low energy building database

Internal ref: http://dev.pheriche.com/leb/ (B Butcher account)

Search Go

Your Saved Projects

LEBD entry Public access for entering projects to LEBD

Create New Project

Project Name (click to edit)	Last Edit	Publish Status	Download PDF	Energy charts
Radical Retrofit, Cumberworth	08 Jul 2016	draft	PDF	View Charts
The Granary	24 May 2016	draft	PDF	View Charts

Projects marked 'Draft' are not viewable by the public. You can toggle the relevant Draft/Publish status by clicking it

Certificates

CLR entry – moisture related CLR course pass required for access

Carbonlite Retrofit Certification

Manage CLR Certifications

Apply for, and manage, your Carbonlite Retrofit certificates

Carbonlite Retrofit Certification is a self-certification scheme for building refurbishment projects. Certifiers must have completed the Carbonlite Retrofit Training course before beginning a building project certification.
Read more about Carbonlite Retrofit and Certification

AECB Silver Standard Certification

Manage Silver Certifications

Apply for, and manage, your AECB silver certificates

AECB Silver Certification is a self-certification scheme open to building projects that meet the AECB Silver Standard design and performance criteria.
Read more about the AECB Silver Standard and Certification

LEBD entry tabs:

LEB / Your Projects / Edit Project

Project Description | Design Strategies | Fuel Use Data | As Built Design Data | Measured Performance | Project Images | Project Files

post-construction stage

AECB admin for managing certifications

- Manage Projects
- Featured Projects
- Passivhaus - Featured Projects
- Manage Control Panel Users
- Silver Certification
- CLR Certification
- Charts

Projects Awaiting Silver Certification

Project	Status	Edited

Recently created projects

Project	Created	Edited
Radical Retrofit, Cumberworth	06 Jul 2016	08 Jul 2016
The Granary	18 May 2016	24 May 2016

Low Energy Buildings : Main : **CLR Certifications** logged in

CLR certification projects

Projects : 2

Project	Design-Stage	Airtightness	Ventilation	Space Heating	Hot Water	Moisture Sources	Moisture Risks	Thermal Comfort	Contact Certifiers	Certification	Payment
Radical Retrofit, Cumberworth	unverified	unverified	unverified	unverified	unverified	unverified	unverified	unverified	**14 July 2016** Design Trades	unverified	xx
daffodils	under-review	✓ verified	under-review	unverified	unverified	unverified	unverified	unverified	**12 May 2016** Design Trades	unverified	xx

Carbonlite Retrofit Certification

Project Name	Status	Action
Radical Retrofit, Cumberworth	90% **As Built** Evidence *6 sections complete*	Continue

Let’s look at this live for GBS radical retrofit via Bill Butcher’s account
http://dev.pheriche.com/leb/clr_asbuilt.php?id=408

Design stage entry first….this stage encourages a thorough pre-retrofit assessment and building investigation

Then we will look at an example of a construction assembly (junction)….

Next few slides if i-connection fails

First Design Stage (including pre-retrofit investigation)

Carbonlite Retrofit Certification

Review Design Stage Data

About your building project

Project name	Radical Retrofit, Cumberworth
Project location (Town)	Huddersfield
County	West Yorkshire
Country	England
Building sector	Private Residential
Property type	Large Semi-Detached

People involved

Project client	Sue and Paul Beard
Architect	Green Building Store
Energy consultant	Green Building Store
Person responsible for PHPP calculations	Green Building Store
Main Contractor	Green Building Company

Pre Retrofit Property Elevations

North Elevation (Before Retrofit)

East Elevation (Before Retrofit)

IMG_4700.jpg (113.6 KB)

South Elevation (Before Retrofit)

IMG_4697.jpg (96.2 KB)

West Elevation (Before Retrofit)

IMG_4696.jpg (106.5 KB)

Finance and Grants

Mortgage provider	None
Grant Provider	None
Other source of finance	Client financed the project through savings.
Has any financial modelling been carried out?	No
Financial report	

