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# Planning your home's doors & windows



**M**any people's urge to self build or renovate starts with the glazing: they might dream about sliding back huge glass doors to step out into the garden or envisage waking up to a picture window framing the perfect view. Choosing the windows and doors is one of the biggest decisions to be made on a bespoke home project, and for every person who knows exactly which supplier they'll go to or the energy spec or frame material they want, there will be those who are starting with a blank canvas.

The following pages will help you to navigate the sea of choice, from insights from architects about how they create designs that maximise daylight and stick to budgets, to what you'll need to know from suppliers. Some key issues surrounding fenestration are also tackled, with a guide to the relevant Building Regulations and how they might apply to your project, and how to harness the power of the sun without creating an uncomfortable indoor temperature.



**1** A project in South Lanarkshire given colour and character by Rehau's Total70 window and door system **2** Green Building Store's Performance tilt-and-turn window, from £650 per m<sup>2</sup> **3** Modern fenestration can work well with traditional materials, as shown by this project with glazing by Velfac



# Planning doors & windows

How to tailor fenestration to your plot, budget and stylistic preferences

**C**reating a home with lots of natural light is often the number-one priority for self builders and renovators. Doors and windows create a clear link between inside and out and bring a feelgood factor like nothing else – daylight's link with health and wellbeing is now beginning to be fully appreciated. It adds value, too. The Modern House,



need to make decisions about the level of energy efficiency and security you want, and ensure that everything meets Building Regulations (see page 11). Choosing a material is key (p15) and will come down to your particular set of priorities, including cost, longevity and how much ongoing maintenance you're prepared to do.

While traditional properties might have just a few glazed features – front door, back door, windows – today, the options are enormous, stylistically as well as functionally. Fixed glazing is playing an increasingly important role in homes, from rooflights to oriel windows to gable ends. Glass itself continues to evolve to meet needs, from self-cleaning options for hard-to-reach areas to acoustic products that can aid noise-control.

The doors in your home, whether at the entrance, opening up a rear elevation (read about glazed doors on page 47) or those inside dividing rooms, can add real wow factor, so it's understandable that homeowners are keen to focus budget into these elements. For internal doors (more on p43), working out what style is right for you is the first consideration – is a standard opening method suitable, or would pocket doors help to maximise space? Your front door (see page 40) will be one of the first things visitors see, so make sure it's adding to your home's overall kerb appeal and works with the other elements on that elevation. Material choice is important, as is ironmongery and whether you should get a bespoke design – remember that all these choices will have an impact on cost.

## Design considerations

Architect Darren Oldfield says he takes a 'first principles' approach to planning fenestration. "We visit the site to assess the orientation and any obstructions to the solar path. If it was north-facing surrounded by trees and high walls, we'd know ample roof glazing will be needed to make it feel



Top right: Period elegance meets modern performance in this build, which features timber sashes and a glazed gable by Dale Joinery. Above: This space by Catriona Burns Architects combines fixed panes with a slim openable ventilation panel.

the estate agent specialising in contemporary architecture, researched sales and found people were willing to pay a premium for 'good' design, with natural light and a considered relationship between internal and external spaces high up the checklist of what buyers were looking for.

## Primary considerations

"Many of our customers are looking to completely transform spaces. They usually want to reveal an open space with unrestricted views and let as much natural light as possible into the property," says Steve Bromberg, managing director at Express Bi-Folding Doors. That may be your goal, too – but be aware that planning consent might dictate the style and material of your windows, and restrictions may apply for existing properties that are listed or in conservation areas.

As well as finding a fenestration style that suits the architecture you have in mind, you'll also

light and bright. If south-facing we might orientate the glass more to the south-west to prevent overheating, and include openable rooflights."

Clever use of even small amounts of glazing can bring a real sense of wonder to a house, and that doesn't necessarily mean huge windows. From a glass-topped shower that avoids overlooking issues with neighbours to a porthole window that frames a country view (but blocks out the A-road in front of it), it can be useful problem-solver, too.

The comparatively poor thermal performance of glazing versus an insulated solid wall is something to be balanced with the heat gains that come from swathes of glass. In airtight homes with south-facing windows, overheating could be a very real problem, although one that can be addressed through a number of measures (see p12).

### Choosing a supplier

Visit showrooms and ask questions; being able to see the products in real life is essential. Be wary of ordering directly from overseas, online-only manufacturers unless you're very sure they are au fait with UK Building Regs. Many suppliers have diversified into offering a one-stop service for front and back doors, windows and sliders or bifolds, making it convenient to have one point of contact and possibly offering cost savings for large orders. Internal doors are usually a separate order, though some do offer these, too. Getting lead times right is important to consider, since it's key to a smooth construction phase, and Steve Bromberg of Express Bi-Folding Doors asserts that lead times are shorter when you buy a package of fenestration from one source.

Make sure anything you buy comes with an insurance-backed guarantee, which will offer protection if the company goes out of business.

### Money matters

Glazing can swallow up a large percentage of the budget – six figures, even. If your finances are tight, be aware that lots of glass, especially in custom sizes, costs. Don't wait until your architect has produced plans full of huge swathes of bespoke glazing and then find out you can't afford it. There are lots of ways to save money (see the box opposite), from basing your design around standard-sized units to having a row of three smaller rooflights instead of one big one. Costs can also rise if access is poor, or if specialist equipment is required to install very large panes.

### Ventilation planning

Doors and windows should be considered



alongside a wider ventilation strategy. If you are replacing old units in a period property, make sure that the house will still be able to 'breathe' adequately – draughty windows may be a pain, but the degree of ventilation they provide could also be preventing condensation. Integrated trickle vents in the new units are the most common solution; extractor fans can also be installed in kitchens and bathrooms. Vents can now also be concealed within walls and painted over. If you're aiming for an ultra-low-energy build, however, you will want a completely airtight envelope, and these ideas will not be acceptable. Mechanical ventilation with heat recovery is the standard here.

**Above:** Fixed panes can be larger than openable units, offering uninterrupted views; this project features glazing from Express Bi-Folding Doors

## Q&A Glazing costs

**Architect Kayleigh Harp of Harp & Harp explains how to make the most of your budget**



### What factors push up the cost of glazing?

Within the different frame materials there are varying levels of quality and price, typically dependent on glass standard, sightlines and thermal performance. Higher-spec windows tend to have minimal sightlines, better thermal performance and solar-controlled glazing.

### If you wanted to cut back on costs, what would you target?

I would consider individual elements, for example the rooflights: are they opening; do they need to be? Are there alternative manufacturers that offer similar products, accepting perhaps an increased frame thickness? Can the contractor manufacture or source alternatives? Can several smaller panes of glass be used to create a feature rather than one big expanse?

### What aspects are too important to lose?

If possible, I would try to protect the height of windows. Extra height can have a big impact, letting substantially more daylight into a room.





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# What the Regs say

Building Regulations approval for windows and doors includes everything from thermal performance to safety. Here's what's covered – and who can sign it off

**N**ew and replacement doors and windows are subject to the Regs, so must meet minimum standards and be certified as such by building control. Ventilation, security, energy efficiency and a suitable means of escape are all covered, making fenestration one of the most rigorously regulated parts of a home.

For an extension, the size of the glazing should take up no more than 25% of the total floor area (unless you upgrade performance elsewhere). No minimum exists for new builds, but other factors restrict the amount of glass used, such as overall energy efficiency or what planners say about neighbours' privacy.

## Thermal performance

There are different energy efficiency rules for new and existing homes. For the former, performance is measured via an overall Standard Assessment Procedure (SAP) rating, so fenestration is one of many factors. There's a limiting U-value (a measurement of heat loss, where lower numbers mean better efficiency) of 2.0 W/m<sup>2</sup>K for windows and doors, but most homeowners look to achieve 1.4 W/m<sup>2</sup>K or lower. For existing homes, the limit is 1.6 W/m<sup>2</sup>K for windows and 1.8 W/m<sup>2</sup>K for doors.

U-values always refer to the whole unit, including the frame. A range of specification choices could make one product more energy efficient than another, from the materials (see page 15) to whether it's double or triple glazed.

Rules apply about the type and extent of ventilation required in a room, which needs to be more efficient somewhere that gets steamy, such as a kitchen or bathroom. Windows and doors can act as a ventilation source, but



Left: Building Regs say that glazed areas within 800mm of the floor, such as the sidelights on this front door by Kloeber, should be fitted with safety glass

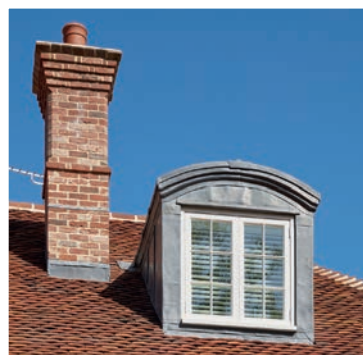
mechanical extractors, often as part of a whole property ventilation setup, are preferred in most new dwellings.

## Safety & security

Part Q of the Regs covers security (but only applies to new homes, conversions and houses in conservation areas). Requirements for front doors include the need for homeowners to be able to see callers without opening the door. Ground floor, basement and other easily accessible windows must meet one of various security standards, including BS PAS 24.

Windows fitted within 800mm of the floor, or any glazed door and sidelights, require safety glazing, usually laminated or toughened glass.

All habitable rooms in two storey homes (as well as in many bungalows) must have an unobstructed escape window in case of fire. Minimum standards also apply regarding window size; for example, the width or height must measure no less than 450mm.



Above: French casement windows (ie, with no central post) like this one by Westbury Windows & Joinery, are a good option in lofts, to satisfy minimum size requirements for an escape window

## Who signs it off?

For new homes, approval is required for your entire project and fenestration is a part of that. Your building control surveyor will visit the site several times to check the work has been done to the correct standard and issue a completion certificate once everything is finished.

If you're renovating, choose an installer that's a member of a

competent persons scheme for glazing, eg FENSA or CERTASS. They have the authority to self-certify their work and will notify your council as well as issuing a certificate of completion.

If your installer is unregistered, or you do the work yourself, apply to your local authority building control department for them to inspect and sign it off.



# Solar gain & combatting overheating

How to keep a comfortable indoor temperature all year round – even if your property features lots of glass

**Above right:** A brise-soleil protects the interior of this home by architects Cowper Griffith from the intense midday sun in summer. In winter, the lower angle means all available light will penetrate into the room

**L**arge amounts of glazing can come at a price when it comes to personal comfort. When the summer sun hits a room, the heat gets trapped inside, and with nowhere to go the space could get unbearably hot. As homes become ever-more energy efficient, and climate change means we're likely to see temperatures rise, it's a problem that's now more urgent for architects to tackle.

At its worst, overheating requires old-school air conditioning (so-called 'comfort cooling') to solve, but if you're concerned about energy efficiency, then you'll probably be against such an idea.



in the first place. Passivhaus principles say that as much as possible of the glazing in a home should face south, to maximise solar gain (ie the heat generated by the sun). By the same token, there should be few openings on the north side so that the cold is not given the chance to penetrate. However, the more south-facing glass there is, the more overheating is likely to be an issue. One solution is to just accept that you're going to miss out on some free heat and orientate the house in the way that's best for other factors, such as the best view. South-west and south-east facing homes offer a good compromise.

South-facing homes should use architectural techniques to prevent overheating. For example, external overhangs or brise-soleils can stop too much light entering when the sun is high in the sky; but, when it is low in the winter months, there will still be maximum solar gain when it's most needed. Modelling software can be employed to calculate the exact dimensions required for the overhang, since every plot will have a unique optimum setup, dictated by factors such as its orientation and any light-blocking surrounding structures like trees or buildings.

Designers can incorporate bespoke external coverings for windows and doors, which can be opened and closed manually or automatically. Done with some creative flair, these can be beautiful features in their own right: Enviroblinds makes bespoke sliding and folding panels in wood, aluminium or canvas, while Renson makes aluminium external shutters that can be matched to the colour of your window frames.

