The GRADUS Knowledge

Introduction to the Gradus Knowledge

The Gradus Knowledge covers a number of important industry topics and aims to offer building specifiers and contractors insightful guidance from the market leaders in contract interior solutions.

About Gradus

Gradus was founded in 1966 and has evolved from a flooring accessories business, which still remains at the heart of its activities, into a fully-fledged contract interior solutions provider.

With over 280 employees serving both the UK and international markets, Gradus offers solutions for floorcoverings, barrier matting, wall protection and LED lighting, in addition to a comprehensive range of stair edging and floor trim profiles.

Click **here** to view video.

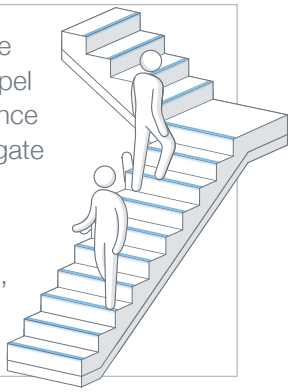
The Stair Safety Series

There are many misconceptions and misunderstandings with regard to the specification of stair edgings.

Should the top and bottom steps be different colours? What are LRVs and why do they matter? Why do I need visual contrast?

This instalment of The Gradus Knowledge will focus on stair safety. It will look to dispel some common myths and provide guidance to help to ensure building users can navigate around a building safely and equally.

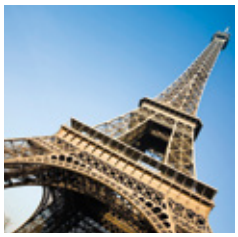
We hope that this document will be valuable to anyone involved in the design, specification, construction, installation or maintenance of stairs.



Why Gradus?

With over 50 years experience in designing and manufacturing stair edging profiles, Gradus is well placed to give accurate information about stair safety and offer valuable insights.

Gradus provides the most extensive range of stair edgings in the UK... and can even be found at the most-visited paid monument in the world - the Eiffel Tower! It has continually improved its own stair edging range over the last five decades, due to the on-going need to keep up with changing guidance and the increasing awareness of stair safety.



Gradus is a key contributor to the UK Slip Resistance Group (UKSRG) and helped to produce an informative guide called “What Makes Stairs Safer?” that offers an overview of the key aspects involved in creating safe internal stairs.

The Equality Act

What it relates to:

The Equality Act, which replaced the DDA, came into force 1st October 2010, **bringing together 116 separate pieces of legislation into one single Act** to create a legal framework to protect the rights of individuals and ensure equal opportunities for all.

In regards to building development, this legislation works alongside Approved Document M (ADM), which relates to the access to and use of buildings.

ADM deals with the design of buildings to enable all people to gain access, and be able to use the facilities of the building, such as stairs. It also includes requirements to help people with sight, hearing and mobility impairments use buildings. **This is law**.

This is important when looking at stair safety in particular, as specifiers must ensure they are specifying stair edgings that meet the design requirements, helping to achieve an inclusive environment in line with the regulations. However, it must be noted that ADM sets out the minimum requirements to ensure a range of people can access a buildings facilities.

Complying with ADM **does not mean you have complied with the broader obligations listed in the Equality Act.**

Legality

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

Who is responsible?

The designers, builders and installers working on a building as well as the building owner.

What happens if you don't comply?

You can be served with an enforcement notice.

Think of the consequences

A well-known high-street retailer was fined £9,000 after a member of staff slipped down an unmarked step, fracturing her left ankle and damaging her right knee.

Under the Equality Act 2010, building owners have a duty to make stairs accessible to all and failure to comply risks the safety of building users. In this case the step edge was not clearly marked and the retailer had to admit liability.

> "You're dumb not to consider equal access"
>
> George Osbourne

Gradus offers a RIBA assessed and approved CPD seminars on 'The Specification & Design Considerations of Stair Edgings'. Want to know more? Click **here**.

