Panther PC Quality Control Standard

Objectives

- *Defining What is and is not a "Defect" in Resin Installations*
- *A Metric for Manufacturer, Contractor and Client in assessing Acceptable Standards, and unacceptable defects*
- *Creation of an acceptable means of Remedying each type of Defect*

Terms:

- "Damage" includes impact, scratching, gouging, staining, overspray, splatter, spills, and other forms of damage caused by the Contractor during any part of the installation process.
- "Designer Install" is a multi-coloured resin installed for the primary purpose of creating a decorative or designer effect
- "Functional Install" is a mono-coloured or multi-coloured resin installed for the primary purpose to meet a set of functions such as safety, hygiene, cleanability, etc.
- "Solid Colour" refers to the applied resin or coating fully bocking the colour of the substrate underneath.

Limitations:

- The following additional circumstances can override this Standard:
    - If a greater or lesser standard compared to this Standard has been agreed in writing between Contractor and Customer
    - If Contractor or Customer has neglected its contract to the other party, creating greater difficulty in achieving this Standard.

Damage to Surrounding Surfaces

Resin floors are installed in situ and the preparation works are also done on site and often around existing furnishings, wall finishes, stone, trims, thresholds, door and window frames, adjacent flooring materials and other. While it is not reasonable to expect a zero impact on the surrounds when the flooring is receiving treatments such as grinding, blasting, cutting, sanding, dust removal, and liquid applied resins, etc, due caution with the products and equipment should be exercised to protect property.

The Contractor should exercise care and concern for property and attempt to eliminate/minimise damage during installation.
The metric for resin floors by which damage can be analysed in order to determine whether it is acceptable or unacceptable:

a) Damage should not exceed **0.1% -** this is calculated by measuring the cumulative surface area of the adjacent walls/surfaces and calculating the area of the damage. The damage is deemed acceptable if less than one tenth of one percent has been damaged by the installation.
b) Unacceptable levels of damage should be repaired by the Contractor as detailed below
c) Acceptable levels of damage are not the liability of the Contractor to remedy
d) Paint peeling off due to masking tape does not accrue towards this metric and is dealt with in the Masking Tape & Formwork section

Acceptable Remedies for Damaged Surfaces:

1) Painted surfaces can be sanded, flush-filled and repainted in the closest colour available
2) Metal Surfaces can be repaired with a metallic spray-paint, or coloured coating in the closest colour available
3) Stone or Cabinetry can usually be brought back to acceptable with a flush fill with appropriate material followed by coloured coating to match as close as possible. In some instances, replacement of the material may be necessary if the damage is still clear and unattractive from a standing position 1m out from the surface.
4) The Contractor is responsible for returning the state of the property back to the above stated tolerance of 0.1%

Noticeable & Unattractive Irregularities in Resin Coatings

Resins and coatings are installed insitu and therefore subject to contamination from the environment and surrounds. This is not entirely within the control of the Contractor, and therefore only in some circumstances is deemed unacceptable workmanship. Contamination can include dust, sand, rain or moisture, thread, or virtually any small, mobile object that is transferred onto the floor during the curing process or installation itself.

Even with self-levelling resins the expectation of the Contractor is not to achieve a glass-like, fully homogenous, fully level floor, unless this has been agreed between the parties in writing. However, due care should be taken to achieve a serviceable and tradesman-like finish as defined below:

This Standard shall include

- contamination arises from within the concrete during installation
- resin failing to flow to cover areas of the floor
- holes/divots/cracks not being filled, in instances where these have been agreed to be filled in their entirety
- Sections where broadcast materials fail to embed into the resin, in instances where a full broadcast has been specified

This Standard does not cover:

- Irregularities in colour/gloss/texture/finish – these are covered in other sections of this document

The responsibility of the Contractor:

- To vacuum, sweep, air-blow, etch wipe, or mop the substrate prior to commencing the installation work
- To pick out where possible, objects that fall/blow into the resin during installation. This is often not possible without risking damage to the floor and the Contractor should use due care to decide whether it is best to remove the contaminants or to leave them.
- To use a proper technique for the substrate preparation prior to installation of the resin. Depending on the application, the substrate should be sanded, grinded, shot blasted or pressure washed unless there is a clear justifiable resin not to use these processes.

