

SATURATION DIVING SYSTEM

Completed in 2010 and certified by DNV, rated to 300 msw - is fitted with a 3 man Diving bell and a saturation diving complex consisting of living chambers for up to 12 divers (1 x 6 man chamber plus 2 x 3 man chambers).

The System, manufactured to the highest international standards can deploy the bell through a moon pool or over the side, depending on installation on the mother ship.



The System is contained within steel modules: 14 separate containers/skids, arranged on 3 levels:

- On the lower level there are the Hyperbaric complex, Diver Hot Water Machines, Gas Reduction and Management Panels and the electrical distribution.
- On the middle level there are the Dive Control, Saturation Control, Bell-handling machinery, Bell umbilical winch, Chamber environmental control, potable water unit and transfer gas compressor.
- The upper level holds the Main Winch, Guide Wire winch, gantry-type bell LARS. All the modules are manufactured and certified as per DNV "Offshore Standards".

A 12 man Hyperbaric Rescue Chamber (HRC), complete with dedicated launching system, is provided for divers evacuation.

The Hyperbaric Rescue Chamber (HRC) and its launching system can be connected to the main living complex in a variety of positions allowing maximum flexibility and adaptability of the system layout onboard.

SATURATION DIVING SYSTEM

System Particulars

Number of Divers :	12 (9 Operative + 3 Deco)
Max Working Depth :	300 msw
DNV ID N°:	D29340
Significant Wave Height :	4m
D.A.P :	1g in Vertical Direction 1g in Longitudinal Direction 1g in Transversal Direction
Overall Dimension :	W 15.8 x L 21.3 x H 9.4 m
Total Weight :	360 Tons
Installation :	On Moon Pool or on Ship Side.
Distance From Bell frame and Ship Side :	1.9 m

HRC (Hyperbaric Rescue Chamber)

The **HRC** is designed to sustain – as independent unit - the life of 12 Occupants up to 72 hrs. as per DNV rules.

For this scope she is equipped with proper quantity of Mix Gas, O₂, Potable Water and Soda-Sorb and Fi Fi systems.



HRC is provided of tiltable launching platform with stored power system, therefore can be launched in black ship condition.

Single point lifting is fitted on top of the vessel to allow the recovery with on board crane of the rescue vessel. The lifting point can be used, also, to deploy the HRC in the water using the on board crane.

Specification

Occupant Capacity:	12 men
Manufacturer:	Drass Galeazzi
Construction Year:	2009
Volume:	20 cubic meters
Internal Diameter:	1.800mm
Working Pressure:	300 msw
Certification:	IMO



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Diver Heater Unit

The unit is a 30' Container carrying the two Diver Heating Machine.

The water supply line to the Bell is fed by two twin machine in order to guarantee the total redundancy.



The manual switching manifold is provide to allow easy reconfiguration of the system.

The manifold is used also to share the working hrs between the two Sea Hot Water Machine. Complete monitoring of the unit is achieved by the CCTV, Comms, Flow and Temperature alarm fitted on each machine.

Remote control is provided inside the Dive Control Panel.

Container is fitted either with ISO corner or certified lifting set to upload the unit indifferently via crane or via transtainer.



General Specification:

Dimension:	30' container
Weight:	15 Ton
Construction Year:	2009
Manufacturer:	Drass Galeazzi
Certification:	DNV Offshore container 2.7-14

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Main Components

6-Man Chamber :	Twin Lock, 2200mm Inner Diameter, Insulated and SS-cladded, mounted on Transport/Installation Skid, Top Flange For Bell Mating
3-Man Chamber :	Twin Lock, 2200mm Inner Diameter, Insulated and SS-cladded, mounted on Transport/Installation Skid
3-Man DMAC Chamber :	Twin Lock, 2200mm Inner Diameter, Insulated and SS-cladded, mounted on Transport/Installation Skid
3 Diver Diving Bell :	5.4 m ³ , 1900mm Inner Diameter, Bottom Mating, Floating (Drop Weight)
40' 2.7-1 DNV Certified Container :	Sat Control Room And Dive Control Room + Handling Control
40' 2.7-1 DNV Certified Container :	3 x Chambers ECUs
30' 2.7-1 DNV Certified Container :	Fully Redundant Diver Hot Water Supply (Two machines)
30' 2.7-1 DNV Certified Container :	Filling Compressor, Reclaim Buffer Tank and Sanitary Water Supply
20' 2.7-1 DNV Certified Container :	Gas Management Panels - Distribution and Reduction
20' 2.7-1 DNV Certified Container :	2 Diver Reclaim System
10' 2.7-1 DNV Certified Container :	440/230v Main Switchboard
10' 2.7-1 DNV Certified Container :	440/230v Emergency Switchboard

