LANG+FULTON

Architectural Gratings

Pressure Locked and Electrofused Products

www.langandfulton.co.uk

Our History

Lang+Fulton is one of the oldest companies in Scotland; its history as iron merchants in Greenock dates back to 1781. From those early days it developed into an important supplier of steel to the UK shipbuilding industry, often carrying steel from the mills in its own ships.

The business has progressively evolved from this background in steel stockholding, fabrication and shipping and today operates as a supplier to the construction industry, employing a young team from engineering and surveying backgrounds.

The Company's main sales and technical office is based in Edinburgh with a presence and stockholding facility in the West Midlands in order to serve its primary market in the South.

The Custom House Quay, Greenock 1820
Robert Salmon (1775-1845)

Our Mission

Our aim is to generate design-led specifications, using a standardised material to produce a bespoke finished product.

We encourage contact with our clients from concept to completion and enjoy collaborating on challenging projects which involve a high element of design. We see our drawing and design service as a core strength, encompassing all aspects of support steelwork and fixings.

Our gratings are sourced throughout Italy and include several unique products. Diversification is key to our ongoing expansion and we continue to build our supply chain in order to be able to offer the broadest possible range of products.

Index

Our Products

At Lang+Fulton we understand the difficulties of choice overload in the decision making process.

We have therefore categorized our vertical gratings into 11 product ranges, each of which has a distinctive characteristic, so that the architect can more easily select the best grating to convey their vision.

Our Technical Team can draw upon a wealth of experience to propose the exact product that will deliver the desired aesthetic and the most cost-effective, code-compliant solution for a particular project.

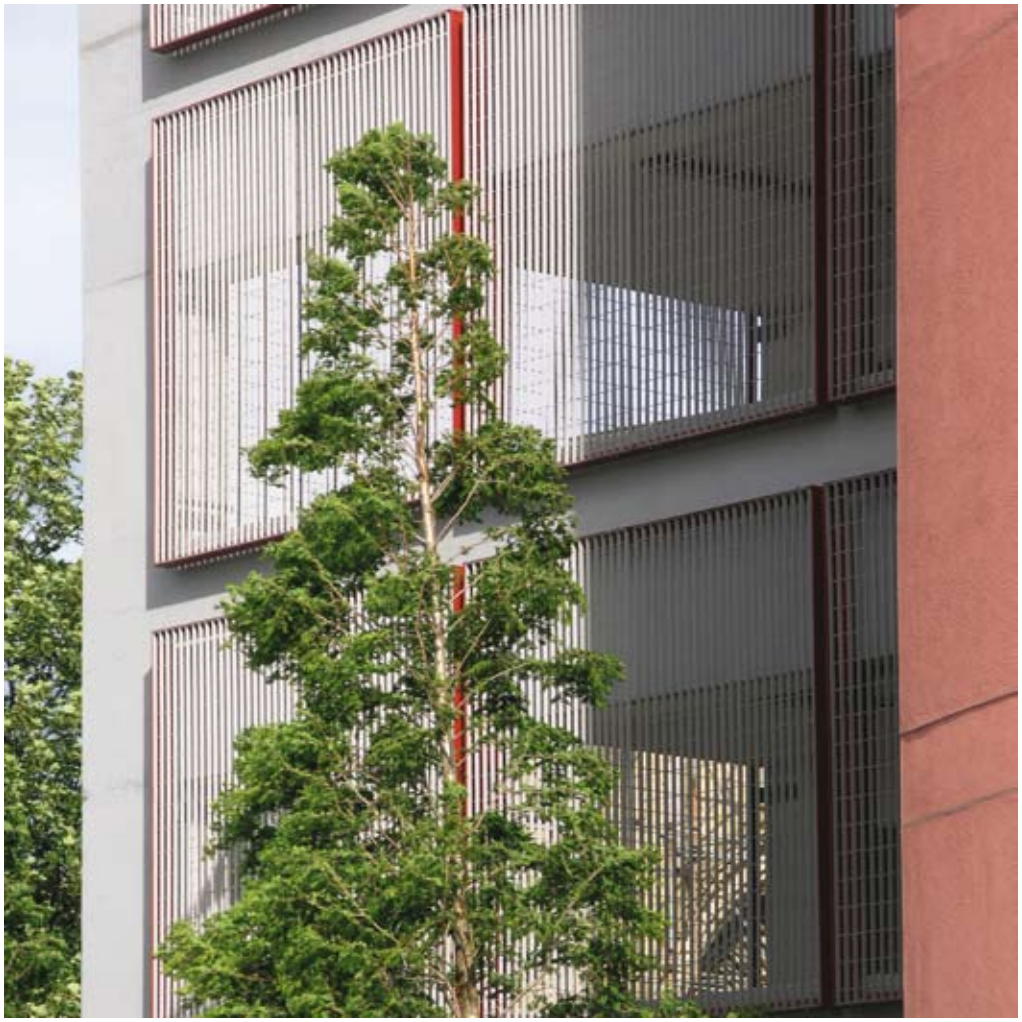
Steel is a sustainable material with 100% recyclability. The overall average end-of-life recovery rate for steel from construction is 94% in the UK.

