irish blue limestone

stone

| the natural choice for generations |

irish blue limestone

explore the possibilities

Irish Blue Limestone has made an important contribution to the heritage of Ireland. In the traditional quarrying areas of Carlow and Kilkenny it is hard to find an older building where the stone does not feature.

Many of the buildings which form Ireland's valuable heritage are testament to the skills of the mason and the versatility of the Irish Blue Limestone.

However no country can dwell solely on past glories and no material can survive without embracing progress. Forward looking and technologically competent companies, who have married up to the minute processing with traditional mason's skills, mean that many of the most striking buildings of today can incorporate one of the most traditional materials.

The skylines of Dublin, Cork, Galway and European cities like Brussels, Amsterdam and London testify to the enduring character and versatility of the Irish Blue Limestone. The interiors of numerous churches, offices and public buildings would be much poorer without the altars, cladding, floors, desks and architraves made

from the Irish Blue Limestone. The public spaces and gardens in many European and Irish towns and cities are also enriched by the use of Irish Blue Limestone for walling, walkways and structural features.

Whatever your ambitions - be it a floor for the porch, a centre point for the garden or the future heritage building, the versatility of Irish Blue Limestone means that there will be a finish, a texture or a colour that will add the final touch to the project.

You only need to look around to see the evidence of millennia of experience in the mining and working of the Irish Blue Limestone. The producers have continued the traditions of getting the best from the material when it comes to extraction and processing but the future is in your hands when it comes to making innovative uses of Irish Blue Limestone.

Go with your ambitions and use the skills of the Irish Blue Limestone producers to turn it into reality.

| **Editorial team** | Patrick Feely, Phil Meaney, Niall Kavanagh, Tom Murphy.

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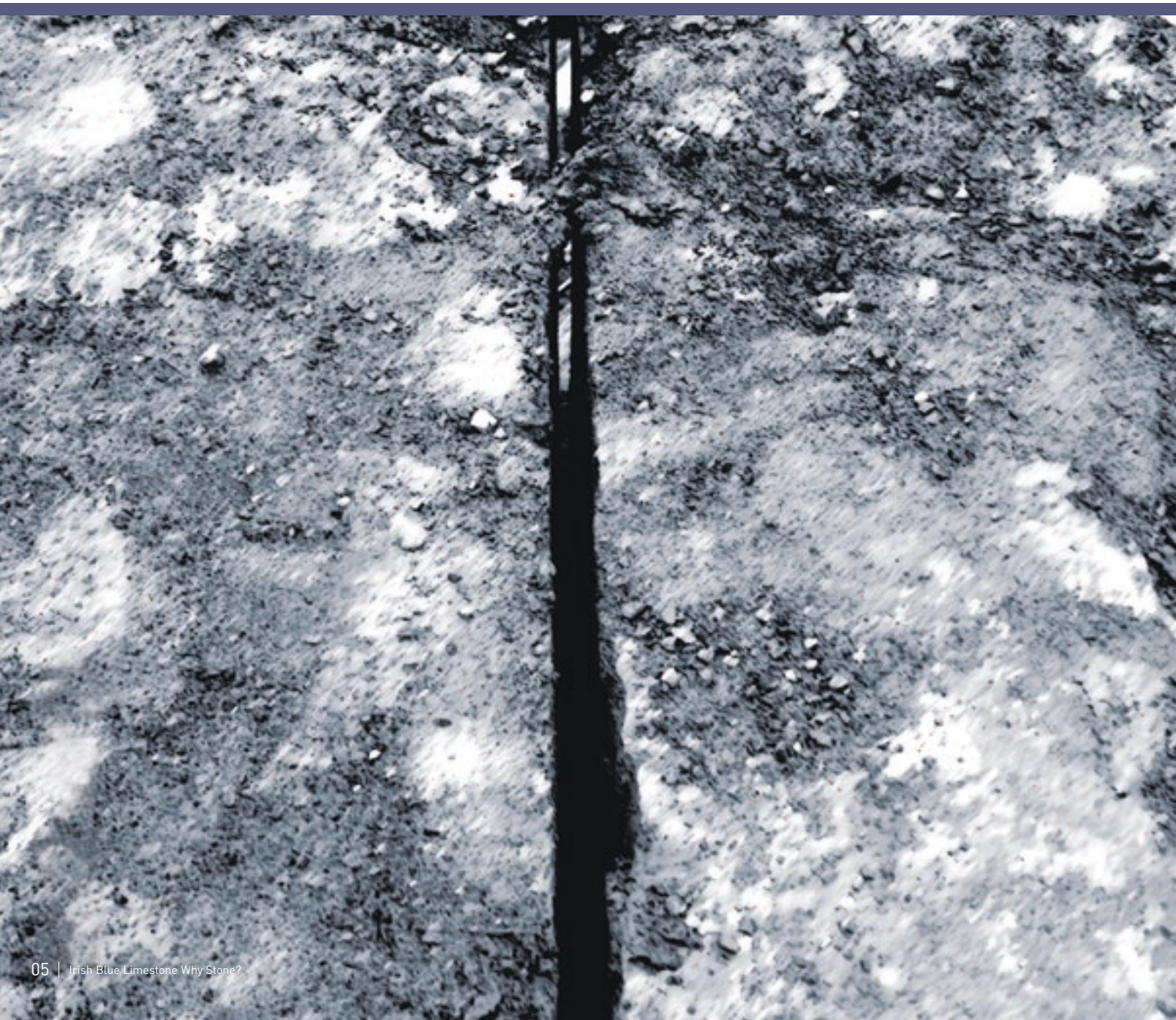
why

stone?

commercial buildings | urban renewal | residential developments

the natural choice
for contemporary settings



why stone?

For as long as people have built structures the fundamental question was ‘What material do I use?’ ‘What I can get’ was the answer for a long time but in the twenty first century it has become ‘what do you want?’. The Irish Blue Limestone producers feel that what you need is a natural stone with the pedigree of their product!

flamed tiles with honed border tiles

l: water feature | london r: traditional use of ibl

What happens to it?

Irish Blue Limestone is a completely natural material, and production processes are limited to cutting, shaping or applying surface dressings. Careful control of the manufacturing processes ensure that nothing is done to the stone that will change its physical characteristics and nothing is added in the form of surface coatings or chemical impregnations that might deteriorate over time.

What is its pedigree?

Although the actual equipment used in production has changed, the final product is essentially identical to limestone that was used in the past to build the houses, churches and castles that form Ireland's heritage. The history associated with the stone is the best guarantee of the durability of today's product and the justification for not adding any coatings or sealants to the finished articles.

Why should I choose it?

By specifying Irish Blue Limestone you are buying into traditional skills of working stone that go right back to the earliest history of Ireland. The material is durable, attractive and chemically inert. It looks rich and has a classic appearance that can complement any design or style from gothic to ultra-modern.

However, all this is insignificant compared with the fact that Irish Blue Limestone has subtle variations of colour and texture that no synthetic material can match.

flamed paving and seating | london

why stone | commercial buildings

l: sanded limestone | r: sanded facade

Any commercial building, and the space around it ,makes a statement that clients will pick up on almost unconsciously. They want to use materials that give gravitas to their buildings, reduce alienation of the public but don't complicate maintenance.

The use of natural materials such as Irish Blue Limestone in the public areas around the building can make the surroundings practical to maintain, but much less austere than concrete.

The Irish Blue Limestone can also be used to provide a continuity between the surrounds and the interior of the building by clever use of tiling, cladding or features in the foyer or reception areas.

Stringer-courses and entrance detailing can add life to the most cutting edge architecture without detracting from modernity. The bland facade of tinted glass can be enlivened by cladding service areas and stairwells with a practical finish that continually changes with the light and the weather.

flamed cladding

Subtly toned blue grey cladding panels with startling white brachiopods can make the ground floor of any building distinctive and memorable.

Changes of size and shape of the cladding can break up the outline and make the enclosed services and accesses less daunting and more of a complement to the structure.

Traditional coursed limestone walling will provide an interesting and practical contrast to the muted tones of the sawn Irish Blue Limestone panels.

