

OPERATION & MAINTENANCE MANUAL



keepitkool

TENSILE STRUCTURES & SHADE SAILS





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Introduction

Broxap fabric structures, tensile structures and shade sails have been supplied to designs that have been proven over years of development and installation.

All Broxap structural steel products are CE marked in accordance with the recently introduced Construction Products Regulation (Execution Class EXC2).

Our structures are supplied in a base material of mild steel with sections and grades of material being used that ensures they are fit for purpose for many years to come.

To aid in ensuring the maximum life can be realised with the structure, along with minimising the costs for major refurbishment, this manual has been created to assist in the ongoing maintenance requirements along with identifying important points that should be followed at all times.

Broxap are ISO9001 (Quality), ISO14001 (Environmental) and OHSAS18001 (Health and Safety) certified through the BSI.

These 3 standards have been utilised during the design, manufacture, processing and delivery of the product. Our commitment to providing a service of quality that takes into consideration the effects of the environment during its manufacture and life plus the health and safety of the Customers has been fully considered.

Other standards that have also been considered during product design and manufacture are:

- BS EN 1993-1-1:2005 (Euro code 3. Design of Steel Structures).
- BS EN 1090-1:2009+A1:2011 (Execution of Steel Structures & Aluminium Structures).
- BS EN ISO 3834-3:2005 (Quality Requirements for Fusion Welding of Metallic Materials).
- BS EN ISO 1461:2009 (Hot Dip Galvanized Coatings on Fabricated Iron & Steel Articles).
- BS EN ISO 12944-2:1998 (Paints & Varnishes – Corrosion Protection of Steel Structures by Protective Paint Systems).

Health & Safety Information

The structure supplied has no specific operating instructions once it has been installed. However, there is a need for certain Health and Safety notes to be considered during its use and ongoing maintenance.

These being:

For non-braced shade sail structures (NB – this is not PVC waterproof structures but knitted shade sail cloth structures without perimeter beam bracing):

- During “Weather Warnings” it is advisable to de-tension and remove the fabric.
- **It is recommended that the fabric is removed throughout winter weather periods.**
- When tensioning the fabric, refer to the method statement/drawing provided. Please ensure that the sail is fitted in the same manner it was originally installed (ie. the same corner orientation, tension, fittings and webbings face down. Each corner of the sail is marked for reference).
- After high winds, all shackle connection pins should be checked to ensure they are not loose.
- Never place a BBQ or similar heat source directly beneath the sail fabric. The fabric is not heat resistant and could melt. Smoke could also permanently discolour the material.

General fabric structures:

- When routine maintenance is being undertaken Broxap identify that:- **It is the Customer’s responsibility to ensure that at all times when working at height and by whatever method chosen, full care, responsibility, correct operation, training and supervision must be adhered to as a minimum.**
- Broxap cannot accept any responsibility for any damage or injury to persons or property as a result of not working in a safe and proper manner.
- Should any structural concerns, product failure, product quality or issues relating to ongoing maintenance and repair of the product be necessary, then it is strongly recommended that in the first instance contact is made directly with Broxap.

Materials & Processes

As the product is designed to utilise various customer requirements, the following is a list of materials and processes that could have been used during its processing:

Materials

- Mild steel in grades S235, S275 or S355
- Reinforced bar foundation cage
- Shade sail fabric – Commercial 95 or Rainbow
- Waterproof PVC tensile fabric – Ferrari or Mehler
- Wire rope safety cables
- Extruded Aluminium
- Fixings in Grade 8.8 or 10.9 in steel or stainless steel
- BZP Tek screws
- Ground anchors – Sleeve or resin type

Processes used

- Bending, forming, laser cutting, fabrication and welding.
- Hot dip galvanizing
- Polyester powder coating
- Wet painting
- Cutting (fabric)
- High Frequency welding (fabric).

Cleaning, Maintenance & Repair

This section gives a generic overview of the inspection and cleaning regimes, solutions, methods and techniques which will preserve the aesthetic finish of the product.

Inspection & Cleaning

To maximise life expectancy the product should be visually inspected, on a regular basis, for any signs of damage, vandalism, breakdown of surface finish, build-up of salt, dirt or atmospheric residue, fungal accumulation and loose fixings.

