

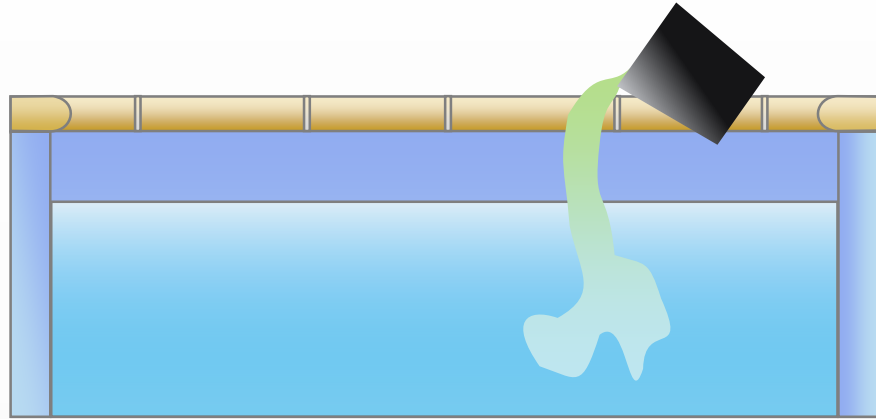
# Who Killed the Cover

A Chemical Guide  
19/02/2018 v2 daft

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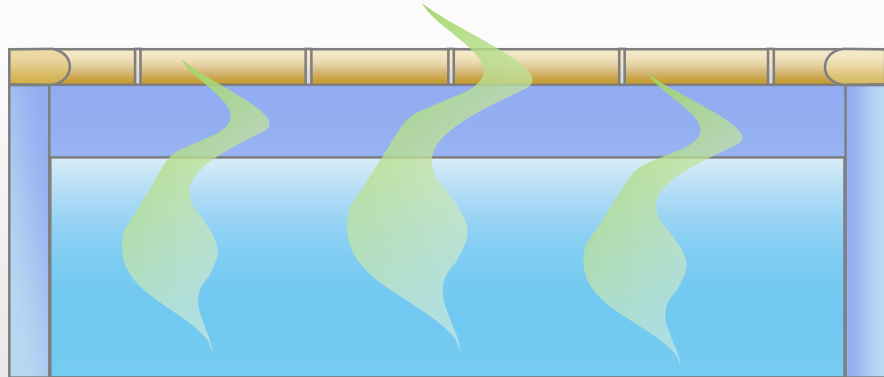
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# Chemical Degradation



When shock dosing a pool, the sanitiser levels are elevated from the normal 2 to 4ppm (parts per million) to as high as 10ppm or even up to 30ppm when removing algae blooms.

The increase in sanitiser burns off foreign matter in the pool and allows the by-products such as chloramines to gas out of the pool.



As a result active sanitizer levels in the pool quickly return to balance.

However, when a pool cover is left on during a shock dosing, the cover is exposed to the intense levels of the oxidant as well as trapping the by-products under the cover reducing the efficiency of the chemical treatment.



When the pool is outside of the industry recognised balance or when shock dosing the pool, it is important to remove the cover and only return it to the pool once oxidiser levels have stabilised.

# Ideal Chemical Levels for a Domestic Pool

## Chemical Balance Summary

Substance	Ideal Range
Salt	2500-4000
Stabiliser	depends on chlorine demand and type
Free Chlorine	2.0-4.0ppm
Combined Chlorine	<0.2ppm
Total Chlorine	$TC = FC + CC$
Total bromine	4.0-6.0
pH	7.2 -7.8pH
Total Alkalinity	80-120ppm
Calcium Hardness	150 -400ppm
Total Dissolved solids	<2000ppm
Phosphate	as little as possible
Heavy Metals	as little as possible

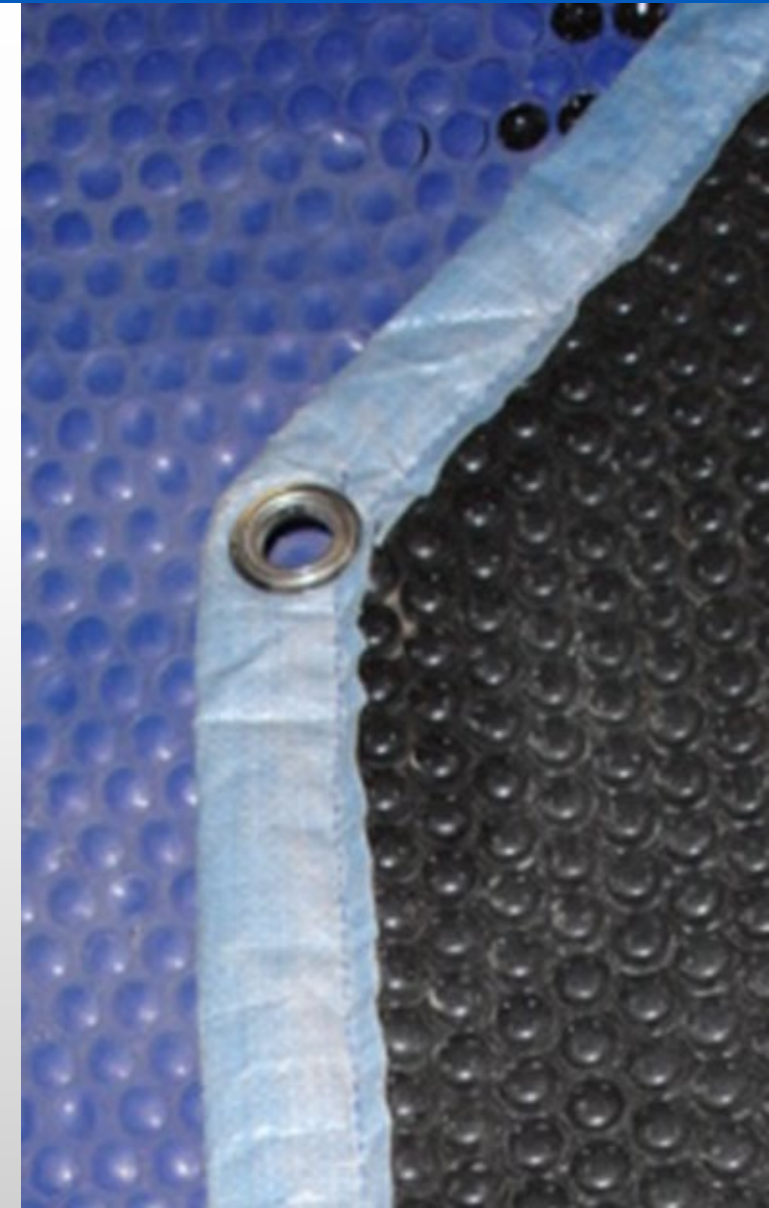
99% of most cover issues could have been avoided with appropriate chemical regulation.