Metric to Evaluate Whether the Irregularities/Contaminations are Defects:

a) The Contractor has not complied with the above procedures
b) The surface area directly containing the irregularity or contamination exceeds **0.1%** in Designer Installs and **0.3%** in Functional Installs - this is calculated by measuring the cumulative surface area of the installed floor and calculating the area containing the irregularity/contamination.
c) For full broadcast floors, any individual section of the floor devoid of the embedded material with an area greater than 0.001 square metres.

d) Any area obstructing or making difficult the preparation or installation of the materials, including furnishings, hard to access areas, areas not cleared, and so forth do not count toward this metric

Acceptable Means of Remedying Irregularity/Contamination defects:

a) The contaminant should be scraped or sanded or cut out
b) Optionally, the area surrounding where the contamination was can be resealed/recoated, if necessary (some contaminants that have not penetrated deep will pop out without requirement to recoat
c) For areas where the resin has failed to flow, and for full broadcast floors, the area should be "touched-up" as neatly as possible. It is usually not be possible to match in the touch-up seamlessly, but effort should be made by the Contractor to minimise the aesthetic impact of the repair.

Air-bubbles, Craters/Off-Gassing and Fisheyes

An air-bubble is when air is trapped inside the coating
A crater is when the coating has been shaped into a crater by gas being released from the concrete surface/pores
Fisheyes are when the substrate or previous layer causes subsequent resin layers to be pushed off from the surface, leaving the surface exposed. This is usually caused by contaminants in the substrate or atmosphere and can affect more than just the first layer.

If the application of the Panther PC Resins has been conducted within the Panther PC guidelines, then the above phenomena have likely been caused by environmental factors and are therefore outside of the control of either Manufacturer or Contractor. These are not defined as defects, however they can be resolved as required:

Recommended Process:

a) Test various Panther PC resins for their ability in the particular scenario to overcome the issue. The below are generalities and may not work in every instance:
    a. For cratering/bubbling a lower viscosity RFSL-LV can be tested, and potentially at a higher film thickness
    b. For fisheyes, the RFSL Mineral-Rich is highly resistant but in extreme cases can have additional Component TX to increase rigidity.
    c. The affected area can then be recoated to resolve the problem

Contaminants Arising from Underneath the Coating

Contaminants arising from underneath the coating system can cause delamination or affect the appearance or performance of the coating system. As this is at least partially outside of the control of the Contractor, no coating defect shall be the liability of the Manufacturer or Contractor.

Acceptable Remedy for Rising Contamination

a) Affected areas are to be mechanically or chemically removed, and recoated
b) The area will likely show as a repair, effort should be made by the Contractor to blend as best as possible.

Capillary Action affecting Quartz, Sand, Flakes, other manually cast material

Low viscosity resins and resins with self-levelling properties are more likely to experience this phenomenon. This is a common experience in resin flooring where the placement of a generous amount of aggregate (or other) creates an upward pull similar to capillary action, that causes the resin to saturate more than just the typical base layer of aggregate. The result is a raised section of flooring sometimes in excess of 5 millimetres above the rest of the floor. While this does not reduce the strength or waterproofing nature of the floor, it is a defect that the Contractor should rectify by grinding to smooth. Optionally, the area can have a clear coat installed or a base coat-aggregate plus topcoat applied over the affected area, depending on Customers selection.

Colour Variation

Mixing with accuracy is critical to achieving a tradesman-like finish with Panther PC resins. Disparity in colour caused by a batch receiving the incorrect colour pack will result in a dramatic colour change. This should be corrected by the Contractor. The remedy for this is masking off the affecting area, sanding or chemical etching when required to ensure adhesion and the application of another coat of resin with the correct colour pack.
As Panther PC resins are usually installed insitu with varying conditions (temperature, substrate, humidity, moisture, level, etc), and because in a similar way to concrete batching, each batch of resin is potentially a different colour (human variation, combined with conditions during manufacture, combined with various environmental conditions during installation), variations in colour between batches is not considered a fault of the Contractor or the Manufacturer.
Time of placement and "last-touch" can also alter the final colour appearance of the finished resin.
Note: Digital and physical colour charts are only a guide and it is to be expected that actual flooring colour varies significantly from floor to floor.

