



Oregon

Kate Brown, Governor

Department of Environmental Quality

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April 12, 2016

Eric Durrin
Bullseye Glass Company
3722 SE 21st Ave
Portland, OR 97202

Thomas Rhodes
Horizon Engineering
13585 NE Whitaker Way
Portland, OR 97230

Re: Bullseye Glass Company
ACDP Permit 26-3135-ST-01
Source Test Plan

Eric Durrin and Thomas Rhodes:

DEQ originally received the source test plan for testing the emissions from glass furnace T7 located at Bullseye Glass in Portland, OR on March 21, 2016. DEQ received the first revised plan on March 25, 2016, and final revised plan on April 8, 2016. The final plan details the methods and approach to determine the emission rate and removal efficiency of particulate matter (PM) from the baghouse inlet and exhaust, and the measurement of total chromium (Cr) and hexavalent chromium (Cr⁺⁶) at the baghouse inlet. DEQ has reviewed the source test plan and is approving it with the following conditions:

GENERAL PROCESS CONDITIONS

- 1.) Only regular operating staff may adjust the production process and emission control parameters during the source performance tests and within two (2) hours prior to the tests. Any operating adjustments made during the source performance tests, which are a result of consultation during the tests with source testing personnel, equipment vendors or consultants, may render the source performance test invalid. Any adjustments made during the test must be recorded and included in the test report.
- 2.) Testing shall be performed while the furnace is making glass with the highest percentage of chromium normally used. The furnace must also be fired in the most oxidizing condition under which chromium containing glass is normally made. The ingredients in the batch must be the most oxidizing ingredients normally used to make chromium containing glass. Documentation stating and explaining this must be provided in the test report.

- 3.) During source testing the following process parameters must be monitored, recorded, and documented in the source test report. The process parameters below are to be reported for each individual test run and averaged for all test runs, if appropriate.
- Amount of total chromium in the batch (lbs)
 - Type and quantity of material being processed
 - Oxygen usage (quantity used, hourly minimum)
 - Natural gas usage (quantity used, hourly minimum)
 - Furnace temperature (°F, hourly minimum)
 - Baghouse pressure drop (inches of water column, twice per test run)
 - Weight of charges during each batch (lbs)
 - Time of charges
 - Weight of finished product (lbs)
 - Duration of the charging period (hrs)
 - Duration of refining period (hrs)
 - All other normally recorded information

**TOTAL CHROMIUM & HEXAVALENT CHROMIUM (EPA SW-846 METHOD 0061)
CONDITIONS**

- 4.) During sampling, make sure other sampling equipment is not interfering with isokinetic sampling.
- 5.) Take steps to minimize the blockage effects of the sampling probe in the test duct/stack.
- 6.) Testing must be performed using two ports located 90 degrees from each other.
- 7.) The sample shall be collected in a different plane (i.e., different set of ports and a port at a different angle) than the inlet particulate sample.
- 8.) To ensure that representative chromium samples are collected during these extended test intervals (~16 hours), four sequential traverses should be performed on each of the two ports. For example, sampling points should be moved every ten minutes (120 minutes per traverse), rather than performing a single traverse (40 minutes per point). The test run only needs to include one port change.
- 9.) Ensure the recirculating KOH cannot be lost out the sampling nozzle.
- 10.) With the exception of the sampling nozzle (glass) and the silica gel impinger, all of the sampling train components (including connecting fittings) shall be Teflon.

11.) In Section 10, Horizon notes that the pH of the KOH sample solution will be measured after the completion of the testing, which is required by the method. Given the duration of the testing you may, to make sure the pH of the absorbing solution remains above 8.5, momentarily pause the test to check the pH periodically throughout the run (e.g., every few hours). Any pH data collected shall be documented on the field data sheet. Leak checks must be completed any time the sampling system is opened. Leak checks of the equipment and any gain in volume by the dry gas meter due to the leak checks must also be documented on the field data sheets. Correct the final sample volume by the amount collected during the leak checks and use the corrected sample volume amount for emissions calculations.

12.) Equation 7.6.4 of the method has an error. If Horizon opts to perform a blank correction, please use the following equation:

$$m = [(S, \text{ug/ml} * V_{ls}, \text{ml}) - (B, \text{ug/ml} * 300 \text{ ml})] \times d$$

(Note: The above equation assumes that the impingers are initially charged with 300 mls of the KOH reagent)

13.) Verify the KOH recirculation rate is at least 50 ml/min.

14.) Record the nitrogen purge rate and duration.