A cover should always be removed when shock dosing and when the chemicals come out of balance.

This ensures the cover will meet or even exceed its expected lifespan as well as ensuring the health of users, longevity of the lining, pipes and fitting of the pool.

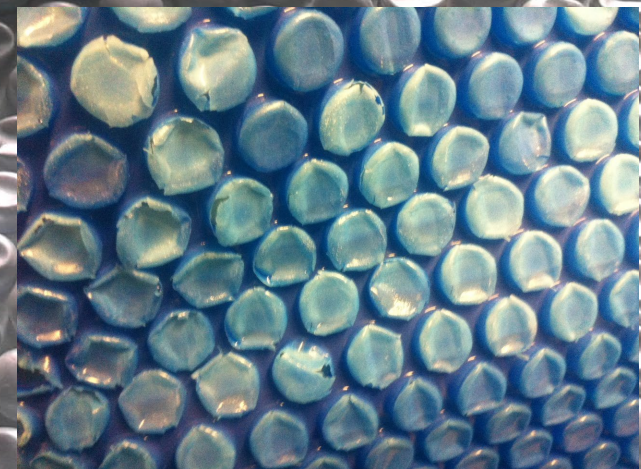
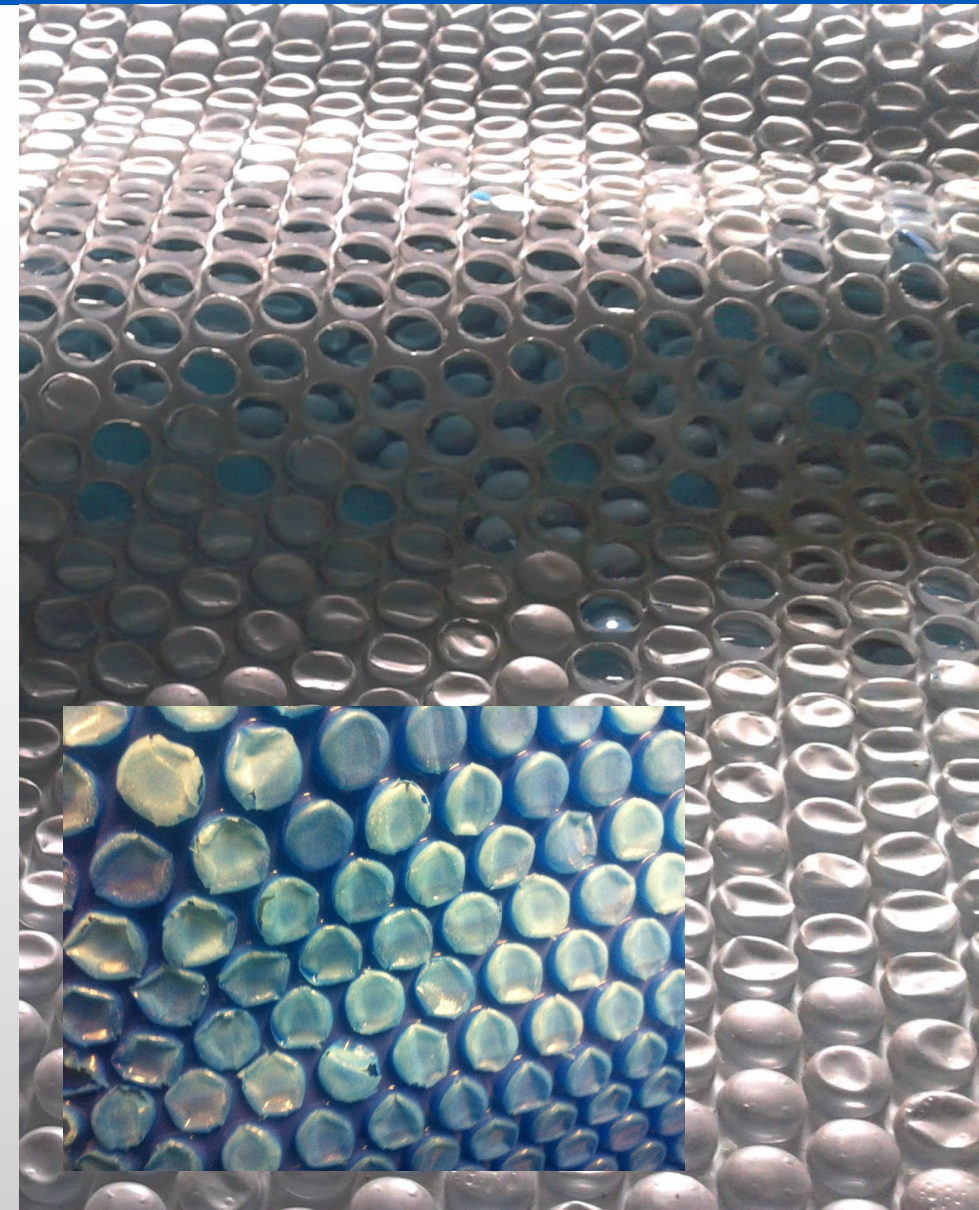
# Chemical Degradation

- Many automatic dosing systems and salt water chlorinators work by releasing or creating a set amount of chlorine and a set rate.
- When a new cover is placed onto such a system, it is important to monitor the water balance and adjust for the savings the cover provides.
- When placed on a pool a cover will prevent debris, reduce chemical photolysis and in some cases inhibit algae growth. These factors reduce the chemical demands of the pool.
- As a result, if not adjusted for the covers savings, the pool's chemical levels can inadvertently elevate.
- By monitoring the pool for a few days it is possible to reduce the chemical demand of the pool while ensuring the performance of the cover.



