BASTION PAINT
SPECIAL EFFECT PAINTS

Medium to Deep Casting Epoxy Resin

1. Overview

Manufacturers Brand Name: Kristal 50.
Clear, UV Stabilised (slow to yellow compared to non-stabilised resins).
FDA approved for food contact up to 50°C. (*Test method: FDA 21 CFR 177.2600 report number GZ190826027FR*)
Low viscosity (high flow resins) so air entrainment is less of a problem than with higher viscosity systems.
These cured resins are suitable for temperatures up to 80°C.
Cured resin is hard.
Mixing ratio 100 Resin : 33 Hardener by weight. This allows casting up to 30mm thick.
Mixing ratio 100 Resin : 25 Hardener by weight. This allows casting up to 50mm thick.
Maximum volume of a single cast is 30 litres.

2. Safety and Health

- Epoxy Resins are an irritant to skin, eyes and mucous membranes.
- Avoid breathing fumes. As a minimum use them in a well ventilated work area. The use of an approved respirator is strongly recommended and essential for larger projects and regular users.
- Avoid eye contact. Wear protective eye-glasses.
- Avoid skin contact. Wear rubber gloves and long sleeve shirt. Barrier creams reduce skin contact. Over time, skin contact can cause sensitisation (this means one can become allergic to them).
- Do not clean resin off your skin with solvents. This can accelerate penetration of harmful substances through your skin. Use soap and water to clean skin.
- Do not swallow. Keep out of reach of children.
- The harder (Part B) is corrosive and may cause severe eye damage and skin burns. It is a sensitizer that may cause dermatitis from skin contact and exposure to fumes.
- If sanding or machining cured resin then wear a dust mask to prevent dust inhalation.
- First Aid:
    - In the event of eye contact, wash eyes under running water for 15 minutes and get medical attention.
    - In the event of skin contact, wipe clean with white vinegar then wash with soap and water. Get medical attention if irritation develops.
    - If fumes are inhaled or if breathing becomes difficult, move to fresh air. Get medical attention if symptoms develop or persists.
    - If swallowed do not induce vomiting. Drink 1-2 glasses of water and seek medical attention.

3. Key Parameters

- Mixing ratio is 100 Resin : 33 Hardener by weight. This is standard and allows casting up to 30mm thick (recommended 10-30mm).
- For deeper casting you can use 100 Resin : 25 Hardener by weight, This will slow the curing and allows castings up to 50mm thick (recommended 30-50mm).
- Maximum volume of a single cast is 30 litres
- This resin should not be measured by volume.
- Pot Life: 60 minutes (longer if you use mix ratio of 100:25)
- Cure time: 48 hours (longer if you use mix ratio of 100:25)
- This resin has a reasonably low viscosity (reasonably high flow), is clear, UV stabilised, FDA approved for food contact up to 50°C and can tolerate temperatures up to 80°C.

*Pot Life

Larger volumes and containers with lower surface area reduce the pot life. The pot life will be reduced in hot weather. You can extend the pot life by pouring the mixed resin into flat trays.
Pre-warming resin to aid air removal will reduce pot life. This is actually recommended for this resin.
If you leave the resin too long it will start to thicken and air entrainment and heat generation will become a problem. Never leave mixed resin unattended as it can start to generate excess heat, give off toxic fumes and even become a fire danger. If this starts to occur then move the resin to a safe place outdoors and don't try to use it. Don't mix more than you can use in a relatively short space of time.

**Cure Time

This is an average time the resin will take to get hard at ambient temperature (23°C).
Thicker layers get hotter and thus cure faster. Thinner layers will take longer to cure.
The hard resin will continue to gain strength for many weeks.
Wait at least a week before subjecting the cured resin to the maximum temperature it can handle which is 80°C.

4. Which resin to use, maximum casting thickness and dangers of heat

The curing chemical reaction between epoxy resin and hardener generates a significant amount of heat (exothermic chemical reaction). When this heat cannot escape it increases the temperature causing the epoxy to cure faster and generate even more heat. The higher temperature increases differential shrinkage in the casting which may lead to induced stress and cracking. A potentially massive build-up of heat can cause the epoxy to crack and discolour.

Uncontrolled exotherm may cause the epoxy to foam, smoke, give off dangerous vapours, crack and generate enough heat to melt its container or cause nearby items to catch fire.

