

Revolution Pool Cover

Product Data Sheet

ver 1.5

Revision History

Version	Date	Type	Comments
0.01	12.4.04	Internal	First draft
0.02	18.4.04	Internal	Additional info
0.03	19.4.04	Internal	Corrections
1.0	25.4.04	Public	Full Public Release
1.0.1	1.1.05	Internal	Additional info
1.1	10.1.05	Public	Full Public Release
1.1.1	19.10.05	Internal	Additional test data
1.2	25.10.05	Public	Full Public Release
1.2.1	6.6.07	Internal	Additional test data
1.2.2	12.6.07	Internal	Corrections
1.2.3	16.6.07	Internal	Additional test data
1.3	20.6.07	Public	Full Public Release
1.3.1	25.1.08	Internal	Additional info
1.3.2	6.2.08	Internal	Corrections
1.4	10.2.08	Public	Full Public Release inc Web
1.5	13.1.11	Public	Amendments / corrections

Contents

1. Product Overview
2. Dimensions
3. Lamination Structure
4. Thermal Conduction Performance
5. Thermal Insulation Performance
6. Evaporation Performance
7. UV Performance
8. Chemical Attack Performance
9. Strength
10. Images

1. Product Overview

First4poolcovers Revolution Pool Cover is designed to be used as a floating swimming pool cover that helps heat swimming pools while preventing heat loss and evaporation water loss.

Its appearance is one of a flat sheet of plastic film which is a matt carbon black colour on one side, with a silvery white appearance on the other.

Primarily the cover is designed for the black side to face the sun (heating mode), but can be used 'upside down' so as to all but eliminate pool heating should the pool water already be at the desired user temperature.

2. Dimensions

As swimming pool covers go, the Revolution Pool Cover is remarkably thin, measuring just 0.12mm thick. Despite this, it is as strong as conventional 'bubble' covers up to 6 times thicker (see Strength info below), and will last just as many years, thanks to its structural core weave layer (see Lamination info below).

Being very thin is one of the reasons the Revolution Pool Cover is able to transmit heat into the pool water as well as it does, and with its small thickness, comes low weight making it easy to deploy. The weight of a Revolution Pool cover is approximately 0.11Kg per square meter / 0.42oz per square foot. Revolution Pool covers can be supplied in any size, with 'off the shelf' sizes available up to 15m wide by 30m long / 45' x 90'. Larger sizes than this are available via special order.

3. Lamination Structure.

The Revolution Pool Cover is made up of 5 layers. Starting at the top, they are:

1. Protection layer, UV and chemical resistance layer. Clear in colour, >99% UV transmission.
2. Solar Absorbency layer, carbon black in colour, UV energy absorbent >95%.
3. Internal structural layer, black in colour, used to provide additional strength to sheet.
4. Heat Reflective layer, silvery white in colour, used to help reflect heat back into the water.
5. Protection layer, UV and chemical resistance layer. Clear in colour, <5% UV transmission.

Layers are heat fused together during 2 the stage manufacturing process and are guaranteed to never delaminate.