During these inspections, should any concerns be noted, then the Customer's attention is brought to the following pages whereby suitable maintenance and repair methods are described for the various materials used.

In the event of serious damage to any main, or structural, component then Broxap should be contacted immediately for detailed technical advice.

In addition to the visual inspection, a regular cleaning regime is also required.

Steelwork

The required frequency of visual inspection and cleaning of the steelwork will be dependent on the environment in which the product is situated:

- In rural and urban environments (C1 – C3) the products should be visually inspected monthly, and cleaned every 3 months.
- In harsh industrial or coastal environments (C4, C5-I, C5-M), where the products may come into contact with concentrated atmospheric pollutants (chemical, marine), the visual inspection frequency should be increased to weekly, and the cleaning frequency increased to monthly (or as required).

Fabric Membrane

The frequency of visual inspection of the fabric membrane should be 6-monthly.

This inspection is to detect minor damage in the membrane before it develops into a major problem.



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The inspection should check for:

- Small cuts or openings in the fabric, by observing the material against a bright light screen (sky, artificial light).
- Any distortion of shape (wrinkles etc) indicating the possibility of damaged material, released clamp profiles, cables or tensioning devices.

Any serious defects should be reported to Broxap immediately.

In addition to the visual inspection, there should also be a routine **annual** inspection, carried out by suitable specialists. This should be scheduled for late summer to ensure the components of the structure are in an acceptable condition prior to the autumn and winter months when the incidence of storms is most likely.

This inspection should include:

- Inspection of membrane clamping elements
- Check for debris lodged along the edges of the membrane
- Checking welded joints for integrity
- Inspection of membrane for damage
- Inspection of cables and turnbuckles
- Checking all fixings are tight

The fabric membranes should be cleaned each 6 months, or more frequently if required.

Note – this document is not designed to be exhaustive and extensive in the exacting requirements of every case. If you consider your cleaning or repair circumstances to be outside of the scope of this document, then please contact Broxap and we will be happy to help you keep our products looking as new.

All cleaning and maintenance should be recorded, detailing the method of cleaning, what products have been used, and what repair work has been undertaken.

In the case of a warranty claim against Broxap, this information will be requested.

Galvanized Coating

The Galvanizing used on the product has been processed in accordance with the requirements specified in BS EN ISO 1461:2009.

Galvanizing is a hot dip chemical reaction of molten zinc onto a steel substrate.

At the time of the process taking place the appearance will be one of shiny silver, however, this will not last and over a period of several weeks this will dull off to a grey colour. This is the natural finish of the Galvanized surface.

Note - due to the nature of the Galvanizing process some surface irregularities may occur on the surface of finished products. Although these will be finished flat, where possible, this will not be undertaken where it may breach the zinc coating. Some visual irregularities may therefore be present on galvanized products, including those finished with a polyester powder coating – these do not compromise the durability and performance of either the product or the coatings in any way.

The cleaning of any exposed Galvanized surfaces should be undertaken using:

1. A low pressure water wash e.g. hose pipe.
2. A soft brush, with warm soapy water, to remove any surface dirt.

Scourers, wire brushes, and abrasive cleaners must not be used during cleaning as they may compromise the protective surface and result in premature rusting.

After cleaning ensure the product is rinsed thoroughly.

Galvanizing has the ability to “self-heal” any minor knocks or scratches.

However, there will be occasions whereby the coating has been damaged to base steel at a size that will not allow for self healing. Based on this there are several proprietary repair paints on the market. In Broxap’s experience we have found 2 that give a satisfactory repair and finish for ongoing use. The 2 methods are either Galvafruid or Zinga with both being available in either a paste / brush application or an aerosol spray.

- Where the surface is scratched or damaged through to base steel, a check should be made to establish if rusting has occurred.
- Where rusting is present, then the area should be wire brushed / sanded to bring back to a bright steel surface.
- The system used for repair will state the required precautions that should be taken along with the application method, however, a build up of coating should be such that the thickness will be capable of giving ongoing protection as required. The coating thickness on renovated areas should be at least 100 microns.