Houses can be designed so natural ventilation is optimised. For example, cross-ventilation is a good strategy – it's been used for thousands of years, in the hottest climates, to cool buildings naturally. If windows or other openings are placed



**Above:** IQ Glass devised the solar-control glazing for this extension by Eastabrook Architects

Thankfully there are lots of ways to tackle the issue, and it will come down to a combination of a few different measures that creates the ideal setup for an individual dwelling.

## Integrated solutions

A considered approach to the architecture of a new-build means that the issue might never arise

opposite each other in a building, the cool air flowing in will displace the warm air going out (but this only works if the outdoor temperature is lower than the indoor, such as at night).

### Solar-control glass

Specialist glazing can help to minimise overheating while preserving a high level of light transmission. Solar-control glass, such as Pilkington's Suncool, has a special metal oxide coating, applied to the inside face of the external sheet of glass in a

Minimal, slide-across interior screens are an option if you want any window treatment to be invisible when not in use. Centor's S4 system, for example, is a retractable shade-screen (insect screens are also available) that retracts into the doorframe when not in use. It comes in several neutral shades, with light-filtering or blackout fabrics depending on how much light you want to screen. Several window and door companies offer integrated blinds that sit within the cavity between panes and can be opened automatically.

**Below left:** ScreenLine is an Italian-made system of integral blinds, with both manual and motorised options. **Below:** Centor's S4 screening system retracts into the doorframe so it's invisible when not in use



double (or triple) glazed unit. A large degree of the heat is deflected while still allowing as much light as possible to pass into the room.

Similarly, Planitherm 4S by Saint Gobain, combines solar control with insulating properties with the aim of giving year-round comfort – not too hot in summer or too cold in winter.

### Curtains and blinds

There's also the old-fashioned option for blocking out the sun: curtains and blinds reflect some (but by no means all) of the heat back through the window. Some homeowners feel that such window treatments spoil the effect of the minimal, modern architecture they've spent their hard-earned money on, but if a bit of forethought's gone into the design a more clean-lined style can be retained. Curtain tracks hidden within ceiling channels look much more streamlined; for long runs of windows and doors, consider automated opening and closing, otherwise it can be a chore to do it manually. Automation is a necessity for out-of-reach openings such as high roof windows.

## Q&A

**Chris Cowper**, architect at Cowper Griffith, shares his ideas for how to combat overheating with good design



### What architectural measures can help to prevent overheating?

We'd design a building that reduces the amount of glass facing directly south. Solar glazing will help lessen solar gain, while planting some trees in front of the fenestration creates shade in the summer, and if you choose a variety that you can see under, it keeps the view.

### Is there a reason to use a brise-soleil instead of a solid overhang?

If a brise-soleil is operated by a timed actuator that follows the angle of the sun, it can maintain shade throughout the day – solid overhangs are fine too, but non-adjustable, and could be oppressive.

### What about ventilation?

Design the building to have natural cross-ventilation by installing shutters or fenestration that can be opened. You can also create a natural stack effect through the property so that heated internal air is naturally drawn up to the top of the house and dispelled outside through an actuator-controlled rooflight or cupola.



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# Specifying materials for windows & doors



The materials you choose for your home's fenestration will ultimately be dependent on a number of factors: your own personal tastes, of course, as well as any planning stipulations and performance requirements. For instance, if you live in a conservation area, your local authority may insist upon traditional timber sashes, or if you are working towards Passivhaus standards, you will need to specify triple glazing in order to gain certification. In addition, certain finishes will be better suited to achieve different aesthetics; wooden entrance doors will always be the most suitable choice for period properties, while for more modern abodes, you might find that a minimal glazed or bold metal unit may also fit the bill.



**1** This project features timber windows and glazed doors from Norrsken, finished in a subtle grey shade to complement the industrial look **2** In this kitchen diner extension by Whiteman Architects, slimline metal frames allow uninterrupted views and large spans of modern glazing **3** If you are looking to renovate a period property, traditional style timber casement windows like these units by Scotts of Thrapston, are often a planning requirement – especially if your home is listed or you live in a conservation area



# Timber

Find out why wood could be the best bet for your home's fenestration

Right: This bespoke Porto E98 flush door in European oak was designed and made by Urban Front. Expect to pay from £5,500 plus delivery for a similar 1,200mm x 2,400mm design

In the past, wood's merits as a durable, readily available and easy-to-work material made it a natural choice for all manner of construction work, including doors and windows. Today, those qualities combine with modern production techniques to ensure timber units team great looks with state-of-the-art performance.

## Style

Fundamentally, any kind of door or window installation you can envisage is achievable with timber – whether you're after a heritage casement, contemporary feature window or a stunning statement entrance. You can choose between keenly-priced off-the-shelf designs, made-to-measure ranges or a fully bespoke service to suit your budget and requirements. In addition, many suppliers now offer the complete spectrum of RAL hues (a colour-matching system spanning a huge variety of options for paints and stains). So you can rest assured there's something to suit every homeowner's tastes (as well as the planners' preferences).

## Materials

Whether softwood or hardwood, most suppliers elect to use engineered timber for their windows and doors these days (ideally using material from the heartwood). It's simply stronger than solid wood, which means sightlines can be thinner and units are less likely to move or twist.

European redwood is the most common option for softwood windows, with larch and Douglas fir among the alternatives. They're suitable for a wide range of applications, with



openings such as large feature windows and long runs of bifold or sliding doors eminently achievable. Hardwood versions will bump up your budget, but as the name suggests they're strong and durable – so can increase design choices. For similar reasons, there's been a big growth in the adoption of modified timber products, such as Accoya. Materials such as oak are often left to weather when used for cladding, but this isn't typical for doors and windows. Painted finishes are popular, as well as stained – many people want to preserve the wood's original tones.

## Maintenance

A big advantage of opting for factory-finished timber fenestration is that the paint or stain is applied accurately in controlled conditions; so it should outlast site-finished versions.

Depending on the design of the frame, as well as your home's location and exposure levels, you might be looking at between five and 10 years before any reapplication is needed. Some manufacturers offer lengthy guarantees that include the finishes – though they tend to be slightly shorter on stains than on paints.

An occasional wipe down with mildly soapy water is enough to keep dirt at bay; and will extend the life of your finishes. Overall, it's worth bearing in mind that – while they require more maintenance than PVCu or metal designs – timber units offer excellent longevity. Some originals still exist hundreds of years after they were first installed, thanks purely to a simple schedule of cleaning and refinishing. So the higher upfront cost than opting for plastic, for instance, is likely to be repaid many times over.

## Sustainability

Timber windows and doors score well when it comes to energy performance – both in terms of embodied carbon expended in their manufacture and transport, and in situ. Provided it's responsibly sourced from properly managed forests (look for FSC or equivalent certification), wood is a natural, renewable and often recyclable product. It's also innately more insulating than plastic or metal, so it's a comfortable fit for eco projects where thermal efficiency is vital. Timber fenestration can easily achieve Passivhaus-standards in terms of whole unit U-values.

## Closer look

# Timber glazing for a traditional-style self build

This demolish and rebuild project features glazed elements by Dale Joinery

In 2011 Mr and Mrs Hedley purchased a post-war property, tucked away in a quiet Essex village, that was in serious need of some TLC. They planned to renovate and extend it into their dream home; however, after speaking with an architect, decided to take a different approach. "We were told that bringing the house up to today's standards would be incredibly expensive," says Mrs Hedley. The solution was to completely demolish and rebuild a new home from scratch.

Keen on a property suited to modern living but that boasts a traditional look, Mrs Hedley set about designing their new home with meticulous



Above: Various glazed solutions by Dale Joinery have been fitted in this new house

options after a recommendation from their builder, Derek Mason. Even though Mr Hedley works in the window industry with non-timber products, the couple were impressed by the choice of timber windows that Dale Joinery offered. "From the minute we saw the sample, we were convinced that wood was the way to go," says Mrs Hedley. "Based on that and Derek's recommendation, after a meeting with the company we decided not to even look at other suppliers."

A selection of traditionally-styled sash windows, flush casement windows, an entrance door with big glazing elements and three sets of bifold



attention to detail throughout, even though there were various planning hurdles to overcome.

Understanding that the windows were going to make a big impact on the look of their property, the couple approached Dale Joinery to discuss their



doors were chosen for the house. The large windows provide picturesque views of the land and fields surrounding the property and the grand front door with top and sidelights perfectly represents the heritage effect that the Hedleys desired. "We are really happy with our new doors and windows," says Mrs Hedley. "The look is exactly what we hoped for and the colour finish works really well with the scheme of the house."

Above: The house features sash windows and three sets of bifolds. Left: The front door has large glass panels, both within the unit and at the sides

## QUICK CONTACT

**Dale Joinery** 0845 652 7399

[www.dalejoinery.co.uk](http://www.dalejoinery.co.uk)



# Aluminium

This metal option is strong and durable, and offers a lot of design flexibility, too

In the past, aluminium glazing frames were limited to commercial buildings and high end domestic projects, but thanks to modern innovations it's now a popular choice for many homeowners. This strong material allows for

contemporary new builds with wow-factor glazed elements. Agricultural conversions and warehouse transformations are another natural pairing for these units, thanks to the chic industrial look that can be achieved with metal.

## Efficient material

Metal is a conductor, which is why it often feels cold to the touch, but you don't need to worry about your aluminium frames compromising room temperatures. That's because modern windows and doors in this material are generally fitted with thermal break technology. This means

the core is insulated to prevent heat loss and attain excellent levels of energy efficiency.

Aluminium is durable, too, and requires little upkeep – a simple wipe with a mildly soapy cloth is what most suppliers recommend when it comes to cleaning. It's so robust, in fact, that it's a great option for exposed locations because it resists the effects of harsh elements, such as salt water spray in coastal areas.

Generally, you can expect the finish and the frames themselves to give a long lifespan of around 40-60 years. Its long life expectancy could outweigh any environmental

concerns, plus aluminium can generally be recycled at the end of the frame's service life.

## Other metal finishes

**Steel** This metal is stronger than aluminium, so it can be used in even smaller frame depths and to host extreme spans of glass; it's also heavier, however. It's enjoyed a slight renaissance recently thanks to the current trend for Crittall-style doors and windows, but steel is generally an expensive material.

**Copper** A copper finish is an attractive option for high spec, luxury contemporary front doors. This type of fenestration will have a composite internal makeup (see page 20), clad with copper – often in a rustic brushed finish.

**Bronze** Offering a wow-factor look for heritage-style or contemporary homes, this material is striking and rich in its appearance. Check out Architectural Bronze Casements if you're interested in this style.



Above: Cero doors by The Caulfield Company feature a slim 34mm aluminium profile

thinner sightlines, perfect for framing views, and its smooth appearance is ideal for achieving a contemporary look. Saying that, many renovators updating traditional buildings have also chosen to invest in aluminium because of its excellent durability and inherent strength.

## Style versatility

Aluminium is a great option for window frames and front doors, and is especially popular for glazed doors, due to its lightweight yet robust profile that's capable of hosting wide spans of glass. People like the smooth finish that's possible with metal, but aluminium is also flexible when it comes to colour thanks to the powder-coated finish that's generally applied.

It's possible for any RAL hue to be used in the powder coating process, and you can have a different tone on the exterior and interior to perfectly match your home's material palette. A black or charcoal finish is often the architect's preferred choice, especially within striking

## Closer look

# Integrated glazing maximises views

The team at IDSystems has combined a range of window and door solutions to give this award-winning modern home, set on a sloping plot overlooking rolling countryside, a consistent, seamless look

**S**hortlisted for the National Eisteddfod Gold Medal 2018, this eye-catching new build home on the edge of Abergavenny in Wales – named Vila Mir – was designed by Loyn & Co Architects and features a full range of custom-made glazing solutions by IDSystems.

The open-plan design makes the most of the site's contours to hide the bulk of the structure, while opening the entire west elevation with glazing to fill the house with light and break down the boundaries between inside and out.