- Never exceed the recommended maximum thickness or volume of a resin system as this may lead to overheating. Use mixed resin before it starts to thicken or increase in temperature.
- The maximum thickness and volume apply to resin used at ambient room temperature of 23°C with relative humidity below 85%. Warmer temperatures will reduce pot life and may also influence the casting thickness. If temperatures are warmer than 25°C, reduce maximum casting thickness by 50% or as appropriately required to avoid excessive exothermic reactions.
- If you pour resin into a closed mould then the heat build-up will be greater than when using a flat open mould with a large surface area for the resin to loose heat. Reduce film thickness when using relatively closed moulds.

The above tells you the dangers of casting too thick or with too high volume. Casting too thin for a specific resin system leads to slow hardening and it could take many days for a resin to harden in cold weather. This gives more time for pigments to settle and for amine blush to develop so it is definitely best to use a resin most suited to the thickness you intend to cast. Thin layers curing at temperatures below 18°C may not sure correctly. There is no limit to the number of layers that you can cast on top of each other.

5. Avoiding Air

This resin is slightly thicker than Kristal 6 and 30 and as it is used in thicker layers it is important to take steps to avoid air.

- Warm both Part A and B to 28-30°C by placing the containers in warm water. This increases the flow and allows air to rise up and escape.
- When mixing do not beat the resin. Mix in a way that does not introduce air.
- The resin can be vacuum de-aired.
- When pouring, pour in a way that minimises the introduction of air.

6. Protecting surfaces

- Apply 3 coats of RAMWAX® or equivalent onto surfaces that you don't want the resin to adhere to. Apply wax, allow 15 minutes for solvents to evaporate, polish to a high gloss and then apply next coat of wax and do the same. Use a lint-free cloth (Important!).
    - If making a river table then coat the entire melamine box with wax for easy removal.

7. Equipment Required

- Two Plastic or metal containers. Containers must have smooth continuous sides for scraping. (Do not use foam or glass containers.)
- Scale (the two components of this resin system must be measured by weight and not volume).
- Stirring sticks with square edge and straight sides that reach to the bottom of all containers.
- Isopropyl alcohol (rubbing alcohol) for cleaning up. Remember that this is flammable.
- Ensure that all containers and tools are free from dust, grease and other contaminants.

8. Surface Preparation

- Ensure all surfaces are free of dust, oils and contaminants.
- Non-porous surfaces such as tiles and glass do not need priming.

- Porous surfaces (such as wood and cement) must be priming to prevent air bubbles being released from the surface when resin is applied. Priming can be done by applying an initial thin layer of Counter Top & Shallow Casting Resin. Mix only sufficient resin to create this thin film which should be about 1.5mm thick. Wait 24 to 48 hours for this thin layer to cure and become hard.
- You can also prime to remove air from porous surfaces with a water based paint. Never use an oil based paint under resins.
- Apply wax to all surfaces that you require the cured resin to release from. See section above "Protecting Surfaces".

9. Mixing

Proper mixing is a key requirement for a successful resin project. Poor mixing will lead to defects which may often be cloudy streaks or patches in the cured resin. These defects cannot be removed.
The components of this resin system must be measured by weight only (not by volume).

- Accurately measure out Part A into the mixing container followed by Part B.
- Stir together well for 3-5 minutes using a square edge stir stick. Include scraping of the sides and bottom of the mixing container several times. Do not mix in a manner that introduces air.
- Transfer entire content to a second clean mixing container and mix for another minute again scraping the sides. Failure to scrape the sides sufficiently will lead to streaks.
- Your resin is now ready for pouring and it must be poured before it starts to get thick or hot.

Mixing can be done by hand or with a drill fitted with a mixing unit. Drill mixing can help mix larger quantities but should be set to low speed on a variable speed drill so as to avoid making a vortex that will pull in air. A drill mixer will not scrape the sides so manual mixing with scraping of side and bottom of the container is still required for 2 minutes. If drill mixing introduces air, time will be required to allow the air to rise.

If the mix quantity is large it may start to thicken and/or generate heat prior to pouring. This indicates that curing is underway. The heat generated can reach dangerous levels. You can extend the pot life by pouring the mixed resin it into large flat trays where heat can more readily escape.

10. Adding liquid colourants or powder pigments

Bastion Paint Allure Liquid Colourants and Pearlescent Pigments stir in very easily. These can be added at any time. Some other pigment types do not mix in as easily and these should be mixed as follows: Pigment first, add Part A to pigment and mix then add part B and stir. A mixer fitting on a drill can give the required mixing force for difficult to mix pigments. Don't add more than 6% of the total resin mass unless you have tested it.

