CLEANER SEAS

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Oil Spill Response Equipment by DESMI

SPILLCON 2013

GLOBAL | REGIONAL | LOCAL

8-12 April 2013
Cairns, Queensland
Australia

The most experienced manufacturer in the world

The Tsakos Energy Navigation Ltd., the suezmax Spyros K. (dwt 158,000)

INTRODUCTION:

A warm welcome to all the participants at Spillcon 2013 in Cairns - the gateway to the beautiful region of the Barrier Reef - and may I say the most apposite venue for all those involved in the protection of the our oceans to meet and to continue the good work.

Spillcon 2013 is a vital landmark event in the calendar supporting the continuing interchange of communication between manufacturers

and end users alike, in the drive to ensure that the latest hi-tech skills and equipment are available to meet every eventuality.

In addition Cleaner Seas would like to add it's recognition for the support that Spillcon 2013 receives from the private industry sector as well as both governmental and inter governmental instituitions alike.

It is that very ambition and support that represents an important platform of communication at what is a paramount event in the calendar.

In conclusion, we also welcome all our advertisers to this special Cleaner Seas Cairns 2013 Spillcon conference and exhibition edition and of particular significance - DESMI who continue to provide an array of proven existing and new technology products clearly enumerated and explained within the pages of this special Spillcon 2013 edition

Cleaner Seas wishes all the participants a successful exhibition and may we extend our desire to work with you all in making Cleaner Seas as your first port of call for advertising and the achievement of your continued product awareness

Best regards,
Richard Jan
Publisher, Cleaner Seas

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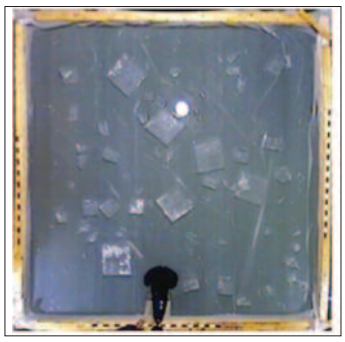
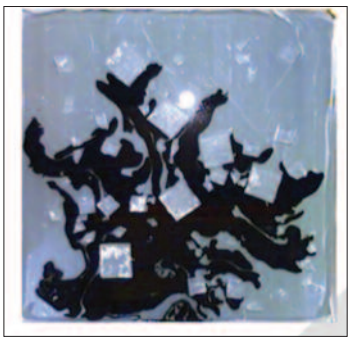
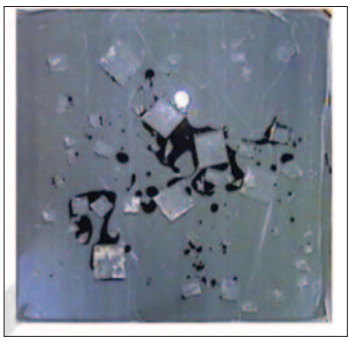






WHEN DISASTER STRIKES, DESMI OIL SPILL EQUIPMENT SAVES THE DAY

Desmi's Launch And Recovery System (LARS) Crane with the umbilical hose wheel launches a DESMI Giant Octopus skimmer.

On October 5, 2011, a cargo ship carrying 1,368 containers struck a reef in New Zealand's Bay of Plenty. "Rena" caused the biggest environmental disaster in the country's history, spilling over 360 tons of oil into the sea, killing over 2,000 sea birds and affecting the habitat of sea lions, plants and penguins. When disasters of this magnitude strike, rescue operations rely on smart solutions. This is where DESMI Ro-clean A/S (DESMI) can come to the rescue, with a vast array of oil skimmers, booms, pumps, power packs, storage tanks and much more.

The increasing number of oil spill disasters has highlighted the need for reliable and proven oil recovery equipment - to recover costly oil and protect unique and vulnerable marine life. For DESMI, this has meant a greater demand for their wide range of oil recovery systems including the In-Situ burning equipment.

Equipment systems for any eventuality

One stage of an effective response outside dispersants is to deploy a suitable boom which restricts oil spread, concentrating it into an area so it can be recovered. DESMI's

boom installations range from small, lightweight models to larger, robust units for extreme offshore deployment.

Once the oil has been contained, the rescue team can 'skim' as much oil from the water as possible. Here again, DESMI offers a variety of skimmers in capacities from 2 – 400 cubic meters per hour. The range includes the most popular type of skimmers on the market using weir, oleophilic, vacuum and belt mechanical technologies.

Some of the more unusual designs include the DBD type skimmers, offering customers total flexibility and options with one floating body that can use disc, brush or drum banks in the same skimmer. Another, the Mop-Rope skimmer, also offers flexibility and can have a very large area of influence. With this proven technology and high performance the Mop is ideal in narrow or confined spaces often found in harbours and industrial applications.

Ready for action: any place any time

To power its hydraulic oil skimmers, pumps, thrusters and other hydraulic demands, DESMI have often employed the PowerTech 6068H engine as a main driver. "Reliability anytime at any location is of utmost importance to our customers," comments Rune Fabek Kristensen, design engineer at DESMI Ro-Clean. "Fortunately, oil spill accidents don't happen on a regular basis, but it does mean our equipment stands idle for a while and at short notice must be up and running. We know the 6068H is a proven performer and reliable even after a longer break."

