

Section 5

Appendix

Information on product testing, cleaning & maintenance and the most relevant building regulations and standards and how they impact upon the selection of Gradus products to help achieve an inclusive environment in line with the Equality Act 2010. Details of the Gradus Design Service and RIBA assessed CPD seminars.

The Gradus Guarantee

All Gradus products are designed to meet the latest UK building regulations. Accessibility to buildings, as well as the provision of an inclusive environment for all, is now a requirement of the building regulations (ADM 2004 & BS 8300:2009+A1:2010). Gradus is actively seeking the advice of RNIB Access Consultancy Services and The Centre For Accessible Environments, and has consulted directly with Communities & Local Government (formerly the Office of the Deputy Prime Minister). Gradus is confident that all stair edgings, pvc skirtings and transition strips meet the necessary standards and, as such, building owners and specifiers can use Gradus Accessories with confidence.

Testing

- All inserts are tested for: Slip-resistance, surface roughness, chemical and bacterial/fungal resistance
- Wear test independently carried out by SATRA using the Taber Abrader Method and classified in accordance with the results shown in Figure 1
- Slip-resistance tests have been independently undertaken by the Health & Safety Laboratory using the pendulum test (see Figure 2)

Figure 1.

	Composition	Environment	Slip Potential	Stair Edging Compatibility
Xtra-grip & Xtra-grip Plus	Pvc with Mineral Inclusion and Pvc Wear Layer	Interior Dry or Wet Conditions	Dry Conditions Low (PTV Av. 70) Wet Conditions Low (PTV Av. 64)	Aluminium, Bronze, PVC-u XT & Traditional
Interior	Pvc with Natural Mineral Fillers	Interior Dry Conditions	Dry Conditions Low (PTV Av. 68)	Aluminium, Bronze, PVC-u XT, Traditional & Elite
Standard Exterior	Rubber Composite with Aggregate Fillers	External Conditions	Dry Conditions Low (PTV Av. >70) Wet Conditions Low (PTV Av. >55)	Aluminium, Bronze Traditional
Heavy Duty Exterior	Glass Reinforced Polyester with Fused Alumina	Internal or External Conditions	Dry Conditions Low (PTV Av. 76) Wet Conditions Low (PTV Av. 67)	Aluminium Trans-Edge TEX
Stairtile	Rubber Composite with Aggregate Fillers	Internal or External Conditions	Dry Conditions Low (PTV Av. >70) Wet Conditions Low (PTV Av. >55)	Aluminium Trans-Edge TE
Wear Classification *	<p>Xtra-grip, Xtra-grip Plus, Interior, Standard Exterior and Stairtile inserts achieve wear classifications of: Group T – Class 34 – Commercial Very Heavy Group T – Class 43 – Light Industrial Heavy</p> <p>* Standard Exterior, Stairtile and Interior (standard, grained, Elite) tested to BS EN 660-2:1999 and assessed against the requirements of BS EN 649:1997. Xtra-grip and Xtra-grip Plus tested to BS EN 13845:2005 – 50,000 cycles.</p> <p>Heavy Duty Exterior - Accelerated wear test using a SATRA Pedatron</p>			

Figure 2.

Pendulum Test Value (PTV)	Slip Potential
0 - 24	High Slip Potential
25 - 35	Moderate Slip Potential
36+	Low Slip Potential

BS 8300:2009+A1:2010 - a PTV of at least 36 is required irrespective of wet or dry conditions (see page 137)

Cleaning & Maintenance

A planned cleaning and maintenance programme is crucial to help maintain the performance and visual appearance of Gradus stair edgings and to maximise the lifespan of the products. Trained cleaning staff or a reputable contract cleaner should be used.

Gradus has worked with Selden Research to undertake extensive testing on all Gradus stair edgings. As a result, the method of cleaning and a range of cleaning products have been recommended for use with Gradus stair edgings in a variety of environments.

Cleaning and maintenance information for all Gradus stair edgings is available from: www.gradusworld.com

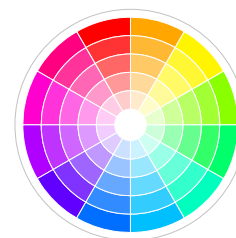
For further information about recommended cleaning products, including instructions for use and COSHH data sheets, contact:

Selden Research Limited, Staden Business Park, Buxton, Derbyshire SK17 9RZ
Tel: 01298 26226 Email: gradus@selden.co.uk Website: www.selden.co.uk

Specification Guidelines

Colour & Contrast / Light Reflectance Values

Colour and contrast within the built environment affects accessibility of all building users, in particular those with a visual impairment.



