Fact Sheet 1

Evaporation

daisy POOL COVERS

A Daisy Pool Blanket provides a physical barrier to evaporation.

It covers the pool surface like putting a lid on a jar.

It can't be totally watertight like a jar lid, but a properly fitted pool blanket is so effective that it stops 97% of evaporation.

All across Australia, water is a precious, scarce and costly commodity.

A Daisy Pool Blanket can almost completely stop water loss through evaporation - but just how much water are we really talking about?

This Fact Sheet explains all that.

PLEASE NOTE: All figures quoted refer to typical UNHEATED pools. If your pool is heated, and depending when and to what temperature, the evaporation rates could well be significantly higher.

How much water does your pool hold?

Most people are surprised by what seem like enormous quantities of water that an average pool can lose through evaporation.

The main reason they are so surprised - and sometimes question the quantity evaporating - is that they don't usually have much idea how much water their pool holds in the first place.

To put things into perspective, here are some of the sizes and capacities of pools that you would typically find in backyards right across Australia.

Pool Length	x	Pool Width	x	Average Depth	=	Water Capacity
8.0 metres		4.0 metres		1.3 metres		41,600 litres
9.2 metres		4.5 metres		1.3 metres		53,820 litres
10.0 metres		5.0 metres		1.3 metres		65,000 litres

Perhaps measure your own pool roughly and do the sum.

According to the Swimming Pool and Spa Association NSW, Australian domestic swimming pools generally hold between 22,000 and 60,000 litres of water, with the average being between 40,000 and 50,000 litres.

How much are you really topping up your pool?

Here's some more information that might also come as a surprise.

Do you know how much water flows from your backyard hose per minute?

Of course it will vary with local water pressure, but according to the NSW Government 'Water for Life Plan', it can be around 17 litres a minute.

So, how often do you top up your pool in summer?

As an example, 10 minutes a day, every second day would use:

17 litres x 10 minutes x 15 days = 2,550 litres a month.

This is a very conservative estimate. In the middle of summer it is quite common that it would be more like:

17 litres x 30 minutes x 30 days = **15,300 litres a month**.

Makes you think, doesn't it.

What is evaporation?

As we know from boiling water and seeing it turn into steam, a simple definition of evaporation is: the process whereby liquid water becomes a gas and dissipates as the water temperature is increased.

Eventually, a saucepan of water will 'boil dry' as all the liquid becomes a gas and disappears into the atmosphere.

Calculating evaporation rates is a very complicated process, with many variables such as water surface area, water temperature, air temperature, air pressure, air density, wind speed, and humidity - among others - all affecting evaporation.

Evaporation from swimming pools

The main factors that affect evaporation rates from domestic outdoor pools are:

1. pool surface area
2. the temperature of the water and air
3. humidity
4. wind

1. The bigger the pool, the more surface area, therefore, a greater evaporation volume.
2. The highest evaporation rates occur when the differences between water and air temperatures are the greatest. This may not be in the middle of a hot day when the pool is in use. At this point the water and air temperatures may be quite close. Later at night the pool water may remain warm, but the air temperature has fallen substantially - that means a greater temperature difference between the air and water - and greater evaporation.
3. The drier the air is, the greater the evaporation rate. In very humid conditions less evaporation occurs.
4. The final and very significant factor for home pools is wind. A breeze of just a gentle 11 kilometres per hour can more than double the evaporation rate by removing the insulating layer of warm, moist air directly above the pool surface.

Typical evaporation rates

For the sake of simplicity, we have used official Bureau of Meteorology long term historical evaporation rates for Sydney, Melbourne, Brisbane, Adelaide and Perth, measured at their respective airports.

Also for simplicity, we have used only the six hottest months, October to March - generally the swimming season when pools receive most use.

Mean Daily Evaporation Rate (mm)

	Oct	Nov	Dec	Jan	Feb	Mar	6 month average
Sydney	5.8	6.5	7.4	7.2	6.4	5.3	6.4 mm
Melbourne	4.6	5.7	7.4	7.5	7.3	5.8	6.4 mm
Brisbane	6.4	6.7	7.6	7.9	6.7	5.8	6.9 mm
Adelaide	5.3	7.2	8.1	8.9	8.4	6.4	7.4 mm
Perth	5.3	7.4	9.1	10.2	9.8	7.9	8.3 mm

The figures above are **DAILY** rates.

