



Enhancing Hospital Design

Key Considerations for Floors and Walls

Gerflor[®]

GRADUS

Contents

Introduction	03.
Infection Prevention and Control	04-05.
Designing for Dementia	06-07.
Sustainability	08-09.
Wayfinding and Signage	10.
Acoustic Comfort	11.
Patient Safety and Fall Prevention	12.
Biophilic Design and Well-being	13.
Fire Safety	14.
Conclusion & References	15.

Gerflor & Gradus – The Healthcare Specialists

The Gerflor group is well known as a credible and valued supplier of complete flooring solutions designed specifically for the healthcare market. The constraints of hygiene, slip resistance and acoustic qualities are part of mandatory characteristics for this sector. Our expertise allows us to offer numerous flooring products suitable for all areas of a healthcare facility. Whilst maintaining the technical performance and the design aspect of our floorcoverings, we manufacture our ranges with the environment in mind, as well as the health and wellbeing of end users. We have recognised brands ideal for healthcare facilities, including our Mipolam, DLW, Taraflex, Taraflex® and Tarasafe flooring ranges.

Gradus is a UK manufacturer of contract interior solutions, these include wall protection, stair edgings, floor trims, barrier matting and LED lighting. As the largest UK Manufacturer of Wall Protection we are able to offer a comprehensive range of profiles which includes handrails, dual rails, combination rails, wall guards, corner guards, bed protectors and door protection, as well as textured wall cladding, and hygienic cladding. Gradus control the design of profiles from initial concept through to finished products including specialist CAD design and the manufacture of tooling. This ensures that quality is maintained and provides customers with an efficient, flexible, and fast service. We also offer a project management and installation service for our wall protection systems.

When it comes to designing new hospitals or refurbishing existing healthcare facilities, there are many crucial factors that architects and specifiers should consider.

Infection prevention, dementia-friendly design, and promoting overall well-being are particularly important aspects that cannot be overlooked.

In this white paper, we will delve into eight key considerations regarding wall protection systems and flooring to ensure optimal design outcomes for new build hospitals and other healthcare interiors. By keeping these factors in mind, architects can create healthcare environments that are not only functional but also promote the safety, comfort, and well-being of patients and staff alike.



1. Infection Prevention and Control

Infection prevention and control (IPC) is a practical and proven method to protect patients and healthcare workers from avoidable infections. To make IPC effective, everyone involved in the healthcare system, such as policymakers, facility managers, healthcare workers, and patients, must consistently act and stay vigilant.

Walls and floors can act as breeding grounds for harmful bacteria, posing a significant risk to patients with weakened immune systems. Architects must prioritise materials that are antimicrobial, easy to clean, and resistant to moisture.

Wall Cladding

Specifiers should make sure that wall cladding meets all the health and hygiene requirements set by the EU Directives. It's advisable to ask for testing according to the ISO 22196 guidelines.

ISO 22196 is a test method that quantitatively measures the antibacterial activity of plastics and other non-porous surfaces. It is a standard method established to test the ability of treated surfaces to kill (bactericidal) or prevent growth (bacteriostatic) of bacteria over 24 hours.

By specifying wall protection with ISO 22196, you can ensure that the product has been tested and proven to have antibacterial

properties. This is particularly important in settings where hygiene and cleanliness are crucial, such as healthcare facilities.¹


Surface Treatments


Surface-treated flooring can have properties such as antimicrobial or antifungal treatments that inhibit the growth of bacteria and other microorganisms.

This helps in reducing the risk of healthcare-associated infections (HAIs) and maintaining a safer environment for patients, staff, and visitors. Other benefits are added chemical resistance, enhanced slip resistance and easier maintenance when compared to other flooring options.


They can be swept, mopped, or mechanically cleaned without extensive effort. The non-porous and stain-resistant nature of these floors minimises the time and resources required for regular cleaning and upkeep.²









Clean




Versatile



Attractive



Watertight



Resistant & Durable

Clean Corners

Corners are where most of the imperfections in buildings are found, as their shape makes cleaning and decontamination difficult.

Weakened by use, they often end up losing their watertightness, and can tear or sag under the weight of traffic. Incorporating seamless wall protection systems and impermeable flooring can greatly reduce the risk of infection transmission, while also ensuring durability and longevity in high-traffic areas.³

¹Gradus SureProtect. Pure hygienic wall cladding products are tested according to ISO 22196:2011.