John Deere engine distributor West Diesel Engineering A/S in Denmark has proven a worthy partner. "Quick follow up on our questions, ready supply of technical information, drawings, 3D files etc. And it's great to know John Deere's 'in-field service' really works worldwide. It helps us market and service our products with confidence around the world!"

Emission Cert.	Tier1/Stage 1	Non Certified
Engine Model	PowerTech 6068TF150	PowerTech 6068HF258*
Displacement	6.8L	6.8L
Rated Power	127kW (170hp) @ 2500 rpm	183kW (245hp) @ 1500 rpm
Cylinders	6	6
Aspiration	Turbocharged	Air-to-air aftercooled
Distributor	West Diesel Engineering A/S Esbjerg, Denmark +45 76114162 rs@westdiesel.dk www.westdiesel.dk	

*Generat Set Power Unit (GSPU) only. Not avaible as bare engine. A GSPU is a John Deere factory-built gen-set power unit, based on a bare engine with mounting pads, cooling package and air filter.

READY FOR DISPATCH Standard Systems - RFDs
OS-1S Containerized Offshore Skimmer System

Proven Oil Spill Technology

PROVEN TECHNOLOGY

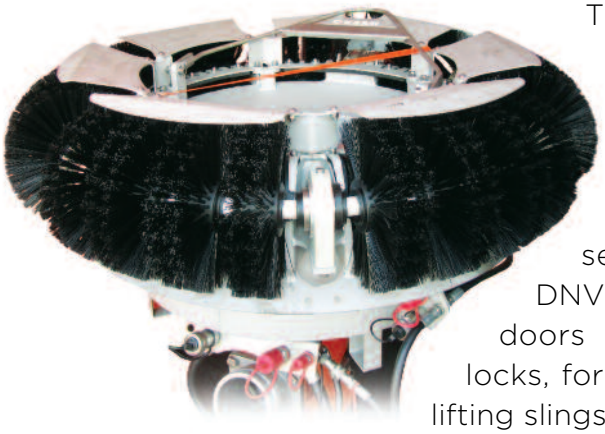
DESMI

OS-1S Containerized Offshore Skimmer System

Ready for Dispatch systems (RFDs) are an initiative developed by DESMI Oil Spill Response to have available in stock* a range of complete standard equipment systems to suit scenarios from the offshore to shoreline. The systems, including booms, skimmers, power packs and hoses, are all packaged, including DNV containers, and ready for immediate dispatch. These systems can then be immediately deployed in to the operations arena without delay.

Much attention has been given to the standard equipment mix and details such as spark arrestors and chalwyn valves on the offshore power packs are default fitments. Other details such as boom tow sets, inflation valve keys, hydraulic hoses, and even copies of the operations and maintenance manuals are all included.

The standard systems are prefixed with either OS, for Offshore or NS for Nearshore or coastal. Thereafter a B or S simply identifies a boom or skimmer system respectively. The advantage of these set menu's of equipment systems results in the end user or client being able to start their operations with high quality, ready to go equipment with a simple, one line instruction.



