

Beequip Strips Oxalic Acid Glycerine

A guide to safe mixing and soaking

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OA & Varroa!



Beequip^{NZ}TM

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Overview

Congratulations on your decision to use cardboard Beequip Strips.

These cardboard strips are an excellent vector (carrier) for numerous different substances. A common application is to soak the strips in an Oxalic Acid / Glycerine solution. It is very important to consider one's own safety and the safety of others who may be involved.

Safety with Oxalic Acid

When handling Oxalic Acid, the minimum protective equipment required is Nitrile gloves, clothing with full length legs and sleeves and most important of all, eye protection, which should be in the form of Goggles that will protect your eyes from splashes of the Oxalic Acid. A face shield as well as goggles is recommended.

Any skin contact should be washed off immediately with water. Always keep a bottle of water handy. Alternatively, a water hose with a shut off valve at the operator end is ideal and highly recommended. Refer to your Material Safety Data Sheet for emergency procedures in case of eye contact. A clean water flush is required, followed by immediate medical intervention.

Transportation

Oxalic Acid Dihydrate is not classified as dangerous goods for transportation purposes in NZ.

Food Grade Glycerine

Glycerine is a harmless substance. However, in solution with Oxalic Acid, it may help Oxalic Acid to penetrate your skin and enter your blood stream. In excessive amounts, this is dangerous to your health.

It is important to use nitrile or rubber gloves when handling Oxalic Acid / Glycerine treated strips during processing and when handling them thereafter.

Mixing Ratios

The popular preference is a mix ratio of 40% Oxalic Acid (OA) and 60% Glycerine **by weight**:

Ratio Table for Mixing (Oxalic Acid in Round Numbers)					Ratio Table for Mixing (Glycerine in Round Numbers)				
OA	Glycerine	Total kg	In litres	Max Qty. of Strips it could soak. (@23.7g ea.)	Glycerine	OA	Total kg	In Litres	Max Qty. of Strips it could soak. (@23.7g ea.)
1	1.5	2.5	1.9	105	1	0.67	1.67	1.27	70
2	3	5	3.8	210	3	2.00	5.00	3.80	211
3	4.5	7.5	5.7	316	5	3.33	8.33	6.33	352
4	6	10	7.6	421	10	6.67	16.67	12.67	703
5	7.5	12.5	9.5	527	15	10.00	25.00	19.00	1055
10	15	25	19	1054	18	12.00	30.00	22.80	1266
10.6	15.9	26.5	20.14	1118	20	13.33	33.33	25.33	1406
15	22.5	37.5	28.5	1582	25	16.67	41.67	31.67	1758
20	30	50	38	2109	50	33.33	83.33	63.33	3516
25	37.5	62.5	47.5	2637	75	50.00	125.00	95.00	5274
50	75	125	95	5274	100	66.67	166.67	126.67	7032
75	112.5	187.5	142.5	7911	250	166.67	416.67	316.67	17581
100	150	250	190	10548	750	500	1250	950	52742
1000	1500	2500	1900	105485	1250	833	2083	1583	87890

Mixing and Soaking Equipment

The Glycerine must be heated before it will mix properly with Oxalic Acid. Only use a robust and stable heating device to heat an Oxalic Acid / Glycerine Solution. Ensure there is adequate ventilation. Containers made from Stainless Steel or Copper are the only practical containers recommended. Do not use aluminium.

When mixed, 1 litre = 1.32kg
Or, 1 kg of solution is 0.76 litre.

Stainless Jacket Heating Tank

Beequip NZ supply 304 grade stainless steel tanks with a water jacket to heat the contents. This is a very safe and efficient way to heat the solution and to control the temperature with the thermostat. This tank has 70 litre capacity and uses a 230 volt, 2kw element.



Product code: **750-0659**

Beequip Strips

Each dry cardboard strip (390mm long x 30mm wide) weighs 11 grams. Store the dry cardboard strips in a dry place to prevent them soaking up moisture from the atmosphere.