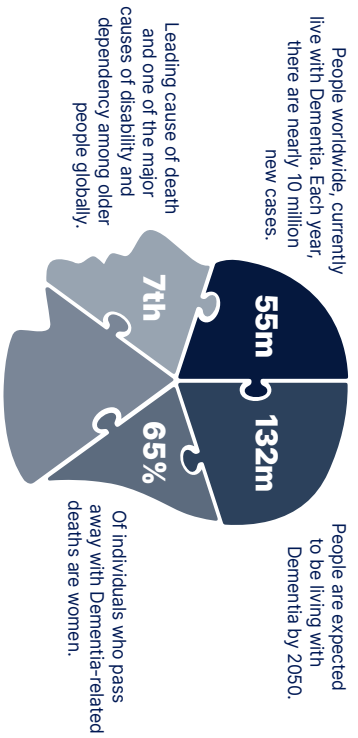
²Gerflor Mipolam Homogeneous floor coverings are treated with exclusive patented Evercare™ technology, which has been tested according to ISO 22196 & ISO 21702 guidelines, achieving 99% and 99.7% after 2 hours respectively. ISO 21702 is an antimicrobial surface test that performs the measurement of antiviral activity on plastics and other non-porous surfaces. ISO 21702 is a surface test generally used with the different viruses that can be substituted depending on the needs of the customer.

³Gerflor has partnered with cleaning professionals to create a patent pending innovative Clean Corner System to aid the control of contamination.

2. Designing for Dementia

Dementia is an umbrella term that includes many brain-related conditions that may worsen over time. Each type of dementia affects different parts of the brain, making it harder for people to remember things, think clearly, and speak. Doctors use the word “dementia” to describe common symptoms like memory loss, confusion, and difficulty with speech and understanding, which worsen as time goes on.

Why Designing for Dementia is important



There are more than 200 types of dementia. The most common ones are Alzheimer’s disease, vascular dementia, Lewy body dementia, frontotemporal dementia, and mixed dementia.

The proportion of older adults (aged 65 and above) is steadily increasing in the UK due to rising life expectancy and declining birth rates. The Office for National Statistics predicts that by 2035, 24% of the UK population will be aged 65 or older. Dementia can affect a person at any age, but it’s more common in people over the age of 65. As of January 2022, 424,000 people aged 65+ have been formally diagnosed with dementia.

Dementia-friendly Environments

As the understanding of dementia and its impact on patients grows, hospitals are placing greater emphasis on creating dementia-friendly environments. Wall protection systems and flooring can contribute to this goal by incorporating design elements that aid orientation and reduce confusion.

Consider using contrasting colours, clear signage, and visual cues to help patients navigate the hospital corridors.⁴

Flooring should also have an anti-slip surface to prevent falls, while minimising glare and excessive noise levels that can agitate dementia patients.⁵

Light Reflectance Values (LRV)

It is suggested that there should be a contrast of 30 points in Light Reflectance Values (LRV) between surfaces, specifically between floors and walls, stair nosings and floor coverings, as well as doors and walls in line with guidelines in BS8300:2009 and Approved Document M of The Building Regulations 2000.

If achieving this exact contrast is not feasible, it is important to ensure the best possible contrast between these important areas.⁶

BS8300:2009 promotes good practice design principles to ensure new buildings and their approaches can meet the needs of disabled people and are convenient to use.

The Approved M document of The Building Regulations 2000 provides guidance on access to and use of buildings, including facilities for disabled visitors or occupants, and the ability to move through a building easily, including to toilets and bathrooms.



⁴ Gradus SureProtect PVC-U Wall Protection profiles are available in 35 colours, allowing different colours and profiles to be used for wayfinding. SureProtect Endure Wall Cladding can also be cut into bespoke designs and shapes to create durable, easy-to-clean signage.

⁵ Gerflor Mibolam Homogeneous flooring is available in a wide range of colours, has a slip rating of R9 and has been tested according to EN ISO 717-2 achieving SDB.

⁶ Gradus and Gerflor have partnered with the Dementia Services Development Centre (DSDC) to review all relevant products and have rated them in relation to dementia design principles, with most products being rated Class 1a/b. All relevant Gradus and Gerflor colours have been measured to provide LRVs.

3. Sustainability

The NHS has set ambitious targets to achieve net-zero greenhouse gas emissions by the year 2040. The primary goal of these targets is to reduce the environmental impact of the healthcare sector and contribute to global efforts in combating climate change.

