Unique Group

Buoyancy Solutions

APPLICATION NOTE

The Use of Seaflex Buoyancy for Pipeline Shore Approaches

Buoyancy & Ballast

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APPLICATION NOTE

Overview
Executive Summary

Seaflex pipelaying buoyancy modules are designed to ensure the best possible outcome for installation contractors working in a competitive market: improved profitability.

+ This is achieved through low intrinsic cost of the equipment if purchased (because air costs absolutely nothing)and even lower intrinsic cost if hired - combined with Seaflex modules being by far the easiest and the safest buoyancy solution to work with onsite, when compared to the big, heavy steel or solid foam alternatives.

  The result is lower upfront cost of investment, compounded by a better return on that investment through a much quicker and safer operation – all of which will feed directly through to the project's bottom line.

  Although the price differential will become increasingly favourable to Seaflex the larger the size of buoyancy module selected, it can be expected that Seaflex modules will always be less expensive to purchase than steel or foam alternatives and much less expensive again to rent.

World-leading support from project conception through execution

+ No other shore-pull buoyancy supplier is able to draw on more relevant experience than Seaflex or offers a higher level engineering support and onsite technical support to turn a supply and demand relationship into a partnership, and ensure successful outcomes. No other shore-pull buoyancy supplier offers greater ex-stock availability ready for immediate dispatch worldwide.

The quickest, easiest and safest option to transport, stow, handle, deploy and retrieve

+ Up to 500t of capacity can fit into just 1 x 20ft container, making airfreight a viable option for urgent requirements (for comparison, 40-50t of solid buoyancy would normally fill a 40ft container). Due to lack of product weight even our 5t modules at 40-45kg can easily be lifted onto pipeline by 2 men, so no specialist and time-consuming handling is required. Minimal points of connection (just one in the case of our MBUs)make for simple and speedy rigging (very often a simple choked round sling).

  And because our modules can be vented prior to their detachment from the pipeline, using Seaflex removes all the risks to divers and to workboats associated with solid buoyancy modules effectively becoming high-energy projectiles upon release.

A different philosophy, creating best return on investment

+ Whereas all other manufacturers of similar-looking buoyancy modules are primarily looking to sell their equipment, Seaflex is mainly a hire company. What this means is that, as opposed to our competitors who are reliant on repeat business over time, it is very much in the interest of Seaflex to ensure that our bags are designed as well as they can be and that they are built to last – to give us the best possible return on them within our rental fleet via intensive use over a long period of time. As the bags we sell to customers are exactly the same as those we put into our rental fleet, customers who opt to purchase from us also reap the benefit of this philosophy.

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APPLICATION NOTE

Introduction

The Use of Seaflex Buoyancy for Pipeline Shore Approaches

Introduction

+ Unique Seaflex have more than 20 years' experience of supplying inflatable buoyancy solutions for offshore engineering projects – most notably where pipeline crosses shore, either afloat or pulled along the bottom.

  Our experience of such projects is vast, and allows us to not only supply industry leading buoyancy bags with all necessary accessories but also to work with our clients from design engineering stage to optimize the specification of the buoyancy and the rigging as well as to jointly develop the methods to ensure the most efficient use of our equipment within the project.

  If required, we can also provide BOSIET-ticketed technicians to assist with the correct and most efficient use of our equipment on the project.

  Our client list is long, and within it you will find many of the most prominent names in offshore contracting.

  All our bags are designed and manufactured in full compliance with IMCA D-016 guidelines, and those units we can drop-test come with type test certificates proving that they meet the required 5:1 factor of safety. Within our rental pool, all bags are inspected, tested and recertified between each and every job, and each bag comes with its own logbook demonstrating that servicing regime and also providing full traceability down to component level for our customers' peace of mind.

Overview

+ Further on within this application note you will find some schematic drawings to demonstrate how Seaflex bags can be rigged, deployed and then vented and retrieved after touchdown.

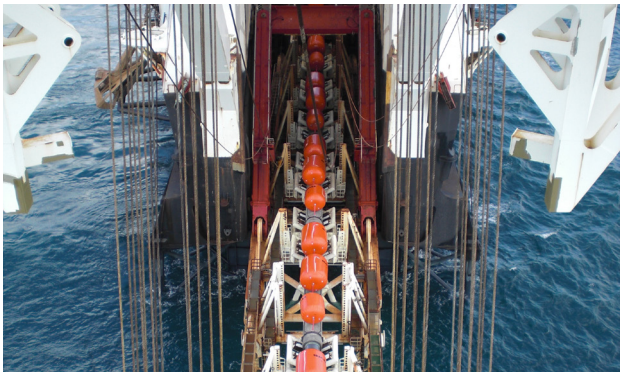
  Seaflex bags are suitable for use on projects where the pipe is being pulled into shore or pulled out from shore, floated into shore or floated out from shore. They are suitable for use through cofferdams on the shore or to assist with positioning on HDD projects. They are used on conventional rigid oil and gas pipe, as well as on HDPE intake and outfall pipes. They can be rigged to accommodate piggy-back arrangements. They can be secured to pass through a stinger without risk of fouling.

  We also offer the patented Kraken system of continuous buoyancy with low profile, particularly suited to ultra-shallow work such as through swamps.

  In short, there are not many pipeline landing projects for which Seaflex buoyancy is not suitable.

  In terms of attachment, the preferred method is the use of simple choked round slings, but if these cannot be fitted at a joint recess and abrasion is a concern (ie in the event of a bottom pull) then clients have simply used steel bands to fit a d-ring or similar to the top of the pipe, onto which our buoyancy units can then easily be shackled.

  Each project will have its own set of parameters and its own ideal solution in terms of rigging the bag and in terms of how best to fill and then vent the bags – and Seaflex are able to consult with the client to agree the best solution for the specific combination of pipe, location and intended method.



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Summary

The Use of Seaflex Buoyancy for Pipeline Shore Approaches

Commercials

+ Seaflex offer both hire and sale options, per customer preference. We are generally able to supply either new or rental bags from our extensive stock, although for larger requirements a production lead-time which is generally in the range of weeks rather than months would need to be allowed for.

