celsius
4. **Lift height:** 500-600mm To be formed from 2 to 3 sub-lifts.
 - 4.1. Sub-lift: Comprises of 200 - 250mm high layer of cob material (Thermal and Structural) placed using placement tool (F50/810). Refer to CobBauge Outline methodology document and standard details. Maximum 3no layers per lift.
 - 4.2. Structural Cob is always to be placed first for each sub lift.
5. **Daily progress:** Contractor to ensure all started sub-lifts are fully complete by the end of the day for both thermal and structural sides. If not possible, contractor to ensure all material is protected from differential drying using polythene or damp hessian sheeting.
6. **voids at dissimilar materials:** Pack with cob material relevant to particular side of wall.
7. **Joints:** As per CobBauge Outline Methodology Document
8. **Inspection:** Give notice at completion of each full lift.
9. **Compaction:** Compact into formwork, using placement tool and hand tools as section E20. Compaction in accordance with Quality Assurance and CobBauge Outline Methodology Documents.
10. **Cracks:** Refer to clause F50/640

625 Drying generally

1. **Protection:** Full lifts are to be protected from drying out too quickly using polythene or damp hessian sheeting over the top of the layer to prevent surface cracking. All cob material to be protected from weather in accordance with details in the CobBauge Outline Methodology Document and clause F50/840.
2. **Requirement:** CobBauge formwork to be held in place to allow CobBauge lift to adequately dry out, prior to next lift as clause E20/521.
 - 2.1. Surfaces covered by formwork: Retain formwork in position and, where necessary to satisfy drying period.
 - 2.2. Allow CobBauge Lift to dry out for a minimum of 2 week prior to commencing subsequent Lifts.
 - 2.3. Top surfaces of lift: Cover immediately after placing and compacting. If covering is removed for finishing operations, replace it immediately afterwards.

- 2.4. Allow CobBauge lift to dry out for a minimum of 4 weeks, or until moisture reading reaches maximum readings as described in the Outline Methodology Document, whichever is shorter, prior to striking formwork and rendering and plastering.
- 2.5. The top of the previous lift should be moistened to aid adhesive of the subsequent lift.
3. **Records:** Maintain details of location and timing of forming of individual lifts, removal of formwork and removal of coverings. Keep records on site, available for inspection.

630 Wall construction tolerances

1. **Horizontal position at base and at each story level:** Horizontal differential between lifts should be kept within 5mm
2. **Deviation from vertical in total height of building (from base):** 20mm maximum. Deviations along length of wall acceptable.
3. **Deviation (bow) from line in plan in any length up to 10 m:** 20mm maximum
4. **Deviation from design wall thickness:** 300mm to each layer minimum requirement.

640 Surface cracking

1. **Description:** Extent and size of cracks to be considered before agreeing and undertaking remediation action. Remediation options set out in the CobBauge Outline Methodology Statement.
2. **Method of measurement:** Visual inspection, measured.
3. **Maximum crack width:** 4mm, for more detail see the Outline Methodology Document.
4. **Action:** Should cracks occur that are wider than the maximum crack width:
 - 4.1. **Survey:** Frequency and extent of such cracks and investigate cause.
 - 4.2. **Report:** Findings together with recommendations for rectification.
 - 4.3. **Repair:** Repair the cracks in accordance with the CobBauge Outline Methodology Document. If in doubt seek the advice of someone with ECVET level ?

645 Surface Finish

1. **Description:** To be lightly brushed to remove loose fibers ensure good key for external and finishes
2. **Method of measurement:** Visual inspection.
3. **Action:** Should any crack be found refer to clause F50/640
4. **Action:** Should voids occur that require backfilling:
 - 4.1. **Survey:** Frequency and extent of such voids and investigate cause.
 - 4.2. **Report:** Findings together with recommendations for rectification.
 - 4.3. **Repair:** Repair the voids in accordance with the CobBauge Outline Methodology Document

650 Wall Plates

1. **Assembly:** Timber wall plates to SE. specification. Refer to typical details.
2. **Installation:** Installed on completion of final structural layer of Cob. To be located central (150mm) to the structural cob layer.
3. **Insulation:** Once installed, wall plate to be covered in thermal cob material to top / flush side of rafters.
4. **Connections between components:** To SE. specification.
5. **Voids:** Pack with thermal cob material.