11. Including rocks, stones and crystals

Wash these and dry them thoroughly. Porous items should be oven dried at 100^{o}C for an hour and cooled before use. For larger items it is a good idea to dip them into mixed liquid resin to pre-coat them prior to pouring the liquid resin over them (this is because poured resin may not get underneath them).

12. Removing air with a propane torch

Torching to remove air shortly after pouring is important if air bubbles are present. Do not hold the torch closer than 8cm from the resin surface as too much torching will burn and discolour the resin. As these resins have a relatively high flow, air is not usually a big problem.

13. Prevent dust contact during curing

Dust and air-born debris are an enemy of all curing resins. Pour and allow to cure in a clean area. We recommend covering your pour with something like a sheet draper over a suspending frame. Do not cover with something that traps fumes or heat.

14. Adding subsequent layers

There is no limit to the number of layers that can be added. The bond between layers will be permanent and invisible. Allow the poured resin layer to cure until hard and for its temperature to reduce to room temperature. Pour the new layer directly onto the dust free cured layer.

- If amine blush develops you must wash with soap and water, sand and wash again. Then allow for proper drying before applying a subsequent layer. Failure to do this will ruin your project. Amine blush can be identified as the surface being cured (hard and resisting finger nail indentation) but feeling tacky. A milky or "oil on water" appearance also indicate that amine blush is present.
- Where inter-layer adhesion is critical you should sand and wash the cured resin surface before pouring a subsequent layer. This applies even if no amine blush has developed.

- After any washing, always make sure that the resin has fully dried before pouring a subsequent layer.

15. Storage

Store in cool area. 23^{O}C is the best storage temperature. Both resin components have an expiry date.

16. Pouring into a mould

Pour mixture into a single spot at the lowest point of the mould or enclosure. Let the mixture seek its level. A uniform pouring flow will help minimise entrapped air.

17. Cleaning spills

- The best chemical to clean small spills effectively is isopropyl alcohol. Rubbing alcohol and some hand sanitisers are fine. Clean spills as soon as possible before curing. Don't clean resin off your hands with these types of solvents; use soap or hand cleaner and water to clean skin.

18. Making a river table or similar item

Watch the following video: https://www.smooth-on.com/tutorials/waterfall-table-epoxacast-690/
Use melamine for the base and sides or box that will hold the resin in place.
Apply 2-3 coats of wax to surfaces that must be released. See section above "Protecting Surfaces".
Mix resin as per mixing instructions.
Pour resin into prepared space. Measure the depth to ensure that no individual layer exceeds the allowed depth.
Torch carefully to remove air if required.
Allow 48 hours (resin must cool to room temperature and become hard) before adding the next layer.
Once the final coat is dry, a series of dry and wet sanding steps can be performed followed by polishing.

19. Useful Parameters

- Shore D Hardness: 90
- Heat Distortion Temperature: 80^{o}C
- Compressive Strength (kg/mm^{2}): 13.4
- Viscosity of Resin (Part A): 1000-2000cps
- Viscosity of Hardener (Part B): 300cps
- Specific Gravity (g/mm^{3}): 1.1

20. How to calculate the amount required

You must use a scale and resin mass. You cannot measure this resin by volume.

For a roughly rectangular shape multiply as follows:
Resin required in kg = Surface length in m x Surface width in m x required resin film thickness in mm x 1.1

For a roughly circular shape multiply as follows:
Resin required in kg = 3.14 x Circle radius in m x Circle radius in m x required resin film thickness in mm x 1.1

Example
If your rectangular surface is 1.2m x 60cm and you require a film thickness of 27mm
Resin required in kg = 1.2m * 0.60m * 27mm * 1.1 = 21.38kg of resin

Now work out how much of Part A and how much of Part B you need to give you the total requirement of 23.76kg
Ratio for this resin is 100A to 33B PBW (PBW = parts by weight).

To get 21.38kg total resin:
kg Part A required = 21.38/133 * 100 = 16.08kg
kg Part B required = 21.38/133 * 33 = 5.30kg

(Note: You must use a Ratio of 100A to 25B PBW when casting 30-50mm thickness.. Then use 125 in place of 133 and 25 in place of 33 in the above calculation.)