Summary

A safe, efficient and ultimately profitable outcome to such pipeline installations – insofar as it can be influenced by the selection of buoyancy – can be assured via the following outcomes of adopting the Seaflex solution:

+ Ease of transportation, stowage and handling: up to 500t of capacity in just 1 x 20ft container
+ Speed of rigging / de-rigging due to lack of weight and minimal points of connection
+ Flexibility offered by ability to top-up or vent bags during the course of the operation to only provide buoyancy when it is required.
+ Diver and workboat friendly, due to decreased handling weight and ease of deploying extra buoys onto pipe if required / ease of retrieval via the hose once vented at the end of the job
+ Module designs fully compliant with IMCA 5:1 factors of safety
+ No capex, storage, maintenance or disposal considerations once the project is complete, if rental option is selected
+ Possibility of site support from Seaflex technicians if required
+ A greater track record than any other manufacturer on the supply of inflatable buoyancy for such installations worldwide, as can be seen from the reference list later on in this application note as well as the images of the use of Seaflex buoyancy on pulling wires and pipelines which are scattered throughout this covering letter.

Seaflex buoyancy is not just suitable for use on the main pipeline itself – it can also be used on the pulling wire, for the installation of any umbilicals, and to facilitate the AWTI phase of such operations.

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APPLICATION NOTE

Mono Buoyancy Units (MBUs)
Changing the Pipelaying Market

Designed for High Load Angles

+ Through listening to our customers, Seaflex has developed the MBU - a pioneering way of combining the different and hitherto incompatible operational benefits of our ALBs and IBUs.

  The Seaflex MBU is enclosed buoyancy, but it has the essential advantage of having a single attachment point like an ALB, which makes it as tolerant to load angle as the parachute-type bag. So, unlike any other enclosed lifting bag in the world that we are aware of, the Seaflex MBU can be used in line with the load, and can be lifted through. Each Seaflex MBU design has been tested and proven to demonstrate a safety factor in excess of 5:1 on a pull through its axis (eg the 5t MBU design has been proven to resist a through-load of more than 25t). These loads are transmitted through the bag via a proprietary through-strop design, and as of today we are the only manufacturers to be able to demonstrate via testing that their product of this type is capable of offering any sort of safety factor over and above the capacity of the bag itself.

Easy to Handle and Deploy

+ MBUs are a more practical alternative to solid buoyancy in many situations, and are exceptional within towing scenarios. As they can be simply lifted from a single point, they can easily be recovered by crane with no possibility of tearing of the strop pocket or canopy. And 500t of MBU lifting capacity can fit into a single 20ft container.

User-controlled Buoyancy Variation

+ During the mobilisation phase, and particularly important during demobilisation, the air can be introduced and released in a controlled manner into and from single or multiple units to allow the load to settle gently into the correct position, or to reposition it if required, before the MBUs are vented and released under zero load.

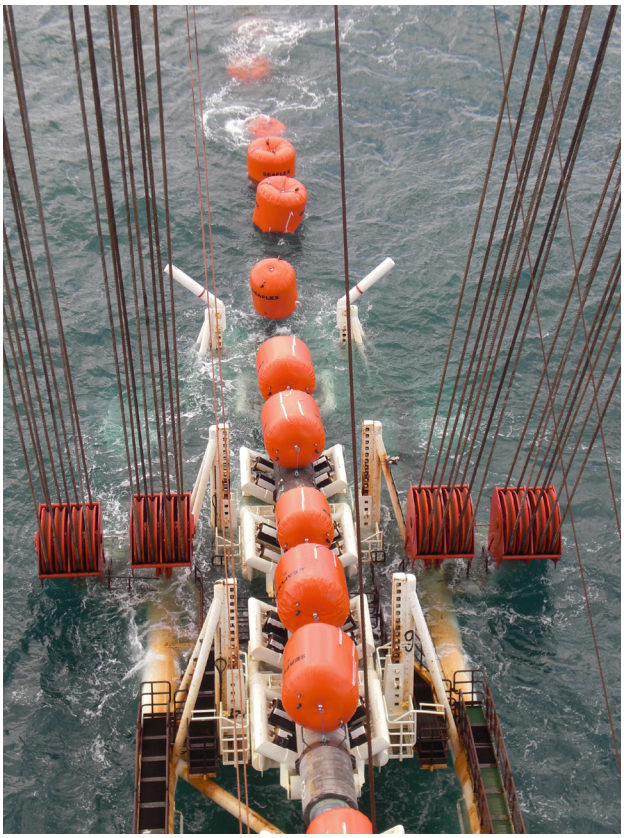
Made to Last

+ Made of our toughest High Tensile Trevira® Polyester 3/3 base cloth coated with heavy duty UV stabilised PVC coating, MBUs are massively reinforced with six reducing concentric rings of fabric layers at each end, and are terminated with a custom made stainless steel lifting ring fitted into this reinforcement, rather than having a having an external harness or system of strops, which would lend themselves to being connected onto for convenience, and to damage being caused to the bag as a result.

Tested, Proven, and Changing the Market

+ Seaflex MBUs are available in 1, 2, 3 and 5 ton lift sizes, and as with all our products they are fully type tested and proven to the relevant international standards.

  Since their introduction, many pipelaying contractors who were previously taking standard IBUs from Seaflex or from one of our competitors have now made the switch to be able to benefit from the unique operational advantages of our proprietory MBU design.



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APPLICATION NOTE

Mono Buoyancy Units (MBUs)
Key Features and Benefits at a Glance

For Your Ease of Operation

+ Lightweight (approx 1% of capacity) and packed small for Fully compliant with IMCA D-016 recommended 5:1 factor of safety.
+ Overall assembly physically tested and proven to exceed a 5:1 minimum WLL safety factor. Independent Type Test Certificates are available.
+ Fitted with multiple pressure relief valves to ensure safety during use.
+ High performance structural fabric canopy.
+ RF welded seams.
+ Structural through-strop for transmission of lifting loads.

For Your Peace of Mind

+ Designed to transmit through-loads via single central connection, can be lifted via this point, can even be moored onto.
+ Rental units inspected and tested between every single job.
+ Buoyancy of individual or multiple units can be increased or decreased as required from the surface.
+ 2 x 3/4 inch BSP standard inflation/deflation valves with 316 stainless steel male Camlock adapter as standard.
+ Leafield Marine high flow pressure relief valves (PRVs).
+ Delivered in an enclosed crate and ready for immediate use with universally compliant documentation: MBU specific log book containing certification, service records and operating manual.

