
Products in Practice July/Aug 2016

Extreme spec

Stepped
living roof
08

Roofing

Elytra Filament
Pavilion, V&A
14

Special report

Hotels and leisure: how the
market is changing
23


Lighting

Luminaires' role in the
Internet of Things
30

Interiors

RSHP's new HQ
in the City
42





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but our advice at this stage would be better.

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The joy of...

...working in architectural journalism rather than the profession, aside from the odd pop-up, is how quickly, from writing to layout to printing, you see the fruits of your labour; rather than wading through the protracted process of mud-mired construction. Of course that joy is more fleeting too; we might be priming twitter on a daily basis, but 140 characters evaporate into the ether almost as soon as they are typed; for us then, no real testimony of our having

been there, no physical mark on the landscape. This month, the pain is doubly acute, as time itself even steals that journalistic edge. Going to press 10 days before the EU referendum, the printing process suddenly takes on the glacial lag of the construction. I'm aware of my reliance on contractors, my message is muddled in the possible delays of manufacture of the printed word. Words here are impotent; with not a single voting paper yet marked,

history is ahead of me and this leader no more than a vain appeal for an extension of time. So I'm taking a punt, as architect Patrick Abercrombie did with his post-war London Plan, where new thinking arose from the ruins of the old. I'm happy we decided to be more than this severed isle and to remain in the EU. So we remained co-architects of a greater collective destiny. Or not, as the case may be. ●
Jan-Carlos Kucharek, Editor



Compendium.....	04	Analysis: Hotels & leisure.....	23	Specified: Interiors.....	44
Tech IT/Books.....	07	Lighting.....	30	Showcase.....	46
Extreme Spec: Stepped living roof.....	08	Costed: Lighting.....	36	Sign Up...Sign Off.....	50
Roofing.....	14	Specified: Lighting.....	38		
Specified: Roofing.....	20	Interiors.....	42		

Cover image: Elytra Filament Pavilion at the V&A, photographed by NAARO

Compendium



Sea-ramic

It's nautical themes ahoy at O2's riverside Intercontinental on the Greenwich Peninsula. Its 453 bedrooms, swimming pool, spa, ballroom and 20 meeting rooms, needed a whole lot of tiling – 16,000m² to be precise. The contractor sought adhesives manufacturer Kerakoll UK's advice on all areas, including the Eighteen Sky Bar, above. Overlooking Canary Wharf and the London skyline it's the perfect vantage point for hedge fund managers to feel on 'top of the world' when they seal the deal – and even better for walking the plank next time the taxpayer bails them out.

Teutonic tiles

'If at first you don't succeed' is not a statement that seems to have bothered German designer Constantin Grcic, with his new range of tiles for Italian firm Mutina, launched here in the UK by Domus. His first gambit with ceramics has seen him turn out his 'Numi' range, which not only all uses strong geometries, but takes on the use of gloss and matt finishes to produce a compelling collection with an 'Abigail's party' twist at the end.



Penthouse and parametrics

As the city that inspired Zaha Hadid mentor Rem Koolhaas to write 'Delirious New York', a manifesto for deconstructivism in all but name, it's strange to think that the late Hadid never put up a building in the Big Apple – until now. At 520 West 28th in West Chelsea – 39 condos over 11 storeys – New Yorkers, especially those on the adjacent High Line, can finally sample the parametric work of the Pritzker, Stirling and Royal Gold Medal winning architect. Top of the shop is Penthouse 37, a 647m², five-bedroom, triple level affair with 3.7m ceiling heights, sculpted staircase, 200m² terrace and two private balconies. Yours at a snip for \$50million.

Testing the waters

It's interesting to see how design can sometimes fetishise the old industrial aesthetic and re-package it. PIP can't help but be taken, for instance, with Marcel Wanders' Pipe shower for Gobi, a reductively simple – if eye wateringly pricey – douche which, with its single stopcock, leaves me still unable to work out how you control the temperature. Now niche brand Watermark has come up with its Elan Vital Collection of kitchen faucets; with all its elbows, it still has me asking 'where's the hot tap'?





Ayes on the prize

The 2016 Galvanisers Awards were presented last month, with the 'Galvanising in Architecture' prize going to worthy winner Sutherland Hussey Harris' Edinburgh Sculpture Workshop. Starting as a grass roots movement to make studios for struggling artists, it received a Foundation Scotland Art Funding prize in 2010 and gained further momentum with a £3 million private donation. The project's latest manifestation is SuHuHa's workshop cloister and campanile, paying homage to the work of Gillespie, Kidd and Coia. Pared-back and using nothing but concrete, brick and galvanised details, the exterior workspaces and community café are a hub for artists and locals; the joy of which is announced to the city by its austere yet compelling tower, illuminated at night, to counterpoint its curved Crown steeples.

KEITH HUNTER

Takes the biscuit

We're used to Italians setting the fashion trend, but will luxury timber flooring firm Listone Giordano's latest forays into new design territories be more than a flash in the pan and be picked up by other manufacturers? Tired of rectilinear parquet, the firm has created designs such as 'Biscuit', below, tessellating a range of interlocking curve ended engineered 'bricks', available in different finishes, to produce a variety of layouts and effects. It's Italy's biggest take on the cookie since the Garibaldi.



A way to treat the bleat

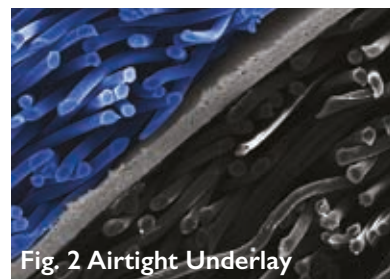
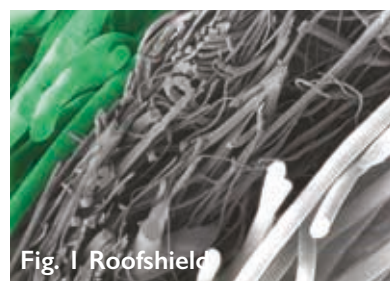
For the yet to be constructed £63million Woolston waste water treatment plant on the coast near Southampton, the designer, not surprisingly, went for a wave-like form. Its curves will have to be accurately emulated by the roof and cladding, which have been designed by Prater, using its partner BEMO's standing seam system – to suit the building's relatively complex geometry. It will replace the existing building, which no longer meets Environment Agency standards, and solve the odour issues that have bothered the locals.



Each-way bet

The home of the eponymous Festival and the Queen Mother Champion Chase, Cheltenham racecourse now boasts a new five-storey, 6,500-person stand as part of its £45 million redevelopment – with views over not only the track and winners' enclosure but also, from the rear, to the picturesque Malvern Hills. The new structure, designed by Gloucester-based Roberts Limbrick Architects, has been fitted out with over 1900m² of Pilkington Insulight glass to match the existing elsewhere, to keep the champagne bar, fine-dining restaurant and the Royal Box nice and cool and maintain those crystal clear views out to the form.

GARY BRITTON



NOT ALL ROOFING UNDERLAYS ARE CREATED EQUAL

For years the debate on how to achieve a truly ventilation free cold pitched roof has continued across the construction industry. Now, reputable roofing contractors and leading housing developers such as Bellway, Bovis Homes and Crest Nicholson, backed by the NHBC, and independent industry research, have come to the realisation that some underlays perform at an exceptional level, providing a failsafe option, without the need for additional ventilation.

Improved thermal and moisture performance of pitched roofs

The A. Proctor Group developed Roofshield 20 years ago in response to problems caused by the requirements of the UK's demand for cold-pitched roof construction, and the drive towards ever increasing thermal performance requirements. Today, trusted by architects, developers and contractors, the Roofshield brand is synonymous with the highest quality, providing a pitched roof underlay, which is both air and vapour permeable.

The combination of cold-pitched roof construction, and increasing thermal performance requirements has fuelled the tendency to place additional insulation above the ceiling joists, leading to an increased risk of condensation in the roof space. In an effort to combat this problem, the industry developed a series of breathable membranes, which were designed to be installed over the rafters as roof underlay, and allow the vapour to escape.

The majority of these membranes were vapour permeable, but air tight, rather like a Gore-Tex jacket. While water resistant, they did not completely prevent condensation within the roof space, meaning additional ventilation had to be introduced in order to allow air to circulate.

Not all roofing underlays are the same

Generally, two types of technological solutions have been presented to specifiers; 1. Vapour permeable, but

airtight solutions, based on film laminated polypropylene technology, or 2. A vapour and air permeable version, such as Roofshield, alleviating the need for additional ventilation.

Iain Fairmington, Technical Director of the A. Proctor Group, explains, "Roofing underlays come in all manner of different colours, but it's what you can't see that does most of the work – the middle layer. Whilst the colour of the top surface or underside is useful for identification, it is irrelevant in terms of performance. This middle layer can be likened to the same robustness as normal kitchen cling film, and needs the protection of the sandwich construction to make this suitable and fit for purpose in a pitched roof. Taking a microscopic view of the middle layer clarifies the difference between an airtight and air permeable membrane. Fig. 1 shows the Roofshield membrane, Fig. 2 shows a typical airtight roofing underlay. The difference between air permeability and air tightness is fundamental to the products performance and use.

In a traditional UK cold pitched roof construction, the large cold void above the horizontal insulation requires the quick release of vapour laden air that is reaching its dew point and potentially causing damaging condensation; Roofshield is certified by the BBA and accepted by the NHBC for use without ventilation or a VCL in even these most demanding circumstances. This is particularly advantageous in refurbishment projects where the installation of the VCL can lead to owners or tenants having to move out if a non-ventilated roof strategy is adopted."

Independent research and NHBC guidance

Iain Fairmington, explains the building physics around why air tight membranes' limited vapour permeability means that condensation can still occur: "If you have a big cold roof space, and you have a sudden drop in temperature, you want to have air movement. People assumed that because they were installing a vapour permeable membrane you didn't need to ventilate your roof, but in

certain circumstances moisture levels were too high or temperatures too cold to allow the vapour to permeate without condensing."

By contrast, Roofshield has a far higher degree of vapour permeability, as well as air permeability, so will still perform in conditions in which air tight alternatives will not. Between 2001-2004 independent research was carried out, conducted on a cross-industry basis with Glasgow Caledonian University. The Partners in Innovation study was necessary, because there was a need for consensus on whether it was still necessary to ventilate buildings where vapour permeable membranes were installed," says Fairmington.

In fact, the study contained the crucial finding that when a roof was unventilated, and used an air and vapour permeable underlay, such as Roofshield, this would further reduce and inhibit the formation of condensation on the underlay. This contributed to the NHBC making a statement in their Technical Extra bulletin Issue 6 that independently certified air and vapour permeable underlays, such as Roofshield, could be used without additional ridge ventilation in cold roofs.

As Roofshield is accepted by the NHBC without the requirement of ventilation or a VCL, even in cold-pitched roof constructions, the choice of underlay becomes simple. Another independent research report undertaken in 2014 by property consultants Hardies shows that the use of Roofshield without ventilation or a VCL is the most economical choice. When looking for the best vapour permeability, combined with the added benefit of air permeability – Roofshield is the only membrane that meets both these criteria. The evidence is clear for architects, house builders and contractors looking for a fail-safe roof that is cost effective, and delivers the highest performance, Roofshield is in a class of its own.

For more information please visit:

www.proctorgroup.com/roofshield | contact@proctorgroup.com | 01250 872261

A good BIM vintage



RTC, a three day conference devoted to all things BIM, was held this year in Hunter Valley outside Sydney, a wine region where we could reflect on vines of a less virtual type. My firm presented two case studies on workflows used to document projects.

The tower in the heart of Melbourne, 466 Collins House was designed with two massive structural walls from which a collection of pre-fabricated steel units hang with cantilevers of up to 4m. Working closely with the contractor, we developed a smart family that could be placed and stretched for construction documentation while updating information for factory line fabrication in the background. This method shifts final fabrication two stages earlier in the design process, bringing accuracy and cost certainty.

At 450 St Kilda Rd, an 18 storey residential building with a complex facade, the challenge was to model hundreds of double curved facade panels in a larger BIM model and embed each one with its unique data characteristics. We used Rhino and Grasshopper to generate the geometry

with a simple csv file storing the data. We created a script in Revit's Dynamo that built a super family with all the panel types nested in one place. The script extracted geometry from our sat file and paired it with data from the csv file, creating a new type for each – in effect an automated 'family builder'. The project was then populated with the appropriate family type using another Dynamo script. The result was native BIM geometry, able to be scheduled, tagged and integrated – the process bypassing manual family creation and placement. We also worked around Revit's archaic geometry tools and tapped into other programs more suited to creating complex geometry. Time savings for this and subsequent projects have been tremendous.

The conference also showcased an amazing array of open source software and techniques; below are some of the more powerful free tools.

Konrad Sohban from Grimshaw has developed Mantis Shrimp, an open source plug-in that translates geometry between Rhino/GH and Revit/Dynamo. The plugin has a suite of buttons

to enhance both packages and is well worth downloading. Paul Wintour from BVN presented two workflows for calculating and documenting interior solar access. Though far from simple, the plug-ins he used are definitely worth a look. The first method used Rhynamo, a great plug-in for Revit's Dynamo, sorting and exporting Revit geometry for analysis. The Grasshopper plug-in Ladybug was used to analyse the solar radiation for each space. The results were pushed back to Revit through Excel and represented on plan as rooms. The second workflow used Flux, a new cloud based plug-in by Google. It acts as a geometry translation device between different software and has its own node based scripting interface for users to control the links.

For nerds, Elefront allows users to embed Rhino geometry with unlimited metadata. This data passes to other software creating hyper geometry with searchable attributes. All freely available, they're plug-ins to raise a glass to. ●

Alan McLean is an architect at Bates Smart Architects in Melbourne

Books

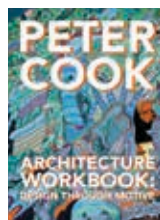
Buy at ribabookshops.com



Decide & Deliver: 5 Steps to breakthrough performance in your organisation

Marcio W Blenko, Michael C Mankins, Paul Rogers eds. Bain & Company. 172pp HB £19.99

Given practices' ability to know how to put other peoples' house in order while often enduring the chaos of their own, this 2nd edition of 'Decide and Deliver' offers itself as a welcome salve against practice mismanagement. Its central tenet, about improving decision-making on an organisational level, means it's more suited to the practice that's already a certain size, so if you're wanting to improve your decision-making, you might want to look under 'Self-Help' in the bookshop. Expect a lot of corporate speak – processes, priorities and 'behaviors' – a few flow diagrams and 'score cards'; but at least each chapter opens with a real example of a problem and breaks down how it was solved so you can keep the bull**** bingo card in your back pocket.