The total weight of solution required per soaked strip will be close to 23 grams. That equates to 13.8g of Glycerine and 9.2g of Oxalic Acid. Use these numbers to calculate requirements. Allow some extra product for the soaking process. See page 4. A properly soaked cardboard strip should weigh between 34 & 35 grams. More than twice as much solution is required in the first instance to properly soak the strips in the tubs. The excess is then removed and can be used for the next soak. At time of printing, the strips were packed in bundles of 80 & 86. That number can end up a bit tight in the rack when fully soaked so we suggest doing 80 per slot in the rack. 80 strips will measure approx. 92mm thick before soaking.

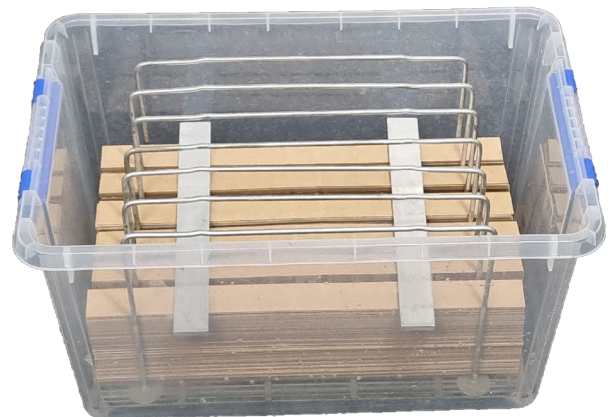


Product code: **751-0030**

Bin with Stainless Steel Rack.

Beequip NZ supply 27 litre bins with stainless steel racks that are ideal for soaking 480 strips. (Six stacks of 80) They also make it easy to drain off excess solution from the strips.

The racks are supplied to suit the 30mm wide Beequip cardboard strips as standard but can easily be adjusted to suit other sizes of strip.



Product code: **751-0005**

This shows 6 bundles of 80 dry strips (480 total) in position with the Aluminium bars over top.

Instructions for Mixing and Soaking

1. Fill outer jacket of tank till water shows approx. $\frac{3}{4}$ up the sight tube. Turn on and set thermostat to 90 degrees and start heating the water in the jacket.
2. Pour 37.5kg of Glycerine into the SS tank and heat to 70 degrees C.
3. Pour in 25 kg of oxalic acid crystals. The temperature will immediately drop below 40. Set thermostat to 60 degrees C and stir every 15-30 minutes till mixed. A piece of timber dressed to around 70mm x 20mm makes an excellent stirrer and lump squasher. A BBQ thermometer is also recommended, hanging from the side as shown in the photo. Do not let the Oxalic Acid go over 60 degrees C. The chemistry starts to change.
4. After approx. 3.5 hours, the solution should be mixed and have reached the temperature of 53 degrees. It will look clear, and you can clearly see the stainless-steel base of the tank. Use a BBQ thermometer to check the accuracy of the thermostat dial.
5. Alternative Option. At 5pm, add 37.5kg of Glycerine and 25kg of Oxalic Acid to the tank and set thermostat to 56° C. At 7am, stir it every 15min. At 8am it will be mixed.
6. Pour 0.5 litre of solution out of the tank outlet valve into a jug. There is likely to be OA crystals sitting in the line, not properly mixed. Pour into the tank and stir. The solution is now ready to use.
7. Set up a Beequip Soaker Bin as shown on page 3. To stop the strips floating, they will need to be held down in the solution. 2 strips of timber approx. 380mm long with section size around 75mm x 20mm work very well. Lay them in the 2 outer slots and add a flat board over top at 90 degrees as shown in the photo on page 5. Add a weight on top of approx. 2 kg.
8. The outlet valve has a 1" BSP thread. It is beneficial to fit a 90-degree elbow for better control but not essential. Any irrigation shop will have this part. Pour the solution into the tub until it is approx. 24mm from top edge. That will equate to approx. 26.5 kg of solution. The photo on page 5 shows the floating strips.
9. Only use hot solution to soak the strips to ensure maximum intake. Keep the Soak bin in a warm area, away from cold drafts. The strips will soak up max solution in 24 hours. The photo at the bottom left of page 5 shows strips after soaking for 21 hours: nearly at the top of the rack. Drain off the excess solution into a 20-litre honey pail. There will be approx. 14.6 kg.
10. Pack 80 strips into a bag. It should be very close to 2.72kg. Seal the bag but allow room for the strips to continue to swell and absorb solution over the next 5 days. The strips are now ready to use or can be stored in sealed bags for 12 months. Keep out of sunlight. Tip: - Store 10 bags per banana box.