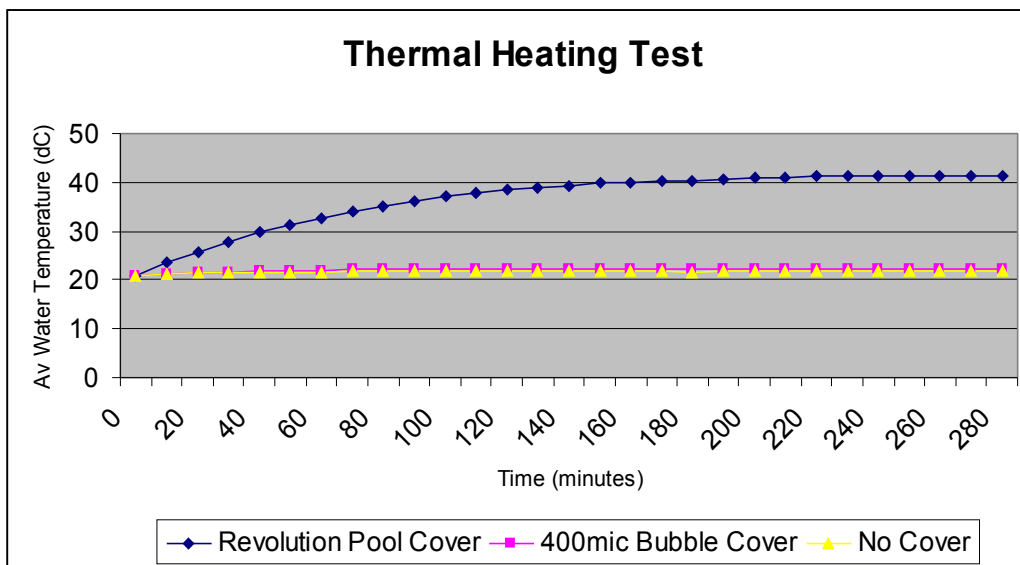
4. Thermal Conduction Performance

The following graph shows the solar gain of 3 samples all placed in the same environment giving both absolute and relative performance of each.

The 3 test conditions are identical except sample 1 has a Revolution Pool Cover fitted, sample 2 to has a blue 400micron 'bubble' cover fitted, and sample 3 has no cover fitted.

Test conditions as follows:

Solar power 980W/m² perpendicular to horizontal; Ambient Air Temp 21dC ; Initial Water Temp 21dC ; Water tank dim L=20cm, W=20cm, H=6cm ; Water filled to 5cm, vol=2.0 litres, Tanks constructed of 1mm pale blue polyprop with 5cm insulation on outsides and bases.



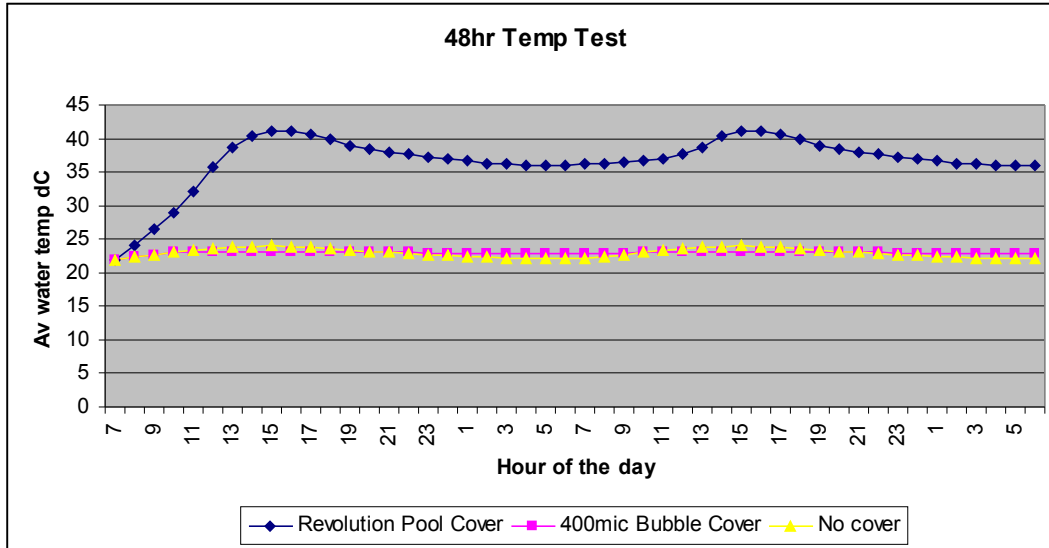
In this test the water under the Revolution Pool Cover levelled out at 41.3dC while the water under the bubble cover reached 22.1dC. The water with no cover reached 21.8dC. In this test, the water under the Revolution Pool Cover was heated 65 times more than the water under the 400 micron bubble cover. *Note: care must be taken when reading this particular data. The amount of sunshine, volume of water, pool surface area and pool side insulation properties will all affect the final temperature in any particular pool. In saying that, one can expect the heating effect to remain fairly constant, ie a Revolution Pool Cover will have ~65 times more heating effect than a 400micron bubble cover, however the final temp will vary case by case.*

5. Thermal Insulation Performance

A bubble or foam pool cover will always slightly outperform a Revolution Pool Cover in terms of retaining heat. This is because bubble and foam covers are essentially just insulators. This is one of the reasons why they are so poor at conducting heat into the water when looking at the Thermal conduction tests above, unlike a Revolution Pool Cover.

