Instructions,

Product and

Safety Information

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PLEASE READ THOROUGHLY BEFORE USE

WARNING!

DO NOT TIP THIS PRODUCT INTO THE WATER

IMPORTANT SAFETY DIRECTIONS

Mr Crystal is an alkaline product. Be sure to wear gloves and eye protection.

If skin or eye contact occurs, wash immediately with clean water**.**

Mr Crystal will not give off toxic fumes once mixed.

In powder form, ***Mr Crystal*** may present small amounts of harmful dust.

Handle in well ventilated area in dry form.

Confined spaces can sometimes involved with repairs. It is the responsibility of the user to familiarise themselves with confined space hazards. This information can be sourced from your government Occupational Health & Safety body.

TOXICITY

Mr Crystal is safe for use on concrete structures for potable water and will have

less toxic effect on the water than the concrete itself.

'Mr Crystal Tank Repair Kits' is a registered trademark. ®

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INTRODUCTION

Thank you for purchasing this fine Australian made product.

Used correctly, ***Mr Crystal*** will help you rejuvenate concrete structures for the retention of liquid by the formation of insoluble crystals in the capillary tracts of the concrete. ***Mr Crystal*** has a reputation of being a cost effective, successful product, easily used by landholders and giving vastly superior results in its field.

Mr Crystal can save you thousands of dollars by avoiding costly replacement of structures. Remember, concrete tanks are allowed to weep….but not leak.

CAUSE & EFFECT

Why do concrete structures crack?

Concrete structures are generally designed to crack to find relief from movement. The three contributing movements are: Ground movement, temperature expansion & contraction and loading (eg 10,000 gallons = 45 tonne). Reinforcement is placed in (or around) concrete to *"control, limit & minimise"* cracking from movement.

Like a railway line on a hot day……movement cannot be stopped!

Naturally, cracks will occur at the weakest point of the structure. Weak points will vary with manufacture, location, design, materials and the manner in which a structure is used.

WHY SHOULD A CRYSTAL GROWTH SYSTEM WORK WHERE EVERYTHING ELSE HAS FAILED?

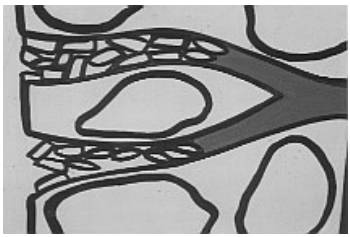
In the past, people have applied a membrane over the crack/s. This can be a render (with or without additives), glues, flexible sealants, fibreglass…..the list goes on. As soon as movement occurs, the membrane will tear, crack or puncture. The first occasion of massive movement usually occurs when you initially put the water back in the structure. (Eg 10,000 gallons = 45 tonne) The successful results attained with a crystal growth system are because it repairs and continues to repair the structure as the structure moves!!

How Mr Crystal works

Mr Crystal is applied to the surface of the concrete. Within concrete are millions of tiny voids**.** ***Mr Crystal*** migrates through these voids by osmosis and capillary action, generating in-soluble crystals as it travels. ***Mr Crystal*** is in fact a catalyst, which causes your existing concrete to grow in-soluble crystals. This means you have a large amount of material in the structure, which can generate in-soluble crystals without adding material that will expand cracks. ***Mr Crystal*** is stimulated by the by-products of your existing concrete and hydration. This means, each time water is present within the substrate**,** ***Mr Crystal*** will activate.

Insoluble crystals grow

into the substrate



How does it protect the reinforcement?

Mr Crystal protects the reo in two ways. Firstly, it protects the reo from the elements by excluding water and air from reo tract. Secondly**,** ***Mr Crystal*** chemically protects the reo by restoring the alkalinity of the substrate thus reducing the acidity of the environment in which the reo is located.

Limitations of the product

Mr Crystal is designed to work on commercial grade concrete that has basic structural integrity. To achieve success with this method, you must ensure that, structure is made of concrete containing building cement (commonly known as Portland cement). Movement must be controlled by adequate foundations and reinforcement and finally the structure must be treated according to the enclosed directions for use. Tips for controlling movement are contained in this booklet.

