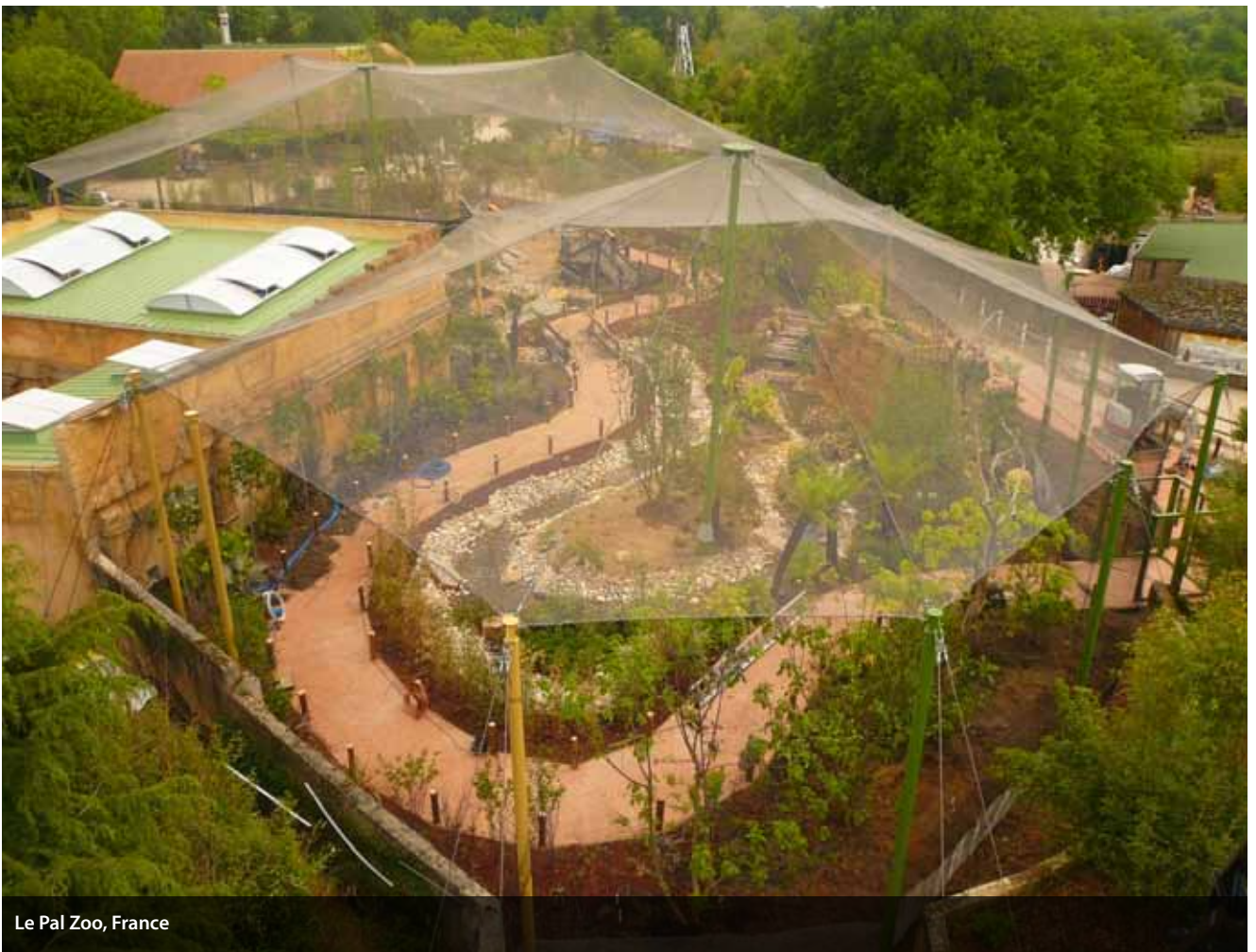




A Guide to Netted Enclosures



One of our bespoke stainless steel aviary mesh enclosures.



A Guide to Netted Enclosures

Choosing the Correct Net Mesh:

1. Synthetic polyethylene or polypropylene nets: These nets are ideal solutions for simpler/ smaller aviary structures providing cost effective lightweight solutions for both wall and roof panels. Due to their lightweight nature and the fact that the material can easily be trimmed to size onsite, installation is relatively quick.

Lifespan: These meshes are rot and UV resistant. Correctly installed meshes, with a good maintenance programme, could be expected to last up to 10 years in ideal circumstances. An exposed location with strong winds and/or extremes of climate would expect to see this lifespan reduced.

Use: As these nets have a reduced lifespan to metal meshes, architectural design should incorporate consideration for replacing nets over the lifespan of the structure. Due to this nature, with exceptions, synthetic nets are more suited to smaller or structurally simple designs, which greatly ease the expense of replacement.

