BOSTON UNIVERSITY DIVE SAFETY
COVID-19 DIVING SOP

OVERVIEW
On March 16, 2020 in response to the emerging COVID-19 global pandemic, the BU Office of Research ordered the ramping down of research and campus activities.

This is a guidance for divers in the BU Diving Safety Program conducting training, proficiency, and scientific diving. Allowance of field diving operations will be consistent with the instructions from the Office of Research.

The procedures and protocols below follow social distancing recommendations and industry best practices to help mitigate the risk of transmission of the novel coronavirus.

MEDICAL EVALUATION AND DAILY SELF ASSESSMENT

Research Occupations Health will contact all divers via email to conduct a COVID-19 screening prior to starting diving. ROHP clearance will be required to resume diving.

University of California San Diego released documents in an effort to share information on evaluating fitness to dive in individual who have contracted COVID-19. Divers who have been exposed will need to be evaluated per the UCSD guidelines. If divers believe they have been to COVID-19 after ROHP clearance should contact ROHP.


Please note, as more knowledge becomes available, these documents are anticipated to change and will be updated as needed.

Divers should complete daily symptom survey sent out via email prior to reporting to either dive locker or the dive site.

DIVE PLAN SUBMISSION AND APPROVAL

Field Research activities must be approved by Gloria Waters, Vice President and Associate Provost for Research. Dive Plan submission timelines remain the same:

- Dive plans involving local diving (New England) shall be submitted at least 10 business days in advance of the planned dives
- Dive plans involving domestic travel shall be submitted at least 10 business days in advance
- Dive plans involving reciprocity divers 30 days (1 month) in advance
- Dive plans involving international travel 30 days (1 month) in advance

DIVE LOCKER PROCEDURES

Gear Checkouts and Returns
- Each diver is responsible for checking out and returning their gear to be used by them
- Everyone must wear face coverings
Upon arrival to the dive locker, individuals will wash hands and don gloves to pack up gear.

Adherence to 6 ft minimum distancing through the dive locker and packing and loading gear in vehicles:
- 2 divers will be permitted inside the locker room at a time; one diver per side of the locker room
- Gear will be taken to hallway where bags will be spaced 6 ft apart for packing

**Compressor Operations and Fill Station Concerns and Procedures**

Compressor air intake as a source of SARS-CoV-2 transmission by aerosolized droplets in the air has been addressed by Divers Alert Network.

“When additional information is needed, scientists will sometimes look to related but slightly harder-to-kill viruses. In the case of the novel coronavirus, some data reports are based on the SARS-CoV-1 virus because it is more difficult to kill than the novel coronavirus. One study found that the SARS-CoV-1 virus loses infectivity after being heated to 133°F (56°C) for 15 minutes, and the World Health Organization specifies this temperature and timing as well. Another study found that the SARS-CoV-1 virus remains stable between 40°F (4°C) and 98°F (37°C) and would lose infectivity after 30 minutes at 133°F (56°C).

Divers Alert Network has received questions about the virus entering a scuba cylinder as a result of contaminated air being drawn into the compressor. Calculations show that a four-stage compressor with 1 ATA inlet pressure and an 80°F environment pumping air up to 29 ATA or around 4000 psi, would have an inter-stage temperature inside the cylinder of 225 °F. This calculation is very basic and does not account for anything outside of ideal conditions. However, it does indicate the instantaneous temperature at the moment of peak pressure.

In reality, the outlet valve temperature will likely be 170°F-190°F, and the gas temperature around 150°F, occurring during each stage of the compressor (i.e. four cycles for a four-stage compressor assuming each stage’s outlet temperature is the same). Because this is hot enough to kill SARS-CoV-2, it is therefore unlikely that the virus would survive this process should an infected individual cough into the compressor intake.

- Only approved personnel will operate the compressor and fill cylinders. Approval will require Fill Station Operator training and PSI HAZMAT training. Currently the DSO is the only approved operator.
- Proper fill station procedures for avoiding introducing moisture and contaminate will be strictly adhered to
- Cylinder valves will be wiped or sprayed with a disinfectant – yet to be determined
- Only the compressor operator will be in the room while the compressor is running
- Prior to starting the filling process hands will be washed and gloves donned and face covering worn at all times

**DISINFECTION**

**Program Gear**
- Dive program gear will be rinsed and soaked in disinfectant dunks provided by the dive office. In the even the below disinfectant is unavailable, the CDC recommended bleach solution will be used.
Disinfectant: Simple Green d Pro 5 – EPA Registration Number 6836-140-56782

List N: Products with Emerging Viral Pathogens AND Human Coronavirus claims for use against SARS-CoV-2

<table>
<thead>
<tr>
<th>EPA Registration Number</th>
<th>Active Ingredient(s)</th>
<th>Product Name</th>
<th>To kill SARS-CoV-2 (COVID-19), follow disinfection directions for the following virus(es)</th>
<th>Contact Time (in minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6836-140</td>
<td>Quaternary ammonium</td>
<td>Lonza Formulation S-21F</td>
<td>Norovirus</td>
<td>10</td>
</tr>
</tbody>
</table>

Page 5 of the product label states the product is safe for use on “half mask respirators, full face breathing apparatus, gas masks.” Directions for these surfaces say “rinse all equipment that comes in prolonged contacts with the skin in clean, warm water…and allow to air dry before use.”

