

**WAC 296-37-570 Equipment.** (1) General.

(a) All employers shall comply with the following requirements, unless otherwise specified.

(b) Each equipment modification, repair, test, calibration or maintenance service shall be recorded by means of a tagging or logging system, and include the date and nature of work performed, and the name or initials of the person performing the work.

(2) Air compressor system.

(a) Compressors used to supply air to the diver shall be equipped with a volume tank with a check valve on the inlet side, a pressure gauge, a relief valve, and a drain valve.

(b) A compressor shall be constructed and situated so as to avoid entry of contaminated air into the air-supply system and shall be equipped with a suitable in-line particulate filter followed by a bed of activated charcoal and, if necessary, a moisture absorber to further assure breathing air quality. These filters should be placed before any receiver and after the discharge in the compressor. If an oil-lubricated compressor is used, it shall be equipped with a carbon monoxide alarm or an equally as effective alternative if approved by the department.

(i) If a carbon monoxide alarm is used, it shall be calibrated to activate at or below 10 parts per million carbon monoxide at least once per month. A calibration and maintenance log shall be kept and shall be available for review and copying by the director or his or her designee. The log shall identify the test method, date, time of test, results, and the name of the person performing the test. The log shall be retained for at least one year from the date of the test.

(ii) If the use of an alarm at the compressor will not effectively provide warning to the diver or tender of a carbon monoxide problem, a remote alarm or other means of warning the wearer shall be used.

(iii) Breathing air couplings shall be incompatible with outlets for nonrespirable plant air or other gas systems to prevent inadvertent servicing of air-line breathing apparatus with nonrespirable gases.

(c) Respirable air supplied to a diver shall not contain:

(i) A level of carbon monoxide (CO) greater than 10 ppm;

(ii) A level of carbon dioxide (CO<sub>2</sub>) greater than 1,000 ppm;

(iii) A level of oil mist greater than 5 milligrams per cubic meter; or

(iv) A noxious or pronounced odor.

(d) Compressor systems providing surface air to divers must have a low pressure warning device installed at the air purification system inlet to alert dive tenders of low air pressure.

The minimum alarm setting shall be 45 psi plus an additional 15 psi for each working atmosphere.

1 ATM = 33 fsw or 15 psi

2 ATM = 66 fsw or 30 psi

3 ATM = 99 fsw or 45 psi

4 ATM = 132 fsw or 60 psi

5 ATM = 165 fsw or 75 psi

6 ATM = 198 fsw or 90 psi

(e) The output of air compressor systems shall be tested for air purity every six months by means of samples taken at the connection to the distribution system, except that nonoil lubricated compressors need not be tested for oil mist.

(3) Breathing gas supply hoses.

(a) Breathing gas supply hoses shall:

(i) Have a working pressure at least equal to the working pressure of the total breathing gas system;

(ii) Have a rated bursting pressure at least equal to four times the working pressure;

(iii) Be tested at least annually to 1.5 times their working pressure; and

(iv) Have their open ends taped, capped or plugged when not in use.

(b) Breathing gas supply hose connectors shall:

(i) Be made of corrosion-resistant materials;

(ii) Have a working pressure at least equal to the working pressure of the hose to which they are attached; and

(iii) Be resistant to accidental disengagement.

(c) Umbilicals shall:

(i) Include a safety line which shall be attached in a manner to remove strain from the air supply hose;

(ii) Be marked in 10-foot increments to 100 feet beginning at the diver's end, and in 50 foot increments thereafter;

(iii) Be made of kink-resistant materials; and

(iv) Have a working pressure greater than the pressure equivalent to the maximum depth of the dive (relative to the supply source) plus 100 psi.

(4) Buoyancy control.

(a) Helmets or masks connected directly to the dry suit or other buoyancy-changing equipment shall be equipped with an exhaust valve.

(b) A dry suit or other buoyancy-changing equipment not directly connected to the helmet or mask shall be equipped with an exhaust valve.

(c) When used for SCUBA diving, a buoyancy compensator shall have an inflation source separate from the breathing gas supply.

(d) An inflatable flotation device capable of maintaining the diver at the surface in a face-up position, having a manually activated inflation source independent of the breathing supply, an oral inflation device, and an exhaust valve shall be used for SCUBA diving.

(5) Compressed gas cylinders. Compressed gas cylinders shall:

(a) Be designed, constructed and maintained in accordance with the applicable provisions of WAC 296-24-295 and 296-24-940 of the General safety and health standards.

(b) Be stored in a ventilated area and protected from excessive heat;

(c) Be secured from falling; and

(d) Have shut-off valves recessed into the cylinder or protected by a cap, except when in use or manifolded, or when used for SCUBA diving.

(6) Recompression/decompression chambers.

(a) Each recompression/decompression chamber manufactured after the effective date of this standard, shall be built and maintained in accordance with the ASME Code or equivalent.

(b) Each recompression/decompression chamber manufactured prior to the effective date of this standard shall be maintained in conformity with the code requirements to which it was built, or equivalent.

(c) Each recompression/decompression chamber shall be equipped with:

(i) Means to maintain the atmosphere below a level of 25% oxygen by volume;

- (ii) Mufflers on intake and exhaust lines, which shall be regularly inspected and maintained;
  - (iii) Suction guards on exhaust line openings; and
  - (iv) A means for extinguishing fire, and shall be maintained to minimize sources of ignition and combustible material.
- (7) Gauges and timekeeping devices.
- (a) Gauges indicating diver depth which can be read at the dive location shall be used for all dives except SCUBA.
  - (b) Each depth gauge shall be deadweight tested or calibrated against a master reference gauge every six months, and when there is a discrepancy greater than two percent of full scale between any two equivalent gauges.
  - (c) A cylinder pressure gauge capable of being monitored by the diver during the dive shall be worn by each SCUBA diver.
  - (d) A timekeeping device shall be available at each dive location.
- (8) Masks and helmets.
- (a) Surface-supplied air and mixed-gas masks and helmets shall have:
    - (i) A nonreturn valve at the attachment point between helmet or mask and hose which shall close readily and positively; and
    - (ii) An exhaust valve.
  - (b) Surface-supplied air masks and helmets shall have a minimum ventilation rate capability of 4.5 acfm at any depth at which they are operated or the capability of maintaining the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute.
- (9) Oxygen safety.
- (a) Equipment used with oxygen or mixtures containing over forty percent by volume oxygen shall be designed for oxygen service.
  - (b) Components (except umbilicals) exposed to oxygen or mixtures containing over forty percent by volume oxygen shall be cleaned of flammable materials before use.
  - (c) Oxygen systems over 125 psig and compressed air systems over 500 psig shall have slow-opening shut-off valves.
- (10) Weights and harnesses.
- (a) Except when heavy gear is worn, divers shall be equipped with a weight belt or assembly capable of quick release.
  - (b) Except when heavy gear is worn or in SCUBA diving, each diver shall wear a safety harness with:
    - (i) A positive buckling device;
    - (ii) An attachment point for the umbilical to prevent strain on the mask or helmet; and
    - (iii) A lifting point to distribute the pull force of the line over the diver's body.

[Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, 49.17.060. WSR 04-18-078, § 296-37-570, filed 8/31/04, effective 11/1/04. Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. WSR 92-22-067 (Order 92-06), § 296-37-570, filed 10/30/92, effective 12/8/92. Statutory Authority: RCW 49.17.040 and 49.17.050. WSR 87-02-002 (Order 86-44), § 296-37-570, filed 12/26/86. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW. WSR 78-10-094 (Order 78-18), § 296-37-570, filed 10/2/78.]