About the certifiers

Designers

Certifier name (Design)	Paul Smith
CLR course PASS date (Design)	06 July 2016
CLR course PASS certificate reference id (Design)	ID123
Certifier (design) Email address	paul@greenbuildingstore.co.uk
Is Certifier (design) a member of AECB ?	Yes
Certifier (design) AECB Membership number	12345
Certifier other nationally recognised professional qualifications	Certified Passivhaus consultantHND and HNC in construction

Builders

Certifier name (builder)	Jude Wilson
CLR course PASS date (builder)	06 July 2016
CLR course PASS certificate reference id (builder)	ID123
Certifier (builder) Email address	jude@greenbuildingstore.co.uk
Is Certifier (builder) a member of AECB ?	Yes
Certifier (builder) AECB Membership number	12345
Certifier(builder) other nationally recognised professional qualifications	Site managed on 3 certified Passivhaus projects.

Materials and measurements

Existing external wall construction	Stone
Pre Retrofit Floor area	151
Post Retrofit Floor area	136
Floor area calculation method	phpp

Other Strategies and contextual information

Other relevant retrofit strategies	The occupants vacated the property whilst the deep retrofit was carried out so that work could commence uninterrupted.
Contextual information	

Energy Targets & Modelling

Certification to other Energy Standards	none
Energy Model	PHPP
Heat demand (PHPP)	69 kWh/(m².a)
Primary energy demand (PHPP)	78 kWh/(m².a)
Overheating Risk (PHPP)	0 %

Design Strategies

Energy Modelling strategy	PHPP was used to asses all aspects of the refurbishment before works on site commenced.
Space heating strategy	Ground source heat pump with underfloor heating + room sealed wood burning stove. Heat losses reduced via use of MVHR system.
Water heating strategy	Ground source heat pump + 7m2 Solar thermal array + 300 litre thermal store.
Fuel strategy	Mains electricity, (no mains gas)
Renewable electricity generation strategy	10m2 photovoltaic panel array
Passive solar strategy	Refurbishment project. Window orientation, size and number restricted to existing.
Space cooling strategy	Opening windows for natural ventilation + MVHR unit with summer bypass.
Daylighting strategy	Fenestration had to remain the same due to project restrictions. Internal layout was re-structured ie, removal of partition walls, re-configuring the main staircase, optimising daylight and removing dark recesses and corridors etc..

Airtightness

Airtightness Target	$3\ h^{-1}$
Airtightness strategy	Airtight membrane used under roof structure and on the insulated timber stud system, over the cavity wall construction, taped at joints and junctions. Parge finish used as airtight layer on solid stone wall construction taped at junctions.Airtight tapes used to seal around windows and doors to the airtight layer.Airtight tapes and grommets used to seal any penetrations through the airtight layer.Airtight tapes used to seal around the perimeter of the insulated slab to the airtight layer.

Assess Pre-retrofit Moisture Risks

Ventilation of crawlspaces or basements	Not applicable
Mould Spores in crawlspaces or basements	Not applicable
Ventilation of habitable spaceshabitat_ventilation	Yes
Mould Spores in habitable spaces	No

Ventilation & Indoor Air Quality post-retrofit

Ventilation type	mechanical ventilation heat recovery (MVHR)
Ventilation designed by	Green Building Store
Ventilation strategy	80>% efficient MVHR unit installed with summer bypass, supplying to habitable areas and extracting from wet rooms + Opening windows for purge ventilation if needed.
Indoor Air Quality Strategy	MVHR + Natural ventilation through opening windows

Moisture

Moisture risks present associated with ;	rain wetting,ground water,damp materials
Moisture risk mechanisms	rising damp,penetrating damp,hygroscopic absorption,condensation

Walls(Pre-Retrofit)

North Elevation

Type of wall	Party
Party Wall insulation	Full
Party Wall insulation image	 IMG_7125.jpg (80.7 KB)