Mesh Sizes: As a rough guide the synthetic mesh types most commonly used are:

25 / 25mm Polyethylene knotted mesh (10/12, 15/12 or 15/15 gauge, 3 strand twine, varying in width from 1.1 to 1.5mm.) NB lighter gauges are available, however we would not recommend their use in structures of any size for reasons of longevity of life.

25/ 25/ 1.5mm high tenacity polypropylene knotless mesh. NB lighter gauges are available, however we would not recommend their use in structures of any size for reasons of longevity of life.

Panel Sizes: Maximum panel sizes are dictated by the tensile strength of the net and the practicalities of installation. Spans of 30 x 20 m can be achieved.

Knotted or Knotless: Strength for strength knotted meshes use a less dense twine and will be thinner than a similarly rated knotless mesh. This makes knotted mesh less visible, with lower wind loadings. Knotted mesh is also easier to repair and patch compared to knotless mesh.

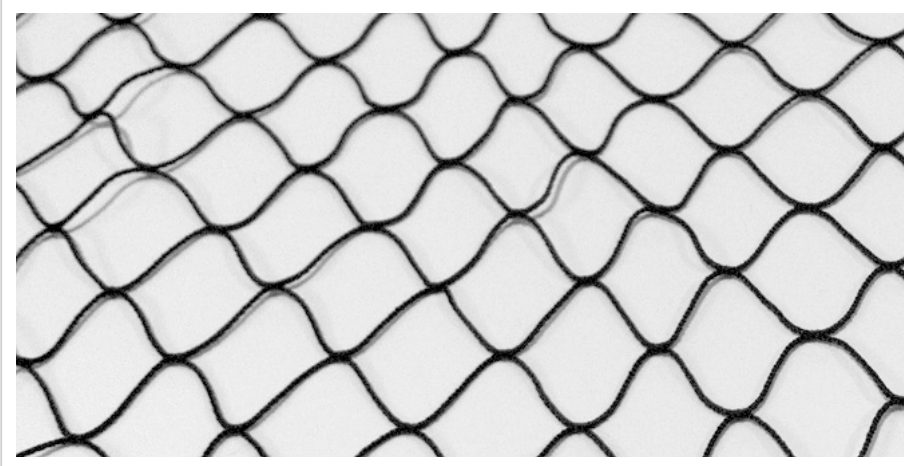
Where knotless mesh wins over knotted mesh is in the ease of installation and the aesthetics of the finished product. This is best illustrated when considering installing wall panels to a netted structure. A knotted mesh requires a tensioned cable net or a rigid frame to which the net is mechanically fastened and tensioned to evenly 'open out' the mesh from its natural diamond shape. A knotless net can simply be hung, as the mesh naturally opens square. The selve edges of adjacent panels can be fixed directly to each other without recourse to a secondary tensioning structure such as cables or a steel frame.



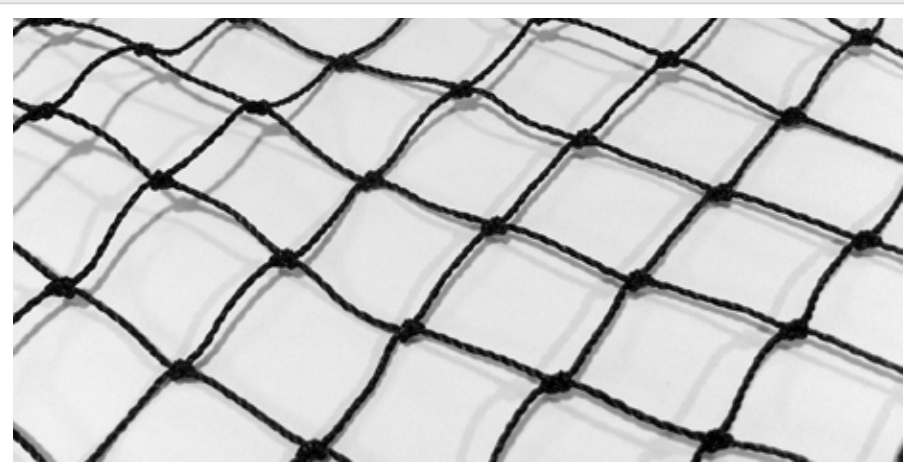
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Flammability: Polyethylene and polypropylene burns slowly in air, fine filaments tend to melt and drop away before propagating a flame. Some proprietary treatments are available to improve fire ratings, with variable degrees of success. This may be a requirement for a 'walk through' structure.

Predation: A consideration for the use of either type of synthetic mesh is the protection of expensive exhibits from predators, such as rats and foxes. Ground level metal fencing with the addition of electric fencing is generally required. Such costs need to be carefully weighed up prior to deciding on the final product. Base would be more than happy to present you with all options to aid this process.