From the driveway, the building is unobtrusive and the timber cladding blends in with the trees. The hallways, bedrooms and bathroom on the entrance floor feature IDSystems' versatile IDS65 aluminium windows in various sizes to give each space the perfect amount of natural light.

The master bedroom enjoys the best of the vistas thanks to a full height glass-to-glass corner window. This includes a Grand Slider II sliding door to provide unobstructed views as well as access onto a private terrace, which is surrounded by frameless glass balustrades. Directly below, the large open-plan kitchen and living space features big fixed windows and sliding doors to make the most of the panoramas, while the westerly view is further enhanced by another frameless glass-to-glass corner. The design of sliders is particularly innovative: the single panels glide directly behind a fixed frame window that features the exact same profile. This ensures consistent finishes across the entire elevation.



Above: The garden-facing elevation features a range of IDSystems' fixed windows and sliding doors. Left: The master bedroom's glazed corner. Below left: The bulk of the house is hidden from the main street, but unfurls over the sloping plot

"Each of our systems looks brilliant on its own, but where we're unique is that – with nearly 50 products in our range – we provide an integrated solution to create a uniform design with matching sightlines and frame depths," says Carl Farrow, technical manager at IDSystems. "We worked closely with Loyn & Co to understand exactly what the client was looking for and created a glazing solution that provides a consistent design," says Carl. "Integrating sliding doors, tilt-and-turn windows, and fixed units has maximised the amount of glass, while still allowing for ventilation." The result is a house that can be enjoyed inside and out, whatever the weather.

## QUICK CONTACT

**IDSystems** 01603 408804 [www.idsystems.co.uk](http://www.idsystems.co.uk)



# Composite

With a timber core and weather-resistant finish, this framing material can offer the best of both worlds

If you're looking for a high-performance door or window framing system, then composite could be the answer. These factory-engineered products combine different materials in order to maximise the benefits of each, delivering a stylish, low-maintenance and durable result.

## What is composite?

In general, this term is used to identify glazed doors and windows that combine a wooden internal frame with a protective aluminium face

The main reason engineered timber is used on the internal side is because it's an innately good insulator – so it can help to improve U-values and minimise heat loss. The wood can be painted, stained or lacquered to suit your tastes.

The metal cladding provides a wonderfully low-maintenance finish, massively reducing upkeep compared to a timber-only unit. It can be finished in pretty much any colour using the RAL system, and is great for coastal and other exposed locations, as it's excellent at resisting the effects of harsh weather. In terms of lifespan, you can expect 40-plus years of service from a decent-quality alu-clad product.

Composites are hugely popular in Scandinavia, Canada and areas with similarly chilly climates, hence when they first came over to the UK, the vast majority were triple glazed (3G) – although good-quality double glazed versions are widely available, too. You can easily find 3G composite windows offering U-values down to as low as

0.7 W/m<sup>2</sup>K; while glazed doors can dip below 1.0 W/m<sup>2</sup>K.

In Scandinavia and other parts of Europe, the tilt-and-turn window configuration (see page 32) is incredibly popular, so many composites are sold in this format – although flush and stormproof casements are common options, too. In terms of glazed doors, you can choose from the full range of French, sliding and bifold styles; Idealcombi even offers a tilt-and-slide version that's a great solution for Juliet balconies.

## Costs & considerations

With the allure and natural insulation of timber, and the low-maintenance properties of aluminium, there's a lot to like about composite windows – but every product has its own pros and cons. Combining these two materials naturally puts the price point at the higher end of the market; so expect to pay a premium over straight wood or metal designs.

Another potential consideration that the aluminium outer finish means composites tend to work best in contemporary settings, such as a new build or modern extension. They're not as natural a fit for heritage projects. That said, the likes of Marvin Architectural are now offering alu-clad casement and sliding sash windows that can provide an impressively faithful look.



Above: Velfac's 200 series of composite aluminium-timber windows and patio doors feature uniform sightlines, and are available in both double and triple-glazed formats

– hence why you'll often see products referred to as being 'alu-clad'. This is the type we'll focus on in this article, but it's worth mentioning that the moniker can also take in other types of symbiotic construction (such as doors with a timber core, steel subframe and PVCu or GRP outer finish).

## The benefits

There are a number of key advantages to specifying your doors and windows as alu-clad composites. First up, aesthetically it gives the flexibility of having characterful timber internally, adding natural warmth to your home's decorative scheme, combined with sleek powder-coated aluminium on the external face.

# PVCu

A budget-conscious option with many other advantages – including increasingly good aesthetic appeal

**V**isit almost any street in the UK, and you're going to see plenty of PVCu windows and doors. They've become the industry standard for lots of reasons: they're inexpensive, secure, low-maintenance and it's easy to find an installer. But on that same street you'll probably find the reasons why PVCu gets a kicking from certain quarters: chunky frames that have replaced timber originals and look wrong with the house style; and gleaming white finishes when perhaps another colour would be more appropriate.

Dig deeper for the right product, however, and PVCu can harmonise with the wider architecture, both traditional and modern, and tick many other boxes, too. "It's always been considered the cheap option – sometimes that means cheap and nasty, rather than simply low cost – but in the last 10 years, the industry has really picked up. It's incredible what they've done," says Build It magazine expert Mike Hardwick. Thinner profiles, better energy efficiency and improved longevity are all making plastic a viable option.

## Style

PVCu windows are available in every format, from sliding sash to casement and tilt-and-turn, while doors offer some versatility in terms of style, too. White might be the default, but many companies offer coloured frames (including different hues inside and out) and a choice of finishes. So, an anthracite-grey smooth-finish frame can do a very good job of mimicking aluminium, while a foiled woodgrain version in a soft green hue can look right for a rural property.

Traditionally, the steel that reinforced PVCu units acted as a thermal bridge, but new products are helping combat that. For example Neuffer's Passivhaus-certified Energeto 8000 range is reinforced with carbon fibre instead. Some makers, such as Internorm, fill the internal cavities with additional granular insulation.

In the past, PVCu fell down when it came to recreating the elegance and specific decorative features of timber period windows, such as



sliding sashes. The best-looking timber style PVCu units, from companies such as Quickslide, Roseview and Residence, now solve many of the problems and do a good job of mimicking wood windows in terms of their proportions.

**Above:** The Residence 7 window can be mechanically jointed for a traditional effect, or welded for a modern feel

## Will they last?

PVCu does not have the life expectancy of aluminium or (well-maintained) timber doors and windows. But quality has certainly improved, and these days the seals and opening mechanisms are more likely to fail before the actual frame. "You can argue that plastic may not last as long, but now there are guarantees of 30 years available, which is comparable with what you'd expect from many softwood window suppliers," says Mike. "Make sure it's an insurance-backed guarantee, though, not just any old cover."

## PVCu in protected areas

Houses located in a designated conservation area may be subject to additional planning regulations via an Article 4 direction, which means you need permission to change or replace fenestration. Sometimes (depending on the councils' position) PVCu replacements are considered acceptable, but your choice will have to be approved by planners.

Some manufacturers have used the Article 4 guidelines as a spur to push designs forward, resulting in much improved PVCu frames with all the correct detailing. Chat to your planning department's conservation officer to discover what they'll accept – and look around the area to see what others have done.

There are more stringent rules for listed buildings, where you will usually be required to stick to the original materials.





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# Double or triple glazing?

High performance glass might seem like a smart choice – but will the greater outlay deliver the results you want?

**W**ith the price gap between double and triple glazing falling, the debate on which option represents the best investment for your home continues. While the former works by trapping a layer of air between two glass panes to provide extra insulation, the latter features a third sheet that forms an additional thermal barrier. So triple-glazed fenestration can help to improve your home's thermal performance by reducing heat loss – but there are plenty of elements to account for before taking the plunge.

## Thermal performance

If achieving low U-values (a measure of heat loss, where smaller numbers are better) is high on the list of priorities for your project, the likelihood is that you've already considered fitting triple glazed (3G) windows. Double glazing will typically attain a low U-value of 1.2 W/m<sup>2</sup>K, while 3G versions will generally reach 0.8 W/m<sup>2</sup>K or better. This is great if you're looking to build a highly-insulated shell – particularly if you're aiming for Passivhaus certification. But always remember to consider the U-value of the whole window, including the frame – not just the result produced at the centre of the glass. As such, the quality of the surrounds and how well the units are fitted will have a big impact on the overall performance of your glazing.

That being said, it's important to take a holistic approach to your bespoke home project by looking at the building's thermal performance as a whole. If you want to achieve an energy-efficient property but are working to a tight budget, for instance, it might make more sense to channel your cash into improving the building fabric itself by adding extra insulation, rather than upping the spec of the windows.

## Further considerations

Some triple glazing critics argue the insertion of the third pane of glass reduces the amount of light that can flow through the window. But the

variance is minute and could be offset by installing larger units with thinner frames, to allow as much light inside as possible.

A more pressing concern might be the extra weight the additional pane of glass in triple glazing products will add to the total load of the window. You will need to ensure that your building will be able to cope with the extra bulk, especially if you're installing large spans of expansive glazing. Check hinges, fixings and other forms of hardware are up to the task, too.

On the plus side, triple glazing tends to reduce the risk of condensation forming on your home's windows. This is because the inner pane of glass is kept at a warmer temperature by the extra layer of thermal protection, meaning that the surface isn't cool enough for droplets to form.

## Costs

Although the price gap between double and triple glazed products is lessening, the latter still represents a larger investment. "Our 3G windows cost from £340 per m<sup>2</sup> which is about 10% to 15% more than our 2G units. This brings a jump from a U-value of 1.31 W/m<sup>2</sup>K, down to 0.74 W/m<sup>2</sup>K," says Tom Herring from Idealcombi.

## Acoustic function

As well as boosting your home's energy-efficiency, you may have heard that installing triple glazing can offer a modest improvement in soundproofing. While this could be handy if you live in a busy urban location and are keen to block out the noise, there's little evidence to suggest there's a huge improvement to be gained.

If you want to cut down on sound transfer, one way to do this is by introducing a thicker pane of glass on the external face of the glazed unit. Incorporating specially-formulated acoustic glass is another way to help block out unwelcome sound.



Above: This cut-out window section, from SEH BAC, shows the structural arrangement of the company's triple glazed windows



# Ironmongery

The handles and hinges on your fenestration will have a big impact on overall appearance and usability



Above: A long steel pull handle on this door by Urban Front adds to the contemporary feel of the entrance

It's easy to feel overwhelmed by the amount of decisions that go into choosing your home's doors and windows – but once you've worked out the style, size and material of the unit itself, the ironmongery is another essential element to consider thoroughly. These components have the potential to make or break the finished look and functionality, so here's what you need to know.

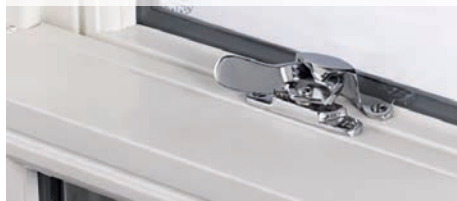
## Style choice

They're essential, but the look of handles, hinges, latches, locks, door stops and window stays will all make a considerable impact on the finished look. And don't forget the extras that come with certain doors and windows, such as letter boxes and door numbers on front entrances, or

espagnolettes (a special lock for casements and sash windows) and sash fasteners, for instance.

The most suitable hardware for your project's fenestration will be heavily influenced by the look of the unit it'll be attached to – in fact, some manufacturers offer specific ranges to mix and match with the products you buy from them and can make suggestions in terms of what they think works best. Remember doors and windows

Available in chrome and brass, this hidden sash spring fitting from Dale Windows is ideal if you're keen to re-create a heritage look



are an investment you're unlikely to update in the foreseeable future and you tend to get what you pay for in terms of durability and quality.

A metal finish is a popular choice, but there's still a plethora of options within that bracket for shapes, sizes and decorative elements. Different materials have a different feel. Aluminium is a light metal so is such to move, but its soft profile can mark and dent easier than some of the alternatives. Zinc alloy is heavier and can be plated in an array of finishes, while stainless steel is hardwearing and less likely to corrode under the occasionally harsh British weather.