The approaches to the Millennium Bridge in London illustrate that creative use of a traditional material such as Irish Blue Limestone can complement ultra-modern materials such as glass and stainless steel in the most cutting-edge design.

r: bushhammered cladding l: bushhammered fossil

sanded limestone

bushhammered facade

l: use on historic buildings r: sanded door surround

l: split, sanded, flamed coarses r: bushhammered facade

why stone | urban renewal

l: sanded seat and flower boxes r: paving and monument in brussels

The use of concrete blocks, concrete paviors and asphalts make all urban areas look alike and it can be difficult for pedestrians, tourists or drivers to figure out where they are without reading the name plates.

Every component made from Irish Blue Limestone is subtly different but still has an underlying continuity of colour and texture.

Pavements become interesting:
What are these strange shapes?
Do you seriously mean I'm walking on 350 million year old fossils?

Walls and balustrades never appear exactly the same: The colour changes depending on whether its dry or raining. The crystal structure reflects or absorbs light differently depending on the position of the sun.

Textures and finishes make the walls appear totally different depending on whether you are at the top or the bottom of the street. Shells give intriguing patterns and hint at old mysteries.

Make the urban environment interesting. Go Irish Blue Limestone.

l: flamed bench and paving r: square, tralee

l: splitstone wall and capping r: kerbing and paving | brussels

why stone | residential developments

l: sanded archway r: sanded columns, steps and facade

The use of stone in residential buildings is long established and the skill of the mason in transforming an inert block into a beautiful feature adds to the charm of many of Ireland's historic houses and castles.

In recent times the use of stone has been restricted to the interiors of churches and offices and designers felt that modern cutting-edge synthetics were the be all and end all of domestic life.

As in all areas things change and increasingly owners are deciding that timeless style, durability and long life are more important than short term fashion and throw away.

Irish Blue Limestone, be it on a floor as tiling, used as a work surface for a kitchen or a bathroom, or forming the sills to a window, has it all. The textures and colours of the surface can blend with the most traditional or the most cutting-edge furnishings. It has an easily maintained but pleasingly tactile surface.

l: sanded sills with random rubble r: sanded sills with split ibl facade

It proclaims solidness and durability to the eye and in use.

Modern processing makes it a cost effective surface alternative but one with obvious class.

Irish blue Limestone is also at the leading edge of much modern garden design. Cappings and sills invite you to touch or sit on the edge of water features or raised beds. Modular spilt stone makes it easy to construct walls and secluded seating areas that interact with the light and complement any planting scheme.

Paving and setts combine ease of construction and maintenance with long service life. The fossil crinoids and shells add a touch of mystery and intrigue to even the largest space.

Features in a house or garden utilising Irish Blue limestone add a rich classic touch to even the most mundane of objects and enrich the domestic environment with a classic timeless beauty.

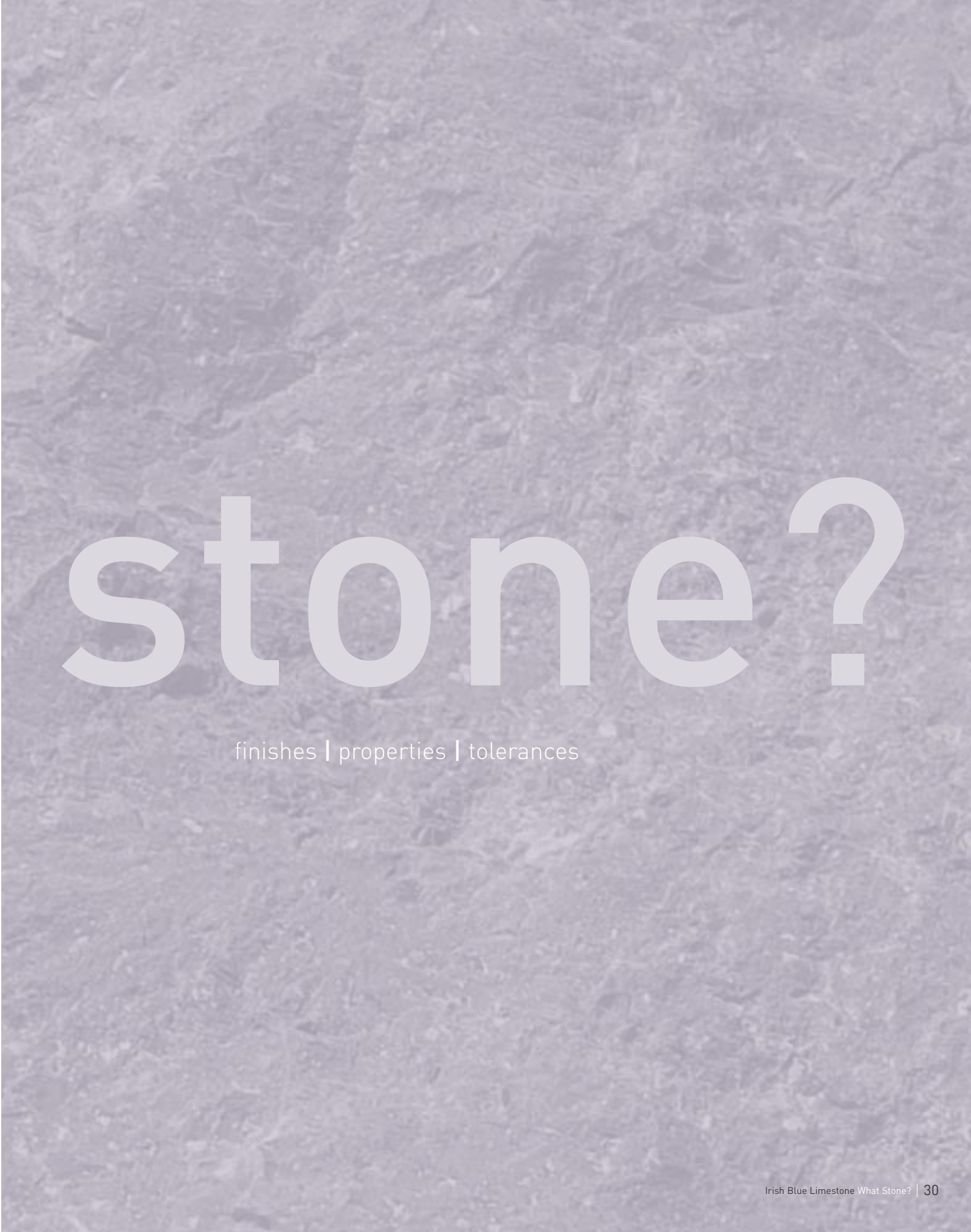
l: limestone countertop r: bushhammered tiles

flamed & brushed vanity unit

l: sanded steps and capping r: sanded ibl window surrounds

l: sanded steps and wall cappings r: sanded circular seat


what



stone?

finishes | properties | tolerances

the natural selection

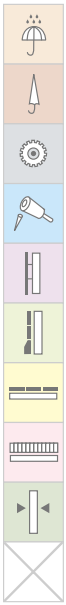
and various treatments

Irish Blue Limestone has been used for centuries as the material of choice for the construction of prestige buildings. It can be worked to provide colours that range from deep blue black to subtle blue grey and surface textures ranging from silky smooth to positively aggressive.

In the hands of a skilled architect, designer or mason the combination of colours and textures can bring the most mundane structure to life or produce stunning variations with the interplay between light and texture.

As with all materials there are some limitations on limestone thickness for the textured finishes. In a similar way some of the mechanically produced textures cannot be applied to the edges of the blocks. Polished and honed finishes generally do not perform well out of doors.

The icons associated with each finish provide a quick guide to the application and minimum thickness of the finished stone.