# Chemical Degradation

- Most issues involving premature degradation are the result of elevated chemical levels within the pool.
- Frequently, a sudden deterioration of the cover can be the result of a shock treatment.
- Noticeable effects:
  - Bleaching of the underside of the cover.
  - Bleaching of the hemming/edge.
  - Material has turned brittle - in particular on the bubble layer.
  - High residue amounts on the cover.
  - Oxidation of eyelets.
  - Strong chlorine smell.



# Overheating on the Reel System

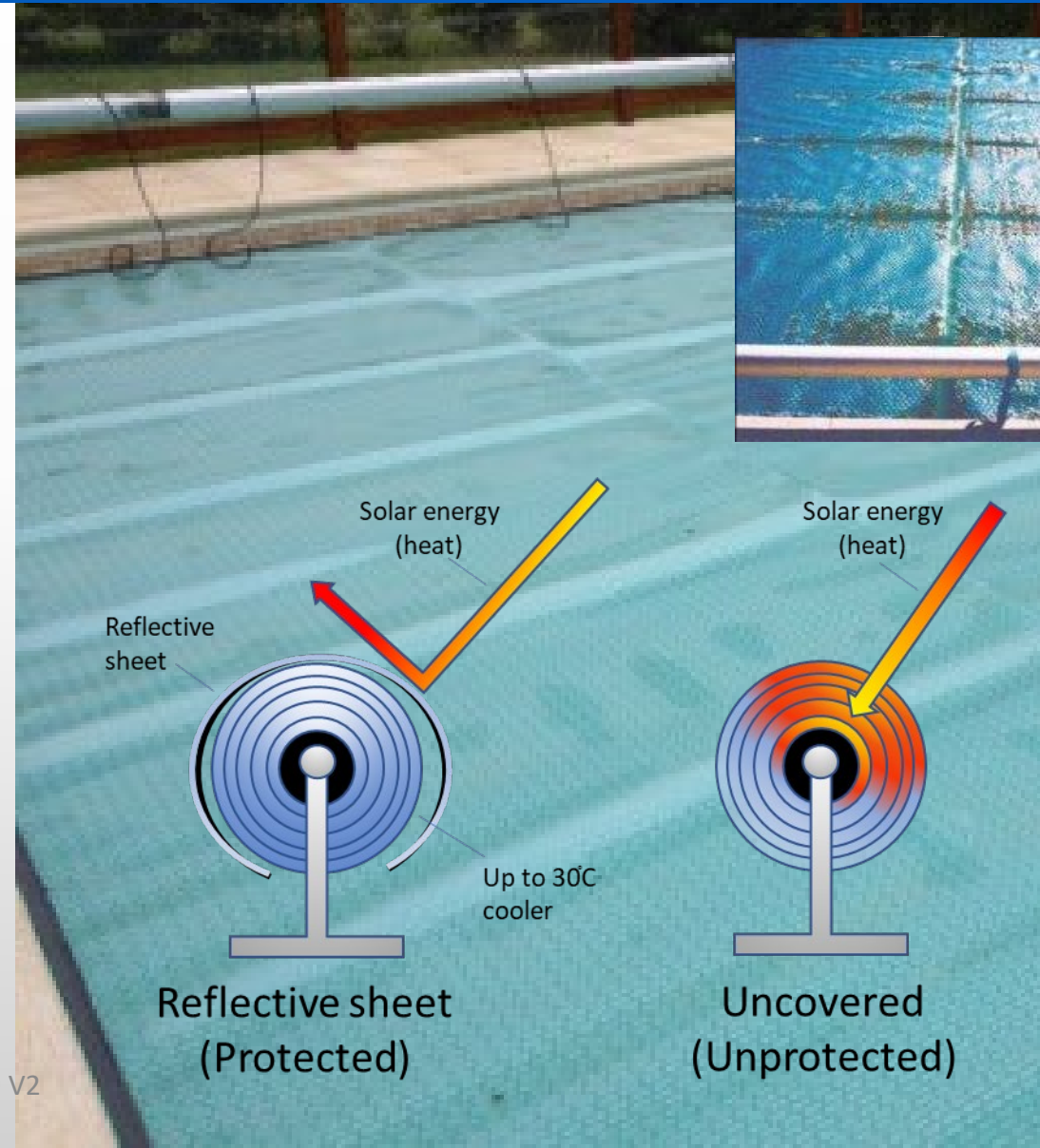
A sadly common issue of improper storage can be identified by the bands of poor lay flat occurring across the pool.

Usually these bands increase in frequency as they get closer to the reel system, or the folding edges when fan folded. This occurs when the cover is stored in direct sunlight for a prolonged period of time.

Bubble Covers (solar blankets) are designed to heat the water and insulate the pool to keep the heat in. When exposed on the reel system, this results in a rapid elevation in temperature at the centre of the roll. Tests conducted found temperatures of up to 80°C.

PE (polyethylene) is a thermoplastic which means it becomes malleable as the cover reaches its Vicat softening point. As the cover cools, the material sets to the shape of the reel and results in poor lay flat.

In extreme cases the covers can even oxidise or weld the layers of material together.