East Elevation

Type of wall	External
Is east wall shaded?	Yes
Existing rain protection type	Solid Stone Wall 450mm thick, rubble fill.
Existing rain protection image	 IMG_4700.jpg (113.6 KB)

South Elevation

Type of wall	External
Is south wall shaded?	No
Existing rain protection type	Stone rainscreen, Cavity wall construction.
Existing rain protection image	 IMG_4697.jpg (96.2 KB)

West Elevation

Form Factor and Heat Demand/Loss

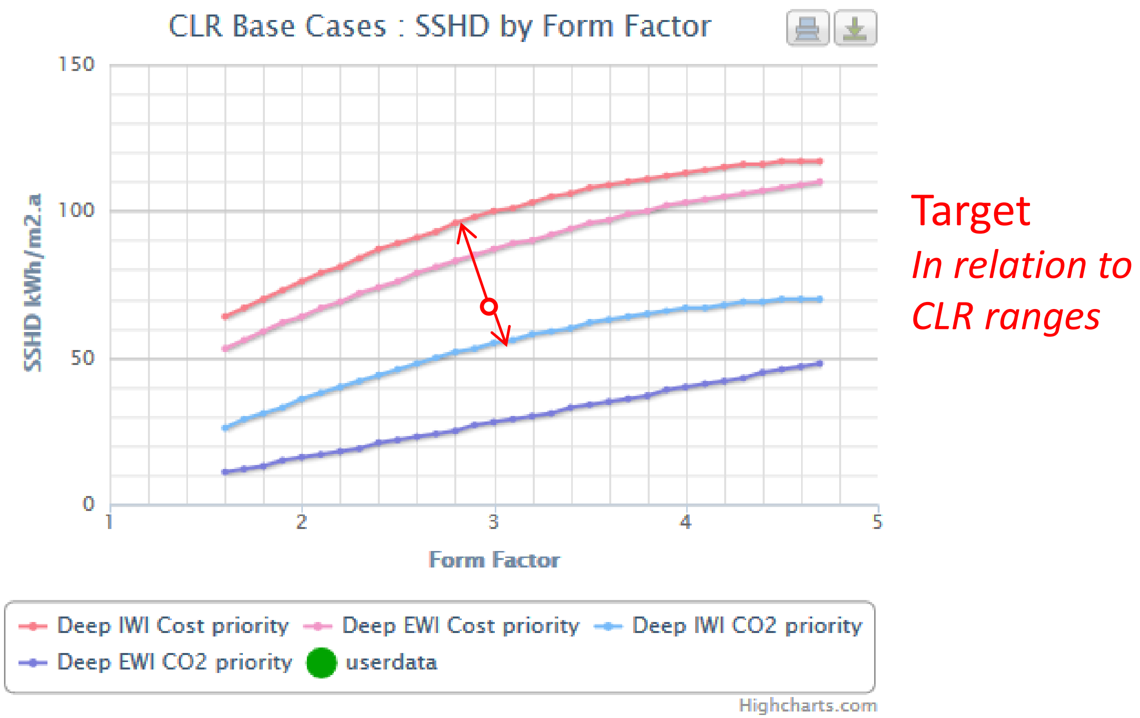
Target SSHD

67

Form Factor

2.7

SSHD by Form Factor



Strategy for minimising thermal bridges

All linear thermal bridge junctions modeled using thermal bridging ana
impact on the overall energy use of the refurbishment. Continuous lay

Airtightness

Pressure testing Data

Pressure test ≤ 3 h^{-1}@50Pa with MEV
1.5 h^{-1}@50Pa with MVHR

Pre Retrofit Pressure Test Method	(●) Q50 ( ) N50	
Pre Retrofit Pressure Test Result	17.9	h@50Pa
Post Retrofit Pressure Test Method	( ) Q50 (●) N50	
Post Retrofit Pressure Test Result	2.47	h@50Pa
Pressure Test carried out by	Leeds Beckett University	