	Visual Empahsis: Horizontal (H) Vertical (V)	Electrofused (EF) - flat bars & round bars	Pressure-locked (PLX) - flat bars of equal section	Pressure-locked (PL) - flat bars of unequal section	Rectangular aperture	Square aperture	Vertical bearing bar	Horizontal bearing bar
Stereo	V	x			x		x	
Piazza[*1]	V	x				x	x	
Micro	H	x			x			x
Terra	V	x			x		x	
Alto[*2]	V		x		x		x	
DemiAlto	V			x	x		x	
Quattro[*2]	◘		x			x	x	
DemiQuattro	V			x		x	x	
Stretto	H			x	x		x	
Metro	H			x	x			x
Stella[*2]	Δ		x			x	x	

[*1] - *Piazza* can be used with the flat bearing bar on the horizontal or vertical

[*2] - load bearing is shared between both bars

Electrofused Grating



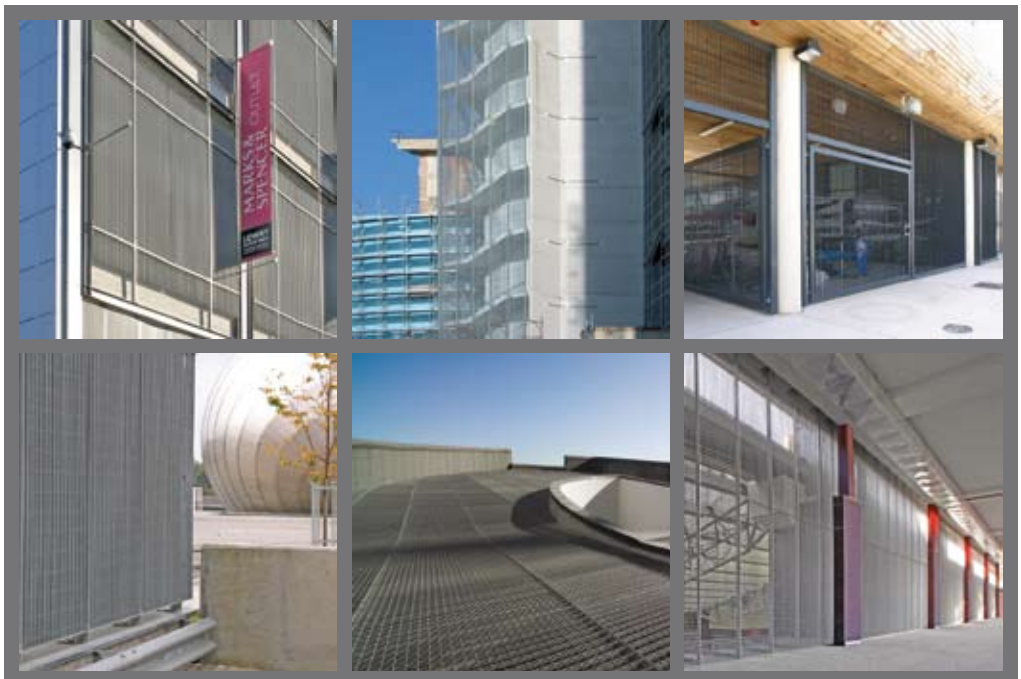
Electrofused gratings offer the most economical solution where there is a requirement for a large size of panel, either as a wall cladding material or as a security screen. The overall size of panel is only limited by the practicalities of on-site handling.

Composition & Appearance: for all vertical applications the mild steel gratings are made from flat bars and attractive plain round bars, rather than the utilitarian twisted round bar which is more suited to industrial floor grating.

Manufacturing Process: high voltage electricity combined with pressure totally amalgamate the flat bearing bars and round transverse bars. The fusion of each intersection produces a material which has complete integrity, thus allowing it to be cut, shaped or radiused without compromising its overall strength. Production lines, as well as cutting and framing processes, are all fully automated for quality control and maximum cost-efficiency. All panels are supplied framed and fully finished.

Panel Size: mats are made 6100mm long and range from 1000 to 1890mm wide, depending on the aperture of the grating, but typically the maximum recommended panel size is 4000x1890mm (flat bar x round bar).

Bespoke Gratings: for minimum quantities of 400m², gratings are also available with alternative sections of flat bar - 40x3; 50x4; 60x4 or 70x4mm. Non-standard apertures can also be designed for large scale projects.



Standard Apertures

Stereo	rectangular aperture with vertical bearing bar standard bearing bars: 25x2; 25x3; 30x4mm
Piazza	square aperture with vertical or horizontal bearing bars standard bearing bars: 25x2; 25x3mm
Terra	rectangular aperture with vertical bearing bar standard bearing bars: 25x2; 25x3; 30x2; 30x3mm
Micro	rectangular aperture with horizontal bearing bar standard bearing bars: 25x2; 25x3; 30x2; 30x3mm

	Transverse Bar Centres (mm)						
Bearing Bar Centres (mm)	25	44	66	76		100	132
15							
25							
34							
43							
63							
126							

Pressure-Locked Grating

The process of pressure-locking produces a very high quality material with perfectly formed intersections, resulting in the most aesthetic grating for vertical applications.

The flexibility of this method of manufacture means that all panels are made to custom sizes, with the economy of little or no wastage. Production can also be readily adapted to provide gratings to non-standard specifications of weight, aperture and performance. It is therefore often the grating of choice for all types of projects: from prestigious developments to practical industrial flooring.

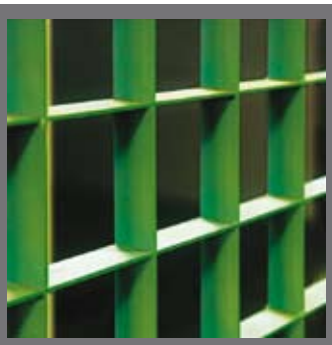
Composition & Appearance: gratings are made entirely from flat bars of either equal or unequal depth. The standard section of bearing bar is 25x2mm.

- Panels made with the transverse bars to the front have a rectangular or square, geometric appearance.
- Panels made with the bearing bars to the front have a linear emphasis, either vertical or horizontal depending on the choice of grating.
- Gratings made with equal sections of flat bar have an identical appearance from both sides.

Manufacturing Process: an arrangement of transverse bars are fixed under pressure into notched bearing bars. Flat bars of equal depth are twice notched (cross-pressed); bars of unequal depth are once notched (pressed). The bars are further secured with a flat framing bar.

Panel Size: maximum recommended panel size: 2000x2000mm

Bespoke Gratings: gratings can be made to custom apertures or with alternative sections of bearing bar: 25x3; 30x2; 30x3; 30x4; 40x2; 40x3; 40x4; 40x5; and 50x3 up to 70x5mm.