Continued Over...

So in Sydney for example, for every square metre of pool area - an average of 6.4mm of water is lost to evaporation.

That's 6.4 litres of water - per square metre - per day!

The following table shows the average DAILY evaporation in litres for the same three pool sizes we used at the beginning of this Fact Sheet across the five capital cities.

Mean Daily Evaporation Volume (litres)

Pool Size	Surface Area	Water Capacity	Sydney	Melbourne	Brisbane	Adelaide	Perth
8.0x4.0m	32.0m²	41,600l	205	205	221	237	266
9.2x4.5m	41.4m²	53,820l	265	265	286	306	344
10.0x5.0m	50.0m²	65,000l	320	320	345	370	415

That's litres per day.

If you're in Perth, and have a 9.2m x 4.5m pool, you're losing an average 344 litres each and every day for the six month swimming season.

The approximate total water lost is a staggering 182 days x 344 litres **= 62,608 litres - or 10,435 litres a month.**

To use our earlier 'topping up' hose flow rate of 17 litres a minute, to replace that water you'd need to **run your hose for 20 minutes every single day for six months**.

Here are accurate figures for the same size pool in all cities:

	Pool Size	Surface Area	Total Evaporation Oct - March	Average Evaporation per month
Sydney	9.2mx4.5m	41.4m²	**48,475** litres	**8,079** litres
Melbourne	9.2mx4.5m	41.4m²	**48,012** litres	**8,002** litres
Brisbane	9.2mx4.5m	41.4m²	**51,638** litres	**8,606** litres
Adelaide	9.2mx4.5m	41.4m²	**55,513** litres	**9,252** litres
Perth	9.2mx4.5m	41.4m²	**62,261** litres	**10,377** litres

Although evaporation rates are lower during the cooler six months of the year, it never stops.

For Perth, the average 12 month evaporation volume totals 86,054 litres - 7,171 litres a month.

The pool only holds 53,280 litres, so it's losing more than 1.5 times its total capacity each year.

In the two lowest evaporation months, June and July, it's still losing 2,970 litres in each of those months.

For the same pool in Sydney, the 12 month total evaporation loss is 81,189 litres - 6,766 litres a month.

What about rain?

A Daisy pool blanket will almost completely stop evaporation - yet, when it does rain, all the water that does fall can still go into the pool, effectively 'topping it up'.

In an uncovered pool, some water lost to evaporation will also be replaced by rainfall. However, rain is likely to have only a small effect on the total evaporation water loss - for several significant reasons.

Firstly, in the hottest summer months when evaporation is the highest, rainfall is highly unreliable, and generally at the year's lowest levels.

Secondly, you can't turn the rain on and off like a tap.

Your pool may well be full when summer rain does fall, so the water will simply run off as overflow.

Some summer rain will certainly help top up an uncovered pool, however, it is almost impossible to predict how much the effect of this would be.

Even if we adopt a quite unrealistic approach of assuming all the rain that falls refills your pool - and none overflows - the net evaporation losses are still quite alarming.

Pool Size - 9.2metres x 4.5 metres

	Average Total Summer Rainfall	Maximum Possible Total Rain "Top-up"	Evaporation Water Loss Oct-March	Total Net Water Loss Oct-March	Average Monthly Net Water Loss
Sydney	557.1mm	22,704 litres	48,475 litres	25,771 litres	**4,295** litres
Melbourne	283.7mm	11,745 litres	48,012 litres	36,267 litres	**6,045** litres
Brisbane	600.4mm	24,857 litres	51,638 litres	26,781 litres	**4,464** litres
Adelaide	146.6mm	6,069 litres	55,513 litres	49,444 litres	**8,241** litres
Perth	121.8mm	5,043 litres	62,261 litres	57,218 litres	**9,536** litres

This is a highly unrealistic scenario. If rain was to fall evenly across this six month period, the maximum amounts by which rain could compensate for evaporation loss are:

Perth, 10% - Adelaide, 11% - Melbourne, 24% - Sydney, 47% - Brisbane, 48%.

However, the two highest summer rainfall cities, Brisbane and Sydney, each average only 11 rain days per month October to March. So, all their rain falls on just 66 days out of 182.

Therefore, although it is impossible to calculate exactly how much - a very significant proportion of the rain that does fall into swimming pools will overflow and run off.

References

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