	Inflated (Kgs & Mtrs)			Packed (Kgs & Mtrs)			
Model No	Lift	D	H	Wt	L	W	H
1 MBU	1000	1	1.5	15	0.6	0.5	0.2
2 MBU	2000	1.33	1.7	18	0.75	0.6	0.2
3 MBU	3000	1.5	2.2	27	0.8	0.65	0.2
5 MBU	5000	1.75	2.2	37	1	0.8	0.2

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APPLICATION NOTE

Inflatable Buoyancy Units
Flexible, Multi-Purpose Flotation

Reliable and Controllable

+ Seaflex enclosed IBUs are the system of choice where reliable, controllable buoyancy is required. They are particularly suited for installation buoyancy on pipeline float-outs, beach pulls and river crossings. Our IBUs have also been used in applications such as vessel and platform draught reduction in limited water depths, and as pontoons for temporary bridges and docks.

  Constructed from High Tensile Trevira® Polyester 3/3 base cloth coated with heavy duty UV stabilised PVC coating, our IBUs come fitted with stainless steel camlock terminated inflation points and 38 mm diameter pressure relief valves each capable of releasing 80 cubic feet (2.3 cubic metres) of air per minute. The IBU operates at 2 psi over ambient to ensure maximum volume, and therefore full displacement, during operation.

Designed for Ease of Handling

+ The multiple attachment points of our IBUs assist in spreading the lift points across the load. Their relatively low vertical heights and short strop configurations are a key advantage where water depth is limited or a load needs to be supported near to, or on the surface. We have designed-into all our IBUs an intuitive system of ensuring accurate strop spacing; a spacing link strap joins the fixed ring strop terminations together. And, just like our range of ALBs, our IBU's have integral ladders to facilitate handling.

  Typical 5 tonne capability IBUs weigh just 46 kg, making them an easily handled item for two rigging crew.

User-controlled Buoyancy Variation

+ During the mobilisation phase, and particularly important during demobilisation, the air can be introduced and released in a controlled manner into single or multiple units to allow the load to settle gently into the correct position, or to reposition it if required, before the IBUs are vented and then released in a completely safe manner with no uplift force remaining.

Optimised for Horizontal Deployment

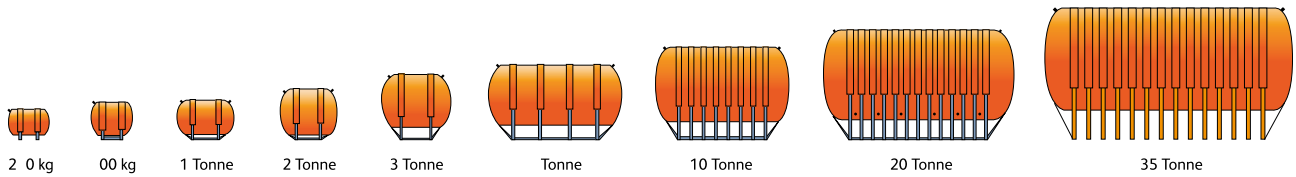
+ IBUs are not designed to find their own level on inflation; they must be held approximately horizontal to prevent tearing of the strop pockets. Within this context, and unlike versions of IBUs offered by others, the unique Seaflex end-strop system forces air through the IBU as it is inflated - to prevent bulging and resulting failure. Circumferential strops built into the IBU itself deal with shallow angles, enabling the IBU to cater to load angles of up to 10 or 15 degrees (where greater working angles are expected, Seaflex Mono Buoyancy Units are the perfect answer).

  Our IBUs offer significant advantages over ALBs where static as opposed to dynamically-ascending buoyancy is required, especially in relatively shallow water. They are also very stable under way and can be towed, dependent on load and sea state, at up to 2 knots.

Extremely Cost-Effective: Hire Options Available, Transport Costs Minimised

+ Seaflex has over 25 years' worth of experience of the manufacture, rental and maintenance of the world's largest stock of certified, best in class, IBUs. Our fleet of IBUs have worked in every ocean and sea, and on every populated continent.

  With a shipping weight of approximately 1% of inflated lifting capacity, Seaflex IBU's are first choice for contractors requiring significant, compact lift; a single 20 foot shipping container can hold a massive 500 tonnes of buoyancy.



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APPLICATION NOTE

Inflatable Buoyancy Units

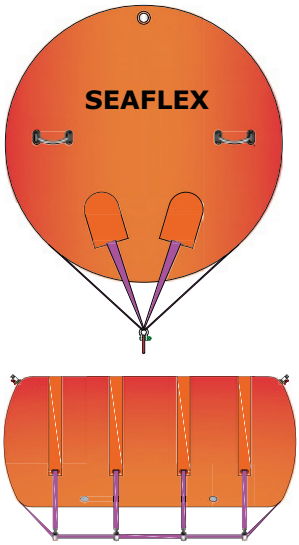
Key Features and Benefits at a Glance

For Your Peace of Mind

+ 5:1 design WLL factor (strops 7:1).
+ Fitted with multiple pressure relief valves to ensure safety during use.
+ High performance structural fabric canopy.
+ RF welded seams.
+ Unique end-strop design prevents stress and bulging on the extremities of the IBU.
+ Rental units inspected and tested between every single job.

For Your Ease of Operation

+ Ideally suited to extreme shallow waters.
+ Buoyancy of individual or multiple units can be increased or decreased as required from the surface.
+ Webbing harness includes multiple fixed steel lifting rings fitted with spacing straps.
+ Integral end strops to prevent rotation.
+ Integral handling ladders.
+ 2 x 3/4 inch BSP standard inflation/deflation valves with 316 stainless steel male Camlock adapter as standard.
+ Leafield Marine high flow pressure relief valves (PRVs).
+ Delivered ready for immediate use with universally compliant documentation: IBU specific log book containing certification, service records and operating manual.



	Inflated (Kgs & Mtrs)				Packed (Kgs & Mtrs)				
Model No	Lift	L	H	Ø	Wt	L	W	D	No/Pallet
250 IBU	250	1.1	0.7	0.6	5	0.40	0.20	0.10	40
500 IBU	500	1.1	1.0	0.8	9	0.50	0.25	0.15	30
1t IBU	1,000	1.6	1.2	1.0	12	0.60	0.25	0.20	20
2t IBU	2,000	1.6	1.4	1.3	19	0.70	0.35	0.25	11
3t IBU	3,000	2.0	2.0	1.5	34	0.80	0.40	0.35	6
5t IBU	5,000	3.5	2.0	1.5	46	0.90	0.50	0.35	5
10t IBU	10,000	3.5	2.5	2.0	68	1.10	0.80	0.30	3
20t IBU	20,000	5.0	3.4	2.3	120	1.20	0.90	0.35	2
35t IBU	35,000	6.5	3.4	2.6	300	1.50	1.00	0.50	1