Solidness of Colour

In instances where an Panther PC solid colour floor is installed, the flooring must be a solid colour.

If the substrate is showing through after installation, the coating is deemed to be unacceptable and the Contractor should apply an additional coat to the affected section.

In instances where the transparency has been caused at least in part by a soft or honeycomb area of concrete, or a substrate that is not level or contains holes/lips/breakage/fretting/wear or the like, the defect is not deemed to be an error on the part of the Contractor.

Drains / Falls / Gradient / Levels

Resin flooring around drains must butt directly up to, or in some instances overlap, drains and floorwastes. The flooring must be at equal height to the drain or higher. Lower than the drain can cause pooling of water

Panther PC coating systems do not necessarily modify, change or correct the gradient / fall of the floor unless applied in such a way to achieve this objective.

Metric of Quality Control for the deliberate creation of a level floor: Unless otherwise agreed between the parties, a levelled floor should pass the Panther PC straight edge assessment. Place a 1.8m straight-edge on the floor in any place and there must not be a gap of more than 5mm. Note the use of a straight edge rather than a spirit level. To level a floor to perfect gravity can not be achieved.

Acceptable Means of Remedying Defective Levelling:

a) Diamond Grinding or scarifying the high points
b) Installation of further levelling materials

Metric of quality control for the deliberate creation of falls to wastes: The act of pouring water on the floor should cause at least 97% of the water to travel across the floor and down the drain. It is the Clients responsibility to check over installed screeds prior to installation of the finished floor. Once the flooring is installed, it is much harder to change the falls.
Areas of the floor where it is not reasonably possible to achieve a fall are to be excluded from this analysis

Areas of the floor that the Contractor has intentionally created a more level surface or fall in a different direction (eg for the benefit of equipment or to increase the fall closer to the drain) are to be excluded from this analysis

- There are times when it is not reasonably achievable to have a fall running to the drains in all areas of the selected floor. This can occur if there is not enough height available at the perimeters or fixtures, or when particular heights are needed in particular locations in the floor. There may also be areas that were excluded in the Quote. Excluded areas, and areas where it was not reasonable to achieve the desired falls should be excluded when conducting the above metric.

Slip Resistance
Slip Resistance is typically built into a resin floor via a slip resistant additive or granule. These granules are usually manually cast into the floor and therefore impossible to achieve perfect evenness. Most resin floors have some level of slip resistance built in but in instances where the Client has specifically requested a precise slip rating the following Quality Standards will apply:

If the slip resistance is higher than the requested slip resistance in an area it is deemed to have achieved its slip resistance target. If the slip resistance is below the requested R or P rating, across greater than 5% of the installed floor then the Contractor is responsible to get the floor back to a 95% success rate of slip resistance.
If the floor has achieved the requested slip rating across greater than 95% of the installed floor, then the flooring is not deemed defective.

Shot-Blasted Floors
Shot-Blasting is the ultimate surface preparation for resinous coatings. It provides a surface texture for the coating system to permanently adhere to. During shot-blasting, the machinery is run along the floor in linear strips until the floor has been adequately blasted. One down-side with shot-blasting is the creation of what are called "Tiger-Stripes." Tiger-stripes show the work pattern of the blasting and these often "ghost" through the finished floor. While they aren't major lines, and they can't be felt by the touch, they are noticeable. Tiger-stripes are not defective because they indicate a superior form of surface preparation has been completed.

Concrete Repairs
Concrete repairs are primarily carried out to adjust the function and safety of the floor. It may require significant additional work to perform repairs in such a way that when they are coated, they become invisible. In some instances, this is not possible. Unless specified agreed between the Contractor and Customer separate to this Quality Control document, concrete repairs will remain visually identifiable as repairs.
Note: The nature of concrete is such that it moves, breathes, contracts, expands. No guarantee can be made that crack repairs or concrete repairs will not reoccur.