Finish normally used for internal applications

Finish normally used for external applications

Mechanically applied finish

Manually applied finish

Finish suitable for use as cladding

Finish suitable for use as ashlar, lintels, mouldings

Finish suitable for tiles, skirtings, worktops

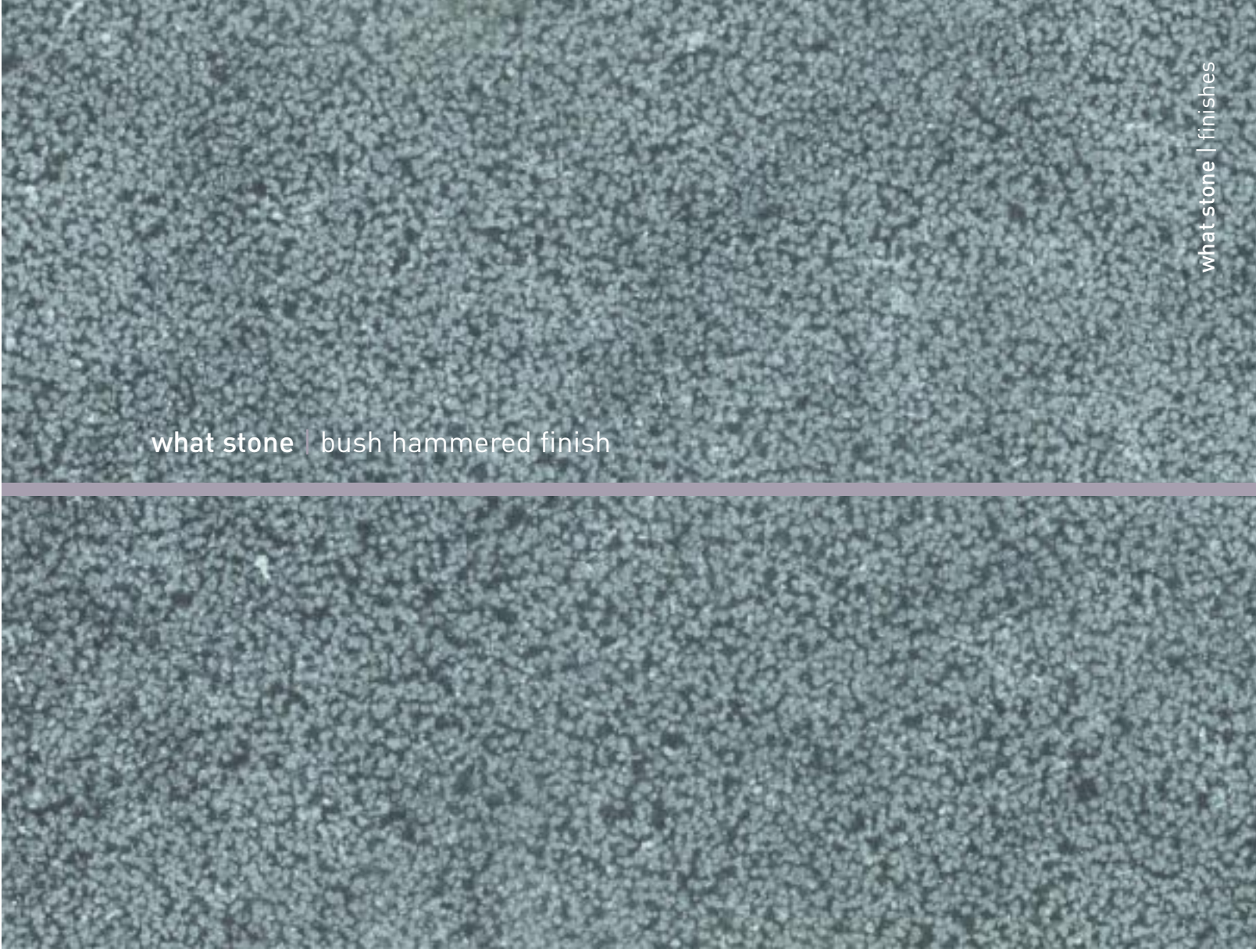
Finish suitable for paviors, setts, kerbs, steps

Minimum thickness for either manual or machine finish

Not recommended

Disclaimer: Due to the nature of the printing and photographic process the colours and finishes represented in this brochure may differ slightly from the colours and surface features of the natural stone product.

Please contact your Irish Blue Limestone producer for advice and guidance.



what stone | bush hammered finish

Colour

Bushhammered finish has a dark blue-grey background with randomly distributed, closely spaced, contrasting paler blue-grey spots.

Finish

The surface has a smooth background with a closely spaced, randomly distributed pattern of fine dimples. Very little of the underlying limestone texture is visible but larger crinoids and white lines may show up as slightly paler areas. The appearance will vary slightly depending on the interplay of light and shadow on the surface.

what stone | chiselled finish

Colour

Chiselled finishes are a pale blue-grey colour with thin sharply contrasting dark grey to black parallel lines. Crinoids will form a randomly distributed pattern of paler grey flecks.

Finish

The surface has a series of smooth parallel incised curved surfaces separated by thin lines of darker limestone. These will have minor imperfections where the calcite crystals or crinoid traces have fractured during the machining. The appearance will vary depending on the orientation of the grooves and the interplay of light and shadow on the surface.

what stone | crust finish

Colour

The colour can be highly variable ranging from dark blue-grey to pale brown-green depending on the beds being extracted. There can also be extensive development of white calcite.

Finish

The surface is produced by the various lithification processes during the transformation of the lime mud into the limestone and may often have slightly brown colouration due to the presence of clay minerals within the calcite. There may be considerable variations in the actual thickness of the finished material.

what stone | flamed and brushed finish

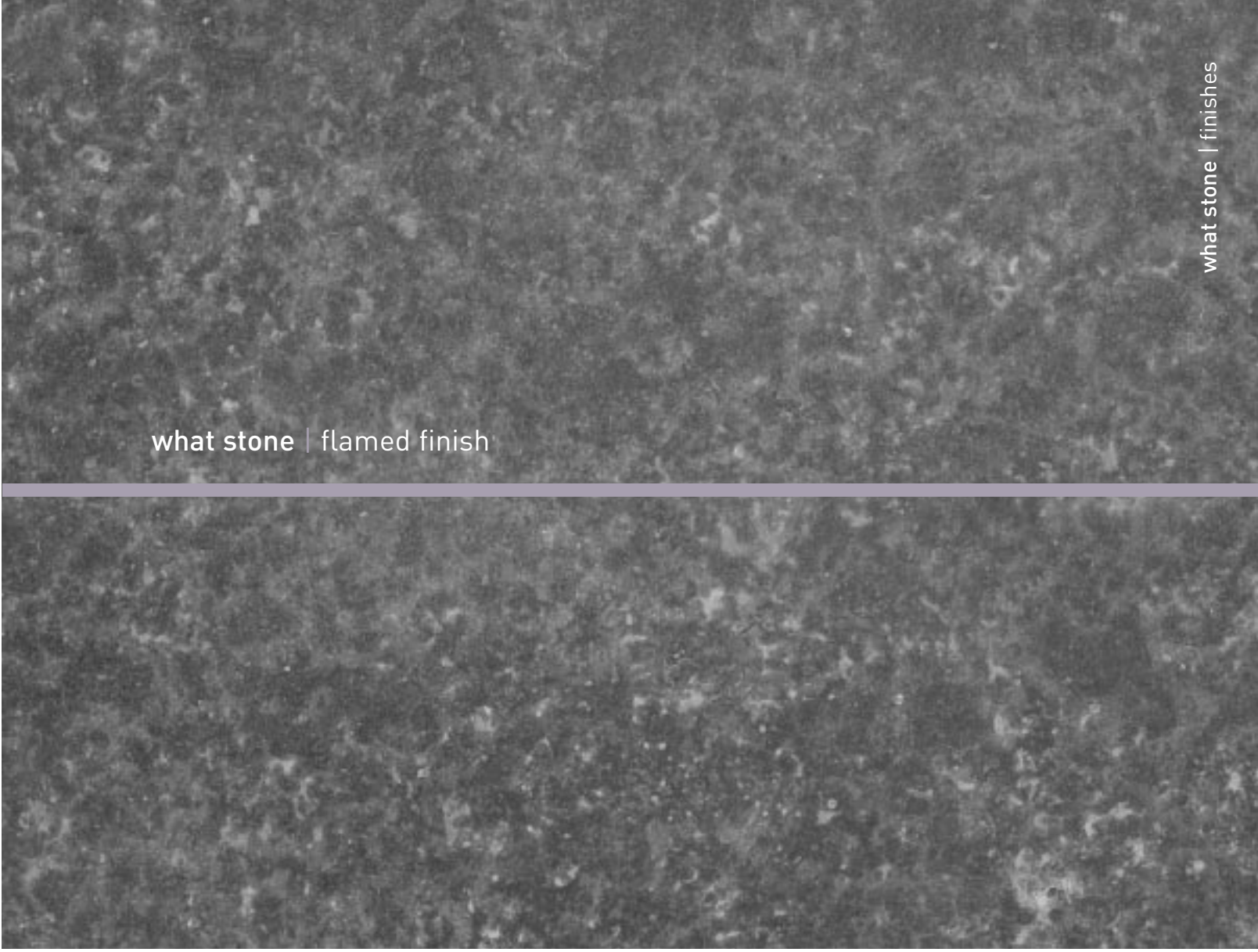
Colour

Flamed faces have a translucent mottled grey colour. The tonal variations are randomly developed and very little of the underlying calcite grain structure is discernable. Crinoids will show as paler flecking.