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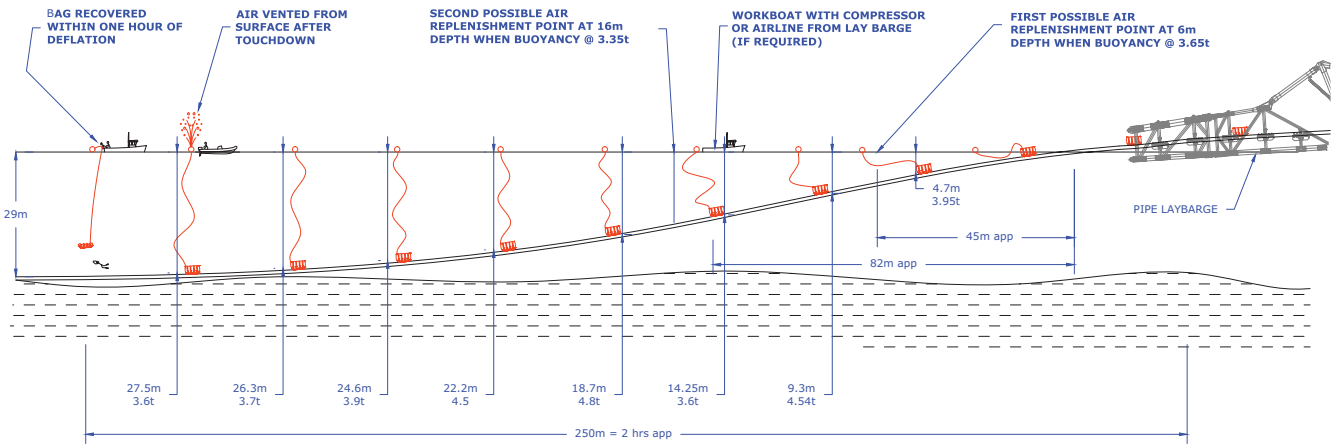
APPLICATION NOTE

Inflatable Buoyancy Units
Technical Representation

REPLENISHMENT AND RETRIEVAL OF INFLATABLE BUOYANCY UNITS IN PIPELAYING OPERATIONS



TYPICAL EXAMPLE

30" PIPE LAID IN 29m OF WATER.

1 x 5t INFLATABLE BUOYANCY UNIT (IBU) EVERY 2 JOINTS. (24m)

BUOYANCY FIGURES SHOWN SHOW VALUES IF IT IS CALCULATED THAT BAGS ARE TO BE TOPPED UP AT 6m AND 16m DEPTHS

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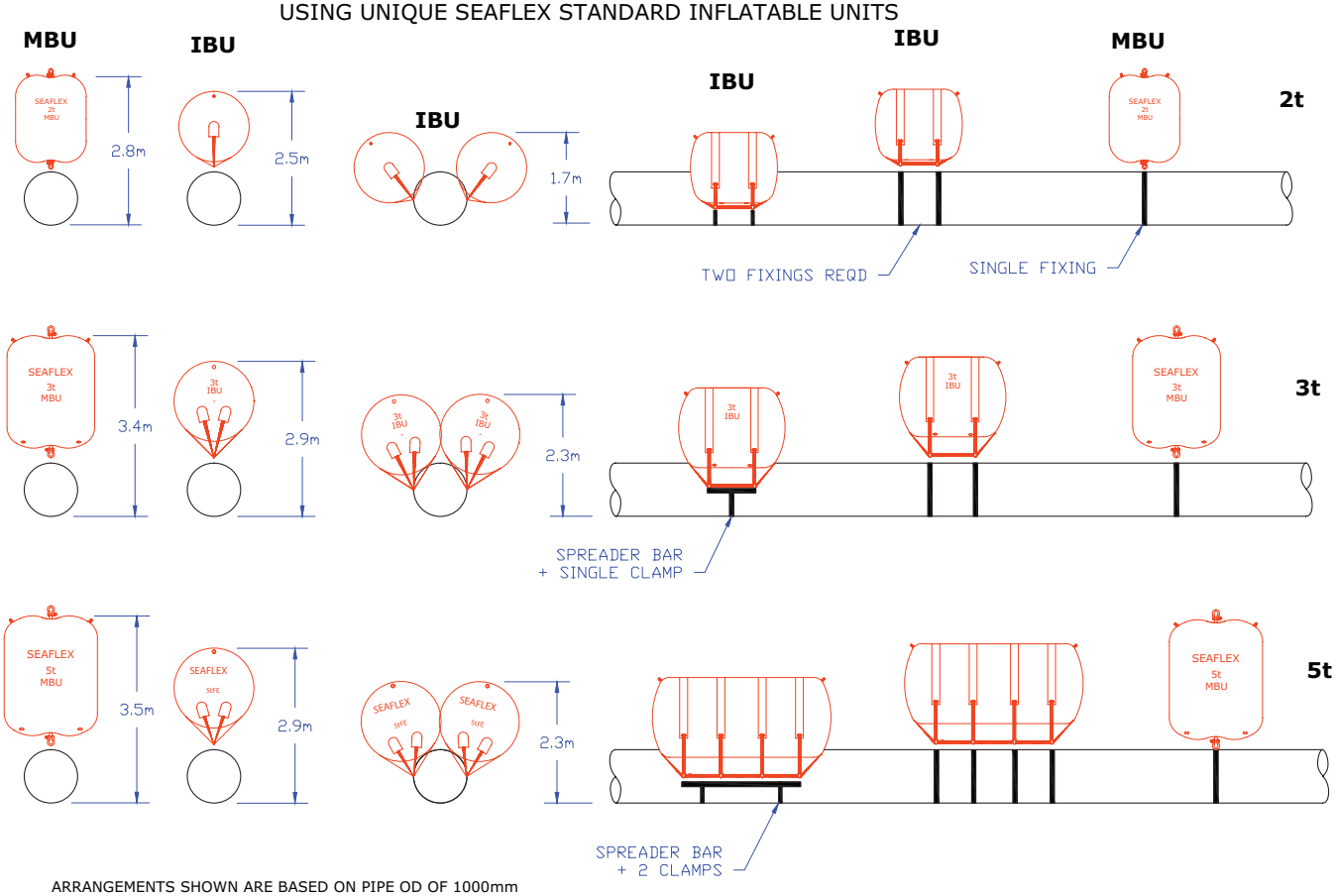
APPLICATION NOTE

