Visible Emission Evaluation Test Method

for

Selected Abrasives Used in Permissible Dry Outdoor Blasting

A. Principle and Applicability

Principle: Dry abrasive material is blasted against a bare steel plate under specified conditions. The opacity of the resultant dust plume is "read" in accordance with EPA Method 9 by a certified visible emissions evaluator representing the California Air Resources Board.

Applicability: This test is used to evaluate the visible emission of abrasives, free of influence from surface contaminants when:

1. Abrasives are to be used for permissible dry outdoor blasting.

2. Abrasives have previously been tested and found to meet the requirements of Section 92530(b)(2) of Title 17, California Code of Regulations.

3. The person who desires Air Resources Board certification of the abrasive elects the certification option provided by Section 92530(b)(1)(B) of Title 17, California Code of Regulations.

B. Performance Standard

To pass this test an abrasive must meet a 20% or less opacity emission standard as specified in Section 92530(b)(1)(B) of Title 17, California Code of Regulations. The 20% opacity limit is an upper limit based on the margin-of-error of the test method, and is not to be exceeded.

C. Apparatus

1. Blasting machine, (see Figure 1) A-BEC model SBM-14 HR/PBM-14, 150 lb. capacity, stationary/portable, with ARC-300 remote control or equivalent constructed as follows:

   a. With coned bottom of 35 degrees or greater from the horizontal position.

b. With bottom-of-cone abrasive discharge.

c. With abrasive chamber air pressure balancing pipe.

d. With internal inspection door.

e. With unrestricted 1 1/4 in. or greater external primary air piping.

f. With 1 1/4 in. or greater remote control system in compliance with OSHA / CAL OSHA requirements.

1.1. Blasting machine further equipped or modified as follows:

a. Equipped with A-BEC model CBM-14 cover for 14 in. diameter blast machine or equivalent.

b. Equipped with 1 1/2 in. Powell #2700 150 psi bronze gate valve or equivalent installed upstream of the blast machine remote controlled inlet valve.

c. Equipped with an in-line standard orifice holder installed below abrasive flow ball shutoff valve (see Figure 1A).

d. Equipped with Norgren model #F18-B00-M3DA 1 1/2 in. FNPT filter (moisture separator) or equivalent installed upstream of the bronze gate valve.

e. Eqipped with abrasive pot pneumatic vibrator.

2. Ingersol-Rand model P250WD, 250 scfm at 100 psi or greater air compressor or equivalent. (Note: air compressor must be capable of sustaining an adequate volume and pressure to overcome air and abrasive line friction to maintain 100 psi when tested and monitored in a flow condition at the nozzle.)

3. A-BEC model ATVL-6, 3/8 in. ID venturi nozzle 6 11/16 in. long threaded 1 1/4 in. NPSM or equivalent. (ID wear not to exceed 1/32 inch).

4. Gage and port assembly as per Figure 2.

5. Whip sand blast hose assembly #55-210012F-BB, 1 1/4 in. by 12.5 feet full flow blast type.

6. Bull hose assembly #55-112025S, 1 1/2 in. by 25 feet standard dixon. An additional hose assembly is needed if an after-cooler is installed.

7. Hot rolled steel plate 3 ft. by 3 ft. by 1/4 in. that meets the requirements of ASTM A36, Specifications for Structural Steel.

8. Magnetic angle marker accurate to +/- 0.5 degree to measure plate angle (see Figure 3).

9. ABEC #177-1148 nozzle pressure gage package or equivalent.

10. Scaffold equipment setup (see Figure 3).

11. Stopwatch.

12. Optional equipment, which may be required due to climatic conditions or to obtain a required flowrate.

    a. Air cooled after-cooler; Hiross model #A05, 210 scfm 2 in. FNPT compressed air cooler or equivalent.

(Note: Atmospheric conditions may result in excess moisture being present in the compressor discharge air. This condition (greater than .5 % moisture) will cause dried abrasives to flow erratically. The addition of an air cooling device such as an after-cooler will allow the filter moisture separator to extract a significantly greater portion of the moisture from the discharge air.)