Bearing Bar Centres (mm)	Transverse Bar Centres (mm)						
	11	22	33	44	66	99	132
22							
33							
44							
66							
99							
132							

Standard Apertures

Quattro	square aperture with equal section bearing bars
DemiQuattro	square aperture with vertical bearing bars
Alto	rectangular aperture with equal section bearing bars
DemiAlto	rectangular aperture with vertical bearing bars
Metro	horizontal aperture with horizontal bearing bars
Stretto	horizontal aperture with vertical bearing bars

Wall Cladding

Steel grating is an extremely low cost type of wall cladding which can provide a strong visual statement as well as fulfilling many practical functions:

- ventilation
- protective barrier
- security
- bird screen
- natural daylight

The grating panels can either form a solid, free-standing screen or be used as a decorative cladding to introduce shape, colour and texture to a concrete or blockwork substructure. The framed panels are designed with either bracket fixings or holed for bolting into a secondary framework.

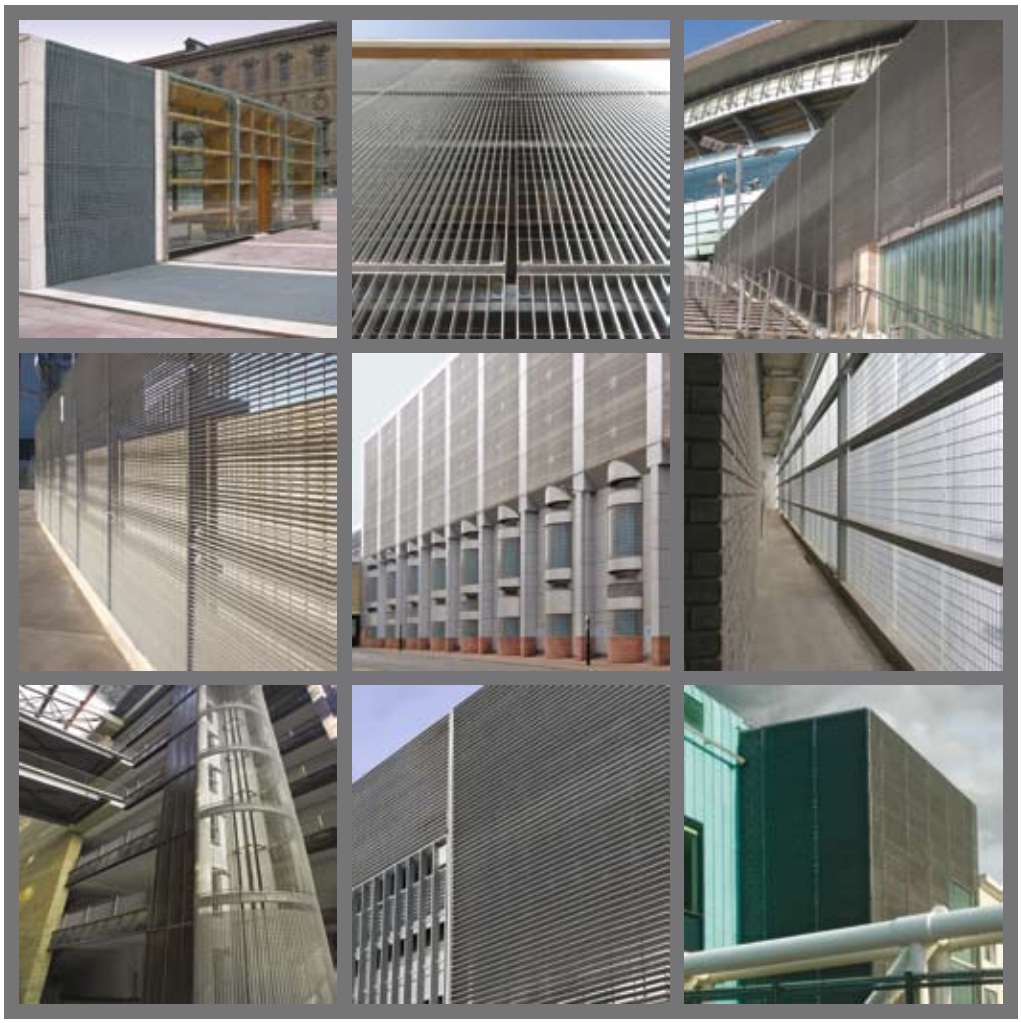
The choice of aperture and depth of flat bar will determine the degree of visual screening or through-visibility. The rotation of the bearing bar will determine a vertical or horizontal visual emphasis.

Elements of design can be added at no additional cost such as alternating panels or the use of gratings with contrasting apertures to create a chequerboard effect.

The largest panel sizes are made from electrofused gratings up to a maximum dimension of 4000x1890mm.

Panels can also be shaped or rolled to a radius.

It may be appropriate to consider the use of complementary gratings with a smaller aperture and anti-climb properties for ground level panels.



Multi-Storey Car Parks

The challenge of designing a utility building such as a car park is to conceal its functionality and to soften its structural impact so that it may be sympathetically integrated within the surrounding built environment. Often this must be achieved within the constraints of strict budget limitations.

Grating is economical and meets all the required objectives of providing security, natural light and ventilation, while also obscuring the internal structure of the levels or ramps which may not conform to the exterior elevation.

The grating panels can be used in several different ways: to create a continuous facade, to link adjacent sections, to break the monotony of a surface area, to act as an effective floor to ceiling pedestrian barrier or as infill panels for ventilation.

Panels can be supplied with alternative styles of frame to create either a visual accent or a continuous screening effect. Fixings are individually designed according to the substructure.

The maximum standard panel size of 4000x1890mm is suitable for covering most large openings or surface areas. Exceptionally, panels of a greater height can be manufactured but will require intermediate fixings.