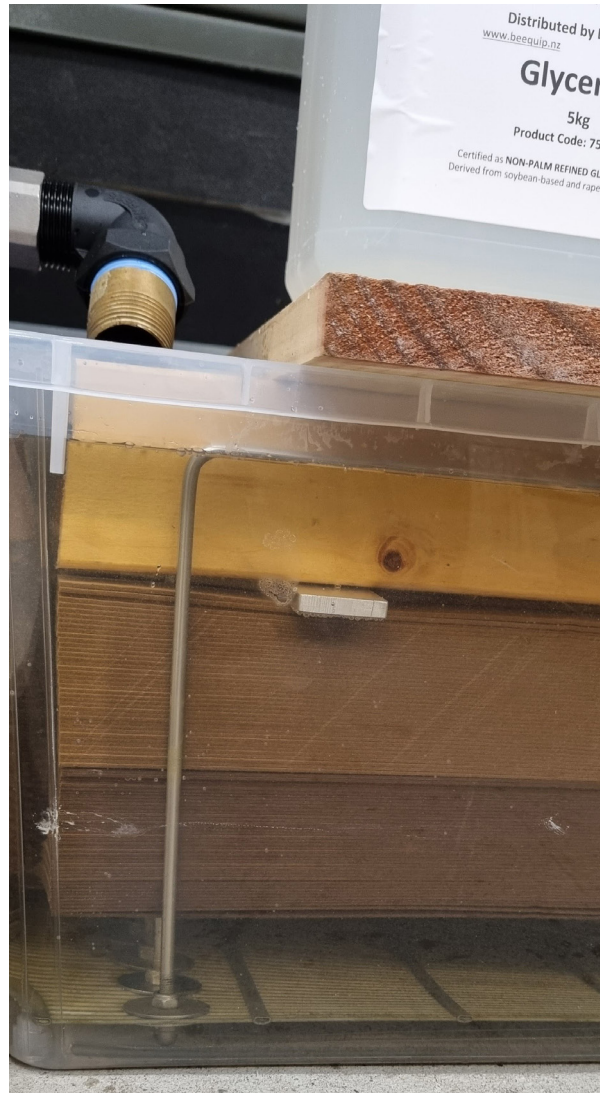
NB. Leftover solution should always be heated and stirred carefully before soaking more strips. When left in storage, after a few days, the Oxalic Acid (OA) will start to settle out of solution and go to the bottom. Ensure it is all used to retain the correct 40% strength. A full batch as stated above, will make 62.5kg of solution. After soaking 2 batches of strips (960), there will be approx. 38.7kg of solution left over.



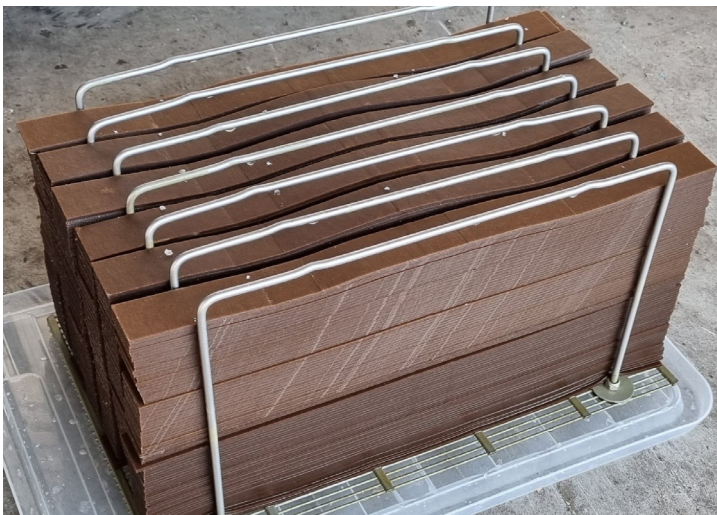
As shown above, 37.5kg (1.5 Jerry Cans) of Glycerine works great with a 25kg bag of Oxalic Acid as a starting point.



The solution will look like this as you mix it up in step 3.



As explained in step 7, your setup should look similar when soaking the strips in the tub.