Bell Handling System – DNV Lifting Appliance Certified

1. Gantry Type - Overhead Hydraulic Operated Trolley System. If System installed on ship side the outer part of rail can be folded to reduce the overboard occupation during the vessel transfer.
2. Main Winch : 12t SWL. Two Independent Motors, Two Band Brakes.
3. Guide Wire Winch : 2.5t SWL (7.5t SWL In Emergency Mode) One Motor, Two Band Brakes, intended as Primary Bell Emergency Recovery System.
4. Umbilical Winch : Capable of store, deploy and recover up to 420m of 96mm Main Umbilical, Constant Tension Mode available.
5. Shock Absorber : 100% Fully redundant Shock Absorber System for Bell and Clump Weight handling.
6. HPP : 2 Twin Units. 1 Primary and 1 Emergency. Swapping Manifold provided.

HRC: 12 Man- 72 Hours autonomy as per SOLAS Rules. Tiltable platform for launching. Maximum installation Height : 7m.

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Safety Features

Outer Area:

H ₂ S Monitor and Alarm System:	Dräger Polytron
Fi-fi System:	Water Deluge
PPE:	Dräger Breathing Apparatus
Communications:	ClearCom, with audio and visual call alert
CCTV:	Telesub, with wide view

The above systems cover all the main points of the Sat System (eg. Food lock, material lock, clamping, other critical and remote area).

Electrical connectors:	Marechal Electric, Decontactor type outfitted with integral load-break isolating switch
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Inner Area:

Fi-fi System:	Permanent Hi-fog Flame detector
Self Contained Conditioning Unit: Emergency Medical Care :	Tertiary Chamber Heting & Cooling Unit DDC2 is out-fitted with medical equipment to fulfil latest DMAC 28 requirements
Black Box System:	Integrated digital recording system. All the critical parameters are recorded: PpO ₂ , PpCO ₂ , Hr%, Temp., Depth of each lock and system cycles.

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Diving Bell

Specification

Occupant capacity:	3 Man
Manufacturer:	Drass Galeazzi
Construction Year:	2009
Volume:	5.4 Cubic meters
Internal Diameter:	1.900 mm
Working Pressure:	300 msw
Certification:	DNV



Out Fitting

Internal CCTV System:	1
Environmental Analyzer:	3
Breathing Mask BIBS	4
Scrubber:	2
Heater:	1
Double Acting Drop Weight Release	
Main Wire Release System	
Main Umbilical Cutter	
Guide Wire Release System	
Divers Umbilical	2 (up to 65 m)
Bell Man Umbilical (external)	1 (up to 70 m)



Handling System

Integral hydraulically operated winches for handling the bell, and separate winches for the bell umbilical and clump weight plus a “trolley” arrangement allow rapid transfer of the bell from its “locked on” position on the living chamber complex to the working position over the side or trough the moon pool.

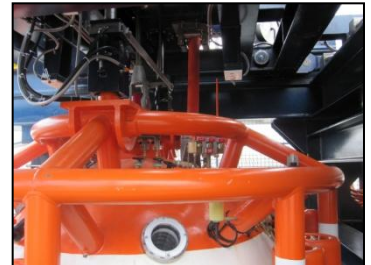
Main Winch:	12 Ton SWL
Manufacturer:	Drass Galeazzi
Construction Year:	2009
Certified:	DNV

Guide Frame Winch:	2.5 Ton SWL (Normal) 8.5 Ton (Emergency)
Construction Year:	2009
Certified:	DNV



Fully Redundant Shock Absorber Main Guide Wire System

Umbilical Winch:	420m of 96 mm Main Umbilical
Hydraulically Actuated Gantry:	Type trolley system



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Hyperbaric System Complex

The Hyperbaric Complex is composed of three twin lock chambers, one 6 man and two 3 man. One of the three man chamber (DDC2) is dedicated to Emergency medical care (DMAC 28), the other 3 man chamber is normally use for decompression.

