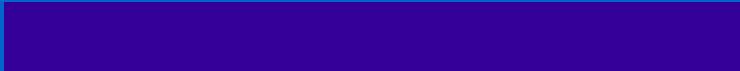


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RSI Containerized Hyperbaric Therapy Facilities



Stephen D. Reimers, PE.
Reimers Systems, Inc.



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Major Features

- Can be economically shipped nearly anywhere via standard container carriers. The marine certifications of the containers are not violated.
- Fast set-up and teardown. Less than a day in most cases.
- Highly self-contained. With on-board oxygen generator option, no utilities are required other than electric power and, occasionally, water.
- System designs are compatible with both diving applications and medical therapy applications. The facility produces both breathing quality air and medical grade oxygen (95%) as needed.
- Systems are simple to operate and designed for easy maintenance.
- Fully automatic oxygen production minimizes labor costs

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Model 4202S-C-OGEN 2-Place Self-Contained System

Imagine:

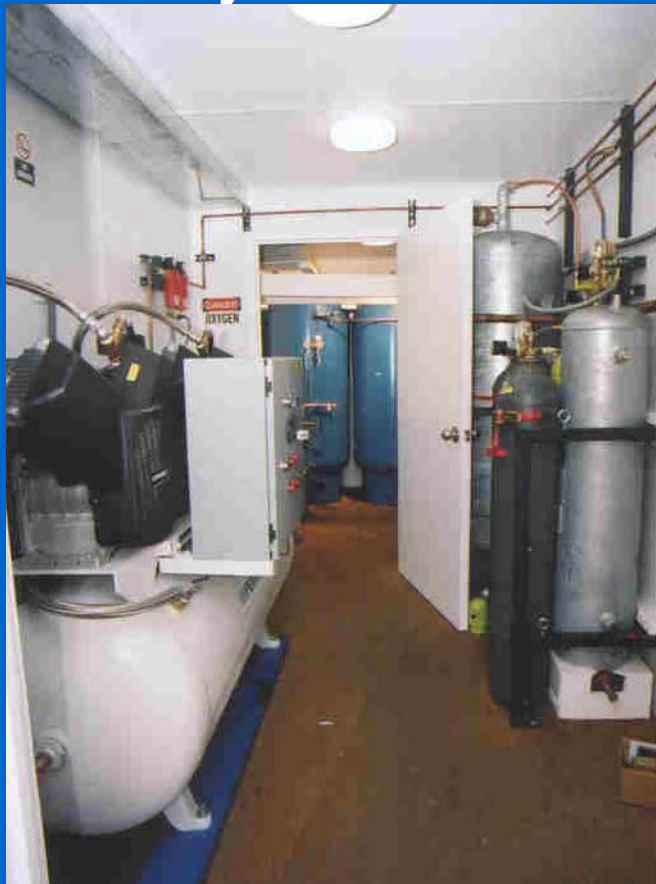
From on the truck



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Model 4202S-C-OGEN 2-Place Self-Contained HBO Facility

To ready to use



In just one day.

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Typical Applications

- Locations where oxygen is expensive or difficult to transport
 - Caribbean and Pacific Islands
 - Developing countries
 - Any location far removed from a liquid oxygen plant
- Locations where site construction is difficult or costly
- Clinical HBO and recompression chamber applications in remote locations
- Seasonal or short-term needs
- Military
- Large scale surface decompression diving operations
- Sites where low exit costs make project finance easier.
- New markets where non-recoverable costs must be minimized.

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Chamber Container Interior

The chamber shown is a 42” Marine Dynamics single lock chamber upgraded with a fire suppression system and RSI’s hood/mask breathing system.