## Security & costs

Fundamentally, ironmongery is in place so you can operate your windows and doors, but as an opening element, it's also a potential weak point in your property's security. So the hardware you choose must comply with specific certification and testing. Consider the quality of locks and understand the security elements, especially in fenestration on the ground floor. Understand if a fire door is necessary, too, because you'll need suitably rated hinges and latches for these units.

What you pay is essentially down to how much you're willing to spend – you can get budget aluminium latch levers for internal doors for just £7 from a DIY store, or spend in the region of £1,600 for a luxury decorative handle, so cost is really down to you. Remember to ask whether ironmongery is included in the price of a unit – you don't want to settle on a door at the top of your budget only to discover that the handle and fittings cost extra on top.



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# Window options for your property



**1** Kloeber's timber casement windows were used to upgrade this period property  
**2** Edwardian-style sash windows by Lomax & Wood  
**3** Origin's aluminium French windows give uninterrupted views out when open

**W**indows are the hard-working multi-taskers of your home, setting the tone architecturally, letting in daylight and fresh air, and creating a visual link with the outdoors. But this complex role means that it can be hard to pin down exactly what product is right for your build, since the decision is based on a balance between looks, performance and budget. Sometimes there are more specific needs on top of that, for example units that will suit the demands of conservation officers, or tilt-and-turn models for easy cleaning in a hard-to-access loft conversion.

The style of window is often a good place to start when finding the best solution. The following pages tackle the main options, ranging from sliding sashes that emulate the period units of the past – albeit with the additional performance benefits that modern technology brings – to near-frameless casement windows that put all the emphasis on creating a seamless link with the outside world. This information should help you narrow down the options and pinpoint the most appropriate design, whether it's for a new build, renovation or extension.





# Choosing a window style

Combine practicality and looks with our introduction to what to consider when specifying your glazing



Top: Industrial-style products by Clement Windows suit this London warehouse conversion, bringing extra character to the interiors

A surprising amount of the character of a home is derived from its windows. You don't need to be a qualified architect to know when something's not right with the style, proportions or arrangement. This is why self builders and renovators take huge care over choosing glazing, knowing it can make or break a property. Your planners might want a say in the style, especially in protected areas, but beyond that, here's how to narrow down the huge stylistic choice.

## The traditional look

If you're trying to capture the style of a particular era, your job is, in a way, fairly easy. Some houses can be dated almost down to the decade from

their windows, so research the period features you're trying to emulate. Sash windows were prevalent from the late 17th century, falling out of favour with the Edwardians, while casements pop up throughout history, from Tudor houses to post-war prefabs. Elements to get right include the number of individual panes, and the width and style of the glazing bars, decorative details (like horns on sash windows) and ironmongery.

## Contemporary builds

The goal for many homeowners is a modern look with big windows where the frame barely exists. They let in maximum light, and give the biggest views out. Opening and fixed models can all offer this picture window solution, and a well-designed mix often yields best results.

There's not much character to the glass panels themselves: the beauty lies in simplicity, although there's nothing to say frames couldn't be colourful, unless the planners object. Instead, it's usually dramatic fixed glazing that offers talking points – eg gable ends, oriel units or a run of rooflights.

## Where old meets new

Unsympathetic replacement of heritage windows is rife, but you can get harmonious results. On older homes, most architects prefer to install period-looking windows on the original fabric, but be contrastingly modern in any new areas, so it's easy to 'read' the building's stylistic journey.

There are always exceptions and anomalies, though. Converted agricultural buildings can look stunning with minimal modern windows, while the jury's out on whether the current mania for 1930s-style Crittall-inspired designs paired with Victorian terraces is going to run the distance.

## Q&A

Scotts of Thrapston's **Tom Barfield** offers his advice on narrowing down a style that suits your home project



### How do you guide homeowners towards the best look?

I'd ask what windows they like, the style of house and their project aims – I believe the property chooses the windows. Is there a view they love or dislike? The windows can maximise or obscure this.

### What else is there to consider?

How the windows are positioned is just as important. Should they be set back from or level with the brick face? Will there be a timber, stone or tiled cill? Are they in a flush or rebated reveal, or in a stone surround? You could create lots of looks using the same window.

### Could modern fenestration work on a period property?

The only examples I've seen are where modern high-performance products are manufactured to look like traditional versions. It can work because it replicates the effect of the original single-glazed windows.

# Sliding sash

Slim and elegant, these windows can combine period character with excellent performance

**R**ecognisable from countless rows of period houses, sash windows are an important part of the UK's built heritage. There's a huge potential market for new versions of these older designs with both renovators and self builders seeking to replicate their character.

Sash windows open by one sash vertically sliding in front of the other. Over the 250 or so years that this style was the norm, its design details evolved: Georgian properties had a larger number of individual panes separated by glazing bars, but Victorian improvements to glass technology meant that only one or two panes per sash prevailed. With this came the addition of the 'horn', sitting either side of where the top sash meets the centre bar – not just for decoration but a way of reinforcing the joint to support the weight of a larger pane. Conservation officers will be sticklers about this if you are replacing these windows in a protected area.

Traditional models are counterbalanced by a system of weights and pulleys. The alternative is sprung-balanced, with the mechanism concealed within the frame. According to James Upton of Westbury Windows & Joinery (see box), a weight-and-pulley mechanism has a slightly smoother movement than a sprung one. With either system, the frame can be recessed into the walls so only a slim portion of it is revealed.

For timber units, factory-finished microporous paint means that the wood should only need maintaining every five to 10 years, depending on how exposed the property is. PVCu versions have also vastly improved, now that manufacturers have mastered a more refined look with slim glazing bars and 'run-through' horns, rather than them being stuck on afterwards. The choice will come down to your budget, whether you live in an area where PVCu is forbidden, and how highly you value traditional joinery. Composite products,



**1** This triple-glazed timber unit by Green Building Store is spring-balanced, and costs from £1,150 **2** Traditional timber sashes in a dormer, by Westbury Windows & Joinery; available either sprung-balanced or with a weight and pulley mechanism **3** Rehau's PVCu sliding sash does a good job of replicating the detail of its timber predecessors and it's A-rated for energy efficiency

such as those from Marvin Architectural, have aluminium on the outside and timber within.

New sashes can achieve high U-values, up to Passivhaus standard when triple glazing is specified. Existing units can be draught-sealed to make them more energy efficient. Some companies, like Envirosash, specialise in replacing single glazing with ultra-slim double glazing on original frames.

## Q&A

**James Upton**, managing director of Westbury Windows & Joinery, explains the appeal of period-style windows



### Is there a difference between Georgian and Victorian design?

They have similar proportions, but the glazing bars generally differ: Victorian sash windows are traditionally two over two, while Georgian windows are six over six.

### What needs to be done to properly maintain timber sashes?

Applying a water-based microporous paint provides a protective barrier against weather, moisture ingress, UV exposure and bacteria that will last for years. We also recommend a washing down of paintwork twice a year, and to touch up any areas of damage with end-grain sealer as soon as they occur to stop moisture ingress.

### How do modern sashes meet thermal performance standards?

Weather seals and manufactured brushes are incorporated to stop any draughts coming through: this will cover gaps created by the parting bead, staff beads (which go around the frame) and meeting rail. Combine this with outstanding glazing and you will have a very high-performing window with a traditional look.



# Casement windows

Available in a array of configurations, this versatile option is suitable for a wide range of projects, whether traditional or contemporary

**T**he ever-popular side-hinged window has straddled most periods and styles of building. This means there's a huge variety of products on the market, from those divided by glazing bars, which best suit period properties, to minimal and near-frameless designs. Historically, side-opening and top-hung windows were often combined, both for aesthetics and to offer a degree of flexibility in controlling levels of ventilation.

Opening windows can also be paired with fixed panes. For example, a run of three might have a fixed central portion. If you are a stickler for detail, then it's important to be aware that the opening window's frame will create a deeper

fitting has a lipped design where the window overlaps the frame a little and sits proud of it, providing more protection from the elements. These are often referred to as storm windows.

A variation on the casement style is the French window. It still works on the principle of a side hinge, but there's no fixed mullion – so when you open both sides of a pair, you get a truly uninterrupted view. The larger aperture means these types can be useful for meeting Building Regulations requirements for a means of escape: you'll often find them in loft dormers for this reason.

Casements come in lots of materials, from PVCu, engineered softwood and aluminium through to unusual options such as to bronze. PVCu's affordability makes it a popular choice, and the designs have come a long way if you know where to look. Ugly, chunky 1990s profiles have given way to slimmer frames and flush fittings that get close to the elegance of their timber counterparts – with companies such as Evolution successfully leading development. But premium timber and aluminium casements can offer even sleeker looks, and many self builders and renovators select them for their longevity.

**1** Horizontal glazing bars on Kloeber's flush aluminium casements add character to a period property  
**2** With a frame size of just 65mm, Origin's OW-70 aluminium slimline units have impressive sightlines. They cost from £300 depending on the window configuration, size and colour



border than the fixed pane; specify a 'dummy' window for the non-opening section if you want equal sightlines. RIBA guidelines state that the typical maximum height for a casement window is 1,500mm with a maximum width of 600mm.

Casements are available with either a flush or rebated design. In flush styles, the window sits exactly within its frame when closed – this is often preferred for period properties. A rebated

## Glazing bars explained

- In the past, glazing bars were traditionally used to make up a larger window from a number of smaller, less expensive panes – but now they're used to evoke character, especially in period properties.
- A true glazing bar holds several smaller panes, but this option isn't great for energy efficiency. Glass is much cheaper now, so modern bars are usually applied to one large sheet of glass to give an illusion of division.
- The way that stuck-on bars are incorporated can vary – with differing levels of success. Glazing bars integrated within the double-glazing are never going to give the right level of authenticity if you are going for a period look; while overly thick, chunky beading, especially on PVCu models, is something else to avoid.

# Top-hung

Simple and effective, these units are good all-rounders that come in a handful of variations suitable for specific locations

**T**echnically a casement window, an outward-opening, top-hung model still has all the benefits of side-hinged version. It also has the edge when it comes to being more weather-proof as its design prevents rain from entering the home. Like side-hung casements, these designs can be a good budget option compared to some of the other configurations available.

Top-hung windows are often seen as part of a set, installed above side-opening casements; this was a particularly popular configuration in 1930s houses, where the upper row was frequently more decorative, featuring leaded lights or stained glass. It still works well in a contemporary build, and this set-up gives loads of flexibility when it comes to ventilation – just open the smaller aperture at the top to securely let in a little breeze, or fling the whole lot open for a maximum burst of fresh air.

These units are also frequently used for sloping rooflights in loft conversions (see box, right, for guidance on how to choose between a top-hung and pivoting model). One product that has been designed specifically with lofts in mind is the balcony window, which features two vertically aligned panes: the upper, top-hung pane swings out and up to create a clear open space, while the bottom pane unfolds to reveal an integrated balustrade. While not adding to the floor area, they can give the illusion of a lot more space in the room.

The maximum size of a top-hung window can be larger than a side-hung casement (up to about 1,400mm wide if you opt for a lightweight aluminium frame, for example). There are some manufacturers that make heavy-duty fixings that can take the weight of an even larger piece of glass. A taller window will, of course, swing out further, which is not always desirable from a safety perspective as you'll need to lean out further to close it. If safety is a concern, look for models fitted with restrictors (you'll need to be



**1** A traditional configuration sees side-opening casements vertically aligned with top-hung sections, like this example by Westbury Windows & Joinery. The top portion is opened for gentle ventilation **2** Fakro's wood-vener FPP-V model is ideal for loft conversions and other pitched-roof sites **3** Top-guided windows, like these triple-glazed Velfac examples used in a Cambridgeshire house, give better ventilation than a straightforward top-hung model, because they open up an extra gap at the top



able to override this if it's a designated means of escape). Restrictors can also be retrofitted.