Panels can be made to accept the horizontal loadings for pedestrian barriers up to a 3m span (BS 6399-1).

All steel gratings are hot dip galvanized with an optional polyester powder coating. This two stage approach to the protection of the steel provides an extremely durable finish. In 1988 Lang+Fulton supplied gratings for a car park at the St Enoch Centre in Glasgow. Twenty-five years later the polyester powder coating on the grating is still intact and protecting the galvanized surface below.

Security Screening

Grating panels can be used effectively wherever there is a requirement for security.

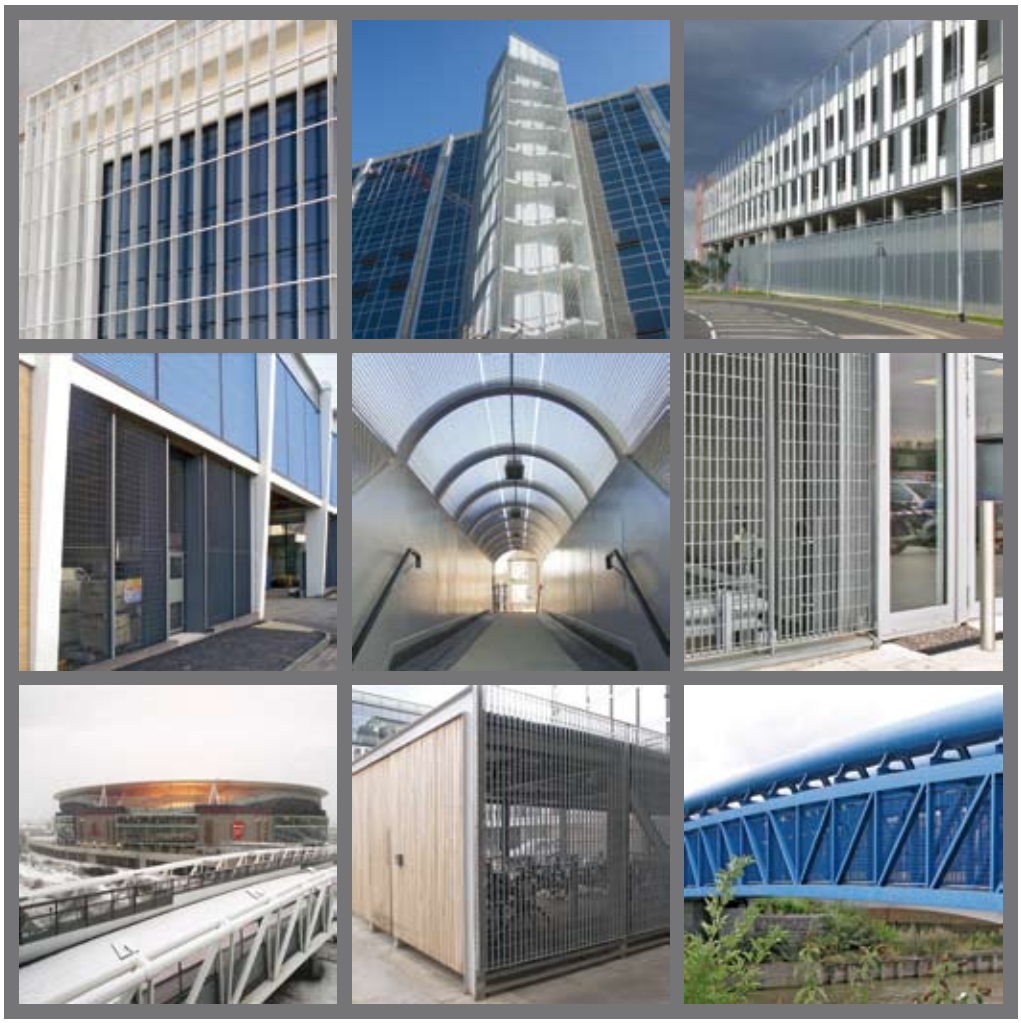
The size of the panel may determine the type of grating. Lang+Fulton would recommend that smaller panels such as window grilles are made from pressure-locked grating, while electrofused grating may be more appropriate for the continuous screening of an undercroft.

Sliding screens and gates can be integrated with fixed panels to provide a continuous yet versatile facade.

The aperture and weight of grating should be chosen according to the function, the overall size of the area to be secured and the required level of security.

As an example, ***Piazza-25*** grating with a 25x25mm aperture is advised for screens where there is considered to be a threat from projectiles or for securing enclosures at high risk from vandalism. Lang+Fulton have worked on several projects with Network Rail supplying panels of *Piazza-25* in conformity with the regulations for safeguarding rail tracks.

Recent requirements for security grating have also included the supply of panels for bike stores. The grating panels minimise the potential for theft by fulfilling the dual purpose of providing both a secure shelter and good through-visibilty.



Plant Housing

Compounds, enclosures and plant housing for the screening and safe protection of heating and air conditioning systems or power-supply equipment are individually designed from electrofused or pressure-locked gratings, as well as steel louvres.

The comprehensive range of apertures provides different levels of performance: from 22x22mm or 25x25mm for anti-projectile to 126x132mm for maximum free area.

Pressure-locked gratings can be supplied with different depths of flat bar. A greater depth of flat bar will increase the level of visual screening.

Each installation is supplied with posts and any ancillary steelwork as well as separate blanking plates, bird guards or insect mesh if required.

Gratings can also be used as an outer cladding to protect and enhance the appearance of acoustic panels.

Lang+Fulton's ***Italia*** and ***Delta*** ranges of steel louvred grille are often chosen for this type of application to create a robust compound or housing for mechanical plant. Both ranges include products which will provide either total or partial visual screening.

DeltaWing-33

Italia-100

Balconies

Gratings for balcony balustrading have the advantage of providing a semi-private yet see-through space with the aperture determining the relative openness of the structure.