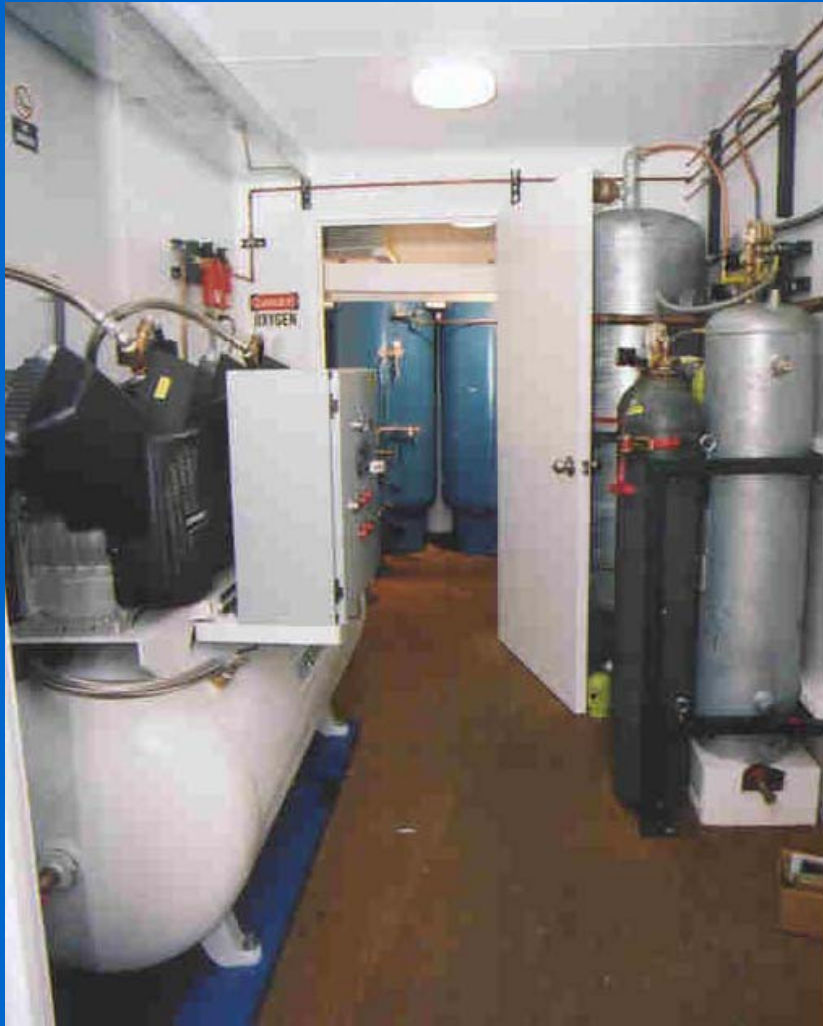


Other chamber systems up to 60” diameter and two locks are possible.

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Equipment Container Interior



Left foreground: air compressor

Right foreground: fire suppression water tanks and HP reserve breathing air supply

Rear: Oxygen room

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Compressor Room



Note the ventilation duct in the upper left and the vents adjacent to the door to the oxygen room. The oxygen room has its own ventilation system.

Compressor Assembly



The air compressor assembly uses two 5 hp oil-less (no oil at all) air compressors.

Downstream from the air compressor is a refrigerated air dryer and a 0.01 micron filtration set. The room fan (above the compressor by the door) starts automatically when either compressor starts.

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RSI Model OXYGENSYS-100 Oxygen Supply System



From left to right are shown the oxygen pressure intensifier, low pressure oxygen receivers, HP reserve oxygen storage bank and the oxygen concentrator.

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Oxygen Concentrator and Analyzer



The oxygen concentrator is the heart of the oxygen system. It converts air from the compressor into 95% oxygen gas for patient use by scrubbing the nitrogen from the air stream with a pressure-swing absorption process. The remaining 5% is about half residual nitrogen and half argon. (Normal air is about 0.5% argon which increases to 2.5% when the nitrogen is removed.)

Concentrator output is continually monitored by a high accuracy analyzer.

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Oxygen Pressure Intensifier



The pressure intensifier boosts the 0-50 psig outlet pressure from the concentrator to up to 175 psig for storage. Its operation is fully automatic.

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Low Pressure Oxygen Storage



The twin 200 gallon receivers store nearly 400 scf of oxygen deliverable at a pressure of 60 psig. Additional receivers can be added for applications requiring greater surge capacity.

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High Pressure Oxygen Reserve



Conventional high pressure oxygen bottles are used to provide a reserve oxygen supply. They also provide a 100% span gas sample to the oxygen analyzer.