Finish

The surface has a smooth glassy texture with an irregular overlay of minor pits and peaks.

what stone | flamed finish



Colour

Flamed faces have a slightly translucent mottled grey colour with slightly paler areas. The tonal variations are randomly developed and very little of the underlying calcite grain structure is discernable. Crinoids will show as paler flecking.

Finish

The surface has a smooth slightly dusty appearance with an irregular overlay of minor pits, peaks and flakes.

what stone | honed finish [1]

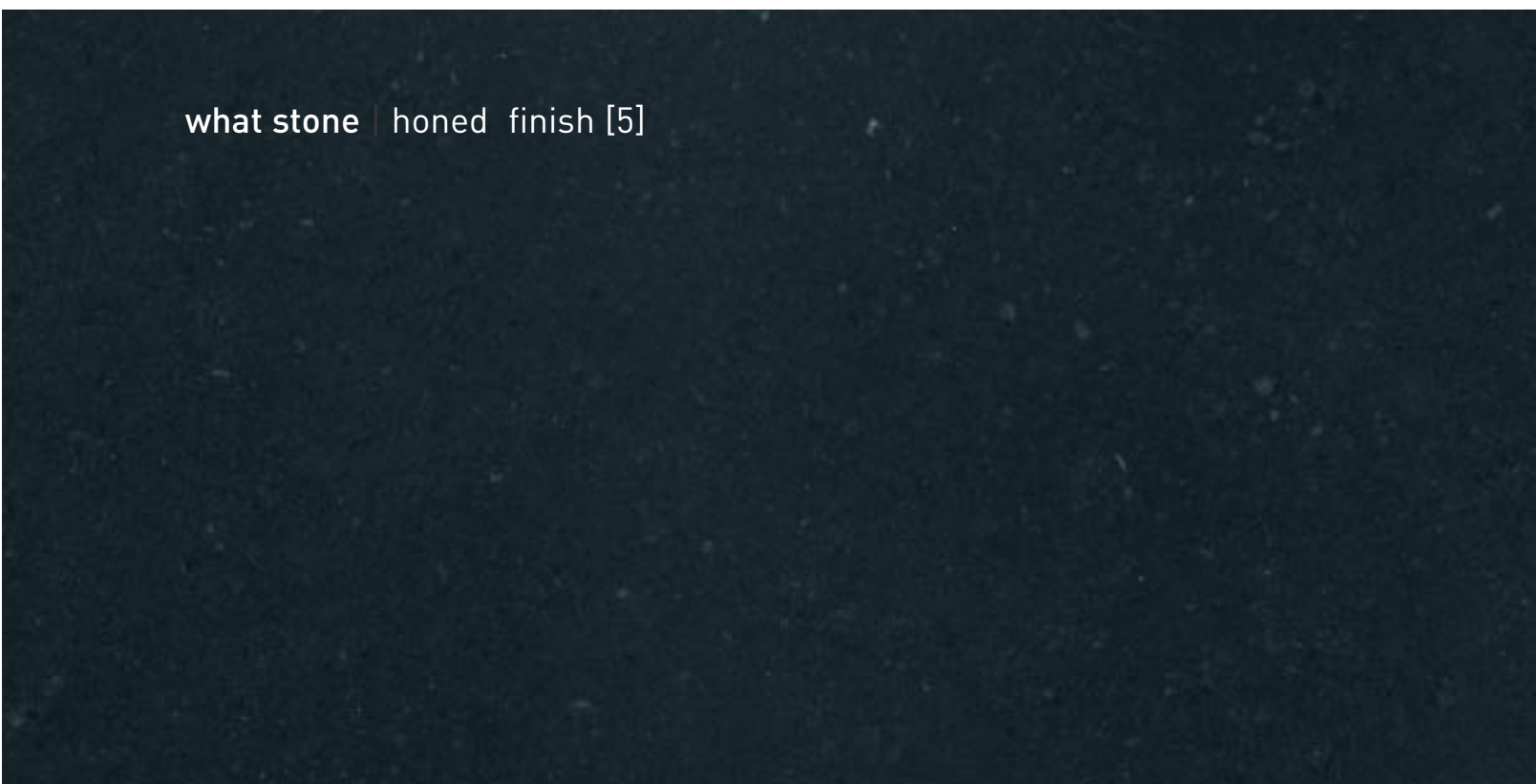
Colour

Honed finishes can be produced using a range of grits. The coarsest grit (1) will give a pale blue-grey colour and the finest (5) a dark blue-grey to black. There will be subtle variations between different beds in any quarry. Most quarries have a limited number of beds that yield an even colour but where crinoids are present they will show as well defined surface mottling. Shell beds honed with a fine grit are often black with a spectacular white contrast provided by the brachiopods.

Finish

The surface produced by the coarser grits (1) is smooth and matt with a faint pattern of circular scores. Finer grits (3 & 5) produce a smooth matt texture with no obvious tool marks .

what stone honed finish [3]



what stone honed finish [5]

what stone | polished finish

Colour

Polished finishes vary from intense dark blue-grey to black but some beds may have a very slight brownish tint. The crystal structure of the calcium carbonate and the crinoids will be obvious. The white brachiopods in the shell or fossil beds will form a startling contrast to the dark even finish on these materials.

Finish

The surface has a smooth glossy texture which appears to have depth. This illusion is due to the light reflecting from the back faces of the calcium carbonate crystals forming the finished surface.

