

# QUBISM

WHERE ART & SCIENCE  
REALLY DO COMBINE!



*One of the most important aspects of keeping a successful Koi pond is biological filtration, and one of the most important elements in successful filtration is the biological media within them. We'd like to introduce you to the latest development in filter media technology from Elite Filtration Systems Ltd and the new generation of filtration systems they operate within.*

The media is called ORBS - (Oxygen Reactive Biological Spheres), which are a completely new generation of filter media. Unlike all other filter media that have been adapted from other applications, ORBS are specifically designed to provide high performance filtration systems for the aquatic industry. In addition to the new media, Elite have also designed and manufactured a range of filtration systems custom made to operate using ORBS technology. The new filters are called Qubes.

All Koi Keepers know that nitrifying bacteria will grow pretty much anywhere, but optimising the growth and development of these crucial nitrifiers, stabilising that growth and then

maintaining them to provide an optimal population in terms of both numbers and efficiency is entirely a different level of challenge and, pretty much, filtration holy grail.

## Surface Area

Many media claim to have massive surface areas, which in theory they do. The biggest problem is in our organic rich Koi systems - most of them quickly block up rendering the massive available surface basically unavailable!

Their key benefit of ORBS is that they deploy advanced design and materials technology to make sure they

don't block, thus rendering the entire surface area of the media always available for bacteria growth.

As the name suggests, ORBS are essentially engineered spheres with a carefully designed row of radial protrusions on the periphery and a series of lateral internal voids on the opposing plane. A combination of features carefully designed and engineered to provide an optimised environment for the development of nitrifying bacteria. The combination of smart engineering design, advanced materials technology and cutting edge manufacturing delivers a genuinely unique media with a massive usable biological surface area delivering significant performance benefits over conventional filter media. The media also has some subtle but highly important advanced qualities, again carefully designed with the same primary agenda - the provision of an optimised environment for biological filtration.

The ORBS surface finish is, unusually, grainy and not completely smooth. When combined with the three dimensional media geometry on both the inside and outside profiles of the media, the resulting complex matrix is absolutely ideal for nitrifying bacteria's nitrosomonas and nitrobacter to secrete their sticky bio films. Once colonised, the dense bio-film, courtesy of the aforementioned design elements, delivers a much more robust bio population, which in turn accelerates the stabilisation and continuity of the vital nitrification process.

## Voids Designed To Avoid Compaction!

Although unlike ORBS, which are designed specifically for filter media, conventional compactible products originally designed for other duties and adapted as filter media such as beads, filter matting etc are indeed also excellent at trapping solids. They can and do deliver good water clarity, but because of their propensity to block, often fail to achieve full biological capability. The problem is that when media is compacted the crucial void spaces that facilitate effective free flow around the media surface area disappear.

Although the surface area of the aforementioned media have a theoretically large surface area, media compaction drastically reduces the amount of the

surface area that's actually functioning, thus ultimately compromising the media's performance. The bottom line is they work, of course, but not to an optimised degree of performance. That's one of the drawbacks to using a media not designed to be a media.

Voids therefore are absolutely crucial to optimise performance and, uniquely in ORBS, the voids are actually designed into the media - completely avoiding compaction and because as long as they are maintained properly, it's impossible to block ORBS - the entire media surface is available for population by bacteria.

ORBS overcome the crucial and performance limiting issue of media compaction with a proven design element called EVP (External Void Protectors). EVPs are, in themselves, not new and are successfully and widely used by media technologists in a wide range of applications. What's new about

ORBS EVPs is their strategic location in a single plane. This cutting edge design ensures it's impossible for the spheres to totally compact and, crucially, block. This deal busting feature ensures a constant water flow can pass freely around the entire surface area at all times.

## Durability

ORBS have been designed and manufactured with durability as well as performance in mind. The unique design has both internal and external protection. The internal surface area is protected from compaction by specially designed cavities. Having multiple cavities, instead of one, gives the sphere its integral strength. This is only possible because of the injection moulding manufacturing process and the advanced materials used. This combination ensures the outside surface area is well protected by the EVPs.