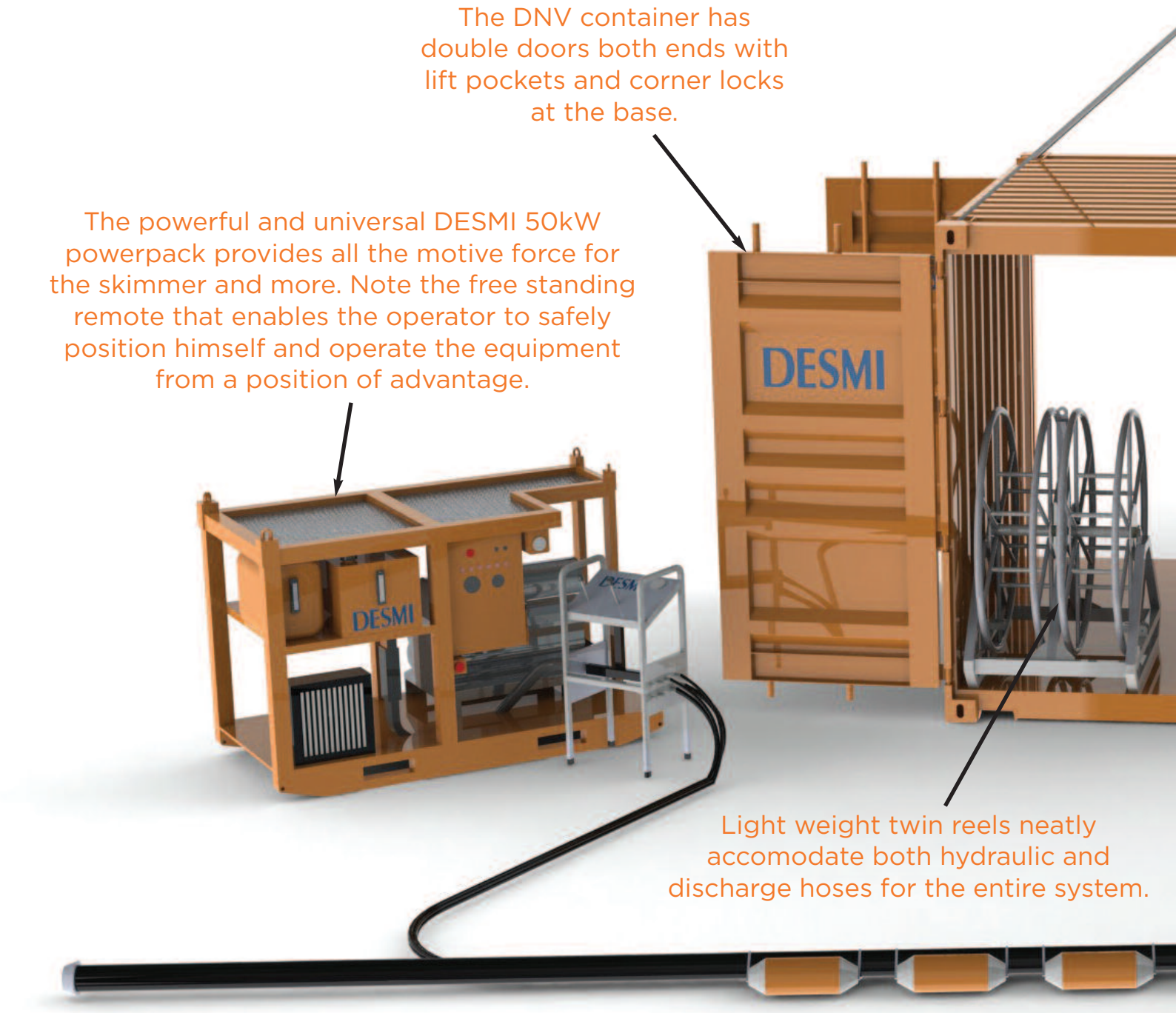
The OS-1S system is a DESMI HELIX 250 Brush Terminator skimmer with a 50kW diesel hydraulic power pack. The hydraulic and discharge hoses are conveniently stored on a reel. All this equipment is stored and secured inside a 10 foot DNV container with double doors both ends. Corner locks, fork lift pockets and lifting slings are all standard.

OS-1S is just one of the systems being offered in the DESMI RFD range. Other boom and skimmer packages are also available and our staff and representatives would be happy to discuss your needs. The RFD range compliments all the other DESMI Oil Spill Response equipment which we continue to develop and offer as before.