Further reading

For further information on the Equality Act or Approved Document M, please see:

- The UK Government Whitepaper on Approved Document M
- The UK Government legislation on the Equality Act 2010

UK Building Regulations

What are they?

The Building Regulations are minimum standards for design, construction and alterations to virtually every building.

The Building Regulations impose certain mandatory requirements in relation to:

- The construction of any building and to certain services and fittings in conjunction with any building
- The construction alteration or extension of any building's construction
- Any building undergoing a change of use

The Government publishes guidance on ways of meeting these requirements in what are known as Approved Documents. They are intended to provide practical advice on ways to comply with the functional requirements in The Building Regulations.

Approved Documents

Approved Document M (ADM) sets out minimum requirements to ensure a diverse range of people are able to access and use facilities within buildings.

It states that reasonable provision must be made for people to:

- Gain access to; and
- Use, the building and its facilities

However, the guidance only indicates one way of satisfying the requirements - there may well be alternative ways of achieving compliance.

There is no obligation to adopt any particular solution contained in any Approved Document if you prefer to meet the relevant requirement in some other way, such as standards.

If you choose to do this you assume the risk, which is why we recommend following guidance.

Remember

Building Regulations impose mandatory requirements.

If you fail to comply with Building Regulations:

- An unlimited fine may be imposed
- An enforcement notice on the building owner requiring alteration or removal of work which contravenes the regulations

Helping you stay compliant - BIM

Gradus' BIM objects provide specifiers with a comprehensive range of profiles to enable the optimum specification.

This is further supported by additional product knowledge, such as warranty information, floor covering advice and information on installation.

How Gradus meets these regulations:

Gradus works hard to ensure that all of its products have been developed in line with the latest legislation, standards and guidelines.

To view supporting recommendation from Gradus in each document visit:

- **Approved Document M**
- **Approved Document K**

UK Building Standards

What are they?

Put at its simplest, a standard is an agreed, repeatable way of doing something. The point of a standard is to provide a reliable basis for people to share the same expectations about a product or service.

What is the difference between a standard and a regulation?

Regulation

- A rule that we must follow
- Rules that the Government makes under an Act
- Rules are made "real" and "enforceable" by the power that the Government gives itself under an Act

Standards

- Not written by Government
- Are written by organisations such as BSI
- Typically refer to product performance or how to do a job
- Have no authority on their own, but may be adopted into regulations making them legal requirements

Are standards a legal requirement?

No, standards are voluntary and do not impose any regulations. However, you may need to meet certain standards to comply with particular legal requirements and ensure building users can navigate around a building safely.

Gradus products are in line with three main standards:

To view supporting recommendation from Gradus in each document, click on the links.

- **BS 8300-2:2018** explains how buildings, their approaches and immediate surroundings can be designed, built and managed to achieve an inclusive environment.
- **BS9266:2013** gives recommendations for the design of accessible and adaptable general needs housing.
- **BS 5395-1:2010** provides a code of practice for the design of stairs with straight flights and winders.

Technical Support

Have you got a technical question? Contact Gradus Technical Support on 01625 428992

Gradus offers a RIBA assessed and approved CPD seminars on 'The Specification & Design Considerations of Stair Edgings'. Want to know more? Click **here**.

Accidents

100,000 injuries on stairs every year resulting in 100 deaths.

The causes of falls on stairs are well understood, but poorly designed stairs are still commonplace. However, it's important to note that it's not just poor installation of products, but also the surroundings and maintenance which have an impact.

For example, stairs should be well lit in daylight and/or artificial light (a minimum 100 lx is recommended). A 'clearly visible' stair is one that is safe.

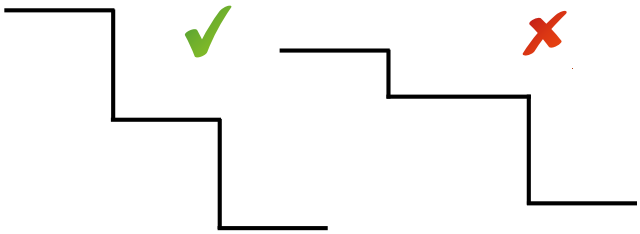
A stair fall often leads to serious injury or even death and **in the UK there is a fall on stairs every 90 seconds** (BS 5395-1: 2010).

