SPECIFICATIONS OF SAT 8 SYSTEM

SATURATION SPREAD 200m

SATURATION DIVING SYSTEM

SAT 008

SPECIFICATIONS OF SAT 8 SYSTEM

The system will be mobilised with the following items as a minimum.
Additional equipment will be provided as required.
The System designation is Saturation Diving System 008.
This Diving System is a modular Subsea Horizontal Vertical System consisting of:

- ✓ Main Skid including Launch & recovery system
- ✓ HRC (Hyperbaric Rescue Chamber)
- ✓ Horizontal Living Chamber
- ✓ Vertical Entry Lock
- ✓ Saturation Control Van
- ✓ Dive Control Van
- ✓ HRC Control Van
- ✓ Life Support Container (E.C.U. & Hot Water Machine) Sanitary Pumps
- ✓ Reclaim Container
- ✓ Sat Technicians Store & Workshop
- ✓ Rigging Container
- ✓ Hydraulic Power Packs – Electric / Diesel Chain / Emergency
- ✓ Main Bell Winch – Norson 10 SWL
- ✓ Clump Weight Winch – Norson 4 SWL
- ✓ Three man Bell
- ✓ Umbilical 400 Mtrs c/w Basket

The designed maximum operating depth is 200 MSW, The system can accommodate 9 divers in the horizontal & HRC chambers.
The System is designed to allow for several different configurations, providing greater operational flexibility.
The System is configured to minimise the time required for mobilisation and demobilisation.
The System underwent an extensive refurbishment program between June 2005 and February 2006.
The System will be mobilised with a full Certification package to the internationally recognised IMCA guidelines.
The System will be mobilised with a full inventory of spares and manuals for all plant and equipment.

SPECIFICATIONS OF SAT 8 SYSTEM

DIMENSIONS AND WEIGHT

Description	Overall Dimensions (m)	WT (Tonnes)
Main Skid including Launch & recovery system	12.40 x 4.50 x 7.20	75.00
HRC & Skid	6.10 x 3.25 x 3.40	23.00
Saturation Control Van	6.10 x 2.43 x 2.43	8.00
Dive Control Van	6.10 x 2.43 x 2.43	8.00
E.C.U. & Divers Hot Unit / Life Support Container	6.10 x 2.43 x 2.43	8.00
Horizontal Living Chamber	4.76 x 3.2 x 3.54	21.00
Vertical Entry Lock	3.3 x 3.2 x 3.54	20.00
Gas Reclaim Container	3.10 x 2.43 x 2.43	4.00
Saturation Technician and Workshop	6.10 x 2.43 x 2.43	8.00
Rigging Container	6.10 x 2.43 x 2.43	8.00
Bell Umbilical Basket	3.00 x 3.00 x 1.49	2.50
Flyaway Container (Twin ECU)	2.20 x 1.32 x 2.58	1.20
Main winch, & clump weight winch, Electric Power Pack, Diesel & Hydraulic Power Pack	14.00 x 4.50 x 3.20	21.00

SYSTEM VOLUMES

Horizontal Living Chamber	15m3
Horizontal HRC/Living Chamber	15m3
Transfer Lock	4.3m3
Bell	5.0m3
HRC Trunking	0.80m3

OPERATIONAL INTERFACE REQUIREMENTS

The following Power, Water and Air supplies are required during operations:

Electrical Power

Primary Supply	440V AC . 3 phase . 60Hz . 350kVa
Secondary Supply	440V AC . 3 phase . 60Hz . 300kVa

Power Supply switching and distributing is provided through the Life Support container.

SPECIFICATIONS OF SAT 8 SYSTEM

Seawater Supply

ECUs	30gpm @ 50psi
Divers Hot Water	30gpm @ 51psi

Fire Main hook-up for deluge system

Freshwater Supply

Sanitary Water	20gpm @ 45psi

Work Air Supply

Primary Supply	750cfm @ 116psi (for reclaim only)
Secondary Supply	500cfm @ 116psi

MAIN SKID

This comprises two Subsea Vertical / Horizontal Living Chambers, one Transfer Lock, one Diving Bell and the Bell launch and recovery system.

- All the service and supply bundles to the Saturation Control, the Reclaim Control and the Life Support Container are pre-made using Synflex high pressure whips fitted with stainless steel JIC swivels.
- The Skid Frame is engineered to ensure the rigidity of the system at all times.
- Externally the Skid and the Chambers are corrosion protected by four coats of Jotun epoxy paint.
- A hard plumbed Fire Deluge system is fitted, covering the area of the living chambers.
- System Hydraulics is hard plumbed to a single penetrator panel for ease of operations, and, to reduce mobilisation times.
- A System of 500w floodlights ensures a safe working environment during nightime operations.

