

**WAC 296-52-805 Hand charge makeup methods.** General. The department must recognize two permissible methods concerning hand charges for avalanche control blasting. The descriptions and requirements for each method are contained in this section.

**Note:** A well-designed and constructed hand charge makeup room can enhance the correct assembly of explosive components and reduce the incidences of misfires from incorrect makeup or moisture.

(1) Method I. Makeup at the blast site.

(a) The ignition system must consist of a nonelectrical blasting cap and highest quality water resistant safety fuse, or detonating cord, assembled as recommended by the manufacturer.

(b) Detonating cord must be used to connect separated multiple-charge blasts.

(c) No other ignition system must be permissible on hand-placed or hand-thrown avalanche control charges unless variance is granted by the department.

(d) Caps must be installed on correct length fuses prior to being transported out onto control routes.

(e) Caps must only be crimped with a crimper tool approved for that purpose.

(f) Assembling caps and fuses must be done in a warm, dry, well-lighted environment. The location used for assembly must not have flammable fuels, flammable gases, or explosives present where accidental detonation of the caps could create a secondary ignition or detonation hazard.

(g) Each cap must be protected by a styrofoam shield or the equivalent before being placed in an avalanche control pack for transportation.

(h) A fuse igniter must never be attached to a fuse until the fuse and cap assembly is installed in the hand charge at the blast site and the control crew is fully prepared to ignite the charge.

(i) All 1.1 explosives must be attended as defined in this chapter at all times when the explosive is out of the Type 1 or 2 storage magazine.

(j) Disbursement of explosive charges from the Type 1 or 2 storage magazine into avalanche control packs must be done outside the storage magazine. Records must be maintained for all explosives disbursed.

(k) Caps, cap and fuse assemblies, armed hand charges, or fuse igniters must not be carried into or stored in a Type 1 or 2 magazine which contains 1.1 explosives.

(2) Method II. Hand charge makeup room. This method is different from method I primarily in that the fuse and cap assembly is installed in the explosive charge while inside a special makeup room. The assembly procedure must be as follows:

(a) Install caps on correct length fuses with an approved crimper tool before explosives are brought into the makeup room.

(b) The cap and fuse assemblies must not be combined with explosives to form hand charges until just before the intended time of distribution.

(c) Only nonsparking skewers must be used to punch holes in an explosives cartridge.

(d) The fuse must be laced or taped in position after inserting the cap in the charge.

(e) Each hand charge must be placed in an explosives box or avalanche control pack immediately after assembly is completed.

(f) No spark-producing metal tools must be used to open explosives containers.

(g) Fuse igniters must never be attached to a fuse or a hand charge until the hand charge is at the blast site and the control crew is fully prepared to ignite the charge.

(3) Makeup room requirements, procedures.

(a) Construction requirements.

(i) Makeup rooms located in accordance with the American Standard Quantity and Distance Tables for storage must not require construction of reinforced concrete walls, floors, and doors. All other requirements of this chapter must be applicable for such facilities.

(ii) Floors and walls. The floor and walls must be constructed of reinforced concrete not less than eight inches thick. The rebar must not be less than one-half inch diameter and must be spaced on twelve-inch vertical and horizontal centers. The rebar must be bent at a ninety degree angle and extend a minimum of twenty-four inches into the adjoining floor or wall to secure each floor and wall joint.

(iii) Roof. The roof is not limited to specific materials but must provide both weather protection and standard snow loading protection for the region.

(iv) Access door(s).

(A) If a hinged door mounting is utilized, the hinge must be mounted on the inside so that the door opens into the makeup room. In the fully closed position, in position to be locked, the door must be a minimum of two inches larger than the access opening on all sides.

(B) If a flush door mounting is utilized, the door must be mounted with a two-inch decreasing taper on all sides of both the door and the concrete access opening to form a wedge seal.

(C) If a sliding door mounting is utilized, the mounting apparatus must be on the inside of the makeup room and the door must be a minimum of two inches larger than the access opening when the door is fully closed.