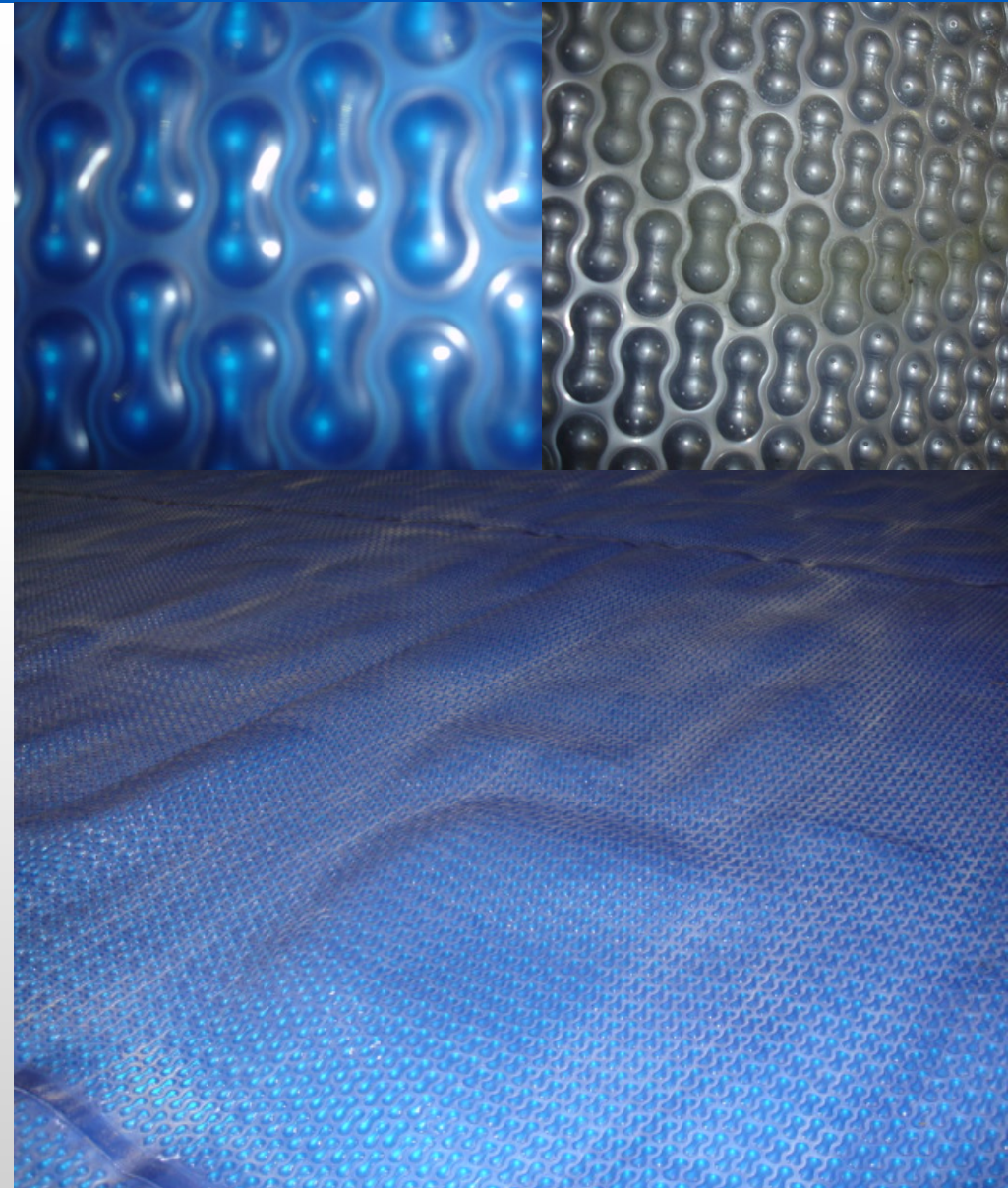
# Bubble Expansion

Bubble swell is a rare cause for complaint and is often mistaken for shrinkage.

Although it is not entirely clear what exact conditions produce this effect, key factors seem to be atmospheric pressure, pool temperature and chemical levels.

Features may include:

- The bubble will resist compression.
- The cover material will have the appearance of lumps in random patches of the cover.



# Bleached pigment

When a cover has been bleached, this is the result of high chemical level and is often exacerbated by high temperatures such as on a hot tub.

The first indication of chemical degradation will be the bubbles on the underside of the cover.

Bleaching of the cover will normally be noticed once the bubble layer has started to become brittle and crack easily.

In extreme cases like in this image the cover has been used on a hot tub and the combination of high chemical levels and higher temperatures have resulted in a dramatic change in the cover's appearance and properties.



# Shrinking Cover

Shrinkage of the cover can happen and is usually exaggerated by bubble swell.

Shrinkage is the result of the polymer in the material releasing stress as it gains molecular mobility.

As the material heats up the polymer gains the ability to release any stresses held within the material.

