

## Vinyl sheeting vs Epoxy floors in Hospitals

### **GENERAL CONSIDERATIONS**

According to IUSS HEALTH FACILITY GUIDES - Internal Floor Finishes in Healthcare Facilities - Gazetted 30 June 2014, the following selection criteria have been identified.

#### ***Considerations for finish***

- Infection prevention
- Cleaning and maintenance
- Safety
- Indoor air quality – humidity
- Indoor air quality – emissions
- Acoustics
- Aesthetics

With the modern development of vinyl sheeting, it meets all the above criteria. Epoxy may meet some but not all the above. The innovation of vinyl to meet the specific need of specific areas makes it far more versatile (Safety, ESD, Wood/Stone designs).

### **Installation, guarantee & maintenance**

#### ***Vinyl***

For vinyl sheeting the material carries a minimum product guarantee of 10 years. If the flooring is installed and maintained correctly, the vinyl can last between 15 to 20 years. Some South African installations are over 50 years old. **You need a smooth, dry, and level substrate with a surface hardness of a minimum of 20MPa to receive vinyl.** The PUR reinforced products from Polyflor do not require a strip and seal and a wash and buff maintenance is generally all that is required. This makes the month-to-month maintenance cost dramatically less and easier for the maintenance team.

#### ***Epoxy***

With epoxy or polyurethane products, the preparation that is needed before applying is the same as for vinyl. **These products are installed in thin coats, so would need a very level surface with a surface hardness of a minimum of 20MPa to receive epoxy.** With this type of product, the rule of thumb is that the product is only guaranteed for time in years, per mm that the epoxy is applied. For a 2mm epoxy, the guarantee would be for 2 years. For a 4mm epoxy, the guarantee would be for 4 years etc. When re-applying new epoxy coatings, the previous layer must be ground down to a solid base, and a new coating needs to be applied. This puts epoxy particles into the air and is harmful to lungs, the epoxy coating is also harmful while applying it. Installation teams need to wear special PPE when working with epoxy. This will create long term maintenance/repair considerations for occupied and operational facilities.



## IPC

From an Infection control and prevention perspective, The South African Patients' Rights Charter (1997) states: "Everyone has the right to a healthy and safe environment that will ensure their physical and mental health or wellbeing including ... protection from all forms of environmental danger, such as pollution, ecological degradation or infection."

According to a survey conducted by Rohde (2002), materials and finishes have in the past been selected according to the following characteristics in declining order of importance: Aesthetics, durability, ease of maintenance, client preference, initial cost, cost of maintenance, infection control, ease of installation and life cycle cost.

Selecting the correct finish is a complex process with many aspects to consider, and the many and varied room types in a health facility extend the options. However, in healthcare facilities, **the importance of the effect of a particular finish on the prevention of infection control must be prioritised**. While it is understood that not every area of a hospital or health facility will carry infection prevention as the highest priority, this aspect remains the most pressing issue in selection of finishes in health facilities.

Determining risk areas:

| Risk categories      |                             |                            |                       |
|----------------------|-----------------------------|----------------------------|-----------------------|
| <b>Extreme</b>       | <b>High</b>                 | <b>Medium</b>              | <b>Low</b>            |
| Operating theatres   | General wards               | Pathology units            | Offices               |
| Intensive care units | Dispensary production areas | Outpatients units          | Engineering workshops |
| Sterile supply units | Treatment rooms             | Dispensaries               | Medical records       |
| Neonatal             | Nurseries                   | Radiology                  | Plant rooms           |
| Delivery units       |                             | Kitchenettes/ward kitchens |                       |
| Burns units          |                             | Mortuaries                 |                       |
| Oncology units       |                             | Public areas               |                       |
| Renal units          |                             |                            |                       |

Floors that resist the spread of infection will have qualities that can be summarised as follows:

- Smooth
- Impervious
- Joint-less/seamless

Vinyl has these properties when fitted and maintained properly.

### **Maintenance**

Floors that have a high priority for easy cleaning and low dirt retention can be summarised as follows:

- Low maintenance
- Washable

PUR coated vinyl reduces maintenance costs by 60% with an easy spray and buff cleaning system which means less water and chemical usage.