Causes of accidents on stairs

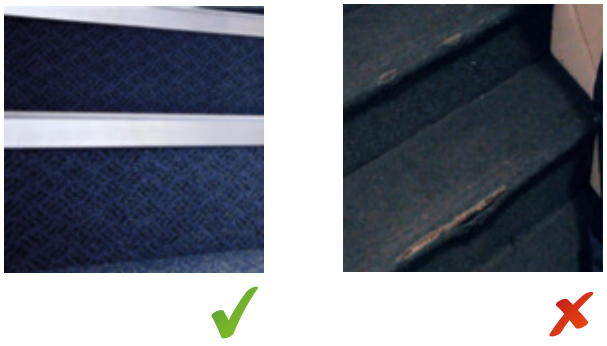
- Size and consistency of step dimensions
- Stair nosings – damaged or incorrect
- Light Reflectance Value (LRV)
- Lighting
- Handrails
- Cleaning and Maintenance
- Human error

Best practice for stair design:

Step dimensions: To minimise risk of falling, you need to ensure consistent rise and goings on stairs.



Stair nosings: They need to define and protect the nose of stairs. Carpets or nosings that become loose or damaged can present a trip hazard. To find out more visit our **stair edgings chapter**.



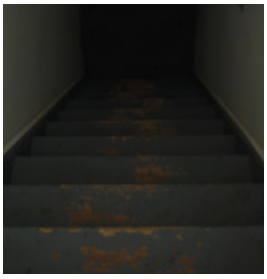
LRV: The colour of the stair nosing is required to differ from that of the floor covering. There should be at least 30 points difference between the stair nosing LRV and that of the floor covering.

To find out more visit our **visual contrast chapter.**

Accidents

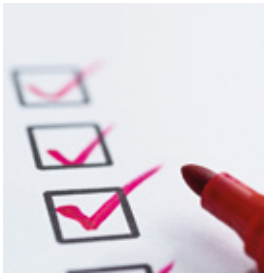
Best practice for stair design:

Lighting: Good lighting ensures that steps can be seen clearly and that there are no shadows which could result in a trip hazard



Handrails: A correctly installed handrail can not only prevent a fall, but can save someone from one that has already started.

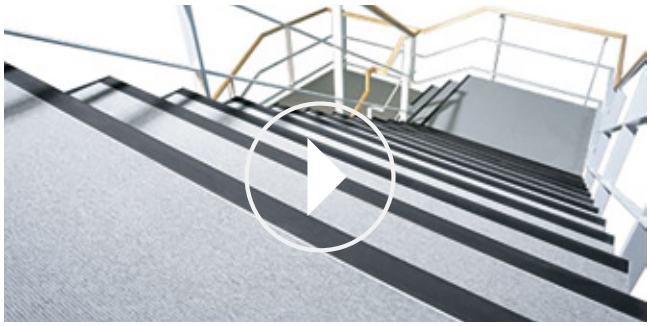
Cleaning and Maintenance: Looking for signs of wear and tear, loose carpet or fittings, obstacles, broken lighting and build up of contaminants all make for a safer stair and minimise the risk of accidents



Human Error: Negotiating stairs is a largely subconscious task and, as such, falls are often blamed entirely on human error. In reality, the design of a stair plays a critical role in helping people to safely negotiate the stair.

Product Tip

Gradus XT stair edgings offer the ultimate solution in reducing slips, trips and falls on stairs.



Click **here** to view video.

BIM

For up-to-date and accurate data, providing you with the relevant technical information to build into your projects – download Gradus' BIM objects, available for the entire range of XT stair edgings and side trims.

Download here.

Further reading

As a key contributor to the UK Slip Resistance Group (UKSRG), Gradus has provided valuable input into a guide entitled "What Makes Stairs Safer?" that aims to educate building specifiers and contractors on ways to improve stair safety.