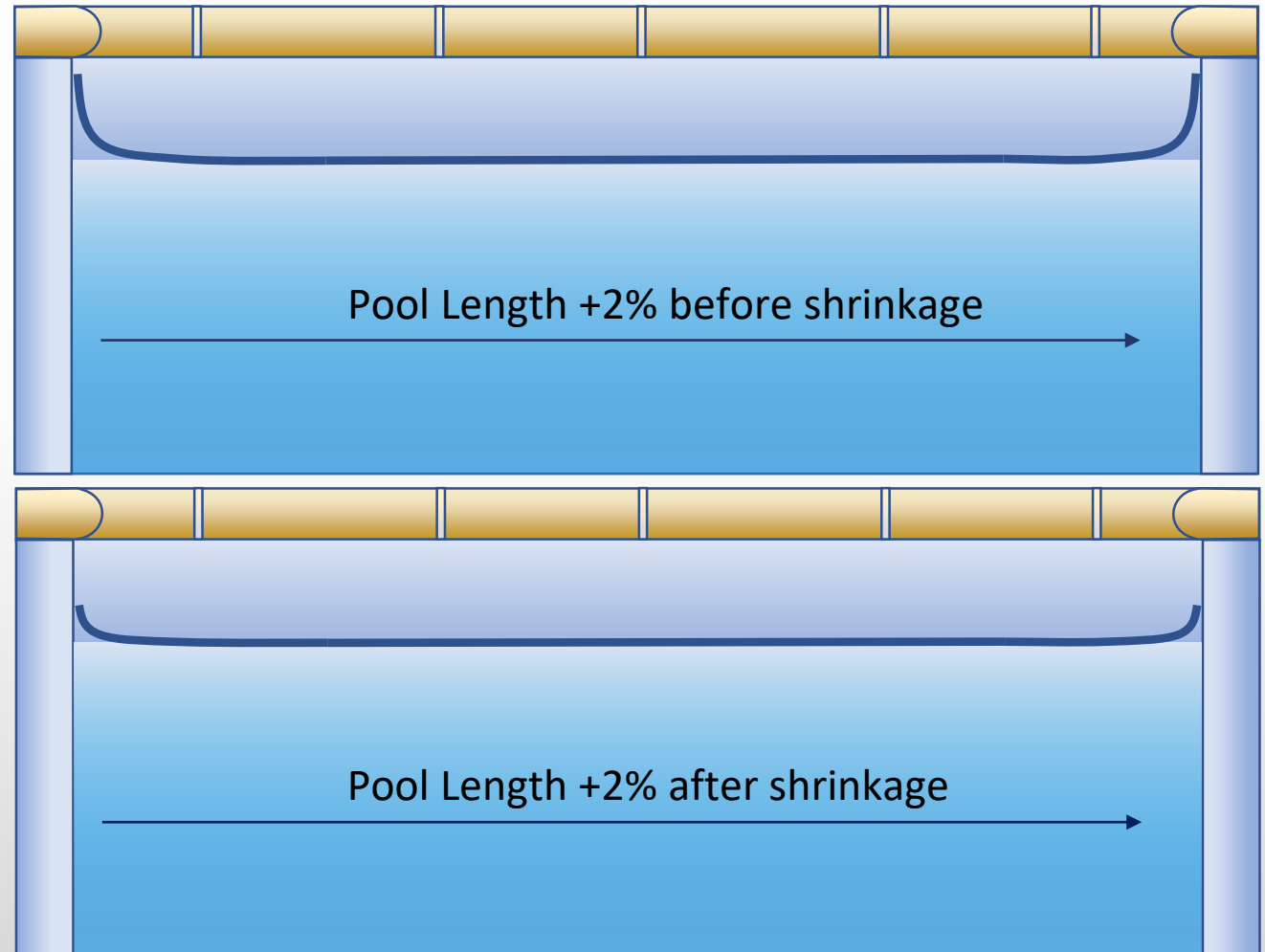


# Shrinking Cover

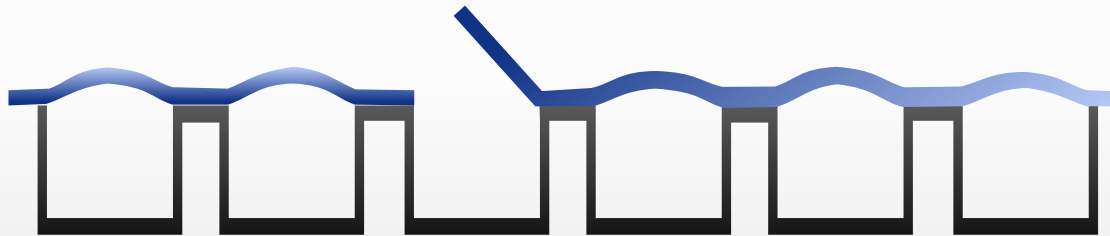
As a result of this Plastipack aims to remove as much stress from the material as possible. Because of this, should shrinkage be triggered, the material should only shrink between 1% and 2% of its total length.

While we endeavour to prevent as much tension as possible it is not possible to eliminate all tensions from the production process.

It has become a common part of industry's best practice to oversize the cover by 2% in its length to allow for a small amount of shrinkage as the cover settles on the pool.



# Top Hating



Top hatting is where the flat top surface of the cover starts to come away from the material around the bubble profile.

Top hatting usually occurs as the cover starts to degrade either chemically or from UV as they reach the end of their lifespan.

However, this issue can also present itself from overheating. As discussed in the section “Overheating on the Reel System”, a cover could reach up to 80°C, which could cause permanent damage to the cover, even an issue such as top hatting.

This is most often seen in materials with a dark/opaque top surface.

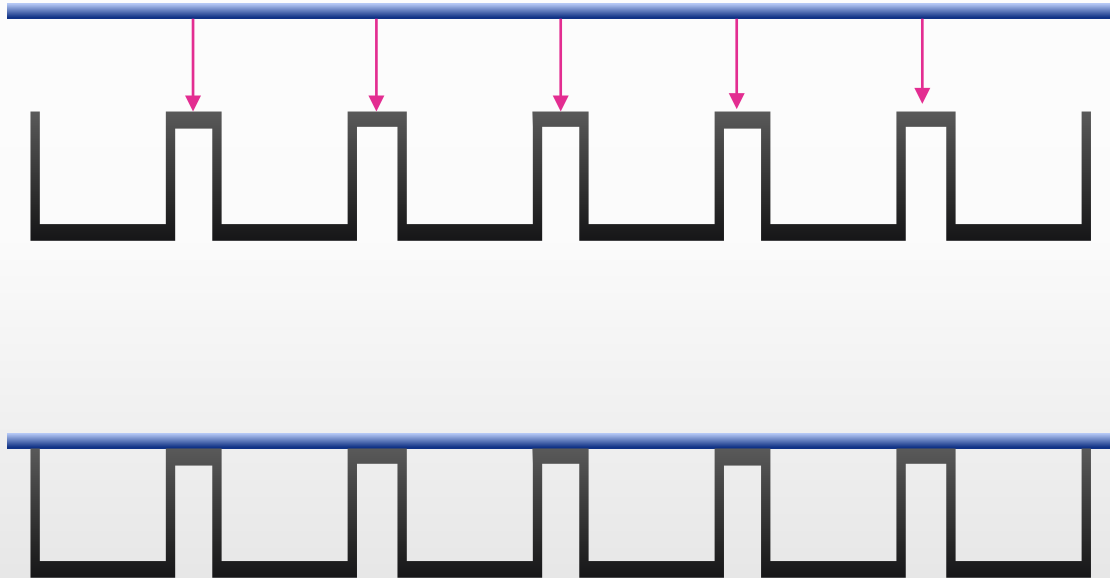
With a well monitored chemical regime and appropriate storage provisions, this can often be prevented.