Strips finished soaking and ready to go.

Mixing and Soaking in small batches

The 4 litre Pail Package

This is recommended for soaking a small number of Beequip Strips in a safe and economical manner.

Includes: -

- 13 litre soak tub and lid
- 4-litre pail and lid
- 3kg Glycerine
- 2kg Oxalic Acid (OA)
- 2 bundles of 86 Beequip Strips. (172 total)
- Digital thermometer
- Wooden trivet & stirrer
- 3 Wooden blocks for draining the strips
- Instruction booklet



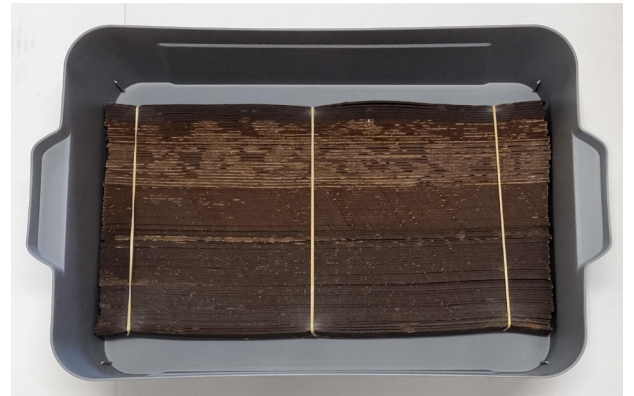
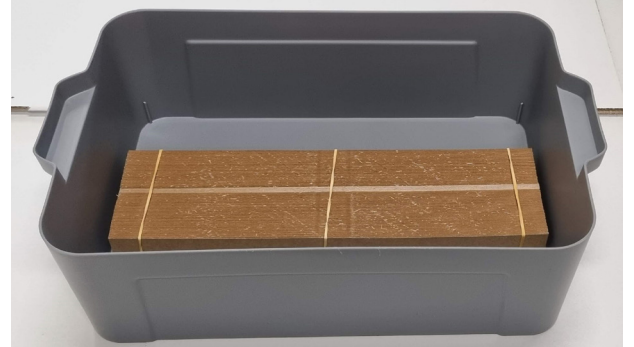
Product code **751-0004**

Procedure to soak 86 Beequip Strips

1. Read all safety instructions on previous pages.
2. Locate a pot with 20cm inner diameter. (Min)
3. Add 1.5kg of Glycerine to pail & 1kg of OA.
4. Add Trivet to pot and place pail on top.
5. Pour water into pot until it reaches similar level to the contents of the pail. Heat on medium.
6. Secure thermometer to side of pail.
7. Stir contents continuously and watch temp.
8. As soon as the water starts to simmer, turn to low heat.
9. When the temp reaches 55°C, the solution should be mixed and will go clear.

Do not let the solution go above 60°C. Remove pail from the pot if necessary to stop it getting too hot.

10. Remove and wash the thermometer probe in water when finished heating
11. Pour the hot solution over a bundle of 86 strips as shown in the photo with 3 rubber bands.
12. Within approx. 24 hours each strip will soak up between 23 & 24g of solution and will double in thickness. See photo on lower right.
13. With Nitrile gloves, remove the strips and place on the bottom side of the tub lid.
14. Pour the excess solution from the tub into pail.
15. Add the 3 drain blocks to tub & refit strips.
16. Allow the strips to drain for 24 hours minimum.
17. Pour off the excess into pail. You will end up with approx. 0.5kg (or 380ml) of excess solution in the pail that can be heated, stirred, and used next time.
18. Keep the lid on the tub. It can now be transported to apiary sites and the strips added to beehives.



Using the Strips

Handling the Strips

A bag of 80 strips is very convenient to carry around the apiary sites. Alternatively, use a 25-litre bin from M10 to store the strips needed for the day. It fits nicely inside a full depth box and can hold 6 layers of 80 strips if placed slightly curved on their edge.

When handling soaked strips, always wear nitrile or rubber gloves; there are no exceptions to this rule.

Failure to adhere to this safety rule will result in skin damage.