HORIZONTAL

Each Living Chamber has the following features:

- HLC are fitted with the following penetrators, all penetrators are fitted with internal & external skin valves,
  - ✓ Gas Supply
  - ✓ Exhaust
  - ✓ Analysis
  - ✓ Pneumo
  - ✓ Bilge Drain
  - ✓ Oxygen Make Up
  - ✓ BIBS Supply
  - ✓ BIBS Dump
  - ✓ Medical Lock Equalisation
  - ✓ ECU Primary In
  - ✓ ECU Primary Out
  - ✓ ECU Secondary In
  - ✓ ECU Secondary Out
  - ✓ Electrical 1
  - ✓ Electrical 2
  - ✓ 4 x spares
  - ✓ Sound Powered Phone
  - ✓ Intercom phones
  - ✓ Sanitary Cold In
  - ✓ Safety Relief Valve
  - ✓ Call up System
- Full and effective insulation is provided against external sound and temperature extremes,
- Three manways, with standard Tube Turn bolted flanges, allowing considerable configuration flexibility,
- A 16"x 30"Tube-Turn Medical / Food / Equipment lock, the lock is provided with both manual and mechanical interlocks,
- 6 x 8" viewports are provided,
- The Medical lock is provided with hard wired internal / external communications for reasons of Safety and ease of operations,
- Each chamber is fitted with internal video surveillance camera,
- Chambers are provided with internal CO2 scrubbers, the canisters are fabricated to fit the locks, thus minimising changes,
- Passive Emergency Scrubbers are also provided for each diver,
- Removable Aluminium diamond grid chequer plate flooring is provided,

- Bunks for three & four divers,
- A folding aluminium table for eating,
- Hard Wired primary communications with call-up facility to Sat Control,
- Secondary Sound Powered phone communications with Sat Control
- Individual Bunk lights,
- Storage space for the divers personal equipment,
- 5 sets of externally dumping BIBS,
- Chamber environment is continually monitored for temperature and humidity,
- Under floor ECU and atmosphere homogenizer,
- The electrical systems are protected externally with British Standard, weatherproof, harsh environment boxes,
- Emergency B.A. Sets x 2 Nos.

TRANSFER LOCK

- The transfer lock is spherical and is fitted with a standard Perry type Bell mating flange at the side. The Bell mating flange is provided with both Manual and Mechanical Interlocks.
- The TUP is fitted with three standard manways with bolt flanges.
- The transfer lock is fitted with the following penetrators, all penetrators are fitted with internal & external skin valves.
  - Gas Supply
  - Exhaust
  - Analysis
  - Pneumo
  - Bilge Drain
  - Oxygen Make Up
  - BIBS Supply
  - BIBS Dump
  - Hot Water Supply
  - Cold Water Supply
  - Toilet Exhaust
  - Electrical 1
  - Electrical 2
  - Trunking Blowdown / Exhaust
  - Trunking Pneumo / Interlock supply
  - 2 x spares
  - Safety Relief Valve
- The trunking door is spring counterbalanced for ease of operation
- 2 x 8” viewports are provided
- The TUP is fitted with internal video surveillance camera

SPECIFICATIONS OF SAT 8 SYSTEM

- Divers Shower with hot and cold water supplies
- Pressure proof toilet with interlock
- Equipment storage hooks for the divers gear.
- 4 sets of externally dumping BIBS
- Hard Wired Communications with Call-up facility to Sat Control
- Hard Wired Communications to Deck for Life Support Technicians
- TUP environment is continually monitored for temperature and humidity
- The electrical systems are protected externally with British Standard, weatherproof, harsh environment boxes.