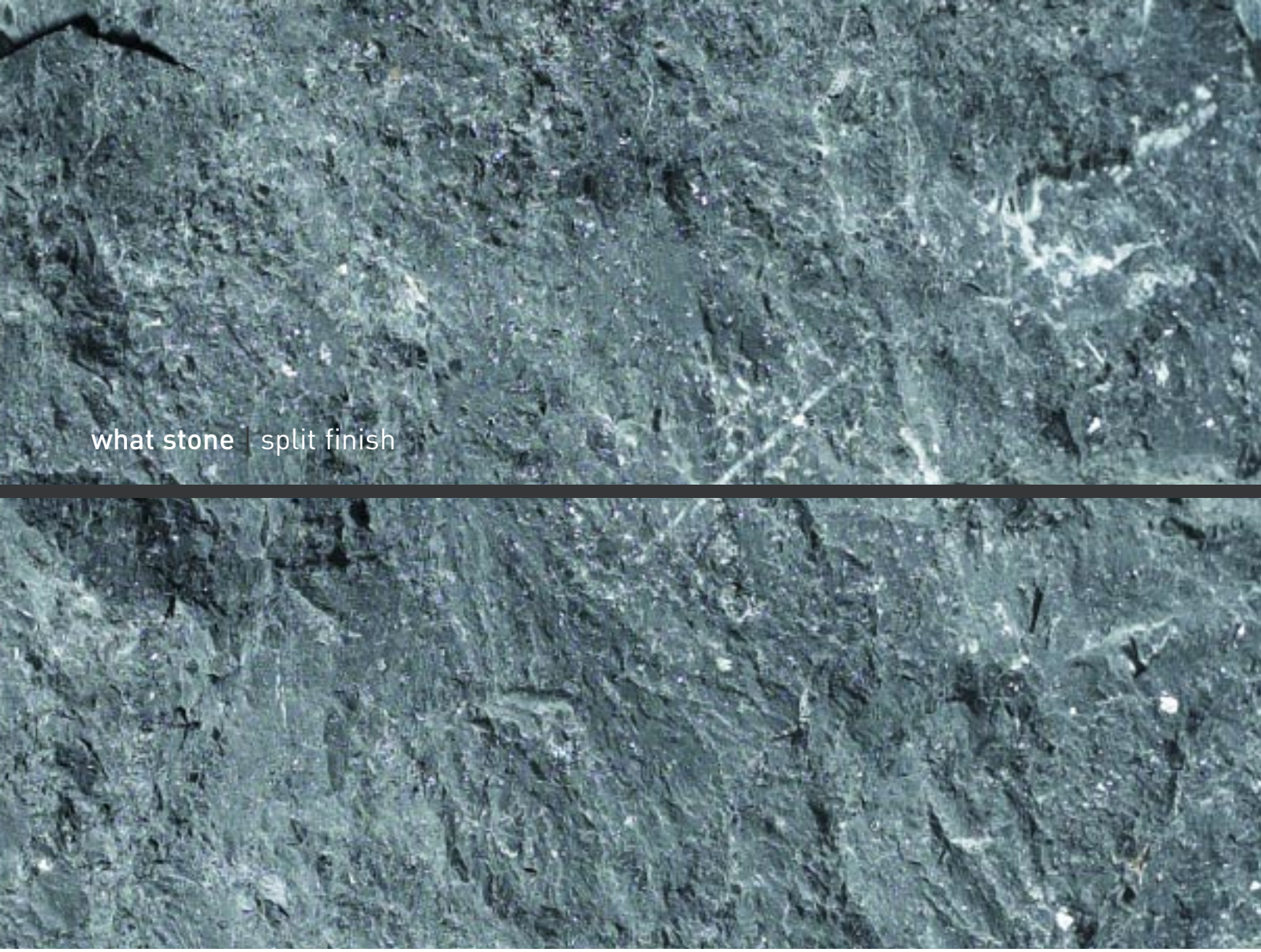
what stone | sanded finish

Colour

Sanded faces will normally have a pale blue-grey colour with crinoids and the calcite grain structure giving minor tonal variations.

Finish

The ground faces are flat with a faint fine pattern of scores.



what stone | split finish

Colour

Split face will normally have a dark blue-grey colour with random paler flecks where crinoids are present. The technique often fractures the calcium carbonate crystals giving small reflective planes that make the surface sparkle.

Finish

Splitting produces an irregular surface which may have quite high relief. Humps, hollows and pits will be randomly developed on the surface and may extend across the block edges. Ashlar traditionally had a chisel dressed edge applied to the exposed face. It will be necessary to dress areas of split stone using a point to remove the visible sawn edges.

what stone | matrix

Finishes								
Bush-hammered	●	●	●	●	●	●	●	●
Chiselled	●	●	●		●	●		●
Crust	●	● *	●					
Honed 1	●	●	●	●	●	●	●	●
Honed 3	● *	●	●	●	● *	●	●	*
Honed 5	*	●	●	●	*		●	*
Flamed & Brushed	●	●	●		●	●	●	●
Flamed	●	●	●		●	●	● *	●
Polished	*	●	●	●	*	*	●	
Sanded	●	●	●	●	●	●	●	●
Split	●	*	●	●		●		●

* Not recommended but could be used

The Irish Blue Limestone is a natural material and every single piece is unique and carries the marks of its geological history. The producers all operate strict quality control procedures to make sure that the material supplied is suitable for the purpose. The stone will however have certain features that are characteristic of the material and cannot be avoided.

The lithification process results in the formation of stylolites. These appear as fine black slightly crenulated lines on the surface of the stone and will only become apparent when the stone is viewed from less than three metres. The presence and width of the stylolites form part of grading criteria used by the producers when they select stone for any application.

Where honed or polished finishes are specified only very fine stylolites will be acceptable. Similar criteria apply to the selection of monumental grade stone. Cladding and ashlar may have slightly more apparent stylolites but the quality control will make sure they will not cause the surface to degrade in use.

A second consequence of the transformation of the lime mud into the Irish Blue Limestone, is the formation of fine white calcite veins and masses within the stone. Provided the calcite is completely bonded to the surrounding blue limestone it will not affect the durability of the stone. Fine white calcite veins and small white calcite masses can be found in all grades of the limestone and, in the case of fossil limestone, they are part of the attraction of the stone. In terms of the grading criteria, the more expensive monumental grade stone will have the least number of fine white lines and masses. Stone used for ashlar and cladding will always have some white lines and masses.

Fossils are a characteristic feature of the Irish Blue Limestone and their distribution can give rise to subtle variations in the colour. Uniformity of colour and appearance only forms part of the grading criteria for monumental stones. The subtle variations in fossil content is part of the attraction of Irish Blue Limestone when used in a project.

what stone | properties | irish blue limestone

	Typical Value	Range
Apparent Density	2690 kg m^{-3}	2680-2700 kg m^{-3}
Porosity by Volume	0.31%	0.15% - 0.51%
Compressive Strength	110-126 N mm^{-2}	
Modulus of Elasticity	751 kN mm^{-2}	740-760 kN mm^{-2}
Flexural Strength	14.7 N mm^{-2}	13.3-15.8 N mm^{-2}
Thermal Expansion	0.01 mm m-$1K^{-1}$	
Thermal Conductivity	2.5-3.1 W m-$1K^{-1}$	
Ultrasonic Velocity	5416 ms^{-1}	5180-5785 ms^{-1}

The stone is frost resistant and will not be affected by normal levels of atmospheric pollution.

The results given above are based on samples tested in accordance with the following specifications:

Apparent Density	ASTM C97-82; NBN B15-22
Porosity	BRE PD85/75
Compressive Strength	NBN B05-21
Modulus of Elasticity	NBN B15-203
Flexural Strength	NBN B15-214
Ultrasonic Velocity	NBN B15-229

The processes involved in the conversion of a 20 tonne block of limestone extracted from the quarry into cladding, ashlar, tiles or any of the myriad of other products used in construction will inevitably introduce errors in the final sizes and thicknesses. This can be further complicated by the type of finish applied to the component. By continued investment in the latest cutting and finishing equipment the Irish Blue Limestone producers endeavour to supply material as close to the specified sizes as possible. The current operating tolerances are set out below.