D. Test Procedure

1. Mount steel plate to scaffolding on test stand perpendicular to the plane of the ground and 15 degrees off perpendicular to the blast nozzle (see Figure 3).

2. Mechanically fix blast nozzle at 90 degrees to the end piece of the scaffolding. End of nozzle must measure 40 in. from steel plate (see Figure 3).

3. Perform internal cleaning of blast machine through access door and then visually inspect equipment to insure cleanliness prior to each test series.

4. Activate blast machine and abrasive pot vibrator between tests as required to clean blast machine and to blow all accumulated abrasives out of whip blast hose and nozzle.

5. Install the feed rate orifice (see Figure 1A) in the holder. During blasting the feed rate should be equal to or greater than 400 lb/hr.

6. Fill blast machine with pre-measured 60 lbs. +/- 0.25 lb. of test abrasives.

7. Activate air flow of blasting machine.

8. Activate abrasive pot pneumatic vibrator and set pressure to 40 psi.

9. Open the abrasive flow ball shut-off valve above the orifice holder and record start of the blast time when the abrasive starts to flow from the blast nozzle.

10. Adjust air pressure at the nozzle with bronze gate valve to 100 psi (+/- 2 psi).

11. After stabilization of air-abrasive flow, record actual nozzle pressure.

12. Upon completion of abrasive flow, stop stopwatch and record elapsed time in minutes and seconds. Calculate the abrasive feed rate by dividing the total weight of abrasive blasted by the elapsed time, i. e. 60 lb. divided by 8.90 minutes = 6.74 lb/min. or 404 lb/hr.

13. Failure of the abrasive to feed uniformly or to achieve the applicable feed rate or any other irregularity may, at the discretion of the representative of the California Air Resources Board, invalidate the test.

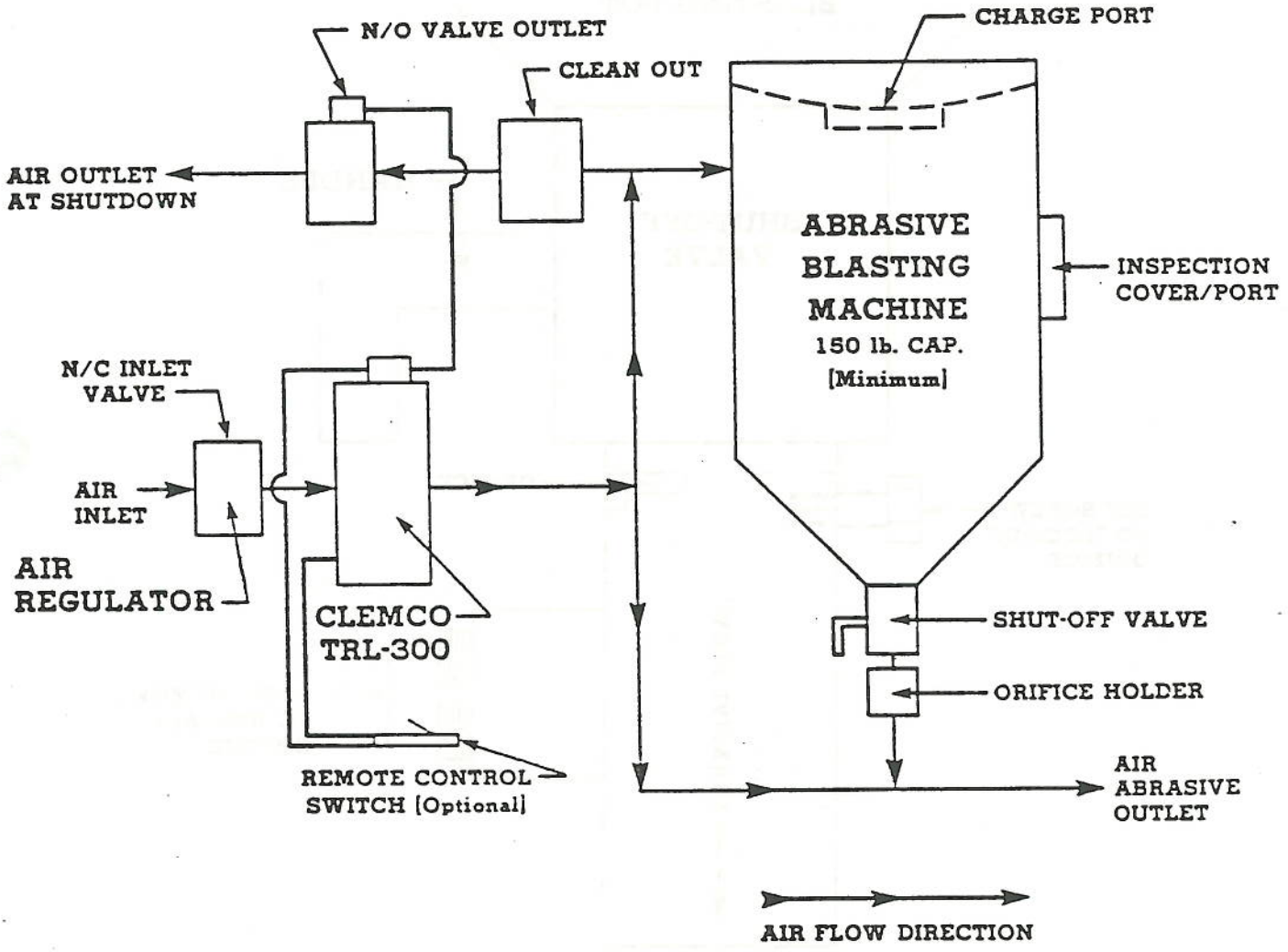
14. The blast test shall be halted whenever the visible emissions exceed 40% opacity.