BELL

- The Bell is designed to be side mating
- The Bell trunking is fitted with both a top and a bottom door, doors are hydraulic assisted for ease of use
- The Bell is fully externally protected against mechanical damage.
- The Bell carries its onboard gas and Emergency power pack on a detachable stage mounted underneath
- The Bell is plumbed to allow three diver operations with Mara Dive Panel
- 4 x BIBS are provided
- All penetrators are fitted with external and internal skin valves
- The Bell is fitted with a Gas Services Helium reclaim panel the reclaim can be set up to sense from the diver's pneumo or from the bell depending on operational requirements. Gas reclaim is achieved using the Gas Services system in conjunction with two Kirby Morgan 17B Diving Helmets.
- The Bell is fitted with a video surveillance camera.
- The Bell is fitted with 2 x 24v hyperbaric lights internally and two 500w Viking lights externally.
- The Bell is fitted with panel mounted quick connections for the emergency umbilical hook-up. The emergency umbilical supplies Gas, Hot Water, Communications and Power in the event of severe damage to the main umbilical.
- The Bell is equipped with Hard wired Communications and Through Water Communications for back-up purposes
- The Bell is fitted with an emergency location transponder system. The system can be used either from the surface or by a rescue diver.

BELL UMBILICAL

- The Bell Umbilical is 400m - Fibron

- The Umbilical has spare power, communications and camera cables built in, this will minimise delays in the event of minor damage to those components

EXCURSION UMBILICAL

The System will be mobilised with 5 excursion Umbilicals:-

- 3 x 55 m (Fibron) candy twist, with camera – Diver 1
- 2 x 65 m (Fibron) candy twist – Bellman

HYPERBARIC RESCUE CHAMBER & CONTROL VAN

The HRC is of the horizontal design it was built to fully comply with International Regulations and IMCA Guidelines.

The HRC was designed and built with the following features.

- It is mounted on its own dedicated detachable skid. Sea fastening is achieved with quick release bolted hooks.
- The Onboard Gas banks and the Battery Pack are fully protected by an encapsulating framework, the Chamber is rubber mounted inside this framework.
- It is provided with dedicated, Certified lifting and towing rigging. The rigging is permanently attached during operations.
- The HRC floats stable and upright with 1.1 tonnes of reserve bouyancy.
- The HRC has its own purpose built Control Van and dedicated umbilical bundle. The Control Van allows the supervisors and technicians full control of gas supplies, services, analysis and communications in the event of an evacuation.
- It is fitted with an EPIRB to aid.
- Divers Shower with hot and cold water supplies.
- Pressure proof toilet with interlock.
- The HRC is fully insulated against external sound and temperature extremes.
- The Chamber is fitted with two manways, with standard Tube Turn bolted flanges.
- The HRC is fitted with a 16”x 30”Tube-Turn Medical / Food / Equipment lock, each lock is provided with both manual and mechanical interlocks. Each Medical lock is provided with hard wired internal / external communications.
- 3 x 8½ ” viewports are provided, protection provided for damages
- The HRC is fitted with a video surveillance camera.

- The HRC is provided with two internal CO2 scrubbers, the canisters are fabricated to fit the locks, thus minimising changes.
- Passive Emergency Scrubbers are also provided for each diver.
- Removable Aluminium diamond grid chequer plate flooring is provided.
- 13 sets of externally dumping BIBS.
- Chamber environment is continually monitored for temperature and humidity.
- Chamber is fitted with an under floor ECU and homogenizer.

SATURATION AND DIVE CONTROL

The System has a purpose built Control Van.
All Gas distribution & supply panels, valves regulators & fittings are designed to comply with International regulations and guidelines.
All electrical Supplies and equipment components comply with the International guidelines relating to the safe use of electricity under water.

SAT CONTROL

- Each individual chamber and trunking is served by its own dedicated panel,
- Primary communications to the chambers is provided by two panel mounted Amron 2825 radios with Helium unscramble capability. Power supplies are fitted with emergency Gel Cell backups,
- Primary pneumo Gauges are all 8½" dials,
- Permanent Chamber atmosphere analysis is provided using 4 x G30 Carbon Dioxide monitors and 4 x G22 Oxygen analysers. All analysers are permanently panel mounted for ease of use. Power to the analysers has a UPS in line to ensure stable supply,
- Chamber atmosphere temperature and humidity is controlled on the panel
- Breathing apparatus is provided for key personnel in the event of atmospheric contamination,
- All Surveillance system controls, monitors, power, light and comms switching, through water communications and power supply back ups have been panel mounted to provide the best possible working environment for the Diving Supervisors and Life support technicians.

DIVE CONTROL

- The Bell and Diver Gas supplies manifold is fully compliant with International Regulations and Guidelines.

- Primary Communications with the Bell and the Divers is provided by, two, Amcom III – 2830R radios, with Helium unscramble capability.
- Primary Pneumo Gauges have 8½" dials.
- Divers Hat Camera is viewed using a 9" colour monitor connected to 2 x VHS Tape recorders.
- The Dive Control has a large window to give the supervisor the best possible view of Bell handling operations.