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Oxygen Supply System: Basic Specifications

<u>OXYGENSYS Model</u>	<u>100</u>	<u>200</u>
Compressor capacity (scfm at 125 psig)	34	105
Compressors:	2 @ 5 hp (*)	3 @ 10 hp
Oxygen production rate (scf per hour)	100	200
Equivalent 244 scf cylinders per 24 hours	10	20
Oxygen purity (USP 93%)	90 to 96%	
Target purity range	94 to 96%	
Typically achievable purity	95%	95%
Oxygen concentrator air consumption (scfm)	30	44
Oxygen analyzers	1	2

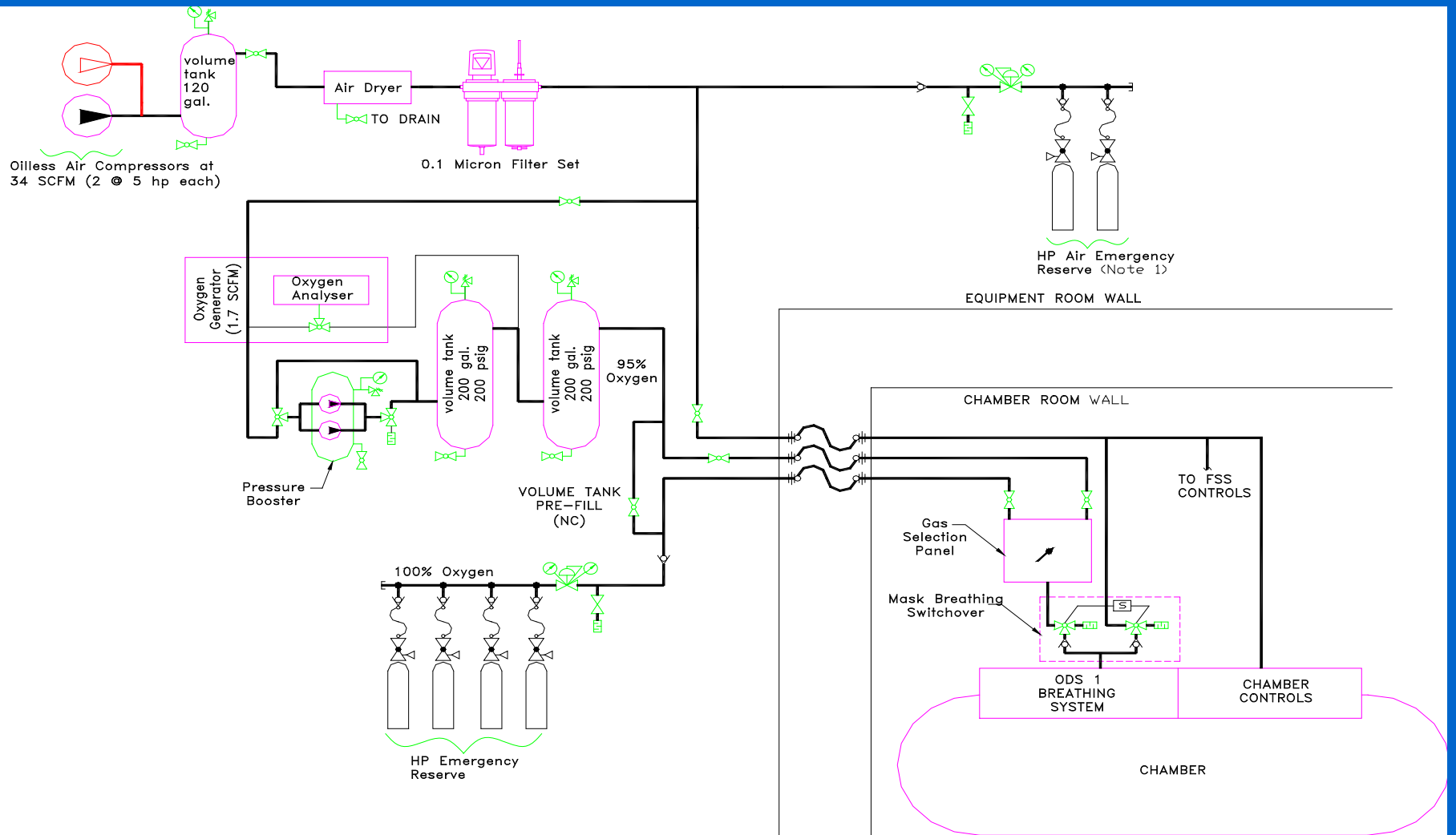
(*) 2 @ 7.5 hp for OXYAIRGENSYS-100, Total cap. = 52 scfm