Inflatable Buoyancy Units
Technical Representation

VARIOUS RIGGING ARRANGEMENTS FOR PIPE BUOYANCY
USING UNIQUE SEAFLEX STANDARD INFLATABLE UNITS



ARRANGEMENTS SHOWN ARE BASED ON PIPE OD OF 1000mm

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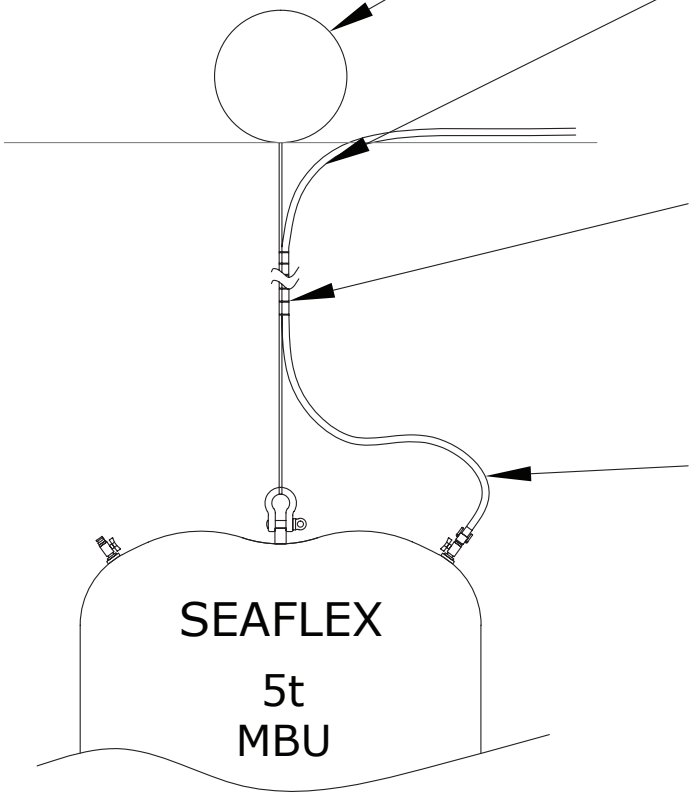
Inflatable Buoyancy Units
Technical Representation



Pick-up Buoy on surface attached to top shackle of the MBU via rope.

Adequate slack in hose to allow for movement, hose run on surface of water to barge and connected to the manifold.

Hose connected to rope via duck tape.

Adequate slack in hose to allow for movement, connected to MBU via female camlock on hose male camlock on MBU.

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APPLICATION NOTE

Seaflex Kraken™ for Pipelines
Introduction

Introduction

+ Seaflex Kraken™ is designed to provide temporary buoyancy for the launch and installation of shallow water pipes and for supporting lengthy sections during surface or bottom tows. From a beach launch, the equipment can take up the pipe weight in very shallow water and, with a suitable air supply, provide buoyancy at any depth. It is particularly suited to ultra-shallow applications such as the floating of pipeline through swamps, where its low profile will ensure minimum draft throughout the operation.

Description of Seaflex Kraken™

+ The patented Kraken™ buoyancy system consists of our heaviest weight PVC coated polyester fabric tube with high frequency (HF) welded seams and mechanically fitted penetrators with location loops spaced at 1.33m pitch along the crown of the unit. Various sizes are available, depending upon the amount of buoyancy required per metre to support the pipeline – generally working off a 2:1 reserve ratio against the actual weight in water of the pipeline. By fixing this buoyancy tube to a pipe with webbing strop or banding at 1.3m intervals, a continuous buoyancy is applied which produces very low stresses in the pipe.

  The coated fabric tube is extremely strong and made by the world's leading performance fabric manufacturers. It has a proven record spanning 20 years and is an ideal material for underwater air filled buoyancy.

HIDD Pipeline, Bahrain, supported by Seaflex KrakenTM type 2650/2/13

Benefits of Seaflex Kraken™

+ **Power to weight ratio**
  In round numbers, 10kg of packed flexible buoyancy will produce 1000kg of lift when inflated. A ratio of 100:1. No other type of buoyancy can come anywhere near this ratio.

+ **Cost per ton**
  On a per-ton of buoyancy basis, Kraken will be the cheapest form of inflatable buoyancy, when compared with individual buoyancy units such as Seaflex's MBUs and IBUs, and will be considerably lower than the cost of fabricating steel units or purchasing foam-filled plastic units. As a rough rule of thumb, solid buoyancy filled with foam designated at or near the surface will cost approximately GBP 1000 / USD 1500 per ton to purchase, whereas Kraken™ can be expected to come in at less than half that cost – and depending upon the size can be as little as a third of the cost of solid buoyancy.

  When this is combined with the massively reduced shipping volume, the overall cost benefit of choosing Seaflex flexible buoyancy becomes extremely compelling.

+ **Control**
  By venting air, buoyancy can be removed by remote control from the surface; an ability that can be exploited to huge commercial effect. The advantage of being able to place the pipe on the bottom when positioned correctly after the tow, gently and without underwater intervention, is a major advantage over conventional forms of rigid buoyancy.

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APPLICATION NOTE

Seaflex Kraken™ for Pipelines
Benefits Continued

+ **Kind to Pipes**

Because the Krakenn™ buoyancy is uniform along the pipe and each attachment is carrying a light load, the forces exerted on the pipe are small and point loads are eliminated. The light weight is also helpful when fixing the buoyancy before launching as it exerts negligible rotational forces on the pipe before immersion.

+ **Suited to ultra-shallow work**

Initially designed for a project in a swamp, because of its continuous nature Kraken™ need not be of that big a diameter to offer a large amount of buoyancy through its entire length. This, combined with the fact that it is secured directly onto the top of the pipeline, makes it very probably the most efficient product in the market to float pipelines through ultra-shallow water.

+ **Perfect for pulling and towing**

While individual buoyancy units are ideal for the type of work where the pipe is only moving at a few metres per hour and they can be topped up from a floating airline, they are not so suited to a 'fast tow' with their large frontal area and individual air lines.

By using long tube Kraken™, individual air supply lines are reduced to manageable numbers and frontal area almost eliminated.

+ **Robust and resistant**

The fabric is extremely strong, and coated both inside and out, however chafe should be avoided to maintain the airtight integrity and structural strength of the fabric.