Lang+Fulton will work with the architect to design and supply the secondary steelwork as well as the framed panels, which are made to exacting dimensions to fit within a structural framework.

Pressure-locked gratings are especially suitable for balconies as the particularly neat intersection of the flat bars is ideally suited to a residential environment.

In addition, the custom sized panels are manufactured with little or no wastage of steel. Therefore, in spite of the high quality and pleasing aesthetic of the pressure-locked panel, it is surprisingly economical, especially for the typical size of a balcony balustrade.

Small apertures with anti-climb properties are recommended for residential projects. The ***Stretto*** range has closely spaced transverse bars at intervals of 11, 22, 33 or 44mm and the 25x2mm horizontal flat bar has the advantage of providing significant visual screening when viewed from below.

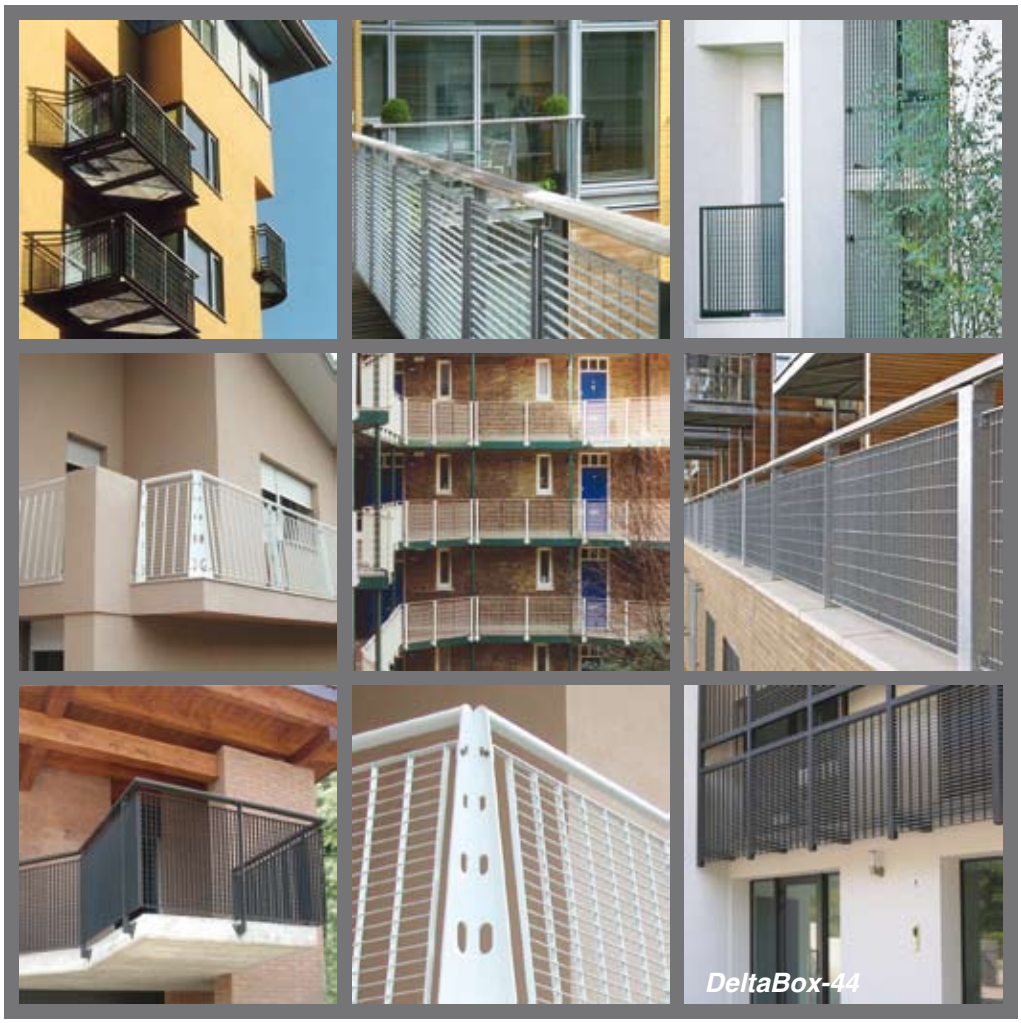
Gratings from the ***Quattro*** and ***Alto*** ranges are also a popular choice for this type of application as the equal flat bars deliver an identical appearance on both the inside and outside.

In conjunction with their Consulting Engineers, Lang+Fulton will develop a design to accept horizontal loadings for pedestrian barriers up to a 3m span in accordance with BS 6399-1.

Hot-dip galvanizing with an additional polyester coated finish is always recommended for balcony balustrades for the smoothest possible, durable finish which can be easily cleaned .

Louvred panels from the ***Delta*** and ***Italia*** ranges can be used to deliver a greater degree of visual screening.

Lang+Fulton also supply specialist steel gratings suitable for balcony decking.



Balustrades & Stairs

The imaginative use of grating panels can transform an external staircase or balustrade into an independent feature, adding architectural interest to a solid facade.

The semi-solid structure of the gratings generates a feeling of security which is particularly appreciated by elderly people and young children.

Panels for parapets and staircases can be made out of any of the smaller mesh gratings. Consideration on the choice of grating should always be given to loading and anti-climb properties.

The gratings can be supplied either as framed infill panels or with a post system which can be modified to carry a decorative handrail.

Panels can also be rolled to a radius to suit rounded or circular landings.

A duplex galvanized and polyester coated treatment is recommended for balustrades to deliver a smooth finish.

Lang+Fulton can also supply treads and landings for stairs from a comprehensive range of horizontal gratings. These include specialist heel-proof gratings with small apertures, Barrot 'comfort' grating and AntiVertigo which is a non-transparent grating.