To achieve this target, the NHS has committed to developing more sustainable healthcare infrastructure by incorporating energy-efficient technologies and sustainable building practices. This includes the promotion of renewable energy sources and environmentally friendly construction materials.

Environmentally Friendly Materials

PVC (Polyvinyl chloride) wall protection can be considered more environmentally friendly than some alternatives due to certain characteristics and factors. PVC wall protection products are known for their durability and resistance to wear, tear, and impact. Their long lifespan means they do not need frequent replacements, reducing the overall consumption of resources.⁷

Consider specifying flooring such as Linoleum that is made from natural materials like linseed oil, wood flour, rosin, limestone, and jute. These materials are renewable and biodegradable, making linoleum a more environmentally friendly choice compared to synthetic flooring materials.⁸

The Importance of Operational Carbon and Embodied Carbon

Operational carbon and embodied carbon are both important aspects of the environmental impact of a healthcare building. Operational carbon refers to the emissions from the energy use of the building, such as heating, lighting, and cleaning equipment. Embodied carbon refers to the emissions from the production, transportation, and disposal of the materials and components used to construct and maintain the structure of the building.

Healthcare buildings typically have high operational carbon demands due to the need for infection control, patient comfort, and medical equipment. Reducing operational carbon can help lower the greenhouse gas emissions from the healthcare sector, which is responsible for an estimated 4 to 5% of the UK's carbon footprint.⁹

Embodied carbon can be reduced by choosing low-carbon materials, minimising waste, and extending the lifespan of the building.



It is important to prioritise reducing both operational and embodied carbon in healthcare buildings to avoid locking in emissions that will persist for decades or centuries and contributing to the global carbon budget.¹⁰

It is essential to consider a products entire lifecycle, including sourcing raw materials, manufacturing, usage, and end-of-life disposal. Responsible manufacturing practices, recycling initiatives, and appropriate waste management are crucial in maximising the environmental benefits of any product.¹¹

Mipolam Symbioz™
Rooted in nature

83%

natural & recycled material

⁷ The Gradus SureProtect Endure range of Wall Protection profiles are made from PVC-u and Aluminium. Both materials are 100% recyclable.

⁸ Gerflor DLW Linoleum products are made of 98% natural (bio based and mineral) raw materials. DLW Linoleum is Cradle to Cradle Certified™ Silver.

⁹ Gerflor Surface treatments such as Evercare™, ProtecSol™ and Neocare™ help to reduce water and detergent consumption when cleaning on site. This means less operational carbon emissions produced from the floor's cleaning and maintenance schedule.

¹⁰ On average over 70% of Gerflor flooring ranges contain more than 70% bio-based, mineral or recycled materials. Using flooring with high recycled and bio content will reduce the total embodied carbon of a healthcare building.

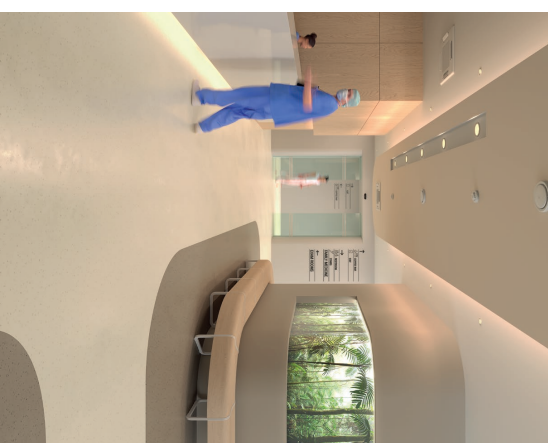
¹¹ Gradus and Gerflor have recently released Corporate Sustainability Responsibility (CSR) reports outlining their commitment to a sustainable future. Among these reports are pledges such as a 20% reduction in carbon emissions and use of at least 30% recycled materials in products by 2025.

98%
biosourced or mineral based materials

76%
renewable within one year

Up to **40%** recycled content

0001
Banana Yellow



4. Wayfinding and Signage

The term “wayfinding” describes the processes people go through to find their way round an environment. The wayfinding process is fundamentally problem-solving and is affected by many factors. Clear wayfinding and signage systems are vital in any healthcare facility, especially in large hospitals where patients and visitors may feel overwhelmed or anxious.