660 Door Fixings

1. **Purpose:** To fix window and doors to structural opening.
2. **Assembly:** 50X50mm Softwood timber batten set into structural cob where needed during formation of lifts. See standard details for reference.
 - 2.1. **Depth:** Surface mounted within structural cob layer.
3. **Void:** Pack with cob material relevant to surrounding cob layer.

670 Timber Fixing Points in Thermal Cob

1. **Purpose:** To enable external fixtures to be attached to the building / thermal cob layer.
2. **Assembly:** 50X50mm Softwood timber battens (G20/27) set into thermal and structural cob during formation of lifts. See standard details for reference.
 - 2.1. **Depth:** Surface mounted within thermal cob layer.
3. **Void:** Pack with cob material relevant to surrounding cob layer.

700 Installing DPC Flashings

1. **Location:** To window sills.
2. **Installation:** To form airtight and waterproof seal to window and door openings.
3. **Material:** DPC as per J40
4. **Lap joint treatment:** To be laid over thermal cob and lapped up window jamb by 150mm on either side. Render to be applied over face of DPC at jamb.
5. **Method of fixing:** To reveals in conjunction with adjacent lining. Refer to typical details.

710 Earth plaster and Rendering

1. **Application on unframed construction:** Only after all CobBauge lifts have been completed and lifts are fully dry in line with clause F50/625.
2. **Surface cracks:** To be repaired in line with Clause F50/640 prior to plastering and rendering.
3. **Surface flaking to Thermal Cob:** Loose material to be carefully removed to achieve suitable key prior to rendering.
4. **Embedded timber:** Wrap 40 x 40 x 1.4 mm wire EML mesh (F50/430) around embedded timber elements that will be covered with plaster.
5. **Coats:** Apply as render and plaster coats in accordance with manufacturers specification.
6. **Final coat:**
7. **Application:** Apply as thinly as practicable, to give the walls their final appearance.
8. **Finish:** Smooth finish.
9. **Protection:** After initial set, keep the surface moist for 7 days.

820 SCAFFOLDING

1. Application: Scaffolding to be used to enable safe construction of CobBauge walls and to aid protection of walling from precipitation during construction.
2. Extent: Scaffolding is not required for the first lift of CobBauge due to the low level and ease of construction at this height. Above this lift, a full scaffold system is required.
3. Formation: Scaffolding to be erected in accordance with required standards and by personnel with suitable qualifications.
4. Use: Scaffolding to be used in accordance with safe practice and to have no more than designated limited number of people on scaffolding at one time.

Temporary Work / Protection

830 Adverse temperature conditions

1. **General:** Do not use frozen materials or lay on frozen surfaces.
2. **Air temperature requirements:** Do not lay CobBauge:
 - 2.1. Below 5 degree C and falling
 - 2.2. Above 30 degree C and raising
3. **Requirement:** Submit proposals for protecting CobBauge when predicted ambient temperatures indicate risk of CobBauge freezing or overheating.

840 Weather Protection

1. Application: General and localized protection of all CobBauge material.
2. CobBauge Material prior to use protected at all times from:
 - 2.1. Rain and snow
 - 2.2. Excessive drying out in hot conditions and in drying winds
 - 2.3. Reason: To minimise changes in the consistency of the material.
3. Newly erected walls, prior to striking of formwork to be protected as all times from:
 - 3.1. Rain and snow
 - 3.2. Excessive drying out in hot conditions and in drying winds
 - 3.3. To help minimise the risk of differential drying / wetting and movement during construction.
4. Newly erected walls prior to render application:
 - 4.1. To minimise the risk of differential drying / wetting, weather damage and movement post construction and before being protected with render.
5. Method:
 - 5.1. Localised protection: Contractor to make use of polythene or damp hessian sheets to protect all cob materials in specific locations. Contractor to use wooden sheet material over top of unfinished CobBauge walls to protect from weathering.
 - 5.2. General protection: Once full scaffold is erected, contractor to cover top of scaffold with polythene covering. This will help to give protection to the CobBauge walls during construction. Care to be taken to safely and strongly secure all sheeting to scaffold. Also care taken to ensure safe working at height can be maintained.

QUALITY ASSURANCE & TESTING

F50/910 QUALITY ASSURANCE

- Requirement: Quality assurance procedure to verify the following items:
- Compaction of material
- Procedure for dealing with cracks and other defects
- Quality of cob material
- Methodology:
- To be in accordance with the quality assurance document.
- Materials to be tested on and off site.