Barrot

AntiVertigo

Solar Screening

Brise soleil panels promote environmental sustainability by reducing solar gain within a building and maintaining an even temperature during the summer months. The resultant shading will measurably reduce the load on air conditioning units.

Panels for solar screening should be made from a grating with a deep flat bar in order to create a significant shading effect to the windows below.

Pressure-locked grating, which can be supplied with a flat bar of sufficient depth yet only 2mm thickness, is the most appropriate for suspended or projecting structures. This creates a panel of minimum weight allowing for longer spans and lighter supports.

In addition, the panels can be designed to take a pedestrian loading so that they perform the dual function of providing an external walkway for cleaning a glazed elevation.

Lang+Fulton will advise on the best choice of grating for a particular span or which will take the maintenance loading of 3kN/m², keeping the number of horizontal supports to the minimum.

Effective solar screening can also be achieved using vertical panels: as a structural element of the building design, as suspended moving screens or as fixed window grilles.

Louvre gratings will provide a greater degree of solar shading. The ***Delta*** range of pressure locked panels is made with a 45 degree inclined louvre set at 33, 44, 66, or 88mm centres.

Green Wall Planting Trellis

Lang+Fulton are increasingly being asked to provide a green wall screening solution as a requirement of the planning process. These are favourably received by Planning Departments which are often concerned about the impact of larger scale developments.

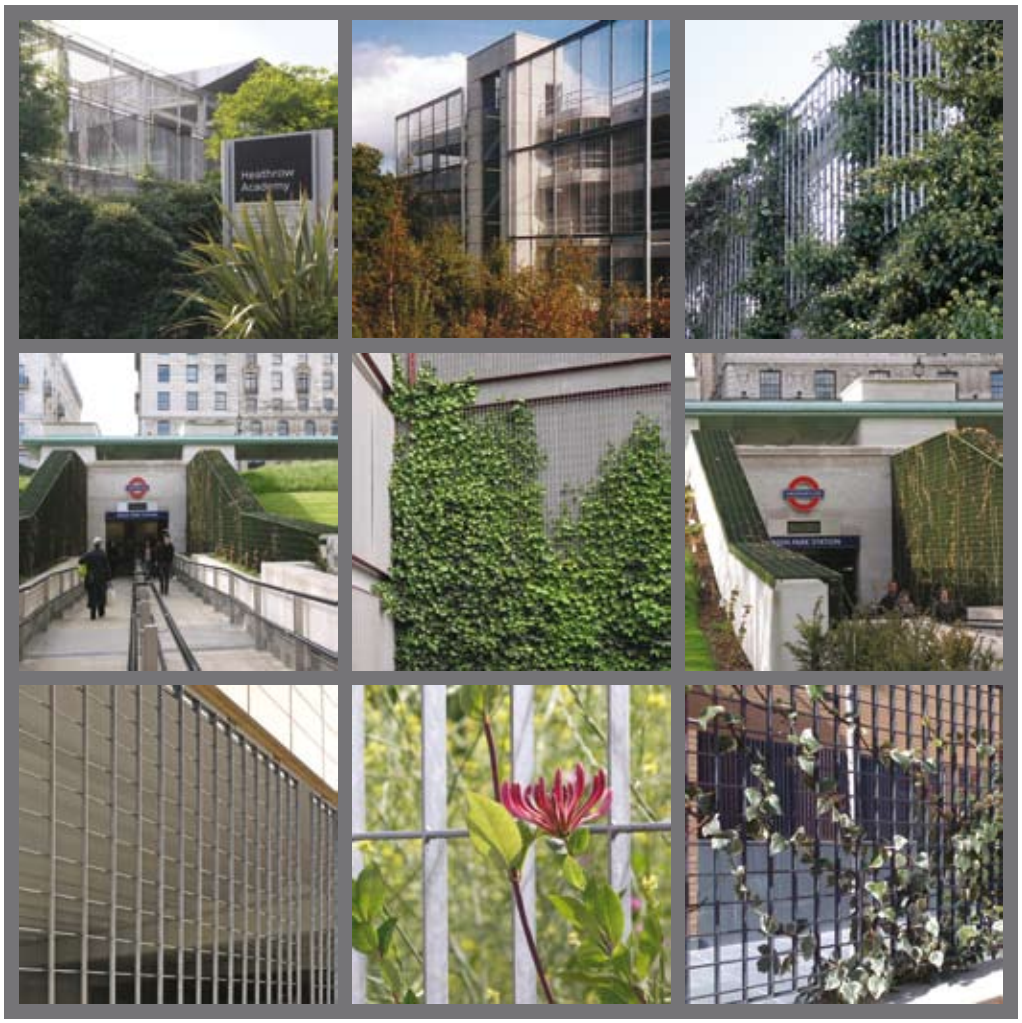
Moreover, by adding an organic element to the built environment, green walls and planted trellis promote a positive image of eco awareness.

Panels can an be made up to 2910x1890mm which are either surface-mounted with bracket fixings or designed to fit into a free-standing structural steel framework, creating a plant trellis of any height.

The strong but relatively light-weight structure of ***Piazza-132*** with a 126x132mm aperture makes it an ideal and economical product for the support of plants. It is unobtrusive with excellent see-through properties during the initial period as the plants grow.

In recreational areas, ground level panels made from complementary gratings with a smaller aperture should be considered for public safety. These base panels should aim to reduce any initial risk of the structure being climbable prior to planting becoming established.

It is important that this type of structure should have a long life-cycle. Hot-dip galvanizing with an additional polyester powder protection will ensure maximum durability.



Finishing

Galvanizing
All products are supplied hot-dip galvanized to BS EN ISO 1461 for long term durability and a low-cost life cycle. Galvanized products may randomly exhibit a rough surface texture as well as dissimilar colour characteristics and will oxidise when exposed to the elements.

Polyester Powder Coating
Subsequent to galvanizing, a multi-stage process applies thermo-setting resins producing a significantly superior finish to painting. Polyester powder coating is available in any RAL or BS colour in full accordance with BS EN 13438. In order to meet this standard and receive certification, the complete process has to be continuous and applied at the same location.