UK SLIP RESISTANCE GROUP

Stair Edgings

No matter how many steps you are installing, the same guidelines apply for creating safe, accessible staircases.

Step 1: Choose the right stair edging for the step

Shape of step

This should be a tight fit to the step to ensure that the profile does not lift or rock during use. There are four main nosing shapes to choose from:

Square

Rake Back

Kinked Face

Bullnose

Gauge

It is important to ensure that the gauge (thickness) of the stair edging is suitable for use with the surrounding floorcovering. The gauge of the stair edging should be a flush finish to the floorcovering to avoid a trip hazard being created.

Gauge	For use with
Ramp Back	No floorcoverings / resilient floorcoverings - install profile on top of the floorcovering to ensure a safe fit
2mm - 3mm	Resilient floorcoverings
4mm - 5mm	Carpet / carpet tile / resilient floorcoverings with a bevelled underlay in heavy use areas
6mm	Carpet / carpet tiles
7mm - 10mm	Carpet / wood / ceramics / other heavy duty floorcoverings
10mm - 15mm	Ceramics / stone / marble

Did you know?

Current guidance in Building Regulations require a minimum tread of 280mm.

Tread (going)

The depth of the tread also has an influence on the stair nosing selected. A study conducted by **BRE** found that slips on stairs are often as a result of an overstep, especially on narrow treads (less than 300mm). Double and multiple channel stair edgings may be more suitable for stairs that have a large going, especially if they are subject to heavy volumes of foot traffic.

Top Tip: Guidance for Double Channels

When specifying double channel stair edgings, both inserts should be of the same colour, and be of a contrasting colour to the surrounding floor finish. When specifying multiple channel stair edgings, the front insert should always be a different colour to the other inserts and visually contrast with the surrounding floor covering. The remaining inserts should match the surrounding floor covering.

Stair Edgings

Step 2: Select the correct slip resistance for the conditions

It is important to consider the environment in which a stair edging is to be used as this will determine the level of slip-resistance required in order to reduce the risk of slips and falls on stairs. For example, inside buildings, staircases can become wet too.

Selection of the correct stair edging insert will help to minimise the risk of accidents.

For more information, read our **slip resistance chapter.**

Step 3: Choose a colour that visually contrasts

It is recommended that there is at least a 30-point difference between the Light Reflectance Value of the stair nosing and floorcovering to achieve a suitable contrast. For more information see our **Visual Contrast chapter.**

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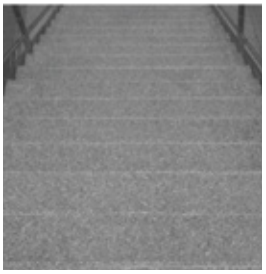

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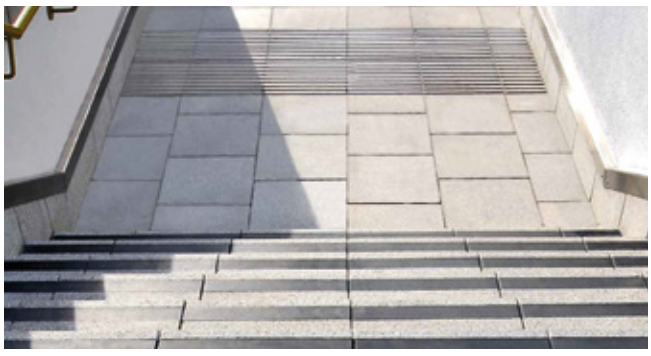
Product Focus

Gradus Stairtile™

Offering a hard-wearing, slip-resistant, internal and external solution for stairs, floors and ramps.



Check

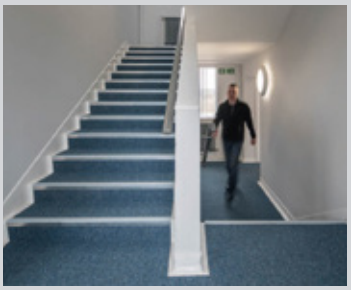
Stair Edgings

Legality

What happens if you don't comply?