A Revolution Pool Cover works in a different way in order to keep heat in the pool. Instead of simply being an insulator, it retains heat using reflection and evaporation control (see below). Using the same test conditions as in the thermal conduction tests above, the test is repeated showing the temperature effect over a full 48 hour period starting with all 3 tanks of water at 22dC at 7am on day1.

One can see the water under the Revolution Pool Cover quickly gains temperature peaking in the middle of the afternoon on day 1. As the sun starts to go down, the temp in all the tanks starts to fall. The lowest temp the water under the Revolution Pool Cover falls to is ~37dC. Although the water has lost some 4dC from its peak daytime temp, it did start at the highest temp of the 3 samples. Essentially then, some of the free solar energy gained in the day is being lost at night.



Over time, the heat gained in the day starts to match the heat lost at night and the final water temp stabilises, in this test setup at about 39dC.

Note: For the sake of interest, if the same volume of water under the bubble cover tank was conventionally heated to 41dC (using electric heating), under these conditions it too falls more significantly at night. Separate testing indicates the drop would be ~3dC compared to the 4dC exhibited by the Revolution Pool Cover.

6. Evaporation Performance

Up to 80% of the heat lost from a swimming pool occurs through evaporation both during the day, but more severely during the night. Using a Revolution Pool Cover significantly reduces this loss. The following test conditions are the same as above, with 3 tanks filled with water with a Revolution Pool Cover fitted to one, a 400micron bubble cover fitted to the second and no cover fitted to the third. The water temperature was heated and regulated at 30dC in all 3 tanks, with the external air temp regulated at 21dC. Relative humidity was controlled at 75%.

Weight of water was set at 2Kgs at the start of the test.
Water lost after 24 hours was:

Tank 1 fitted with a Revolution Pool Cover	lost 0.6 grams of water
Tank 2 fitted with a 400micron bubble cover	lost 0.6 grams of water
Tank 3 with no cover	lost 7.1 grams of water

7. UV Performance

The Revolution Pool Cover is designed to withstand the harshness UV radiation subjects it to. The cover is supplied with an ultra high performing UV protection layer on both sides which is added as films during the 2nd phase lamination process. The inner layers are also protected (to a lesser extent) using UV inhibitors mixed into the molten plastic during manufacture.

Accelerated life testing confirms Revolution Pool Covers will survive in excess of 3-5 years under typical solar radiation conditions.

8. Chemical Attack Performance

The material properties of the Revolution Pool Cover include protection against mild chemical attack. This protection is inbuilt in the chemistry of the plastics used to make up the cover. Accelerated life testing shows the product can withstand chemical attack ranging from ph levels 6.5 to 8.3 in excess of 2 years. More neutral ph levels, ie 7.2 to 7.6 which are the levels maintained in swimming pools, show life expectancy in excess of 3-5 years.

Chlorine levels up to 5ppm and saline solutions up to 6000ppm are also well within acceptable levels for long life. The Revolution Pool Cover can also withstand Bromine sanitation solutions.

9. Strength

The plastics used to make up the Revolution Pool Cover are very strong. They combine excellent flexibility and elasticity with puncture resistance and toughness. The lamination structure with its internal weave core represents a significant step up in performance from conventional bubble or foam covers. A 1 meter square of Revolution Pool Cover rolled up to form a tube can suspend over 1000Kgs (1 ton) in weight before tearing.

10. Images

