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High performance spray foam insulation for Grade 2 listed barn restoration

CONTRACTORS RESTORING AND CONVERTING AN ARCHITECTURALLY SIGNIFICANT BARN COMPLEX IN THE HERTFORDSHIRE VILLAGE OF STANDON WERE FACED WITH A DIFFICULT CHALLENGE IN BRINGING THE 300 YEAR-OLD STRUCTURE UP TO MODERN THERMAL PERFORMANCE STANDARDS, WITHOUT COMPROMISING THE UNIQUE AND HIGHLY ORIGINAL, INTERNAL TIMBER FRAME AND EXTERNAL BOARDED FACADES.

Old Mill Barn is a Grade 2 listed building, situated close to the River Rib in the conservation area of Standon Village. The owners of the building were granted permission to convert the L-shaped single and two-story structure into a two-bed home and engaged Hertfordshire based conservation contractors, Datum Point Construction to undertake the work.

The barn, which is one of the oldest buildings in the village and thought to date back to the 17th Century, had up until recently, been used as a storage facility. Much of the original timber frame and external horizontal timber boarded exterior were still in place and in relatively good condition.

The visual appeal of the barn and its contribution to the village setting were influential in its listed status so bringing the building back into use, insulating it to modern standards and restoring its fabric in a sensitive and sustainable way, were priorities for Datum Point Construction.

The barn comprises a traditional internal frame of rough-hewn timbers with an external skin of dark painted weatherboard, set on a low brick plinth. Roofs are pitched, with clay plain tiles and half hips to all gables. Paul Adams, Construction Director and Project Manager for Datum Point Construction takes up the story.



"We've worked on a number of historic building restoration projects and know the challenges that old structures bring. Hardly anything is square, there are gaps all over the place and most of the original timbers were hand cut and variable in dimension"

Continuing, Paul said, "These factors took us down the route of a spray foam insulation solution rather than using conventional, rigid board material which would be difficult to fit and almost impossible to make the building anywhere near air tight." Because of the sensitive nature of the Old Mill Barn restoration, Datum Point Construction worked closely with Hertfordshire Building Control and Spray Foam Insulation specialists Icyne, to come up with the most appropriate material to insulate the building.

Clive Phillips, Building Control Officer in charge explains. "Working with Icyne's



technical team, it was quickly obvious that an open-cell foam insulation was best for the job, as it gave us outstanding thermal insulation but still allowed the building to breathe so there was no risk of internal condensation"

Insulation sub-contractor, Foam Insulations Ltd, applied Icyne's Foam Lite LDC 50 to a thickness of 100mm to all walls and 125mm to the pitched roof areas, achieving U values of 0.32 and 0.29 respectively. Foam Insulations completed the spraying in one day – fitting in with the tight construction programme required for the wider restoration work.

To satisfy the Conservation Officer requirements, Datum Point Construction stapled a physical breather membrane to the inside of the timber cladding and original posts so that, if any repairs are need to the timber cladding or frame at a later date, it would be easier to separate the from the foam to undertake any required repairs or replacements.

Icyne Foam Lite is a spray applied system that expands instantly on application. It's specifically designed to get into difficult to fill areas where traditional insulation materials just don't work. It closes off gaps and holes, reducing air leakage, but because it has a soft, yielding texture, it puts only minimal pressure on the building structure. According to Icyne, air leakage is

responsible for up to 40% of a buildings heat loss and the system's ability to close off small structural gaps and service holes, creating a near "sealed box" environment, makes it one of the most efficient and cost-effective means of heat-loss mitigation in a building.

Icyne also points out that, unlike urethane foams of 20 years ago, modern spray foams like Foam Lite use water as the blowing agent. The reaction between the chemical components produces CO2 which causes the foam to expand. As the foam expands the cells burst and the CO2 is replaced by air.

As a result, Foam Lite has a global warming potential [GWP] of 1 [One] and an ozone depletion potential [ODP] of 0 [Zero]. Furthermore, Icyne does not emit any harmful gasses once cured and is completely inert. Restoration work on Old Mill Barn began in September 2018 under the direction of Richard Pedlar Architects of Ware, Hertfordshire and followed a year-long consultation process to achieve the necessary approvals.

According to Paul Adams of Datum Point Construction, "The sensitive and detailed restoration of Old Mill Barns generated a huge amount of attention - so much so that the project has been nominated by Hertfordshire Building Control for the LABC [Local Authority Building Control] Excellence Awards, competing in the category: Best change of use of an existing building or conversion"



The LABC Awards will be presented at the Guildhall London in May 2019.

1. Old Mill Barn is a Grade 2 listed building in the conservation area of Standon, Hertfordshire.

2. A breather membrane was fixed to the inside of the timber frame to make it easier to remove the foam to undertake any later repairs to the structure.

3. Icyne Foam Lite LDC 50 was sprayed to a thickness of 100mm to all walls and 125mm to the pitched roof areas, achieving U values of 0.32 and 0.29 respectively.

4. Icyne Foam Lite LDC 50 was sprayed to a thickness of 100mm to all walls and 125mm to the pitched roof areas, achieving U values of 0.32 and 0.29 respectively.

5. Icyne is an open-cell foam with outstanding thermal insulation which allows the building to breathe.

Icyne

Compliance

icynene is approved by the following organisations.

BBA

The British Board of Agrément (BBA) is a construction industry approvals body which certifies a wide range of different product sectors, the largest of these being insulation and roofing. BBA approvals show compliance with Building Regulations and other requirements, including installation quality.

KIWA

Kiwa is a European institution for testing, inspection and certification of construction materials. KIWA is based in the Netherlands and is active worldwide in approximately 50 countries.

EST

The Energy Saving Trust [EST] is an independent and impartial organisation which promotes energy efficiency across the domestic housing sector, helping consumers save energy in their homes.

CE

CE Marking on a product is a manufacturer's declaration that the product complies with the essential requirements of the relevant European health, safety and environmental protection legislation. The letters "CE" are the abbreviation of French phrase "Conformité Européene" which literally means "European Conformity."

EOTA

European Organisation for Technical Assessment [EOTA]. EOTA's primary purpose is the drafting of The European Technical Assessment (ETA) which is a document providing information about the performance of a construction product, to be declared in relation to its essential characteristics.

Passivhaus Trust

icynene is a member of the Passivhaus Trust. The Passivhaus Trust is an independent, non-profit organisation that provides leadership in the UK for the adoption of the Passivhaus standard and methodology. Passivhaus is the leading international low energy, design standard. Over 65,000 buildings have been designed, built and tested to this standard worldwide.

AMICA

AMICA - The Association for Chronic and/or Environmental Poisoning Diseases - is a European Organisation established in 2003 to promote awareness of health problems caused by exposure to chemical substances present in the environment and in common use.



Further information

For further information on all aspects of Icynene Spray Foam Insulation visit: www.icynene.co.uk

See also: <https://youtu.be/xn4ZHQJLWHM>