The law states that buildings must be accessible to all and there is a legal duty to make a reasonable adjustment for disabled people.

If someone doesn't co-operate with their duty to make reasonable adjustments, a discrimination claim can be brought against them under **The Equality Act**. You may also be required to pay them compensation as well as make the required adjustments. A stair edging is a robust solution that makes an essential contribution to creating safe stairs.



flickr

Want to view our stair edgings in situ? Visit our Flickr profile

Gradus offers a RIBA assessed and approved CPD seminars on 'The Specification & Design Considerations of Stair Edgings'. Want to know more? Click **here**.

BIM

In line with the Government's BIM (Building Information Modelling) mandate, Gradus has BIM objects available for the entire range of XT stair edgings and side trims.

Download **here**.

Request a Sample

Request an individual sample by calling **01625 428992** or pick one up at your local trade counter.

Product Tip

The XT stair edging range incorporates a slip-resistant insert that extends around the leading edge of the profile in line with BRE recommendations.

Click **here** to view video.

Further reading

For further information surrounding stair safety, please see

- www.createsafestairs.co.uk

Visual Contrast

It's not just black or white.

Improving access to buildings for all users in line with the Equality Act 2010 is fundamental and stairs need to be designed or refurbished in order to create an inclusive environment.

The importance of Light Reflectance Value (LRV)
LRV is the total quantity of visible and useable light reflected by a surface in all directions and at all wavelengths when illuminated by a light source. Every colour has an LRV of between 0 (Black) and 100 (White). Current guidance states that the colour of the stair nosing is required to differ from that of the floor covering.

British Standard BS 8300-2:2018 and **Approved Document M** indicate that there should be at least 30 points difference between the stair nosing LRV and that of the floor covering, this helps create the 'ladder effect' which can help to safely identify the step edge when ascending and descending.

It is imperative that you do your homework when it comes to LRVs. For more information view our **Colour and Contrast design guide**.

Should the top and bottom steps be different colours?

There is no guidance that states the top and bottom step colours should be different. Despite recent trends that have been adopted, it is not a practice that is based on any research or guidance.

Gradus Opinion

There is no right or wrong answer. As long as you meet the guidance, that's what matters, however Gradus advise not to use a different colour for the top and bottom steps as there is no evidence to support this practice and it could lead to more confusion. If you deviate from this advice, you have to be able to back up your decision.

Over the years, Gradus has been in correspondence with the Royal National Institute of Blind People (RNIB), which **does not** recommend the use of different coloured top and bottom steps as it is visually confusing.

Single band of colour

BS 8300-2:2018 (10.1.4) states that: 'Each step nosing should incorporate a durable, permanently contrasting continuous material for the full width of the stair on both the tread and the riser to help people who are blind or partially sighted appreciate the extent of the stair and identify individual treads.'

Colour and contrast – the science

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) identified the importance of colour and contrast in improving the built environment for visually impaired people.

Click **here** to view video.

This research resulted in the publication of "Colour and Contrast - a design guide for the use of colour."
View the guide here.

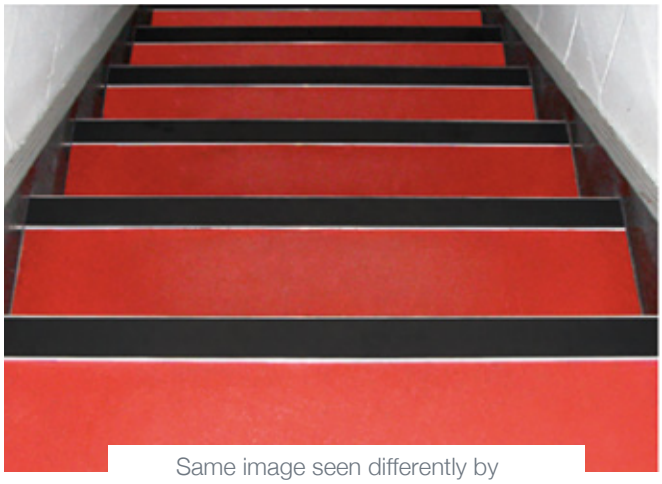
Visual Contrast

Achieving the Right Tone

It is important to achieve a tonal contrast between the floorcovering and the stair nosing. The stair edging needs to highlight the step edge by providing a visual contrast with the remainder of the tread and riser material along the full width of the stair.