TALL TANK TALES - WHAD'YA RECKON?

We have heard it all! We have tried all "worthy of consideration" methods in formal controlled conditions. Most people start their tank stories with ***"I reckon"!!!!!!!***

I reckon throwin' cement in the water is the go!

When hydrated, raw cement attaches itself to other particles. As it cures, these attached particles, form into a permanent unified bond. However, when cement is thrown into solution, each tiny particle has a chemical reaction all by itself with **"nothing whatsoever"** to attach with. The result…...dust…..mud…..contaminated water. Fire ash, baby powder, flour or pepper have the same result. Better kept for the baby or the stew!

I reckon I'll pour a new floor in the tank and be done with it!

Concrete cracks to find relief from movement. Of course, it will crack at the weakest point. Obviously, the weakest point will be where the existing cracks are. It is guaranteed to crack in the same place! **Save your time and money.**

Well, I reckon' I'll pour a real thick floor in it!

Whether 1mm or 1 metre thick, concrete will crack at the weakest point (see above). **Save even more of your time and more of your money.**

I reckon the blokes stopped for lunch halfway through the pour!

Maybe they did. But, why tanks often crack at the "halfway" point is because that is where the maximum point of leverage occurs. (Break a stick over your knee and it will break near halfway even if you move it more to one side)

I reckon there has never been a decent concrete tank made!

After the first world war, to create employment for returned soldiers, grants were made to build town water supplies in rural towns. These concrete tanks have successfully supplied thousands of townships with cool clean water. Despite cracks and dribbles, they continue to give excellent service with a little well designed maintenance. **Concrete is an excellent choice** for: design life, water quality, fire resistance, heat & light exclusion, robustness.

I reckon I'll purchase a new tank!

Most concrete tanks & troughs can be easily & cheaply rehabilitated making them fit for purpose. **You have already purchased a tank.** Save thousands on replacement. Most township water supplies are around 85 years old!!!

Remember: Unstressed concrete is designed to crack.

DIRECTIONS FOR USE

Description

A cement based waterproofing compound that chemically reacts with moist cement substrates forming insoluble crystals within that substrate thus waterproofing the concrete yet still allowing the surface to breathe.

Coverage

1 Kilogram will treat 4.5 metres of crack or 10m/2 of porous surface.

Surface Preparation

Because Mr Crystal has a chemical reaction with the concrete, it is important that it is in direct contact with it. Surfaces to be free from grease, oil, efflorescence and other contaminants. Also, concrete is like a big hard sponge….we want this chemistry to migrate into it, therefore we must take care not to polish the surface such as with a wire wheel. With tanks and troughs you can use a scraper or shovel, a chipping hammer, angle grinder or pressure cleaner. With a grinder, remember, you are not trying to cut concrete…. just "bullying" the contaminants off the surface. Structure to be repaired **must have basic structural integrity**. Clean out and patch cracks larger than .5mm thick with a sand and cement render*. Wet down thoroughly the surface to be coated immediately prior to application.

**3 parts sand & 1 part cement is cheap to use and will crack in a hairline which Mr Crystal can then repair.*

Temperature

For "easiest" results, apply ***Mr Crystal*** when temperature is between 10C – 25C.

Mixing

Mix only the amount that can be used in a few minutes. Mix with water and bring to a thick paste. Mix thoroughly and add water or product to bring the mixture to a thick creamy, yet just paintable consistency. The final ratio should be about 1kg powder to 375 mls. water. (This can vary widely with your conditions & situation so always mix a small test batch first).

Application

Mr Crystal to be applied to wetted concrete (splash some water on the crack as you go). Apply a strip of mixture 60mm wide with the enclosed brush directly over the crack, working the mixture well into voids. You may notice that the first coat appears patchy. As this first coat begins to go tacky, apply a second coat. The "tacky" first coat will "grab" the second coat enabling you to build the mixture up to a total of 6mm thick. Don't be alarmed if a little washes off….it is not a membrane. Provided the intact material receives a little moisture crystal growth will start to occur. You will start to see results in the 3-7 day period. It takes up to 21 days to achieve full potential.