According to the Approved Document M of The Building Regulations 2000 clear and accessible signage must be installed throughout the building to assist all users, including those with visual impairments or mobility challenges. The guidelines include specifying the appropriate size, location, and contrast of signs to ensure they are easily recognisable and legible.

Wall protection systems can incorporate signage and directional elements to guide people efficiently throughout healthcare buildings. It is important to choose wall protection materials and colours that offer a high contrast with the surrounding environment. This helps visually impaired individuals and those with low vision to easily identify and distinguish walls from other elements in the area.¹²

Additionally, the flooring design can include colour-coding or patterns to denote different areas or departments. By implementing effective wayfinding and signage solutions, hospitals can enhance patient experience and reduce stress for all individuals navigating the facility.¹³



¹² Gradus Handrails, Corner Guards and Wall Guards are available in 35 colours and have been measured to provide LRVs to ensure specifiers can select products with the appropriate visual contrast.

¹³ Gerflor Vinyl and Linoleum flooring ranges are available in a huge range of colours, all measured to provide LRVs. Water jet cutting and digital printing enables for customisation of flooring to assist with creating wayfinding and signage requirements.

5. Acoustic Comfort

Hospital environments are often filled with noise, which can negatively impact patient recovery and staff performance. When choosing wall protection and flooring, it is essential to consider acoustic comfort.



Opt for materials that have sound-absorbing properties, such as acoustic wall panels or specialised flooring solutions with noise-reducing features.

This will help create a quieter and more serene atmosphere, promoting better rest for patients and improving communication among healthcare professionals.

Health Technical Memoranda (HTM) 08-01

It is important to consider the Health technical memorandum (HTM) 08-01 which looks at the acoustic requirements and design of health and social care facilities.

For critical areas like operating theatres and intensive care units, the flooring should meet specific acoustic requirements to maintain low noise levels.¹⁴

Specialised flooring materials designed for these areas can help control noise and contribute to patient recovery and staff focus.

Impact Sound Reduction

Impact sound reduction is the process of reducing the noise that is transmitted through a floor or ceiling from one room to another. Impact sound can be caused by footsteps, furniture moving, or other sources of vibration on the floor surface.

Impact sound can affect the health and well-being of the occupants of a building, especially in multi-storey buildings where noise can travel between different levels.

Gerflor flooring can help in reducing impact sound in multi-storey buildings by providing a range of vinyl flooring products that have acoustic properties. Vinyl flooring is a type of resilient flooring that can absorb and dissipate sound energy, resulting in lower noise levels in the rooms below. Gerflor offers a wide range of vinyl acoustic flooring with efficient sound insulation up to 19dB, in order to ensure a maximum reduction of noise transmission underfoot.¹⁵

¹⁴ Gerflor Taralay Impression Acoustic has been tested according to EN ISO 717-2 guidelines achieving 19dB. Other Gerflor Acoustic ranges include Taralay Libertex, Nerok 70/55, Taralay Initial.

¹⁵ Gerflor has many products that offer impact sound reduction, some of which are: Creation 55 Loose Lay Acoustic - a removable LVT product that has 19dB acoustic impact noise reduction, Creation 55 Rigid Acoustic - a full rigid board product, that has an acoustic backing of 19dB noise reduction, Sagga® - a loose lay product that has 15dB sound insulation. It is 30% less heavy than similar products and it is made in Europe.

6. Patient Safety and Fall Prevention

From April 2021 to March 2022, English NHS organisations reported 2.3 million incidents as occurring. Of those incidents, 72% happened in an acute care/general hospital setting, and nearly 300,000 incidents were categorised as a patient accident. This typically involves harm, injury, or adverse effects that are unintended and not related to the patient's underlying medical condition.



Preventing falls within a hospital setting is therefore a top priority. Specifiers should select flooring materials that offer excellent slip resistance, particularly in areas prone to spills or moisture, such as bathrooms and corridors.¹⁶

Entrance Matting

Entrance matting is the most effective way of reducing slip and fall accidents in a building, especially during wet or icy conditions.

According to the Health & Safety Executive, 90% of slip accidents in public buildings occur on wet floors. An effective matting system can reduce the amount of dirt and moisture tracked into a building by up to 90%, helping to reduce such slip accidents.

Entrance matting can also prevent contaminants from spreading onto surrounding floorcoverings, which can become slippery and hazardous if not cleaned regularly. Therefore, entrance matting is a crucial element of any building's safety and hygiene strategy.¹⁷

Handrails

Handrails are important in hospitals for several reasons, including the prevention of falls.

