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GEAR

**GROUP TEST:
AIRPUMPS**

AERATING YOUR POND

Do you have a large pond filled with treasured fish or several fish-houses indoors? If so, a 'big gun' pond airpump is exactly what you need. We put a selection to the test

**GABOR
HOVARTH**

A Hungarian aquarist now living in the UK, Gabor is a prolific fish breeder, project undertaker and writer.

Powerful air flow
is vital to Koi
ponds

THE FIRST factor to consider when picking a pump is the amount of air required. Recommendations are sometimes based on the surface area, calculated as average length multiplied by average width. As a basic rule you need 25 litres per minute for every 10m² of pond.

Pond airstones are much larger than those in aquaria and the bigger the stone, the more air it needs. Small, 5cm-diameter balls use 5-10 l/min of air; 25cm-diameter need 40 l/min. In large ponds use several small airstones instead of one big one; this will increase surface agitation, giving gentle currents all over.

Based on these guidelines you should be able to calculate the air needed. Now add 30% to cover what's lost at valves/junctions. This final value is the amount of air you'll need at the depth of the airstones.

Now things get complicated. The deeper you go, the lower the amount of airflow the pump can deliver, as it must fight against the pressure of the water column.

While the maximum airflow shown on the box of an indoor airpump is usually measured at the top of the water, larger pumps show the output at the rated back pressure – usually equal to the pressure found at 1m or 1.5m water depth. Sometimes, max depth is given too, showing where air delivery drops to zero.

On pro pumps, the maximum back pressure (in KPa, MPa or Mbar) is shown. So 1m water depth causes 0.01MPa/10kPa/100Mbar back pressure – meaning a device with a 300Mbar rating can reach 3m depth.

“In large ponds use several smaller airstones instead of one big one; this will increase surface agitation, giving gentle currents all over”

Types of airpump

Large-capacity airpumps generate airflow in three different ways.

The first type uses a rotating turbine. These vortex blowers produce huge amounts of air with low electricity consumption, so they appear economical. However, they handle back pressure poorly – most can't pump deeper than 90cm.

The second group are piston airpumps, which are usually highly efficient, pushing out large volumes of air at high pressure. Their low cost and compact size explains their popularity. If well maintained, these usually last.

The third type are diaphragm airpumps – most of the pumps in our test belong to this group. If you've ever used a small aquarium airpump you'll be familiar with the humming noise. The high output pumps operate in a similar way, but usually resonate two membranes, one at each end of a magnetic coil, to generate air. Maintenance involves cleaning the air filter and replacing the membranes if the output drops.

The method

I asked Maidenhead@Cardiff for help with this test and they kindly let me use one of their deep Koi ponds. As some pond blowers can pump out 1 litre in 0.2 seconds, I decided to use a 20 l aquarium as a measuring vessel.

I took a length of 5cm-diameter drainpipe that was 4cm shorter than the water depth in the pond. This

ensured that the top was well submerged. I could then position the measuring tank upside down over the top of it without difficulty.

I drilled two holes in the drainpipe at 1cm and 99cm from the top. Then I

connected two 4m-long airhoses to the pipe by pushing them through the holes. To finish, the bottom end was weighted down so it stood vertically in the water.

When everything was ready, I connected the first air pump to the system. The measuring aquarium was filled by submerging it in the pond, then I turned it upside down and lifted it out until one of the two marks on its side was level with the surface of the water. The aquarium was floated above the pipe and I measured and noted down the time the decreasing water level spent between the two marks. As this meant exactly 10 litres of air, it was easy to calculate the actual performance of the air pumps.

Each pump was tested three times at both depths and the results at each level averaged out.

Top tip

In winter, lift the airstones at least 30cm above the bottom, so they won't disturb the 4°C water layer fish need to overwinter.



SUPPLIERS

Eheim

eheim.com

Pondteam

pondteam.com

Cloverleaf

cloverleaf.co.uk

Velda

velda.com

Hozelock

hozelock.com

Blagdon

interpetcentral.com

PondXpert

pondxpert.co.uk

SuperFish

petproducts.co.uk

HIBLOW

hiblow.co.uk

Evolution Aqua

evolutionaqua.com

MEDO

nitto-kohki.eu

SECOH

partsandpumps.co.uk

HOW DID THEY DO?

GEAR

GROUP TEST: AIRPUMPS

**EVOLUTION AQUA 70****Price:** £145

The Evolution Aqua 70 is like the perfect business partner. It keeps its promises (bang on), is reliable and works tirelessly to move you forwards. No surprise it's so popular.

**MEDO LA-60E****Price:** £180

The Medo LA-60E was the only piston airpump in our test, but its performance matched that of the best diaphragm ones. Very efficient and unexpectedly quiet. Highly recommended.

HIBLOW HP150**Price:** £390

The HIBLOW HP series has been around for quite a while and is loved by many. It's easy to see why. Although a bit pricey, these Japanese pumps are solidly built, reliable and offer good value for money.

**HOZELOCK AIRPUMP 75****Price:** £209.99

The Hozelock Airpump 75 is a no-frills airpump that does exactly what it says on the tin. For average-sized, average-depth ponds you don't need anything more.

**EHEIM AIR 500****Price:** £45.90

For more air without a huge investment, the EHEIM AIR 500 is a good choice. This well-designed airpump will give you almost 500 l per hour at 1m depth, so it's ideal for small, but even deep ponds.

PONDTEAM SUPER 3000**Price:** £179

The Pondteam Super 3000 was somehow underwhelming, as it seemed to run out of breath at 1m.

On the positive side, the build quality is good, so this pump could serve you well at the recommended depth of up to 50cm.

**DID YOU KNOW?**

Even in well-balanced ponds, big airpumps are invaluable in emergencies like sudden water quality deterioration, heatwaves or when there's a need for medication.