Architecture Workbook: Design through Motive

Peter Cook. Wiley. 256pp HB £29.99

Any cynics out there thinking Peter Cook's latest tome is just an excuse to wheel out his half-century old Archigram work again would be right – partly; but there's still plenty of opportunity in its copiously illustrated pages for him to talk about recent ideas and buildings. Cook gives us nine 'motives' for architecture as a springboard for 'what ifs?' and 'how could's?', using, his, his students' and any number of works from the canon of 20th and 21st century architecture to interrogate subjects like 'New places and strange bedfellows' and 'Can we learn from silliness?' Cook remains an outspoken provocateur and his book is a visual feast of classics and forgotten delights (I mean you, Hans Poelzig and your destroyed Schauspielhaus). And with works like his 2013 'Hidden City', he still retains the ability to generate wonder for our cynical and dulled architectural senses.



Building Revolutions: Applying the Circular Economy to the Built Environment

David Cheshire. RIBA Publishing 138pp PB £35

You'd think that by now yet another book promoting the concept of the circular economy in construction is like teaching your grandmother to suck eggs, but when profligate waste in the sector remains the norm, the message still seems to be missing the mark. So a regional director at AECOM who also wrote CIBSE's sustainability guide gives us his take. The book is simply laid out, if a little unadventurous, with clear descriptions of built examples he's found to make his point; most in the UK to keep both context and possibilities pertinent. While informative, it's more prosaic than a call to arms: I prefer it when he veers off piste to muse on the dismantling, reconstruction and re-use of old materials of Japan's Shinto shrines; a philosophical curl of incense around the driven-in timber posts of his argument.



Stepped living roof

What: Bespoke metal hopper green roof

Where: Family home, Hackney, London

Nestled away in a landlocked corner of Hackney's De Beauvoir Town, a small home and studio is making as much of its rooftop as Spiderman might. And in this case, there is a specific connection. The couple living here are costume designer/makers, whose specialisation in working with leather over the years has seen them employed by the film industry to create costumes worn by the likes of Batman and Wonder Woman.

The small infill site was originally a late Victorian foundry, later converted to a photographer's workshop, and most recently turned into a studio for the pair. They decided to avail themselves of the sui generis live/work status and asked architect Hayhurst and Co to find a way of maximising the volume of the tiny site, allowing them to create a home for themselves there.

Project architect Jonathan Nicholls

explains that with every wall being a party wall and rights to light a real concern for all the neighbours, any second level of accommodation on top of the single storey was going to have to be squeezed in under a roof form that would not only take account of these issues but pre-empt the planners' desire for a sustainable proposition.

The result is this strange asymmetrical stepped form. Two of the party walls are straight, while the two other sun-facing sides are at 30° and 45° angles. With the aim of creating a heavy duty green roof that the owners could clamber up when necessary, the firm opted for robust steel 'hoppers' that step down from the apex of the roof to the access point on the first floor balcony.

Nicholls explains that, when it comes to green roofs, the steep angles they were working with made the options quite limited, and, in any case, the couple were averse to the idea of a mere blanket of sedum, preferring something they could garden.



ROOF COMPOSITION

The build-up of the extensive hybrid roof is, like the rest of the house, timber. Glulam posts and beams form the main structure of the new building and are key in helping to carry the significant loads of the roof. The 1.6mm thick folded steel plates that make up the lapped planting trays are fixed with stainless steel screws through a GRP fibreglass roofing membrane onto vertically laid 25x50mm softwood batons at 500mm centres. The batons are fixed to 12mm Sterling OSB board which sits atop 150mm Celotex solid insulation, with all joints taped to act as a continuous vapour control layer. The underside of the insulation is 12mm WBP sheathing. Much consideration was given to ensuring that, on an exposed sun-facing roof, the steel troughs expanded and contracted as little as possible. To achieve this the architect chose a geotextile fleece to line the bottom face. This not only insulates the metal but allows water to run off the roof without the build-up of a dead load. It works with the 'reflective' white granite chips on the soil surface to help minimise expansion and contraction of the troughs.

With access an issue, the architect moved away from the idea of plastic interlocking tray systems for a bespoke design of lapped 150mm deep steel trays that could take the load of soil, plants and chippings. The metal picks up on the mirrored stainless steel window reveals, which are designed to maximise daylight ingress for the almost completely roof-lit living area at ground level.

Each steel tray, fixed back to timber roof batons, creates a V-shaped trough, spaced with drainage holes to allow excess water to drain down into the next tray and away at first floor level. The optimum size of holes was worked out by the firm building a full-size model of the detail at its office and testing the irrigation qualities over a period of months.

Engineering loadings were a key consideration. The timber glulam structure had to take the weight of an extensive green roof and steel structure, making the whole building, like Marvel Comics' Antman, a small but extremely robust thing. ●

Westbrook Primary is a pioneering new school that received central funding in order to realise an ambitious target: a low-energy building with minimal ongoing maintenance and running costs. To tick all the boxes, fibre cement slates were chosen for the roof and facade. The final effect is a striking modern statement that provides superb energy-efficiency today, and is adaptable to the needs of the future.

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Prague's very own Crystal maze

Bespoke aluminium systems from Reynaers were used to achieve the striking shape and chessboard appearance of these new offices in the Czech capital

The Crystal office building is a striking addition to Prague's desirable Vinohrady district and demonstrates how far curtain walling can help push boundaries to create original spaces and bespoke shapes.

Cutting-edge geometric design

Crystal has two main parts with a sharp chasm slicing between them. The building's significant height and distinctive shape, supported by bespoke aluminium systems from Reynaers, means it has a unique and unexpected look from every angle.

The chequered appearance is used to visually unify all exterior faces of the building, including the roof. Walking around the outside, the reflected and refracted light creates a dynamic facade. Clarity and light underpin the strength of the composition.

The innovative build sits beside the busy Vinohradská Boulevard opposite one of Prague's largest cemeteries, Olšany, and the post-modern 1990s Don Giovanni hotel. On the same side of the street is the modernist 1960s Casablanca tower and a long block of Czech savings bank offices, all designed by Atelier 15 architects.

On the Vinohradská elevation, Crystal rises to 14 storeys, while the second element faces the much quieter Kouřimská Street on the opposite side of the site.

There are fewer storeys on this elevation, in keeping with the roofline of the other buildings in the street.

The floor space totals 12,827m² and comprises offices and five retail units on the ground floor, including a café and a brasserie. Warehouses, technical facilities and ample parking are concealed underground.

The new Crystal office building was



Left The main elevation of the Crystal building to Vinohradská Boulevard.

Above Detail of the Reynaers facade showing blank aluminium panels and full height glazed panels with opening lights.

commissioned by the GES REAL development group and was completed last summer.

Bespoke facades

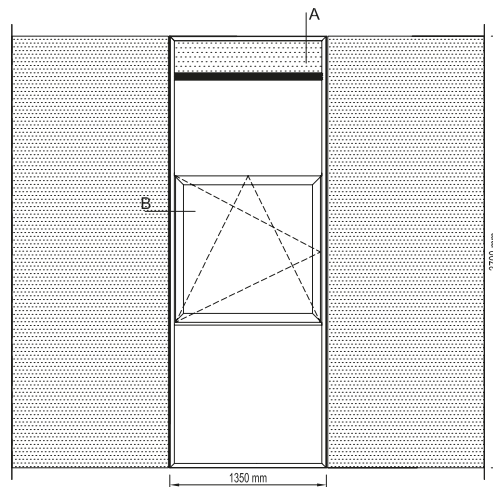
High-performance, bespoke glazing solutions were essential to ensure the building's design features could be achieved. Its unconventional curtain walling is a unique system from Reynaers, based on its CW 86-EF aluminium range. By using a modular facade, a complete skin for the entire Crystal building was produced. Reynaers' multi-chamber, high insulation CS 86-HI aluminium floating windows were also included in the build.

The implementation was relatively complex, and some elements had to be custom-made for the project. The unusual shapes did not allow the use of standard system profiles, so bespoke elements were designed, including corners, gaskets and special glazing beads.

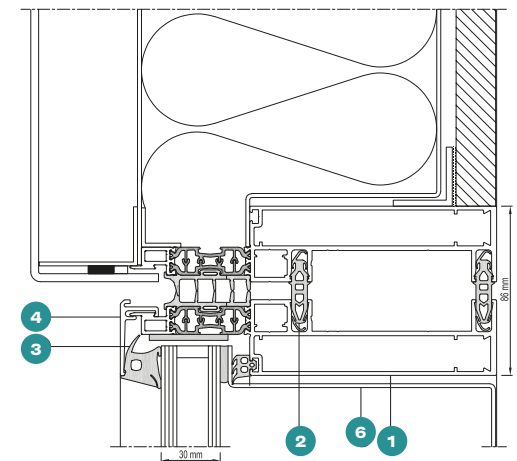
These profiles were prepared using 3D models of the element and Reynaers helped to develop a solution that incorporated custom-built drainage modules for use on different aspects of the building, including sloping surfaces.

This state-of-the-art design not only allowed for the unusual shape and the segmentation, but maximised use of the land while minimising construction time. □

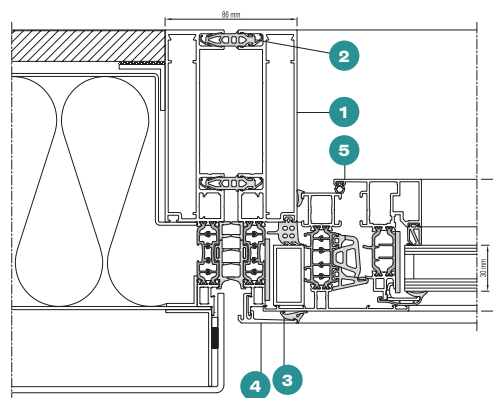
Typical element elevation



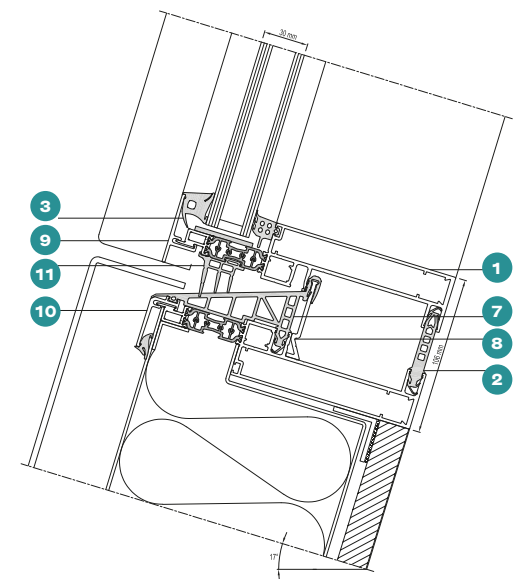
Vertical section A



Horizontal section B



Vertical section inclined element – drainage solution



- 1 CW 86-HI/EF bespoke frame profile
- 2 Linking gasket
- 3 Outer glazing gasket
- 4 Glazing bead
- 5 Window CS 86-HI/HV
- 6 Shadow box
- 7 Gasket for cascade drainage
- 8 Support profile
- 9 Glazing bead for bottom of inclined element
- 10 Glazing bead for top of inclined element
- 11 Insulation gasket

Reynaers prides itself on embracing creativity and originality and its bespoke solutions can help projects push the boundaries. The company has been designing premium quality aluminium windows, doors and curtain walling for over 50 years. To find out more, call Reynaers on 0121 421 1999, email reynaersltd@reynaers.com or visit www.reynaers.co.uk.



Made



Phil Southall
UK sales & marketing
director



Gary Wilson
Head of technical



Lorna Williams
Head of product design
and creative branding



Above Glint Orb Glint Void Woven.

Left Bespoke Laying Patterns, running clockwise from top left: Flagstone – Kura Anise with Kura Kala Stripping; Pleat – Kura Caraway, Kura Cassia, Kura Anise and Kura Kala; Tile – Kura Cassia.

What: Amtico
Where: Coventry

In a city historically famed first for its ribbon-making, then watches and clocks in the 18th and 19th centuries, and its bicycles and cars in the 20th century, today Coventry's largest manufacturing company is the luxury vinyl tiles manufacturer Amtico. With 400 people at its head office in the north of the city and a further 500 employees worldwide, Amtico stole the title from The London Taxi Company in recent years after a big investment. This followed its buyout by Mannington Mills in 2012 and increasing year-on-year growth.

Sitting on the site of a former Jaguar car production plant, Amtico started life in 1964 as a joint venture between Courtaulds and American Biltrite, with the company name representing the 'American Tile Company'. After a management buyout in 1995, it was sold to

Mannington Mills, the carpet, laminate and wood flooring manufacturer. Despite its US heritage, Amtico has always been based in the middle of England and celebrated its 50th birthday in 2014.

Alongside its factory in Atlanta, Georgia, it supplies luxury vinyl tiles across the world, with its products specified evenly between residential and commercial projects – to housebuilders and student housing as well as high street retail, hotels and healthcare. The company is busy developing sales in Russia, China, Brazil and the rest of South America. But what stands out is that it is the only such brand designed and made in the UK.

'Amtico is really three separate businesses in one,' says UK sales & marketing director Phil Southall. 'It is at once a design, manufacturing and sales/marketing business.' As well as undertaking all this completely in house, Amtico has distinguished itself from the very

beginning for doing things differently and better.

It is this that has driven the company over the past 51 years, and is in particular responsible for the highly creative and energetic design team. While many other companies have divided different sections of their businesses geographically, Amtico has kept all its parts together on the same site.

The factory is next door to the design studio, and the sales and marketing team sits nearby in Solihull. This self-manufacturing means the company can work up bespoke designs and react quickly to customer demands and trends, as well as properly integrate production processes with design ideas. Prototype surfaces are, for example, tested on the same machines as final saleable products.

In terms of products, Amtico offers eight collections: Signature, Spacia, Click, Access, Marine, Assura, Entryway and First. Signature,

Amtico's flagship collection, is available in 163 designs. Spacia is available in 96 designs while Click is a new collection designed for DIY enthusiasts. Within these collections there are three ranges – Woods, Stones and Abstracts – which can be laid in more than 30 patterns.

