



The SKYSTREME Model 729

INFLATABLE RESCUE KITE INFLATABLE AIR SPLINT INFLATABLE BODY WARMER

The SKYSTREME is the worlds first, combination inflatable rescue kite, inflatable air splint, inflatable body warmer.

When used as a personal emergency rescue / location marker the SKYSTREME is a radar reflective location marker which flies, floats, can self launch, requires no power supply or gas and can lift ancillary devices such as compatible lights and wind socks.

When used as an inflatable splint for injured limbs the SKYSTREME has a unique angular splinting capability.

When used as a body warmer the SKYSTREME utilises its unique air chamber arrangement in combination with its heat reflectivity, to give the highest thermal capacity for the least weight and size.

This unique “three in one” emergency tool weighs only 43grams (total pack) and measures just 12cm x9cm x3cm.

Simple in form and to operate, the SKYSTREME is actually a complex piece of design and engineering utilising high tech materials which, as long as the outer pouch is undamaged, has no replacement date.

It's function is akin to a flare in that it creates a visual point of reference in the sky between 35 mtrs (100 ft) to 50 mtrs (150ft). However, unlike a flare whose visual duration for the point of reference lasts for a relatively short length of time. The Skystreme has a virtually unlimited time for this visual reference point with the added advantage of radar reflectivity.

In all instances where advice is given to find, or construct shelter, eg snowholes, for survival outdoors during bad weather, or injury, there is also further advice concerning attracting attention to possible rescuers in the vicinity, therein lies a major problem in that how do you expose your position without breaking cover or shelter and if you do, when is the right time.

A Skystreme in this situation resolves this dichotomy, it will fly attached to any object and hover at 100ft plus in winds of gale force, in rain, and snow and will lift lights to the same height or reflect light shone upon, it and will remain hovering for day's if necessary and the without having to be held or manipulated by a person.

In the marine environment the Skystreme has particular advantages for carrying in small boats such as RIB's and other craft with a low freeboard, their propensity in weather to be a fairly wet and the limited stowage facilities require careful consideration when thinking about distress signalling and location marking.

The Skystreme is contained in a waterproof external pouch that is only the size of a credit card wallet and can be stowed within jackets or boat boxes without taking up much space and are complementary additions to any existing distress signalling kit carried.

Handheld radio's have range limits and fully function internally mounted radios can consume power that may not be available in a failed engine scenario, this can be due to excessive use of batteries in attempts to restart a failed engine.

Flares have to be kept in watertight containers with date limits on the flare they also have to be used when the right opportunity is available this can mean when the situation has deteriorated and become serious or when a local vessel is within sight.

Epirbs are also in this category of waiting until a deteriorating situation requires emergency action

All the above signals are extremely effective but there is a natural reluctance to deploy these signals, because of the massive search and rescue response that is instigated, also the time at which the distress signal is made is the only time the boats position is accurately marked, after that the drifting and windage of the craft means that the search pattern will only begin at the last known point.

The Skystreme allows an intermediate stage of distress and permanent location signalling to be used, the following scenario of a typical dive boat problem illustrates this well.

When a dive boat has divers down and the engine fails, or the Smb is detached from the divers, the boatman has a dilemma, when to deploy current distress signalling, which would start a major call out for what may only look like at the time, a minor problem.

The Skystreme resolves this issue, by deploying it immediately, not only is it possible for a nearby vessel to come to assistance, it enables surfacing divers to see from low in the water the direction of the dive boat and of course if the divers deploy their own Skystreme they can be also spotted easily. The other advantage is, if the problems are resolved, the signal can be taken down indicating a return to normal operations.

The Skystreme is patented as follows:-

European Patent No 0695207

Australian Patent No 676033

United States Patent No 5816537 and others applied for.

MATERIALS & PERFORMANCE PARAMETERS

The outer flexible container pouch is heat sealed to withstand a minimum of 5 bar external pressure.

It has been chamber tested frozen at -40° degrees centigrade and pressure reduced to 0.185 bar over 20 mins (equal to 40,000 ft altitude). The seals maintained their integrity.

The upper horizontal edge has a V notch through the material to create a weak point for opening.

Airtight and waterproof it is a tough three layer pouch with its central layer being a solid aluminium barrier foil.

It has a Military standard conformance MOD Def stan18-75 type1.

The SKYSTREME 'envelope' weighs 17gms is a metalised Mylar laminate with welds to a specified minimum burst pressure of 0.4 bar. The leading edge of the SKYSTREME measures nearly 3/4 of a metre across and the total visible surface area is approximately 1 square metre.

The bridle attachment points are reinforced to a tear strength minimum pull force of 30n over 360 degrees (the yarn used has a minimum breaking strain of 7kg).

The SKYSTREME has been subjected to a number of rigorous controlled environment tests and has been exposed to temperature extremes of -40° c to $+60^{\circ}$ c without damage. The exception is the deflation straw which can become brittle below -10°

The SKYSTREME has been deployed in the field at altitudes of 17,000 feet and flown successfully, in desert at $+60^{\circ}$ c and sea states of force 8. Uninterrupted, uncontrolled flight of 7 days and nights in mid Atlantic have been recorded.

Tests were conducted in the High Arctic in temperatures of -45° c and recorded wind speeds reached 62 knots. The SKYSTREME continued to fly. As the pressure adjustment straw becomes brittle in temperatures below -10° c, a special solid nylon pressure adjuster is available on request for use in these temperatures. This adjuster will also clear ice formed from the warm breath that condenses in the self sealing valve.

The SKYSTREME flies at an average tether angle of 45 degrees. Therefore a fully paid out line (normal specification 60 metres) will achieve an average vertical height of 30 metres.