### **Safety**

Safety as a selection factor for floor finishes can be broadly discussed under the following subheadings:

- Slips, trips and falls (STF)



- Occupational health safety (OHS)
- Slip resistance
- Wheeled equipment use
- Fire performance

Vinyl sheeting has ranges to meet all the above requirements dependent on varying areas and needs. Epoxy/Concrete struggles to meet the ergonomic needs of hospital staff and noise levels are higher caused by foot and wheel traffic. Studies have shown that high levels of noise have negative physical and psychological effects on patients, disrupting sleep, increasing stress, and raising blood pressure levels. People who work in noisy environments for long shifts day in and day out, also have similar stress-induced experiences. They report everything from exhaustion to burnout, depression, and irritability. Even with frictional floors for slip prevention, vinyl has PUR coated options for ease of maintenance with the ability to provide a range specially designed for wet floors.

### ***Aesthetics***

Finishes influence the patient's experience as well as the recruitment and retention of staff – happy staff are more motivated to care for patients, who in turn recover more quickly.

Paediatric wards particularly allow for opportunity to set a playful scene and help little patients feel at ease. In public areas, more emphasis may also be required for an attractive and welcoming interior.

Colour and pattern can be used in floor finishes in health facilities for practical and aesthetical purposes:

- to improve the 'institutional/cold' interior look of the facility, room, or area.
- for wayfinding, e.g., colour-coding per department; or
- to create 'spaces' by giving individuality, e.g., to a specific area within a large open area.

There is no better finish than vinyl flooring to create this.

### **EPOXY AS A FLOORING SOLUTION - IUSS GUIDELINES**

Epoxy/polyurethane/resin coatings – This term encompasses a wide range of liquid or trowel applied products such as epoxy, polyurethane resins. Thicknesses of coatings vary. This provides a more impervious surface than cementitious coatings.

#### ***Infection prevention***

Although these finishes produce continuous, seamless coatings, the product should be laid in panels according to the manufacturer's instruction, and under slab joints must be carried through the finish. These finishes are commonly used in food process and pharmaceutical prep areas due to the high chemical resistance, abrasion, and impact resistance.

**Both cementitious and granolithic toppings are prone to fine, barely noticeable cracks and together with the 'panel joints' present weaknesses in terms of infection control as these areas can store moisture and encourage microbial growth.**

#### ***Cleaning and maintenance***

The impervious surface lends itself to easy cleaning and maintenance and the surface resists most chemicals and does not stain easily. The finish can withstand rigorous cleaning regimes and mild alkaline detergents.



All joints must be grouted with manufacturer approved coloured grout, and the surface is to be sealed in accordance with manufacturer's instructions.

Single- or double-head rotary scrubber is recommended for regular cleaning. With good maintenance, a life expectancy of 10 years is common.

### **Safety**

**Epoxy finishes present an increased risk of slips, trips and falls due to the smoothness of the surface, and this is amplified during cleaning. Nonslip finishes are available but decrease 'cleanability' of the surface.**

The hard surface increases the risk of injury when falls do happen, and staff fatigue is increased due to the hardness underfoot. The installation process presents OHS risks during construction, e.g.: grinding of terrazzo, scarifying substrate to prepare for cementitious topping application, etc.

### **Indoor air quality: Humidity**

These surfaces are durable in areas of high moisture/humidity and are easily dried with the appropriate mops, making them suitable for service areas. **The fine cracks which can result will retain moisture, however, making them unsuitable for use where infection control is a high priority.**

### **Indoor air quality: Emissions**

**The high synthetic content of epoxy and polyurethane coatings affect the indoor environment through VOC-emissions. These are most notable directly after installation, but these continue, albeit reduced, for the life span of the product.** This does vary from one manufacturer to another, and most will claim low VOC emissions, and some even claim VOC-free products.

### **Acoustics**

**The hard reflective surface of this finish will contribute significantly to a noisy environment as little sound absorption will take place. This finish is not suitable for use in sound-sensitive environments.**

### **Aesthetics**

Terrazzo coatings are available in vivid colours, and stone chip textures give a lively appearance below the glossy smooth surface. Vibrant patterns can be created for an impressive foyer for example. **Most other epoxy and cementitious coatings are monochromatic, flat colours that appear quite utilitarian.** They are most used in plant rooms.

### **Skirtings**

Integral skirting can be formed in one with the floor covering for a clean and tidy junction. Skill and experience is needed for a neat, durable result. **The same tendency to crazing and cracks over long lengths will increase the infection control risk.**

## **VINYL AS A FLOORING SOLUTION - IUSS GUIDELINES:**

### **General description and properties**

Vinyl sheeting is manufactured from a combination of vinyl resin and various additives such as the following:

- Plasticisers – used to make the sheet more flexible,
- Stabilisers – to minimise degradation and discoloration



- Pigments – for colours and patterns
- Fillers – such as lime, or other locally available material

It is commonly used as a floor finish in health facilities because it provides a durable, resilient, and impervious finish.