Hospitals often have patients who may be weak, unsteady, or recovering from surgeries or illnesses. Handrails provide support and stability to patients while walking or moving around, reducing the risk of falls and injuries. They offer patients something to hold onto for balance and assistance.¹⁸

¹⁶ Gerflor flooring is tested according to DIN 51130 guidelines and HSE +36 guidelines, with the Tarasafe ranges meeting these requirements.

¹⁷ Gradus offers an extensive range of barrier matting systems, providing an effective barrier against dirt and moisture.

Gradus barrier matting is tested via the HSL ramp test, which forms the basis for the British Standard (BS 4592).

¹⁸ Gradus SHR40 and THR450 Timber Handrail are designed to meet the guidelines in BS 8300-2:2018 and Approved Document M 2010

7. Biophilic Design and Well-being

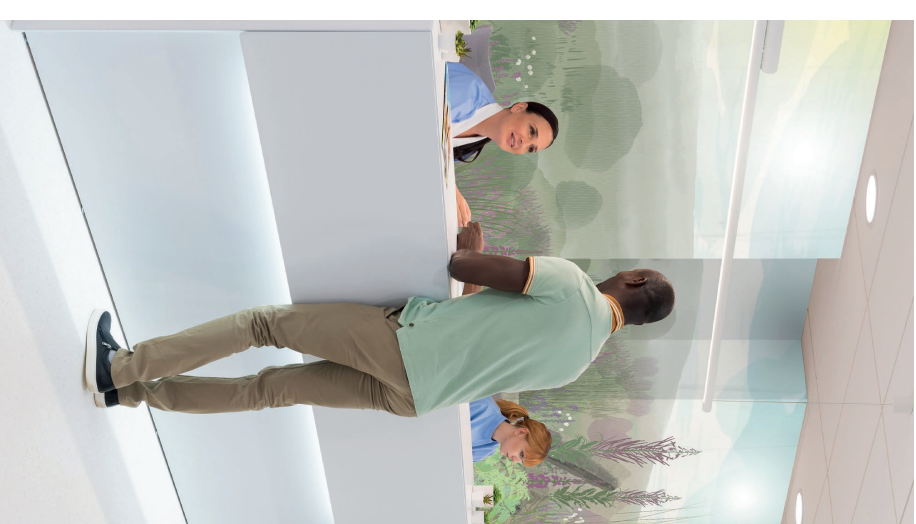
The word "biophilia" was created by psychologist Erich Fromm in 1964. It means the 'love of life' and explains two important things about living things: first, their instinct to protect themselves from dangers that could cause death, and second, their natural desire to connect and cooperate with others.

Patient Well-being

Research has shown that exposure to natural elements can have a positive impact on patients' well-being and recovery rates. Biophilic design principles, which aim to connect people with nature, can be incorporated into wall protection systems and flooring choices. Consider using materials that mimic natural textures, colours, and patterns. Wallcoverings with nature-inspired designs and flooring with wood or stone finishes can help create a calming and healing environment for patients, staff, and visitors alike.¹⁹

Murals and Wall Art

Consider using murals, artwork and print with nature-inspired elements in the healthcare environment to improve patient outcomes and well-being. The presence of these natural motifs helps create a calming and supportive atmosphere, reducing stress and anxiety for those using the space.²⁰



¹⁹ Gradus SureProtect Artworx is a wall cladding system that allows bespoke images to be printed on to the PVC-U sheet. This allows specifiers to incorporate murals into healthcare spaces and introduce biophilic design elements whilst still achieving durability and infection prevention.

²⁰ Gerflor Taralay Impression is a heterogeneous flooring that has multiple designs inspired by woods, minerals and even textiles.

8. Fire Safety

Fire incidents in healthcare buildings are a serious concern for the safety and well-being of patients and staff in the UK. According to the Home Office, fire and rescue services in England attended an average of 1,420 fires in hospitals and medical care premises per year from 2015 to 2021.

These fires caused an average of one fatality, 41 non-fatal casualties and £2.9 million in property damage annually. The majority (81%) of the fires were accidental, and the most common causes were faulty appliances and leads, misuse of equipment or appliances, and cooking.

Fire Safety Guidance for Flooring and Wall Protection

Fire safety of both flooring and wall protection can help protect the lives and health protection occupants by providing fire-resistant, non-combustible, and low-smoke materials or systems that limit the spread and intensity of fire and smoke and prevent the generation of toxic fumes or gases.