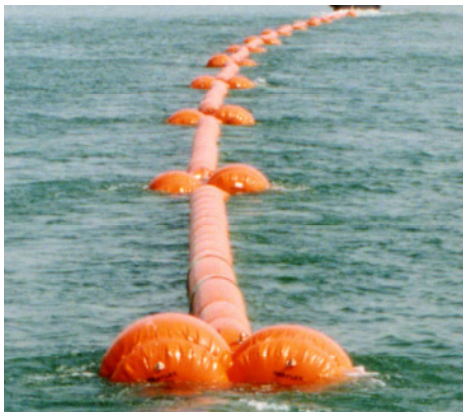
It can withstand large impacts from blunt objects but continual movement on a single point, particularly a creased seam when folded, will erode the outer coating and eventually the basecloth. The outside coating is not critical as most of the air retention is performed by the inner coating; however chafing through the basecloth should be avoided.

Much of our equipment is used in contact with the sides of rusty and heavily encrusted wrecks, and for these short periods the fabric withstands attack from rough metal and crustaceans very well.

In practical terms, particularly with the Kraken, chafe problems can be reduced or eliminated by design of the attachments, use of chafe barriers (barriers as simple as sections of carpet have been used in the past) and proper handling procedures during attachment and removal.

+ **Easy to repair if need be**

The fabric is extremely strong, and coated both inside and out, however chafe should be avoided to maintain the airtight integrity and structural strength of the fabric. It can withstand large impacts from blunt objects but continual movement on a single point, particularly a creased seam when folded, will erode the outer coating and eventually the basecloth. The outside coating is not critical as most of the air retention is performed by the inner coating; however chafing through the basecloth should be avoided.



More images from Hidd Project, Bahrain

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APPLICATION NOTE

Is Seaflex Kraken™ Suitable For My Project?

Perhaps. Ultimate suitability will depend upon factors such as the following:

Are you floating the pipe or pulling it along the bottom?

+ If you are pulling it along the bottom, Kraken offers 545kg/m, so this solution will not be suitable for pipelines weighing more than around 300kg/m.

How much buoyancy per metre will you require?

+ The largest size of Kraken offers 545kg/m, so will not be suitable if more than 300kg/m of buoyancy is required.

How deep will the Kraken need to operate at?

+ Hoop Stress dictates that the smaller the Kraken the greater the depth that it will be able to operate at. The table underneath provides the main Kraken sizes, buoyancy and maximum depth rating.

  But it is at the shallower end of the depth scale where the low-profile of the Kraken makes it most advantageous to users.

Do you wish to purchase or hire buoyancy for this project?

+ Much of Seaflex's work with contractors installing pipelines is of a rental nature and makes use of individual buoyancy units such as our IBUs and MBUs rather than a continuous system such as Kraken. The reason for this is the versatility of individual units in that four sizes, 1t, 2t, 3t & 5t units are able to cope with any weight of pipe by varying the distance between units. From a hirer's point of view, we are only able to stock our massive tonnage of buoyancy for hire because this versatility ensures a reasonable usage rate.

  So if your preference is to hire, then IBUs or MBUs are the way forward, whereas if your preference is to purchase and you are looking at a long float out in ultra-shallow water then Kraken is the best product for the job.

Seaflex Kraken Specifications

Type	Lay Flat Width on Drum (mm)	Inflated OD Afloat (mm)	Buoyancy Kg/m	Weight / 50m Section (Kg)	Nominal Max Working Depth
2650-1-6	1305	830	545	222	12 msw
2650-2-10	655	430	132	76	20 msw
1500-1-18	730	465	170	85	22 msw

* The maximum working depth is based on a reserve buoyancy factor (RF) of 50% and a 3:1 Factor of Safety on the working pressure.

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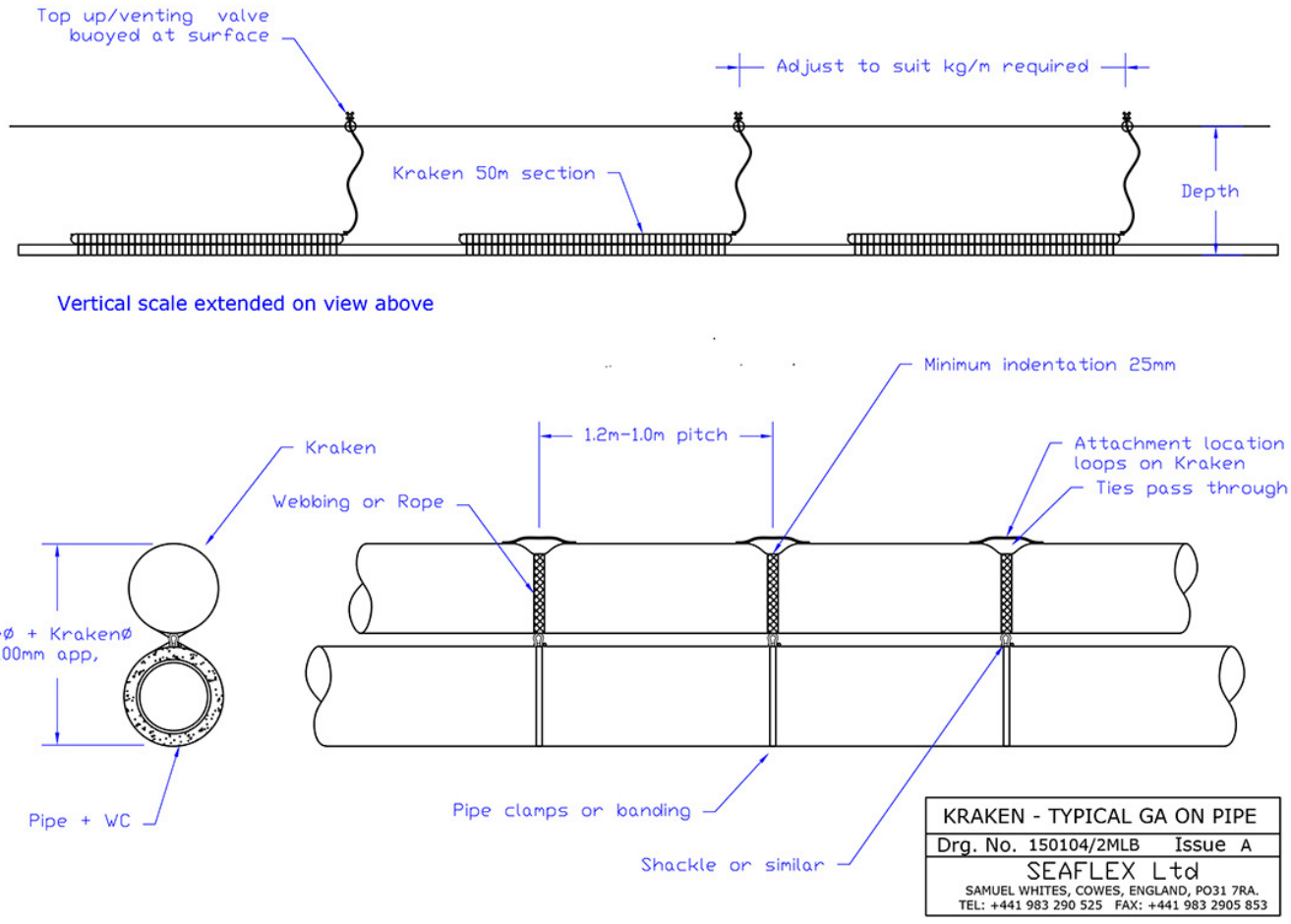
Seaflex Kraken™ for Pipelines
Overview Diagrams