Project Rainbow

A research project carried out by Reading University in conjunction with the Royal National Institute of Blind People (RNIB), The Guide Dogs for the Blind Association (GDBA) and ICI Paints first examined the use of colour contrast to aid navigation around the building and identified that highlighting critical surfaces and special features can provide the basis for wayfinding for visually impaired people.

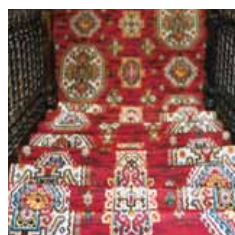
The 'Colour Contrast & Perception' document produced by Reading University uses light reflectance values (LRVs) to measure colour and contrast in products/surfaces and determines whether or not a suitable contrast has been achieved between surfaces.

The findings from Project Rainbow identified the following:

Special Features: identified as areas that need to be highlighted to allow a building to be used effectively by visually impaired people, i.e. stair edgings, handrails and door opening furniture.

'Special features are additional areas, smaller than critical features, that need to be highlighted to allow the building to be used more easily by visually impaired people. Such features include sanitary ware, handrails, door handles, finger plates, switches, socket outlets, and stair nosing etc, all of which should be contrasted against the background against which they will be seen. Smaller items such as these will need a greater colour difference from their surroundings in order to be identified.'

Trim: 'Special attention is needed to those items used in an internal environment to improve the decorative appeal and overall finish of an interior. Such items, which include coving, skirting, architrave, dado rail etc, should be decorated in colours used on larger critical surfaces.'



Critical surface:
patterned carpet
and no stair
edgings - staircase
looks like a ramp



Special features:
stair edgings are a
different colour and
luminance to the
flooring to define
step edges



Special features:
skirting is the
same colour as
the wall

Source: Building Regulations - Access to and use of buildings - Approved Document M - 2004 Edition
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BS 8300:2009+A1:2010 and The Building Regulations 2000: Approved Document M

British Standard BS 8300:2009+A1:2010 states that light reflectance values (LRVs) are used to assess visual contrast using the method of measurement detailed in BS 8493:2008+A1:2010. Approved Document M (ADM 2004) directly refers to colour and contrast in the definitions section, stating:

'Contrast visually, when used to indicate the visual perception of one element of the building, or fitting within the building, against another means that the difference in light reflectance value between the two surfaces is greater than 30 points.'

ADM 2004 then refers to Colour, Contrast & Perception – Design Guidance for Internal Built Environments, Reading University (Project Rainbow).

Light Reflectance Values (LRVs) explained

Reflectance is the proportion of light that a surface reflects compared to the amount of light that falls on the surface. An LRV is a value given to a surface to denote the amount of light reflected. Therefore, as many people with a visual impairment can perceive light and dark, LRVs are a suitable method to measure contrast.

LRVs are marked on a scale of 1 to 100 depending on the percentage of light reflected. Dark, matt and/or textured surfaces absorb a large amount of light and, therefore, have low reflectance values. On the other hand, light, glossy and/or smooth surfaces reflect the majority of light that falls on them and have high reflectance values.

Light Reflectance Scale

In order to achieve a suitable contrast between different surfaces, Project Rainbow and ADM 2004 recommend that there is at least a 30 point (not 30%) difference in the LRVs of the two surfaces.

Black 0

White 100



How to Measure LRVs

The British Standard [BS 8493:2008+A1:2010](#) specifies the method of test to determine the light reflectance value (LRV) of different surfaces of materials, including preparation of specimens in standardised conditions and results put into a test report. [All relevant Gradus products have been measured using the CIE Y value and a test report is available upon request.](#)

Previous to this standard being published, two widely used methods of measurement had been used - the CIE L value (fluorescent light) and the CIE Y value (natural daylight), causing confusion and potentially dangerous specifications. [This standard has adopted the CIE Y value as the single consistent method of measurement for LRVs that is to be used across all industries.](#)

What the colour & contrast guidelines mean for Gradus flooring accessories:

Stair Edgings

[BS 8300:2009+A1:2010](#): 'Each step nosing should incorporate a permanently contrasting continuous material for the full width of the stair on both the tread and the riser to help blind and partially sighted people appreciate the extent of the stair and identify individual treads. The material should be 50 mm to 65 mm on the tread and 30mm to 55mm on the riser, and should contrast visually with the remainder of the tread and riser.'