READY FOR DISPAT

OS-1S Containerized Off

Helix 250 Brush Terminator skimmer, 50kW power p



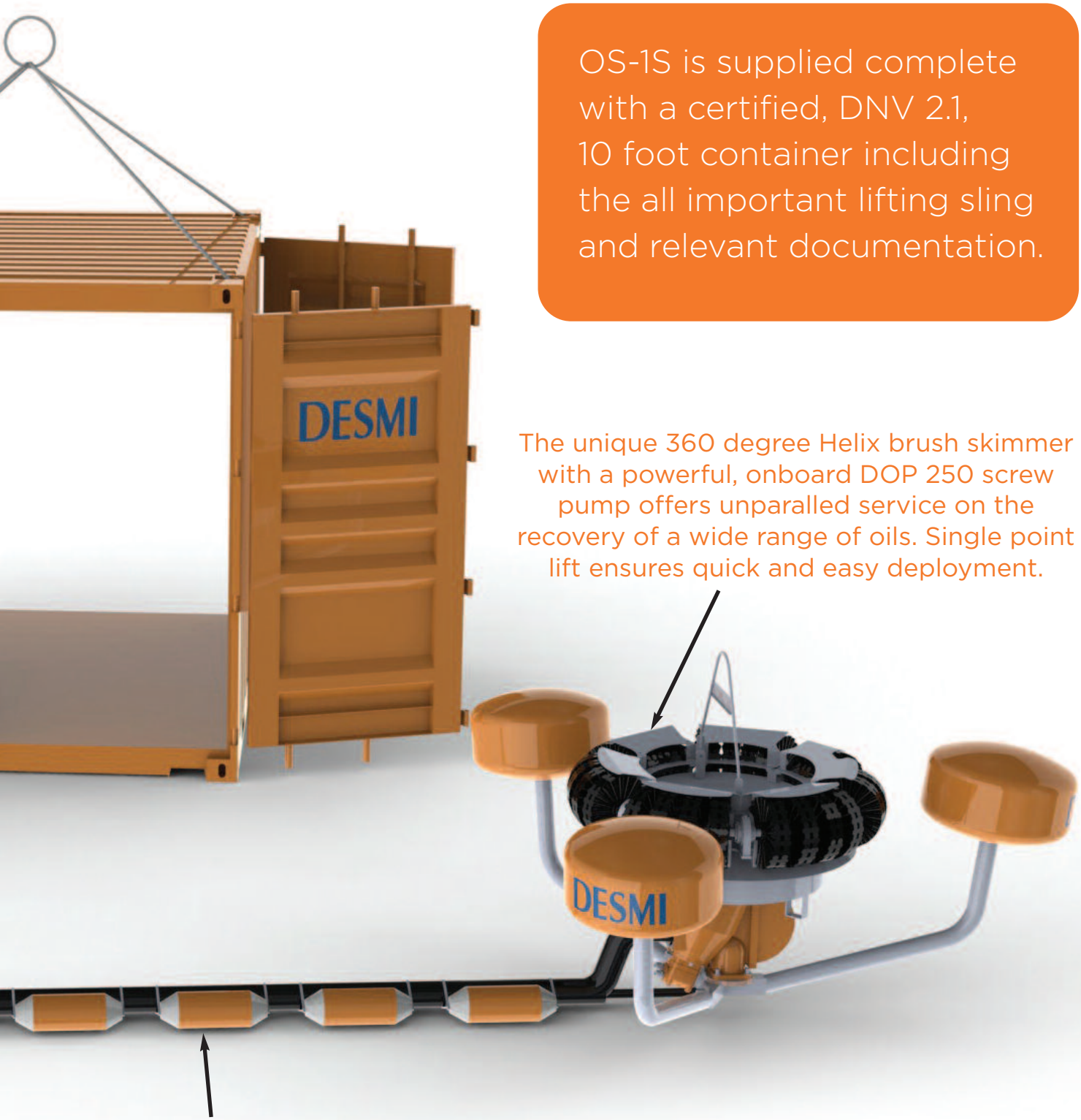
The discharge h
supported by si

TCH System (RFDs)

fshore Skimmer System

back, hoses and reel and a 10 foot 2.1 DNV container

OS-1S is supplied complete with a certified, DNV 2.1, 10 foot container including the all important lifting sling and relevant documentation.



The unique 360 degree Helix brush skimmer with a powerful, onboard DOP 250 screw pump offers unparalled service on the recovery of a wide range of oils. Single point lift ensures quick and easy deployment.

ose and hydraulic hoses are neatly bound and
mple floats that are supplied with the system.

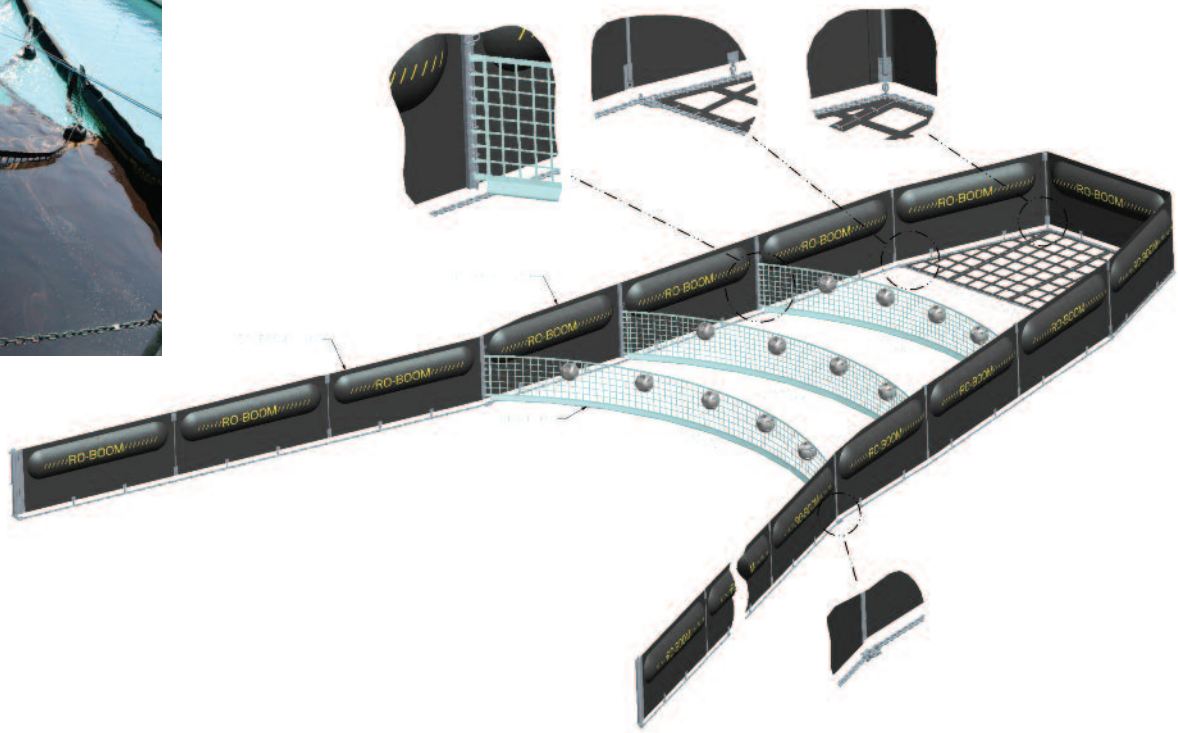
THE UNIQUE DESMI SPEED-SWEEP

A SWEEP SYSTEM THAT CAN OPERATE UP TO 3 KNOTS - FULLY TESTED AT OHMSETT

Available in 3 sizes, 1500, 2200 and Hi-Seas 3200

The Desmi Speed-Sweep System is a heavy duty rubber boom recovery system designed to allow for the collection of oil at greater speeds than has previously been possible. Once the pollutant has been collected at the cusp, a skimmer can be located at the apex and recovery can begin. This can continue while the sweep system is moving forward. The unique, high efficiency DESMI Speed-Sweep System is designed to either connect to a Ro-Boom system or operate as an independent collection unit. It can be towed either between 2 vessels or 1 vessel with a jib arm or paravane. The Speed-Sweep can collect oil up to speeds of 3 knots which results in easier and quicker operations all round.