Where the Contractor has agreed to conduct repairs to the floor, all agreed repairs must be carried out as agreed, subject to the criteria below:
Unacceptable Repairs:
Where the Contractor has agreed to
a) patch the holes in the floor, no more than 1 in 10 should be missed
    a. Holes less than 5mm at the smallest diameter measurement or 5mm at the largest depth measurement do not accrue towards this metric and are considered too small to reasonably be able to find across and concrete floor prior to coating
b) Fill the cracks in the floor
    a. No more than 10% by a lineal measurement should be missed as repairs
    b. Hairline cracks which cannot reasonably be seen prior to overcoating and are therefore omitted as repairs do not equate to unacceptable workmanship or contribute to the above metric

Acceptable Remedy:
Holes or cracks or concrete repairs requiring repair should be opened up with a diamond blade (if required) and the same resin and colour pigment applied to the hole/crack. The repair will not blend seamlessly but effort should be taken to use the exact same batching to obtain as close to a match as possible

Aesthetic Variation of Fleck / Quartz / Other Designer Cast
Designer finishes are installed insitu with a team of people and a range of factors. When an aggregate or designer fleck (or other) is installed it is manually applied and therefore subject to variations from environmental factors as well as human error, or human judgement.

To create a metric by which a floor can be deemed acceptable or unacceptable, the Panther PC Standard for materials cast into wet resin is as follows:
Unacceptable Finishes:
a) For full broadcast floors, any individual section of the floor devoid of the embedded material with an area greater than 0.001 square metres.
b) Where the aggregate has been placed so heavily that the section has come up significantly rougher compared to the remainder of the floor to the point of creating a trip or slip hazard is unacceptable.
c) Where a section of the floor is significantly roughly compared to the rest of the floor, and that rougher section is more difficult to clean.

Acceptable Remedy: The best remedy for each instance is unique to the circumstance. Acceptable techniques include:
1) Light sand over the rough area followed by a topcoat
2) Clear coat or colour coat over the affected area followed by partial or full reapplication of the aggregate
3) Or Sanding the section and reapplying
4) Or In some instances a tapeline is the best method, but consideration should be given to paintbrush style touch-ups to minimise the overall impact.
5) Capillary action in the floor should be treated according to the Capillary Action section

It is usually impossible to blend the remedied section with the remainder of the floor, but the defect is successfully remedied when the floor meets the above criteria

Trowel Indentations, Roller Lines & Cutting In Irregularities
Skilled application can reduce the final effect of roller lines, trowel indentations and cutting in irregularities. In instances where these are unacceptable as per the below criteria the remedy is as follows: Sanding or chemically etching when required, followed by grinding or filling the indentation as required, followed by another coat over the affected areas. The affected areas should be taped first to create a seam.

Please Note: Roller lines, trowel indentations and cutting in irregularities usually look the most obvious directly after the completed application, often reducing over time.

Panther PC resins were developed initially for Industrial purposes and have been utilised for cosmetic or designer purposes – wherever possible, Panther PC has opted for performance over aesthetics. One negative affect of this is that the products in some cases are more susceptible to roller lines after application. Some of the additives in the Panther PC range and slip resistant additives can also add to the tendency to leave visual evidence of the rolling process.

Trowel indentations and roller marks are deemed unacceptable in the following circumstances:
a) They have caused a *slip* hazard not consistent with other parts of the flooring
b) They have caused a *trip* hazard not consistent with other parts of the flooring

c) They have made the affected area harder clean than the rest of the flooring

The above notes apply also to marks from roller application, trowel application, squeegee application, pin-rake application, etc

Overlap Lip

Overlap lips are created when one section of the floor installation is installed over a previous section of flooring installation. The correct procedure is to have the two sections either butted up against each other (not always achievable) or an overlap lip to ensure the floor remains seamless and sealed. An overlap lip is sometimes referred to as a seam but is contrasted by way that both sections are joined with the same material without the introduction of a different jointing/seaming compound.

Acceptable means of creating an overlap lip:

a) Running the first and/or second section install up to a line of tape or other form
b) Feathering the overlap with a paintbrush, roller or other
c) Where an overlap lip is created onto a different or existing material, or in instances where the overlap lip is created in awkward places such as under cabinetry, a flood coat may be the best way to get the material to cover as much surface area as possible – the overlap lip in this instance wont be a straight line, but achieves a greater surface cover.

Overlap lips are not a defect in flooring installations.

