

Rocklyn[®] Sports Domes



Rocklyn Air Supported Structure Operation and Maintenance Manual



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1. Introduction

Rocklyn air-supported structures provide a cost-effective and flexible means of covering outdoor sporting areas, primarily during winter months. The structure comprises 2 or 3 'skins', held in place by a steel cable net which is anchored at multiple points around the perimeter. The skins and structural cable-net assembly are then inflated by the introduction of positive air-pressure, provided by powerful blower units, and managed by a central control system. Your dome may include optional items such as heaters, insulation, back-up generators, and specialised lighting controls.

This manual provides user-level descriptions of materials and equipment included with your dome, recommendations for ongoing care and maintenance of those components, and an inspection/maintenance regime for the secure and safe operation of the dome.

2. Components – care and use

2.1 PVC Main Skin

The main skin/membrane is made from flame-retardant, PVC-coated polyester fabric (500 microns nominal thickness). It is manufactured with a translucency rating of 35-40% to allow natural light to pass through. This translucency allows day-time use without the need for artificial lighting (and associated running costs). It is important in the ongoing care of your dome that this membrane is kept clean to ensure it retains its translucent properties, and to protect it from premature wear or cracking. The outer protective foil (see item 2.2) will provide protection from abrasion and environmental contaminants (dust and pollution) while the dome is inflated.

The PVC membrane is designed to be extremely strong, and will resist impacts from most objects associated with sporting activities. However, poor handling during erection or dismantling, or abuse with sharp objects could result in tears to the membrane. Small tears (less than 20cm) should be temporarily repaired with a heavy duty adhesive tape, and reported to Rocklyn for repair during the next appropriate maintenance visit. Large tears (over 20cm) are unlikely to threaten the structural integrity, but may impact the operational efficiency of the dome. Large tears should be temporarily repaired with a heavy duty adhesive tape, and reported to Rocklyn for repaired to Rocklyn for immediate repair.

Care should be taken when inflating and dismantling the dome, the skin should be folded in accordance with instructions from Rocklyn supervisors. Storage of the membrane when the dome is dismantled should be in a clean, dry facility free from rodents and out



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PVC Main Skin Cont.

of direct sunlight. When used over clay courts, a protective ground sheet should be used during inflation and dismantling to protect the inner surface from clay-dust.

With due diligence and care, the main membrane has a life expectancy of 20 years or more.

2.2 Protective Foil

The second, outer-skin is known as the protective foil, and is 'sandwiched' between the main skin and the steel cable-net. The protective foil is made from industrial polyethylene (150 microns nominal thickness), and is relatively light-weight and inexpensive. As the name suggests, the protective foil serves as a protective layer for the main skin, preventing cracking from UV radiation, dirt from environmental contaminants such as dust and pollution, as well as abrasion from the steel cable-net.

Care should be taken during dismantling and erection of the dome to prevent tearing of the protective foil. Storage of the membrane when the dome is dismantled should be in a clean, dry facility free from rodents and out of direct sunlight. Any tears identified should be repaired using a heavy duty adhesive tape.

With due diligence and care the protective foil has a life-expectancy of 4-5 years.

2.3 Insulation (optional)

Although not generally required for weather conditions in the UK and Ireland, a third insulating foil (or bubble foil) may be incorporated. The insulating skin is sandwiched between the inner main skin, and the outer protective foil, and is used when extremely cold weather conditions are encountered, or when the inner temperature of the dome is an important consideration (eg clay courts).

Care should be taken during dismantling and erection of the dome to prevent tearing of the insulating foil, and the membrane should be stored vertically (to prevent air being squeezed out of the bubbles) in a clean, dry facility free from rodents and out of direct sunlight. Any tears identified should be repaired using a heavy duty adhesive tape.

With due diligence and care the insulating foil has a life-expectancy of 5-6 years.



2.4 Steel Cable-Net

The dome derives its structural strength, shape and rigidity from a 'net' of 10mm zinccoated steel cables joined by stainless steel cross-clamps. The cable net is anchored to points around the perimeter of the dome at approx. 3m intervals. This arrangement distributes dynamic stresses generated from the internal air-pressure, and natural forces such as wind, into the ground. High strength 'stirrups' enclose the cable end-loops at each anchor point.