A variation on the theme is the top-guided window; when opened, a gap at the top emerges, for improved ventilation. It's more stable when open than a top-hung window, and for this reason it's often specified when the aperture is wider than it is tall. Some versions spin through 180° – known as a top-swing model – making them easy to clean from the inside, which is why you'll frequently find them specified for housing blocks.

## Loft roof windows: top-hung or pivot?

- A top-hung window gives an uninterrupted view when fully open, but a pivoting model will always block sightlines.
- How high up the slope of the ceiling the window is installed is a factor: pivoting windows have the handle at the top, so make sure you will be able to reach it when it is installed.
- Consider what's going in front of the window: it could be fiddly to access a handle at the bottom if you need to lean over drawers or a dressing table – a top-handled pivoting model might work better in such instances.
- Most pivoting products can be tilted around to be cleaned from the inside; top-hung examples can't.
- When it comes to specialist conservation products, top-hung units are seen as more authentic, because they replicate their Victorian cast-iron predecessors.

For more advice on rooflights, turn to page 35.

# Tilt-and-turn

Offering versatility and easy cleaning, these dual-purpose models are becoming increasingly popular

The default window used in many European countries, these tilt-and-turn models can offer unbeatable flexibility. Their dual-mechanism designs allow the units to tip inwards from a fixed point at the bottom, providing for efficient ventilation, with any warm air released at the top; while they can also be opened like a traditional casement, ticking the box for having a large opening that can act as a means of escape.

In tilt mode, there's no danger of children or pets falling out and it's more secure than most options when it comes to opportunists climbing in. With some models, the size of the opening is fixed, so there's no separate stays to prop the unit open; others have adjustable restrictors so there are a few options for how far it leans.

This configuration can be useful in a bathroom, because of the way it offers both privacy and ventilation. The design is also handy for a run of windows behind the kitchen sink, where it might be hard to reach across and close a casement.

In addition, tilt-and-turn windows are a good choice where there's a narrow space outside and it might be obstructive to have an outward-opening model. In turn mode, the units usually hinge inwards, which makes them a lot easier to clean from the comfort of inside your home.

You can specify this type of window in PVCu, timber, aluminium or composite formats. It works well with contemporary styles with no glazing



**1** Tilt-and-turn models can be useful behind a kitchen sink, where it's hard to reach over to operate a casement; this timber set is by Dale Joinery **2** The tilt facility on KAT's PVCu sash windows allows for easy cleaning **3** Green Building Store's mock sliding sash (from £760) looks traditional, but the whole unit can tilt and turn

## Q&A

**Roald Myers** from Enlightened Windows gives the lowdown on the popularity of this flexible format



### What are the advantages of this configuration?

Ultimately, choice: the ability to slightly tilt or fully turn the same window is incredibly flexible. Beyond that, the system has better air tightness, due to the espagnolettes running around the perimeter, pulling the window leaf or wing tightly into the frame. Tilt-turns can have up to four airtight seals (most normal UK windows have one).

### Does the dual-mechanism affect the frame's size or depth?

When it comes to frame depth, each manufacturer is different. Our German tilt-turns have a depth around 70mm and some of our Danish systems are over 120mm. Frame thickness of a tilt-turn is normally wider than the equivalent outward-opening window.

### How do costs compare to a casement or top-hung window?

In all our ranges, a tilt-turn is going to be slightly more expensive; the mechanism itself is more complicated than a standard hinge. But you are effectively getting two windows in one.

bars, but there are also options for more traditional properties. A tilt-and-slide model replicates the look of a sash window, featuring top and bottom sashes that both tip inwards independently of one another, as well as sliding up and down. Green Building Store supplies a triple-glazed mock sliding sash, pictured above, where the whole unit tilts and turns.

Another variation is Fakro's preSelect roof window, which combines both a top-hung and pivoting mechanism. The pivot function enables the sash to be rotated 180° in order to clean the outer pane – useful in a loft conversion.

If you want to gain maximum sightlines, then be aware that tilt-and-turn models usually have wider frames to accommodate the various mechanisms. They can also be deeper than standard frames, but it depends on the manufacturer.



## Closer look

# Contemporary glazed home

This striking new property features expansive glazing throughout thanks to a range of solutions from Internorm



Expansive glazing is a core design feature in this striking new 300m<sup>2</sup> self build home in Buckinghamshire. The owners took a hands on approach to their self build project, being very knowledgeable about construction and the type of products to use. To ensure the wide spans of glass they wanted didn't compromise the thermal efficiency of their new property, they were keen to install high performance triple glazing, which led them to products by Internorm.

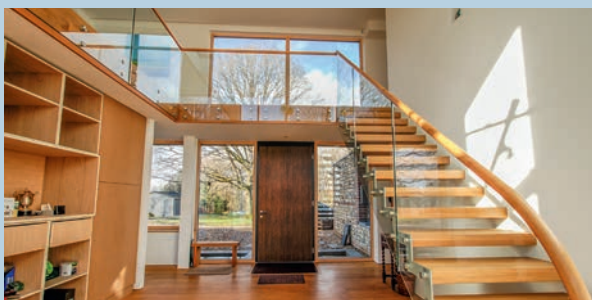
A mix of the company's tilt-and-turn and fixed windows were chosen, supplied by Thames Valley Windows – who advised the homeowners on design options, providing 3D visualisations. A composite frame allows a grey aluminium face on the outside and a timber finish internally to imbue the interiors with the character of natural materials. The surrounds sit behind the house's timber cladding to achieve a frameless look.

To enable access within the largely glazed rear elevation, a four panel set of lift-and-slide glazed doors were installed. This has created a 22m span of glass, in the same finish as the windows to provide a seamless aesthetic throughout.

### On site logistics

Access to the site was fairly limited, which made delivering and installing these large glazed elements quite complicated. Hoisting equipment and vacuum lifting machinery was required because of the scale and weight of the units, some of which come in at more than 250kg.

The result is a breathtaking home that has a core connection with nature thanks to the



glazing. The windows and doors work to provide panoramic views of the garden and beyond throughout the new property. "The Thames Valley Windows sales, engineering and installation team were great to work with, and we're very pleased overall," say the homeowners.

Top: The modern new house has a box-like form, which is enhanced greatly by ample glazed elements. Above: The entrance door is flanked by floor-to-ceiling fixed windows. Left: Glazed doors span the width of the open-plan layout to create a real sense of inside-outside living

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# Rooflights & lanterns

Bring plenty of daylight into your home with overhead glazing, from fixed panes to electrically-opening automated skylights

**O**verhead natural lighting has become hugely popular, creating rooms awash with sunshine. A flat or sloping roof window, or a lantern, lets in proportionally much more daylight than an upright equivalent, so even a relatively small unit can make a big difference.

Rooflights are excellent problem-solvers, especially for renovations. Use them at the top of stairs to send light down onto the ground floor into previously dark hallways, or above showers and baths in loft conversions to avoid privacy issues. They have become a core feature of kitchen-diner extensions to period

and for accessible windows in places like lofts, tilt-and-turn units solve the problem.

Minimal, near-frameless aluminium styles let in the maximum amount of daylight, but some homeowners prefer the character of multi-pane designs like lanterns. If you want a big lantern, then you may have to compromise on slim sightlines, because you need thicker frames to provide structural stability. If you're keen to save on costs, avoid large single panes and go for a run of smaller units. A multi-pane product, featuring two or more within a single frame, can be better value than separate smaller rooflights.

**1** A row of Velux modular skylights makes a kitchen-diner extension a sun-soaked space; weather sensors ensure that they automatically close when it rains **2** Roof Maker's O-Lite circular rooflight is a dramatic conversation piece in this contemporary extension; prices start from £1,275 + VAT **3** Fully opening rooflights are a growing trend, according to Sunsquare: its Aero Dual model is designed with access to roof areas in mind



properties, supplementing the daylight from glazed doors. Architects often like to design a line of roof windows running along the space where the side-return used to be: not only does this mean a brighter extension, but the room that sits behind, which will have lost an exterior window, benefits from borrowed light. Rooflights are also invaluable for making lofts habitable.

Openable rooflights can be part of a wider ventilation strategy, releasing trapped humid air outside. Weather-sensitive motorised versions are easy to operate even if they're out of reach, and will close if it starts to rain; Velux now even makes a solar-powered product. Add motorised external blinds to help control overheating.

Keeping hard-to-access overhead glass clean is difficult. If the units are angled, then the steeper the better, as dirt will run off more easily when it rains. Self-cleaning coatings can help,

## Q&A

**Justin Seldis**, managing director of Sunsquare, gives the lowdown on overhead glazing options



### What sort of factors push up the cost of a rooflight?

The main factor is the size of a pane of glass: the bigger it is, the thicker it needs to be (so it doesn't bow, etc) and the pricier it is.

### What are some of the trends you're seeing in this sector?

Fully opening skylights are great for providing access to a roof terrace. With space often at a premium, these skylights maximise roof space and allow in more natural light and ventilation.

### Can they be installed on a DIY basis?

More self-builders now are confident enough to do it themselves, or carry out assisted installs. Our rooflights come with everything needed, from simple instructions to the exact number of screws.



# Conservation windows

Protected homes require a sensitive approach to design, and many suppliers are rising to the challenge

If you live in a protected area, own a listed property or you're just interested in period authenticity, there are additional considerations for specifying fenestration. There is no set definition of a 'heritage window' – local planners and conservation officers will all have different ideas of what they think is acceptable.

Check your permitted development rights if you live in a conservation area, as you may be subject to an extra layer of planning regulation (known as an Article 4 directive), and thus will need permission to change or replace windows and doors. A few manufacturers have used the Article 4 guidelines as the basis for improving their designs, resulting in convincing PVCu frames with the same detailing as their timber equivalents. Some councils have allowed them into conservation areas; others wouldn't dream of it.

With black frames and featuring a single vertical glazing bar, conservation rooflights are



**1** These heritage style units featuring traditional slim glazing bars are from Sash Window Workshop **2** Velux's conservation windows are available in either centre-pivot or top-hung formats. Prices start from £432 plus VAT

meant to mimic cast-iron Victorian equivalents. They sit flush with the roof rather than standing proud, looking less obtrusive from the outside. These have grown in popularity, with homeowners of 'ordinary' period properties specifying them over non-conservation equivalents, even if there's no planning requirement. Suppliers like Velux and Fakro have expanded their product offering to include them. Velux's Grant Sneddon suggests checking with your local conservation officer to see if the black finish is essential; if not, it can add conservation glazing bars to any of its range.

For sash and casement windows, design details matter: the number of panes and the thickness and exact profile of the glazing bars can all make or break an authentic scheme. This is where bespoke timber glazing comes into its own, because these features can be replicated.

As for listed homes, the rules are especially stringent, and you will require listed building consent to replace old units (and maybe to repair existing ones – check with your council). Double glazed (2G) windows are rarely allowed, but a local joiner or specialist such as Lomax & Wood can make single glazed versions using restoration glass with slight imperfections. Fitting secondary glazing can attain some of the energy efficiency and acoustic-dampening properties of 2G, but it can make the original units hard to clean. Expect to have the design scrutinised so as to ensure both sets of glazing bars align.

## Q&A

Build It magazine's period property expert **Alan Tierney** gives his top tips on heritage fenestration



### Why's it important to get heritage windows right?

Much of the history of an old building lies in its windows. Their detailing is often specific to a particular period and has a crucial influence on a house's appearance, inside and out, and its value.

### How do homeowners work out the appropriate window style?

If the style of the lost windows is known (eg from photos or any remaining originals) or there is evidence in the local area as to what might have been in situ, then the best approach is to reinstate them as accurately as possible. If there is no historic template to follow or replication is not feasible, good modern design can also be successful.

### It is better to repair or replace?

If you have original timber windows in your house, retaining them will almost always be the right thing to do. Measures such as draughtproofing, secondary glazing, shutters and thick curtains can cost-effectively improve thermal performance.