The DESMI Speed-Sweep System is manufactured in the tough Ro-Boom 1500 offshore containment boom, with individual three metre buoyancy chambers, tapered down at either end to match Ro-Boom 1300, which is the ideal guide boom for the sweeping system. There are also 3 off 900mm nets, with foam filled circular floats, which are used to interupt the speed of the oil, allowing it to be collected at the cusp. The excess water simply escapes through the rear netting. This system allows the surface water and oil to be slowed by as much as 70%, which allows the oil to concentrate in the apex ready for collection. No head wave phenomena or planning will occur.



Technical Specifications:

Ro-Boom Material:	Neoprene/Hypalon
Speed-Sweep Front Net Material	Kevlar
Width (Deflated):	Apex 1500mm Guide Booms 1300mm
Standard System Length:	Sweep 30m Guide Boom 2x16,5m
Freeboard:	Apex 0.52m, Guide Booms 0.45m
Operational depth of skirt:	Apex 0.72m, Guide Booms 0.63m
Operational weight (incl. Chain):	Apex 12kg/m, Guide Booms 9kg/m
Buoyancy chamber length:	3m
Tensile strength of boom wall:	250N/mm
Breaking load of chain:	Apex 200kN, Guide Booms 110kN
Temperature range:	-40°C to + 80°C
Section connector:	ASTM Slide (Standard)
Total Weight on RB1500 winder:	1970 kg
Dimensions winder LxWxH:	2194 x 2000 x 2189 mm
Weight winder:	780 kg

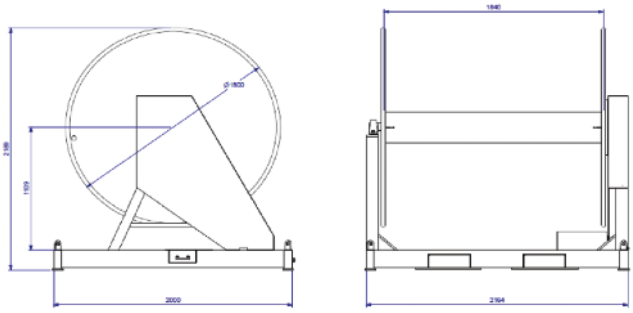
Bollard pull recommended: 2 x 1,5 ton if pulling with 3 knots with a sweep opening of 15 meter.
Deck space recommended for deployment and recovery: 6 x 5 meter
Power requirements (hydraulic) for reel and inflation; 40 l/min – 25l/min – 200 bar

Size and weight of power pack you could provide for reel operation/inflation;
DESMI 15kW power pack no. 070682722. LxWxH: 110x800x980mm weight 370kg full tanks

BOOM REEL for DESMI Speed-Sweep System:
DESMI recommend a hydraulically operated reel for storage, easy deployment and recovery of the Speed-Sweep System. Manufactured in high grade steel and epoxy painted for the offshore environment, the reel is fitted with a permanent hydraulic motor and gearbox driving an enclosed duplex chain to the reel.

Twin shock valves are supplied on each reel to relieve excess loads during any upset conditions during deployment and recovery operations. The maximum hydraulic motor demand is typically 40 litre per minute with a 140 bar pressure. Fork lift channels, heavy duty weather cover are all standard.

The height of the reel is designed for it to be stored in a 10' ISO container if so required.

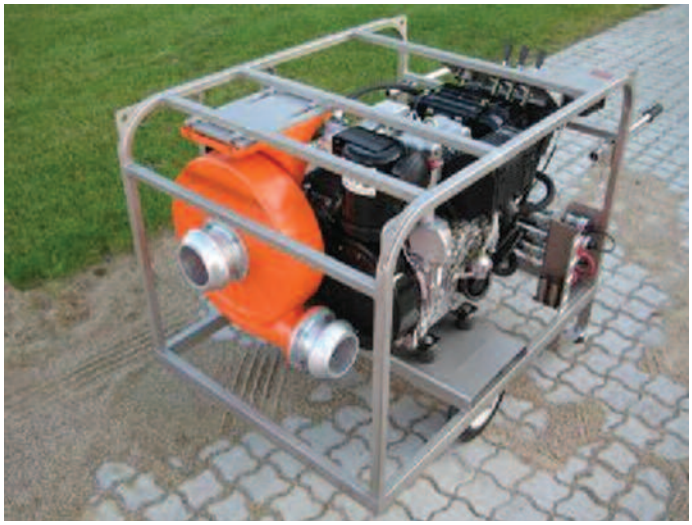


Dimensions: 2194 x 2000 x 2189 mm
Weight approx. 800kg

DESMI Multi Purpose Power Pack.
For operating the boom reel and inflating the Speed-Sweep boom a 15Kw multipurpose power pack with hand and electric start air cooled diesel engine is offered for the smooth operation of both the reel and Sweep inflation.
The power pack is mounted in a galvanized frame with wheels and extendable handles for easy positioning.
The hydraulic pump provides flow to two hydraulic circuits. Twin directional, proportional valves offer complete control of the boom reel and air blower unit.