Tonal contrast is particularly important for people with visual impairments as may not be able to see some or all colours, but can perceive light and dark.

Fully-sighted People



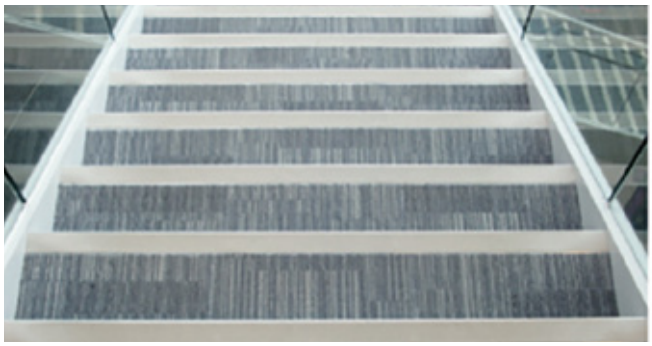
Same image seen differently by different people

Visually Impaired - Poor tonal contrast

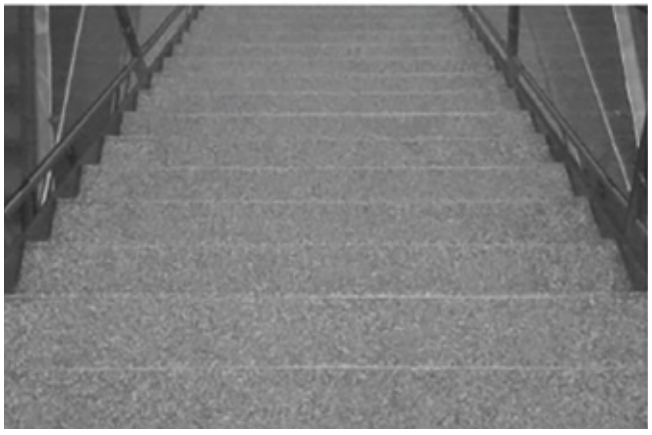
The Importance of Stair Edgings

One of the biggest causes of accidents on stairs is mis-stepping and falling forward while going down the stairs. The cause of these accidents is directly associated with having poor definition on the leading edge of each tread, which creates a visual ramp effect. Poor delineation is particularly confusing in poor lighting conditions where there is an increased risk of an overstep. Stair nosings are important because they visually highlight the step edge against the tread and riser surface.