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# Choosing the right doors for your home



**D**oors provide a number of really important functions – both from an aesthetic and a practical standpoint. Your front door is one of the first things visitors will see, while internal models help prevent the unwanted travel of sound, trap heat in rooms during the colder months and create privacy when needed. An entrance can even contribute towards improving your lifestyle, with glazed options helping to facilitate a better connection between internal and external spaces, creating that coveted feeling of light and openness. In this section, we'll walk you through each of the key types of door available and what you need to consider to make the right choice.



**1** This cottage-style oak veneer door by Todd Doors is supplied unfinished for you to personalise, from £76.50 **2** Hormann Thermo65 steel front doors have excellent insulation and come with a 5-point security lock, from £1,195 **3** Velux rooflights and full length sliding doors allow sun into this kitchen diner

# Entrance door design

From traditional cottage-style doorways to modern marvels, here we've rounded up a selection of eye-catching ideas



Top right: An oversized door, like this model by Urban Front, provides additional design flair as well as helping to future proof your home in case wheelchair accessible entrances are needed in future. Above: The strip of obscured glazing in the Metris aluminium front door, from £2,000 at Express Bi-Folding Doors, allows light to flood into this property's hallway

As well as serving a practical purpose – to provide an entrance point to your home and an effective barrier to burglars – your front door can have a powerful visual impact on the overall aesthetic of the house. It's vital, therefore, to select a model that works in harmony with the architectural style of the dwelling. Plus, you'll want to choose a design that stands the test of time in terms of looks and performance.

## Using glazing

As well as establishing unique visual character from the outside, incorporating glass into your front entrance – either in the form of a glazed panel or sidelights – will help bathe your hallway with natural brightness. A pane could also be installed above the doorway, if the height is available. For a contemporary, asymmetric look, using glass on just one side of the opening could also be an effective option, too.



## Door size

Choosing an oversized front door can be another clever route to making a strong visual statement – particularly if you're building a contemporary home or tackling a barn conversion. Historically, domestic doors were made smaller as a means to keep warmth inside, so upping the size is an effective way to introduce a modern flourish.

Of course, this design solution is only viable if the house is large enough to accommodate a bigger opening. If you're keen to incorporate an oversized entrance, bear in mind that the dimensions will still need to work in harmony with the proportions of the whole building. It's worth consulting your architect to ensure the door complements the structural makeup and suits the pattern of the rest of the fenestration.

## Discreet design

Incorporating a 'hidden' front entrance that blends with the elevation can give you a sleek, stylish result. This solution is particularly effective for minimal homes featuring clean, contemporary architecture. "If the outside of the house features timber cladding, it's quite exciting to be able to hide the door within the wall finish," says Elizabeth Assaf, designer at Urban Front. "It is a little complicated to achieve as you have to line up all the boards with the door. As you're making the entrance panel off site and bringing it in later, you need to ensure the measurements all match."

In order to attain a seamless effect, the entrance should sit flush with the floor. That way, the door is only revealed when it is opened. "It's essential to have your architect, builder and supplier work together to achieve this," says Elizabeth.

## Country chic

Traditional front doors come in a plethora of styles, from period pieces through to rustic finishes. If

you're looking for a doorway that complements a farmhouse look, selecting the right material is key. Warm wood works well to create characterful allure. "There's nothing better than oak when it comes to creating a traditional effect," says Matthew Todd, managing director of Todd Doors. "Modern products are stable, secure and well-insulated. Composite versions are also available so you can achieve an authentic look without compromising on modern manufacturing tech."

### Bold hues

Adding a burst of colour is another way to ensure your front entrance stands out. Selecting a shade that contrasts with the rest of your home's external materials palette can be a smart move, particularly

If you want to make this kind of statement, it's important to get the perfect paint job – so think this through carefully. "Selecting a door that's supplied pre-finished can be cost-effective, as the final coating is applied in a controlled environment," says Matthew. "Most manufacturers can finish to any RAL colour and will spray apply the top coat. This is far better than buying a great door, having it professionally fitted and then ruining it by finishing it with a shoddy or amateur paint job."

### Surface texture

The finish you choose will have a massive impact on the look and feel of your entrance, of course – but you also need to consider practical issues such as the level of maintenance required.

"Texture, pattern and character are all in force for this new season of trends," says Elizabeth. If you don't want to go for a natural finish, then the surface of a timber door can be manipulated to create quirky grooves, patterns and effects. "Creating expression and depth is an exciting option with wood and very achievable thanks to the material's warmth and grainy texture," she continues.

However, homeowners keen to create an out-of-the-ordinary aesthetic aren't limited to timber. "The metallics trend is still very strong, with copper and bronze as the forerunners," says Elizabeth. "There has been lots of interest in the industrial look, as well as corten or blackened steel. That rough beauty certainly seems to be gaining steam."

Below: Supplied by Todd Doors, the Hillingdon design comes in a selection of attractive finishes – arctic white (pictured), hush grey, and anthracite black. Hardwood veneer infuses the entrance with traditional appeal and works in harmony with the canopy-style porch. Prices start at £280



Left: Urban Front supplied this e80 pivot doorset, which has been fitted into a boarded Onyx-finished panel, complete with number engraving. IQ Glass fitted the entrance into frameless glass for extra wow factor

if tracking down a perfectly matching finish is proving challenging. "Going for something bold and different is always the best way to make a real design statement," says Steve Bromberg, managing director at Express Bi-Folding Doors.



## Statement ironmongery

Close attention to detail can often make the difference between a standard front door and one that truly stands out. There's myriad options available, with lever and pull handles in an array of shapes and sizes. There's also plenty of choice of materials, from the warmer-hued metals like rose gold and copper to cool, crisp finishes of stainless steel or aluminium.

Think about how you'll interact with the handle on a day-to-day basis, too. For example, consider whether you want to

install a model that incorporates a latch, which will allow you to keep the door open if you're bringing the shopping in.

When choosing a bar handle for your entrance, pay close attention to the proportions. "The rule of thumb for domestic properties is to go for something that's no more than half the size of the door," says Elizabeth. "Also, consider how your hand feels around the handle. Some square designs look good, but aren't always comfortable."



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# How to specify internal doors

From reflecting your personal tastes to protecting you and your property in the event of a fire, your choice of doors can have a big impact on your home's feel and performance

A property's internal doors can fulfil a range of functions. Aside from the obvious privacy benefits, they also have useful soundproofing and insulating qualities and can make a real aesthetic statement. So, what do you need to know to select the right products for your home?



## Opening style

First and foremost, consider how you are going to use the door and the adjoining rooms/circulation areas. Standard hinged models will usually be suitable, but there are certain scenarios that may benefit from a different arrangement. For instance, do you have narrow



corridors or a small bedroom with an ensuite? Installing a pocket door system that slides into the wall may be the best solution here, as it won't take up floor space or require any strategic positioning of furniture. "I think in the past, pocket doors were seen as being a bit tacky," says Elizabeth Assaf from Urban Front, "but there are some really good designs now and you can do so much with them. A lot of people install them in rooms where they want a seamless transition between the wall and the door. The flush fitting means you can't see a frame, so it's a really great way of concealing an entrance."

Internal bifold or sliding doors are often used to create a feeling of connectedness between two spaces while also allowing you to close areas off to create more privacy – a great option in an open-plan living zone. "Putting in room dividers gives you more flexibility," says Matthew Todd, managing director of Todd Doors. "It can also stop the transmission of cooking smells from the kitchen. Most people opt for glazed panels so that when they're closed, you still retain the flow of light in the house."

## Materials

Whether you like high gloss modern finishes or rustic timber textures, your material choice should be largely informed by your home's overall aesthetic. Wood is a popular material choice for internal doors and you can find these in styles to suit virtually every scheme. "For contemporary interiors, many of our clients

Above: This mushroom grey double doorset by JB Kind has a neutral appeal that will work well in modern interiors thanks to its clean lines and slightly textured finish. Left: These glazed French doors by Todd Doors allow zones to be closed off while still allowing light to travel throughout the house



Top: This pocket door from Todd Doors is ideal for smaller areas. Below: A pivot door, like this oversized Urban Front model, can add wow factor

want the units to disappear into the walls, so they opt for doors with no frame or architrave," says Elizabeth. "If you're going more traditional, an oak panel design with ornate handles often works well in these scenarios."

Glass doors can look stunning, owing to their ability to bring a feeling of light and openness, but this quality also has a down side. "With glazing, you do have to consider whether you can keep the rooms on the other side of the door tidy," says Matthew. "They're suddenly visible all the time. You can't just close the door and lock away the mess!"

Metal interior finishes have also been growing in popularity over the last few years. "Especially in mews houses, a lot of people have copper

kitchens, so they want a copper door to match," says Elizabeth. "Darker options, specialist metals and more outrageous finishes are definitely in vogue right now."

These do tend to be pricier than wooden models, but there are similar alternatives if you're on a tight budget. "We offer a number

of timber units that reflect the look of metal with slim rails and glazing bars to replicate the Crittall-style look from the 1920s and 30s," says Matthew. "These work really well in more minimalist loft-style apartments."

### Price

As we've seen, options such as metal finishes and glazed panels will push up costs, but generally, the price of a door will depend on whether it's a solid wood, solid core or hollow core construction. The latter units are typically constructed from a timber frame, with a plywood or hardwood surface, filled with rigid cardboard and covered with veneer. Solid core veneered versions made from chipboard or particleboard have midrange price tags and mimic the weightiness of solid wood with its range of associated benefits.

Your decision will come down to what represents value for money for your budget. Installing high quality fixtures in your home will increase its overall worth. Solid doors are very sturdy, with a thick, highly insulating construction that can boost comfort levels and stop the travel of unwanted noise. A lot of homeowners elect to install this type downstairs, where it's noisier and people spend more time, and go for cheaper models upstairs.

### Size

All internal doors must meet the UK's minimum accessibility requirements as outlined by Building Regulations, but aside from that, there's no specific size they have to be. A typical door might be 1,981mm (H) x 762mm (W) x 35mm (D), with a width of 838mm or more if wheelchair access is required. When space is limited, smaller doors are usually 686mm wide. Opting for larger wheelchair accessible entryways means that, should you need them in future, you will be protected from having to undertake expensive renovation works or potentially having to move house.

## Quick guide: fire doors

Building Regulations state that for all houses over two storeys high, every door leading from a habitable room to a stairwell must be fire rated, aside from toilets or bathrooms. If you have an internal garage, a fire door is also required where this joins the home. "If you are in a bungalow, for instance, there's less likelihood of needing fire doors for rooms other than the garage," says Elizabeth, "but in most houses there is a legal requirement for fire doors. If you

are unsure about what you need, then ask your architect, Building Regs officer or builder – they will be able to help."

Many designs are available in fire rated guises, so you should be able to keep to the aesthetic you want. Remember that if you purchase fire doors, all the ironmongery, frames and seals also have to be certified. These doors won't perform properly if they have been incorrectly fitted – so use an experienced joiner to install them.



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# Glazed door essentials

Get the basics right with our guide to the key design and practical considerations

**A**esthetics are the first port of call for most homeowners when choosing glazed doors. French doors (page 50) are great for small projects, and available in a range of traditional and contemporary styles. But if you really want to open up the space, bifolds (p48) or sliders (p49) are often the way to go. Each has its pros and cons: some are ideal for achieving a fully-opening run; others might give you better garden views while the doors are closed. Our individual guides contain more product-specific information, but here's a heads up on the general considerations: **Planning permission** If you're self building, you'll always need full planning consent – but on many renovations and small extensions, glazed doors can be fitted under permitted development rights. See the rules at [www.planningportal.co.uk](http://www.planningportal.co.uk), or speak to your local authority for clarification.

**Sizing up** Off-the-shelf models are around 2,100mm–2,400mm tall to suit standard storey heights, but some manufacturers offer bespoke oversized designs as tall as 4,000mm – perfect for adding real wow-factor. French doors can get to widths of 1,800mm, while the sky's the limit with sliders and bifolds (on big spans, you may be pushed towards aluminium as the frame choice).