[ADM 2004](#): 'All nosings are made apparent by means of a permanently contrasting material 55mm wide on both the tread and the riser.'

[Colour, Contrast & Perception \(Project Rainbow\)](#): 'The nosing of every step in a flight of stairs should be adequately colour or luminance contrasted with the remainder of the step and the floor coverings adjacent to the top and bottom of the flight.'

Tactile Warning Tile

[BS 8300:2009+A1:2010](#): 'To give advance warning of a step, tactile paving with a corduroy hazard warning surface should be provided at the top and bottom of each flight. Where the approach to the stair is wider than the flight, the tactile surface should extend beyond the line of each edge of the flight.'

[Colour, Contrast & Perception \(Project Rainbow\)](#): 'Colour or luminance contrast of tactile warning floor coverings at the top and bottom of each flight (of stairs) will also assist in the identification of an imminent potential hazard.'

Skirtings

[BS 8300:2009+A1:2010](#): 'To avoid giving the wrong impression about the size of a room, skirtings should have the same LRV as the wall so that the junction between the skirting and the floor marks the extent of the room.'

[Colour, Contrast & Perception \(Project Rainbow\)](#): 'Skirting should be either decorated the same colour as the wall, the same colour as the floor or, if different to one or the other or both, must be decorated in a colour which highlights even further the junction.'

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Guide to matching PVC-u Hardnose™ channel to insert colours for visual contrast

HARDNOSE™ CHANNEL	LRV	INSERT AVAILABILITY							
		Xtra-grip	LRV	Xtra-grip Plus	LRV	Interior Standard	LRV	Interior Grained	LRV
● Black	4.99	Carbon	5.01	Raven	5.01	Jet	4.56	Black	6.47
● Ink	5.40	Deepsea	5.94	Navy	5.94	Ink	4.96	-	-
● Burgundy	5.89	-	-	-	-	Burgundy	5.70	-	-
● Evergreen	6.63	-	-	-	-	Evergreen	6.69	-	-
● Midnight	6.77	-	-	-	-	Midnight	6.56	-	-
● Brown	7.15	Truffle	7.85	Conker	7.85	Coffee	6.05	Brown	12.13
● Bluebell	9.76	-	-	-	-	Ocean	8.00	-	-
● Granite	11.69	Rock	10.91	Marl	10.91	Lead	12.77	Granite	13.44
● Nutmeg	13.21	-	-	-	-	Nutmeg	8.15	-	-
● Dove	26.19	Pebble	27.61	Cliff	27.61	Steel	26.99	Dove	23.40
● Linen	37.50	-	-	-	-	Linen	38.59	-	-
● Glacier	42.73	Vapour	39.74	Lunar	39.74	Glacier	42.09	-	-
● Duckegg	51.46	-	-	-	-	Duckegg	47.72	-	-
● Clay	51.53	-	-	-	-	Clay	47.97	-	-
● Sky	55.38	Breeze	51.13	Meltwater	51.13	Sky	52.63	-	-
● Canvas	55.43	Oat	50.66	Bone	50.66	Canvas	53.27	-	-
● Jade	55.54	Pampas	53.04	Vine	53.04	Jade	53.98	-	-
● Buttercup	62.62	Zest	51.11	Sulphur	51.11	Buttercup	55.54	-	-
● Snowdrift	80.54	Iceberg	81.58	Diamond	81.58	Snowdrift	83.77	-	-

Specification Guidelines

The Building Regulations and British Standards specifying the right Gradus product

The Building Regulations and British Standards are designed to ensure the optimum specification of products through a combination of legislative requirements and guidance. The following extracts have been taken from The Building Regulations 2000 and British Standard BS 8300:2009+A1:2010 and show how Gradus products can be used to help satisfy these requirements, and help achieve an inclusive environment in line with the Equality Act 2010. For further details on this or any other aspect of The Building Regulations and British Standards contact Gradus Technical Services on 01625 428922.

Extracts shown below represent examples of good practice.

BS 8300:2009+A1:2010

Design of buildings and their approaches to meet the needs of disabled people. Code of practice.