Good Visual Contrast - Picture 1 - Installed with Gradus stair edgings



Poor Visual Contrast
No Stair Edgings - Don't take the Risk

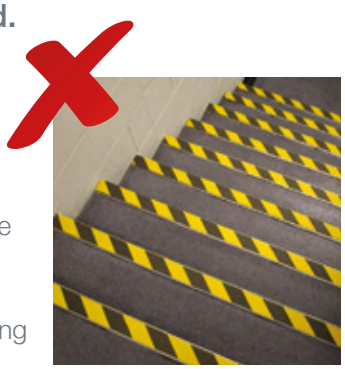


Visual Contrast

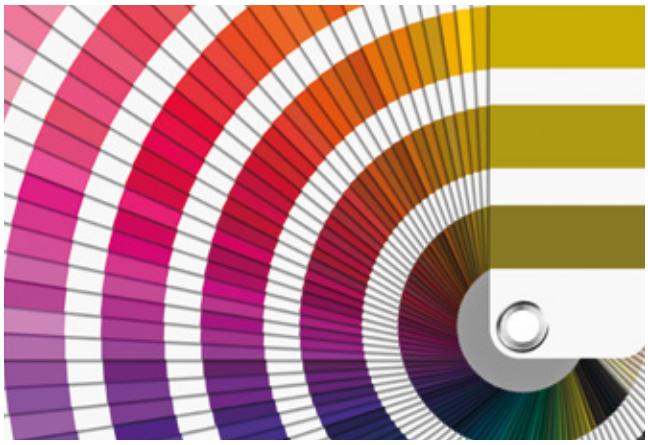
Make it Permanent

Temporary solutions for highlighting step edges should be avoided, as they generally do not adhere to the standards. Adhesive tapes and paints are not recommended on steps as they are not regarded as permanent and if not securely fixed, may become a trip hazard.

Research has also shown that patterned highlighting such as hazard warning or shark tooth should be avoided as it can distort the visual image experienced by some visually impaired people and lead to confusing and conflicting messages.



Product Tip



Get creative with colour

Just because you have to have achieve the correct LRV, doesn't mean the stair edging cannot be incorporated into the design scheme.

With Gradus, there is no extra cost for getting colourful. There is a wide variety of colours available for next day delivery.

Request a Colour Swatch Sample

Request a colour swatch sample and see how you can improve your next installation.

01625 428992 @Gradus_World

imail@gradus.com

BIM

In line with the Government's BIM (Building Information Modelling) mandate, Gradus has BIM objects available for the entire range of XT stair edgings and side trims.

Download here.

Natural Colour System

Natural Colour (NCS) is a user-friendly colour language used by professionals as a tool for precise colour communication, selection and specification.

Click here to view video

Did you know...

All Gradus colours are measured for LRV's in line with BS8493:2008+A1:2010 to help with your selection.

www.createsafestairs.uk

Slip Resistance

When creating safe stairs it's important to consider the slip resistant properties of the stair edging specified. As outlined in the British Standard BS 8300-2:2018, contractors should ensure the slip resistance of the surface finishes reduces the risk of slips and ensures safe access for all building users.This can be done by installing a stair edging insert that creates friction between the sole of the shoe and step edge.

Selecting the Correct Insert

Things to consider:

- **Potential contaminants** – is there a risk of the stair nosing becoming wet or incurring spillages?
- **Maintenance** – how often will the floor be cleaned?
- **Footwear** – is this controlled or open to the public?
- **Traffic** – what is the nature of the traffic and likely level of footfall?
- **Life Expectancy** – will the product need a guarantee?
- **Aesthetics** – create visual contrast in line with Approved Documents K & M and BS 8300: 2009 +A1: 2010

Assessing surface slip resistance

Pendulum testing is used to assess slip resistance – a Pendulum Test Value (PTV) of **greater than 36** is required in both dry conditions and also when the stairs are at risk of becoming wet through walked in moisture and spillages. It is important to remember that interior stairs don't always equal "dry".

It only takes a smallest amount of liquid for the stair nosing to become wet. Primary and secondary barrier matting can be used in conjunction other floor coverings to help reduce the amount of moisture tracked in.

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

Please note: Pendulum Testing applies to levels up to ramps or drop down levels, not just complete stair sets.

Insert Materials

Insert Type	Conditions	Slip Potential	Application
Xtra-grip	Interior Wet Interior Dry	Dry Conditions Low (PTV Av. 70) Wet Conditions Low (PTV Av. 64)	Increased surface roughness where the stair nosing may become wet e.g. stairs close to entrances or where safety flooring is used. Areas where health and safety are a priority e.g. schools and hospitals.
Xtra-grip Plus	Interior Wet Interior Dry	Dry Conditions Low (PTV Av. 70) Wet Conditions Low (PTV Av. 64)	As Xtra-grip, with the addition of an enhanced insert bond system for areas subject to more frequent cleaning e.g. catering and food preparation areas.
Interior	Interior Dry	Dry Conditions Low (PTV Av. 68)	Areas where there is no risk that the stairs will be contaminated by moisture.
Standard Exterior	Exterior	Dry Conditions Low (PTV Av. >66) Wet Conditions Low (PTV Av. >58)	Everyday outdoor usee.g. car park entry / exit steps.
Heavy Duty Exterior	Exterior or Interior	Dry Conditions Low (PTV Av. 76) Wet Conditions Low (PTV Av. 67)	Extreme exterior conditions / heavy traffic environments e.g. motorway foot bridges, railway stations, airport terminals and sports stadiums