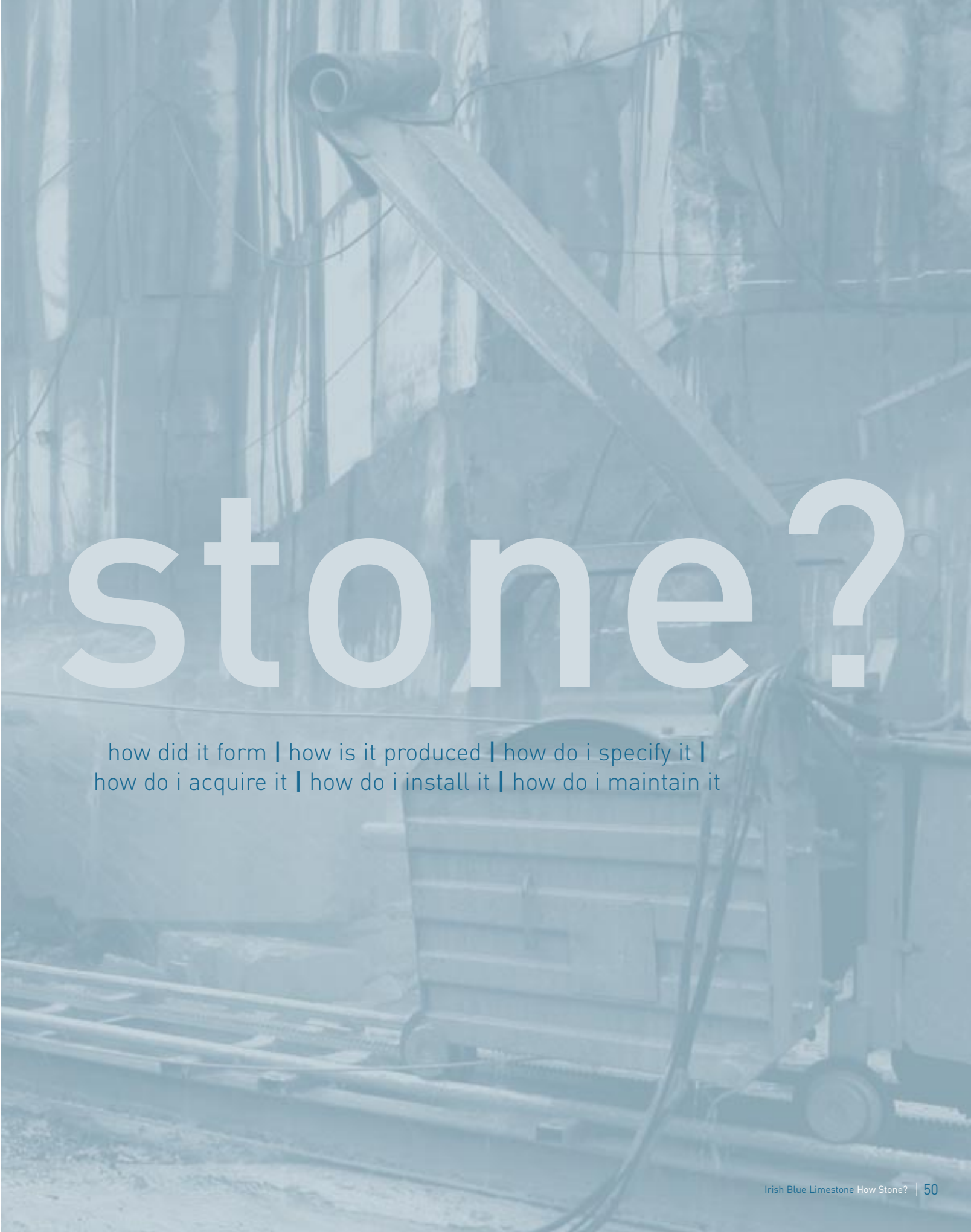
Sawn Slab	
Area	Maximum regular rectangle that could be cut from Slab There is a 20 mm allowance on length and width for subsequent processing losses
Thickness	± 2.0 mm
Bow & Twist	± 2.0 mm per 600 mm of length
Finished Stone **Contra-pass & Sawn Ashlar**	
Length & Width	± 1.0 mm for dimensions up to 600 mm ± 2.0 mm for dimensions equal to or greater than 600 mm
Thickness	± 2.0 mm
Squareness	± 1.5 mm for lengths less than or equal to 600 mm ± 2.0 mm for lengths greater than 600 mm
Cladding	
Length & Width	± 1.0 mm for dimensions up to 600 mm ± 2.0 mm for dimensions equal to or greater than 600 mm
Thickness	± 2.0 mm
Squareness	± 1.5 mm for lengths less than or equal to 600 mm ± 2.0 mm for lengths greater than 600 mm
Bow & Twist	+/- 2.0 mm per 600 mm of length.

what stone | tolerances | irish blue limestone

Split & Dressed Ashlar	
Length & Width	± 4.0 mm for dimensions up to 600 mm ± 5.0 mm for dimensions equal to or greater than 600 mm
Thickness	± 10 mm
Curved Ornate or Complex Ashlar	
Length & Width	± 4 mm with butting faces matched as appropriate
Thickness	± 10 mm
Rustic Paviors & Setts	
Length & Width	Sawn Sides ± 3.0 mm Guillotined Sides ± 7.5 mm
Thickness	± 10 mm
Tiles	
Length & Width	± 1.0 mm
Thickness	± 2.0 mm
Monumental Limestone	
Length	+ 6.0 mm/ -3.0 mm
Thickness	± 3.0 mm
Posts	± 3.0 mm

The tolerances outlined in this section do not include allowable tolerances on applied labours such as chamfered, bullnose & bevel edges, rebates, etc. Details of these should be checked with the individual producers when the specification is being prepared.

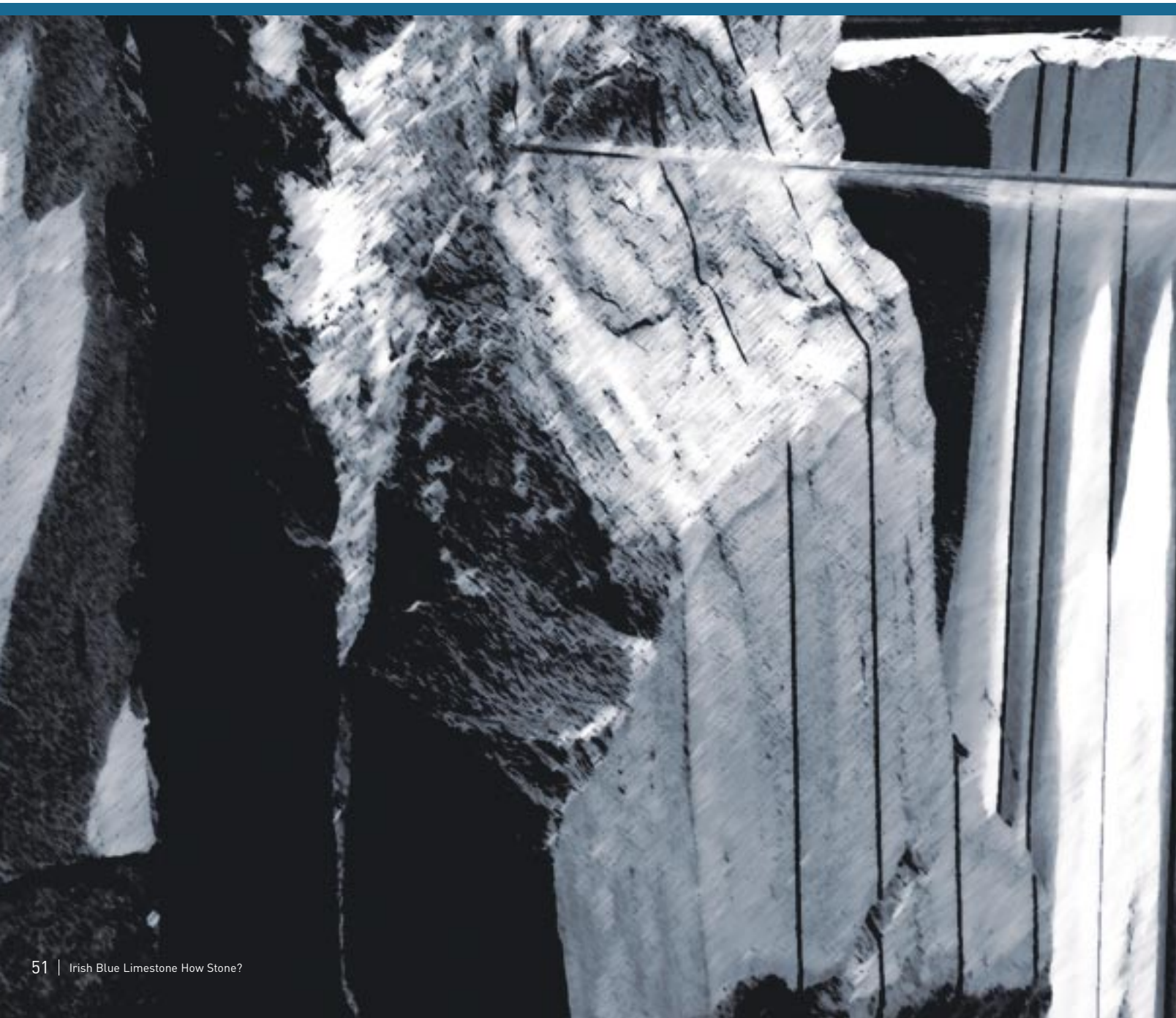
how



stone?

how did it form | how is it produced | how do i specify it |
how do i acquire it | how do i install it | how do i maintain it

the natural form
and all its uses



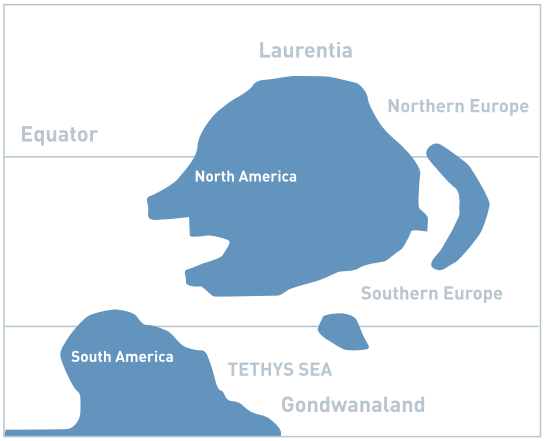
The Irish Blue Limestone story begins 370 million years ago. North America and Northern Europe were joined together in a single continent called Laurentia which straddled the equator. Gondwanaland, incorporating South America, Africa, Antarctica and Australia was centred on the South Pole.