E. Source Evaluation

The visible emission evaluation technique shall be performed by a representative of the California Air Resources Board in accordance with EPA Method 9 (40 Code of Federal Regulations, Part 60, Appendix A, Method 9 - Visual Determination of the Opacity of Emissions From Stationary Sources as it exists on July 1, 1987).

Figure 1

BLASTING MACHINE

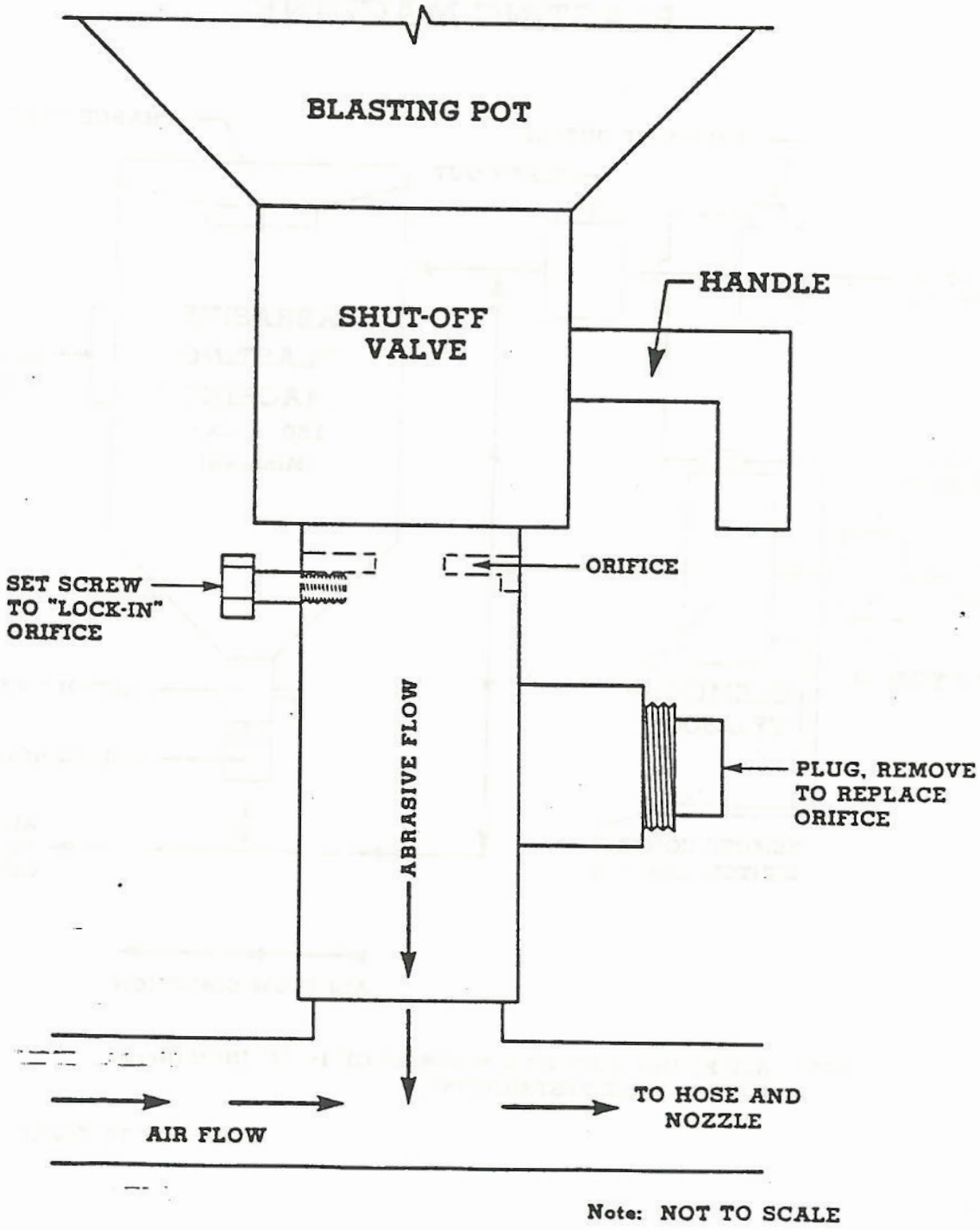


NOTE: ALL PIPING MUST BE A MINIMUM OF 1-1/4" INCH [Normal] WITH NO LINE RESTRICTIONS.