Intermediate floor to wall junction image showing airtightness measures (for joists parallel to wall)

20150110_111749.jpg (53.1 KB)

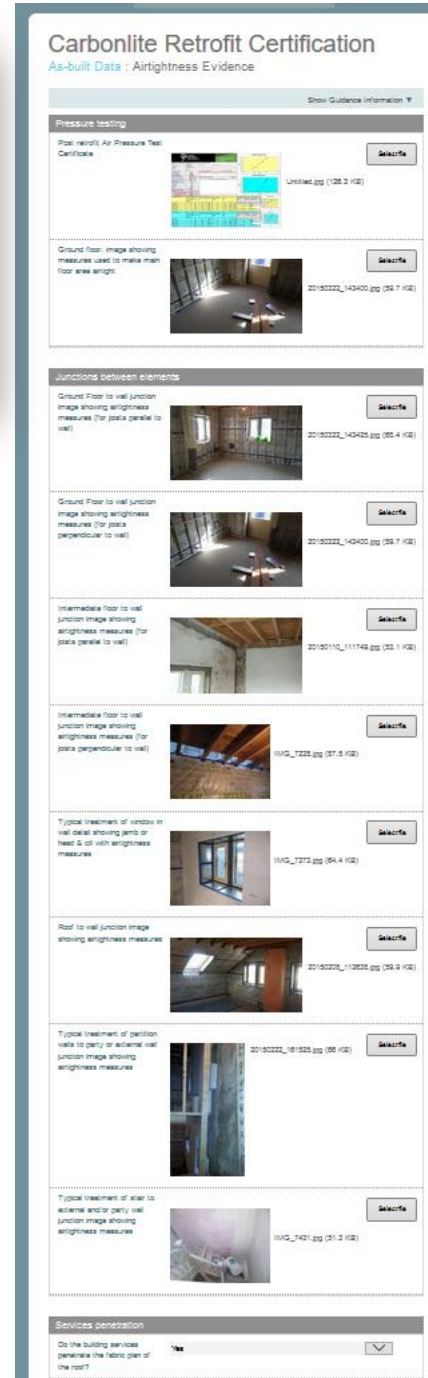
Intermediate floor to wall junction image showing airtightness measures (for joists perpendicular to wall)

IMG_7228.jpg (87.5 KB)

Typical treatment of window in wall detail showing jamb or head & cill with airtightness measures

IMG_7273.jpg (64.4 KB)

Roof to wall junction image showing airtightness measures



Type of wall	External
Is east wall shaded?	No
Existing rain protection type	Stone rainscreen, Cavity wall construction.
Existing rain protection image	 IMG_4696.jpg (106.5 KB)

Damp Proof Course & Wall moisture levels

North Elevation

Existing Damp Proof Course (DPC) North	No
Existing DPC type (north)	
Is the existing DPC effective? (north)	
Are Hygroscopic Salts present on wall? (north)	

Wood Moisture Equivalent (WME) readings (north)

WME range just above DPC	
WME range 1.0m above FFL	
Expected average WME prior to insulation	
Target max seasonal WME within 3 years post-retrofit	

East Elevation

Existing Damp Proof Course (DPC) east	No
Existing DPC type (east)	
Is the existing DPC effective? (east)	
Are Hygroscopic Salts present on wall? (east)	

Wood Moisture Equivalent (WME) readings (east)

WME range just above DPC	
WME range 1.0m above FFL	
Expected average WME prior to insulation	
Target max seasonal WME within 3 years post-retrofit	

South Elevation

Existing Damp Proof Course (DPC) south	No
Existing DPC type (south)	
Is the existing DPC effective? (south)	
Are Hygroscopic Salts present on wall? (south)	

Wood Moisture Equivalent (WME) readings (south)

WME range just above DPC	
WME range 1.0m above FFL	
Expected average WME prior to insulation	
Target max seasonal WME within 3 years post-retrofit	