Vinyl is available in a range of types:

- **Homogeneous**
- **Heterogeneous**
- **Directional or non-directional patterns**
- **With or without PUR finish:** Polyurethane reinforcement (PUR) is introduced in the manufacturing process and provides a 'ready polished' product. No stripping and sealing for the life of the product.

#### ***Infection prevention***

Vinyl sheeting as a material has been found to **inhibit the growth of bacteria, and particularly MRSA**s. The welded joints prevent dust or dirt congregating in areas that are difficult to clean, and the integral skirting supports this seamless appeal. This has made vinyl sheeting very suitable for use in healthcare facilities. **Laboratory tests conducted over a period of 4 weeks at 30°C against criteria dictated by the DIN EN ISO 846:2019 standard resulted in no increased growth of the test germ detected in the direct surroundings and on the surfaces of the samples. The material showed no changes in colour or surface structure compared to the non-inoculated sterile samples and control samples. The evaluation was that the sample material does not contain nutritive substance which favour the growth of the test germ in the direct area around the test pieces.**

#### ***Cleaning and maintenance***

The sheeting is easily washed, which contributes to its performance as a hygienic flooring finish. **Vinyl sheeting is not easily damaged, and when treated with a polymer dressing/surface treatment, is of low maintenance.** When maintained properly, the sheets have a long life span, and therefore cost-effective by comparison to other floor finishes.

Products with PUR require only spray and dry buffing for general cleaning although water-based dressings are beneficial. Special cleaning solutions are used for heavy staining, but abrasive cleaning methods should not be used.

#### ***Safety***

In terms of slips, trips, and falls care must be taken where highly polished floors are used in wet areas. **Specialised safety vinyl flooring in wet areas and ramps is recommended.** Attention also needs to be given to thresholds where floor finishes of differing thicknesses meet, as these can present a hazard if not detailed as a smooth transition.

**In terms of use by staff, the vinyl sheeting is softer underfoot than hard finishes, reducing leg fatigue.** The smooth finish is easy to use with wheeled equipment, which creates a safe and workable environment for staff in health facilities.

**In terms of SANS 10400, operating theatres, ICU, high-care, or critical care units are required to have a floor finish with 120 minutes' fire resistance.** Compliance with this should be checked with the manufacturer.



### ***Indoor air quality: Humidity***

Vinyl sheeting is well suited to areas of high humidity, and wet areas such as sluice rooms. Spills should be wiped as quickly as possible as condensation blooming can take place in the clear wear layer.

### ***Indoor air quality: Emissions***

Some manufacturers have addressed VOC emissions in their products and indicate a pass in VOC emissions tests as well as **BRE A+ ratings. Materials are 100% recyclable** and contain a percentage of recycled material.

Each supplier will differ, and specifiers should check these aspects when considering a product. VOC emissions of adhesives and sealants, where applicable, are also to be considered.

### ***Aesthetics***

The wide variety of colourways available in vinyl sheeting allows for **creative patterns** to enhance the healing environment. Patterns can be used for **wayfinding, signage** (e.g., ward numbers), definition of public and staff only areas, or distinction between different departments.

In addition, **creative floor patterns and detailed aqua jet cuts can present branding identity** and enhance the environment to set patients at ease.

### ***Acoustics***

Vinyl sheeting is relatively soft underfoot and has better sound absorption qualities than hard finishes. Specialised vinyl sheeting products created for acoustic control are thicker at 3.7 mm, but the extra foam backing on these types of sheeting can hamper the use of wheeled equipment in these areas.

### ***Skirtings***

Vinyl sheeting can be laid with a variety of PVC **skirting solutions or coved with cove former and capping strip finishes.**

## **CONCLUSION**

If one considers all the above information, it can be safe to say that vinyl is the better choice for healthcare facilities and has been tried and tested. It is also true that if installed incorrectly and not maintained it can develop a poor reputation. The same will apply for concrete/epoxy. Installation and maintenance is the key to long term performance and look.

The aim is to partner with a supplier who offers the necessary training, onsite support, and technical assistance to see a project through. Polyflor is not just able to do this but equipped for this.

Do not sacrifice aesthetics, properties, and performance because of past failures. Those challenges can always be overcome.