How much water does a pool use after filling? by Paul Dawson

The water replacement needs of a pool will depend primarily upon its size, location and use and will vary considerably. The areas that contribute most to water use after initial fill are, evaporation, filter backwashing and leakage (splashing). If the swimming pool industry is to adopt the ancient Chinese Philosophy that there are no such things as problems, only opportunities to perform, perhaps a start would be the installation of pool blankets on all pools. Here is why:

HOW MUCH WATER DOES YOUR POOL HOLD?

Most people are surprised by what seems 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.

<table>
<thead>
<tr>
<th>Pool length x Pool Width x Average Depth =</th>
<th>Water Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0 metres 4.0 metres 1.3 metres</td>
<td>41,600 litres</td>
</tr>
<tr>
<td>9.2 metres 4.5 metres 1.3 metres</td>
<td>53,820 litres</td>
</tr>
<tr>
<td>10.0 metres 5.0 metres 1.3 metres</td>
<td>65,000 litres</td>
</tr>
</tbody>
</table>

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 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 people top up their pool in summer?

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

\[
17 \text{ litres} \times 10 \text{ minutes} \times 15 \text{ days} = 2,550 \text{ litres a month.}
\]

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

\[
17 \text{ litres} \times 30 \text{ minutes} \times 30 \text{ days} = 15,300 \text{ litres a month.}
\]

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 problem.

2. The highest evaporation rates occur when the differences between water and air temperatures are the greatest.

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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, 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 RATE**

For the sake of simplicity, rates are based on using official Bureau of Meteorology long term historical evaporation rates for Sydney, Melbourne, Brisbane, Adelaide and Perth, measured at their respective airports.

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

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

That’s 6.4 litres of water – per square metre – per day!

Table 2 shows the average DAILY evaporation in litres for the same three pool sizes listed at the start of this document across the five capital cities.

That’s litres per day.

If you are 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 the 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.

Table 3 details accurate figures for the same size pool in all cities:

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 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 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.

And it is not possible to merely subtract total rainfall from evaporation to get a “net water loss”. A deluge of rain will not fill a pool that is already full. Instead it will pump to waste as overflow via the skimmer box.

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 you were to predict 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.

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

Perth 10% - Adelaide11% - Melbourne 24% - Sydney 47% - Brisbane 48%.

**TABLE 2:**

<table>
<thead>
<tr>
<th>Pool Size</th>
<th>Surface Area</th>
<th>Water Capacity</th>
<th>Sydney</th>
<th>Melbourne</th>
<th>Brisbane</th>
<th>Adelaide</th>
<th>Perth</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0x4.0m</td>
<td>32.0m²</td>
<td>41,600 litres</td>
<td>205</td>
<td>205</td>
<td>221</td>
<td>237</td>
<td>266</td>
</tr>
<tr>
<td>9.2x4.5m</td>
<td>41.4m²</td>
<td>53,820 litres</td>
<td>265</td>
<td>265</td>
<td>286</td>
<td>306</td>
<td>344</td>
</tr>
<tr>
<td>10.0x5.0m</td>
<td>50.0m²</td>
<td>65,000 litres</td>
<td>320</td>
<td>320</td>
<td>345</td>
<td>370</td>
<td>415</td>
</tr>
</tbody>
</table>

**TABLE 3:**

<table>
<thead>
<tr>
<th>Mean Daily Evaporation Rate (mm)</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>6 Month Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney</td>
<td>5.8</td>
<td>6.5</td>
<td>7.4</td>
<td>7.2</td>
<td>6.4</td>
<td>5.3</td>
<td>6.4mm</td>
</tr>
<tr>
<td>Melbourne</td>
<td>4.6</td>
<td>5.7</td>
<td>7.4</td>
<td>7.5</td>
<td>7.3</td>
<td>5.8</td>
<td>6.4mm</td>
</tr>
<tr>
<td>Brisbane</td>
<td>6.4</td>
<td>6.7</td>
<td>7.6</td>
<td>7.9</td>
<td>6.7</td>
<td>5.8</td>
<td>6.9mm</td>
</tr>
<tr>
<td>Adelaide</td>
<td>5.3</td>
<td>7.2</td>
<td>8.1</td>
<td>8.9</td>
<td>8.4</td>
<td>6.4</td>
<td>7.4mm</td>
</tr>
<tr>
<td>Perth</td>
<td>5.3</td>
<td>7.4</td>
<td>9.1</td>
<td>10.2</td>
<td>9.8</td>
<td>7.9</td>
<td>8.3mm</td>
</tr>
</tbody>
</table>

**TABLE 4:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sydney</td>
<td>557.1mm</td>
<td>22,704 litres</td>
<td>48,475 litres</td>
<td>25,771 litres</td>
<td>4,295 litres</td>
</tr>
<tr>
<td>Melbourne</td>
<td>283.7mm</td>
<td>11,745 litres</td>
<td>48,012 litres</td>
<td>32,267 litres</td>
<td>6,045 litres</td>
</tr>
<tr>
<td>Brisbane</td>
<td>600.4mm</td>
<td>24,857 litres</td>
<td>51,638 litres</td>
<td>26,781 litres</td>
<td>4,464 litres</td>
</tr>
<tr>
<td>Adelaide</td>
<td>146.6mm</td>
<td>6,069 litres</td>
<td>55,513 litres</td>
<td>49,444 litres</td>
<td>8,241 litres</td>
</tr>
<tr>
<td>Perth</td>
<td>121.8mm</td>
<td>5,043 litres</td>
<td>62,261 litres</td>
<td>57,218 litres</td>
<td>9,536 litres</td>
</tr>
</tbody>
</table>
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 how much – a very significant proportion of the rain that does fall into swimming pools will overflow and run off.

So how much water does a pool use after filling? Well that all depends on whether you have a pool blanket on your pool or not. The differences are clearly very significant.

Pool Blankets provide 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 pool blanket can almost completely stop water loss through evaporation – but just how much water are we really talking about?

References
Swimming Pool and Spa Association NSW, www.spasa.org.au;

A Pool Blanket can save up to 10,000 litres of water a month in evaporation during summer - and that’s great for stretched water supplies, and your water bill.

Only bubble blankets warm your pool water by 8-10ºC using free energy from the sun and a warmer pool means a longer swimming season - up to 4 months longer every year.

Spend more time swimming in a warmer pool and save water, money, salt, chemicals and cleaning time with a lighter, longer lasting bubble blanket.

Choose yours from one of our great suppliers - they all use Australia’s best bubble material from Sealed Air Australia.