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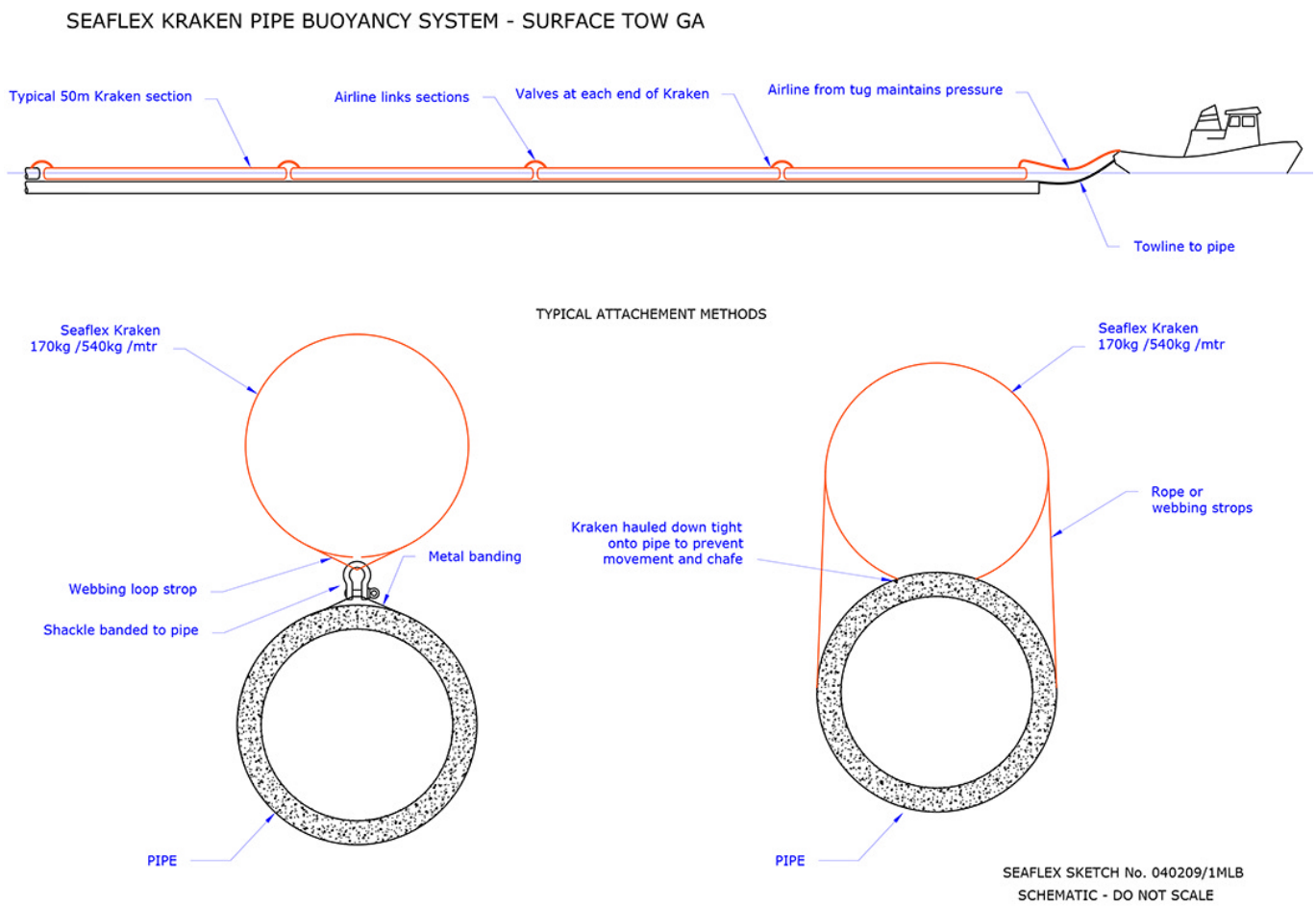