The steel cable-net is designed to be largely maintenance free, and requires no ongoing servicing during normal operation. It is advisable to conduct a visual inspection of the cables and anchor points following strong wind conditions, and advise Rocklyn of any damage sustained.

On dismantling, the steel cable-net should be wound in accordance with instructions from Rocklyn supervisors, and care should be taken that the high-strength stirrups at each anchor point are not dislodged and/or lost. Storage should be in a clean, dry facility and, if possible, covered by a protective sheet.

With due care, the life-expectancy of the steel cable-net is 30 years or more.



2.5 Anchorage

Anchor points, spaced at approx. 3m intervals, are positioned around the perimeter of the dome and used to secure the steel cable-net. Several options are available in terms of anchor points:

- Concrete ring-beam / foundation with chemically fixed anchor points;
- Anchor bolts driven directly into the ground; or
- Ground boring, with anchor cables



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Anchorage cont.

Site and ground conditions will dictate which type of anchorage is the most appropriate, but in most cases a concrete ring-beam is the preferred option.

Anchors are designed to be largely maintenance free. However, it is advisable to conduct a visual inspection following strong wind conditions and advise Rocklyn immediately of any damage identified.

2.6 Blower Units

The structure is inflated by dual blower units, operating in a fail-over configuration (if one motor fails, the second will operate in its place). Blower units are contained within the equipment room, and connected to the dome via ducts. Care should be taken to ensure that ducts/vents for the blower units are kept free from obstruction, and appropriate steps should be taken to ensure dome users are aware of this.

The system incorporates aviation-grade wind measurement equipment, and will automatically increase blower output in response to high wind to improve the structural rigidity of the dome. The windspeed at which this occurs is adjustable, and your Rocklyn representative will discuss appropriate settings with you during the first installation.

In the event of failure of either motor, a red warning light will appear on the main control panel (see section 2.10). An



automated telephone alert system is available as an optional extra. In the event of motor failure the second motor will maintain internal pressure, and Rocklyn should be contacted immediately.

Unless otherwise agreed, servicing and routine inspection of blower units and motors will be conducted by Rocklyn personnel, details of which will be contained within your maintenance contract.



2.7 Heating (optional)

Although not generally required in the UK and Ireland, a heating system may be incorporated where preferred or required (eg over clay courts or a swimming pool). The heating system may be gas or oil burning, and operates in conjunction with the blower units (located in the equipment room).

Unless otherwise agreed, servicing and routine inspection of heating equipment will be conducted by Rocklyn personnel, details of which will be contained within your maintenance contract.

2.8 Door Elements

Your dome will incorporate one or more main entrance doors, consisting of either a 3-leaf revolving door (see right) or a 2-door air-lock configuration. Client preference dictates which system is used, but the revolving door is the more common choice. These doors are lockable for security after hours.

The doors contain glazed panels to prevent accidental impact with other users, and these panels should be periodically cleaned.

Domes covering 2 or more tennis courts (or an area larger than 1,000sqm) will also incorporate an emergency exit door as standard (this applies to domes supplied by Rocklyn, and may differ in other regions). This door is primarily intended for the emergency evacuation of dome occupants, and users should be instructed not to use the door for purposes other than escape. The emergency door is operated by rotation of the handle (see right).





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Door Elements cont.

Emergency doors may be used by approved and appropriately trained staff for bringing large objects in or out of the dome, or to ventilate the dome, but <u>care should be taken</u> not to leave the emergency door open for longer than five minutes at a time as this would eventually lead to dome deflation and collapse.

Unless otherwise agreed, servicing and routine inspection of door elements will be conducted by Rocklyn personnel, details of which will be contained within your maintenance contract.

2.9 Lighting (optional)

Although optional, in most cases a lighting system allowing use of the dome at night will be incorporated. The lighting system comprises rows of fluorescent light-boxes, each containing 2 x 58W fluorescent tubes (80W tubes are also available for increased intensity of lighting).