With its choice of products and design innovations, the company has 20% global market share in the luxury vinyl tile market and sales of £150m a year. Amtico's customers range from US submarine commanders to Number 10 Downing Street and Buckingham Palace, plus a toy store wanting a Monopoly Board floor. ● This editorial is supported by Amtico www.amtico.com as part of the Amtico/ RIBA5 design charrette challenging seven architecture practices to create a new series of laying designs for Amtico's Signature Collection. The winning designs will be announced in the Journal in September and go into production in late 2016.



1. DESIGN

Manufacturing starts in the design department. All tile designs and patterns are created in-house by more than 17 designers from backgrounds including automotive, textile, graphic and interior design. The group scours the world for the trends across all industries – anything from fashion and fine art to ceramics and graphics. Natural finishes usually originate from manipulated scans of the original material (manuscript), while others are based on invention and testing with paints, materials and other effects.



3. MIXING

Materials are stored in silos to the rear of the factory. Once inside though, the material follows one of two production lines, effectively doing the same thing. One line was introduced in 1989 while the other, newer, more streamlined and less work-intensive line was brought in two years ago at a cost of £6m using German and Italian made machines. In the first stage the virgin vinyl powders, plasticisers and additives are mixed using sheer and conductive heat into a dough-like substance in the Kneader or Banbury Mixer.



5. LAMINATION

All the rolls made from the calendaring process are then brought together in the continuous lamination process, carried through the machinery on canvas which is pulled off at the end and put back into the cycle. Films are laminated, together with the specified print, under heat and pressure. This process also imparts a corresponding wood or stone emboss, coated with a polyurethane factory finish and annealed. The annealing is key to taking out stresses put into the product during lamination so that when installed it is dimensionally stable.



2. RAW MATERIALS

Surface finishes take 18 months per design before they are ready for production. Amtico is continually sourcing raw materials, which include PVC powder, plasticisers and other additives. The first two are primarily produced during the cracking of oil; non-oil ways of producing PVC powder are available but usually more expensive. As a result the purchasing department keeps a close eye on the oil price to determine the best times to buy. Generally raw materials are sourced from northern England, France, Germany and the Netherlands.



4. ROLL GOODS MANUFACTURE

From the mixers, the melted/gelled PVC material is made into individual calendared rolls. Material is taken from the high shear mixer or extruder and fed onto a large machine called a calendar. At temperatures of about 180°C, the machine squeezes the material down to a certain gauge and width which starts to resemble the final product. Rolls can be clear when used for the clear wear layer, the actual working surface, or tinted as a different coloured face ply or a backing layer.



6. CUTTING PROCESS AND DISPATCH

After annealing, material is cut into 1m² 'slabs' that are again individually cut, into standard or custom shapes and sizes. This takes place in two ways: on an X-Y table using an automated CAD bed cutter, or by a metal die-cutting process for standard shapes. All are given bevelled edges to create a more realistic 'tile' appearance. While quality is checked at every stage, boxes of tiles are selected at random after the event to ensure everything leaves the factory in perfect condition. All Amtico's products meet the key international standards, including EN649 and ISO 10582.

Elytra Filament Pavilion

A glass and carbon fibre canopy design, based on a beetle's anatomy, is gradually growing at the V&A as robots fabricate its elements, acting on instructions from sensory software

Words: Jan-Carlos Kucharek

Installed in the V&A's John Madejski Garden, the centrepiece of the museum's Engineering Season, is a vision of how we might build in the future. The Elytra Filament Pavilion, built only from glass fibre and carbon fibre strands, is inspired by the wing shells of a specific type of flying beetle known as Elytra.

The structure as you see it is also a form in transition. Over the six months the installation remains onsite, sensors in the canopy will relay real-time data on user movements beneath to the fabrication software, which will make decisions on where the next hexagonal canopy component will be installed, and, as a result, what its consequential loads and stresses will be.

Below the canopy, all this algorithmic information is being relayed to a pair of Kuka robots, whose task it is to make the new component in full view of visitors, ready for installation above their heads. This could be seen as merely whimsical but, according to its designers, it presages a well overdue re-evaluation of the construction industry, acting as a prototype to herald the fourth industrial revolution.

The Elytra Pavilion's design and fabrication methodology is the creation of German architect Achim Menges with Moritz Dörstelmann, structural engineer Jan Knippers and climate engineer Thomas Auer through the University of Stuttgart's Institute of Computational Design (ICD) and Institute of Building Structures and

Structural Design (ITKE). It is the result of four years' research by the two institutes into developing computational design and fabrication techniques for the industry – innovations celebrated annually with a new temporary pavilion on the university campus.

If the idea of academic computational design research summons up visions of bespectacled geekiness, a look at the ICD's website might help dispel the assumption. The short videos showcasing each pavilion design boast high production values, snappy overlaid graphics and electro beats. This latest iteration in London is highly influenced by the 2013 pavilion, which, though 'less highly calibrated' in terms of fabrication techniques and with no sensory modification to the structure, as presented here, looked at utilising the properties of glass and carbon fibre to produce extremely lightweight and robust structures with the potential for large spans. Any structure weighing in at less than 50kg/m² can be considered 'lightweight'; their 2014 pavilion came in at 4kg/m².

Here, each of the 40 unique 5m² hexagonal components, spread over seven supporting columns, weighs less than 45kg; so at 9kg/m², the whole 200m² pavilion will weigh less than 2.5 tonnes. As Achim Menges is keen to point out, that's less than the weight of a 2m² section of the museum's wall.

With the design of the Elytra Pavilion



ICD/ITKE's Elytra Filament pavilion, constructed of nothing but glass and carbon fibres. Once complete the whole 200m² pavilion will weigh less than 2m² of the V&A's wall section.





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Menges thinks they're at the cutting edge of investigating possibilities for new architectures and construction through biomimetics. 'There's two methodologies at play – the technological pull and the biological push,' he explains. 'We tend to concentrate on the latter, looking for a structural solution that has a biological comparator, such as Elytra shells, and then investigating if there are fabrication processes that might align with it to generate their form.' But he admits it's a rarefied world, demanding literacy beyond the usual skills of the architect.

'When your design experiments with the exoskeleton of arthropods or shells of American lobsters, you need to work with not only engineers but biologists, palaeontologists and materials scientists – and even then there's no guarantee it'll work,' he adds. But underlying it all is the ambition to create building systems using new design thinking and methods.

Specialist input

The design team worked with biologists from the University of Tübingen to ascertain the structural principles of the double-layer Elytra shell. This involved micro-tomography of the beetle shells and computational morphological analysis, including commissioning a particle accelerator and scanners to produce a 3D model of the Elytra structure to a resolution of 3-6 microns. Once the engineers and designers had formulated a methodology of mimicking the double-layer structure, they looked at fabrication techniques that would allow the rationalised hexagonal components to be individually spun using robot 'effectors'.

Here, it uses a robot and an external positioner, linked to it via control software. The positioner has a steel framework attached to it, which acts as a template. The robot feeds the resin-soaked glass fibre strands on to this framework, and which acts as a scaffold for the carbon fibre resin strands that follow. The computer controlled, double-skin winding method has been designed to run from one layer to the other as a continuous strand, to harness the material properties of the carbon fibre and give it strength as a 'woven' structural component once the resin has hardened. In accordance with its potential position and associated stress loadings, each component will be individually spun (which will take around three hours) and



Above The pavilion's glass fibres act as a scaffold for the load-bearing carbon fibre structure. The weight of the 40 roof components is transferred to seven steel plates.

Right The Kuka robot sits below the canopy, constructing new hexagonal components – each takes three hours to 'spin'.

be unique to its place in the final matrix. The funnel column forms that transfer the loads of the whole canopy structure to its seven steel posts are formed using an additional framing module connected to the robots.

As the installation is open to the public, components will be assembled manually despite a robot making them, but the intention is that this too will become an automated process. To help realise the paradigm shift in construction they're seeking, Menges and his team still look nostalgically to Paxton's Crystal Palace for precedents for scaling-up the pavilion construction methodology to the size of stadia. Fabrication logistics is everything.

'We want to combine current construction technology, like cranes, with industrial robots to generate an integrated fabrication and construction process,' says Menges. They are helped by the fact that 1km of carbon fibre weighs only 10kg, allowing them to employ novel techniques. Back in Stuttgart, they are working on a new pavilion using unmanned aerial vehicles as a material delivery system across larger



Above The 2016 Stuttgart pavilion, based on a form of sea urchin, is built of elastically bent, double layered segments of robotically sawn beech plywood.

Top The genesis of the V&A pavilion was its 2013 Stuttgart predecessor.

spans. While the team is using commercially available materials such as glass and carbon fibre now, they're liaising with other research bodies to source mineral fibres such as basalt and even graphene to ascertain their structural properties. The aim is to move away from hydro-carbon based to bio-resins – hardening agents that are more eco-friendly and, crucially, fire resistant.

Parametric or not?

One might assume this form generation is the product of parametric thinking, but Menges says it's more complex than that. The iterative procedure, with designs born of natural forms interrogated in the real world for viable construction methods, has resulted in an almost random quality to this series of pavilions over the years. Some might see it as a thinking disconnect, but Menges is reassured by the fact that different problems are generating wholly different solutions unencumbered by 'style'.

'All the pavilions we've done look different because we've never started with an aesthetic endeavour – we can only evaluate the forms after we've realised the project,' he explains. 'While some of our ideas might align with parametricism, where we diverge from it is that we don't end up with an architectural style. We're governed by emerging technologies, structural or user behaviour, so are not looking at a predetermined architectural language.'

Despite the Elytra Pavilion's emphasis on computerised design and fabrication, Menges realises that it's one step at a time. There's no replacement of the artisan with the machine, for instance, but 'a synergy between the two'; and they've been working with Autodesk on 'Hive', an installation exploring human and robotic collaboration. Menges concedes the step change he wants may be a while off. 'For now, the only place to carry out this kind of integrated research is academia, as professional practices are not yet geared up for such speculative enquiry,' he muses. He observes that after steel reinforced concrete technology was first patented in 1860 it took 50 years for it to be adopted by the industry – 'There's a time lag for all innovations to make their way into the mainstream.' Watching his robot spinning away purposefully in the courtyard of the V&A, the paradigm shift could be sooner than we think. ●

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1
PV roofing
Bauder

Ten years since last airing, teen soap Byker Grove still divides. The boosters will point out even more extreme storylines than Grange Hill (upping the latter's 'just say no' ante to take in child abuse, homelessness and teen pregnancy) and so freaking your parents out even more satisfyingly. The theme featured kids leaping about to acid house on this very estate, designed by loveable Swede Ralph Erskine, the restoration of which has just netted Bauder a Roofing Award for its solar installation – letting them party like it's 1999 on the night.

bauder.co.uk

2
Bespoke rooflights
Sunsquare

Remember Merrie Melodies' Case of the Missing Hare cartoon when magician Ala Bahma tries to 'preste... prestedij... prestedigi.... PULL!' Bugs Bunny out the hat? That's sort of what's going on at this private refurb and extension in Brentwood, Essex. The 'hat' is a huge ground floor kitchen-dining extension and the 'rabbit' is a storey-height cube of frameless double-glazing from Sunsquare, with two sides frosted for privacy. But given the spotless look of the extension, this tale doesn't end with a thrown custard pie and the bunny slipping back into the hat playing 'Aloha'Oe' on a ukulele.

sunsquare.co.uk



3
Fixed flushglaze rooflight
Glazing Vision

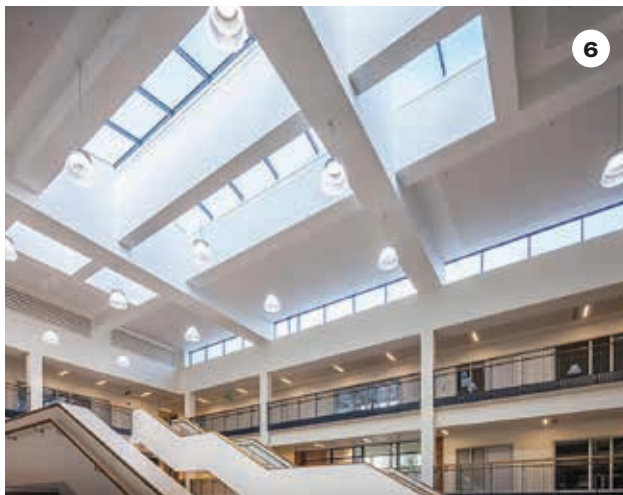
How can you be sure your child is doing homework rather than creating doodles of unicorns, ladders, rocket boots and unicorns? This innovative fixed-flush rooflight from Glazing Vision is perfect for helicopter pilot parents who can hover above to check he/she is progressing as they should with SATS. Or a drone with high res camera would do the trick; as indeed would clambering over the extension roof – perhaps the perfect vantage point for reassuring yourself how Glazing Vision's products meet the new Part Q.

glazingvision.co.uk

4
Conservation rooflight
The Rooflight Company

Just like the Rooflight Company's PR says, specifying a roof window is a one-time decision when working on heritage or listed agricultural buildings. There's no going back once you've installed it, and if it looks bad, you've just got to live with it. An example of getting a decision right in this context is the large Conservation Rooflights installed on Week Farm in Devon. An example of getting it wrong is Radio 4's Helen Archer telling little Henry to run along back to the TV room of the farmhouse after he'd asked mummy why daddy Rob was on the kitchen floor with a knife stuck in him.

therooflightcompany.co.uk



5
Energy efficient rooflights
EOS

This immaculately preserved 21st century tomb was the greatest find of an archaeological site in what was Finsbury Park in London. It is thought to be the resting place of a 'Dead Dad' and is notable for the treasures interred with the body, denoting one of great stature. Among the artefacts was a collection of box sets, including the ELO, the complete Cream and Bob Dylan, as well as rare 'Dad House' speakers, too powerful to have ever been played. The special Krypton-filled EOS rooflights are presumed to be the reason for the excellent condition of the finds.
eosrooflights.co.uk

6
Rooflights
SAPA Building Systems

Local context is important in architecture, and here Associated Architects has used a curtain walling system that matches tonally and aesthetically with the surrounding car park. When it rains at the University of Birmingham School, which is virtually every day, the sheen on the Tarmac echoes the shine on the curtain walling. Inside the atrium, rooflights keep the space bright and as dry as a bone. The academy is the first to be tied to a specific university. SAPA provided the curtain walling, the Dualframe Si Casement windows and the rooflights.
sapabuildingsystems.co.uk



7
Single-ply membrane roofing
SIG Design & Technology

It's not often we see our advertisers making such a bold artistic statement as this, on the roof of the £14m Arnold Hill Academy. But we think the pair of extractor vents, facing away from each other, is a sculptural objet trouvé brilliantly symbolising the way any national schools construction programme tends to diverge from cost-reality. No such problem here though, where the subcontractor helped make the school waterproof and airtight beneath its 3,570m² flat roof, despite a tight budget and even tighter programme.
singleply.co.uk

8
Roofing soffits
HI-MACS

Far-out architecture needs far-out solutions: this Bernard Schoeller designed 'Tournesol' (Sunflower) pool was created in 1969 and graced 183 French towns. The wacky structure opens its 'petals' when the sun comes out, turning itself into an outdoor pool. This, the Lingolsheim pool, was looking pretty grotty before architecture firm Urbane Kultur won a competition to upgrade it. The UFO-like dome was fitted with 48 Hi-Macs acrylic stone panels thermoformed into a double curve to merge with the existing structure.
himacs.eu

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Bedding in to the hotel business

Set to offer an extra 16,000 rooms by the end of this year, England's hotels are booming. There's plenty there for architects who understand the market

Words: Josephine Smit



Above M by Montcalm on London's Old Street, where rooms are 'teched up' in anticipation of its 'Silicon Roundabout' clientele.