West Elevation

Existing Damp Proof Course (DPC) west	No
Existing DPC type (west)	
Is the existing DPC effective? (west)	
Are Hygroscopic Salts present on wall? (west)	

Wood Moisture Equivalent (WME) readings (west)

WME range just above DPC	
WME range 1.0m above FFL	
Expected average WME prior to insulation	
Target max seasonal WME within 3 years post-retrofit	

Retrofit Measures

Hygrothermal Modelling Strategy	WUFI calculations were carried out on areas considered vulnerable to moisture movement to assess the risk involved and influence choice of insulation materials which would protect the integrity of the existing structure.
Moisture Risks:rain wetting strategy	Breathable materials were used on the solid wall construction to allow for wetting and drying out to both the internal and external environment. The Stone rain-screen and ventilated cavity protect the remaining walls from driven rain.
Moisture Risks:rising/penetrating damp strategy	DPC's will be installled to adequate levels to protect the structure from rising damp.
Moisture Risks: preventing decay of / damage to vulnerable materials strategy	Vulnerable materials will be protected by allowing the structure to breath and not restrict the transportation and drying out of moisture. Vulnerable elements penetrating the fabric of the structure will be replaced with suitable materials e.g. steels etc...

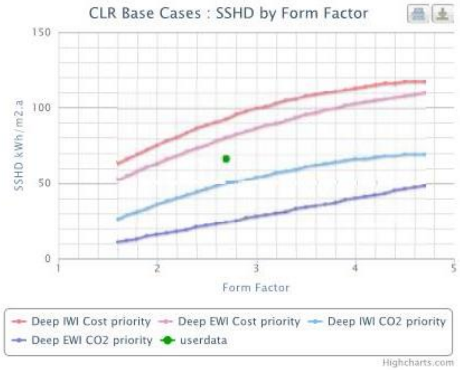
Wall Insulation

Insulation strategy	Two types of internal insulating wall systems were used on the project. One system for the solid wall construction which allowed the fabric to continue breathing and prevent retention of moisture, the second system on the cavity wall was constructed of an insulated stud filled with mineral wool bats, the ventilated cavity acts as a rain screen to the external side of the insulating system to protect from moisture ingress due to driven rain.
Wall insulation	IWI

Form Factor and Heat Demand/Loss

Target SSHD	67
Form Factor	2.7
SSHD by Form Factor Chart	

Target
In relation to CLR ranges



Strategy for minimising thermal bridges	All linear thermal bridge junctions modeled using thermal bridging analysis software.Thermal bridges designed out where possible, judgments made on economic evaluations on overall cost vs impact on the overall energy use of the refurbishment. Continuous layer of insulation and thermal breaks used to minimise thermal bridging.

Wall Insulation

Elevation	CWI	EWI	IWI
North Wall			Yes
East Wall			Yes
South Wall			Yes
West Wall			Yes

Diffusion drying of existing masonry walls

North Elevation

Wall masonry type (north)	Cavity wall
Can the wall dry inwards to habitable spaces?	Yes
Can the wall dry outwards to external air or a ventilated cavity?	Yes
How well is the wall cavity ventilated ?	well ventilated

East Elevation

Wall masonry type (east)	Solid
Can the wall dry inwards to habitable spaces?	Yes
Can the wall dry outwards to external air or a ventilated cavity?	Yes

South Elevation

Wall masonry type (south)	Solid
Can the wall dry inwards to habitable spaces?	Yes
Can the wall dry outwards to external air or a ventilated cavity?	Yes

West Elevation

Wall masonry type (west)	Solid
Can the wall dry inwards to habitable spaces?	Yes

Can the wall dry outwards to external air or a ventilated cavity?	Yes

Moisture Risks: drying pathways strategy

Moisture Risks: drying pathways strategy	Breathable materials or intelligent membranes have been used to ensure drying out can occur in both directions.