**Energy efficiency** The main consideration here is how well-insulated and airtight the unit is as a whole. There's a limiting U-value of 2.0 W/m<sup>2</sup>K for doors on new builds (1.8 for renovations); but in practice, on a big run of glazed doors you'll need to aim for more like 1.2–1.3 W/m<sup>2</sup>K to get good comfort levels and reduce heating bills.

**Weather ratings** Good performance comes down to the quality of the frames, tracks and seals as much as the installation itself. Bear in mind that desirable level thresholds are unlikely to be as waterproof as stepped versions. Weather tests are carried out to European standards (EN

12207 for air permeability; EN 12208 for water tightness) – always ask to see a unit's certification.

**Maintenance** Materials will have a big bearing on upkeep – see the section on page 15 for advice. There are particular considerations for glazed doors. The running gear for sliders and bifolds needs to be smooth and robust, for instance. Check tracks periodically and remove debris, and follow the manufacturer's guidelines for lubricating hinges, trolley wheels and locks.

**Safety & security** Multi-point locking is a must these days, and the installation should meet the minimum requirements set out in British Standard PAS 24:2016. Some products carry the police-approved Secured by Design accreditation. On the safety side, any full-height glazing must be designed to prevent injury. Most manufacturers satisfy this requirement by fitting laminated glass.

**Installation** While you can measure up yourself, for peace of mind it's best to have your installer do it. If possible, use a fitter recommended by the manufacturer. Remember, glazed doors will only perform as expected if they're correctly installed!

**Costs** Prices vary depending on material, spec and size, but a mid-range glazed door setup might cost around £900–£1,200 per linear metre (of opening width). Naturally, if you want high-spec or bespoke units, prices will rise accordingly. French doors tend to be a little cheaper, as the mechanisms and installation aren't as complex.



Above: This extension by Sketch Architects features large Crittall-style French doors, set within a near fully-glazed wall

## Top tip Try before you buy

The best way to do get a feel for what's on the market – and check the quality of hinges, running gear, seals etc – is to try doors in the flesh. So it's always a good idea to visit several showrooms, or head over to one of the Build It Live shows ([www.builditlive.co.uk](http://www.builditlive.co.uk)) where you can meet a range of suppliers and test their products.



# Bifold doors

Want to benefit from more light and enjoy unfettered access between house and garden? This configuration could be the right fit for your project

Above right: Solarlux's aluminium Bi-Folding Door won Best Glazed Door in the 2017 Build It Awards

When it comes to achieving a seamless transition between home and garden, for many people, bifolds rule the roost. Also known as folding-sliding doors, this configuration features multiple panels that are designed to concertina together as you slide them open – giving you an almost totally clear opening (potentially over 90% of the width of the run). Here's what you need to know when deciding whether they're the right fit for your scheme.

## Style & configuration

Bifolds are fantastic for hot summer days, when you can fling them fully open and stack the panels neatly out of the way to bring in fresh air and get the best of indoor-outdoor living.

You can specify these doors in a variety of arrangements – your supplier or installer will help you to identify the best solution for your requirements and budget. Straight runs of three to six panels are the most common options, and ideal for the vast majority of projects. Off-the-shelf versions can span openings up to around 5,000mm wide. The largest bespoke designs might feature as many as 20 doors, but do come with corresponding price tags for the bifold units, loadbearing lintels etc required to accommodate them and the labour for installation.

The individual panels are typically 700mm-1,200mm wide; and you'll want to get the right



balance to give you the access you want while minimising the total amount of frame.

Depending on your requirements and the size of the opening, the units might stack at one end or the other, or you can opt for a centrally-opening arrangement. Given the UK weather, few of us are likely to want to crack open an entire set of bifolds just to get in and out of the house to take the rubbish out. The solution to this is to include a standard-style traffic door that can be operated independently of the rest of the run.

## Considerations

While bifolds' multi-panel setup enables unrivalled garden access, this does come with a downside: all that vertical framing will slightly obscure views when the doors are shut (which is most of the year, outside of summer). You'll still get plenty of natural light and a great vistas – but if your main priority is to enjoy the best possible outlook year-round, then sliders might be more suitable.

Another factor to bear in mind is that, at alternating hinging points, the bifolds will run outside of the track – taking up floor space either internally or externally when they're in use. Most homeowners go for an outward configuration, as it means you don't have to worry about indoor furniture or window treatments getting in the way. But if the property is exposed to the wind, it may be better to go for an internal stack.

## Top tips for specifying bifolds

- Look for premium products that include good guarantees on the running mechanism and hinging hardware.
- Tracks can be either top-hung or bottom-rolling. The former style allows for a concealed mechanism but may mean you need to install a stronger lintel or steel beam to carry the extra weight of the doors.
- The quality of the gaskets at hinging points is crucial, as this will have a big impact on performance in terms of both energy efficiency and weather protection. It's worth asking about built-in finger protection, too.
- Integrated blinds can be a better option than internal dressings where bifolds are to concertina internally.

# Sliding doors

For many homeowners, sliding doors have the edge on views. Their big glazed panels feature minimal sightlines, which means they can offer fantastic vistas whether the doors are open or closed – and there are configurations available to suit a range of design requirements. So could they be the ideal solution for your project?

## The basics

Sliding units have moved on massively since the days of the old patio-style door. Yes the glass panes still slide behind one another on a track, but the size of the framing materials, smoothness of the running mechanisms, threshold details and overall quality are on a completely different level.

An array of configuration options is possible. On a two-panel setup, you'll be able to open up 50% of the aperture; 66% with three panes; and up to 75% with four. These could be made up of a mix of fixed and sliding panels, or all the units might be moveable. You can also opt for hidden pocket door versions, where a single element of glazing glides back into a section of solid wall.

The beauty of the sliding system is that each panel can be much larger than with bifolds – which makes this a fantastic choice for large apertures. In general, you'll be aiming for the biggest panes you can within the confines of your budget and the size of the opening. That way, you'll maximise the ratio of glass to frame. A typical sliding panel might be around 1,500mm-2,500mm wide, but they can go much bigger.

As there's no hinging mechanism between each of the panels, the frame materials can be much slimmer. In fact, some suppliers can achieve near-invisible sightlines – giving your installation a modern, uncluttered look and ensuring the clear visuals of the open doors still apply once closed.

## What to consider

The main argument against sliders is that they won't achieve the full opening that bifolds can offer; and in this respect, the choice between them basically comes down to your lifestyle goals and how exposed the site is. If you want a full party atmosphere, that might tip the balance towards bifolds. If you're more set on year-round

If your self build, renovation or extension is all about maximising views of the garden or surrounding countryside, then full-height sliding doors are a fantastic choice



views and maximum natural light, or live in a windy location, then sliders are likely to be more suitable.

Another consideration is that there's no standard-style independent access door. That said, the first panel can simply be pulled across partially for a little ventilation or to nip in and out; but not everyone finds this ideal for a regularly-used access. Lift-and-slide versions allow you to secure the door in any semi-open position.

**Above:** IDSystems enhanced this addition to a South London property with a set of sliding doors that glide back to create a completely open corner

## Need to know

- Despite the size of the panels, good-quality sliding doors are very easy to operate. A number of suppliers pride themselves on their 'fingertip operation'. Consider a user-friendly lift-and-slide system for effortless gliding.
- Always look out for high-spec tracks and running gear: this part of the installation needs to be robust to ensure long service.
- If you really want to have a totally clear opening, and you've got plenty of garden space, you could opt for an extended track. This way, the glazed panel can slide all the way out to the side of the building.

# French doors

Sometimes traditional is best – although this practical choice can offer a modern look, too



Above: This extension by Plus Rooms features Art Deco-style steel French doors with side and toplights. Right: Scotts of Thrapston supplied the fenestration for this stylish conservatory, which includes fully-glazed double doors

While they can't offer the degree of access as sliders or bifolds on large openings, French doors still have a lot going for them. They're often favoured for heritage projects, conservatories or schemes where you're simply swapping normal windows for full-height glazed doors. Here's how to tell if they're the right choice for you.

## Design details

Standard French doors are available in widths of 1,200mm, 1,500mm and 1,800mm, all in a two-panel configuration. At this sort of size, the glass-to-frame ratio is pretty good – plus, when you open them up you'll get an almost completely clear access to the garden. So on smaller apertures, they can attain better sightlines than bifolds and offer just as good a connection between indoors and out.

Available in myriad materials and finishes, this arrangement has long been a popular choice for getting more light into period homes. There are also plenty of options for modern designs, whether you're extending or building a new home from scratch. For instance, they're hugely popular

for Juliet balconies on master bedrooms, where they'll open inwards to allow you to bring a blast of nature and morning fresh air into the home.

Off-the-shelf French doors are very affordable – after all, there are less moving parts compared to bifolds and sliders, and the units are pretty straightforward to install. Go bespoke, though, and prices will rise. As with other styles of glazed door, PVCu tends to be the cheapest material, but won't suit every project. Timber's hard to beat for a traditional look. Engineered softwood is cost-effective, while hardwood or modified timber (such as Accoya) will give excellent durability. It can work well to mix-and-match a glazed upper section with solid panels lower down.

For the sleekest modern results, opt for a fully-glazed panel with timber or aluminium surrounds (steel is an alternative metal, and will lend a heritage-style look). You could also consider composite products if you want the character of wood internally alongside a low-maintenance PVCu or metal finish.

## Sizing up

The biggest drawback of French doors is you're limited to the two-panel arrangement. Standard products have a maximum width of 900mm per door; hence the biggest opening you can create is 1,800mm – nowhere near the kind of spans that can be reached with sliders and bifolds.



You can increase the amount of natural light entering your home, and improve the sense of space, by fitting fixed glazed sidelights adjacent to the doors. If ventilation is important, these could feature an opening toplight – much like you'd see on a conservatory – but bear in mind that if you're going for a modern look using slimline products, this could undermine the overall aesthetic.



## Closer look

# Modern extension with bespoke glazing

A listed cottage was given a contemporary revamp with a curved addition featuring Kloeber doors and windows



A charming cottage in a Buckinghamshire village was the setting for one of Kloeber's more unusual and challenging projects. The two bedroom property was too small for the owners and their growing household, with two of the older children having to sleep in an outbuilding, so they wanted to transform their home into somewhere more suited to a family of five.

Lynn Palmer Architects were commissioned to create a sympathetic contemporary extension for the thatched abode, working closely with glazing supplier Kloeber to achieve the final design. The brief included creating an entrance hall with a large family living space, a bigger kitchen and two additional bedrooms. However, this project came with a series of challenges. The house is set on a steep, sloping site and the 60m back garden is raised 2m above the original building, which sits 1m above pavement level.

In order for the living space to connect with the raised garden, the new sleeping quarters were located on the lower floor and the kitchen and dining areas on the upper level. The curved roof of the large addition reflects the shape of the original thatched residence, which can be seen through the upper floor from the garden.

### Bespoke glazing

The architect and the homeowner visited Kloeber's Grendon showroom a couple of times to look at the product range and have an in-depth discussion with technical sales advisor Nick Fogg. Creating the perfect curved glazed units was no mean feat; a survey of the extension



Far left: Minimal, anthracite grey frames give the fenestration a uniform and polished finish. Left: The large extension features an unusual curved design, which meant the glass panels had to be carefully cut to fit the space. Left: The glazed doors and windows make a stunning full-height feature inside the property

found that they had to be hand-templated, as there was no other way of making sure the frames would have the right radius.

Kloeber took the architect's drawings and adapted their products to suit, settling on a combination of anthracite aluminium casement windows, fixed glazing, French doors and tilt-and-turn fenestration, plus a FunkyFront door and rooflights above. They also advised on additional vertical and horizontal supports in the gable. These were covered in colour-matched aluminium pressings, creating a neat finish. Due to the unusual nature of the design, Kloeber's team of experienced engineers were hired to ensure everything was installed perfectly.

This extension is a great example of expert design and craftsmanship. The modern French doors and glazed panels complement the lovely period property and its contemporary addition.