This year started with the opening of the InterContinental London at the O2 on Greenwich Peninsula, a hotel boasting more than 450 rooms and a 3,000 capacity, pillar-free ballroom. Before 2016 is over, almost 7,000 rooms look set to be added to the capital's hotel stock, including Ron Arad's 156-bedroom Nobu Hotel in Shoreditch, with its cantilevering Cor-Ten beams, sharply angled concrete balconies and printed glazing.

Hotels are big business for the UK and particularly for London, where around 90, plus extensions, are in the development pipeline. The UK may not have major sporting events on the horizon – like the 2012 Olympics or 2015's Rugby World Cup – to pull in visitors, but the sector is still healthy and looking to a host of factors, from major conferences to heritage attractions, to keep future travellers resting their heads on

its plumped-up pillows. As a result, London's hotel capacity is expected to rise by more than 12% over the next three years, passing the 150,000 room mark in 2018, according to research by the capital's promotional body, London & Partners, and hotel intelligence specialist AM:PM.

Outside London, capacity looks set to grow by 9,000 rooms this year and more than 13,000 in 2017. The picture across the country is more varied, however, with business consultant PwC's UK hotels forecast for the next 18 months marking out Edinburgh, Glasgow and Manchester as locations with significant development pipelines.

Both inside and outside the capital, it is the budget end of the market – covering everything from hostels to more stylish but still affordable 'budget luxury' hotels – that

is booming. AM:PM's listing of the top five UK hotel groups by number of rooms in 2015 includes the well-known names of Premier Inn owner Whitbread, Travelodge and Accor. Some 3,000 budget rooms are under development in London for 2016 – around a third of rooms being delivered. Looking further ahead, the appetite for budget accommodation remains strong, accounting for half the rooms scheduled for 2017.

The science of selling sleep

Big hotel groups have a reputation for being demanding clients, putting a wealth of research into product and service, and then translating that into weighty and sometimes quite prescriptive guidance for their design teams. 'The hotel sector is very exacting,' acknowledges Russell Potter, director of SODA Architects, which worked on the recently opened Green Rooms in north London (see overleaf). But he points out that there is a good reason for that focus: 'That's because ultimately they're selling sleep and that's a precious thing. People might only be staying one night, so the hotel has to get it right or those visitors won't come back.'

Hotel business is driven by a metric known in the industry as revPAR – revenue per available room, which influences not only how a facility is operated, but also what goes into a development at the start. 'When we roll out hotel plans, the key questions are how much are you going to spend on a room, and how much are you going to get out of it,' says Katrina Craig, chief executive of consultant Hotel Solutions Partnership.

'In general the big hotel brands are becoming quite restrictive, particularly at the budget end where they want to guarantee a hotel can be delivered on budget,' she adds, but says architects shouldn't see that as a constraint. 'Designers have to be better at understanding how the hotel operates. They need to be in tune with how service must be delivered,' she says. Features such as view corridors and combined reception desk/bar units can be essential where there are multi-tasking receptionists, for example.

When The Montcalm Luxury Hotels group came to develop its first UK hotel, M by Montcalm on London's Old Street, in Shoreditch, the client was in some respects typical of the industry in its approach to the project. 'They had a magic number in mind of around 200 rooms,' says

Murray Levinson, partner at architect Squire and Partners, which undertook the concept design, working with executive architect 5plus.

The design eventually provided 269 rooms, in a 23-storey tower that has become well known for the optical illusion presented by its distinctive exterior. Hackney Council wanted the hotel to stand out from the crowd, and the client also fully understood the benefit of investing in architecture. 'It was their first new building – their other London hotels were refurbishments,' Levinson says. 'It was agreed that the budget allowance would be higher than for a standard building, and the client was supportive of spending more.'

Rooms at the Shoreditch hotel are larger than average and packed with technology, including touch screen controlled underfloor heating, and lighting and curtains that can be managed via a tablet. Tech is becoming increasingly important, says Craig. 'The size of the hotel room used to be synonymous with luxury, but we're now seeing highly specified hotel rooms commanding high rates.'

If you can't beat them...

Online travel agencies and the sharing economy have played a significant part in changing travellers' experiences, and the hotel offer. 'The rise of online transactions has meant that more companies can operate without being part of a big brand,' Craig points out.

Home sharing is now significant in the UK travel market, with Airbnb reckoned to have around 30,000 home listings in London. 'Home sharing has presented both challenges and



Above Marriott's Moxy brand, targeting younger travellers, is a new offering to the UK market.

opportunities,' says a spokeswoman for the British Hospitality Association. 'More people are travelling because they can afford to, so it has expanded the market. But what's always been of concern is the health and safety issues around the sharing economy. A large part of it is invisible.' Some businesses are said to be considering responding by listing their own rooms on sharing websites, while in April chain Accor went a step further and acquired onefinestay, a luxury serviced home rental platform.

Big brands are also learning from the smaller, independent businesses that have brought individual style to budget city stays. 'Hotels are differentiating more between travellers and what they want. They are now even more conscious of design,' says the BHA spokeswoman. 'There's scope for the bigger groups to have distinctive brands within. They are thinking about how they can have quirky bits.' For

example, Marriott is bringing its new Moxy brand, which targets younger travellers, to the UK, with a 200-room hotel under construction at Aberdeen's airport. 'These are hotels with a design focus, tech-enabled rooms, bigger public spaces and fresh, cool design elements,' says a Marriott spokeswoman.

These are the kind of features that have become associated with brands like Ace Hotels and The Hoxton. Their emphasis on design, lifestyle and comfortable communal spaces for coffee, co-working and clubbing gives them a personality and a local connection that the larger chains have traditionally lacked. There is a clear appetite for something different, says SODA Architects' Russell Potter. 'The priority in a hotel used to be a good bed and a hot shower. Now younger people are interested in the bigger picture, the chance encounter.' The innovations of the smaller independent hotels might just be helping the sector as a whole rise to the challenges of the sharing economy. ●

KEY FACTS

Total rooms in London in 2015	139,880
New rooms due to open in London in 2016	6,970
Increase in openings on previous year	4.9%
Total rooms in the regions in 2015	472,850
New rooms due to open in the regions in 2016	9,210
Increase in openings on previous year	2%
Number of visitors expected to the UK in 2016	36.7 million
Increase in visitors on previous year	3.8%

CATERING FOR CREATIVES

When Green Rooms in Wood Green, north London, opened the doors for its launch party, there was the kind of queue you would normally see outside a nightclub. This is the latest arrival on the capital's budget hotel scene and it is bringing creativity to the sector in a very different way.

Green Rooms provides low cost accommodation that targets touring artists, actors, musicians and other performers. Billed as a social enterprise, the not-for-profit hotel offers a budget stay with a stripped back style. The project was founded by social entrepreneur Nick Hartwright, working with Kurt Bredenbeck, the founder, creator and former owner of the Hoxton Hotel, and has been supported by Haringay Council and the Greater London Authority.

Spa treatments and luxury services are not on offer at Green Rooms, but there is a range of sleeping accommodation, including a dormitory and 22 bedrooms, alongside a café, bar and restaurant, and a third floor space dedicated to events, ranging from performances to art shows. All are housed in a 1930s art deco office building formerly occupied by the council.

The makeover from office to hotel was carried out by SODA Architects on what director Russell Potter describes as 'a



ANNA BACHELOR



SODA ARCHITECTS

ridiculously low budget'. Given the circumstances, Potter says that the conversion approach was 'to do a soft strip and then see what we could work with. We were quite reactive.' Luckily, the suspended ceilings concealed such details as a stained glass skylight and ornate plasterwork, while carpet tiles hid mosaic tiling, parquet on the ground floor and oak floorboards at upper levels. Other finishes are necessarily low cost and simple – OSB partitions, painted concrete floors, exposed brickwork, expressed services – although money has been spent on adding acoustic insulation between rooms. 'That's something you wouldn't expect in a budget hotel. We've tried to do relatively few things well,' adds Potter.

The design is complemented by mid-20th century furniture and fittings, as well as new pieces from fashion-to-furniture brand Folk. With the price of a bed for the night starting at £18, visitors could be queuing.

Top left Green Rooms' pared-back aesthetic offers discreet luxury at affordable prices.

Left Based in Wood Green, the Green Rooms refurbishment of an art deco office is a cut-price extension of the successful Hoxton Hotel brand.

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Ingredients for inspiring, healthy places to learn

A visionary client is as important as the budget, and the latest multi-tasking materials help deliver a safe and sustainable environment. Ruth Slavid reports from the first PiP seminar

Think of a building type with tight budgets and demanding clients, yet the highest aspirations, and it won't be long before you realise that you are talking about schools.

This was the subject of the first PiP seminar, which looked at how talented architects work to make the buildings as good as possible, to help children not only inhabit surroundings suited to learning but also to make them feel valued and to unleash their imaginations.

At the same time, manufacturers explained the products they have developed specifically to make schools work better, whether thermally, acoustically or in terms of air quality.

All three projects presented had won awards, with the most prominent being AHMM's Burntwood School in Wandsworth, south London which won the Stirling Prize last year. This was a well-deserved but bittersweet victory, since the project was one of the last to be realised under the Building Schools for the Future initiative.

A school of this quality is unlikely to be achievable in the public sector under the current regime, but the practice's Susie Le Good showed that adequate funding is not the only factor that leads to success. The client, she said, was 'visionary' – this was the only school on which AHMM had been asked to emulate Mies, with the Illinois Institute of Technology building cited as a particular inspiration.

The existing school was a mix of buildings, with a fine assembly hall and pool designed by Leslie Martin. This was retained but most of the other buildings were replaced, although phasing was crucial since the school remained



Above AHMM was blessed with a visionary client for its Stirling Prize-winning Burntwood School.
Below The first PiP seminar attracted a packed audience.



open throughout. An area of land was 'unlocked' and this enabled a programme of decanting and building to proceed.

There is a coherence and hierarchy to the design, with clever use of a colour palette developed with long-term collaborator Morag Myerscough, and precast concrete facades. AHMM has used these before with Lendlease, and developed expertise with manufacturer Techrete which allowed it to minimise the number of units while creating maximum visual variety by rotating them – an economy of materials that is



Left ORMS' Science Block for Uppingham School incorporates a helical stair and a Foucault's pendulum.

well worth emulating in straitened times.

ORMS, which has ducked the funding issue by working with private clients, showed its work with Uppingham School to develop a new science block. While the building overall was inspirational with, for example, a helical stair and a Foucault's pendulum, the detail was almost more fascinating.

Colin McColl, associate director at ORMS, explained the process of choosing laboratory furniture. The school, he said, wanted a warmer feel and opted in the end for oiled iroko benches. It acknowledges and accepts the responsibility for maintenance associated with this choice but rigorous testing confirmed that 'no material is perfect'.

ORMS chose the manufacturer for the equipment partly on the basis of the quality of hinges it offered – an important consideration since no amount of fine materials will impress if the doors are hanging off after a few months.

If nascent scientists put materials through their paces, then what about sports players? Oscar Acoustics has developed a panel robust enough to be used at playing height and demonstrated that for a very large sports hall at Bedford Academy

A school of this quality is unlikely to be achievable in the public sector under the current regime

this approach allowed considerable savings in the overall area of panels needed, since the panels were being placed where the noise was generated. It achieves a better result than was previously thought possible, and at a reduced cost.

Air quality is at least as important as sound quality, and British Gypsum has developed ActivAir which it argues convincingly can help address this.

Studies show that levels of undesirable chemicals in classrooms, particularly of formaldehyde, are often too high, especially after art classes. While windows can, in theory, be opened, there are often concerns about draughts and noise.

ActivAir reacts with formaldehyde and can be used in place of conventional lining products. It works in such a way that it doesn't 'fill up' or

'wear out', giving it a long life. The company has conducted controlled trials, using the product in one of two near-identical schools and monitoring the results – which are impressive.

If this product is doing two things, then so is the dynamic insulation that Jablite has developed and applied at the Hundreds of Hoo Academy in Kent. The expanded polystyrene panels are moulded in such a way that ventilation air passes through channels, allowing a substantial amount of heat recovery and hence an increase in comfort and a decrease in costs.

Heat recovery was just one of the approaches that Penoyre and Prasad used at Ashmount Primary School in north London, designed to be carbon neutral. Admirable enough, but this was not the most impressive part of the scheme. That came from the architectural approach that took advantage of a unique site on a former railway line to give city children a school that feels as if it is set in woodland.

There was a packed audience for these inspiring talks and a level of enthusiasm that suggests that, whatever the constraints, we will be seeing more good schools designed by inspiring architects using ingenious products in an intelligent manner. ●

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Luminaires light up Internet of Things

Everything is illuminated: the potential of lighting systems to carry nodes that would monitor and control activity in buildings, from data gathering to adjusting air quality and temperature, could be key to an affordable smart city

Words: Stephen Cousins Photography: Ronald Tilleman

If the Internet of Things (IoT) is poised to transform buildings and cities worldwide with its networks of data-gathering sensors, then digital LED lighting is likely to take centre stage.

In the smart city of the future, intelligent internet protocol-enabled luminaires will give end users and building operators greater control over the environment, using software and smart phone apps to switch lights on/off and dim them, increasing comfort and energy efficiency.

Lighting is everywhere, making it one of the easiest ways to bring the IoT into spaces. Sensors embedded in luminaires could support a whole range of new services: movement sensors can track people to improve surveillance and security, or help retailers optimise their store layouts; sensors in street lights could gather pollution and climate data, or detect free parking spaces, and biometric sensors in classrooms could even be used to track pupils' alertness and shift the light spectrum to improve their focus.