This standard provides guidance or good practice in the design of domestic and non-domestic buildings and their approaches so that they are convenient to use by disabled people. Gradus advice and recommendations are [shown in blue text](#).

Guidance on Stair Edgings

5.9.5 Identification and slip resistance of nosings

Each step nosing should incorporate a permanently contrasting continuous material for the full width of the stair on both the tread and the riser to help blind and partially sighted people appreciate the extent of the stair and identify individual treads ¹. The material should be 50 mm to 65 mm on the tread and 30mm to 55mm on the riser, and should contrast visually with the remainder of the tread and riser ².

NOTE 1 A nosing that wraps around the riser might assist blind or partially sighted people ³.

NOTE 2 A proprietary nosing can provide a durable solution that satisfies both visual contrast and slip resistance criteria (see BRE IP 15/03 [13]) ³.

The whole tread or the nosing should incorporate slip-resistant material, starting as close as practicable to the front edge of the nosing and extending the full width of the tread ³.

NOTE 3 Guidance on slip resistance of surfaces is given in Annex E.

¹ All Gradus stair edging colours have been measured to provide Light Reflectance Values (LRVs)* in order to provide the specifier with information to ensure that suitable contrast is achieved with the surrounding stair material. PVC-u Hardnose stair edgings can provide an ideal solution as channel and insert colours can be matched to contrast with the tread and riser (see pages 34 to 39).

* These values have been determined using the CIE Y value, in accordance with BS 8493:2008+A1:2010 – see pages 134 to 135 for further details.

² The profile dimensions stated are guidance only and other factors should be taken into consideration when specifying stair edgings such as step dimension and type and frequency of traffic. However, a large proportion of Gradus stair edgings fall between these dimensions stated, including the XT range (see pages 17 to 18 and 35 to 36).

³ The XT range of stair edgings features a slip-resistant pvc insert that extends around the leading edge of the profile to ensure that foot contact is always made with the slip-resistant element of the stair edging, providing the ideal solution for reducing the risk of slips, trips and falls on stairs in line with BRE. The XT range is available in aluminium (see pages 17 to 18) and PVC-u Hardnose (see pages 35 to 36).

8 Vertical circulation

8.1 Internal steps and stairs

8.1.5 Surface finishes

The surface materials used for internal steps and stairs should be chosen to be easy to maintain and as slip-resistant as possible, especially if surfaces are likely to become wet due to location or use, or if spillage occurs.

NOTE Advice and further references on slip resistance of surfaces is given in Annex E.

A choice of slip-resistant insert materials is available for all Gradus stair edgings. Xtra-grip and Xtra-grip Plus inserts have been specifically designed to reduce the risk of slip in internal wet areas or where spillages are likely to occur (see page 11 for advice on specifying the most suitable insert).

Annex E Slip potential characteristics of treads, ramp surfaces and floor finishes

E.2 Slip resistance

The following indices are used to indicate the slipperiness of surfaces:

- a) pendulum test values (PTVs) obtained using a pendulum tester in line with BS 7976-2;
- b) surface micro-roughness (Rz) measurements using a stylus instrument in accordance with BS 1134-1.

E.5 Step nosings

Where slip resistance is required for nosings and treads, the slip resistance needs to be the equivalent to that expected for level surfaces. A PTV greater than 36 is considered to be suitable, as pushing and turning are unlikely on stairs. On existing nosings, the slip resistance of step nosings are generally expressed by their Rz roughness value as PTV is difficult to measure. In such cases a roughness Rz value of 20 µm is recommended.

All Gradus stair edging inserts are independently tested for slip-resistance by the Health & Safety Laboratory using the pendulum test – all inserts have a low slip potential (inserts measured in dry conditions - PTV of between 68 and 71; inserts measured in wet conditions – PTV of between 53 and 64). All inserts are also tested for wear, surface roughness, chemical resistance and bacterial/fungal resistance (see page 133 for further details).

Guidance on Tread Alert

5.9.6 Landings

To give advance warning of a step, tactile paving with a corduroy hazard warning surface should be provided at the top and bottom of each flight. Where the approach to the stair is wider than the flight, the tactile surface should extend beyond the line of each edge of the flight.

NOTE Further information on the correct choice of tactile warning surface can be found in the DTLR publication Guidance on the use of tactile paving surfaces.

Tread Alert has been designed to meet the requirements of "Guidance on the use of tactile paving surfaces" (see pages 122 to 123 for details).