Polyester powder coating provides a smoother finish which is less attractive to dust and dirt. It is always recommended for schools or residential projects.

Louvres

Lang+Fulton can offer two ranges of mild steel louvre as an alternative to gratings for projects where a greater degree of visual screening is required.

Italia-100 and ***Italia-80***

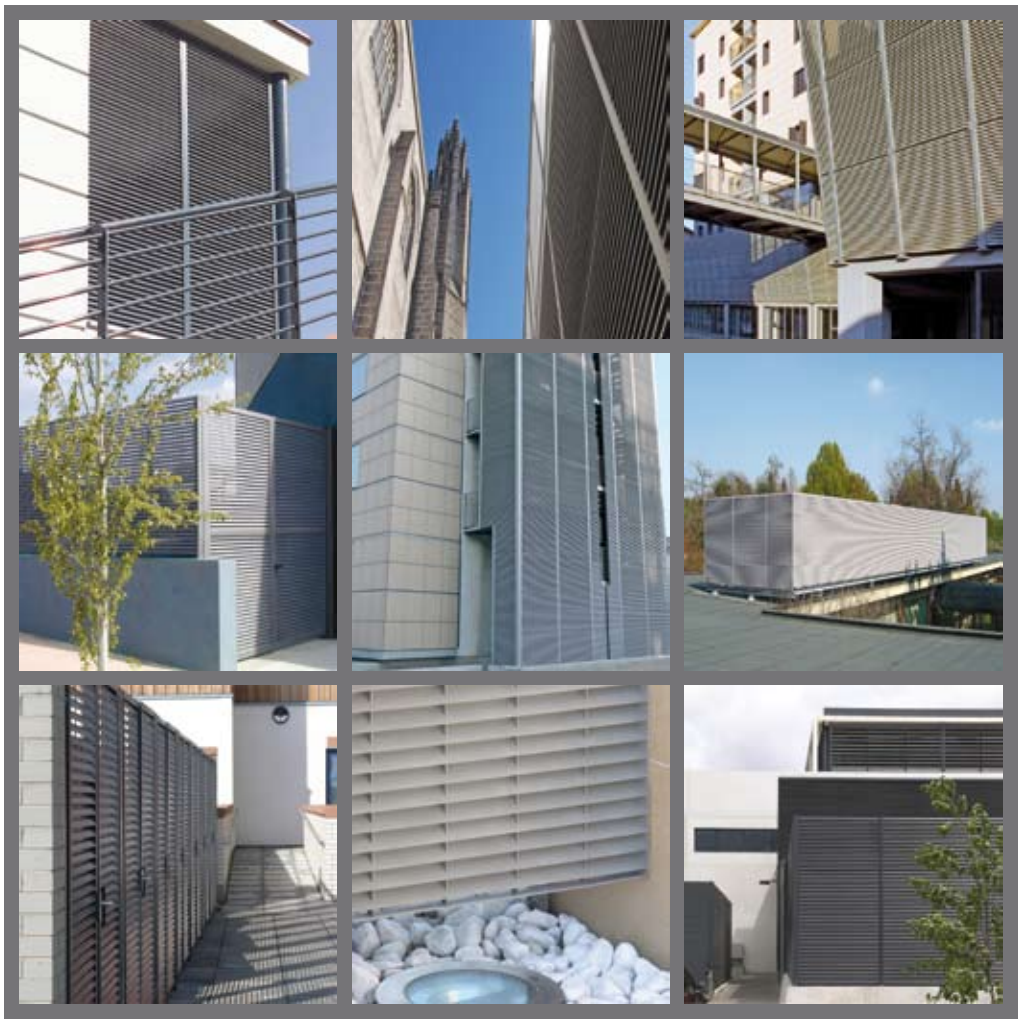
Electrofused range with a profiled louvre and continuous lateral appearance. It offers 100% or 80% screening with 35% or 45% of free area, respectively.

DeltaWing, DeltaBox, DeltaFoil

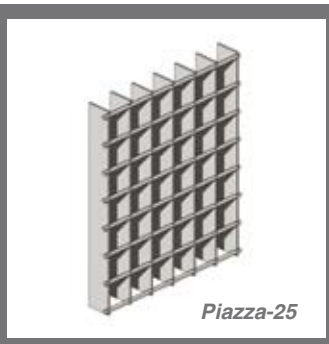
Pressure-locked range for a crisp aesthetic and a linear, geometric or gently profiled form.

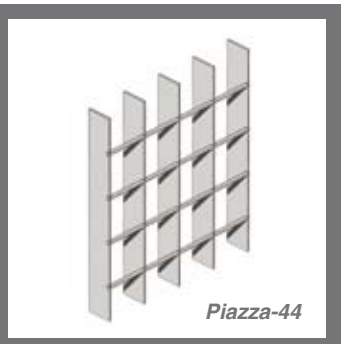
These gratings are particularly robust with a 40x2mm section louvre and 20x2 or 30x2mm vertical flat bar.

The inclined louvre can be spaced at any increment of 11mm to provide the desired amount of visual screening and free area.