BELL HANDLING SYSTEM

- The Main Launch and recovery winch is a Norsen Winch fitted with primary and secondary drives. The winch is rated at 10 tonnes S.W.L. in man-riding mode.
- Hydraulic power is provided by two independent supplies. The primary power pack has an electric drive the secondary has a diesel drive.
- All Hydraulic pipe work is, as far as possible, hard plumbed. The system carries two main hydraulic supply bundles from the power pack to the skid, one primary and one spare.
- The main Bell Wire is a 32mm Non-Rotating, Bridon, Super-wire with a design breaking strain of 87 tonnes.
- The clump-weight / secondary recovery system is provided by an Norson 4 Ton S.W.L.
- Bell handling is achieved using a hydraulic A frame which deploys the Bell over the front end of the Skid. The Skid base has removable wings to allow the surface support team to handle the Bell safely during operations
- Hard Wired communications is provided between the Dive Control and the Winch Control panels and between the Dive Control and the Bell mating flange.
- The skid is fitted with four powerful arc lights to ensure adequate lighting during nightime operations.
- A Pneumatic Motor is incorporated by a dog to clutch on Main winch for Bell Emergency Recovery

GAS RECLAIM SYSTEM

- The surface unit of the Reclaim System was designed and built by Subtec Technicians
- Reclaim suction is provided by 6 x AGD-4, Haskel, Gas transfer pumps.

- The Reclaim Control panel is built integrally with the topside unit this is a very efficient set up as it enables the supervisor to monitor the system operations very closely and to make adjustments immediately.

LIFE SUPPORT CONTAINER

The container houses the following services :-

1. Power Distribution
    a. The main power from the generators is switched, transformed and distributed from here.

2. ECUs
    a. 3 x Kinergetics water cooled CMUs provide environmental control to the system.
    b. 2 x ECUs are on line during operations
    c. 1 x reserve unit

3. Divers Hot Water
    a. 2 x The Divers Hot Water supply pumps and reservoirs (KI Mini
    b. Heater)

4. Sanitary Water

5. The pumps and holding tanks for the sanitary water

6. Fored Feed Multistage Pumps with line pressure reducers

SAT TECHNICIANS STORE & WORKSHOP

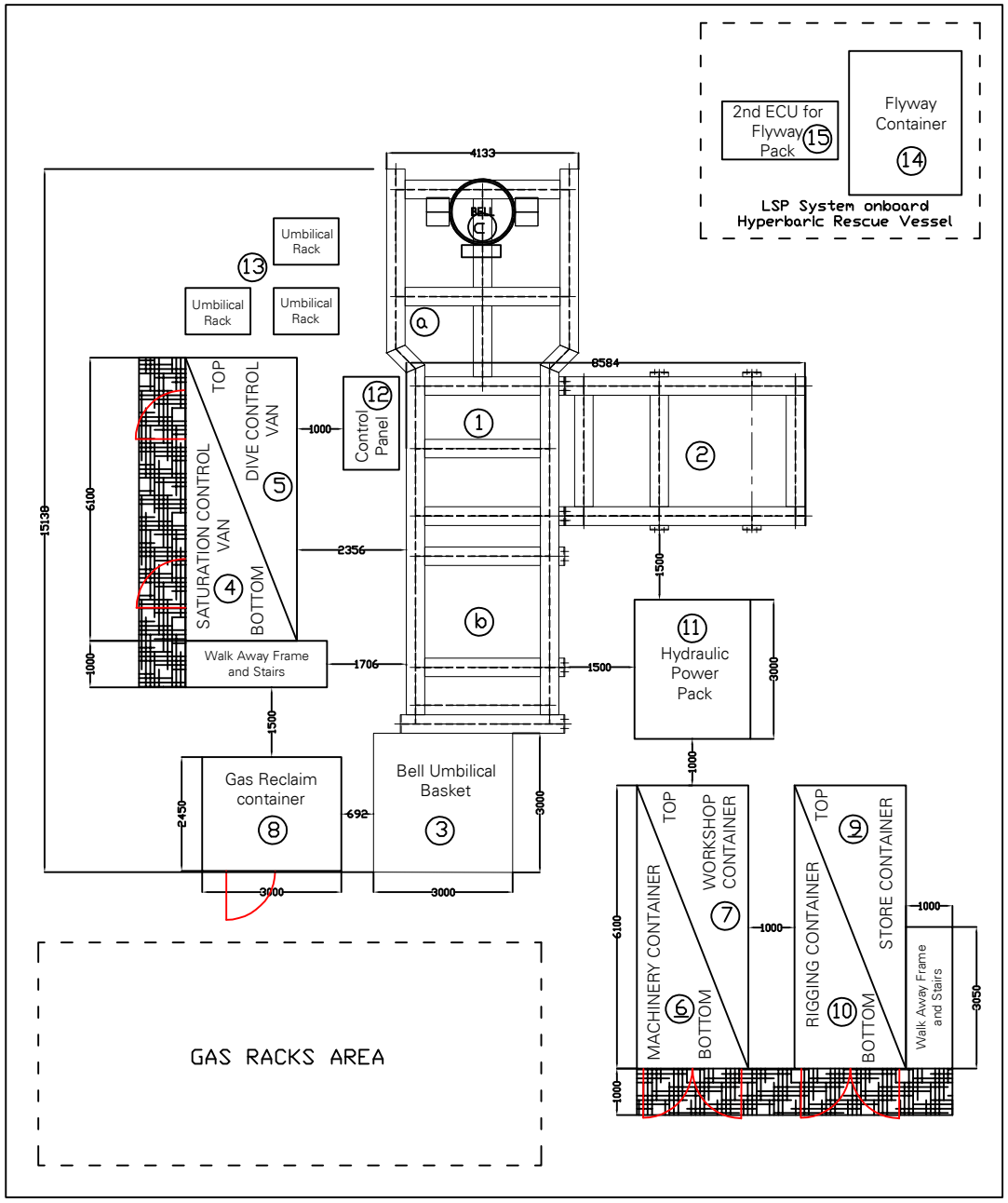
The Techs store and workshop comes with a complete inventory of technical spares, to support the system during operations, there is also a full set of technical manuals. It was built with the following features :-