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APPLICATION NOTE

Selected Project References for Flexible Buoyancy Solutions

Date	Client	Project/Description
November 2017	EMAS Subsea 7	Mono Buoyancy Units for OCTP Project – Ghana
October 2017	Ardent Salvage	Container Liners for Vessel Salvage – South Pacific
September 2017	REDS	Inflatable Buoyancy Units for Pipeline Shore Pull – Caribbean
July 2017	Andrade Gutierrez	Inflatable Buoyancy Units for Swamp Pull – Angola
March 2017	Allseas	Mono Buoyancy Units for Sur de Texas-Tuxpan Pipeline - GoM
October 2016	Saipem Caspian	Mono Buoyancy Units for River Crossing - Georgia
August 2016	Transocean	Air Lift Bags for Semi-Sub Salvage - Scotland
March 2016	Valentine Maritime	Inflatable Buoyancy Units for HAIL project - Abu Dhabi
February 2016	Bumi Armada	Mono Buoyancy Units for Filanovsky Pipeline Work - Russia
November 2015	Technip Paris	Inflatable Buoyancy Units for Moho Nord Shore Pull - Congo
August 2015	Sapura Kencara TLO	Inflatable Buoyancy Units for Thai Binh Pipeline Installation - Vietnam
July 2015	Nestoil	Air Lift Bags for Oil Pipeline Lift and Repositioning - Nigeria
July 2015	Technip Norge	Air Lift Bags for Various Subsea Works – Norway
June 2015	Sigur Ros (Petronas)	Mono Buoyancy Units for Jacket Tow-Out Contingency - Turkmenistan
May 2015	Acciona	Mono Buoyancy Units for La Chira HDPE Pipeline Installation - Peru
March 2015	Boskalis	Mono Buoyancy Units for Shah Deniz Pull Wire - Azerbaijan
December 2014	Petrobras	Mono Buoyancy Units for Various Tie-In Operations - Brazil
August 2014	DEME	Mono Buoyancy Units for Various Works - Ghana
June 2014	Subsea7	Air Lift Bags for Diving Works - Nigeria
May 2014	Allseas	Mono / Inflatable Buoyancy Units for Wheatstone Pipeline -Australia
February 2014	OAS	Mono Buoyancy Units and Bungs for Pile Installation - Uruguay
December 2013	Saipem France	Mono Buoyancy Units for CRX Pipeline Intervention - Congo
July 2013	Siemens	Water-filled Inflatable Buoyancy Units for Platform Ballasting - Denmark
June 2013	Tideway	Mono Buoyancy Units for Pull Wire Installation - Venezuela
May 2013	NPCC	Mono Buoyancy Units for Oil Pipeline Installation – Abu Dhabi
April 2013	West African Ventures	Mono Buoyancy Units for Pipeline Installation Buoyancy – Nigeria
November 2012	McDermott Offshore	Mono Buoyancy Units for Macedon Gas Pipeline Installation - Australia
August 2012	RJG Construction	Mono Buoyancy Units for Outfall Installation - Canada
August 2012	Clough Offshore	Mono Buoyancy Units for Gas Pipeline Installation - Australia
June 2012	Lundin Offshore	Air Lift Bags to disconnect FPSO - Tunisia
March 2012	Boskalis Offshore	Mono Buoyancy units for Nordstream Pulling Wire Installation - Russia
January 2012	SiCIM	Mono Buoyancy Units for Twin Pipeline River Crossing - Columbia
November 2011	Bouygues	Inflatable Buoyancy Units for Work Platform Float Out – France
August 2011	Saipem France	Inflatable Buoyancy Units for Pipeline Installation Buoyancy - Angola
July 2011	Subsea7 France	Air Lift Bags and Mono Buoyancy Units for Subsea Works – Angola
February 2011	Indian High Commission	Inflatable Buoyancy Units for Frigate Salvage – India
November 2010	Jan der Nul	Mono Buoyancy Units for Oil Pipeline Installation – Bahamas
November 2010	Bibby Offshore	Air Lift bags for Subsea Works – Scotland
August 2010	Bam Nuttal	Air Lift Bags for Container Recovery – Scotland
July 2010	CTC Marine	SeaSerpent Cable Installation Buoyancy – UK
July 2010	Spiecapag	Mono Buoyancy Units for Gas Pipeline Installations – Angola
June 2010	Arbeit Kaiserschleuse	Inflatable Buoyancy Units & WaterLoad Bags - Lock Gate - Germany
March 2010	Petroleum Marine Services	Inflatable Buoyancy Units for Steel Pipeline Installation – Egypt
Sept 2009	UMC International	Air Lift Bags for Drydock Draft Reduction – Ireland
Sept 2009	Plasticos P'ductos	Mono Buoyancy Units for HDPE Water Intake Installation – Spain
March 2009	Acergy	Mono Buoyancy Units for Mexilhao Oil Pipeline Installation – Brazil

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APPLICATION NOTE

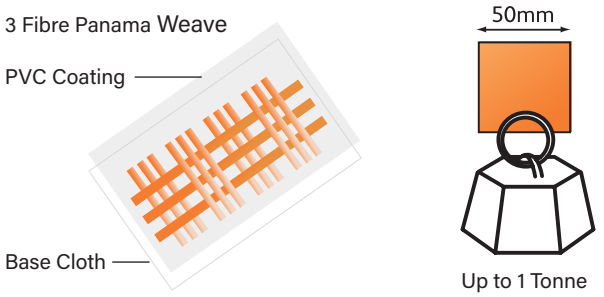
Technology, Service and Support

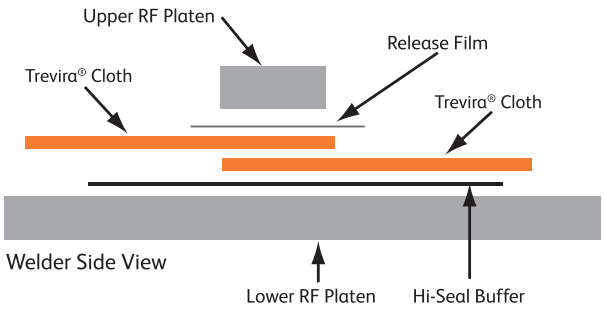
Manufacturing Technology

+ All Seaflex products are designed and manufactured in the UK. Our bag canopies are constructed from High Tensile Trevira® Polyester base cloth (either 2 /2 or 3 /3 fibre panama pattern weave) coated with heavy duty UV stabilised PVC coating or, for special applications, polyurethane. Trevira is incredibly strong; a 50 mm wide 3/3 strip has a break load of approximately 1 tonne. The panels for our bags are precision cut on our 15 metre long, 3 metre wide advanced automated table for perfect repeatability. Once inspected and approved panels are assembled by skilled personnel to using Radio Frequency welding to strict quality control standards.

Certification

+ All our work is carried out within a system which complies with the ISO 9001-2009 Quality Management Standard as audited by Lloyds Register Quality Assurance for full traceability – and we have now gained ISO 14001 and ISO 18001 accreditation.





Service

+ Whether for hire or sale, all Seaflex products are sent out fully tested and inspected against their build criteria. And we do also offer on-site support to our clients in the use of our products – this most often happens within the more complex buoyancy applications for our products.
  In the event that your Seaflex product should suffer minor damage in service, we can supply an approved, boxed field service kit comprising of patches, a professional quality heat gun and instruction manual to make good minor leaks prior to product refurbishment.
  We can also advise on the viability of carrying out more extensive repairs, which would typically be undertaken either at our factory or at one of our approved service centres.

Support

+ Our support philosophy is "Wherever, Whenever". This underlines the Seaflex commitment to not just sending out tested, proven products in proper shipping crates and with the most comprehensive documentation package in the business – but to assisting our customers in every way possible throughout their time using our products, whether the job is a hire project or an equipment sale.
  We offer worldwide support to our customers via either email or phone from head office in the UK and via our ever-growing network of offices and partners around the world.
  You can put your trust in Seaflex – we won't let you down.

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Unique Group's Buoyancy & Ballast products are available for hire or purchase from more than 20 other worldwide locations via our network of independent partners. Please contact us for more details.