## The unique combination of key elements:

- **Advanced, highly sophisticated media design**
- **Advanced materials technology**
- **Cutting edge manufacturing techniques**

Together, these elements really do for the first time see the erstwhile black art of filtration refined, contained and turned into the science of optimised biological performance!

**“ORBS have been designed and manufactured with durability as well as performance in mind.”**

This trinity of benefits provides a media with robust structural integrity that negates harmful compaction by simply designing out this potentially problematic and performance limiting issue by removing it from the equation! The structural integrity ensures that the spheres maintain consistent and maximised productivity whilst colonising nitrifying bacteria and also ensures the continuity of efficient filtration performance.

All this is very interesting, but without an optimised filter to deploy this new media it's not much use - so the Elite technologists designed a range of those too, five to be precise.

## Mechanical & Biological?

Mechanical and biological filtration are both crucial to the overall task of effective filtration - the problem is, these duties have competing requirements. Most mechanical filters are attached to a main filter in some form and if they are fed by oxygenated pond water they will provide aerobic (oxygen rich) conditions for nitrifying bacteria to colonise. While great for biological filtration, these conditions are not ideal for mechanical filtration. The Qube filter range designs overcome this by providing separate areas for each with the perfect conditions for that specific duty, but all within a single unit.

ORBS are primarily designed for biological filtration, but their design also means they are extremely efficient at solids removal. ORBS come in two sizes - 12mm and 8mm. The large ORBS (12mm) are used in the larger Qube filters and the smaller ORBS for the smaller units. This ensures a customised filtration solution and delivers optimum performance whatever the size of Qube unit.

Regular cleaning of the first bio-reactor will ensure the removal of most of the solids above 80 microns. ORBS are designed so that once colonised, they will host a much denser, stronger bio film than conventional media. The twin bio-reactor design delivers exceptional water quality and

clarity. The fact that media containment chambers are sealed also means that there is no smell, no annoying gnat larvae and the units are also very quiet.

## Flexibility

Qube systems are available in five sizes and the two bigger units also have built in UV which is a nice extra space saving touch. Their extremely compact design means they can be located virtually anywhere above or below the pond water level.

Unusually for high performance filtration units, Qubes actually deploy downward flow regimes. This is because researchers discovered that when using the combination of ORBS and Qube technologies, it was this downward flow that delivered the best results. The twin chambers also deploy ORBS in subtly differing situations. In one, the media is entirely free flowing, in the other the media is strategically compacted.

ORBS achieve their enhanced performance characteristics by intercepting particles between 30 and 80 microns by a process of intimate inter-facial surface contact called collisions. These collisions actually increase waste particle sizes and produce waste that is much more easily removed.

The smaller particles, below 30 microns (there are 25 microns in 1/1000"), are removed by a process called bio absorption. This is where particles are adsorbed by the biofilm itself, although this process happens at a much slower rate. The whole process will leave you with crystal clear water.

While the first chamber performs the main mechanical solids removal function, regular cleaning of the second bio-reactor is also encouraged and, because ORBS surface areas are so well protected, very little biomass is lost during cleaning. ORBS media is not designed to have direct aeration to assist function, so there's no need to directly aerate the media. System wide



aerobic conditions being achieved via turbo bottom drains and other in-pond aeration.

While, theoretically, ORBS can be used in any filter unit, they were specifically designed for, and are available exclusively for use in, Qubes. So basically, if you want ORBS technology - buy a Qube - QED!

## Cleaning

Cleaning ORBS could not be simpler. To clean ORBS, turn off the water flow, turn on your air pump and ORBS will bubble and rotate courtesy of a very smart built in air sparge sited within the units bottom drain panel. This releases any detritus from the media which can then be flushed to waste.

If you don't have an air cleaning system, you can simply agitate the media, which again releases any detritus. Once you have flushed to waste, simply rinse the media with pond water until the water runs clear. The fact that the cleaning process is visible through the Qube's clear frontage, users can actually watch the amazing cleaning process as it occurs.