Surface condensation measures (basements and crawlspaces)

Have any measures been taken to reduce condensation wetting of wall surfaces?	No
Please explain why no measures were taken to reduce condensation wetting of wall surfaces?	N/A
Have any measures been taken to reduce condensation wetting of void floor surface?	No
Please explain why no measures were taken to reduce condensation wetting of the floor?	
Have any measures been taken to reduce moisture loading of floor void air via evaporation of moisture from surfaces?	
Please explain why no measures were taken to reduce moisture loading of floor void air?	

Explain your thinking and actions relating to **residual** moisture risks

Surface Condensation Measures (Habitable Spaces)

Have measures been taken to allow periods of safe condensation of water vapour on potentially cold surfaces related to untreated thermal bridges?	Yes
Please describe measures taken to to allow periods of safe condensation of water vapour on potentially cold surfaces.	MVHR has been installed to ensure the whole house is provided with constant circulation of fresh incoming air.

Residual Risks

Moisture reservoirs	No concerns
Bugs, moulds & Rots: residual risks related to decay of vulnerable materials	No concerns
Mould Growth Risk - Residual	No concerns
Summarise residual moisture risks for the proposed retrofit	No concerns
Moisture Strategy (Monitor, Manage, Accept)	No concerns
Moisture risks shared with owner	No concerns

Assemblies - junctions

Carbonlite Retrofit Certification

As-built Data : Assemblies & Junctions

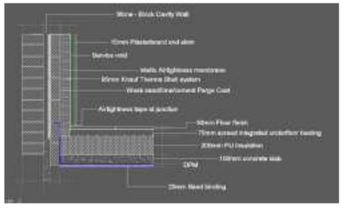
Assembly Overview

Type of Assembly or Junction	Junction

Please give this Assembly or Junction a descriptive title.

Assembly or Junction description	Junction between ground floor and wall

Drawing or sketch showing cross section through entire Assembly or Junction with all key components noted



Select file

Cavity_wall_floor_junction.jpg (65.3 KB)

Photo of Assembly or Junction showing insulation placement & adjacent substrates

Select file

20150322_143425.jpg (68.4 KB)

Vapour Loads & Diffusion Gradients affecting Assembly or Junction

Please give this Assembly or Junction a descriptive title.

Assembly or Junction description	Junction between ground floor and wall

Drawing or sketch showing cross section through entire Assembly or Junction with all key components noted

Cavity_wall_floor_junction.jpg (65.3 KB)