According to the Health Building Note 00-10 Part B: Walls and ceilings, the fire safety guidance for flooring and wall protection materials should comply with the relevant British Standards and Building Regulations for fire performance, such as BS 476 and BS EN 13501.²¹

Health Building Note 00-10 Part B: Walls and ceilings also states that flooring and wall protection materials and should be classified according to their reaction to fire (how they behave when exposed to a heat source) and their resistance to fire (how they prevent the spread of fire and smoke).²²



²¹Gradus Door Edge Guards are fire tested to BS 476: Part 20 & 22 for 30 and 60 minutes. Gerflor flooring is tested in accordance with BS EN 13501-1.

²²Gradus and Gerflor flooring and walk protection systems are fire tested and classified according to their reaction to fire. Information can found in product catalogues and on our website.

Conclusion & References

Designing new hospitals requires a comprehensive understanding of the unique challenges and needs of healthcare environments. The consideration of the topics covered in this white paper regarding wall protection systems and flooring choices are fundamental to the successful design of new build hospitals and refurbishment of existing healthcare interiors.

By catering to the unique needs and challenges of healthcare environments, architects and specifiers can create hospitals that prioritize patient care, enhance staff performance, and contribute to the overall health and happiness of all individuals within the facility. The goal is to create spaces that not only provide excellent medical care but also promote healing and a sense of comfort for patients and their families.

References

- World Health Organisation - Infection prevention and control www.who.int/health-topics/infection-prevention-and-control
- NHS England - NRS national patient safety incident reports – October 2022 www.england.nhs.uk/wp-content/uploads/2022/10/NAPSiR-commentary-Oct-22-FINAL-V4.pdf
- Wajlle Zhong, Torsten Schröder, Juliette Bekkering - Biophilic design in architecture and its contributions to health, well-being, and sustainability – 2022
- NHS England – Wayfinding: effective wayfinding and signing systems guidance for healthcare facilities – May 2021 <https://www.england.nhs.uk/greenhms/wp-content/uploads/sites/51/2022/02/B1728-delivering-a-net-zero-mhs-july-2022.pdf>
- NHS England – Delivering a Net Zero National Health Service – July 2022 <https://www.dementiauk.org/about-dementia>
- Dementia UK – About Dementia <https://www.dementiauk.org/about-dementia>
- Dementia Services Development Centre <https://www.dementiauk.org/about-dementia>
- Renewable Energy World - Embodied carbon vs operational carbon: What's the difference, and why does it matter? – October 2021 <https://www.renewableenergyworld.com/energy-efficiency/embodied-carbon-vs-operational-carbon-whats-the-difference-and-why-does-it-matter/>
- Health and Safety Executive – Slips and Trips: Causes and Prevention <https://www.hse.gov.uk/slips/prevention.htm>
- Health and Safety Executive – Slips and Trips: icy conditions and winter weather <https://www.hse.gov.uk/loistics/slips-trips-bad-weather.htm>
- GOV.UK – Home Office – Fire Statistics – June 2016 <https://www.gov.uk/government/collections/fire-statistics>
- NHS England – Health Technical Memorandum 05-03: Firecode – Fire Safety in the NHS – Operational provisions - April 2024 <https://www.england.nhs.uk/publication/fire-safety-in-the-nhs-health-technical-memorandum-05-03/>
- NHS England – Health Technical Memorandum 05-01: Managing Healthcare Fire Safety - Jan 2024 <https://www.england.nhs.uk/publication/managing-healthcare-fire-safety-htm-05-01/>
- Home Office - Fire and rescue incident statistics: England, year ending December 2020 - May 2021 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/984922/fire-and-rescue-incident-dec20-hosbd1021.pdf

For assistance with your healthcare projects, contact us for further information & support. Gerflor & Gradus can help you with product specifications, RIBA accredited CPDs, sampling, floor design services and technical advice.

01625 428922
contractuk@gerflor.com | mail@gradus.com
gerflor.co.uk | gradus.com

Gerflor[®]

GRADUS

Head Office:

Park Green,
Macclesfield,
Cheshire, SK11 7LZ

Gerflor enquiries

Tel: 01625 428922
E-mail: contractuk@gerflor.com
Website: gerflor.co.uk

Gradus enquiries

Tel: 01625 428922
E-mail: imail@gradus.com
Website: gradus.com