Oxygen Concentrator Run Time

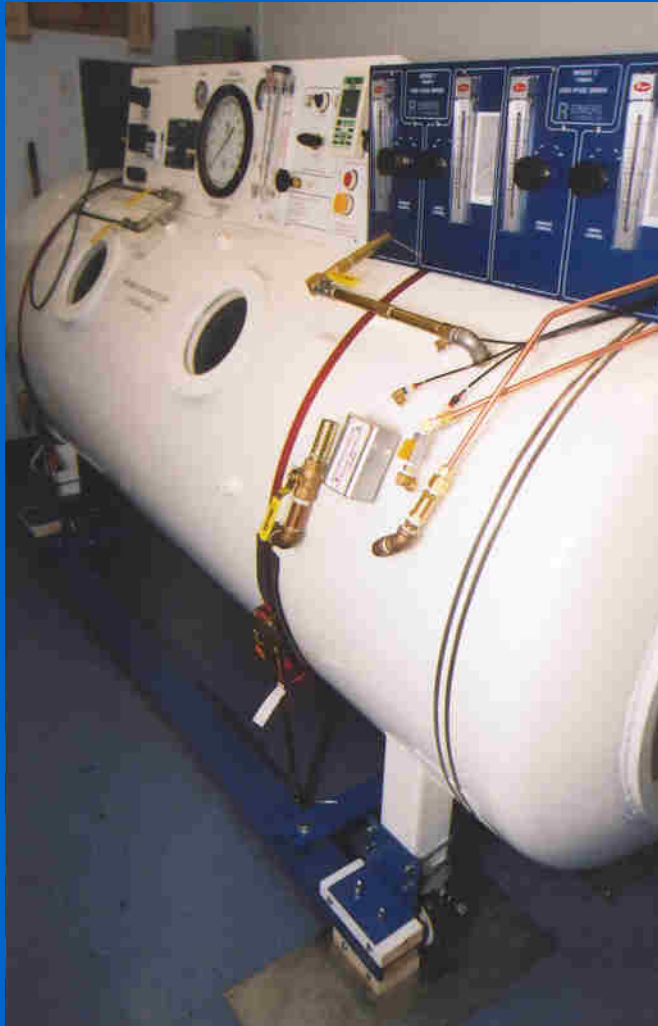
Oxygen Concentrator Run Time Per Patient (minutes)					
				OXYGENSYS	
				<u>100</u>	<u>200</u>
Treatment Parameters				1.67	3.33
				<u>scfm</u>	<u>scfm</u>
	Time	ATA	SCF		
Adult (160 lbs, 1.0 acfm)	90	3	270	162	81
	90	2.5	225	135	68
	90	2	180	108	54
	90	1.5	135	81	41
Child (80 lbs, 0.5 acfm)	90	3	135	81	41
	90	2.5	112.5	67	34
	90	2	90	54	27
	90	1.5	67.5	40	20

The run times shown are based on the typical hood flow rates. Run times for patients using masks can be substantially less.

Oxygen & Air Schematic: Model OXYGENSYS-100



The Chamber



The chamber is mounted on wheels to provide maintenance access to the controls. Stainless steel reinforcing plates provide the floor strength necessary for a wheeled chamber. The chamber anchoring system shown is normally removed once the system reaches its destination.



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Chamber Interior



The chamber interior is kept as clean and neat as possible.

On the left is chamber interior fire suppression deluge control. The deluge nozzles are offset to the rear to leave the top of the chamber free of “head-crackers”.

Communications gear and the fire suppression handline are on the right. Also included in the interior are valves to permit the occupant to exit chamber in the event of incapacitation of the outside operator.

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Chamber Controls



The chamber control panel contains controls for chamber pressure, ventilation, communication, oxygen analysis, breathing gas selection and fire suppression.

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Patient Breathing System



RSI's ODS1 Patient Breathing system supports two occupants using either hoods or constant flow masks. All controls are outside the chamber. Flowmeters calibrated in understandable units permit efficient oxygen usage. The interior patient circuits are assembled in such a way that a patient squeeze ("shrink-wrap" accident) is nearly impossible and the hoods/masks can be operated normally even with the chamber at surface pressure.

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Fire Suppression Controls



The fire suppression controls are 100% pneumatic for maximum reliability. A deluge bypass makes testing of the system easy.

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Main Breaker Panel



Chamber system runs on a 200 amp 220 volt single phase service. Chamber container has a separate panel box (60 amp, 220 volt, single phase) fed from this panel box.

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The Facility: Ready to Move



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RSI Containerized Hyperbaric Therapy Facilities

- Efficient, capable systems designed to be easy to move, simple to operate and easy to maintain.
- Continuing RSI's commitment to expanding access to hyperbaric healthcare by eliminating the technical barriers to having a code-compliant facility anywhere one is needed.

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