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## Comparing Polished Concrete and Resin Floor Options for Commercial Environments

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Polished concrete flooring has seen its popularity soar in recent years, as improved grinding techniques have allowed for the creation of ever more attractive finishes.

Whilst this provides architects and designers with another flooring option, it means that they have to weigh up the attributes of polished concrete with the enhanced performance profile of seamless resin-based flooring materials, which can provide commercial spaces with greater durability as well as lifecycle cost savings.

Whether the project is for the retail, leisure or hospitality sector, it is always important that the finished surface meets the required criteria for appearance and functionality as well as the project's budget and construction constraints. Therefore it is important to understand the benefits and disadvantages of each type of floor when specifying the facility's flooring solution.

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### What is Polished Concrete?

Polished concrete is a concrete floor that has been chemically treated and ground down to a smooth, shiny surface with progressively finer diamonds.

There are on average 10 to 15 steps involved in the diamond polishing process, with the polished grinding procedure typically starting with a coarse 16 or 30 grit diamond and then

consecutively doubling the grit level every time, depending on the required gloss level, up to a final 1500 or 3000 grit.

A densifier is used throughout the process to harden the concrete, which allows for the surface to be polished. A grouting chemical also needs to be applied to fill in any holes, cracks or imperfections exposed during the grinding.

Once the concrete has been sufficiently ground down it is sealed with a natural look impregnating sealer that penetrates 2-5mm inside the concrete's pores to prevent deep staining from oils and spills.

There are many techniques that can be utilised to enhance the aesthetics of a polished concrete floor, such as stains, dyes, decorative aggregates, borders, scoring and stencils. These methods can be used to create intricate patterns or to make the concrete mimic other flooring materials such as marble, river rock or wood.

### Advantages of Polished Concrete

The hard-wearing properties of concrete mean that a polished concrete floor is robust and if well maintained it can last for an extended period of time without getting scratched, chipped, dented or otherwise deteriorating.

It is easy to sustain a hygienic environment with polished concrete, as it does not support mould growth and its low maintenance finish means that weekly washes with warm soapy water is all that is required to clean it, saving time, energy and effort compared to floors that need waxes and sealers.

The American Lung Association has endorsed polished concrete floors as they prevent the build up of allergens such as animal dander, dust and dust mites, all of which will thrive in carpeting.

Concrete may not be considered an environmentally friendly product but polished concrete has sustainable benefits. This solution avoids the extra carbon footprint incurred by manufacturing, transporting and installing additional materials as it is normally the existing concrete substrate that is modified and worked on to create the finish.

The LEED standard even includes guidelines on how using polished concrete flooring can help developments qualify for LEED credits.

### Disadvantages of Polished Concrete

The condition of the existing concrete is the key consideration when determining if polished concrete is a viable option. Certain problems such as cracks, delamination and dusting can be repaired, but if the substrate is too far gone then the concrete will either need to be replaced or a special concrete overlay applied (both of which eradicate the above advantage of not needing to apply another flooring material).

If the concrete is of good standard but with relatively poor level tolerances, then it will be more difficult to polish the surface, so additional labour time and aggregate exposure should be expected.

Polished concrete floors are susceptible to moisture and need to be properly sealed on both the top and the bottom. If liquid does manage to infiltrate the pores of the concrete then it could cause mould and mildew to grow, and if the liquid freezes it could lead to serious cracking in the slab.

Concrete expands and contracts on changes in temperature and these fluctuations are another potential cause of cracking. The cracked cement can be repaired with a waterproof sealant, resin application or cement overlay, but matching the colour and texture could prove difficult.

Whilst no extra material is required, don't assume that this is necessarily a quick or easy process. Not only will it take an experienced contractor a long time to complete the process, due to the many stages required to achieve a high quality surface, but you'll



need to wait at least a month between the concrete being poured before the polishing and sealing can even begin. Cutting down on the level of polishing will speed up the process but the quality of the finish will be unavoidably degraded.

### What is Resin Flooring?

A resin floor can be manufactured from one of several formulations, with epoxy, polyurethane and methyl methacrylate (MMA) being three of the most common materials.

The manner of installation can vary between these systems but the seamless, impermeable, abrasion resistant finishes they create share similar properties that have made them a popular choice in commercial environments.

Essentially the combination of durability and aesthetics that a resin material provides means that floors can be created that will maintain a high-quality appearance despite long-term use in the busiest of facilities.

There are several types of resin floors, ranging from a thin film build floor sealer to a 6 mm thick floor that has been trowel applied and aggregate filled for use in the most heavy duty of industrial facilities.

So long as an appropriate maintenance regime is adhered to, the service life of a resin system will usually be proportional to the applied thickness of the floor.

The thickness that the resin floor is laid to will depend on the on-site conditions and daily activity that it will have to withstand.

Conducting a thorough lifecycle costing of the flooring systems on offer will help the developer to ascertain what the floor will cost over its lifetime. The low maintenance finish of a resin floor means that its initially higher cost of installation will be negated by the number of years of reliable flooring that the system's cost can be divided into.

## Epoxy

Epoxy based systems have traditionally been the most popular form of resin flooring. The widespread use of this material stems in large part from the wide variety of colours and formulations available, which offers developers a significant amount of flexibility when considering the final floor finish.

An epoxy floor will usually consist of a two or three-component system that is trowel or roller-applied on-site. Water based epoxy coatings are suitable for areas with relatively light traffic. More abusive environments will require a higher build system such as an epoxy resin based screed.



### The Good

Epoxies boast a wide range of advantages that help create a functional, hygienic and easy-to-maintain surface. Epoxy systems can be installed that are vapour permeable, low odour and cost effective with excellent dustproofing qualities.