The integral, high capacity air blower offers fast inflation of the air chambers within the Sweep. A typical air flow of 27 m3/ is delivered through the air hose set comprising of;
4" + 2 x 2" filling hoses including 4" quick coupling and two stainless steel air filling/emptying probes.

The frame is fitted with a fork lift channel and comes with a heavy duty weather cover.



WHAT ARE DESMI-AFTI OIL HERDERS?

DESMI-AFTI oil herders are liquid agents designed to contract, thicken, and control the spread of petroleum spills on water surfaces. They were primarily developed to control fairly fresh, liquid oil on calm water with drift ice where boom and mechanical recovery devices may not be effective. Under these conditions, the herders concentrate the oil to a thickness suitable for in-situ burning.

How did Desmi-Afti Oil Herders evolve?
A multi-year, multi-partner research program was initiated in 2003 by SL Ross Environmental Research to advance oil spill response in ice. The program included many laboratory tests along with tests at the National Oil Spill Response Research & Renewable Energy Test Facility (Ohmsett), the Ice Engineering Research Facility Test Basin at the US Army Cold Regions Research and Engineering Laboratory (CRREL), and the Fire Training Grounds in Prudhoe Bay The tests found that herding agents persisted long enough to enable in situ burning of relatively fresh, fluid oils in broken or drift ice and that ThickSlick 6535 and Siltech OP-40 were effective herding agents on cold water and in ice conditions. One field test in Barents Sea pack ice involved the release of 630 L of fresh Heidrun crude in a large lead. The free-drifting oil was allowed to spread for 15 minutes until it was far too thin to ignite (0.4 mm), and then DESMI-AFTI herder was applied around the slick periphery. The slick contracted and thickened for approximately 10 minutes at which time the upwind end was ignited using a gelled gasoline igniter. A 9-minute long burn ensued that consumed an estimated 90% of the oil.

As a result of the success with herders for in situ burning in ice, a two-year program of R&D in the lab and at Ohmsett was undertaken in 2009 to determine if there was a potential to use herding agents to improve other areas of marine oil spill response, specifically:

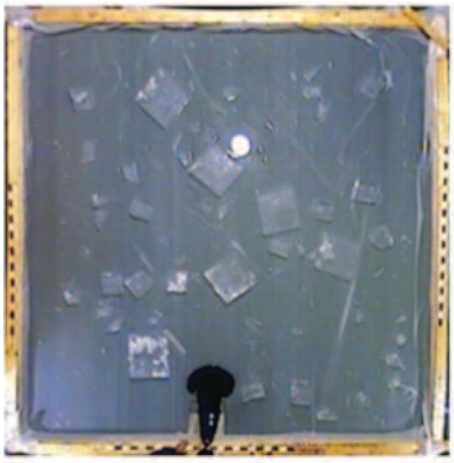
- Employing herding agents in drift ice to enhance recovery of spilled oil with skimmers;
- Using herders to clear oil from marsh areas; and,
- Applying chemical herders around oil slicks on the open ocean to improve the
- Operational effectiveness of subsequent dispersant application

These research studies were variously funded by the ExxonMobil Upstream Research Company; the Bureau of Safety and Environmental Enforcement (BSEE) of the U.S. Department of the Interior; the SINTEF JIP Oil in Ice funding consortium (Shell, Statoil, ConocoPhillips, Chevron, Total, Agip KCO and the Norwegian Research Council); and, the Petroleum Environmental Research Forum (PERF) partners Agip Kashagan North Caspian Operating Company, ExxonMobil Upstream Research, Sakhalin Energy Investment Company and Statoil ASA.

How do Desmi-Afti Oil Herders work?
Herders are applied at a very low rate on the clean water around the perimeter of an oil spill where the herder will form a monolayer. When the monolayer reaches the edge of a thin oil slick it changes the balance of interfacial forces acting on the slick edge and causes those forces to contract the oil into thicker layers. Herders do not require a boundary to "push against" and work in open water. Since the herder forms a monolayer, a small quantity of herder will quickly clear thin films of oil from large areas of water surface. The monolayer will survive for more than 45 minutes in a calm sea thus allowing time to initiate in-situ burning, or for mechanical oil recovery equipment to arrive on scene. Herders confine the oil on the water surface. Neither the oil or chemicals are forced into the water column. Herders do not burn up during an in-situ burn and will continue to act after the fire is extinguished.