A slow anti-clockwise rotation of Laurentia during the 64 million years of the Carboniferous caused it to collide with and finally became part of Gondwanaland.

What was the Environment like?

Sea level rises during the early Carboniferous allowed an inlet of the Tethys Sea to encroach over much of what became Ireland. During the next 45 million years tectonic activity, associated with the continents colliding, caused changes in the depth of water and the position of the coastline.

The inlet initially lay on the southern edge of the continent about 15 degrees south of the equator when the Irish Blue Limestone was deposited. The climate and conditions would have been similar to the modern day Carribean or Red Sea. The Wicklow Hills may have formed an island in this sea and the coast extended from Donegal through Northern Ireland into Louth and Longford.



The conditions changed during the last 19 million years of the Carboniferous. By then Ireland lay just north of the Equator and sandstones, mudstones and thin coal seams superseded the limestone.

Why was the Limestone deposited?

Water draining into the sea from the land to the north carried dissolved calcium salts as well as small amounts of clay minerals and coarser sand grains. Much of the clay and sand would have been deposited near the coast, but mixing of the fresh water with the salt water of the inlet led to chemical reactions that created thick deposits of lime mud on the sea floor.

Crinoids and corals grew in the shallower waters where the sunlight penetrated to the floor and brachiopods lived in the deeper parts. Reductions in sea level caused breaks in the deposition. Deepening of the water replaced the crinoids with brachiopods but subsequent decreases in depth allowed the crinoids to re-establish.

How did the Limestone form?

The relentless increase of sediment thickness caused the water to be squeezed out of the mud. Although some of the calcium carbonate went with it the remainder re-crystallised to form what we call the Irish Blue Limestone. Finely disseminated carbon present in the muddy deposits gives the distinctive colour. When large amounts of calcium carbonate dissolved, fine partings of clay minerals and carbon (stylolites) were left behind. The major stylolites simplify extraction of the blocks in the quarry.

The deeper water deposits became fine grained darker limestones often with prominent white brachiopods. The shallower water deposits became the paler blue crystalline limestone with the crinoid stems. Occasionally coral colonies form distinctive masses in the limestone.

The lithification masked most of the deposition breaks; often all that remains is a subtle colour or texture changes within a thicker limestone bed.

Fissures in the hardening mud allowed some of the dissolved calcite to be deposited as white crystalline infill. These form the distinctive white lines that characterise some horizons in the Irish Blue Limestone.

The interaction of environmental factors and lithification make every horizon in the quarry different. The skill of the Irish Blue Limestone producers is to match these subtle variations to the customer's requirements so that the finest material is supplied for every project.

Extraction

Day to day extraction of the limestone is planned by skilfully combining exploration drilling results, daily monitoring of the exposed stone in the quarry and the feed back from the sophisticated quality control in the production area.

Cores recovered from the future reserves provide the basic production information on colour, texture and fracture zones to assure the long-term capabilities of the industry.

High Technology

High technology diamond wire saws, diamond tipped chainsaws or circular diamond cutting blades, slice the massive beds in the quarry into blocks sized to the processing plants.

Cooling water, recycled through settlement ponds on the quarry floor, prevent the diamonds overheating and suppresses the dust produced by the cutting equipment. Careful positioning of the narrow slots produced by the diamond cutters yield optimum sized blocks for processing with the minimum of waste during extraction.

Like all natural materials there are flaws and fractures within the stone which make it imperative that this material is excluded from the processing plant. Skilled quarry workers using pneumatic or

more hydraulic breakers, enable these variations in production requirements to be easily and effectively accommodated.

Traceability

Transporting the blocks to the processing plant in a safe and efficient manner is equally important. Carefully positioned haul roads and modern loaders equipped with handling forks mean that an eighteen to twenty tonne block of stone can be picked up from workings without hazarding the quarry workers and minutes later be deposited undamaged in the stock yard of the processing plant. Every block leaving the quarry has a unique identification code enabling any piece of limestone supplied for a building to be traced by to its point of origin in the quarry.

Overburden from the quarry development is used to restore worked out areas or completed quarry tips. Waste limestone, which is an unavoidable by-product of the quarrying and processing, is crushed to provide aggregate for the construction industry when viable. Where there is no economic alternative the waste is used to construct screening banks or placed into designed tips that will ultimately be restored to blend into the surrounding landscape.

Production / Processing

A travelling crane will normally pick up the blocks from the stock yard and position them on a frame saw, mono-blade saw, diamond wire saw or circular saw depending on the final product. Diamond technology minimises cutting waste and ensures the accuracy of the cut limestone.

Sophisticated flocculation plants or settlement lagoon systems clean up and recycle the large amounts of water used by the processing plant.

The water in many cases originates from rainfall collected within the quarry area making the plants almost self sufficient.

The cutting and slabbing saws are often the first stage in the limestone manufacture. The cut panels from may be subdivided for use as cladding on a building or provide raw material for the production of flooring tiles. Thicker slabs yield ashlar, kerbs, lintels or sculptures. A wide range of finishes, appropriate to the end use, can be applied to the surfaces.

Safe Working Environment

The skill of the company masons is paramount in this secondary processing and the provision of a safe working environment for them as well as the quarry workers is a high priority for all the Irish Blue Limestone producers.

Water based dust suppression techniques are used by choice in the processing and finishing. If air tools are unavailable powerful dust extraction fans with adjustable intakes are installed. Acoustic hoods or segregated production areas minimise the exposure of workers to avoidable noise.

Ear defenders, forced ventilation visors, dust masks, steel toe cap boots, arrestor harnesses and protective clothing are all used when appropriate, to ensure that transformation of the Irish Blue Limestone from a mass of rock in the quarry to the finished product is undertaken in the safest and least damaging manner possible.

Irish Blue Limestone is a durable material suitable for interior and exterior use in almost all of the countries of Europe. Where the stone is specified for severely exposed applications, stricter quality control must to be applied and a higher grade of Irish Blue Limestone must be used. Exterior water features, like cascades and fountains, and exposed buildings in Northern or Continental Europe, where the wet stone is subject to freeze-thaw conditions, constitute severe applications. Coastal locations, where the stone is subject to salt spray, or paths and surrounds that are frequently treated with de-icing salts or solutions, pose similar problems. Some knowledge of the material; its properties and the manufacturing processes, will help you make the correct choice.

Don't Panic!

There are very few applications in Ireland that present these difficulties but help is at hand. The most important resource available to specifiers of Irish Blue Limestone are the companies producing the stone. E-mail links or enquiry numbers on the web sites provide a link to the specialists who can give advice on the correct and most cost effective materials and finishes for any project.

Manufacturing Considerations

Cutting, using some form of diamond tipped blade, is the primary manufacturing process for Irish Blue Limestone. The equipment is designed to produce straight and accurate cuts. The most cost effective components are those manufactured using a

combination of straight parallel cuts and/or a sequence of straight angled cuts. If complex blind ended cuts are required it may be more cost effective to fabricate the finished article from simpler components or redesign the component to simplify the cutting sequence. Complex curves, where almost all the cutting and finishing has to be undertaken by hand, will be most expensive.

Limitations to Finishes

A wide range of mechanical and manual finishes can be applied to the Irish Blue Limestone. Where uniformity of appearance is essential, components should be designed to be cut from larger mechanically textured slabs. Sides or edges will have to be finished by hand and this can occasionally result in a slightly different appearance.

Polished or honed finishes are not recommended for external use as acid rain, endemic in most of the world, will quickly damage the surface.

How Big? How Soon? How Much?

