

SATURATION DIVING SYSTEM RANA AF-01

The RANA AF-01 Saturation Diving System is a transportable system to be temporarily installed on Vessels of opportunity (DP Multi Purpose Vessels, Crane Barges etc.)

The system is built and maintained in accordance with IMCA guidelines for Offshore Diving Systems D018 and D024.



MAIN CHARACTERISTICS

Maximum depth:	300 msw
Maximum no. of divers:	12
No. of divers in the Bell:	3
Classification society:	RINA (Italian Naval Register)
Classification standard:	RINA
Compliant with:	IMCA D024

DIVING BELL

The Diving Bell is spherical with a cylindrical equatorial band. The bell is fitted with two releasable ballast weight with double safety release devices.

Diving Bell main characteristics:

Internal volume:	4,7 m ³
Total weight in air:	7.5 tonnes (including divers, equipment & ballast)
Man way & mating trunk:	1 bottom located
Onboard gas:	9 cylinders
Onboard oxygen:	1 cylinder
Emergency power:	1 battery pack
Divers gas reclaim:	Divex Gasmizer bell panel for 2 divers
Bell CO ₂ Scrubbers:	2
Bell Heater (hot water):	1
Helium un-scrambler communication system for bell and divers	
Sound powered emergency communication system for bell	
Through Water Communications System	
External Lights:	2 LED type
Internal Lights:	2 LED type
Internal TV camera:	1



DDC 1

It is the central chamber of the system including the transfer lock to the Diving Bell fitted with top mating clamp.

The living compartment is fitted for 3 divers with the possibility of an extra bunk.



DDC 1 main characteristics:

Internal volume:	13.5m ³
Bunks:	3 + 1(extra)
Emergency CO ₂ Scrubbers:	2 +1
Environmental Control unit:	external type
Medical lock:	1
Viewports:	8
BIBS masks complete with dump:	5 + 3
Emergency heating:	hot water
Helium un-scrambler communication system	
Sound powered emergency communication system	
Hyperbaric toilet, shower, wash basin	

DDC 2

This is an additional chamber which can be connected to the DDC1 in line or at 90° depending on the space available on board.



DDC 2 main characteristics

Internal volume:	28.0m ³
Bunks:	6
Emergency CO ₂ Scrubbers:	2 +1
Environmental Control unit:	external type
Medical lock:	1
Viewports:	9
BIBS masks complete with dump:	7 + 3
Emergency heating:	hot water
Helium un-scrambler communication system	
Sound powered emergency communication system	
Hyperbaric toilet, shower, wash basin	

HRC (HYPERBARIC RESCUE CHAMBER) / DDC 3

This chamber is certified as a HRC for 12 divers and can be used for the decompression of three divers for rotational crew change without interruption of the diving operations.



HRC main characteristics

Internal volume:	14.5m ³
Onboard emergency gas and battery power for 72 hrs	
Bunks & seats c/w 12 x full seat harness & safety helmets for 12 man	
Sleeping bunks (decompression use):	3 + 1 (extra)
CO ₂ Scrubbers:	2
Environmental Control unit:	external type
Medical lock:	1
Viewports:	7
BIBS masks complete with dump:	12+2
Emergency heating:	hot water
Helium un-scrambler communication system	
Sound powered emergency communication system	
Hyperbaric toilet, shower, wash basin	
Self launching system (free fall) with accumulator powered hydraulic powerpack	
Towing Bridle & Rigging	

DIVING BELL LAUNCH AND RECOVERY SYSTEM

The diving bell launching system includes:

- Bell hoisting winch (man riding)
- Guide weight winch (man riding)
- Umbilical winch (self tensioning)
- A-Frame with sheaves and bell catcher rams.
- Two hydraulic powerpaks (one on duty and one back up : full redundancy)
- Hydraulic powerpacks (Guide weight and umbilical winch, A-Frame and ancillary)



DIVE & SATURATION CONTROL CONTAINER

The diving operation and the saturation chambers are controlled from a single container including:

Dive Control

Bell launch and recovery control panel
Bell and Divers control panel
Diver colour hat camera, video recording and communications system controls

Sat Control

Bell internal video monitoring and controls
Chambers & HRC control panels
Gas distribution & pressure reduction panel
Chambers camera, video and communications system controls



LIFE SUPPORT AND MAIN ANCILLARY EQUIPMENT

3 Containerised Environmental Control Units.

Each ECU can be connected to any chamber to provide back-up, if required.