Photo of Assembly or Junction showing insulation placement & adjacent substrates

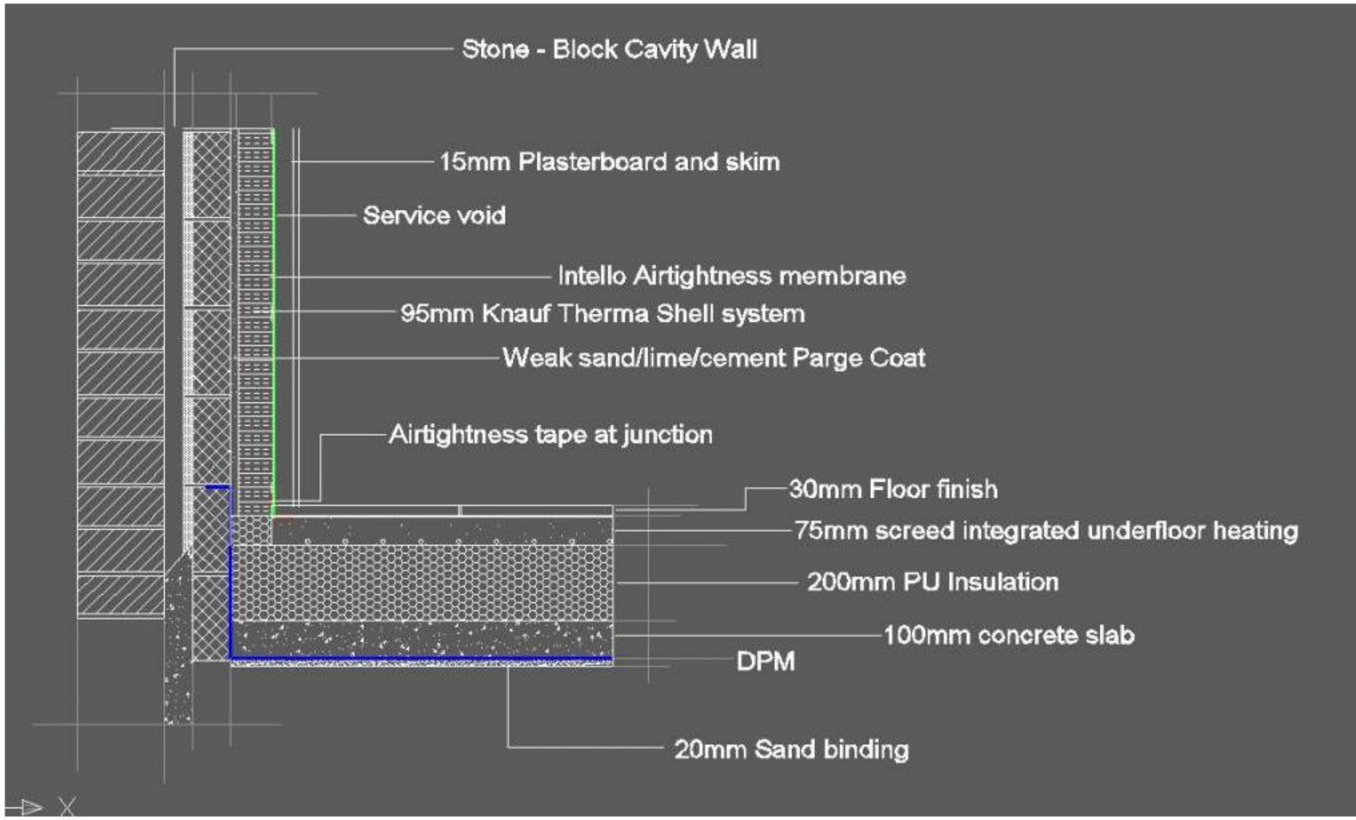
20150322_143425.jpg (68.4 KB)

Vapour Loads & Diffusion Gradients aff

Please identify the sources and potential direction
to all potential flows at various times of the year e
floors from exterior air in spring and summer and
answer this question irrespective of the vapour res

Sources of water vapour flow through assembly or junction.

- [x] from interior air
- [x] from exterior air
- [ ] from non-habitable roof voids
- [ ] from suspended floor/basement voids



CLOSE ✕

Carbonlite Retrofit Certification

As-built Data : Assemblies & Junctions

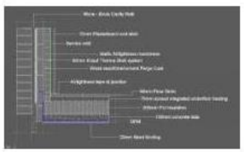
Assembly Overview

Type of Assembly or Junction: Junction

Please give this Assembly or Junction a descriptive title.

Assembly or Junction description: Junction between ground floor and wall

Drawing or sketch showing cross section through entire Assembly or Junction with all key components noted



Select file

Cavity_wall_floor_junction.jpg (65.3 KB)

Photo of Assembly or Junction showing insulation placement & adjacent substrates

Select file

20150322_143425.jpg (68.4 KB)

Vapour Loads & Diffusion Gradients affecting Assembly or Junction

Please identify the sources and potential direction of flow of water vapour through the assembly or junction. This relates to all potential flows at various times of the year e.g. water vapour trying to move inwards through walls and suspended floors from exterior air in spring and summer and outwards e.g. through walls and suspended floors in winter. Please answer this question irrespective of the vapour resistance of the assembly or junction.

Sources of water vapour flow through assembly or junction.