Guidance on Skirtings

9 Surfaces and communication aids

9.1.1 Visual characteristics

The LRV of a wall should be 30 points different from that of the ceiling and of the floor. To avoid giving the wrong impression about the size of a room, skirtings should have the same LRV as the wall so that the junction between the skirting and the floor marks the extent of the room.

All Gradus skirting colours have been measured to provide Light Reflectance Values* in order to provide the specifier with information to ensure that the skirting can be matched to the wall and contrast with the floor.

* These values have been determined using the CIE Y value, in accordance with BS 8493:2008+A1:2010 – see pages 134 to 135 for further details.

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Specification Guidelines

The Building Regulations and British Standards specifying the right Gradus product

Extracts from the Building Regulations

The Building Regulations 2000 - Approved Document M “Access to and use of buildings” (Effective May 2004)

Building owners have a legal duty to ensure all people can gain access to and use a building and its facilities.

Approved documents are intended to provide guidance and much of the guidance in Approved Document M is based on BS 8300:2001. The main points relating to stair and stepped access that are detailed in Approved Document M are shown below, with supporting recommendation by Gradus [shown in blue text](#).

Stepped Access

- 1-27 People with impaired sight risk tripping or losing their balance if there is no warning that steps provide a change in level.
[Use of a stair edging that contrasts with the surrounding tread/riser material will help to clearly define the step edge and warn of a change in level.](#)
- 1-29 Materials for treads should not present a slip hazard, especially when the surface is wet.
[Gradus provides a range of inserts for use in interior \(dry and wet\) and exterior conditions \(see page 11\).](#)
- 1-30 People should easily be able to appreciate where to place their feet by highlighting nosings and avoiding open risers.
[Use of a stair edging that contrasts with the surrounding tread/riser material will help to clearly define the step edge. Both the insert and channel of the stair edging should be of a suitable contrast to the surrounding floor finishes. ADM directly refers to colour contrast in the definitions section stating that:](#)
‘Contrast visually, when used to indicate the visual perception of one element of a building, or fitting within the building, against another means that the difference in light reflectance value between the two surfaces is greater than 30 points.’
[All Gradus stair edging colours have been measured to provide Light Reflectance Values* in order to provide the specifier with information to ensure that suitable contrast is achieved with the surrounding stair material.](#)
[*These values have been measured using the CIE Y value in accordance with BS 8493:2008+A1:2010. See pages 134 to 135 for further details.](#)
- 1-33 (i) All nosings are made apparent by means of a permanently contrasting material 55mm wide on both the tread and the riser.
[The 55mm dimension detailed is guidance only and other factors should be taken into consideration when specifying stair edgings such as step dimension, type and frequency of traffic. Communities and Local Government \(formerly The Office of the Deputy Prime Minister\) also acknowledges that advice given by other expert bodies should be taken into consideration, for example the RNIB Access Consultancy Services who state that the ideal dimension for a stair edging is 55mm on the tread and 30-50mm on the riser, which takes into account lower risers where a 55mm stair edging may take up a large proportion of the riser surface and therefore could be confusing for partially sighted people. If 55mm profiles are required they are available in the Gradus range \(see pages 17, 18, 21, 24, 35, 36 and 37\).](#)

Entrance Lobbies

- 2-29 (e) Floor surface materials within the lobby do not impede the movement of wheelchairs e.g. not coir matting, and changes in floor materials do not create a potential trip hazard.
[The majority of Gradus mats are suitable for use with wheelchairs.](#)
- 2-29 (f) The floor surface helps to remove rainwater from shoes and wheelchairs.
[A combination of Gradus primary and secondary barrier matting will help prevent the ingress of rainwater.](#)
- 2-29 (g) where matwells are provided, the surface of the mat is level with the surface of the adjacent floor finish.
[Gradus offers a range of matwell frames and primary barrier mats designed to work together to provide a smooth transition to the surrounding floor finish.](#)

Corridors and Passageways

- 3-12 In order to help people with visual impairment to appreciate the size of a space they have entered, or to find their way around, there should be a visual contrast between the wall and floor.
[Gradus skirting profiles are available in a wide choice of colours and will provide a suitable colour contrast, helping define where the floor ends and the wall begins.](#)

Specification Guidelines

BRE - Research and Guidelines

BRE has published an information paper (ref. IP15/03) entitled "Proprietary nosings for non-domestic stairs". This paper provides guidance to designers and building managers on the best way to assess the types of proprietary nosings that should be provided on non-domestic stairs.