The lights are attached directly to the main skin via hanging attachments integrated into the main skin during manufacture, and provide a direct and



non-blinding source of light to the playing area. Each court has two rows of lights positioned above the sidelines and consisting of between 30 and 60 light-boxes per court, depending on the intensity required (lux levels of 300, 390 and 480 are available using 58W tubes. Higher lux levels are available using 80W tubes).

Lighting over each court can be controlled independently via master switches on the control panel (see 2.10), which have options for "On", "Off" or "Remote Control". In the event that "Remote Control" is selected, control of the lights will revert to a hand-held remote control supplied as standard. If multiple courts have "Remote Control" mode selected at the master switch, the remote control will operate the lighting for all of those courts (ie there are not separate remote controls for each court).



Lighting Cont.

Coin/token operated and motion sensing activation systems are also available as optional extras. Please ask your Rocklyn representative for more information.

On dismantling of the dome, light-boxes are carefully detached from the main skin during deflation, and stored in a clean, dry location in accordance with instructions from a Rocklyn supervisor. Lights should not be detached until power has been isolated, and a Rocklyn supervisor advises that it is safe to do so.

Unless otherwise agreed, servicing, replacement of fluorescent tubes, and routine inspection of lighting elements will be conducted by Rocklyn personnel, details of which will be contained within your maintenance contract. In some circumstances Rocklyn will provide training to an organisation that wishes to change fluorescent tubes in-house.

2.10 Control Panel

The main control panel is situated on the external face of the main switch box, located in the equipment room. This provides the master control for each motor, as well as the lighting system over each court.

During normal operation, the control switches for each motor should be left in the on position, as turning the motors off



will lead to dome deflation and collapse. Indicator lights for each motor will illuminate red in the event of motor failure (as shown above) and these lights should be checked on a daily basis to ensure correct functioning of both motors. Rocklyn should be contacted immediately if either motor indicates a failure.

As mentioned in section 2.9, the master switches for lights over each court are also contained on the main control panel. Lights for each court can be turned permanently

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Control Panel cont.

"on", "off", or to "remote control" mode. In remote control mode, lights are turned on and off by use of a hand-held remote control, supplied as standard.

Unless otherwise agreed, servicing and routine inspection of the control panel and main switch will be conducted by Rocklyn personnel, details of which will be contained within your maintenance contract.

2.11 Back-up Generator (optional)

An optional diesel generator, used to supply power in the event of a mains power-failure, may be incorporated with your dome. The generator and associated control panel (see right) are located in the equipment room. When selected to "auto", the generator is configured to automatically activate in the event of a mains power-failure, and will provide continuous power to dome motors for up to 18 hours (with lights turned off). Daily checks should confirm the master switch is correctly selected to "auto".

The generator can be tested by turning the master switch to "test", which will cause the generator to start. When testing the generator, it should be allowed to run for at least 10



minutes. While servicing and testing of the generator will be conducted by Rocklyn, it is advisable to run additional internal tests every 2 weeks. If the generator does not start when "test" is selected, Rocklyn should be contacted immediately.

In the event of a mains power failure that has led to prolonged operation of the generator (in excess of 10 hours) Rocklyn should be contacted, as fuel levels may need replenished.

Unless otherwise agreed, servicing and routine inspection of the generator will be conducted by Rocklyn personnel, details of which will be contained within your maintenance contract.



3. Operation

Your Rocklyn air-supported structure is designed to operate with the minimum amount of user input/supervision. A comprehensive Rocklyn service/maintenance contract will ensure the structure continues to operate in a safe, secure and satisfactory manner. Whilst elements of the structure will need to be periodically replaced, it is reasonable to assume that its lifetime is virtually endless.

Notwithstanding the above, there are a number of daily and weekly checks that users should conduct to ensure the ongoing safe operation of your dome. It is advisable to maintain a record or log of these checks, and any unusual events or observations noted. Rocklyn should be contacted if any uncertainty arises as a result of these checks.

3.1 Daily Checks

Actions in **bold** indicate items that should be referred to Rocklyn.