Smart firms are getting partners

Major lighting and tech companies are moving to capitalise on these opportunities and develop software and hardware to ensure the 'Internet of Light' is IoT's most powerful instrument.

Every mega-scale technology company now has a smart lighting for cities division, or significant offering. Philips and LED lighting

manufacturer Cree have both partnered IT giant Cisco to offer Power-over-Ethernet-based (PoE) LED lighting systems for buildings, and in the smart homes space, Osram has teamed up with Google to make its Lightify wirelessly controllable LED bulbs compatible with the Nest home control system.

LED lighting already delivers high energy

savings, but when it is connected to the internet, such as through a wireless or a PoE connection, efficiency is maximised by giving end users greater control to dynamically adjust brightness, on-off patterns, even the colour of each IP-addressable bulb. This demand-based approach runs counter to the traditional top-down way of managing lighting, and other





Above PLP Architects' Edge building in Amsterdam for client Deloitte is, according to Bloomberg, 'The world's smartest building'.

Left The Edge building's 6,500 LED luminaires also act as IT nodes as part of its building-wide system.

LED lighting already delivers high energy savings, but when connected to the internet, efficiency is maximised by giving end users greater control



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PHILIPS



Above Philips POE systems installed at the Edge in Amsterdam.

Right LTG's Smartcast CR Series Troffer offering connectivity and sensors as well as lighting provision in office suspended ceiling layouts.

Below Tridonic's view of how POE LED systems can supply clients and users with a whole range of other data informing energy and space management approach.



systems, via automation and the BMS.

Arup is trialling this concept at its London HQ where six bespoke 'smart desks' have been kitted out with a range of IoT systems, including LED task lights controlled by office workers via smart phones, and heating and cooling triggered by movement sensors.

Where buildings typically include multiple data systems for IT, HVAC, lighting, security, fire, etc. with limited interoperability, here Arup used open standard web protocols and Application Program Interfaces (API) to enable sensing and actuating devices for different systems to be addressable and configurable in a homogeneous way. Ethernet data cables double up as a low voltage DC power source to save on electrical wiring costs and related installation.

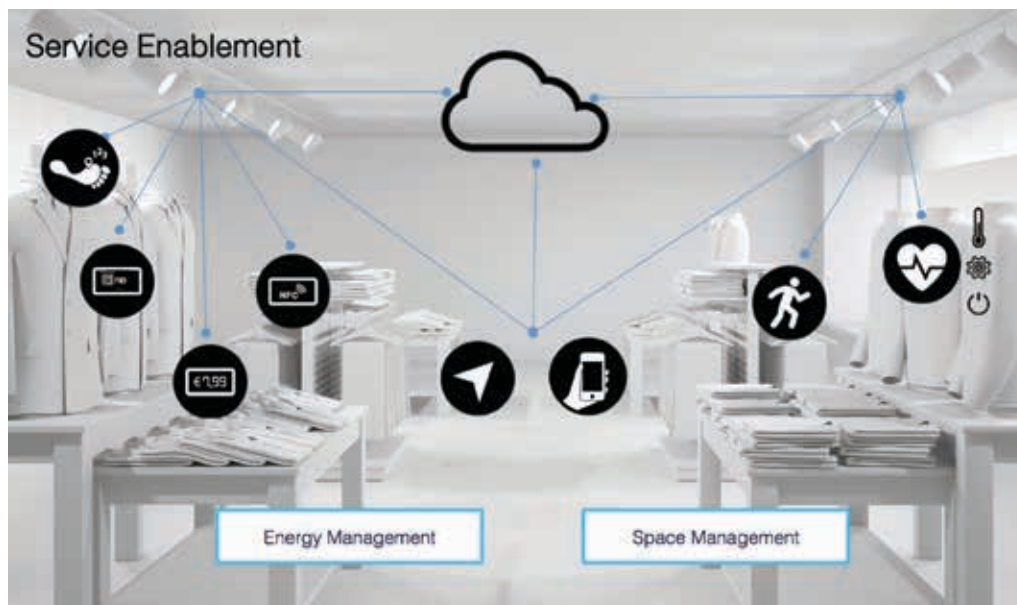
Francesco Anselmo, lighting designer at Arup, and head of the It's All About The Desk project, comments: 'Everything is interconnected in a data-driven environment, and a database logs every single change to the system, so there is no need to procure separate systems for metering, lighting control, sensors etc. Old methods of lighting control can't happen because designers have to consider communication between lighting and other systems.'

People mean lights mean networks

Lighting firms argue that the greatest potential for their products is as a hub to provide IoT networking, power and a range of sensors housed inside LEDs. The logic is simple: wherever there are people, indoors or out, there is artificial light, and luminaires can be configured to house different digital sensors or microchips. Because lights need electricity to run, an integrated power supply is already available.

This concept was implemented at the innovative Edge building in Amsterdam, designed by PLP Architecture in conjunction with Philips, where 6,500 LED luminaires function as nodes in a building-wide IT system.

Each LED incorporates separate sensors for detecting light levels, temperature and motion, and an infrared sensor serves as emergency control in the event of a power failure. The LEDs share data, over PoE cables, on their status and operations with Philips Envision lighting management software. This enables facility managers to track energy consumption



TRIDONIC

and streamline maintenance operations.

The movement sensors give the main tenant, consulting firm Deloitte, real time data on room occupancy, improving its space efficiency by about 20%. It is also expected to save about 10% on cleaning bills by identifying rooms not occupied during the day.

Onno Willemse, business lead for connected lighting at Philips, says: 'We foresee an emerging ecosystem of application providers that will co-develop new values around our lighting infrastructure and leverage data from it for other subsystems in the building. For example, office workers will be able to use a smart phone app to access other building services through a communications network, controlling lighting and temperature.'

Network first

Using lighting as a hub would avoid the cost of having to deploy dedicated infrastructure for different data networks. For example, Bluetooth radio transmitters, used for indoor navigation in stores, hospitals or airports, are typically installed separately to create a network. That would not be necessary if they were pre-installed in luminaires across ceilings.

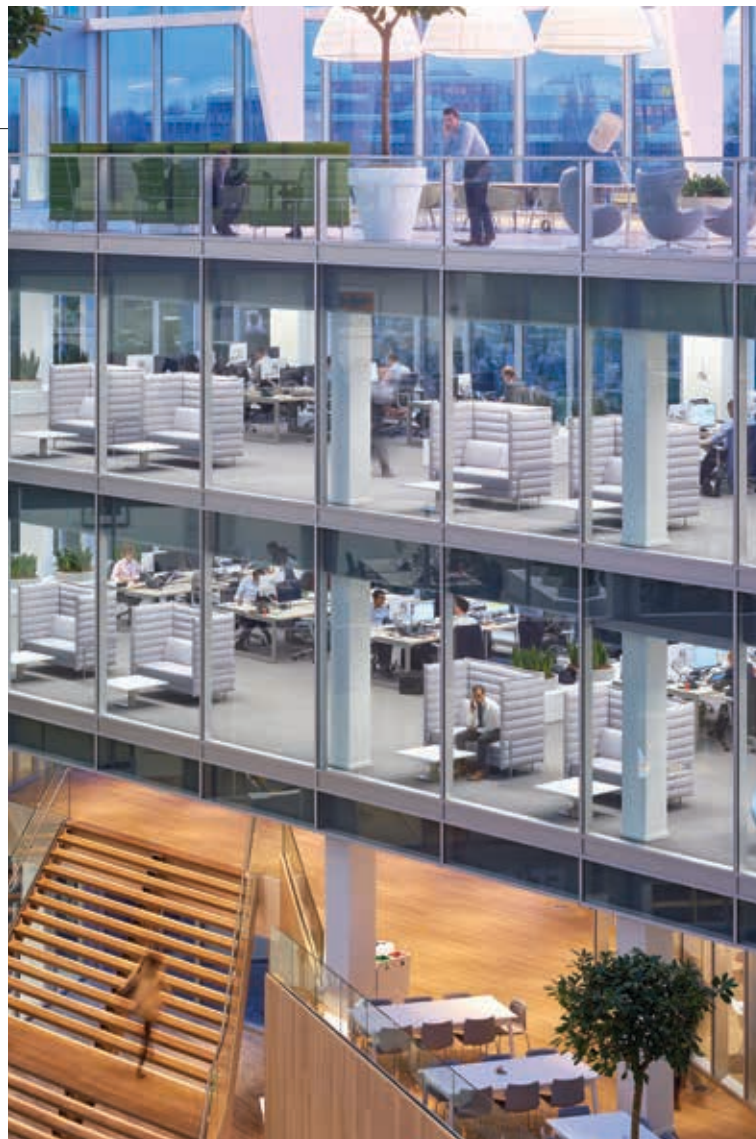
Simon Blazey, head of strategic business development at smart lighting specialist Tridonic, says: 'Deploying sensors is difficult when you also have to deploy the network infrastructure. In the future, luminaire manufacturers will have a range of lights that are customisable to add in connectivity options, such as people-tracking beacons and wireless access points.'

Lighting firms are moving fast to reach the market 'lock-in' achieved by deploying the infrastructure for IoT. Cree, Philips and Tridonic have launched dedicated open protocol software platforms, hooked up to PoE networks, that control LEDs embedded with sensors.

Cree says its SmartCast PoE platform, developed in collaboration with Cisco, cuts out the extra setup step and devices needed in ordinary LED lighting controls, reducing the time and money spent designing, wiring, installing and commissioning lighting projects.

Gary Trott, Cree vice-president of intelligent lighting, says: 'SmartCast PoE provides the technology to make the lights smart and the platform to deploy intelligence across commercial buildings. These buildings have a multiplicity

Right With the new emphasis on IoT systems embedded within lighting systems in buildings, one should not lose sight of lighting's sensory component – bringing mood to different spaces, such as here at The Edge.



RONALD TILLEMANN

of complex systems such as HVAC, plumbing, smoke and fire, security and safety that must respond to dynamic conditions. All are candidates for greater efficiency, control and interaction.'

If smart lighting is to bring the disruptive force of the IoT to everyone, certain obstacles must still be overcome. The absence of a single common networking protocol for the IoT makes it uncertain whether devices and components made by different companies will be able to communicate effectively with each other in the future, potentially putting the brakes on large scale roll outs. And an integrated IoT approach, linking lighting with other building systems, will require a major shift in how buildings services are designed, specified and procured.

Tridonic's Blazey says: 'It is traditionally

quite easy to deploy a lighting system. You buy the lights from a luminaire manufacturer, it installs drivers to enable them to communicate in a standard like DALI, and the contractor knows this requires a five core cable to run through the building. With the IoT there is much more to understand, such as how the lighting will integrate and communicate with other devices and, when procuring for a major scheme, what aspects should be incorporated into which packages. None of this is yet set in stone.'

Tridonic and others are running pilots to determine how different project stakeholders will engage in the design and delivery of IoT systems at scale in buildings. These trials will be vital for the IoT to move from technology buzzword to rapidly expanding market. ●

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Costed

Ruby Galloway, of Gleeds Research & Development, considers lighting costs

Advancements in technology and the introduction of sophisticated components mean lighting has gone beyond its functional purpose of improving visibility. Carefully designed lighting schemes can change the mood of a living room or restaurant and provide a lift to everyday life. Intelligent systems can be used to detect when lighting is required in order to reduce energy consumption and provide safer, more secure access.

Now there is a wide range of luminaires on the market it is important that the requirement,

purpose and primary function of lighting is communicated to the designer or contractor (in the case of D&B) in the early stages of project development. Installation specifications will require co-ordination with various trades and there are a number of key considerations:

- Position of trunking and conduits (note this needs to be identified prior to the first fix);
- Weight and installation requirements in relation to walling and ceiling material;
- Reflection against surface finishes;
- Identification of the potential for overheating

and/or glare; and, importantly

- Capital and operational cost.

Lighting schemes need to address design criteria and meet relevant standards. The design may also need to take account of cost in use and how the energy and carbon emissions can be reduced to comply with European and UK legislation and directives. Lighting should also be analysed for its impact on the environment and nuisance to humans, animals and wildlife. Operational costs are a major factor. ●

Ruby Galloway is associate director at Gleeds

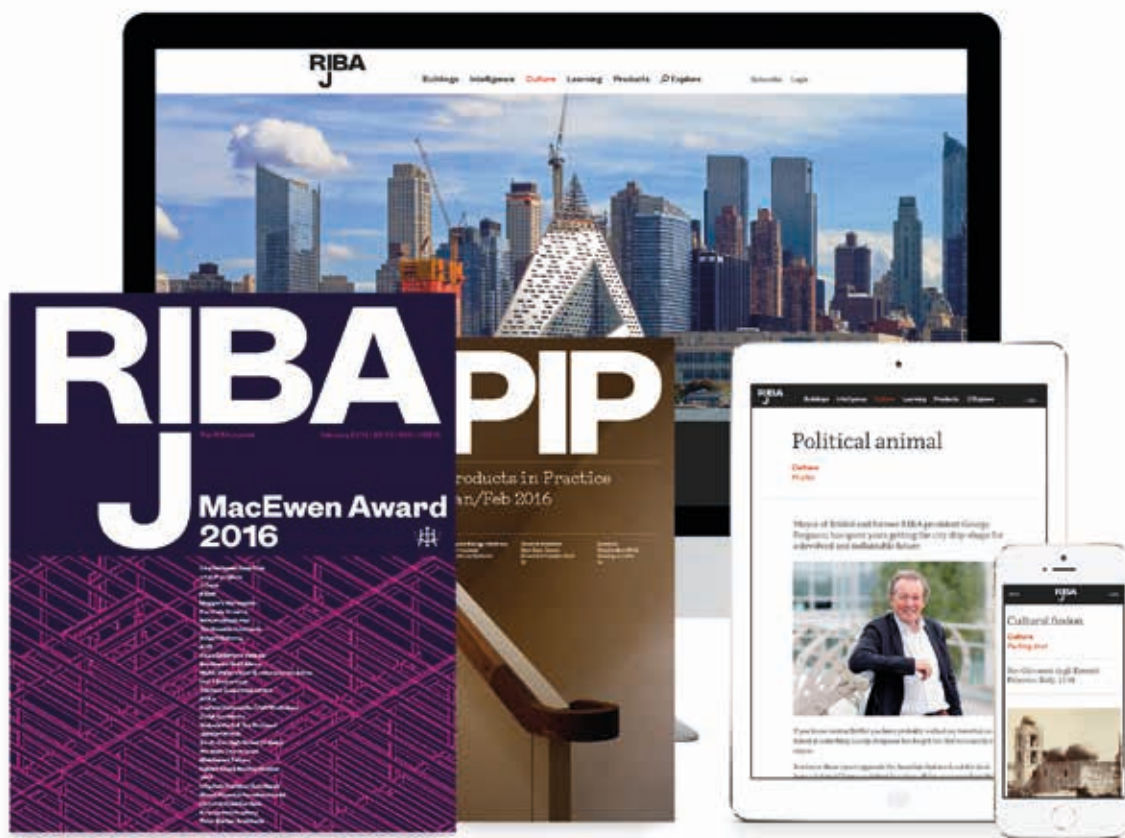
The rates stated below represent a guide to lighting costs and are current as at Q2 2016. No allowance is made for sundry or related preliminaries costs. VAT is excluded.

