

Decompression

Decompression takes place inside Aquarius. Decompression consists of slowly reducing the interior pressure until the pressure inside reaches one atmosphere absolute. Aquanauts are then recompressed to ambient pressure in order to exit the habitat and ascend to a recovery vessel.

Pre-Decompression Preparations

The following items must be completed prior to decompression:

- Aquanauts must be back at storage depth for six hours prior to the start of decompression.
- Aquanauts must have no excursions deeper than 95 fsw or longer than two hours within 18 hours of decompression.
- CO₂ absorbent shall be changed out if it has not been replaced within the preceding 48 hours.
- Pre-decompression medical checks and decompression briefings shall be completed if possible.
- The oxygen BIBS system shall be tested and aquanauts should test fit their individual masks.
- The Daily Habitat Checklist shall be completed.
- The Master Pre-Decompression Checklist shall be completed.
- The Habitat Pre-Decompression Checklist shall be completed.

Decompression Schedule

Decompression rates are as per Table 1.¹ When decompression begins, aquanauts should begin breathing oxygen. Three twenty minute oxygen periods shall be performed with five minutes air breaks.

Habitat internal pressure is normally slightly above 45 fsw upon the start of decompression. For all initial depths, the habitat internal pressure shall be 44 fsw at six (6) minutes into decompression.

Upon reaching one atmosphere internal pressure, a one-hour hold period shall be completed to allow continued off gassing and monitoring for signs of decompression sickness.

¹ The decompression schedule is based on procedures from the NOAA Diving Manual with the addition of oxygen breathing and the modification that depth after six minutes is 44 fsw regardless of starting depth.

Depth Range (FSW)	Deco Rate (Minutes Per Foot)	Notes
>45	Six minutes into deco, depth shall be 44 fsw for all initial depths.	
45 – 30	6	O2 Breathing per procedure.
30 – 28	22	
28 – 26	23	
26 – 24	24	
24 – 22	25	
22 – 20	26	
20 – 18	27	
18 – 16	28	
16 – 13	29	
13 – 10	30	
10 – 8	31	
8 – 6	32	
6 – 4	33	
4 – 0	34	
0	N/A	One hour hold required.

Table 1 : Decompression Rates

A blank Decompression form which contains actual clock times, is used to track decompression. The form is divided into a series of one (1) fsw increments, "stops".

Notes:

- The Technician controlling the decompression station, and the Watch Desk, shall both record the actual time of arrival at each fsw reading.
- Decompression rate between 1 fsw increments is not critical.
- If arrival at the next 1 fsw increment is early, hold and wait for the clock to catch up, then resume travel at the specified ascent rate.
- If actual depth is more than 1 fsw shallower than scheduled depth, pressurize to scheduled depth and resume at specified ascent rate.
- If actual depth is 1 fsw or more deeper than scheduled depth, schedule should be adjusted. Never exceed specified rate in an attempt to catch up by 1 fsw or more.
- Confusion: If for any reason the Technician controlling the decompression becomes confused about any readings, or if any event occurs that seems to be affecting the decompression, close all exhaust valves and come to an "all stop" condition. Open pressurization valves to maintain depth if necessary. Notify the Watch Desk and await instructions.
- Holding depth does not compromise the decompression; it only delays the schedule such that a new form may need to be used once the problem is sorted out.

Decompression Technician

A non-saturated staff member shall serve as the Decompression Technician during decompression. The primary purpose of the Decompression Technician is to operate the Habitat and monitor aquanauts for signs of oxygen toxicity during the initial oxygen breathing phase of decompression. The tender remains throughout decompression as a third habitat technician to control decompression. Although the Decompression Technician manages the initial phase of decompression, the Lead Habitat Technician remains responsible for assuring safety of the Habitat and divers in coordination with the Watch Desk.

The Decompression Technician should plan to remain within a "No Decompression" status up until the time of commencement of decompression within the Habitat. If decompression is delayed and the "No Decompression" limit is exceeded, the standard saturation decompression table without oxygen breathing is sufficient for the Decompression Technician and no compensatory action is required.

Repressurization and Ascent

Following the one-hour post decompression hold period in the Habitat, the Habitat shall be repressurized and divers shall ascend from the Habitat. The one-hour hold period can be extended indefinitely as required operationally. However, once repressurization commences, repressurization and Habitat exit shall proceed in a timely manner. The following general procedure shall be followed for repressurization and ascent:

1. Two ascent divers are present in the wet porch.
2. Habitat Technicians are authorized by the Watch Desk to commence pressurization.
3. Habitat Technician closes all exhaust valves and notifies the Watch Desk that the habitat is ready.
4. Habitat Technician visually confirms that ascent divers are in the Wet Porch and confirms that the swinging door hatch dogs are open.
5. Habitat Technician begins blow-down and notifies Watch Desk. Blow down should occur as quickly as possible utilizing both primary and secondary banks.
6. Habitat Technician watches aquanauts to ensure they are able to equalize ears.

7. Habitat Technician secures compartment pressurization when door opens.
8. Habitat Technician informs Watch Desk that Habitat is on bottom.
9. Aquanauts meet ascent divers and exit the Wet Porch using standard SCUBA equipment for a two minute (25 feet/min) ascent to the surface. Time should not be wasted in exiting the habitat as additional time on bottom increases nitrogen loading.
10. At the surface the aquanauts board the support vessel.
11. Following surfacing, complete chamber watch requirements as per protocol