Equipment Room

- Check main control panel for correct operation of motors
 Contact Rocklyn if either motor indicates a red failure light
- Check lighting master switches are selected to the desired function
- If applicable, check back-up generator master-switch is selected to "auto"
- Check equipment room generally for signs of water penetration or damage
- Ensure equipment room is secure

Doors

- Ensure entrance doors are free from obstruction, and operating correctly
- Check emergency exit/s for correct operation, and closed securely
- Check all glazing panels are clean, allowing sight of other users

Weather

- Check forecasts for any strong wind and/or snow, and take any necessary precautions (see section 3.3).





3.2 Weekly Checks

Equipment Room

- Back-up generator (if applicable), tested <u>every 2 weeks</u> for at least 10 minutes

Membrane & Cable-net

- Conduct external and internal walk around to visually inspect condition of dome membranes. Repair any previously unseen tears using heavy duty adhesive tape Contact Rocklyn if a previously unreported tear larger than 20cm is noted in the main PVC skin
- Conduct external walk around to visually inspect the cable-net and anchor points
 Contact Rocklyn if previously unreported damage to cables or anchor points is noted

Lighting

- Check all interior lights are operating correctly. If appropriate training has been provided, replace any lights that require replacement following correct procedure **If training has not been provided, contact Rocklyn to advise of any previously unreported fluorescent tubes needing replaced**

3.3 Inclement Weather

The Rocklyn air-supported structure is designed to withstand harsh weather conditions including strong wind, snow and sub-zero temperatures. However, in the event that severe weather is likely there are several precautionary steps that should be taken to limit the risk of damage to the structure

3.3.1 Strong Wind

Actions before:

- Check the main control panel to ensure both motors are operating normally
- Check back-up generator (if applicable) and ensure "auto" mode is selected
- Check that emergency exits are securely closed, and that there are no other likely sources of air loss/leaks
- If possible, remove any objects within 1.5 metres of the membrane, inside and out. If practicable, lay all objects (including nets and net-posts) flat on the ground.



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Strong Wind cont.

Actions during:

- Depending on wind severity, <u>limit</u> or <u>prevent</u> access to the dome and its immediate surroundings
- If possible, observe and record the dome's behaviour from a safe distance, including any deflections and/or deformations
- Note any solid debris that is blown into the vicinity of the dome, including size and approximate location
- Note any mains power outages, including approximate length of time

Actions after:

- Check main control panel for operating status of motors
- Conduct visual inspection membranes, inside and out, noting any damage or tears sustained
- If possible, remove any debris from the area, and conduct a close inspection of the membranes in the vicinity of large/solid debris
- Conduct a close visual inspection of the cable-net and anchor points, noting any visible damage sustained
- Notify Rocklyn of any damage sustained to cables, anchor points, membranes, or any irregularity in motor operation

3.3.2 Heavy Snow

The Rocklyn air-supported structure is designed to withstand moderate levels of snow accumulation, and lev-els of snow-fall in the UK and Ireland are unlikely to lead to an accumulation greater than dome tolerances. These steps are precautionary, and applicable only in extreme circumstances.

Actions before:

- Check main control panel to ensure both motors are operating normally
- Check back-up generator (if applicable) and ensure "auto" mode is selected
- If your dome does not have an integrated heating system, consideration should be given to obtaining industrial space heaters capable of raising the internal temperature to 8°C
- If practicable, lay all objects (including nets and net-posts) flat on the ground



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Actions During

- Monitor the dome for accumulations of snow
- If significant amounts of snow begin to accumulate (over 40mm), attempt to physically remove the snow using water jets, long poles, or a rope passed over the dome and dragged across the surface
- In the event of a dome collapse due to snow accumulation, turn both motors and stand-by generator off at respective control panels. Wait until the snow has melted, or has been removed from the dome surface before re-inflating the dome.

4. Rocklyn Contact Details

Your Rocklyn air-supported structure will be the subject of a comprehensive maintenance and service agreement. Key contacts will be contained within your service agreement, or you can contact a representative on: +44 (0)28 9264 8344