### QUICK CONTACT

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# How to specify feature glazing



**T**hanks to improvements in thermal efficiency technology, wide spans of glass – whether it's a run of bifold or sliding doors, a glazed extension or a full height picture window – are becoming increasingly common fixtures across UK homes. The benefits of including such features in your scheme are numerous. In addition to the obvious aesthetic enhancement it can bring to your property, more glass means more opportunity for sunlight – with its proven mood boosting benefits – to stream into your home. Plus, the increased solar gain means you may need less space heating as a result. Installing glazed doors leading into a garden is also an ideal way of facilitating a better connection between your home's inside and outside areas and bringing in plenty of fresh air.



**1** Minimal, near-frameless windows by IDSystems ensure uninterrupted sightlines across the garden in this project by Mulroy Architects **2** The expansive glazing in this extension to an 18th century farmhouse, designed by architects Van Ellen + Sheryn, gives the property panoramic views of the Dartmoor countryside **3** An orangery-style oak and glass extension by Arboreta





# Essential guide to glazed extensions

A glass-filled addition could transform the way you interact with your home, bringing more space, light and value. Here's what you need to know to get your project started



Above: This double-height extension features floor-to-ceiling glazing by Velfac. The timber cladding provides an element of solar shading. Above right: This spectacular new addition provides a generous living space for the residents, while maximising light and views. Oakwrights has blended extensive glazing with green oak construction to give the space a heritage twist

If you're planning an extension, glass could play a key role in terms of design and practicality. A glazed addition can amplify interior space, draw sunlight indoors and better link home and garden. Whether you want to make a statement or simply increase living area, there's an option to suit you.

## Size & style

The first step when designing an extension is to think about how you want to use the space, and how it will interact with the existing building and floorplan. If you're keen on a big open-plan zone, such as a kitchen-diner connecting to a patio area, then using plenty of glazing might well suit your goals. But if you want a snug for watching films and reading books, or you need to minimise overlooking from neighbouring properties, then a more traditional addition may be a better fit.

Think, too, about how a glass structure might complement or contrast with the style of your existing property. Some planners favour a modern glass-link design for heritage dwellings, because there's a clear distinction between old and new.

Scale is important. As a guide, an extension should take up no more than a quarter of your garden – although obviously this depends on the size of your property. The trick is maintaining a good balance between indoor area and outdoor

amenity. Remember that a highly glazed extension will magnify the sense of space anyway.

Exactly where the extensions sits is another consideration, both in terms of how it connects with the garden and the performance of the finished zone (for more on this, see the section on 'creating a year-round space').

## Glazed extension options

There are a number of design styles for this kind of addition – both contemporary and traditional – but which will work best for your project?

**Glass box** A modern structurally glazed zone can add real wow factor. Visible framing is kept to a minimum, allowing for near-continuous views and ample internal light. This can work brilliantly for period properties, creating a dramatic juxtaposition between old and new that planners often like. The vast amount of glazing will inevitably impact on performance – so think about shading and other features that will help to control temperatures.

**Side-return extensions** Many homes have some redundant space at the side that could be incorporated into the dwelling. This can offer a small but potentially useful addition that broadens existing rooms, without reducing the amount of garden amenity. You can also combine a side-return with a rear extension for maximum space.

A good design option is to fit rooflights to bring more light in and frame views of the sky.

**Conservatories** These popular extensions come in off-the-shelf designs, which tend to be very budget-friendly, and bespoke varieties. Provided your project fits within certain parameters (for instance, it must be single storey, less than 30m<sup>2</sup> in size, and separated from the main house by external quality doors), conservatories are generally exempt from Building Regulations. The exceptions are with details such as ensuring the glazing and electrical installations comply. Bear in mind you need still to think through performance, otherwise a conservatory may not offer you year-round living space. The quality of the materials is important, too; opting for a low-cost product may lead to increased maintenance requirements.

**Orangeries** Boasting bags of traditional appeal, these designs typically combine a brick plinth with glazed upper walls, and a flat or shallow-pitched roof with a central roof lantern. "Conservatories are often the default choice, but an orangery has less exposed glass, which could protect your house from harsh weather conditions," explains Jonathan Hey, managing director at Westbury Garden Rooms. Their more solid roof structures also mean you can incorporate insulation, rather than relying solely on costlier high-performance glazing.

### Creating a year-round space

With the exception of qualifying conservatories, you will always need to apply for building control approval for your project. A particularly important area with glazed extensions is energy performance (covered by Part L of the Building Regulations). By default, the amount of glass you can use is limited to 25% of the new floor area – unless



Left: This side-return extension by Mustard Architects features triple-glazed rooflights with a solar control coating to maximise natural light while maintaining a comfortable year-round temperature

you're making improvements elsewhere. "An extension is a big investment, so it's crucial it can be used throughout the year," says Jonathan.

Around 40% of a home's warmth is lost through glazing. To attain a comfortable environment in winter, opt for high-quality double or triple glazing (probably incorporating gas fills). Consider over-insulating in other parts of the structure and potentially upgrading your heating system.

The location of an extension and amount of glass impacts on summer comfort levels, too. "Be careful not to over-expose your house to sunlight," says Opinder Liddar from Lapd Architects. On a south-facing elevation, there will be a lot of solar gain through the glazing. Options to avoid overheating include overhanging roofs and brise soleils, solar control coatings for the glass panes, and ensuring good ventilation (eg via opening windows or a well-designed mechanical system).

## Alternative routes to light

You don't always have to opt for maximum glass to achieve a light-filled home. Here are some options that could help turn a more conventional extension project into a bright living space that meets your expectations:

### 1 Wide spans of glazed doors

Bifolds and sliding doors are popular with homeowners looking to modernise – offering the chance to blur the boundaries between indoors and out. "Fitting glazed doors across one elevation can maximise external views," suggests Charlie Mills from Oakwrights.

### 2 Rooflights

Installing roof windows can work wonders in awkward and light-challenged rooms, providing valuable overhead brightness and ventilation. They can also be a great option for naturally illuminating the potential dark zone where the

new extension meets the existing space. "Just make sure that you don't overexpose a room to sunlight, as this could compromise your comfort levels," explains Ben Lee, director at VITA Architecture.

### 3 Clerestory windows

If you want to integrate more glazing along an elevation where overlooking might be an issue (either for your home or a neighbour's), then installing high-level windows near the roofline could be the answer. This will allow you to boost light levels while maintaining privacy.

### 4 Glazed gables

Where a pitched roof extension makes sense to fit your home's aesthetic, consider incorporating fixed glazing at the gable walls – potentially right up to the apex. It won't come cheap, but it's a wow-factor feature.

# Striking light-filled extension

Graham and Philla have replaced a dilapidated extension with a wow-factor oak frame structure



Above: The reworked listed property features a striking new oak frame extension provided by Oakwrights

**W**hen Graham and Philla bought this grade II listed farmhouse, they knew it was in desperate need of a complete renovation. The original property was built in the early 1600s, with a brick and timber extension added in the 1700s. A huge chimney stack between these sections was fitted by the previous owners.

The homeowners worked with a structural engineer to understand what work was required. They discovered that the chimney stack, which weighed around 35 tonnes, was built on sloped clay soil with no foundations. It was pushing the newer wing out and pulling the original house forward. With the property verging on being dangerous, it was decided that the extension needed to be demolished and replaced.

## Oak frame addition

Thinking about what they wanted from this substantial section of their home (the new extension is 450m<sup>2</sup>), the couple were keen on something that looked modern, but it needed to account for the planner's requirements.

The local authority wanted the new building to be like-for-like with the previous brick and timber structure, but the pair were able to win them round to the idea of something a bit more contemporary in style. This led to Oakwrights

being enlisted to construct an oak frame extension. The design developed as a three storey building, but it was important for this to connect both aesthetically and structurally with the two-storey original farmhouse. This meant the oak frame design needed extremely thorough consideration from the start.

Oakwrights used specialist 3D software to work to the dimensions provided by a 3D laser scan of the back of the house. This approach ensured the frame aligned perfectly to the house.

## Natural light & vistas

A key design requirement for the homeowners was for the new space to feature lots of glazing and make the most of the surrounding views of the beautiful Bedfordshire scenery. To frame the surrounding vistas, large fixed panes of floor-to-ceiling glass feature across the three storeys, with the top storey benefitting from a bespoke shape that fits the vaulted ceiling. The entrance door has sidelights to enhance natural brightness, and the balconies above have glazed balustrades to ensure views aren't obscured.

"The two structures are actually completely independent," says Graham, who is thrilled with the result. "We had to have the front of the old building underpinned and tanked out, and 1.8m foundations installed for the new oak frame section." The build came in at £600,000, with the finished home valued in the region of £1.8 million.

## QUICK CONTACT

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# Structural glazing FAQ

Want to enhance your project by bringing in more natural light? We speak to Opinder Liddar about how building with structural glass could be the ideal solution



**Opinder Liddar is an architect and Build It magazine expert**

## What is structural glazing?

This is when glass is used as a load-bearing element (or for similar purposes) instead of a traditional wall. It is larger, thicker and tougher than standard glass and is fixed to a building without the need for additional supports. It means glazing can be used in increasingly innovative ways, such as for walk-on floors, partitions, gable end walls and even entire extension structures.

## What are the advantages?

As well as providing a bespoke aesthetic, structural glazing allows for unobstructed views and aids the connectivity between home and garden. Yet its greatest benefit is its ability to enhance interior light. By replacing walls with glass components, you automatically increase your home's exposure to sunshine.

## Are there any disadvantages?

Due to its novelty, structural glazing can be very expensive – especially as it's usually specified in large sheets. Budget isn't the only limiting factor: if access to site is difficult, this may restrict the size of panel that can be delivered, for instance.

Glazing is also a fairly poor insulator – around six times worse than conventional modern walling. So if it's not properly planned, you may suffer from a greenhouse effect where your home's interiors are stuffy in summer and cold in winter. You can regulate temperatures by building in the right shading, ventilation and heating systems, as well as compensating by specifying higher quality insulation elsewhere in the house. Glass also requires a lot of maintenance and cleaning, so bear this in mind before buying.



## Will I need planning permission?

This depends on the nature of your project. If you're self building, you'll always need to obtain formal planning consent – and the pattern of the glazing will form part of the approved design.

Some extensions are allowed under permitted development (PD) rights. There are limits on how big the addition can be and the materials you can use (visit [www.self-build.co.uk/pd](http://www.self-build.co.uk/pd) for a rundown), but many extensions are built this way – including those with major glazed elements. If your scheme doesn't fit within the parameters, or you live in a designated area or a listed building, then you'll need to obtain full planning permission. Internal changes don't usually need consent, unless your property is listed (in which case you will need listed building consent for any works).

## What about Building Regs?

On a new house, there are overall performance criteria that must be achieved – and you'll have to show that your project meets the requirements via a SAP (Standard Assessment Procedure) calculation. With an extension, if the amount of glass exceeds 25% of the new floor area, it will be considered 'over-glazed'. You'll need to offset the energy loss by making improvements elsewhere, such as upgrading the loft insulation or installing a new, efficient boiler. In this case, you may need to complete a SAP to demonstrate that your project performs no worse than a theoretical standard extension.

Above: Supported by low-iron glass fins and columns, this structurally glazed extension by Clear Living appears to split the original farmhouse in two – creating a remarkable contrast against the traditional stonework



Above: This self build in Surrey features IQ Glass slim sliding doors and frameless structural glazing, with a walk-on rooflight that allows light to flood into the basement

# Contacts

**Accoya** 020 7421 4300  
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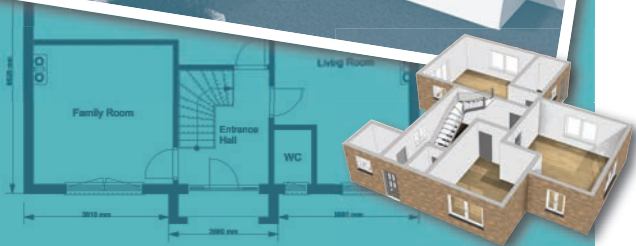
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