Gradus has combined the key findings of this report with in-house research and development, and as a result has developed the XT range of profiles.

Detailed below is an overview and summary of the key findings in the BRE information paper.

Overview

The study considered the dynamics of pedestrian stair use. Previous studies have shown that 80% of slips on stairs are likely to occur when users are descending the stairs. This usually occurs as a result of an overstep (i.e. when a substantial portion of the foot overhangs the tread). Therefore as the going (tread width) becomes narrower the likelihood of a slip incident becomes greater. Where the going is less than 300mm the risk of slip is increased. Most non-domestic stairs have a going of between 250mm and 280mm. The risk of slip is further increased if the tread surface is smooth, becomes wet or there is a lack of clear colour contrast at the step edge.

Diagram to show how a typical overstep situation can occur when the going is less than 300mm.

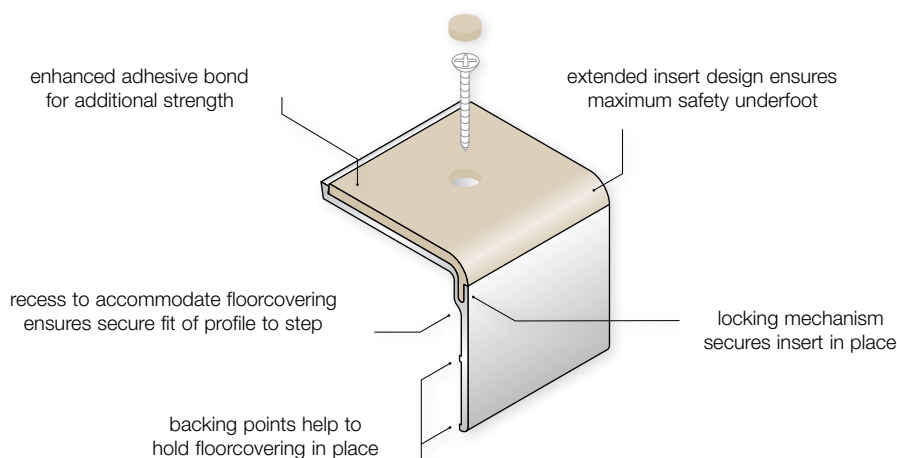


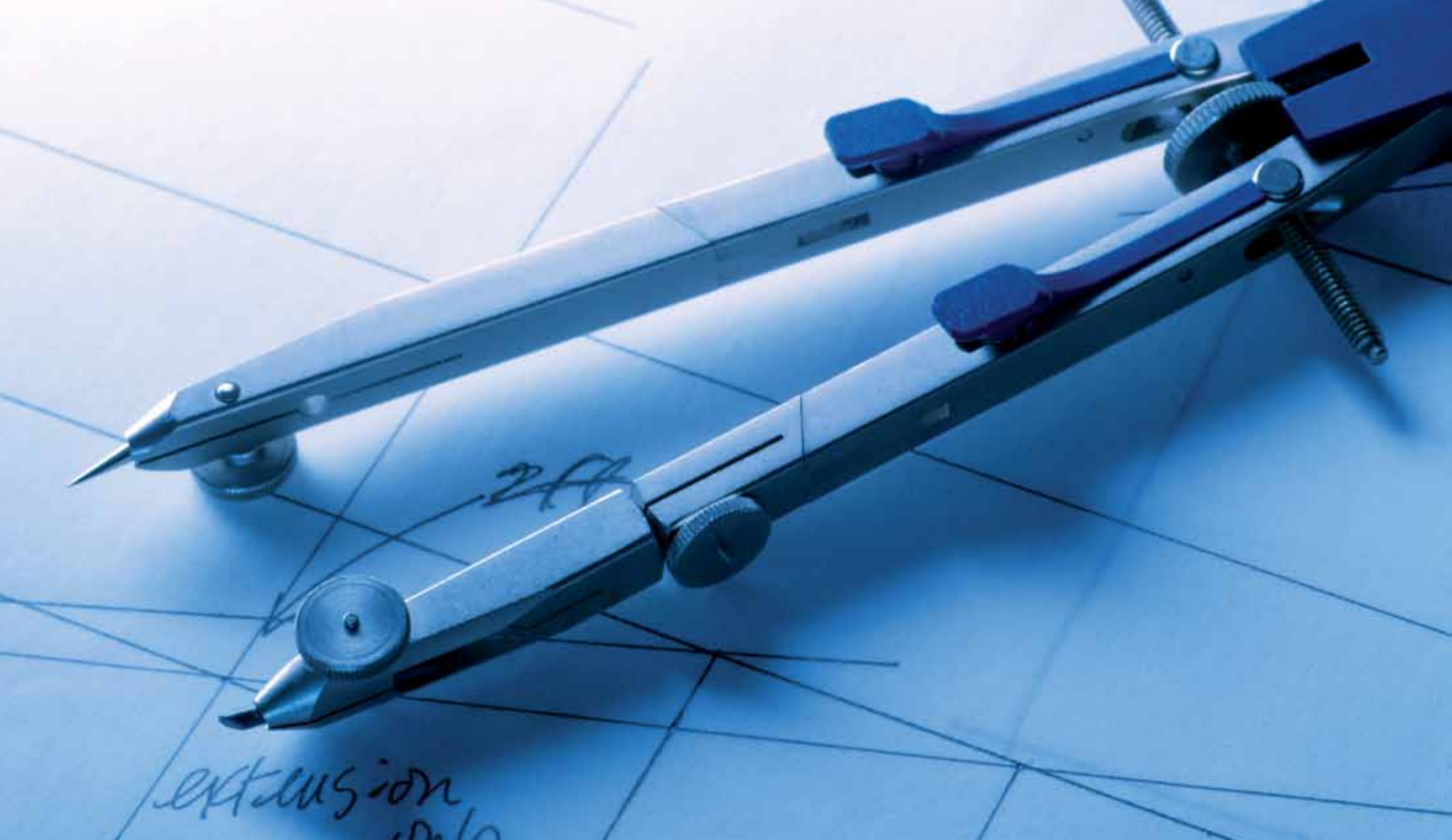
Conclusion

The application of a proprietary nosing may reduce the risk of slipping against the factors highlighted above. The proprietary nosing should incorporate a slip-resistant material that should extend to the point at which it meets the vertical face to minimise the risk of slip in descent. Proprietary nosings should all offer a colour contrast to clearly highlight the step edge.

Gradus recommendation

The **XT range** of stair edgings (see pages 17 to 18 and 35 to 36) offers a new edge in safety for stairs and has been developed to take into account the latest guidance contained in the BRE information paper IP15/03, BS 8300:2009+A1:2010 and in The Building Regulations 2000 - Approved Document M.





Design Service

Although a wide selection of standard product exists we are aware that sometimes something different is required, and therefore Gradus offers a bespoke service where our customers can create products and colours to suit exact design requirements.

Gradus utilises a CAD design system and in-house tooling & manufacturing to rapidly produce bespoke profiles to individual customer requirements.

Bespoke profiles and colours may be subject to minimum quantities and lead times.

For further information contact Gradus Technical Support.

call: 01625 428922



RIBA CPD Seminars

A full range of RIBA assessed CPD seminars available covering specification, legislation, safety, performance and aesthetics.

The Specification & Design Considerations of Stair Edgings

The presentation includes video contributions from leading industry experts in accessibility, visual contrast and health and safety.