The quarries produce a standardised slab approximately 2.5 metres by 1.3 metres with 20 mm, 30mm, 40mm and 50mm thicknesses usually available from stock. Thicker slabs are cut to order but have to be scheduled into the production thereby increasing the lead time. Designing individual components to maximise use of the slab will help to minimise the overall cost. Specifying the optimum limestone thickness will have a similar effect.

Don't Forget!

Sizing of components should take account of the difficulties likely to arise during the fixing. It is extremely difficult for more than two people to lift or place any natural stone building component. The final weight of the individual cut pieces should not exceed 50 kilograms unless a tried and effective mechanical handling system will be available. If one person will be placing the materials individual weights should be less than 25 kilograms.

Successful and effective use of Irish Blue Limestone requires experience and knowledge as well as the flair of the architect or designer. If in doubt use the technical support available from the Irish Blue Limestone producers.

The Irish Blue Limestone producers operate to an agreed classification and quality control standard that guarantees a consistently high quality material irrespective of the company supplying the stone.

It is important to remember all the companies are working a naturally formed deposit which includes subtle variations in colour and appearance between the individual beds within each quarry as well as between the quarries. The choice of finish will also change the final appearance of the stone.

Four simple steps will ensure what you expect is what you get!

Step 1

The sample photographs and descriptions in this guide are the starting point for the choice of material. They provide a realistic indication of the typical appearance of the finished stone and details of the suitability of the finish for any application.

Step 2

Having decided on the finish, it is important to make sure that the actual stone matches expectations. The companies can supply small reference test pieces but where extensive use of Irish Blue Limestone is being considered for a project, it is essential not to rely solely on the test samples.

Step 3

It is possible to arrange to view larger panels of current production runs of the chosen finish. These give a much clearer indication of how the Irish Blue Limestone will appear in the project. The subtle interplay of colour, texture, minerals and fossils which makes the material so desirable often only becomes apparent when larger areas of the Irish Blue Limestone are examined.

Step 4

It is also important to remember that numerous beds are present in each quarry and they all give rise to slight changes in the appearance of the finished stone. If some feature of the larger sample is not quite right for the project discuss it with the producer. Certain aspects of the material may be a natural characteristic that cannot be changed but the company may be able to offer stone from other beds that will be closer to what is sought for the project.

The Irish Blue Limestone producers are all concerned that if their materials are chosen everyone is completely satisfied with the final result. Following the steps outlined in this section for the selection of stone and finish is the only way of making certain that reality matches the concept.

how stone | how do i install it?

Arrival on Site

Cladding panels will normally be supplied on "A" frame supports. Tiles and paving slabs will be packed on edge rather than flat. Larger components will be secured on pallets. Padding, wooden packing, polythene sheeting and steel or nylon strapping is used to secure and protect the Irish Blue Limestone during transport. Appropriate handling equipment must be available to off load the delivery.

Storage and Handling

A level, hard surfaced area is recommended if Irish Blue Limestone is going to be stored on site. This area must be protected from spills and splashes of mud, oils, greases, paints or cement solutions and if the components are for interior use, they will also need to be kept dry.

The Irish Blue Limestone components should only be removed from their packaging at the installation stage. The limestone components should not be separated or moved using steel crowbars or prise bars. Web slings rather than chains; hooks or wire straps must be used for lifting operations.

Most of the apparently flawed components result from failure to observe correct handling procedures on site rather than manufacturing and quality control lapses.

Inspection

The individual pieces must be checked for size and flaws before being mounted or placed. Stylolites and/or white inclusions and/or lines are a natural feature of the limestone. They will be least apparent on monumental grade stone and most obvious in production run materials. They do not constitute flaws in the material, and provided the appropriate grade was chosen for the project, will not cause problems with durability.

Product Characteristics: Ashlar

This is probably the oldest and the best known application of Irish Blue Limestone. The thickness of the stone makes it self supporting and it may be a structural component. Lime based mortars are the preferred bonding material for ashlar. They accommodate minor movements associated with natural stone construction whilst maintaining structural integrity.

Limestone Paviors; Setts and Kerbs

Limestone paviors; setts and kerbs must be sufficiently thick to withstand the likely loadings, particularly where vehicles are involved, and bedded on sand over an adequate sub-base. If a rigid fixing is needed, for example in steps, the full width of the component must be supported rather than placed on cement slabs.

Limestone Tiles and Skirting

Thin limestone tiles and skirting should be fixed to a rigid concrete or brick sub-base using proprietary cement based adhesive.

Cladding

This will normally be supplied sized and drilled to match the chosen fixing system. Stainless steel dowels must be correctly sized for the drilled holes and should not be hammered into place. The mountings on the structure must be accurately placed to maintain clearance and correctly position the individual stone panels. A flexible mastic may be used to seal between the panels with some mounting systems.

Good Housekeeping

Accidental contamination of Irish Blue Limestone with cements, mortars and mastics during installation should be avoided. Cement and mortar must be washed off as soon as possible using clean water but mastic stains may cause permanent discolouration.

Clean softwood packing is essential if scaffolding has to be placed against the limestone. Putlogs must be capped and angled so that rust contaminated water cannot drain onto the limestone faces and splashing from the planks should be prevented by appropriate sheeting.

Wooden battens, polythene sheeting and plywood or particle board should be installed to prevent accidental damage to limestone corners, mouldings, arrases, detailing, floors and stairs during the construction.

how stone | how do i maintain it?

Irish Blue Limestone is tough and durable material but does require some care if it is going to maintain it's original finish and appearance for the life of a building.

Surface Dirt

External limestone is most commonly specified with a matt surface finish that becomes slightly paler over time as a result of normal weathering.

Surface dirt on the exterior of a building should be removed by scrubbing with a bristle brush and clean water. Exposed ashlar and cladding may need to be cleaned in this manner at 10 to 15 year intervals to remove the build up of urban pollutants and maintain the appearance of the finish. Pressure washers, water spray or steam cleaning should only be undertaken in accordance with the guidelines in British Standard BS 6270 part 1: 1982 Code of Practice for Cleaning and Surface Repair of Buildings.

Oils, Paints & Detergents

All limestone surfaces are slightly porous and will absorb oils, greases and detergents and contact with these materials should be avoided. They often result in permanently discoloured patches which can be quite obvious on paler coloured finishes. The stone must be also protected from paints, varnishes and renders during routine maintenance as these will be leave indelible marks.

Graffiti

Alkaline chemical cleaners based on sodium hydroxide or potassium hydroxide can be used to remove graffiti. The original supplier of the stone can suggest specialist contractors for this task. These companies may also be able to apply specialist surface coatings that will limit the absorption of paints or oils. These coatings generally cause some discolouration and may result in a very patchy appearance over time.

Paths & Patios

When the Irish Blue Limestone is used for paving, algae may build up in lightly trafficked or shady areas. Ironically the improvement of air quality in the urban areas is making this a more common problem. Regular scrubbing with a stiff bristle brush and clean water will normally remove it. Algaecides should be used with care and must initially be tested on a small area to make sure they are not going to discolour or damage the surface. Routine use of pressure washers is not recommended as they will force water into the stylolites and degrade the surface.

Building Interiors

A clean dry stiff nylon brush should be used to remove dust from matt Irish Blue Limestone internal surfaces. Washing will tend to cause streaking and marking and is not recommended. Detergents, cleaning sprays or polishes used on the limestone itself or more commonly on adjacent finishes will result in staining. Even specialists have difficulties removing this type of marking or discolouration and maintenance staff should be made aware of this problem.

Where greasy marks may be transferred to the surface by contact with clothing or skin, it is preferable to specify a honed, flamed or polished finish rather than a matt finish.

Flooring

Washing with clean water and a soft mop is normally all that is required to restore the appearance of Irish Blue Limestone flooring. Clay and grit should be brushed or vacuumed off before washing, particularly when ground or sanded finishes have been specified. Specialist sealings are available to protect flooring tiles and the companies can supply details of suitable products.

Ground honed or polished limestone tiles must not be cleaned using industrial buffers as the abrasive pads will damage the surface.

Warning

Acid based cleaners and cement removers will cause irreparable damage to the structure and surface of Irish Blue Limestone and must not be used.

Bathroom and kitchen cleaners designed to remove limescale from sinks and toilets will damage the finish on work tops, sink surrounds and tiles and should not be used.

irish blue limestone

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