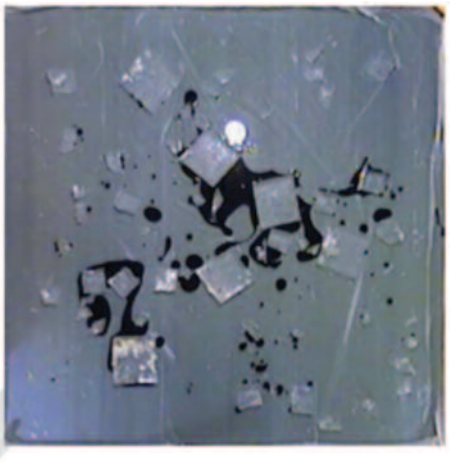
Can Desmi-Afti Oil Herders aid in conventional oil recovery?
- Herders concentrate the oil into a thicker layer occupying a smaller water surface area which will increase the encounter rate for any type of static or advancing skimmer. Herders can provide a quick response to slow or halt the spread of oil before boom can be deployed and skimmer operations started. With small, periodic applications of additional herder, the oil can be held in a thickened, fluid layer until recovery equipment can be deployed.

Do Desmi-Afti Oil Herders have other potential uses?
- Herders may help clear oil from areas inaccessible to equipment if they're not working against the current or wind.
- Herders may protect the shoreline if the wind is parallel to or away from the shore under calm conditions.
- Herders have been used to clear thin oil and sheens from under dock piles and other waterside structures where it was difficult to access the oil.



Oil is introduced into a test pan with simulated drift ice.

The oil rapidly spreads throughout the ice.



Herders change the surface chemistry of the water forcing the slick into a smaller area thereby thickening it

V.Group

PYROBOOM® - THE NEW STANDARD FOR IN-SITU BURNING

PROVEN OIL SPILL TECHNOLOGY

In-situ burning, once reserved for oil spills in remote regions, is now considered a practical alternative to mechanical removal under specific conditions. Experience from the Deepwater Horizon Spill in the Gulf of Mexico validated "controlled burning" as an effective technique and PyroBoom® proved itself to be an excellent performer.

Performed properly, under the right conditions, In-situ burning can rapidly eliminate large quantities of oil, efficiently, with minimal and generally acceptable net environmental benefit. In the Gulf, PyroBoom® played a key role as In-situ burning helped to greatly reduce the amount of oil hitting the beaches and marshes.

In-situ burning is accepted for certain areas around the world, and is recognized by Environment Canada as a "viable alternative to mechanical methods." For spills in Arctic waters, In-situ burning is often the only practical cleanup technique. Testing by the USCG and others has demonstrated Pyro-Boom's ruggedness and effectiveness in ice infested waters.

For more information about In-situ burning, visit the U.S. NOAA website at www.noaa.gov. Environment Canada's Emergencies Science Division has also performed extensive testing of In-situ burning techniques and equipment and issued a report, In-situ Burning: A Cleanup Technique for Oil Spills on Water (2000).

THE SIMPLE SOLUTION, PYROBOOM®

Developed specifically for In-situ burning of oil, PyroBoom® is the only product that meets all the responder's needs from the Arctic to the tropics. In numerous burn tests, including those conducted in accordance with ASTM F2152, PyroBoom® has repeatedly demonstrated its effectiveness, survivability and ease of use.

ADVANTAGES OF PYROBOOM®

Other fire booms, including those using active water-cooled fabric blankets, are subject to burnthrough and catastrophic failure, especially if any component in the complex water cooling system fails. In addition, these designs are complicated to use, requiring extensive training and practice. They become water-logged; the resulting dramatic weight gain makes subsequent retrieval difficult, and drying, storage and maintenance virtually impossible in field conditions. In contrast, the advantages of the PyroBoom® design and construction have been proven repeatedly over 25 years of development, testing and real-world use.

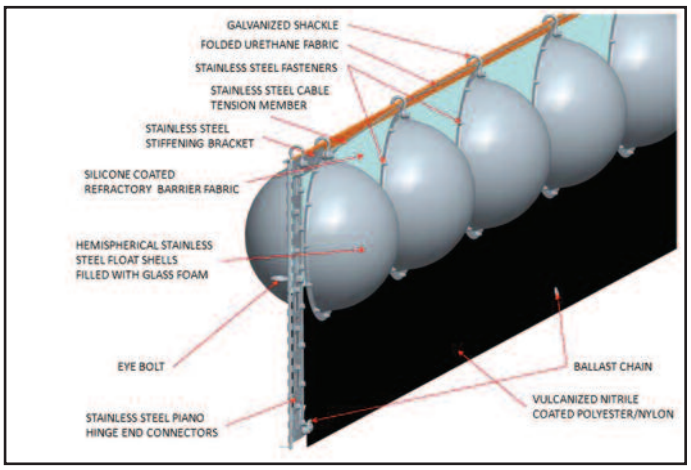
PATENTED REFRACTORY FABRIC

Our proprietary Inconel/Fiberfrax® refractory fabric with silicone coating has been proven in repeated burn tests at temperatures up to 1315°C/2400°F with no catastrophic failures.

FAIL-SAFE OPERATION
Degradation of the PyroBoom® refractory material is gradual, predictable and easily observed, ensuring fail-safe operation. Degraded refractory fabric is easy to replace in the field using only common hand tools.

STAINLESS/GLASS FOAM FLOATS
Stainless steel floats filled with glass foam have completed over 150 hours of burn testing with no damage.

SIMPLE MODULAR CONSTRUCTION



Boom components are assembled using stainless connectors and off-the-shelf fasteners, making it easy to extend, repair or replace boom sections in the field.