The SKYSTREME will normally become airborne in a wind speed of 6 kph. At 8 kph it will begin to lift a payload of approximately 20 gms, increased wind speed will increase the payload capacity exponentially.

At sea level the air pressure is approximately 1000 millibars (1bar). At 5500 metres (18000 ft) the air pressure is less than half that. Therefore, if the SKYSTREME is deployed at extreme altitudes, stronger winds are required.

Notwithstanding its performance in the 'clean' winds of the High Arctic, at sea, wind speeds in excess of 35 knots (Force 8), combined with heavy seas creating air turbulence above the wave height, will affect the flying performance of the SKYSTREME.

The pouched SKYSTREME unopened will float, as will an opened one. It has been tested to depth of 50 metres.

The SKYSTREME can lift off land unaided. It will float and has 1.5 kgs of positive buoyancy. However, it is not designed to lift off water unaided as the surface tension is too great.

When down in water, it must be retrieved and presented to the wind.

The SKYSTREME is light reflective and dependent on ambient daylight and visibility conditions can be seen by the naked eye at a distance in excess of 2 kilometres. With the use of optical devices (eg binoculars) greater distances will be achieved.

At night the SKYSTREME will reflect strongly, from any angle, a light source directed upon it. The flying shape will act as a parabolic reflector if the light source is beneath it.

The radar cross section as measured by the UK Defence Evaluation Research Agency peaked at 2 square metres on 9.4 GHz. It has been independently field tested in the High Arctic and the SKYSTREME's "splash back" has been picked up by a light aircraft using broad band radar, eleven miles distant from the flying SKYSTREME.

NATO code stock Number for the 729 was applied for by the Royal Navy and has now been issued as 4240-99-705-5996. The ID name is "Marker Location Personnel".

Other useful applications that have been discovered or suggested;

The parabolic shape of the Skystreme in flight deflects radio waves downward, for example it has been found that the loss of a mobile phone signal from the radio shadow caused low hills or other such obstructions will be overcome and a ground footprint of the signal will be restored.

Experiments have taken place using the Skystreme to act as decoy's, target practice, and free flying over water for potential ship protection have taken place.

In jungle or a closed canopy situations they have been used in tandem with lighter than air balloons to stabilise the balloons and lift through canopies. The Skystreme taking over when windy conditions above the tree canopy normally cause the balloon alone, to fail.

When deployed from an aircraft the Skystreme can be attached to a piece of cargo with a bobbin, the Skystreme is deployed inflated and the cargo when dropped allows the bobbin to unwind the line to its full length, when the cargo hits the surface (water or land) the skystreme remains in the flying position 30 metres + above the load.

Military medics are conducting experiments concerning use as a pressure bandage for flesh wounds etc.

Kite fishing is another practical use for the Skystreme in a survival situation.

SKYSTREME MODEL 21

Following a number of paramedics who bought the SKYSTREME 729 and dispensed with the line for flying, to use it solely as a splint, we have decided to market this as a separate product.

- 1) Its compact size and weight, over six times smaller and lighter, enables lower storage and transport costs, and is far more portable.
- 2) Stronger nylon material than existing inflatable splints which are made from PVC.
- 3) Single size will fit all limbs and sizes, existing inflatable splints need different sizes for different limbs or patient ie children.
- 4) Angular splinting capability, does not straighten the limb on inflation, it creates a temporary inflated cast.
- 5) Speed and ease of deployment due to low air volume required, compared with ordinary inflating splints.
- 6) Less traumatic for the patient in application than existing splints including the SAM malleable splint.

- 7) Access areas for pulse and wound drainage, application over clothing, plus extra uses as a body warmer.
- 8) When used as a body warmer the structure created by the air chambers allows it to be worn under an outer garment creating heat reflective wind proof pockets directly against the chest area.
- 9) It is also strong enough to act as a portable infant carrier with support from the inflated tubes for the infant creating a temporary carry cot with thermal blanket properties, particularly useful in disaster relief situations,

Dr Alan Gibson, an orthopaedic surgeon at Bristol Hospital, is also the medical adviser to the British Hang Gliding and Paragliding Association. He has given both models his enthusiastic approval and will be writing it up in this vein, as well as requiring them for his own personal use.

The Skystreme model 21 inflatable splint/body warmer is built to the BS EN ISO 9002 standard and meets the BSI requirements as a class 1 medical device for the purposes of the CE mark, and also meets the EU directive for inflatable splints to be carried in first aid kits aboard class vessels class A&B under MSN notice 1726 (M+F).

A couple of tips to use when demonstrating the SKYSTREME.

- 1 A strong sharp pull at the V notch with a full opening tear to the end of the pack ensures that it will open easily.
- 2 When inflating if the first sharp puff of breath does not clear the airway from packing creases, hold the mouthpiece end with one hand and the bottom of the central tube with the other, then inflate, or clear the airway with the red deflation straw. It is also advisable when withdrawing the deflator to run your finger and thumb to the point at which you cannot feel the end of deflator within the valve, then withdraw the deflator holding onto the tube at that point.
- 3 When flying pay particular attention to the “floppy to fly instruction”, it is also wise to try out the Skystreme in a clear flat area at first before trying to find its limits in more difficult conditions. It will also become apparent that after being airborne for a little time it becomes more and more stable, again packing creases stretching out.
- 4 If due to hot sunshine or over inflation it becomes too difficult to insert the deflation straw place the unit in a colder area, water for example, and the internal pressure will decrease enough to allow easy insertion of the deflator.
- 5 When demonstrating as a splint place the deflator within mouthpiece before inflation to prevent the line wrap crimping the valve and then withdraw when the first puff of inflation tensions the line.
- 6 When demonstrating the body warmer ensure that at least 30secs to 1 minute under an outer layer of clothing for the full effect to be felt.