VELDA SILENTA PRO 6000

Price: £240.15

The Velda Silenta Pro 6000 is a less well-known pump, but it performed well. It's a bit more power hungry than its competitors, but gives plenty of oomph, even deep down.



HIBLOW XP-60

Price: £195

The new HIBLOW XP-60 outperformed its older siblings from the HP series. It gives a high output for low electricity usage, which translates to more economical running. A great all-rounder.



SECOH JDK-60

Price: £154

The Secoh JDK-60 has an almost retro design, but you don't let its utilitarian look mislead you. This is a real powerhouse, churning out twice as much air as most of its competitors for each watt it uses. For the price, it's a real steal.

BLAGDON LIBERTY POND OXYGENATOR

Price: £49.99

For just a little bit of air, the tiny, solar-powered Blagdon Liberty Pond Oxygenator could be the one. It can only produce 60 l per hour and even this comes in short bursts, as the pump runs for five seconds, then rests for 12 to conserve energy. The small bubbles disturb the surface allowing more oxygen to get into the water, which could be a game changer in the case of the tiny ponds it was designed for.



SUPERFISH KOI FLOW 60

Price: £109.99

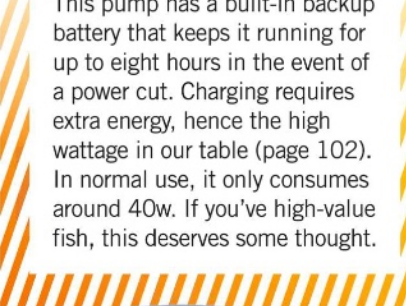
The SuperFish Koi Flow 60 is the only pump in our test that comes complete with a spare set of diaphragms. This and the friendly price make it a great choice for shallower ponds or fish houses.



CLOVERLEAF CL-20

Price: £171

This pump has a built-in backup battery that keeps it running for up to eight hours in the event of a power cut. Charging requires extra energy, hence the high wattage in our table (page 102). In normal use, it only consumes around 40w. If you've high-value fish, this deserves some thought.



PONDXPRT ELECTROAIR 4800

Price: £259.99

The PondXpert ElectroAir 4800 may only have a small body, but it has a real fighting spirit. Surprisingly strong, even below 1m depth.



The airpump test in action.



Airpump dos and don'ts

- ✓ Place the pump above the water level to avoid water back-flow in the event of a power cut. If you can't, then at least use a one-way flow valve.
- ✓ Buy a spare diaphragm set and keep it to hand. This can literally be a lifesaver.
- ✓ Have a smaller airpump on standby. You never know when you might need it – think quarantine or even poisoning.
- ✓ Get a slightly bigger pump than you think you need. Extra air is always good to have.
- ✓ Keep valves, T-junctions and the length of the air hose to a minimum. These can greatly reduce the airflow.
- ✓ Replace airstones regularly as they get clogged over time, affecting performance.
- ✓ Check T-junctions and air valves regularly. They can get clogged and block the airflow.
- ✗ Throw away your pump if the performance drops significantly. Often it's just diaphragms or valves that need replacing – far cheaper than a new pump.

*In battery charging mode

	Rated output	l/min@5cm	l/min@1m	Wattage	Max pressure	RRP	Cost for 10l/min	litre/min per watt	Running cost per year
Eheim Air 500	9l/min@0m	11	7	5W	0.022MPa	£45.90	£41.54	2.21	£5.69
Pondteam Super 3000	50l/min@0m	52	21	40W	0.025Mpa	£179	£83.98	0.53	£45.55
Superfish Koi-Flow 60	60l/min@0m	57	37	35W	0.030Mpa	£109.99	£29.55	1.06	£39.86
Cloverleaf CL-20	65l/min@0m	63	26	*75W/40W	0.020MPa	£171	£65.41	0.65	£45.41
HIBLOW XP-60	60l/min@1.3m	103	86	39W	0.032MPa	£195	£22.59	2.21	£44.41
Medo LA-60E	60l/min@1.5m	124	102	48W	0.028MPa	£180	£17.61	2.13	£54.66
Secoh JDK-60	60l/min@2m	186	129	40W	0.030MPa	£154	£11.91	3.23	£45.55
Evolution Aqua 70	70l/min@0m	71	52	34W	0.032Mpa	£145	£27.96	1.53	£38.72
Hozelock Airpump 75	75l/min@0m	70	51	35W	0.039Mpa	£209.99	£41.19	1.46	£39.86
PondXpert ElectroAir 4800	80l/min@0m	123	117	55W	0.036Mpa	£259.99	£22.23	2.13	£62.63
HIBLOW HP-80	80l/min@1.5m	141	94	71W	0.048MPa	£204	£21.76	1.32	£80.85
Velda Silenta Pro 6000	100l/min@0m	136	128	80W	0.038Mpa	£240.15	£18.81	1.60	£91.10
HIBLOW HP-150	150l/min@2m	337	210	125W	0.052MPa	£390	£18.59	1.68	£142.35

Understanding the table

At 5cm depth, which means almost no back pressure, most of the airpumps we tested produced exactly the nominal amount they promised. Others exceeded the figures printed on the box by quite a margin. The reason behind this is that the professional pumps indicate their outputs at a rated pressure (in the case of the

Hiblow HP-150, for example, it's 20KPa), while the hobbyist pumps show their maximum air capacity at 0m.

Efficiency and operating costs are important. The table above shows the output of the pumps in litres per minute for every watt of electricity used. Higher values here mean more economical

operation, but before you head off and buy the pumps with the biggest scores, consider if you really need that much output. The running costs of some of these pumps can be high, and a lower output pump that gives you just a little bit more air than you calculate you need, may be a better choice in the long run.