(D) Makeup room door may be either:

(I) Constructed to the same structural integrity and mounting requirements of (A) through (C) of this subsection; or

(II) Constructed of plywood not less than two inches thick and overlaid on the outside with a steel plate not less than one-eighth inch thick.

(III) If a door which complies with (II) of this subsection is used, a berm or barricade must be installed within six feet of the door. The berm or barricade must extend at least as high as the top of the door and must be a minimum of two feet wider than the door on both sides of the door.

(E) For security purposes, one steel padlock having at least five tumblers and a case hardened shackle of at least three-eighths inch diameter is sufficient for locking purposes. Hinges and hasps must be attached so that they cannot be removed from the outside when in the closed position and with the lock in place.

(v) Interior finish. The inside of all makeup rooms must be finished and equipped to the following minimum requirements:

(A) Construction must be fire resistant and nonsparking up to the top of the walls. Nails or screws must be countersunk, blind nailed, or covered.

(B) Lighting must be by N.E.C. explosion-proof rated fixtures and all wiring must be in sealed conduit.

(C) Control switches must be outside the makeup room.

(D) No electrical outlet boxes are permissible inside the room.

(b) Restrictions.

(i) Smoking, matches, open flames, or flame- or spark-producing devices must not be permitted inside the makeup room.

(ii) Flammable liquids or flammable compressed gases must not be stored in the makeup room.

(iii) Signs limiting entry to authorized personnel must be posted on the door(s).

(iv) A sign stating the occupancy rules must be posted inside the makeup room where it is clearly legible upon entering the room. The sign must post the following rules:

(A) Occupancy must be restricted to specifically authorized personnel;

(B) Smoking, matches, flame- or spark-producing devices, tools or equipment must not be permitted in the room at any time when explosives or explosive components are present; and

(C) Flammable fuels or compressed gases must not be permitted inside the room nor stored within fifty feet of the room.

(v) Heating units must be limited to:

(A) Forced air systems with the heating unit located outside the room.

(B) Steam systems of 15 psig or less.

(C) Hot water systems of 130°F or less.

(D) The radiant heating coils and piping for steam or hot water systems must be protected so that explosives cannot come into contact with them.

(E) Heating ducts must be installed so that the hot air does not discharge directly on explosives.

(F) The heating system used in a makeup room must have controls which prevent the ambient room temperature from exceeding 130°F.

(vi) The makeup room must be equipped with a portable fire extinguisher of at least 2A-20BC rating.

**Note:** For additional requirements relating to portable fire extinguishers see WAC 296-800-300.

(vii) Ventilation.

(A) The makeup room must be equipped with a ventilation system capable of maintaining a minimum rate of three air exchanges per hour during all times when explosives are present in the room.

(B) Fans and controls must be located outside the makeup room and must be of a type approved for this service.

(C) The lighting circuit control must also activate the ventilation fan and the ventilation fan must be operated whenever personnel are in the room.

(D) Exhaust ventilation must be arranged to discharge into outside air, not into an enclosed structure.

(viii) The floor or exterior walls may be constructed with duct openings for heating and ventilation purposes provided that:

(A) Each duct opening is not greater in volume than seventy-two square inches;

(B) The combined number of duct openings must not exceed three;

(C) Duct openings must be located within twelve inches of the floor or ceiling;

(D) The exhaust duct opening must not be located on the wall above the makeup workbench.

(c) Practices and procedures.

(i) When explosives are present in the makeup room, entry into the makeup room must be restricted to trained and authorized personnel.