- [x] from interior air
- [x] from exterior air
- [ ] from non-habitable roof voids
- [ ] from suspended floor/basement voids
- [ ] from adjacent moisture reservoirs

Vapour resistance of assembly or junction: Low

Vapour control layer

Type of vapour control layer?: intelligent vapour control layer

Describe the type and method of installation of vapour control layer.: Airtight but vapour open membrane used on internal side beneath

Photo of vapour control measure (showing method used for sealing joints)

20150322_143425.jpg (68.4 KB)

Select file

Are vapour control measures continuous over the whole area of the assembly or junction (and continuous with adjacent elements)?: Yes

Vapour control layer position

Please describe the position of the vapour control layer relative to the insulation layer: The vapour control layer is to the warm side of the insulation.

Please upload photo of vapour control layer in relation to the insulation layer

20150208_112023.jpg (80.6 KB)

Select file

Please indicate the sources of moisture risks to the assembly pre-retrofit

- [x] rain wetting
- [ ] surface water
- [ ] ground water
- [ ] saturated or damp materials
- [x] water vapour in interior air
- [x] water vapour in exterior air

Please indicate moisture risk mechanisms to the assembly pre-retrofit

- [x] rising damp
- [x] penetrating damp
- [x] water ingress (leaks)
- [ ] hygroscopic absorption by salts
- [x] condensation
- [ ] suppressed evaporation rate

summarise the moisture risks to the assembly prior to retrofit	Rising damp/condensation on walls due to cold surfaces.AS added: defects allowed rain ingress and localised wetting

Measures taken to reduce risks to existing assembly to prepare for retrofit

Have measures been taken in advance of retrofit to reduce risks	Yes
What measures were taken to reduce risks to existing assembly	DPM installed AS suggests deleting this as is post retrofit:[and internal wall insulation to raise the internal surface temperature to that of which condensation cannot form on.]

Hygrothermal Modelling

Has a WUFI or Glaser calculation been carried out for this assembly or junction?	Yes

Measures taken to reduce moisture risks to as built retrofitted assembly

Have the measures taken to reduce moisture risks been implemented exactly as described in the design stage section?	Yes

Identify residual moisture risks to the *as built* retrofit assembly

Residual moisture risk level	No risk

Enter here %WME readings that represent the immediate pre-retrofit level for key materials within the existing assembly that are being retained as part of the retrofitted assembly. E.g. for assemblies: embedded timbers, plaster, linings. Against each component element please add a target WME that you hope to achieve once the assembly has reached its ideal post retrofit equilibrium. The choice of materials or components added is left up to the certifier.

Example:

- Name : ground floor joists
- Position : At bearing point on brick
- Material : Timber (old pine)
- Worst case location: Joists in corner
- Typical Pre-retrofit WME : From 17% to 25%
- Post-retrofit target WME : 15%

Key component 1

Name	window frames	
Position	ext walls G Floor	
Material	oak	
Worst case location	NE corner G Floor	
Typical Pre-retrofit WME	15	25
Post-retrofit target WME		20

Remove component

Add another component

Moisture Risks to the existing (pre-retrofit) Assembly

For each assembly please identify the general moisture sources and mechanisms that are likely or observed to be affecting the existing assembly, select a risk level for each mechanism. This risk assessment is your judgement of the risks based on either hygrothermal modelling and/or - where no modelling has been carried out - on your own renovation or retrofit experience to gauge the risk. However it is assumed that suitable surveys and building investigations have been carried out. 'No significant risks' means that you consider there to be no insignificant sources of moisture able to move (via the various moisture transfer mechanisms) from the source(s) thereby creating risks for vulnerable areas or components in the construction assembly. Potentially significant risk is where you have gauged the potential risks significant enough to warrant specific measures to manage moisture loads within the assembly.

direction(s) for the assembly as a whole

Identify main energy driver for diffusion drying	space heating system

Mould growth & spores

Understanding microclimates and hygrothermal principles – as applied to specific assemblies/junctions

Moisture Risks to the Assembly or Junction

Conditions of key components pre-retrofit