ALL-IN RATES FOR LIGHTING POINTS	£ PER POINT
Cost for lighting points including rose and wireways in PVC excl luminaires	
Domestic/industrial and commercial properties	£44-£50/£55-67
As above in LSF cable, industrial and commercial properties	£72-£83
Luminaires – fluorescent internal	£ per unit
Batten	
600mm twin, 18W	£28-£39
1200mm single/twin, 36W	£33-£50/£44-£61
1800mm single/twin, 70W	£55-£67/£72-£89
Opal diffuser (surface fixed)	
600mm twin, 18W	£50-£61
1200mm single/twin, 36W	£55-£67/£67-£89
1800mm single/twin, 70W	£72-£83/£83-£100
Surface mounted linear fluorescent; T8 lamp; high frequency control gear; low brightness; 65° cut-off; including wedge style louvre	
600mm twin, 18W	£44-£61
1200mm single/twin, 36W	£44-£67/£67-£78
1800mm single/twin, 70W	£55-£72/£72-£89
Modular lighting; recessed high frequency control gear, low brightness, 65° cut off; wedge style louvre; fitted to exposed T grid suspended ceiling	
600 x 1200mm; 4 x 36W T8 lamps	£111-£139
600 x 600mm; 3 x 14W T5 lamps	£111-£127
Ceiling recessed asymmetric compact fluorescent downlighter; high frequency control gear; TCD lamp in 200mm dia. luminaire; for wall-washing application	
1 x 18W/26W	£222-£255
2 x 18W	£233-£260
Suspended linear fluorescent; T5 lamp; high frequency control gear; low brightness; 650 cut off; 30% uplight, 70% downlight; including wedge style louvre	
1 x 50W	£233-£255
Semi-recessed 'architectural' linear fluorescent; T5 lamp; high frequency control gear; low brightness, delivers direct, ceiling and graduated wall washing illumination	
600 x 600mm; 2 x 24W T8 lamps	£188-£222
600 x 600mm; 4 x 14W T8 lamps	£211-£255
500 x 500mm/600 x 600mm: 2 x 24W	£177-£222

Downlighter, recessed; low voltage; mirror reflector with white /chrome bezel; dimmable transformer, for dichroic lamps	
85mm diameter x 20/50W	£33-£50
118mm diameter x 50W	£44-£61
165mm diameter x 100W	£139-£166
LED lighting	
Typical LED downlight up to 50W	£111-£150
Recessed LED office luminaire 40W	£23-£289
Lighting track	£ per m
25A, steel trunking, low voltage, copper conductors, couplers and supports	
Three circuit/1200mm single	£33-£44/ £44-£67
High/low bay luminaires	£ per point
Compact discharge; aluminium reflector	
150W/250W	£116-£150
400W	£122-£155
Sealed discharge; aluminium reflector	
150W/250W	£277-£333
400W	£349-£404
Flameproof to IIA/IIB, I.P. 64; aluminium body	
600mm single/ 1200mm twin, 18W	£466-£610
1800mm single/twin 70W	£610-£754
Luminaires – external	
Floodlight, enclosed high performance discharge light, reflector, toughened glass	
100W-150W/250W	£144-£222/£260-£321
1500mm circular bollard, vandal resistant with polycarbonate visors	
50W-70W/ 80W	£144-£222/£260-£321
Bollard lighting	
Bollard lighting fitting 26 watt TC-D 3500k including control gear, all internal wiring, connections, earthing and 25m of 2.5 mm² 3-core XLPE/SWA/LSF cable installed ex builder's work	£1,042-£1,164
Outdoor flood lighting	
Wall mounted with tungsten halogen lamp, mounting bracket, wire guard and all internal wiring and containment, fixed to brickwork or concrete and connected	
500W/1000W	£211-£255/£255-£321

More architecture information and inspiration online

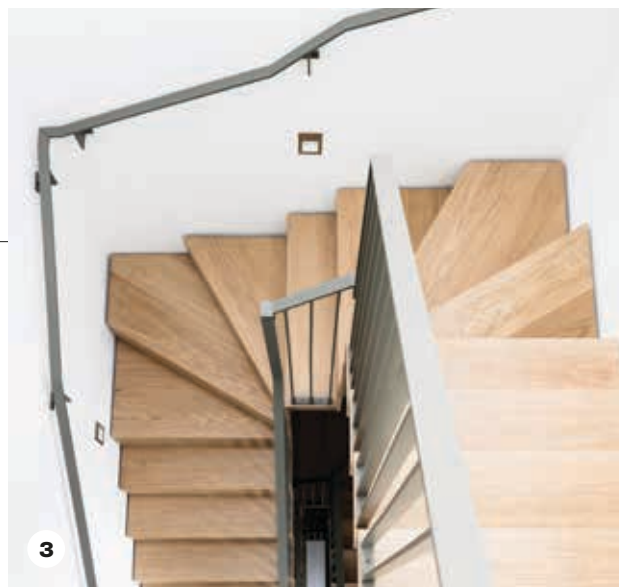
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Specified



1 Beacon Muse LED luminaires Concord

Where would art be without the muse? Would Warhol have lost 15 minutes of fame without Edie Sedgwick? Would Patti Smith ever have ever ridden her Horses without Robert Mapplethorpe's stirrups? Would Francis Bacon have been quite as 'screamy' without the tempestuous George Dyer to rail against? These are considerations one can ponder while wandering the galleries of Compton Verney near Stratford, where 300 of Concord's Beacon Muse LED spots and floods offer more literal and illuminating solutions to far less open-ended questions.

www.concord-lighting.com

2 LED Lighting Ecoled

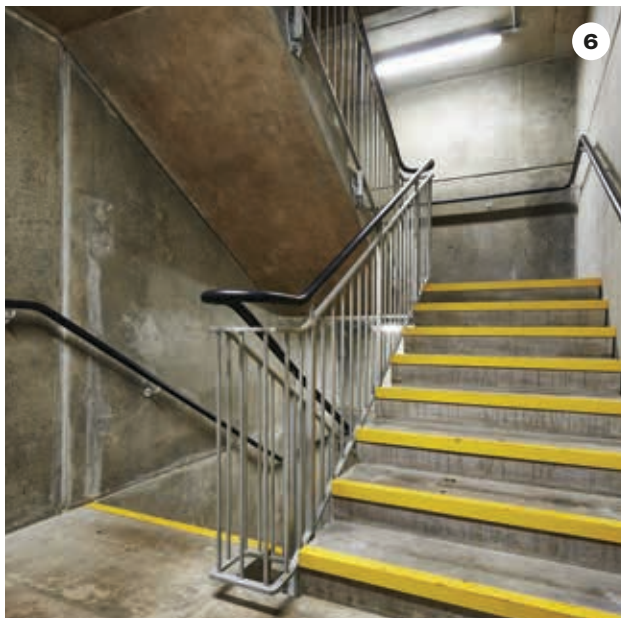
If the Notting Hill set still exists – or ever did – Casa Cruz on Clarendon Road may be an eatery they'd patronise. Would Sam Cam and Dave eat Patagonian lamb ribs (£52), Ushuai king crab ravioli (£37) or potato and black pudding gnocchi (£38)? I thought steak and kidney pie and spotted dick would be more their thing. The former boozier's stunningly revamped interior boasts copper cladding lit with architectural grade S10 Deco Strip LED tape from Ecoled for direct light, with no colour variation to leave any languishing langoustines resplendent in raw and regal red. ecoledlight.co.uk

3 Various lighting Astro

We like to think the sawtooth roofline of this housing in Rye represents the heart rate of Rother District Council when they first saw the plans. However, tasteful timber seems to have averted cardiac arrest over the Cinque Ports Street scheme which has eight apartments plus a studio and a detached house, and two commercial units – and it won a RIBA regional award. Astro lights were specified throughout, including Terra uplights in external paving and Porto Plus external wall lights, with Joel wall lights and pendants inside. astrolighting.com

4 Lighting system Ridi

My school library certainly didn't have any knock-off LC2 Corbusier chairs – it was wipe-clean Pleather and lump it. But props to the girls of Invicta Grammar School in Maidstone, who get not only these clubbable cubes, but also a specially designed lighting system from Ridi and Spectral, including LEDs, sensors, direct lighting, indirect lighting and 'micro-prismatic diffusers' – no sniggering at the back there in Physics II! But I can't see how all this fits a school library's main purpose – a place for nerds to hide from the bullies behind a shakily held Daily Telegraph. ridi.co.uk



5
Customisable luminaire
Aura

Could I call 'journalist's discount' on these Exzite pendants from Aura? I can pretend to be cool about the LED fittings and make a weak joke about 'raising the bar,' but I'd love one of these Keith Haring-meets-Donald Judd-by-way-of-Richard-Serra-and-Dan-Flavin beauties over the kitchen table. I can't even get a handle on my comparators. I know it's slightly vulgar, but I can't eschew po-mo. Designer Joachim Engstrand has created this trendy light bar, each part of which is interchangeable, even the LEDs, sides and end-panels for a luminaire that can change with fashion.

auralight.com

6
Leeds University Car Park
Tridonic

JG Ballard, up in Leeds looking for a suitable setting for his dark dystopian class warfare yarn *High Rise*, might have to move swiftly along now Southgate Lighting has lit Leeds University's 10-storey carpark up like a Christmas tree. Instead of traditional T5 fittings, they chose an LED option using Tridonic drivers, yielding real energy savings. While it'll take a lot longer for crazed thug Richard Wilder to smash out all of its 900 luminaires in a booze and barbiturates fuelled frenzy – spoiler alert! – that'll only delay what finally happens to the dog.

tridonic.com



7
Infinito Light
Davide Groppi

What with the Large Hadron Collider, Higgs Boson and Quantum physics, there's been a lot of musing on infinity of late. One American scientist has even been trapping her tears between a pair of slides and zapping them to kingdom come under an electron microscope to look for possible 'happy' and 'sad' patterns in their unique teary x-rays. In its own interpretation of string theory, Davide Groppi has just launched its extendable minimalist Infinito luminaire which cuts a thin line of light through the dark space and makes us, at least, feel a little bit happier.

davidegroppi.com



8
Chandelier
Kolarz

This is the Cloud from Austrian company Kolarz. I'd say anyone would be delighted to have this contemporary chandelier embellishing their ceiling vault. They could even make a home on it, if it were high enough. Maybe it's cloud one, or eight – but what happened to the rest of them? Did they evaporate? Maybe 17th century meteorologist Luke Howard needs to be told. This sculptural, Italian one that got away is made of Swarovski crystals, hand-blown Murano glass, 24-carat gold and chrome or silver plating. It looks like it'll be hanging around for a while.

kolarz-uk.com



Glazing's light touch on a listed building

Fineline Aluminium overcame numerous challenges to help create a light, modern upgrade to a listed building in Greenwich

Photographs: Matt Cant

Fineline Aluminium was approached by the architect Duncan O'Kelly Partnership in late 2014 to provide glazing for the planned upgrade of a listed building in Woolwich, south east London. Following initial design discussions it was proposed to use the System 22 slimline sliding doors and fixed glazing. With openings of 10m wide and 2.9m high, level thresholds for ease of access to the raised patio area were an essential requirement for the design.

A need to minimise the depths of the tracks meant the openings had to be restricted to two tracks. A sequence of fixed and sliding panels achieved this while still allowing ease of access to the outside. The further challenge of incorporating a new single storey extension to the original Guardhouse was solved with a set of bi-parting doors that were offset at an angle of 126° to allow seamless movement in terms of both design and access. The end return is fixed

glazing with glass to glass joints and corners complemented with a raked head detail. To complete the extension, 14m of fixed celestial glazing designed to wrap around the building's various acute angles was installed. The final need was for all glazing tracks and frames to be concealed within the structure, and the design for the new extension glazing was complete.

In addition to the complete renovation, the listed building required a new bar with a small,

Design and installation issues were only overcome owing to the good working relationship with both contractor Phelans and the project manager, PSE Associates

intimate dining area and courtyard. System 22 bi-parting doors with their discreet, minimal frames give access to the small courtyard. Additional natural light was needed in this area so Fineline's Skyline lantern rooflight with 40mm frames was used to great effect, along with solar control glass to ensure an overall U-value of 1.4, and stainless steel handles complementing the dark grey frames. Finally, 26m of external glass balustrade, which incorporated a glass door for access, was proposed to complete the design concept for Duncan O'Kelly.

Planning and listed building approval was granted in April 2015 for the design and change of use to restaurant and public house, to be operated by Geronimo Inns.

The site, located within a new development in Woolwich, had limited access and offloading glass was one of the many challenges offered to contractor Phelans. Units weighing more than 270kg had to be moved over 100m from offload to site location. In such circumstances, design and installation issues were only overcome owing to Fineline's good working relationship with both Phelans and the project manager, PSE Associates.

Fineline offers initial and ongoing design assistance. Working closely with architects, contractors and project managers, it aims to complete projects in a professional manner. With this approach, its project managers and fitting team build good relationships with all parties, allowing this project and many more to move forward to a timely completion. ●



Above This intimate dining area within the original building has bi-parting doors accessing the outside, with the rooflight offering natural daylight.

Top The clean lines of the System 22 doors, with glass to glass corners and fixings, hidden head track, level threshold and off-set bi-parting door.

Right The Skyline Lantern rooflight, with 40mm sightlines and an integral gutter.

Opposite left Discreetly detailed sliding doors give level access to the restaurant and patio areas. The external area is surrounded by a frameless glass balustrade and glass door for access to the stairs and garden.