Stereo-3

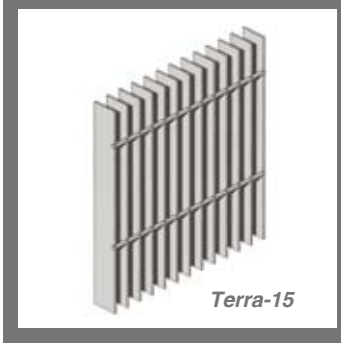

Piazza-25


Piazza-44

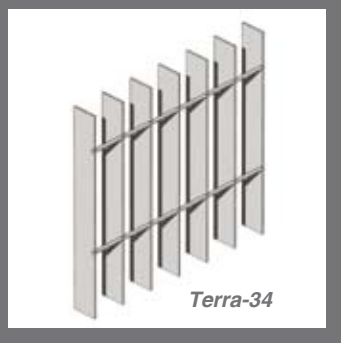

Piazza-44H

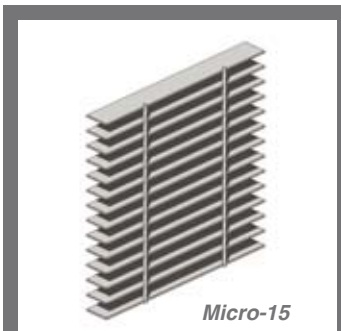

Piazza-66


Piazza-132

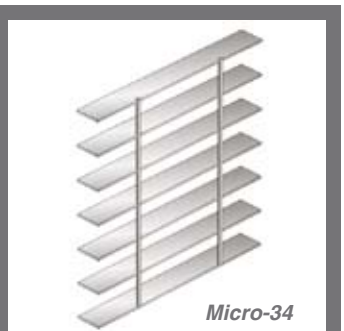

Terra-15


Terra-25


Terra-34


Micro-15

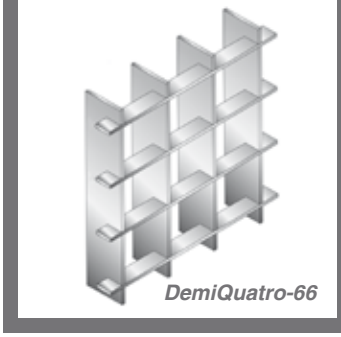

Micro-25


Micro-34

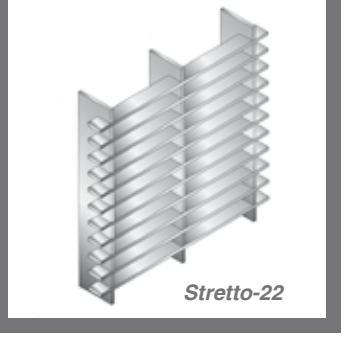

Alto-66


DemiAlto-66


Quattro-66


DemiQuatro-66


Metro-33


Stretto-22

- All dimensions are in mm
- First dimension refers to aperture
- Apertures stated as width x height
- Second dimension refers to bearing bar
- Intersection of the bars to the inside of the panel is generally considered to be standard (except *DemiAlto*, *DemiQuattro* and *Stretto*); intersections to the outside are available on request but must be clearly specified.

ELECTROFUSED GRATINGS

Stereo-2 (63x132/25x2)
Stereo-3 (63x132/25x3)
Stereo-4 (63x132/30x4)
Alternative bearing bar:40x3*

Piazza-25 (25x25/25x2)
Piazza-44 (43x44/25x2)
Piazza-44H (44x43/25x2)
Piazza-66 (63x66/25x2)
Alt bearing bars: 25x3; 30x3*; 40x3*
Piazza-132 (126x132/25x3)

Terra-15 (15x76/25x2)
Alt Bearing Bars: 25x3; 30x2; 30x3; 40x3; 50x3
Terra-25 (25x76/25x2)
Alt bearing bars: 25x3; 30x2; 30x3; 40x3; 50x4; 60x4 or 70x4
Terra-34 (34x100/25x2)
Alt Bearing Bars: 30x2*; 30x3*

Micro-15 (76x15/25x2)
Alt bearing bars: 25x3; 30x2; 30x3; 40x3; 50x3
Micro-25 (76x25/25x2)
Alt bearing bars: 25x3; 30x2; 30x3; 40x3; 50x4; 60x4 or 70x4
Micro-34 (100x34/25x2)
Alt bearing bars: 30x2*; 30x3*

Note: * = minimum Quantity of 400m²

PRESSURE LOCKED GRATINGS

All gratings made in other sizes with characteristic aperture at 11mm increments

Alto-33 (33x132/25x2)
Alto-44 (44x132/25x2)
Alto-55 (55x132/25x2) etc
Alt flat bars: 25x3; 30x2; 30x3; 30x4; 40x2; 40x3; 40x4; 40x5 and 50x3 up to 70x5

DemiAlto-33 (33x132/25x2)
DemiAlto-44 (44x132/25x2)
DemiAlto-55 (55x132/25x2) etc
Alt bearing bars: 25x3; 30x2; 30x3; 30x4; 40x2; 40x3; 40x4; 40x5 and 50x3 up to 70x5

Quattro-33 (33x33/25x2)
Quattro-44 (44x44/25x2)
Quattro-55 (55x55/25x2)
Quattro-66 (66x66/25x2) etc
Alt flat bars: 25x3; 30x2; 30x3; 30x4; 40x2; 40x3; 40x4; 40x5 and 50x3 up to 70x5

DemiQuattro-22 (22x22/25x2)
DemiQuattro-33 (33x33/25x2)
DemiQuattro-44 (44x44/25x2) etc
Alt bearing bars: 25x3; 30x2; 30x3; 30x4; 40x2; 40x3; 40x4; 40x5 and 50x3 up to 70x5

Metro-22 (66x22/25x2)
Metro-25 (66x25/25x2)
Metro-33 (66x33/25x2) etc
Alt bearing bars: 25x3; 30x2; 30x3; 30x4; 40x2; 40x3; 40x4; 40x5 and 50x3 up to 70x5

Stretto-11 (132x11/25x2)
Stretto-22 (132x22/25x2)
Stretto-33 (132x33/25x2)
Stretto-44 (132x44/25x2) etc
No alternative bearing bar

LANG+FULTON

Lang & Fulton Ltd, Newbridge Industrial Estate, Newbridge, Edinburgh EH28 8PJ
t: 0131 441 1255 sales@langandfulton.co.uk www.langandfulton.co.uk

Stockholding Depot: Cygnus Point, Black Country New Road, West Bromwich B70 0BD