# Bubble Collapse

- Description:
  - The Bubbles on the under side of the cover deflate. Most commonly seen in 12mm materials as in the picture to the right.
- Cause:
  - This effect is very rare and can be caused by the build up of Nitrogen trichloride ( $\text{NCl}_3$ ) which is one of the chloramines produced by the reaction of Hypochlorous acid ( $\text{HOCl}$ ) and Ammonia ( $\text{NH}_3$ ), derivatives in the warm water.
  - This is often a indication of a building in TDS (total dissolved solids) and CC (Combined Chlorine).
- Solution:
  - The pool chemistry can be returned to balance by removing the cover and performing a break point chlorination or draining a portion of the loaded water and replacing with fresh.
  - Unfortunately once this has occurred the bubbles will not return to their previous state but actions taken to correct the issue will prevent this happen to a replacement cover.



# Delamination



Our bubble materials are made of two layers of material a flat extruded top sheet and a extruded sheet that is vacuum formed into the bubble profile.

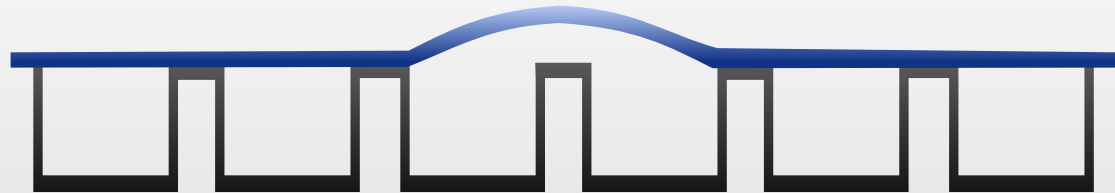
Just after the mould forms the bubble the top surface is laminated to the bubble

Once it is bonded the air inside the bubble is sealed in profile forming a permanent bond between the layers.

To ensure the material is securely bonded Plastipack have developed their own testing practices where the material is exposed to a vacuum forcing the air within the bubbles to expand.

Our materials are tested regularly to ensure a permanent and strong lamination.

# Delamination



Delamination is incredibly rare and most often is the result of the cover overheating when being stored off the pool.

When folded or left exposed on a reel system, the material quickly heats up and causes the air within the bubbles to expand.

In extremely rare cases this can result in the air expansion forcing the layers of material at the land area of the bubble separating.

This can be avoided with the implementation of a reflective storage sheet.

Should delamination occur without indications of improper storage please contact Plastipack immediately.

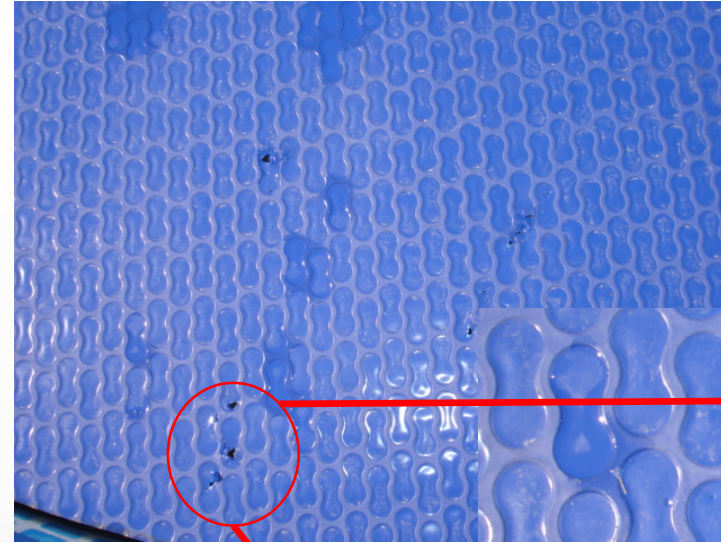
# Bird pecks

This is more common than would be imagined. Small groups of punctured or torn holes are often caused by birds.

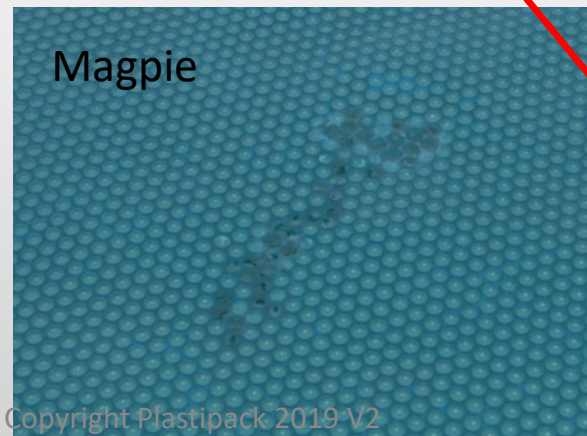
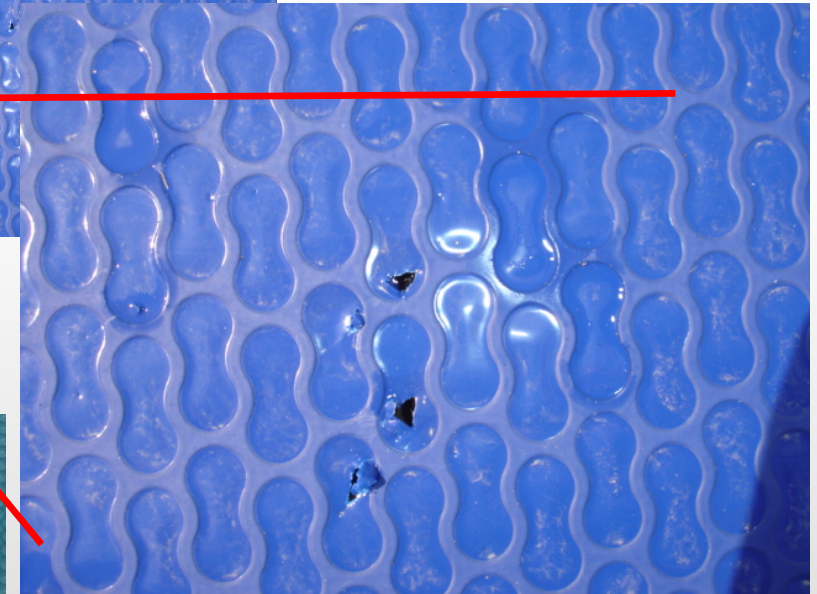
At our test tank site we have a particular Herring Gull family who seem very fond of pecking through our test covers.