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RSHP HQ, Leadenhall Street

Rogers Stirk Harbour & Partners' new home is a long way from its old riverside haunt, in more ways than one, but the spirit remains the same

Words: Jan-Carlos Kucharek Main photograph: Paul Raftery

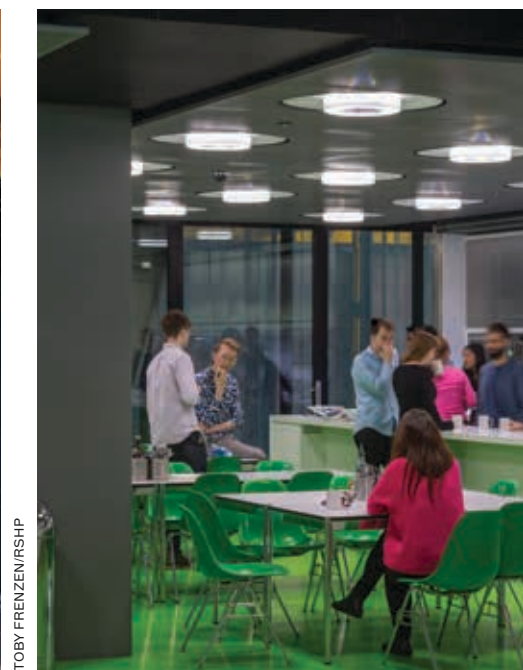
For a firm like RSHP, whose ethos over 30 years seemed in part defined by the genius loci of its west London riverside location, you have to wonder how traumatic the move from the banks of the Thames to Bank station could have been. Lord Rogers of Riverside's status as a peer is, after all, predicated on the office's former location and his wife Ruth made her name and a gastronomic brand from it. What's the chance of your creative potency drying up once you move away from the river?

It's all up in the air now, literally, since RSHP moved to the 14th floor of its own Leadenhall

Building, unable to secure a lease extension on the old place and lured by a preferential one from British Land, sensitive to changes afoot in the City where hedge fund managers seem to be moving to the West End and creative start-ups are crossing over from Shoreditch to the Square Mile. You might see them all come and go looking west over the dome of St Paul's, and there's still a view of the river, albeit a distant one; while Rogers' own masterly response to another genius loci, his Lloyd's Building, lies opposite.

It was a given that RSHP was going to leave its own imprimatur on The Cheese Grater, a

Changes are afoot in the City – hedge fund managers seem to be moving to the West End and creative start-ups are crossing over from Shoreditch to the Square Mile



TOBY FRENZEN/RSHP

building that was originally designed, with its shell and core, for more conservative financial services tenants. The brief for the 1,620m² floor plate, fitted out over 16 weeks for the firm's 200 staff at a cost of £2.3M, was that it retain the best of the former HQ, dispense with its flaws, progress the flexible aesthetic and future-proof it.

The three-building, multi-level domesticity of Thames Wharf is swapped for a tabula rasa of single storey working; the office now split in a tripartite way by its corner breakout spaces. Desks to the east, west and south radiate out from the central meeting space, accessed via the reception off the north core: three fluid and connected colleges of industry around the office's new beating heart.

The signature fluorescent carpet reappears (in green rather than blue), but the suspended ceilings don't; after all, why have 2.75m ceiling heights when you can have 3.7m? It's interesting to look up, however, and see the air handling units, ducts and pipework, in the past celebrated with primary colours, then encased in high

tech stainless steel, now shrouded in a thick layer of black nitrile rubber. Hugging the precast concrete floor slabs, neatly cosseted in its thermal and acoustic absorbent layer, the firm insists this is still a functional expression of the services – just their most nuanced version.

Still at ceiling level, the firm worked with Spectral Lighting on bespoke circular LED light fittings running in regimented lines, directly mounted on the cable trays. But there's room for insubordination; track-mounted task lighting can be inserted anywhere along the runs, actuated by your mobile phone – one of the things supposedly offering what RSHP calls 'a surprising level of humanity within a great super-studio space'.

As above, so below. The flexibility evident in the ceiling void is reflected at task level where, once your eyes make it past the chromatic office seating, you see the results of the firm's collaboration with Dutch furniture maker Ahrend which created desks up to 12m long, with spine, supported on only four legs. The white Trespa

Above left Axial view from the corner breakout space back into the depth of the office.

Above centre The level 14 lift lobby almost doesn't need a sign to announce the brand.

Above The kitchen is the social hub of the new office.

surfaces have central flaps that open for workspace technology and phones; when the CITRIX system is up and running, they should be able to pivot closed permanently. The brief was that in 'meeting' mode a sheet of paper should glide effortlessly over them; an uninterrupted surface – perhaps expediting the passage of the form of appointment from the architect to the hand of the client. But as the practice's sleek new HQ exemplifies, from the detail, to the building, to the context; in the competitive world of the mega-project designer, every little helps. ●

Specified



1
Porcelain tiles
Rombini by Domus

If you like to put on Spotify, move the coffee table and throw some shapes when no one's watching, then maybe this tile collection is for you. French design bros, Ronan & Erwan Bouroullec, have magicked up the maths and conjured squares, triangles and diamonds – flat and ridged in a variety of permutations – to produce a funky new range. The standout is 'Triangle,' moulded in a corrugated 3D effect which creates light and shadow with alternating ridges and grooves. Come to think of it, use as a dance floor is probably not recommended, actually.

domusgroup.com



2
Kitchens
Marchi Cucine

Do you have a grumpy cook at home? The type that won't let you talk to them if they are julienning carrots or making a cranberry jus? They'd look right at home in this moody, dark grey Italian 'Art Fashion Beauty' kitchen: grouchy steel, testy recycled wood and bad-tempered cement. The industrial aesthetic of the Brera 76 celebrates loft living and is the result of the firm's 40 years of production. It will also make any budding Masterchef semi-finalist who relishes making a three-course meal for 150 sailors aboard a Type II frigate feel right at home.

marchicucine.com



3
Floor and wall tiles
Reed Harris

Mary Beard would probably traipse over these Roma Statuario and Roma Imperiale tiles in her blingy lamé pumps seeking telling Latin inscriptions from long-dead citizens. (She's the only person on telly who carries a shoulder bag even though there's a whole team of people employed to satisfy her every whim on set. And what's in it anyway?) Whether she'd be able to evince some of her wry-but-learned enthusiasm about how the tiles, which come in four colourways, can be arranged in a herringbone pattern, is harder to say; but they're way better than Watling Street to walk on.

reedharris.co.uk



4
Shower system
Methven

Where gentrification happens inside the home, it is done by accessory; very little is safe from being zhushed up these days. In this narrative, Methven's system doesn't disappoint, bringing what it calls the 'science of showering' to bear on a product that has not one but two heads. The Aio overhead shower is 70% larger than a normal unit, with a unique 'halo' design, while the handset (bit of terminology for you, there) gives a more directed spray. You've got the rays, now all you need is a soap dish dispensing suds from a bust of Bernini's Ecstasy of St Teresa and you're in heaven.

methven.com



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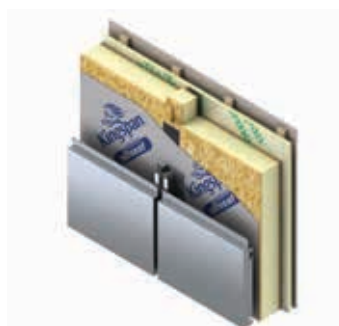
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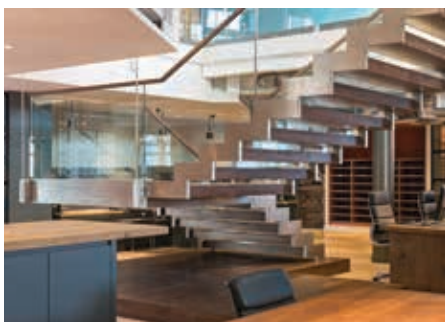
Stirring, but unshaken Ancon

Acting on intelligence in the field, fixing specialist Ancon has launched a new super-Bond, ultra-low thermal conductivity wall tie that even SPECTRE would find hard to crack. Based on the company's multi-award winning TeploTie, with a conductivity of 00.7W/mK, the Teplo-BF basalt fibre wall tie has specially moulded safety ends that improve buildability and boost mortar bond strength by up to 80%. www.ancon.co.uk



A route to outstanding returns Kingspan TEK

A new study from Sweett Group, 'Real Value of Space', has demonstrated that by specifying the Kingspan TEK cladding panel over traditional steel frame wall systems, it is possible to reduce wall thicknesses and increase usable space in commercial properties. The report shows that this can lead to a return on investment of over 1000% on the cost of the panels. www.kingspantek.co.uk



Bespoke stair for award winner CANAL Architectural

CANAL Architectural's minimalist staircase is part of an award winning commercial office in London. The staircase has solid walnut treads installed between stainless steel, zig-zag stringers, while low iron, laminated glass balustrade panels dress the rest of the staircase and first floor. Soft lighting flows through the clear balustrade to create a spacious-feeling office. www.canal.eu.com



Profile of Illumination Schlüter Systems

The latest innovation from Schlüter-Systems, Schlüter®-LIPRO-TEC, adds a fourth dimension to architecture and plays an essential role when it comes to inspired design. Schlüter®-LIPROTEC is an intelligent lighting concept that combines lighting and profiles within the tile and stone covering. Email: sales@schluter.co.uk Tel: +44 (01530) 813396 www.liprotec.co.uk



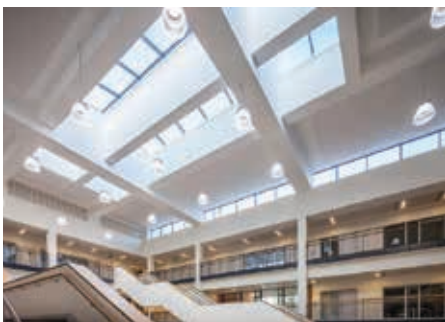
Flooring beauty for skincare store Polyflor

Luxury vinyl tiles from Polyflor's design-led Expona Commercial range have been installed to create a sleek, modern look for innovative skincare brand GENEUE Ltd's flagship store on New Bond Street, London. Hard wearing Commercial luxury vinyl tiles in the exposed concrete design were used. The Commercial range comes in 55 stunning wood, stone and effects/design options. www.polyflor.com



Help in the quest for zero bills A Proctor

Wrapitite-SA airtight membrane has been selected by the Zero Bills Home Company and RIBA award winning development pioneer ZEDfactory in their latest zero carbon housing initiative. Wrapitite-SA, the only self-adhering vapour permeable air barrier certified by the BBA, was installed as part of the OSB panel construction of the home on the BRE Innovation Park in Watford. www.proctorgroup.com/air-barriers



SAPA's high school standards SAPA

When Associated Architects was designing the University of Birmingham School, attention was paid to using the highest quality materials. As the world's leading independent producer of aluminium profiles, Sapa Building Systems met these demands cost effectively, with its Dualframe Si Casement windows, Elegance 52ST curtain walling and STII commercial doors specified throughout www.sapabuildingsystems.co.uk



Hi-Finity gets even better Reynaers

Leading provider of aluminium architectural glazing systems Reynaers has further enhanced its highly successful slimline sliding door Hi-Finity. The new features increase the glass surface, with maximum transparency and minimal sight lines. There can now be fixed panels of glass up to 1200kg and motorised vents up to 750kg, and even larger triple glass units where thermal performance is key. www.reynaers.co.uk



TBA rebrands for the future TBA Textiles

TBA Textiles, the globally renowned manufacturer of high performance and heat resistant textiles, has rebranded and unveiled its new look as TBA Protective Technologies. Over the past 140 years, the Rochdale based company has led its field, making high performance, heat resistant products for the toughest applications. The new name encapsulates this history and points to more pioneering R&D. www.tba-pt.com



Flooring makes the grade Polyflor

High performance flooring from Polyflor, the UK's commercial and residential vinyl flooring specialist, has been installed at The City of London Academy secondary school in Southwark, London. Around 2000m² of Classic Mystique PUR sheet vinyl flooring in the cool blue Mountain Lake shade was laid. The hardwearing, homogeneous flooring is ideal for high traffic school environments. www.polyflor.com



Wholesaler chooses Abloy Optima Abloy

Security expert Abloy UK has supplied its standalone access control system Optima to Secure Access Technologies to upgrade the security system in its offices. The firm wanted a wireless system; Abloy Optima is an electronic handle set or escutcheon that provides a standalone single door control, operating as an electronic master keying system, making it simple to program and easy to use.

www.abloy.co.uk



Gerflor gets in the swim of things Gerflor

Lochee Swim and Sports Centre in Dundee has re-opened to the public after a £1m upgrade. For the flooring specialist Gerflor stepped in with a variety of solutions to improve quality and performance. The refurbishment saw Gerflor's highly successful slip resistant Tarasafe™ Ultra H₂O chosen for the changing rooms, with the main reception area benefiting from the firm's Taralay Premium Compact.

www.gerflor.co.uk



Airtight solution at Shanghai Expo A Proctor

Wraptite-SA airtight membrane has been selected by RIBA award winning development pioneer ZEDfactory in an innovative solution to deliver zero carbon housing to China. The ZED Pod home has been built as part of the Shanghai Art & Design Exhibition. Wraptite-SA, self-adhering vapour permeable air barrier was installed as part of the panel construction to the home.

www.proctorgroup.com/air-barriers



Bauder recharges Byker Wall Bauder

In the £26m refurbishment of Newcastle's grade II listed Byker residential estate, all the roof's original waterproofing was replaced with 4,500m² of Bauder's top quality reinforced bitumen system, BTRS. This has a life expectancy in excess of 40 years, and included a highly efficient 120mm PIR insulation to achieve the required U-value and satisfy building regulations.

www.bauder.co.uk



Four ways to pleasing brick soffits Ancon

A new eight-page brochure and online animation from brick support specialist Ancon show just how simple it is to create suspended masonry soffits on virtually any brick building, regardless of soffit dimensions, brick type or bond pattern. Deep brick-faced reveals and soffits add extra depth to a building facade, maintaining the colour and texture of the main brick facade.

www.ancon.co.uk/nexus



Armstrong's new recycling record Armstrong

A rapidly expanding network of Green Omegas (specialist sub-contractors with equally specialist recycling expertise) has helped Armstrong Ceilings break its recycling records for the second year running. The manufacturer recycled 142,000m² last year while nine of its 136-strong Omega network of approved installers qualified as Green Omegas. That 142,000m² equates to 495 tonnes.

www.armstrong-ceilings.co.uk



Top score for cricket pavilion Hunter Douglas

Oundle School's new J.M. Mills Pavilion features a striking bespoke ceiling from leading architectural products manufacturer Hunter Douglas. The award-winning building features 200m² of Hunter Douglas suspended ceiling panels, which create a show-piece ceiling in the main area. The firm used its Prestige FR MDF 16mm concealed grid panels to provide superior sound absorption.

www.hunterdouglas.co.uk



Gradus launches first BIM objects Gradus

Designed to meet with increasing pressure for specifiers and contractors to work with BIM building practices, Gradus has launched BIM objects for the majority of its InPro wall protection range. These are the firm's first BIM objects and include the Sanparrel sheet, rubrails, kickplates, pushplates, handrails, combi-rails, Dual Rail, wall guards, wall strips; corner guards and bed protectors.

bimstore.co.uk/manufacturers/gradus



Granite flows round Uni's Curve Hardscape

Landscaping materials specialist Hardscape designed and supplied paving and walling for the 10,000m² area around Teesside University new-build, The Curve. Royal White granite was selected as a light silver stone, while a bogan sett pattern in Magma blended granite created warmth and interest. Contemporary finishes included 3m high granite totem poles, etched with the university logo

www.hardscape.co.uk



Nature-inspired homes' oak floors Kährs

Kährs Oak Essex has been specified throughout an award-nominated new-build development in Cambridgeshire by Hatch Properties. Exclusive Wansford Marina consists of six detached properties with their own private moorings. Kährs rustic-contemporary wood floor design was chosen to reflect the homes' nature-inspired interiors and countryside setting.

www.kahrs.com



The purist approach The Rooflight Company

Specifying a roof window is a one-time decision for the envelope of a building. When working on heritage or listed buildings, the original Conservation Rooflight® has the most authentic design. The Nicholas Dean Practice specified 20 bespoke Conservation Rooflights® for Week Farm in Devon in sizes measuring up to 1m wide by 4m in length.