- 2 Divers hot water units (Diesel heated) one back up.
- 1 Chambers hot and cold potable water unit
- 1 Emergency Diesel generator
- 1 Diver Gas Reclaim (Divex Electric Gasmizer) Surface Unit.



HRC EMERGENCY LIFE SUPPORT PACKAGE

The Emergency Life Support Package consists of the equipment necessary to perform the decompression in the HRC. It may be stored either onboard the Attendant Vessel or in the onshore receiving area.

Main features:
 container with HRC control panel, emergency umbilical, electric switch board, lifting slings, and electric power supply cable.

Emergency Gas Quads

One medical oxygen, one for 2% and quads for treatment - Fitted with lifting slings.

Description	Q.ty /Details
Treatment quads	As required
Oxygen quad 100% O ₂	n.1 (16x50 litres @ 200bar)
Mix quad – 2%	n.1 (16x50 litres @ 300bar)
Soda Lime	450kg
Flexible breathing hoses:	n°2 1/2" BSP sinflex gas length.25m
Flexible oxygen hoses:	n°2 1/4" BSP O ₂
Water Heater	1
Umbilical Length=75 m.	N° 2 flex hoses ¼", N° 1 flex hose
Extinguisher	1
Diesel generator 4 kW 220 V.	1
Toilette discharge	1
Telephone SUB	1+1 spare
Electrical cable for container	L= 20 m. 220 V. + N° 2 plug 220 V
MIX reducer (300 bar)	HP ball nozzle – LP ½" BSP
O ₂ reducer (200 bar)	HP ball nozzle - Output ¼" BSP
Oxygen analyzer	SATSYSTEM
Analyzer pump	Draeger + balloons
CO ₂ tube	200

SYSTEM POWER REQUIREMENTS

Type	Specifications	Connections	Notes
Power	300KW 400V 3ph 50Hz or 440V 50Hz		2 independent supplies one main and one emergency from two different generators. A dedicated generator for emergency line can be provided by Rana.
Seawater	150 l/min, filtered		for environment units and heaters
Fresh water	sanitary use		
Sewage	discharge of saturation chambers	1 1/4" hose; hand operated discharge valve	The collecting tank, 2 m ³ capacity at atmospheric pressure, should be connected to the ship's sewage system in order to empty it when full or daily for winches of air diving basket and tool basket;
Compressed Air	7 bar, 6 m ³ /min	1 1/2" NPT or Atlas type connector for diving basket 1 1/2" and 1" NPT for tool basket	2 independent supplies for air diving basket winches, one main and one emergency. A dedicated compressor can be provided by Rana if required.

SYSTEM DIMENSIONS

Item no.	Description	Dimensions L x W x H (mm)	Weight (kg)
1	DDC1 – 3 men	6000 x 2400 x 2550	15000
2	HRC 12 – men (suitable as living chamber for 3 divers)	5600 x 2400 x 3200	17500
3	DDC2 – 6 men	8750 x 2450 x 2600	18000
4	SDC – 3 men Diving Bell	2400 x 2400 x 2750	6500
5	Clump weight	2000 x 500 x 2000	2500
6	Main A-frame with boom	4000 x 2000 x 800	5500
7	Hydraulic winch unit	6000 x 2400 x 3200	24000
8	Umbilical winch	2950 x 2200 x 2350	5500
9	Sat & Dive control room	6000 x 2400 x 2600	7000
10	ECU 1	6000 x 2400 x 2600	9800
11	ECU 2	3000 x 2400 x 2600	4000
12	ECU 3	3000 x 2400 x 2600	5500
13	Gas reclaim	6000 x 2400 x 2600	12000
14	Diesel Heater	3000 x 2000 x 2200	3500
15	Diesel Heater backup	3000 x 2000 x 2200	3500
16	Emergency generator	2500 x 1350 x 1600	1000
17	Compressor unit	3000 x 2400 x 2600	4500
18	Emergency hydraulic power unit (HRC)	2000 x 1400 x 1600	2000
19	Air Diving area		
20	Workshop container	4000 x 2400 x 2600	5000
21	Store/Spare parts container	3000 x 2400 x 2600	5000
21	Store/Spare parts container	6000 x 2400 x 2600	10000
22	Rescue package	3000 x 2400 x 2600	5000

TYPICAL SYSTEM LAYOUT