Legality

By law you are required to ensure all stairs are safe from slips, trips and falls. Failure to demonstrate compliance with the building regulations is a criminal offence.

For further guidance, visit the UKSRG or HSE websites

Further reading

All of our slip resistance inserts spec guides are available on RIBA NBS.

Fixings

A secure fixing between the stair edging and step is essential for ensuring a safe installation and minimising the risk of trips, slips and falls. The stair edging profile, condition of the substrate and the application will affect the type of fixing required.

Surface preparation prior to application is also paramount for a correct and safe installation. When it comes to an installation, it is important to ensure that all surfaces are smooth, level, sound, clean and free of laitance, dust and contamination. If a levelling compound or repair mortar is required, the manufacturer's instructions should be followed to guarantee the material is ready to provide a level and strong surface. The product to be adhered should also be clean and free from contamination such as oil or grease, or anything else that may impair adhesion.

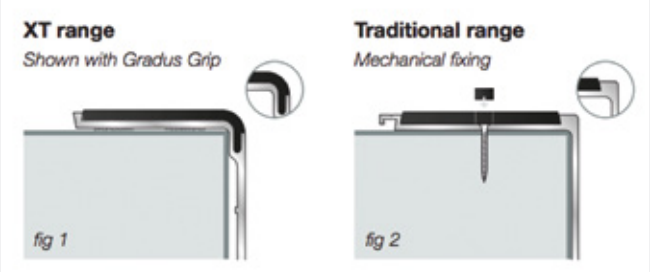
Don't forget! Any fixing will be affected by external influences such as moisture, temperature, traffic etc.

Types of Fixings

When deciding on which fixings to use, it's important to understand that one size does not fit all. Ensure you refer to the installation instructions before applying the adhesive to the product or substrate, to understand if screws are required in addition.

Adhesive only (Fig 1): Gradus Grip has been designed to securely bond stair edgings, eliminating the need for screws and screw head cover plugs, providing a neater finish.

Mechanical and adhesive (fig 2): A combination of screw fixings, cartridge adhesive and screw head cover plugs.



Gradus Grip

Gradus Grip is a solvent free, rapid curing flexible adhesive with excellent gap filling properties that is suitable for bonding Gradus stair edgings to most solid surfaces in internal and external environments. The adhesive has undergone extensive testing to ensure durability and quality.

Did you know?

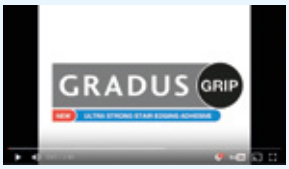
The correct installation of Gradus Grip requires straight beads to ensure an even covering of the correct amount of adhesive?

Check

- **Save time & money** ✓ — quick and easy installation
- **10 year warranty** ✓ — on both the Gradus stair edging and Gradus Grip
- **No more screw head cover plugs** ✓ — improved aesthetic and easier to maintain
- **Ultra strong bond** ✓ — complete peace of mind

For more information about Gradus Grip, download our datasheet **here**.

Top Tip



Click **here** to view video.

Stair edgings and floor trims can be heavily trafficked, which places stress on the sometimes brittle bond of traditional adhesives. This can cause the bond to break and the fixing to move under foot. Gradus Grip is a flexible adhesive, meaning it can absorb more impact and is less likely to break its bond.

Further reading

For further information about Gradus Grip, please visit: http://www.gradus.com/gradus-grip
Spec available on RIBA NBS.