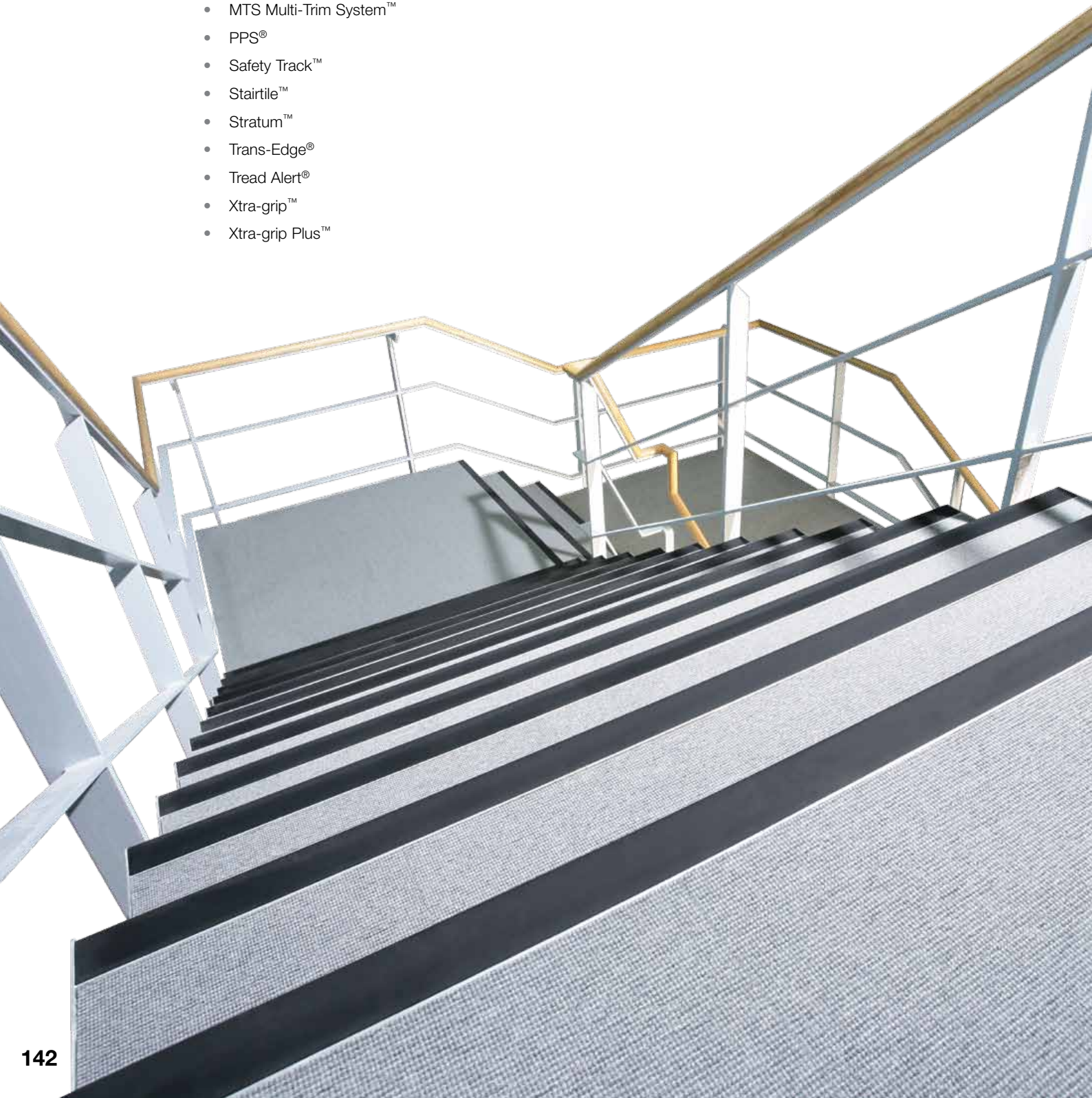
Seminars also available on the specification of Barrier Matting and Wall Protection Systems.

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- Stairtile™
- Stratum™
- Trans-Edge®
- Tread Alert®
- Xtra-grip™
- Xtra-grip Plus™



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Oxford University	NatWest
Cambian Group	University of Kent
Vodafone	University of Reading
Craegmoor Healthcare	Costa
British Gas	Boots
Reel Cinemas	Brunel University
BMW	Virgin
Anchor Trust	Levi's
Lloyds Banking Group	Imperial College London
RAC	Bhs
Nationwide	Foot Locker
Porsche	The London School of Economics
Emirates Stadium	The University of Warwick
Odeon	General Healthcare Group
Cineworld	Barclays
Vue Cinemas	Marks & Spencer
Pathé	BAA
Bass Leisure	Network Rail
Morrisons	Headingley Experience
Chiswick Park	The Christie
Legoland Discovery Centre	Queen Mary University
Everyman Cinemas	Jersey Airport
HSBC	Cutty Sark
TK Maxx	The Crucible
The James Cook University Hospital	UCL (University College London)
Hanover Housing	New Look
BMI Healthcare	Premier Inn
Cannon Gyms	University Partnerships Programme
Pilgrim Homes	William Hill
University of Cambridge	Honda
Imperial College London	O2
University of Essex	Greggs
King's College London	University of Sussex
Spire Healthcare	

Product Index

A			
ACC40	114	AS21	22
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AFT3912	55, 56	CA71	27
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AFT45	61, 62	CC75	114
AFT708	55	CCF 100 1	113
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