Powder Coating

As the name suggests, this process involves the application of a polyester powder onto the Galvanized substrate, using an electrostatic gun. This is then oven cured to create the hard wearing outer layer that can be seen on the finished product.

Note - due to the nature of the Galvanizing process some surface irregularities may occur on the surface of finished products. Although these will be finished flat where possible, this will not be undertaken where it may breach the zinc coating. Some visual irregularities may therefore be present on galvanized products, including those finished with a polyester powder coating – these do not compromise the durability and performance of either the product or the coatings in any way.

Powder coating can last many years, but its life expectancy depends on a variety of factors, including site location, atmospheric conditions and cleaning regime. The recommended cleaning frequency is detailed at the start of this section.

The cleaning of powder coated surfaces should be undertaken using either:

1. Warm mild soapy water and soft brush, sponge or natural bristle brush. Rinsed with clean water.
2. A proprietary car wash and wax system. Rinsed with clean water.

At no time during the cleaning process is it advisable for any abrasive cleaners, solvents, or other chemicals, to be used:

To enhance the appearance of the powder coating, an annual treatment with car wax would be acceptable, but not considered mandatory.

Where Graffiti is present, then it is recommended that no solvent cleaners are used in an attempt to remove it. The method of removal should be with the use of either a car 'T-Cutting' compound or through a specialist cleaner. This should be tested on a small, inconspicuous area first to assess its efficiency.

Where small repairs to the powder coat surface are required, then the following should be adhered to as a minimum:

- For light scratches / chips where the base metal is exposed then a suitable zinc-rich primer should be carefully applied to the defect, followed by a topcoat finish of a matching acrylic based paint or touch up (obtained from Broxap).
- Where scratches / chips have only exposed the galvanized surface, then the above must be followed with the exception of the Zinc Rich primer being applied.

For larger areas of damage, vandalism or coating breakdown, then Broxap should be contacted for technical advice.

Fabric Membranes

The fabric membranes will need regular cleaning to prolong the life of the fabric. All environmental residues need to be removed to reduce the likelihood of stains or fungal growth on the fabric.

Shade Sails:

Every 6 months, use Sugar Soap and a soft bristle brush to clean the sails. Work the soap into the fabric and leave for 15-20 minutes and then rinse the sail with clean water.

NOTE: Brush must have soft bristles and must not be applied to the fabric in such a way as to damage the weave of the fabric in any way.

Do not spray the fabric directly with a high pressure hose (jet wash) as this can permanently damage the fabric. If using a high pressure hose a rotating brush head attachment must be used.

For shade sails with hard to move dirt and grime we recommend the use of a product called Wet & Forget Mould and Moss Removal. This is available from hardware stores or directly from www.wetandforget.co.uk

Always use a soft brush or sponge to prevent damage to the fabric. Use the table below to determine the product concentration and water dilution levels:

DIRT	CONCENTRATION	PRODUCT
Minor	15%	Liquid sugar soap
Medium	30%	Liquid sugar soap
Major	25%	Wet & Forget

Broxap does not recommend the use of bleach, solvents or strong alkaline cleaners.

(Continued)

PVC Tensile Fabrics:

Every 6 months, the surface of the fabric should be cleaned using cold water and a soft brush or sponge. This is to remove any loose surface soiling / debris.

Do not spray the fabric directly with a high pressure hose (jet wash) as this can permanently damage the fabric. If using a high pressure hose a rotating brush head attachment must be used.

For shade sails with hard to move dirt and grime we recommend the use of a mild detergent (eg. Ungapon, or a Ferrari detergent solution). It is recommended that a small inconspicuous area is tested first.

Use the table below to determine the product concentration, water dilution levels and temperature:

DIRT	CONCENTRATION	WATER TEMP
Minor	5%	20°C
Medium	10%	20°C
Major	10%	50°C

The detergent should be applied, left to work for up to 5 minutes and then wiped off. The fabric should then be rinsed off thoroughly with clean water and dried with a cloth.

Broxap does not recommend the use of bleach, solvents, abrasive powders, acid cleaners or strong alkaline cleaners.

Additional Information

Additional information on maintenance can be found on the Broxap website:

www.broxap.com/maintenance