Where to apply Mr Crystal

Mr Crystal can be applied over or adjacent to cracks, suspected weak points, cold joints, porous surfaces, around fittings. ***Mr Crystal*** can be applied to either side of the face of the concrete. ***Mr Crystal*** migrates through the voids in the concrete and will migrate usefully up to 400mm from the point of application. The resultant crystal growth is the waterproofing effect of this product. The raw product itself is not waterproof (in fact, it is highly absorptive by design).

When applying ***Mr Crystal*** where there is flowing water, remember not to be too concerned that some product may wash off. It is important to focus on the intact material (that hasn't washed off) to ensure that it is correctly applied, cured and stimulated. Allow some time for crystal growth to occur (a few days) then apply some more if needed.

Tip:

If the water is running down a vertical crack and washing the material off, try this. Find the exact point of the leak and apply a sharp crack with a hammer. This will compress material into the leak to temporarily reduce the flow during application. Even a sideways (25deg.) scratch will take the water to the side, thus running down beside the crack.

Curing

Protect the surface from rain or frost during initial cure. (Aprox 2-3 hours). Water cure the treated surface by mist spraying with water 3-4 times daily for 3 days if you wish to hasten the crystal growth. This is helpful on structures that are not intended to hold water. (Eg. Concrete silo bases) In the case of tanks, troughs etc. simply putting some water back in will provide adequate hydration. Even 20 litres of water added to an empty tank with lid replaced will provide a good humid environment to hasten crystal growth.

Tip: On a sunny or hot outside wall, draping a wet bag over your work will help accelerate crystal growth. Kitchen cling wrap is also helpful.

When can I replace the water?

If working on the inside of the tank, you will need to wait for the product to have an initial set. Times will vary with temperature however 4 hours is usually adequate. We suggest that you don't focus a pressure pump stream on your new work in the 1st day as it may wash it off. Eg . Let the water trickle in.

Controlling Movement

In order to ensure success of your remedial repairs it is imperative that your tank/trough/pit has basic structural integrity.

Excessive movement from foundation, load and temperature fluctuation are the primary causes of cracking. Minimising this movement will contribute to restoring your structure as "fit for purpose". Some options to reduce movement if needed are:

Banding

External reinforcement is placed around the structure at key locations to assist (or take over) from inadequate or decayed reinforcement.

Generally for tanks up to 75,000 litres (15000 gallons) the addition of two hoops of high tensile deformed bar will be adequate if placed around the tank under tension. This is cost effective and can be done with ease with two people. See diagram. **Do not** use cable...it is too elastic!

Method

Purchase N12 bar (or similar) in 6m lengths. Join by welding to achieve correct circumference of tank (2x36mm welds at joins). Weld short length of chain to each end. Wrap around tank, hold together with chain dogs. Using two chain dogs (double dogging), tension bands as much as possible prior to welding band ends together.

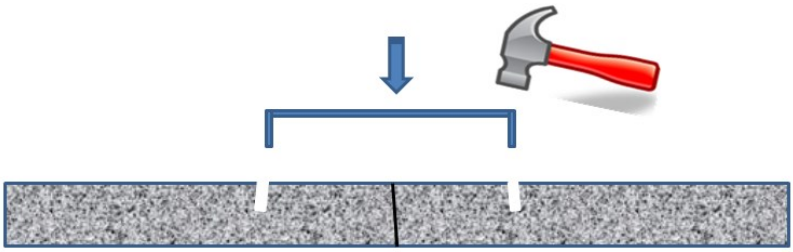
Bands placed at near floor level and just above halfway mark

Stapling

In some cases it will suit better to staple rather than band. Eg. Troughs, oblong structures or where there is poor access for banding. Staples can easily be made from steel rod (suggest N12 high tensile) and placed over cracks into holes drilled into the substrate either side of crack.