- (ii) The access door(s) to the makeup room must be kept locked or bolted from the inside while employees are assembling explosives.
  - (iii) The entire makeup room must be kept clean, orderly, and free of burnable rubbish.
  - (iv) Brooms and other cleaning utensils must not have any spark-producing metal parts if used when explosives are present.
  - (v) Sweepings and empty explosives containers must be disposed of as recommended by the explosives supplier.
  - (vi) Repair activities which utilize spark-producing tools must not be conducted on any part of the makeup room while explosives are present.
- (d) Storage of explosives.
- (i) A makeup room must not be used for the unattended storage of 1.1 explosives.
  - (ii) A makeup room which meets all requirements of this chapter may contain a Type 3 storage facility, for one thousand or less blasting caps.
  - (iii) A Type 3 storage facility must be constructed according to the requirements in WAC 296-52-70030 through 296-52-70040.
- (A) A Type 3 storage facility must be fire resistant and theft resistant. It does not need to be bullet resistant and weather resistant if the locked makeup room provides protection from weather and bullet penetration.
- (B) Sides, bottoms, and covers must be constructed of not less than number twelve gauge metal and lined with a nonsparking material.
- (C) Hinges and hasps must be attached so that they cannot be removed from the outside.
- (D) One steel padlock having at least five tumblers and a case-hardened shackle of at least three-eighths inch diameter is sufficient for locking purposes. The lock and hasp is not required to be equipped with a steel hood.
- (e) Location.
- (i) The makeup room must be located in accordance with the American Quantity and Distance Separation Tables as adopted in chapter 70.74 RCW, Washington State Explosives Act and this chapter except under conditions as indicated in this section.
  - (ii) Where locating the makeup room in accordance with the quantity and distance separation table is impractical because of bad weather accessibility, rough terrain, or space availability:
    - (A) Upon application the department will issue a variance enabling location of the makeup room, by mutual agreement, at the safest possible location within the limitation of the individual base area.
    - (B) The safest possible location will be the location most isolated from assembly areas and buildings that are inhabited with application of additional protection measures such as:
      - (I) Berming.
      - (II) Locating natural obstructions or buildings that are not inhabited between the makeup room and assembly areas and buildings that are inhabited.
      - (III) Limitations on the total quantity of explosives in the makeup room at any one time.
    - (iii) Makeup rooms designed to hold the boxes of explosives awaiting makeup and the makeup explosives in avalanche control packs awaiting distribution may be located using the total quantity of explosives allowed at the makeup table at any one time as the referenced quantity of explosives provided.

(A) The makeup room is located in accordance with the American Quantity and Distance Separation Tables as adopted in chapter 70.74 RCW, Washington State Explosives Act and this chapter for the referenced quantity of explosives at the makeup table.

(I) This separation must apply only to human proximity to the makeup room and only at such time as there are explosives in the makeup room.

(II) When the makeup room does not contain explosives the separation tables must not apply.

(B) The concrete walls of the room are designed to withstand the explosion of the total amount of the referenced explosives.

(I) The concrete walls must be constructed in accordance with specifications designed and certified by a licensed engineer; or

(II) The concrete walls must be constructed to the specifications of Department of the Army TM5-1300 "Structures to Resist the Effects of Accidental Explosions" designed to produce walls which will withstand explosion of the referenced quantity explosives.

(C) The boxes of explosives awaiting makeup and the madeup explosives in avalanche control packs awaiting distribution are located behind separate concrete debris barrier walls which will ensure that detonation of these explosives will not occur if the explosives at the makeup table detonate.

(I) The concrete debris barrier wall must be constructed in accordance with specifications designed and certified by a licensed engineer; or

(II) The concrete debris barrier wall must be constructed to the specifications of Department of the Army TM5-1300 "Structures to Resist the Effects of Accidental Explosions" to produce a barrier which will not allow detonation of the explosives awaiting makeup and distribution should the referenced quantity of explosives detonate.

(III) Access from the makeup table to the area behind the concrete debris barrier walls must not be doored. The concrete debris barrier walls will be designed so that the access way from the makeup table to the area behind the concrete debris barrier wall will deflect debris from an explosive blast by inherent design.

(D) The roof must be designed so that the resistance to an interior explosive blast will be negligible.

(iv) A full containment makeup room may be located anywhere and must meet the following requirements:

(A) The makeup room must be constructed in accordance with a licensed explosive engineer's approved design.

(B) The total amount of explosives in the room at any time must not exceed the design limit of the room.

(C) The makeup room cannot be used for storage.

[Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, and 49.17.060. WSR 17-16-132, § 296-52-805, filed 8/1/17, effective 9/1/17; WSR 06-19-074, § 296-52-805, filed 9/19/06, effective 12/1/06.]