Masking Tapes & Formwork
When masking tape or other tapes or formwork are employed as a means of protecting surfaces, or creating a stop point, there can be an amount of bleeding underneath or through the gaps in the tape. This is heightened with the use of low viscosity or self-levelling type materials, and against surfaces that are textured or with high repellency, and also in high temperatures and low humidity. It is not always possible to prevent bleeding and therefore bleeding is not deemed as a defective application if reasonable steps have been taken by the contractor to prevent/minimise the bleeding.

Another potential issue with adhesives/tapes is the removal of them. If the paintwork is not well bonded to the surface, the paint can come away with the tape. This extends to woods and multi-layered products that have low internal cohesion – the pulling back of the tape can cause a breakage. This is deemed outside of the control of the Contractor as it relates to a poorly bonded material.

To prevent/minimise bleeding the best practice for the Contractor is to push the tape onto the surface with a rag or finger, to get as close an attachment as possible.

Acceptable Remedy: Attempt to scrape the material off with a sharp blade or scraper.

Inconsistency around terminations
Against steel trims, drains, skirting boards, walls, fittings, cabinets, or other terminations there is likely to be some inconsistency of level or finish as the product self-smooths and flows, this is not deemed as unacceptable workmanship.

MMA Reactive Resins
Methyl Methacrylate reactive resins are super-fast curing resins which are at times affected by surface contaminants or environmental conditions. The metric for an acceptable level of curing is 98% of the installed floor to cure to a hard state.

Acceptable Remedy for Uncured Sections of Flooring
Uncured areas can be top coated with another coat of MMA, sometimes a sand or grind may be required prior to application of another coat. The recoated section will be appearing as a repaired section of the floor.

Epoxy Coving
Epoxy Coving is designed as a waterproof, hard, easy to clean junction between wall and floor. These are installed insitu with a blend of resin and aggregates and requires skill to install. The epoxy cove is deemed acceptable if it meets the following criteria:

a) The cove is smooth enough to be easily cleanable (if the cove has aggregate/fleck/quartz embedded then it does not need to be smooth). If the cove has been contaminated by sand or aggregate from the flooring or other, this should be sanded to the point that the cove can be easily cleaned with hose, cloth or scrubbing brush
b) The join between cove and resin floor is sealed – there is usually an overlap lip but there must not be a gap between the two exposing the substrate
c) The cove must be impervious to water

Off-gassing of the Concrete Slab
Bubbling or cratering of the resin is generally caused by off-gassing in the concrete slab. Unfortunately, it is virtually impossible to predict whether any particular slab is going to have excessive off-gassing until it is coated and sealed. The resins are developed with agents designed to allow for the passage of gasses through the coating during curing and lay back flat as a solid film, however if a slab has excessive off-gassing the resin will not be able to overcome it and bubbling or cratering may occur.

While this is not considered a product or workmanship defect, additional coats may help to overcome the issue

Delamination
Separation of the resin from the substrate or from previous coats is considered defective when:

a) There is evidence of "progressive delamination." Progressive delamination is different from simple separation of the resin because the separated area grows in size progressively from normal traffic and use.

Separation of the resin from the substrate or from previous coats is **not** considered defective when:

a) The substrate is contaminated with oil, moisture, or other bond-breaking substance, which occurred after the time of installation, or that the surface preparation method was unable to remove
b) The conditions set out on the Contractors Warranty are not met
c) The substrate itself displays signs of breakage, fretting, drumming, weakening.

Acceptable Remedy for Delaminated Resin

c) Affected areas are to be mechanically or chemically removed, and recoated
d) The area will likely show as a repair, effort should be made by the Contractor to blend as best as possible.

Colours and Designs
As the resin is mixed and batched onsite, and also due to manufacturing limitations, colour matching cannot be guaranteed, even between batches. Colour charts, samples, photos are only an indication of the finished colour, texture, slip resistance and gloss level.
Likewise, the level of gloss can vary from site to site and even to a smaller degree within one site operation.
Patterns and designs and blended aggregates are all hand-crafted, with numerous variables affecting the finish, every floor is a unique creation, and as such a lack of uniformity (whether within a single floor, or between floors applied at different times) is classed as a defect.

Samples Supplied Prior To Installation
Due to resin being site installed and site cured in various site and substrate conditions, and with manual human installation, a sample is not expected to perfectly match the actual. It is purely indicative.

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