- *Note: No legal action has been taken against the Herring Gull family at this point!*

We have found that a few CD's hanging from a string will cause reflections that discourage the birds from lingering around the pools.



Herring Gull Attack!!



Magpie

# Condensation

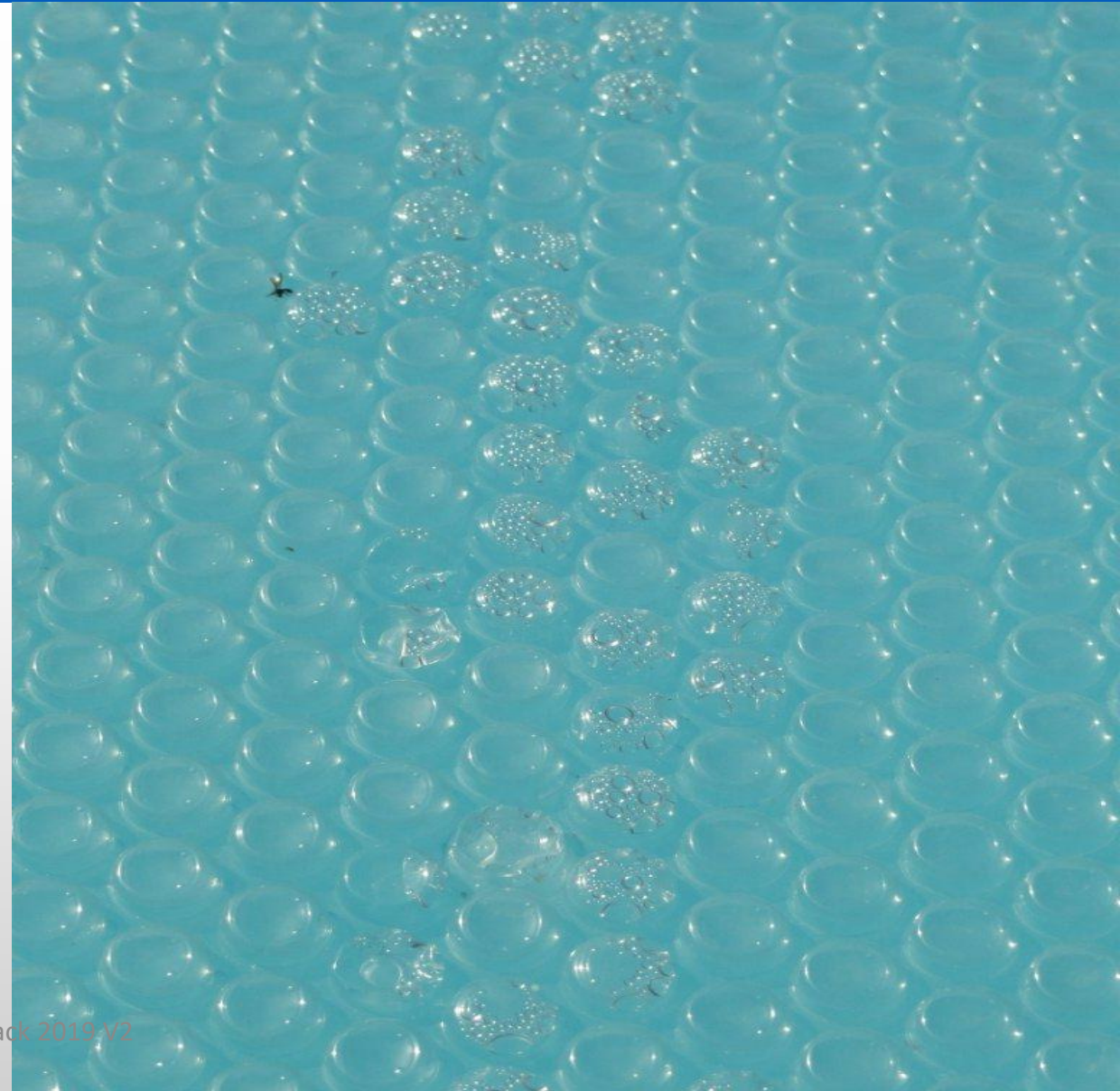
From time to time it may appear that small droplets of water have appeared within the bubbles.

This is the result of the water held as vapour with the air inside the bubbles condensing.

This is no cause for concern and is a natural result of a temperature difference between the pool and the air.

As the temperature increases the water will vaporise into the air within the bubbles this will have no detrimental effects to the cover's performance or longevity.

The polymer that the cover is manufactured from will resist water ingress, as such any bubbles that fill completely are the result of a rupture to the bubble.



# Water incursion into bubbles

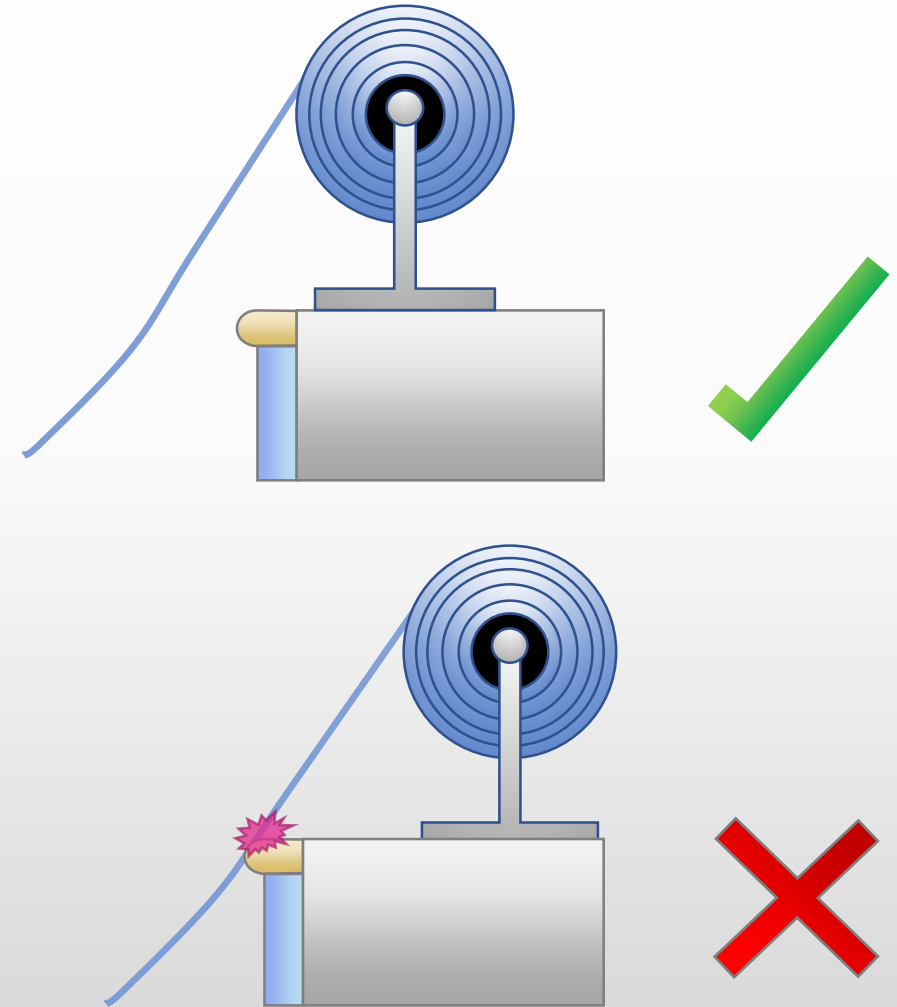
As mentioned in the condensation section a unruptured bubble cannot fill with water.