Note: NOT TO SCALE

Figure 1A

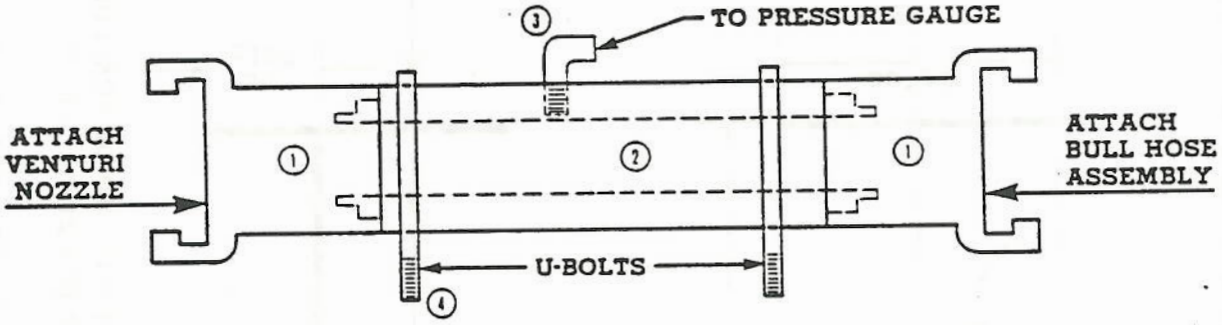
STANDARD ORIFICE HOLDER



Note: NOT TO SCALE

Figure 2

GAUGE and NOZZLE PORT ASSEMBLY



① 2 EACH - A-BEC #181-0524 QUICK COUPLING BFC-1

② 1 EACH - SLEEVE AND ELBOW 90° 1/4" in. NPT BRASS

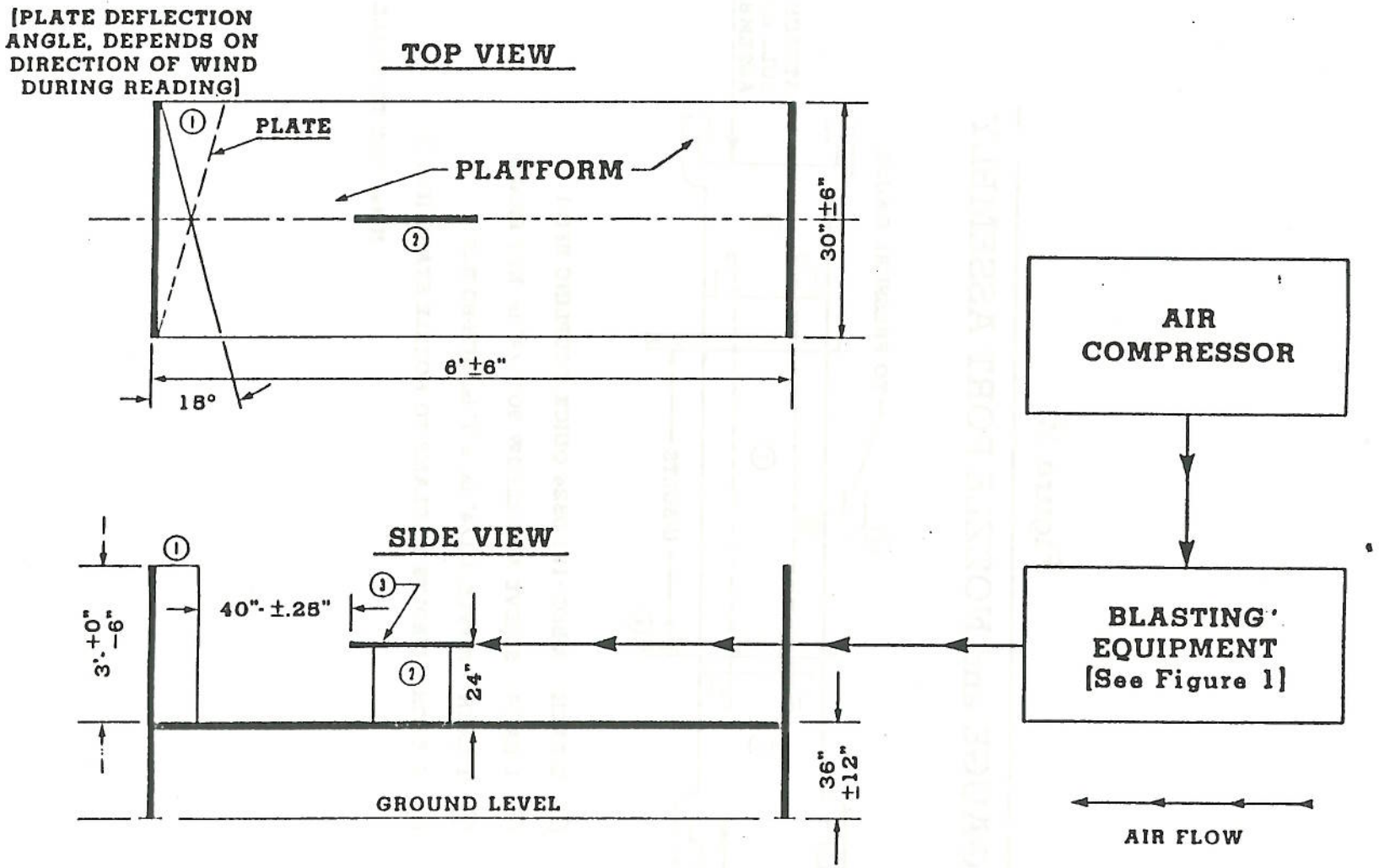
③ 1 EACH - NIPPLE, 1-1/4" in. x 3" in. SCH-80 BLK

④ 2 EACH - U-BOLTS TO CLAMP TO NOZZLE STAND [Fig. 3]

Note: NOT TO SCALE

Figure 3

TYPICAL TEST STAND



NOTES: (1) STEEL PLATE 3'x 3'x 1/4" PLACED AT THE END OF SCAFFOLDING. DISTANCE FROM EDGE OF PLATE TO VERTICAL EDGE OF SCAFFOLDING IS 9-21/32" OR 18° ANGLE - [THE OPPOSITE EDGE EQUAL TO 0° CLEARANCE].

(2) NOZZLE/HOSE STAND IS BOLTED TO SCAFFOLDING PLATFORM.

(3) GAGE AND NOZZLE PORT ASSEMBLY [See Figure 2].

Note: NOT TO SCALE