Polypropylene Knotless net



Polyethylene Knotted Net



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2. Metal meshes/nets: These net meshes are produced from 304 or 316 grade stainless wire woven together to produce a mesh similar in handling property to polyethylene knotted mesh. Swaged or knotted wire versions are available, but less commonly used.

Lifespan: These meshes are designed with longevity of life in mind. A correctly installed net structure should have at least twice the lifespan of a synthetic net (20years +). As the material is 'chew proof' it provides two fold benefits of protecting expensive exhibits from predators, as well as protecting the public.

Mesh Sizes: Enclosure metal nets are invariably made of stainless steel wire generally starting from 25 x 25 x 1.2mm for aviaries to 75 x 75 x 3.5mm for a snow leopard structure for example. Larger sizes are also available on request.

Panel sizes: Can be accommodated up to 20 x 15m. However due to the weight of material, individual panel sizes are generally limited to widths of approx 7metres.

Use: These meshes are suitable for architecturally complex and interesting structures, structures exposed to harsh environmental conditions and in providing habitats for larger exhibits e.g. primates, snow leopards etc. Its material strength also allows the possibility of it being engineered into innovative, more complex tensile structures. As with synthetic nets, panel shapes other than squares and rectangles can be considered.

Like knotted mesh, a woven/spliced metal mesh requires a tensioned cable net or frame to which the net is mechanical fastened and tensioned to evenly 'open out' the mesh from its natural diamond shape into the required square.

Flammability: The product is not flammable, making it ideal for a 'walk through' structure.

3. **Weld Mesh Panels:** This product has limited applications in the construction of larger livestock enclosures. Their use in this context is primarily in the construction of steel framed holding pens or entrance doorway systems into enclosures. The maximum panel sizes do vary with mesh and wire gauge, however generally not larger than 8'x4' (2.4x1.2m).
4. **Ferruled metal mesh panels:** These panels are extremely strong and come made to size to fit rectangular and square panel sizes.



Above: 75 x 75 x 3.5 mm woven/spliced stainless steel net



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The Supporting Structure:

Larger net structures are supported by using masts or posts to provide suitable elevation. Depending on the engineering constraints these could be made from wood or (most commonly) steel. The steel structures can either be finished by being galvanised or powder coated:

1. **Galvanised finish:** Masts or posts may be cold dipped galvanised to provide a dull grey, corrosion resistant finish. This process is the base line standard for protecting steel structures for their lifetime.
2. **Powder Coating:** This is process where a paint powder is applied electro statically, before being baked onto the steel providing a hard, uniform durable surface. The costs are higher, but the advantages are that a colour can be chosen to suit. Powder coating will also provide corrosion protecting for the steelwork throughout the structures lifespan.

Large natural features such as banks, escarpments or rock faces may also be used as an alternative for mast/posts, if available/suitable.

Tensioned cables are then installed between mast/post heads to provide the 'framing' required for the mesh panels. These cables may be galvanised or made from stainless steel:

1. **Galvanised cables:** These provide longevity of lifespan with cost effectiveness. Their use is ideal for use with synthetic nets. NB. Problems with bi-metallic corrosion can exist when mixing stainless steels with galvanised metals. As the ratio of stainless steel mesh to galvanised cable in actual physical contact is so low, the electrode potential is greatly reduced and the likelihood of occurrence low. As a consequence stainless steel nets are installed onto galvanised cables without isolating the two materials. The lifespan of the mesh may be reduced.
2. **Stainless steel cables:** Cables and fittings in stainless steel provide visually stunning finishes, being particularly used where aesthetics play a role in the finished product. Stainless steel's lifespan is undoubtedly longer and its use completely eliminates fear of bi-metallic corrosion where using stainless steel meshes. Stainless steel cables cost on average 3x that of an equivalent galvanised cable.

Additional cables are often required for installation/maintenance purposes. These cables are situated above the net support cables and are used by operatives to gain access to the structure during installation and then for subsequent maintenance.



Illustration of an option for mast and tie back design.



Enclosure side view of the net structure and cable supporting structure illustrated in the previous photograph.



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Choosing Your Structure Design:

By altering mast heights and configurations, as well as mesh panel type, the structure can be engineered to suit.

Masts/posts also require special attention to detailing to allow for tidy, professional exhibit and predator proofing, as well as to provide a professional finish.

Foundations, mast base and tie back options can vary greatly depending on structure, available space and materials used. The pros and cons need to be considered carefully.

From our professional experience of exhibit/livestock enclosures, we will be able to guide you clearly to your preferred design options. Our engineering and design team will be able to specify appropriate materials, minimising impact and cost. Our aim to provide you with a bespoke structure to be proud of, delivered within budget.