Usually the most noticeable sign that a bubble or bubbles across the cover have ruptured is the propagation of algae or the build up of debris within the bubble.

As it is not possible for the bubble to form if there is a rupture in the material, the first step to identify the cause is to look for where the rupture is in the bubble.

A common cause, usually produced when a reel system is set too far back from the pool or the cover is removed by hand, is a scuffing of the underside of the bubble. This causes a rupture through abrasion on rough surfaces and edges.

This is simple to identify by turning the cover over in the affected area and pressing down on the bubble. As the pressure builds you will see bubbles or water ejecting from the affected area.



# Splits at the weld edge

A score line appears as a fine split next to the weld edge that shows no sign of polymer elongation.

Score lines are caused by damage to the material during welding. This can be caused by:

- Residue build-up on the wedge of the hot wedge welder.
- Dirt picked up from the floor being trapped on the wedge.
- Misalignment of the wedge.
- Too much compression from the pinch roller.

All cover fabricators will perform maintenance on the machines and regularly clean their welding floors. However, on rare occasions a score can be produced when welding and go unnoticed, until the point of failure.

While there are tapes that can bond the materials together. This is not a permanent solution. If this occurs in the early days of the covers working life it is better to seek a replacement from the company who supplied the cover to you then attempt a repair.



# Lensing

Lensing is caused by a rupture in one of the material films during production.

This can be caused by a process known as “gelling” from the polymers or from a un-melted or carbonised piece of polymer or debris working its through the production line.

This results in a tear-shaped deformation in the bubble. Lensing can appear in both the top and bubble layer.

On the top layer it will appear as a opening that exposes the inside of the bubble.

On the bubble layer it will pull the top layer down to form the bubble profile.

Plastipack monitor our production constantly to be able to react should we see a imperfection on the line. However unfortunately some do get through.

07/02/2019

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If you receive a roll with lensing that renders the material unusable, please do not hesitate to contact us.

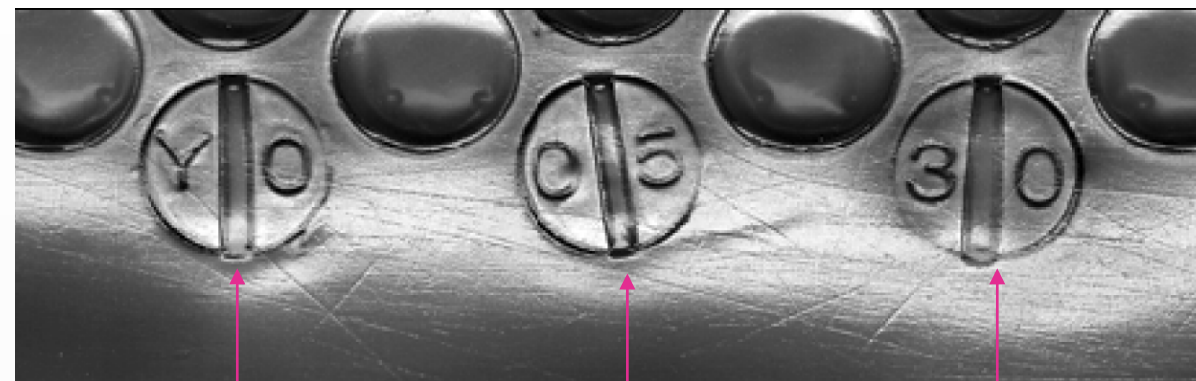
When contacting us please provide the date stamp or QC sheet. This way we can track the material, through our production and raw materials.

# Reporting a issue

Should you have a issue with a cover and require a assistance with what has caused the issue or a fault requires the cover to be replaced Plastipack ask that you follow the guide below.

## Required information and images:

- **Description:** material name, bubble design and thickness.
- **Dimensions:** Size of the cover affected.
- **QC tracking:** Plastipack track our materials and the raw material that they are created from. Because of this we require the date stamp on the weld edge of the material or the QC number (quality control sheet number) from the roll/rolls the material was fabricated from.
- **Pool information:** To understand what has happened to the cover please provide as much information on the pool's chemical environment as possible.
- **Images:** The majority of the time we can determine what has happened to the material from an image. To do this please provide a image of the entire cover as well as a close up to demonstrate the particular issue.
- To help with this Plastipack provide a [Solar cover problem checklist](#) on our downloads page.



Year

Month

Day

Plastipack's warranties are between ourselves and the cover fabricator who purchased the material. As such we will not comment on any cover issues sent to us by end users.

## Should you own a cover and have a issue that requires action or advice:

Please contact the company who supplied the cover with as much of the information stated as possible. They will contact us should they feel it requires our attention and we shall act accordingly after reviewing the details.