The wide variety of colour options and decorative effects means that epoxies are a great way to add vibrancy into an environment. This is best exemplified by certain epoxy terrazzo systems that are available to the market which provide designers with almost unlimited design possibilities. The floor's colour and design can be tailored to the client's request to create captivating patterns that take a venue's interior design scheme to the next level. Even the glittering sheen across the floor's surface can be personalised by adjusting the type and quantity of decorative aggregates incorporated into the epoxy material.

### The Bad

Water based epoxy coatings at the thinnest end of the scale have a limited life span of one or two years and will need to be recoated after this time to maintain a viable surface. More durable solutions that can last in excess of a decade are available, so it's important to know what challenges will be thrown at the floor and what longevity you are looking for to identify the right solution.

Epoxies generally have a slower cure rate compared to polyurethane and MMA floors. They also generally require one or two seal coats to remove porosity whereas the wetter, more resin rich nature of polyurethanes means that they are self sealing.

## Polyurethane

Typically, polyurethane concrete floors come in a mortar form that combines cement and water-based technologies to create a floor with a high cross-linked density. Depending on the system, polyurethanes can be installed as a flow applied, self-smoothing or trowel applied mortar.

The difference between this type of material and epoxy systems is in the molecular structure of the two, which affects how the molecules fuse together during the curing process. Essentially, polyurethanes have a higher cross-link density than epoxies, making them more durable. Additionally the hybrid chemistry of polyurethane concrete makes them an extremely hard-wearing and robust flooring option.



### The Good

Polyurethane systems can really make a commercial venue's floor stand out, as innovative new systems are available to architects and designers that can create unique and highly stylised surfaces underneath the customers' feet.

For example the trowel applied Expressions flooring range utilises a number of creative techniques to inject a truly individual style into a space with a one-of-a-kind surface that can never be fully recreated. As with the epoxy systems, the colour and decorative effect of the finish can be tailored to the client's preferences.

Polyurethane concrete systems are good at coping with temperature changes without cracking. This advantage stems from the fact that they exhibit a similar coefficient of expansion to concrete, meaning that the floor finish will expand and contract at the same rate as the substrate.

### The Bad

Some facilities managers and architects can be put off by the cost of a polyurethane concrete floor, however it is important to note that choosing a cheaper solution will usually mean installing a thinner or more aggregate filled system that won't provide the same long-lasting properties.

## Methyl Methacrylate

Methyl methacrylate (MMA) technology originated in the petrochemical industry and has been utilised for a wide range of purposes. MMA flooring is notable for its ability to offer exceptionally rapid installation and cure times compared to alternative materials.

MMA flooring can be flow applied, making it less labour intensive than trowel applied resin systems. This installation can take place in temperatures as low as  $-30^{\circ}\text{C}$ , which has proven useful on unheated construction sites as well as in the back-of-house cold stores, coolers and blast freezers of supermarkets.



### The Good

In most cases an MMA resin floor can fully cure in less than an hour and it can be installed at extremely low temperatures. Both of these factors make it ideal for speeding up a construction schedule or for a flooring refurbishment project that needs a fast turn around.

An MMA floor can be installed on top of a wide variety of substrates, including concrete, steel, tiles, marine ply and other resin materials, which means that the previous floor system does not need to be removed – further enhancing its reputation as a speedy refurbishment option.

This type of flooring exhibits incredible bond strength and high compressive strengths as well as a wide temperature range. It is also 100% non-porous and monolithic, which creates an impervious surface with exceptional chemical and UV resistance.

The deep penetrating primers of MMA floors creates a strong chemical and mechanical bond with the substrate. This provides the floors with exceptional longevity – with many installations lasting in excess of 15 years if properly maintained.

Like the other resin materials, aggregates can be added into the finish to produce flaked or quartz style finishes to evoke a luxurious, marbled aesthetic.

### The Bad

MMA flooring exhibits a strong odour during installation but it is in fact relatively harmless and quickly disappears. Despite this odour MMA floors have environmentally friendly advantages, as they are non-toxic and extremely low in Volatile Organic Compounds (VOCs).

## Creating an Industrial Aesthetic

Currently many commercial venues want to create an industrial, urban vibe with a key part of the interior design scheme being flooring that emulates the minimalist, worn-in concrete that could be expected in an old factory.

To create this look architects and interior designers might be tempted to utilise concrete floors that have been roughly polished (but not to a high gloss standard) and then sealed. Often this is not strictly speaking polished concrete, as it has not been repeatedly ground down and sealed enough times, therefore it might be quicker and cheaper to complete but it will have a lower quality finish.

Designers are increasingly installing resin floors in locations where an industrial ambience is required to ensure that not only is the right image achieved, but also that the site's operators can rest assured that the floor beneath their feet is fit for purpose.

## Picking Between the Two

In essence choosing polished concrete removes the need to source and install extra material, however it does mean that the site will be subject to the quality of the substrate for the look, longevity and effectiveness of the floor. In contrast the type of material, thickness and functionality of a resin system can be adjusted to fully optimise the area.

Both options also provide designers with a long list of looks and styles to choose from. The appearance will obviously depend significantly on the image that the developer wants to create, and in the case of polished concrete the standard of finish can vary depending on the amount of time and finances that are put into it.

This means that it is important to consider which type of floor will best achieve the desired image. Especially as while resins can emulate many of the same styles as polished concrete, there are some designs and appearances that only a resin system can create.

**This guide has been produced to provide an overview of the alternative flooring options to polished concrete flooring within.**

**Detailed recommendations and advice are available from our network of regional technical and sales representatives.**

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