Method

Cut 12mm bar into 200mm lengths. Bend 30mm at each end to 90 degrees. Drill corresponding holes into structure at slight angle away from crack. Hammer staple in. Render over (filling holes). Angled holes will have a tensioning effect on the bar.



Underpinning

It is important that your structure is well founded. Ideally it will be on a base of compacted crushed rock. If the base has eroded or washed out, it is suggested that you reinstate the missing portion by forcing additional material under the structure. This is known as underpinning. When you have achieved this, it is recommended that the new material is held in by retaining boards, larger rocks or stabilised crushed rock (weak-mix concrete) to prevent washing.

Be sure to call us if you have any questions.

Note: If your structure is moving at a greater rate of speed than this product can generate insoluable crystals, it will of course, be unable to catch the leak. This may present as little or no result or slower results at the extremes of movement. Remember: There is no known product that will defy the laws of physics!

What to expect

This clever chemistry will start to seal your structure with results becoming noticeable at around 7 days. At the extremes of movement you may notice increased leakage which again and again will start to reduce as the chemistry reactivates. It does take 21 days of hydration to reach its potential each time.

This is a product & methodology. Whilst we can exactly quantify the "product" capability, we are unable to make accurate representation of your structure, its use or in how the product is applied. If your structure moves at a greater rate of speed than crystals can grow, of course it will not be able to catch it. This will depend on location, base material, type of use, concrete quality, reo size, reo location, reo quantity and reo degradation. Referring to the section controlling movement may help you save a very expensive replacement of the tank.

If you elect to add bands later, you should not need to re-apply the product.

Finally, like township water supplies, despite incidental weeps and dribbles , your tank should give you excellent service for up to 60 years once the reo is protected or reinstated. We are unaware of any other structure that will offer this excellent service and encourage you not to replace with a lesser structure.

Where to now!

You are using the most technologically advanced method of repairing concrete structures for the retention of liquid. We know that you can save literally thousands of dollars by avoiding replacement of your tanks and troughs by using ***Mr Crystal.*** Even badly deteriorated structures can be restored to a "usable" , if not perfect condition. We trust that you will enjoy the results and benefits of this system. Please let us know if you have any questions or concerns by contacting us on 0418 559160.

To re-order

- ***Always try your local rural merchandise store first***.
- Check www.crystalfix.com.au ***for nearest stockist***.

Packaging

To minimise the chance of spoilage and increase shelf life, ***Mr Crystal*** Tank Repair kits are **only** packaged in 4 kilogram mini packs. As a guide, 4 Kgs treats 1 X 10,000 gallon or 18m of crack or 40M/2 of porous surface area.

Mr Crystal Tank Repair Kits have an excellent shelf life (min 5 years) kept dry.

Summary

You are using an acclaimed and proven product & methodology.

Whilst we can quantify exactly how this product will perform, and suggest methodology taken from years of experience, your results may depend on some other factors beyond our control such as:

- Foundations and soil conditions
- Tank location eg. sun/shade/trees
- Original cement content & placement methods
- Reinforcement content, location and degradation
- Your preparation and application techniques

This product is well proven as the easiest and most cost effective way of making your concrete structures "fit for purpose". Incidental cracking small water loss from time to time is a normal part of concrete structures for the retention of liquids (AS3735). We hope you can avoid the necessity of replacing your tank with a lesser option.

We understand that you may have been frustrated in the past by numerous experiences and attempts at fixing your concrete structures. We hope that you can see past those experiences and enjoy the benefits of having a sound concrete structure that is fit for the purpose and importantly that you have already paid your hard earned money for. In most cases, concrete tanks today have already outlasted all other common forms of water storage.

For more info visit

www.crystalfix.com.au

Phone (03) 5448 8680

EASY PROFESSIONAL CONCRETE REPAIR

CRYSTALFIX

MR CRYSTAL TANK REPAIR KIT®

Fix it now BEFORE the Reo rusts!!!!

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