The complex arrangement allow the split level technique.

General Specification

Total Volume: 80 cubic meters
 Pressure Rating: 300 msw
 Construction Year: 2009
 Manufacturer: Drass Galeazzi
 Certification: DNV



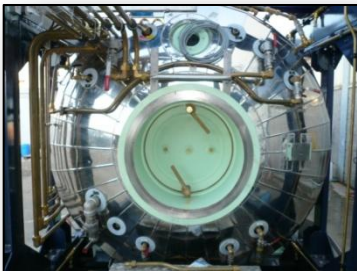
Complex

Specification

	DDC1	DDC2 (DMAC)	DDC3
Occupant Capacity	6 Man	3 Man	3 Man
Volume	30 m ³	21 m ³	21 m ³
Internal Diameter	2200 mm	2200 mm	2200 mm
Working Pressure	300 m.s.w.	300 m.s.w.	300 m.s.w.
Certification	DNV	DNV	DNV
Food Lock	ND 330 mm	ND 330 mm	ND 330 mm



Out Fitting



	ML+EL	ML+EL	ML+EL
Internal CCTV System	2+1	2+1	2+1
Environmental Analyzer	2+2	2+2	2+2
Breathing Mask BIBS	7+4	4+4	4+4
Emergency Scrubber	2+1	2+1	2+1
Emergency Heater	3+1	2+1	2+1
Viewport	4+1	3+1	3+1
Bunk light	6	5	4
Main light	6+3	3+3	3+3

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Sat and Diving Control Room

The unit is a 40' Container carrying Sat Control Console, Dive Control Console, Handling System Control Console.

The container is split, by a internal bulk head, into two independent area; one dedicated to Dive Control Room and the other to Saturation control Room.

A door allow the internal access between the two areas.

External door arrangement ease the access to the key points on system; clamping, handling HPP, umbilical winch and the Diving Bell.

Container is fitted either with ISO corner or certified lifting set to upload the unit indifferently via crane or via transtainer.



General Specification

Dimension: 40' ISO Container
 Weight: 18 Ton
 Construction Year: 2009
 Manufacturer: Drass Galeazzi
 Certification: DNV Offshore container 2.7-1

Chamber ECU

The 40' Container carries 3 Environmental Control Units.

It is installed on top of DDC3 frame.

One of the ECU is the back-up unit for the chambers complex.

Manual switch manifold is provided to reconfigure the ECU supply to chambers in order to cover any malfunction on the running units.

Container is fitted either with ISO corner or certified lifting set to upload the unit indifferently via crane or via transtainer.



General Specification

Dimension: 40' ISO Container
 Weight: 18 Ton
 Construction Year: 2009
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Gas Management and Gas Reduction Panel

The 20' Container carries The Gas Management and Reduction Panel.

Using the Management Panel the Technician can connect the Hp Gas Supply (Quads or Kelly) to the Reduction Panel.

Reduction panel is provided with O₂ analyzer to monitor continuously the O₂ percentage in the gas stream.

Container is fitted either with ISO corner or certified lifting set to upload the unit indifferently via crane or via transtainer.



General Specification

Dimension: 20' ISO Container
 Weight: 8.5 Ton
 Construction Year: 2009
 Manufacturer: Drass Galeazzi
 Certification: DNV Offshore container 2.7-1



Diver Reclaim System

The unit is a 20' Container is positioned on the higher level of the Sat System.

It contains the main parts of the Drass Reclaim System:

- Gas Reclaim Bag
- Regeneration Unit
- Recompression Unit

Container is fitted either with ISO corner or certified lifting set to upload the unit indifferently via crane or via transtainer.



General Specification

Dimension: 20' ISO container
 Weight: 7 Ton
 Construction Year: 2009
 Manufacturer: Drass Galeazzi
 Certification: DNV Offshore container 2.7-1