#GOLARGE discreetly
www.therooflightcompany.co.uk



Oak floor keeps school moving Junckers

The multi award-winning Lairdsland Primary School designed by Walters & Cohen Architects is a contemporary building which features over 600m² of Junckers solid oak flooring. It is an impressive addition to the locale with double height glazing and open plan spaces. Junckers' solid hardwood floors are hardwearing and easy to care for, adding an elegant backdrop to the interior.

www.junckers.co.uk



Support from CPD packages Crown Paints

As a trusted partner for the specification sector Crown Paints offers a range of services. Included are CPD modules, developed to offer a broad brush overview across subjects including safety, the environment, colour and aesthetics. The most recent CPD module in the series focuses on sustainability and builds on the UK paint manufacturer's expertise, reflected in its award-winning Earthbalance® programme.

www.crownpaintspec.co.uk



Swimming with privacy in the light Structura

This new swimming pool at Immingham and the earlier Oasis Academy nearby are great examples of how the Kalwall® translucent daylighting system is used for leisure and sport activities. Unlike conventional glazing, highly insulating Kalwall eliminates the stark contrasts of light and shade, diffusing natural daylight to create an ideal exercising environment without the need for blinds or solar control.

www.structura-uk.com/kalwall



Geze tops Waitrose shopping list GEZE

Geze UK's elegant, integrated solutions have been fitted at Waitrose's flagship store in Chester. Six sets of expansive glass sliding doors have been positioned on the upper and lower floors to provide convenient access and enhance sustainability through creating two atriums. Each main entrance features a pair of bi-parting automatic sliding glass doors powered by GEZE's Slimdrive SL NT drives.

www.geze.co.uk



Thermal break technology Comar

Comar has incorporated technology from its Comar 9Pi system into the Comar 5Pi window range to launch the Comar 5Pi Advanced Casement and Tilt/Turn window system which integrates seamlessly into Comar 9Pi creating the option for standalone high performance windows. The brief was to match architectural demands including low U-values and matching slim sight lines for both systems.

www.comar-alu.co.uk



Traditional looks, innovative fix Marley Eternit

Breakthrough innovation and a traditional aesthetic have produced the easy-to-fix Lincoln clay pantile from Marley Eternit. Lincoln features a classic s-curve profile and thin leading edge, and is easier and faster to install than traditional pantiles. It can be used to a low minimum roof pitch of just 17.5°, giving great versatility on a wide range of projects where a traditional pantile appearance is required.

www.marleyeternit.co.uk



Painting a sustainable picture Crown Paints

Crown Trade has reinforced its industry-leading sustainability credentials, introducing Environmental Product Declarations. Four premium coatings now hold verified EPD certificates, in compliance with the European Standard EN 15804. These include the firm's Fastflow system, which was introduced last year and has already built a strong reputation in the specification sector.

www.crowntrade.co.uk



It's small but it packs a punch GEZE

GEZE's new sliding door system is a real David and Goliath affair. The Levolan 120 belies its modest appearance – the slimline fitting can effortlessly move internal doors of up to 120kg. With straight lines and modular composition, it's a highly adaptable system. Its sleek track, which is only 50mm high, includes integrated derailing protection and can be conveniently installed from the front.

www.geze.co.uk



Facade and roof are on the tiles Marley

A zero carbon home in Belgium has been clad entirely in Marley Eternit clay plain tiles to give character to the minimalist design and meet a planning demand for a brick look, while offering a long lasting, high performance technical solution. The facade of Hawkins and Acme single camber plain tiles forms part of the lightweight thin wall construction, adding thermal properties and maximising internal space.

www.marleyeternit.co.uk



Intelligent flushing control Thomas Dudley

Thomas Dudley has launched Kinetic® – an intelligent water-saving 'all-in-one' electronic urinal control, offering quick and easy installation. Kinetic® is stylish and suitable for any washroom, and can be installed on pipework, wall or ceiling. The contemporary urinal flushing valve has been designed to save up to 80% of water in comparison with traditional petcock and automatic cistern installations. dudleybathroomproducts.co.uk



New Forest's Cor-ten clad scheme APL

The AP45HR-R roof profile on the Mottisfont Abbey development in the New Forest was rollformed by Architectural Profiles Limited, well known for its creative thinking when faced with a challenging specification. Both the roof and walls are produced in Cor-ten faced steel. Its colour will mature, changing from a silver-grey to a warm rustic brown that blends in perfectly with its surroundings. www.archprof.co.uk



On of a kind changing rooms Washroom Washroom

Designer and manufacturer Washroom Washroom has created a unique changing area at a new luxury central London health club, Third Space. A stand-out feature is the bespoke diamond pattern design on Washroom's Luminoso glass shower cubicles. Using materials including copper and Ted Todd end grain feature wood panels, grooming shelves are manufactured from Zodiac stone. www.washroom.co.uk



A roaring success at London Zoo Tilemaster

Tilemaster Adhesives' preparation and fixing products have been specified for a ceramic mural at ZSL London Zoo's new enclosure, Land of the Lions. The installation includes 1,024 individually printed tiles – created using patented Tiled Space technology – which form a visual on a curved brick wall. The ceramic surface spans over 23.5m² and was fixed using Tilemaster's Prime + Grip, Ultimate Grey and Grout 3000. www.tilemasteradhesives.co.uk



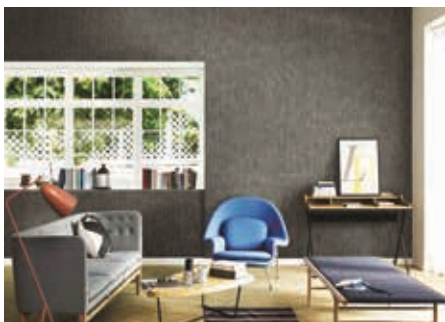
Inspired interiors with XyloCleaf James Latham

Available exclusively through James Latham, XyloCleaf is an innovative, highly textured range of decors which includes a variety of wood grains, linens and other materials. With over 60 colours and patterns in MFC and more than 20 in HPL laminate, the collection is suited to high-end premium design schemes in the commercial or residential sectors and is perfect for furniture, fixtures and wall panelling. www.lathamtimber.co.uk



Sign of Perfection Compac

Unique Calacatta from COMPAC is a stunning pure white quartz work surface featuring powerful grey veins characteristic of marble. The natural hardness of quartz comes with a waterproof, hygienic finish offering even greater resistance, and long term high performance. This makes Unique Calacatta ideal for intensive use areas such as kitchen and bathroom surfaces, floor tiling or wall cladding. www.compac.es



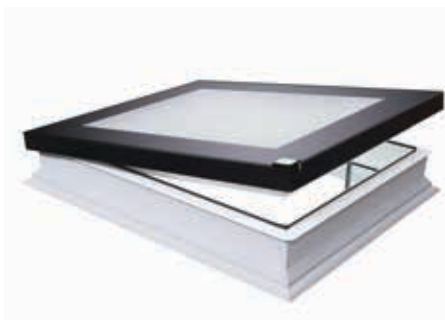
Flexible, decorative, interior film David Clouting

Interior Film from David Clouting is a CE certified self-adhesive, decorative film manufactured by LG Hausys that can be applied to almost any room surface including wood, metal, plaster board, plastics and melamine. With excellent flexibility and adhesion, it gives the perfect finish. Available in a range of innovative designs, it is IMO/MED certified for use in the marine sector. View on BIMSTORE. www.davidclouting.co.uk



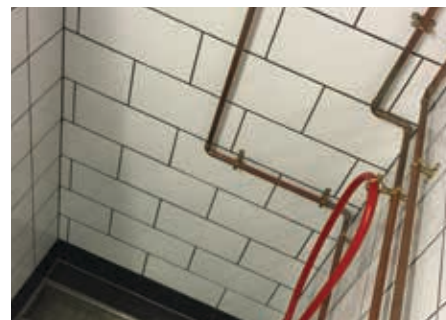
New range of PRIMO cubicles Kemmlit

Kemmlit's new generation of cubicles – PRIMO Kn – has smooth-surfaced doors and walls made of 42 mm thick composite elements with internal aluminium frames for maximum torsion resistance and longevity. A protective surface layer increases scratch and abrasion resistance making it suitable for dry or wet areas. Available in a number of design options, PRIMO Kn is supported by a range of accessories. www.kemmlituk.com



FAKRO wins coveted Red Dot FAKRO

FAKRO has been awarded a 2016 Red Dot Design Award for its DEF DU6 flat roof window. The award, given since 1955 by Design Zentrum of Essen and sometimes considered the Oscars of industrial design, reflects FAKRO's long track record of innovation. The DEF epitomises the latest in contemporary design, with high performance glazing unit, thermal performance and advanced automatic control. www.fakro.co.uk



Drains for trainers, London style Component Developments

1Rebel is an ultra stylish gym in the City. Component Developments was approached to supply drainage channels to both the ground floor and lower ground floor showering areas, keeping in line with the industrial design theme. Four stainless steel channel drains on the ground and lower ground floors, each 180mm wide with a 75mm invert, support 1Rebel's balance of beauty and function. www.componentdevelopments.com

Sign Up

Mike Oades, founding partner at Atomik Architecture, gives us three of his specification favourites



FELT

Working in Kazakhstan for the past two years we have become increasingly interested in felted wool, which has been used on the Steppe for thousands of years. Industrial manufacturing techniques developed in the 19th century mean the material still plays an important role in industry and society. We have been prototyping felt cladding panels using a 6mm thick medium dense natural undyed felt for a pavilion. This renewable material, if carefully detailed, provides a soft yet robust finish and aesthetic. These are buildings you can hug, but they also repel snakes and scorpions.



DOWN DUVETS

We stumbled across the use of architectural duvets while collaborating with performance artist Alice Theobald. Our co-authored work required a cladding element and we wanted to use natural materials with a modular component. The duvets create an uncanny environment, domestic and intimate yet uncomfortable. The light and acoustic transmission cushion the internal spaces from the outside world like an opiate. We have clad the back of our Vitsoe shelving in the studio with one of the duvets. No visitor asks why it is there – perhaps they just assume we sleep there.



PLASTIC CLIPS AND CABLE TIES

Plastic clips and cable ties are some of our favourite components. We are interested in being able to break down building elements into their constituent parts to enable replacement, reuse and repurposing. There is poetic simplicity in a cable tie – one material and one process. It is the quintessential atomic component in the true meaning of the word. We have also been experimenting with glass-fibre reinforced Nylon 6 clips. These come as a three-part injection moulded element, which the user assembles to create a clip for attaching sheet materials to cables. Its grip tightens as the tension increases, but it separates effortlessly for reuse.

...Sign Off

Jan-Carlos Kucharek enjoys three of this issue's out-takes



PLUMB LINE

'The moving finger writes; and having writ, moves on...' Omar Khayyam's words have inspired generations of writers and artists to make their mark – though architects did it with better pens! Not for He the humble pencil; no crisp delineation should be marred by a blunted nib, and so we got the clutch pencil. Even this is destined to fade in the shadow of Mario Botta's Fixpencil by Caran d'Ache. See how the maestro's lifelong fascination with platonic solids are played out in forms of the pencil and case. And its monochromatic geometry: as timeless and sure as the columns of Orvieto's Duomo that guide the eye to Fra Angelico's gaudy daubs...



DORMA IN A TEA CUP

PIP nearly dropped its Sports Direct mug when this popped into its inbox. Celebrating 90 years since the first performance of Turandot at Milan's La Scala, Verona Opera Festival has asked film-maker Franco Zeffirelli to direct its version of Puccini's work. To mark the stage set's Oberammergau-like proportions, the venue's shop will sell the whole thing squeezed onto a teeny espresso cup and saucer. You might not recognise the show's now gnat-sized leading lady, though the glinting gold rim might compensate; but using what looks like digital transfer techniques, a Renaissance fresco it ain't. If Puccini isn't having a caffeine frenzy over this, he sure should be.



BOULLÉE-INN

I mean, who associates an opera with a cup? Oops – who's flying into Leicester City stadium to help hand over the Premier League Cup? World-class tenor Andrea Bocelli, singing Turandot's Nessun Dorma, loosely meaning 'none shall sleep'. They'll be hoping that's not the case here at Man U's new Hotel Football at Old Trafford. Though getting a good night's sleep seems no more likely after their failure to qualify for the Champions League; the UEFA cup means just as many revelries next season from noisy foreign fans. Shame the Gallic influence didn't impact the design. I'm thinking Etienne Louis' Newton Cenotaph and why it's not all shaped like a bloomin' ball.

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Flat is back

Dan
Development Chemist

Cutting edge performance.

Developed and rigorously tested over 18 months, our new flat roofing range offers solutions with cutting edge thinness and thermal performance. You can thank Dan and our product development team for that. Plus, like all Celotex products, they come with online tools, support and aftercare.

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