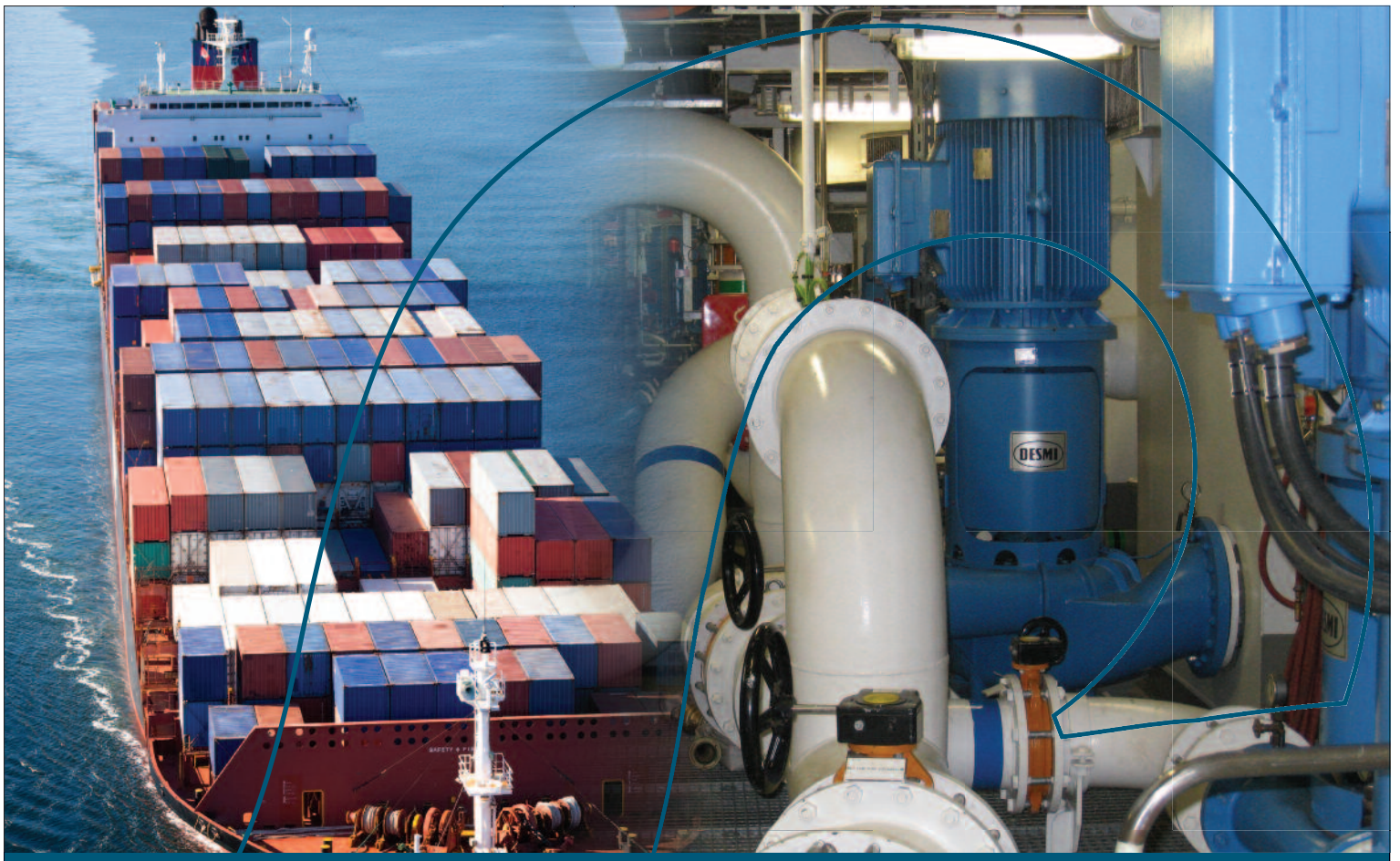
EASE OF USE
With no auxiliary pumps, compressors or delicate connections, using PyroBoom® is a simple four step process:

1. Deploy
2. Collect
3. Burn
4. Retrieve

Because PyroBoom® weighs practically the same wet or dry, retrieval is much easier than with watercooled booms.

LOW MAINTENANCE/LIFE-CYCLE COSTS
Except for replacing degraded refractory fabric after a burn campaign, PyroBoom® is virtually maintenance-free. It can be deployed, then retrieved and stored with no disassembly or extended drying period, making it ideal for training and drills.

- ✓ Proven in the Gulf and in the Arctic
- ✓ 24 Hour test burn
- ✓ No Inflators
- ✓ No Power Packs
- ✓ No Water Pumps
- ✓ No Reels
- ✓ No Wet Blankets
- ✓ Simple, proven, reliable and reconditionable
- ✓ Lower acquisition cost and lowest life cost of any brand



HIGH-QUALITY PUMP SOLUTIONS

- ✓ Engine room pumps
- ✓ Ballast water treatment systems - Proven effective in all water salinities, also fresh water
- ✓ OptiSave™ - energy optimisation
- ✓ Cargo pumps
- ✓ Fine-Fog™ - fire-fighting system

PROVEN TECHNOLOGY
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