Disinfection directions for Simple Green d Pro 5 for Norovirus to kill SARS-CoV-2: 1:64 dilution with a 10 minute contact time (immersion) followed by warm water rinse

**Personal Gear**

Divers will need to disinfect personal gear at home. **DAN recommends** following the CDC’s recommendations on bleach solutions.
- 1/3 cup of bleach per one gallon of water with a contact time of 1 minute
- Cold water should be used as hot water breaks down bleach
- Care should be taken to avoid introducing contamination after disinfection

**GEAR**

**Program Gear and Personal Gear**

With current testing and symptom screening being conducted on campus, no modifications will need to be made to gear configurations.
- Personal gear will only be used by the owner and sharing/lending of gear is not permitted
- Program Gear - Longhose
  - Gear being returned to the dive locker will be disinfected
- Redundant Systems
  - Use of redundant bailout systems will be evaluated based on pandemic state and need to dive.

**TRAVEL AND TRANSPORTATION**

Refer to the state and university issued guidelines regarding approved travel and quarantine requirements

**Vehicles**
• When possible, personal vehicles will be used to avoid unnecessary carpool
• Not all divers own vehicles. If carpool is required all efforts will be made to adhere to 6 ft distance, limit number of passengers, and face coverings will be worn in the vehicle

TOP SIDE AND DIVE SITE PROCEDURES

Emergency Response
Lead Diver should evaluate EMS response time at the start of the day by calling the local Police Department.

Dive Briefing
Will be conducted with appropriate distancing with face coverings

Gear Setup and Checks
• Each diver will set up their own gear and maintain 6 ft distance between each other
• Function tests/Buddy Check will be done by diver with buddy observing from 6 ft in turn

<table>
<thead>
<tr>
<th>Conventional (Octopus)</th>
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<tbody>
<tr>
<td>1. Breath from primary regulator while watching air gauge</td>
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<tr>
<td>2. Demonstrate Octopus function by purging and watch air gauge</td>
</tr>
<tr>
<td>3. Power inflate BC and dump air watch air gauge – avoid oral inflation</td>
</tr>
<tr>
<td>4. Buddy visually confirms cylinder is open. All cylinders have “Pro-Valves”: Green is open; Red is closed</td>
</tr>
<tr>
<td>5. Review weights: ditch-able weight pockets or right and release belt</td>
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<table>
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<th>Longhose</th>
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<tr>
<td>1. Breath from primary regulator while watching air gauge</td>
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<tr>
<td>2. Breath from secondary regulator and watch air gauge</td>
</tr>
<tr>
<td>3. Power inflate BC and dump air watch air gauge – avoid oral inflation</td>
</tr>
<tr>
<td>4. Buddy visually confirms cylinder is open. All cylinders have “Pro-Valves”: Green is open; Red is closed</td>
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Entries, Exits, and Surface Swims
- Divers should time entry and exit with their buddy while maintaining appropriate distance and ready to render assistance if needed. Mask and regulator/snorkel in place, and fins in hand to minimize risk of transmission should they need to assist their buddy.
- Divers should be capable of entering, exiting, and donning and doffing independently.
- Efforts should be made to stay 6 ft apart on surface swims while paying attention to each other and ready to assist.
  - First attempt at surface assists are to verbally instruct the distressed diver
  - If distressed diver is not responding, an approach will be made with mask in place and regulator in mouth
- Site conditions – avoid diving in conditions that require assistance/contact from buddy for entry and exits

**Breakdown**
- Use BCD power inflator to depressurize system and avoid regulator purge

**Post Dive Briefings**
Will continue to be conducted while maintaining appropriate distancing and face coverings

*DSO will initially be on site as Lead Diver to run through procedures and train divers and get divers back up to active status. Divers will be cleared to resume unsupervised upon reaching active status (12 dives) and demonstrated ability to follow new procedures.

#### EMERGENCY PROCEDURES

**Out of Air**
- Standard out of air procedures will be followed for each gear configuration. The need for redundant air sources will be evaluated based on the pandemic state and need to dive.

**Diver Rescues**
- Surface assistance: divers will first attempt to verbally assist and instruct a diver at the surface. If the distressed diver is unable to respond divers can approach but must have the mask in place and breathing off of the regulator not snorke
- Unconscious Diver: Unresponsive divers will be towed in to shore or vessel without rescue breathes. CPR and emergency oxygen will be administered with use of BVM or MTV.

**Emergency Response Procedures, Required On-Site Personnel, and Training Requirements**

**Note:** Diving and providing emergency assistance such as CPR inherent risks. Occupational divers are expected to be able to aid colleagues. The current SARS-CoV-2 pandemic is an additional risk factor. If divers are not comfortable with the added risk factor in providing assistance, please contact the DSO.

- CPR and Emergency Oxygen – All program oxygen kits are equipped with both Bag Valve Masks (BVM) and Manually Triggered Ventilators (MTV)
  - The use of the BVM and MTV should be prioritized over manual breathes allowing rescuers to keep face coverings on
  - The use of the MTV and BVM require 2 people. Divers may want to consider teams of 3 in order to effectively use MTVs and BVMs in the unlikely event that they will need them but not required
- Training Expirations: Divers expiring during the global pandemic and previously trained with in the BU Dive Safety Program, will be assigned E-learning to complete the academic component. Completion of the hands on skills assessments will be evaluated based on the progression of the pandemic state, availability and frequency of testing, and availability of classroom space
• Divers passed expiration will dive restricted (DSO onsite) and will not be designated as lead

**BOATING**

Vessels can increase the difficulty of social distancing due to limited. All efforts should be made follow distancing guidelines and face coverings and PPE must be worn.

- Conduct operational planning and dive team briefings prior to departure to minimize close contact times on the vessel
  - Minimize on site discussions to essential topics to minimize topside close contact
- Assemble and test gear on land and load the vessel and store gear appropriately for transport
  - Conduct proper gear checks upon gearing up on site
  - Change into wetsuit prior to departure and avoid changing times on vessel

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1. [UC San Diego Guidelines for Evaluation of Divers during COVID-19 pandemic](https://example.com)
2. [Divers Alert Network Disinfection of SCUBA Equipment and COVID-19](https://example.com)