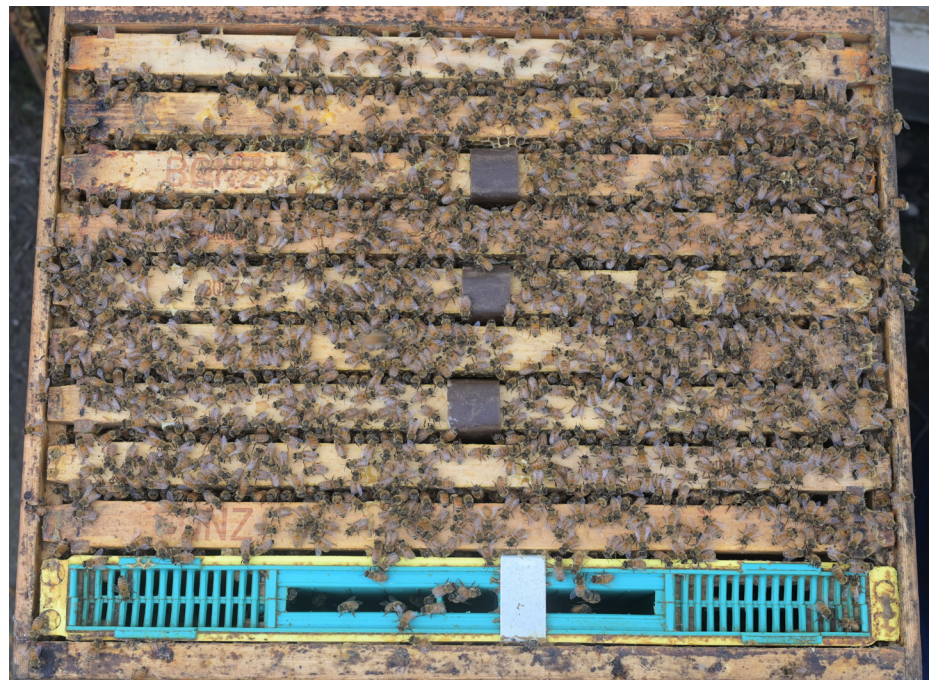


Placing the Beequip Strips

The strips are creased in 2 places near the middle of the strip. Fold them sharply at 90 degrees on the crease lines and then they hang vertically from the top bar of a frame. There are many opinions of where to place the strips in a brood box, but there are a few important rules.

1. The strips must be located near the brood.
2. The strips must be where the bees will walk on them.
3. The strips need to be at brood temperature (32–36°C) for the Glycerine to act effectively as the carrier. As the solution on the surface gets used up, more solution must be able to flow out to the surface. If the strip is too cold, it will not flow and becomes ineffective. In the hot summer months, the strips can be near the end of the frame on the edge of the brood, if there are plenty of bees to walk on it.
4. At 6 weeks, most of the useable OA will have been used up and the efficacy of the strips will greatly reduce. These strips can still be left in the hive until you replace them.
5. Generally, the bees will start to chew the strips after a couple of weeks. That is an advantage, but it varies from hive to hive. To chew up a strip completely, it usually takes over 6 weeks. The bees don't have to chew the strips for them to be effective.

A single brood box full of bees would receive 3 strips placed over brood frames and if there is a second brood box above, it would receive 2 to 3 strips. Variations can be applied as the operator sees fit. A full depth box with 8 frames of brood should have 4 strips.



Example of 3 strips in a brood box with the most effective location.



Example of a strip on a brood frame after 5 weeks. Located toward end of frame in summer months.

For the best long-term results, the strips should be replaced every 6 to 9 weeks. If re-invasion from other colonies is an issue, (it can be very severe in Autumn), do not go longer than 6 weeks.

Winter Use

If your colonies have a brood break in winter, it is better to do an Oxalic Acid vaporization treatment just before they go into a tight cluster, than use the strips. If there is always brood present, use 1 or 2 strips. A vented base is recommended.

Shelf Life

The strips will last many years in their dry form, providing they are kept dry. When soaked, they have a minimum shelf life of 12 months in a sealed bag and minimum of 5 months if stored in a semi-sealed container like the soak bin. Keep in cool place out of sunlight.

If you are in any doubt about any aspect of these guidelines, please email queries to info@beequip.nz and leave a cellphone number.

Happy Beekeeping!

This strip has been in a hive for 8 weeks.