## Chemicality!

ORBS are totally inert, making them chemically resistant and are green in colour. The design of ORBS also render them better able to cope with Koi treatment chemicals necessary from time to time to

eradicate parasites. Because they are protected, less of the population of nitrifiers are adversely affected by the chemicals and by virtue of the design re populate faster.

## Retrofits, Bolt-Ons & Less Energy

Their compact design means that these new filters can be easily added onto any existing systems to provide additional filtration. This bolt-on capability is especially useful for Koi Keepers with older technology based filters that would benefit from a little extra help but don't want a massive re-fit. ORBS deployed in the new Qube filters will give water clarity below 35 microns. Another benefit is that because of their inherent low pressure drop characteristics, low energy circulator pumps can be used.

## Not Just Green - ORBS Are Really Green!

ORBS are not just green in colour, they're also environmentally friendly. Because the reality is, you need to use significantly less ORBS to achieve the same filtration results than other media. This in turn, enables a compact design, which combined to their low pressure drop characteristics require less energy. Consequently, these combined benefits means that it's not just the system footprint that's reduced, but the carbon one too!

levels will also inhibit the immune system, leaving Koi vulnerable to disease and even death. IBFS also results in elevated nitrite levels which reduce the amount of oxygen absorbed by red blood cells - this causes a condition called methemoglobins, more commonly known as brown blood disease. The Hemoglobin in red blood cells is converted to methemoglobin causing hypoxia and eventual death.

The addition of sodium chloride ions (salt) will inhibit the uptake of methemoglobin, reducing its toxicity - but that's a fix, not a solution so filters need to establish an effective bio population as soon as possible. When this happens, IBFS recedes and nitrogenous waste is more effectively converted to nitrate. This is accomplished by the nitrifying bacteria Nitrosomonas and Nitrobacter - we know this as the Nitrogen Cycle. All this is, of course, is a function of filtration efficiency, or during all pond start-ups when IBF occurs - lack of. So it makes sense that the more efficient the filtration systems, the faster it will mature and the less time our Koi are at risk.

The design and function of ORBS not only reduces this potentially problematic maturation cycle, but also maintains this level of efficient operation at a stable and optimised level thereafter - an absolutely crucial requirement of any Koi system. In other words...The permanent solution, not a temporary fix.

It's difficult not to be impressed by the design and technology encompassed in this new media and range of filters. The combination of benefits offered by this genuinely new and innovative technology are compelling. But what's even more impressive than the technology, is the veritable barrage of impressive testimonials from Koi keepers already using it - available for all to see on the Elite web site.

After all, it doesn't matter how impressive the technology is, in the final analysis the real and only acid test of any filtration system is how well it works and what Koi Keepers who have paid their money have to say...

In the case of ORBS based Qube filtration systems - that's a universal thumbs up!

**“It's difficult not to be impressed by the design and technology encompassed in this new media and range of filters.”**

## New Pond Syndrome = Danger Zone

No doubt you will have heard of this term before, it should perhaps more accurately called IBF Syndrome. (Immature Biological Filters Syndrome). This period is when filters first start up and colonisation of the media is taking place. During this time, while filters are not cooking with gas, toxic levels of ammonia and nitrite are not being converted fast enough into less toxic nitrate. This is a real issue in new systems and IBFS can, and does, cause fish health problems.

Toxic ammonia can cause extensive tissue damage to both the gills and kidneys. High ammonia

# ELITE FILTRATION SYSTEMS PRESENT...



## THE QUBE



A totally new generation of advanced Koi pond filtration systems based on ground breaking filter media technology delivering amazing water quality and a range of advanced features:

**Qube Systems deploy ground breaking ORBS media technology!**

- Pump fed or gravity • Compact footprint • Easy to clean
- Significant utility savings • Built in UV option
- Quiet operation • No smells or insects

Want to see one? Visit a Qube APR near you:

**THE QUBE**  
AUTHORISED PREMIER RESELLER

- Shirley Aquatics, Birmingham
- Holmeswood Koi, Lancs
- Quality Nishikigoi, Warrington
- Castleford Pet Centre, Devon
- OutsideWater, Dorset
- Oaks Farm Koi, Blackpool
- GCTek, Oklahoma USA