- Multiple power supplies and outlets for equipment testing
- Full set of high quality tools and test equipment

SPECIFICATIONS OF SAT 8 SYSTEM

- Panel with multiple regulated gas supplies for equipment testing
- Workbench with multi – purpose vice and miniature vice
- Soldering station
- Electronics repair station with lighting and magnification provided
- Deep storage shelving with plastic stackable bin system for storage of spares fittings etc.
- System Offshore PMS data sheets

SAT SYSTEM
SAT-08



LEGEND SAT-08 :

No	Description	Overall Dimensions (m)	WT (Ton)
1	Main Skid including Launch & recovery system	12,40 x 4,50 x 7,20	75.00
a	Main winch, & clump weight winch, Electric Power Pack, Diesel & Hydraulic Power Pack	14,00 x 4,50 x 3,20	21.00
b	Horizontal Living Chamber	4,76 x 3,20 x 3,54	21.00
c	Vertical Entry Lock	3,30 x 3,20 x 3,54	20.00
2	HRC & Skid	6,10 x 3,25 x 3,40	23.00
3	Bell Umbilical Basket	3,00 x 3,00 x 1,49	2.50
4	Saturation Control Van	6,10 x 2,43 x 2,43	8.00
5	Dive Control Van	6,10 x 2,43 x 2,43	8.00
6	E.C.U. & Divers Hot Unit / Life Support / Machinery Container	6,10 x 2,43 x 2,43	8.00
7	Saturation Technician and Workshop container	6,10 x 2,43 x 2,43	8.00
8	Gas Reclaim Container	3,10 x 2,43 x 2,43	4.00
9	Store container	6,10 x 2,43 x 2,43	8.00
10	Rigging container	6,10 x 2,43 x 2,43	8.00
11	Main Hydraulic Power Pack	3,00 x 2,50 x 4,00	7.00
12	Control Panel	2,00 x 1,20 x 1,00	
13	3 x Umbilical Racks	1,40 x 1,00 x 2,50	3.50
14	Flyaway Container 10ft	3,10 x 2,43 x 2,43	3.00
15	2nd ECU for Flyway pack	2,50 x 1,25 x 1,75	2.00
Note: Item no. 6,7,9,10 can be adjusted depend on Deck Conditions			

NOTES :

CAD FILE NAME :
OLD DRAWING NO. :

DD	KKA	DS
25-04-24	25-04-24	25-04-24
PREPARED	CHECKED	APPROVED

PROJECT TITLE : Foot Print SAT-08

TITLE: Foot Print SAT-08

SCALE: NONE | DRAWING No. | REV. 1