15.) Following purging and filtration, the sample solution is to be transferred to polyethylene sample bottles.

16.) Following the test, the impinger solution shall be purged with nitrogen and filtered through an acetate membrane filter (0.45 um pore size); refer to Section 5.4.3 of the method.

17.) The volume of DI water used to rinse the sampling train directly affects the detection limit. The volume should be sufficient to quantitatively rinse the train; it should not be excessive. We recommend that a pre-measured volume of rinse water (e.g., 100 mls) be provided to the sample recovery person so that the same amount of rinse is used for each test.

18.) Take steps to make sure the level of hexavalent chromium in the KOH reagent is as low as possible before testing begins.

19.) Meticulously follow the procedures in section 7.1.2 to make sure the sampling trains are free of contaminants.

20.) The hexavalent chromium analyses are to be completed within 14 days of sample collection (Section 6.3 of the method).

21.) Hexavalent and total chromium test results must be reported as indicated below for each individual test run and averaged for all three test runs. Hand calculations must be provided for at least one test run.

- ng/dscm
- lbs/hr
- lbs/ton of chromium processed
- lbs/ton of glass produced

- 22.) Use the particulate removal efficiency to calculate the emission rate of hexavalent and total chromium emissions. Report results as indicated below for each individual test run and averaged for all three test runs. Hand calculations must be provided for at least one test run.

- ng/dscm
- lbs/hr
- lbs/ton of chromium processed
- lbs/ton of glass produced

Note that Item 22 data (baghouse *exhaust* chromium emissions) shall be clearly denoted in the report's summary table(s) as 'calculated (vs. measured) values'.

FLOW RATE AND MOISTURE (EPA METHODS 1, 2, & 4) CONDITIONS

- 23.) The exhaust duct configurations and flow measurements must meet the EPA Methods 1/1A & 2 criteria. Documentation including clear diagrams must be provided in the source test report.
- 24.) The sample locations must be checked for cyclonic flow. Documentation of this must be provided in the test report.
- 25.) Ensure that the manometer used to record pressure readings meets the criteria of Method 2 Section 6.2.
- 26.) Moisture content of the exhaust stack gas must be determined by EPA Method 4 for each test run. In addition, Section 12.1.7 of EPA Method 4 states "In saturated or moisture droplet-laden gas streams, two calculations of the moisture content of the stack gas shall be made, one using a value based upon the saturated conditions (alternate method) and one based upon the results of the impinger analysis (EPA Method 4). If this is the case, then ODEQ Method 4 (wet bulb/dry bulb) shall be used as the alternative method. At a minimum, two measurements of moisture content using ODEQ Method 4 shall be made for each run and averaged for the run. The lower of the two values as determined by EPA Method 4 and ODEQ Method 4 shall be considered correct for each run.

EXHAUST GAS COMPOSITION (EPA METHOD 3C/ASTM METHODS 1946) CONDITIONS

- 27.) N₂, O₂, CO₂, CO, CH₄, C₂H₆, and C₃H₈ concentrations must be determined to calculate the molecular weight of the exhaust. Collect sample at a constant rate over the duration of the test run. Record the sampling rate on the field data sheet.
- 28.) Immediately after the completion of the test run, close the bag valve and keep the bag under positive pressure until the sample is analyzed to ensure any leakage of the bag will not dilute the sample. A band around the bag should be sufficient to accomplish this although other measures may be taken that accomplish the same result. In the event that multiple bags are collected, record the start and end times of the collection periods.
- 29.) Analyze each bag separately and time weight the concentrations to get an average molecular weight over the duration of each test run.

- 30.) EPA Method 3A is cited in the test plan, DEQ understands that this is an inaccuracy and that Method 3A will not be used during this testing program. The methods referenced in this section will be used to determine the molecular weight in place of Method 3A.

PARTICULATE MATTER (EPA/ ODEQ METHOD 5) CONDITIONS

- 31.) During sampling, make sure other equipment is not interfering with isokinetic sampling.
- 32.) Additional (i.e., empty) impingers may be added between the second and fourth impinger to collect condensate from the flue gas.
- 33.) At the inlet sampling location, the particulate sample shall be collected in a different plane (i.e., different set of ports and a port at a different angle) than the chromium sample is being collected.
- 34.) Take steps to minimize the blockage of the sampling location with sampling equipment.
- 35.) To ensure that representative particulate samples are collected during these extended test intervals (~16 hours), four sequential traverses should be performed on each of the two ports. For example, sampling points should be moved every ten minutes (120 minutes per traverse), rather than performing a single traverse (40 minutes per point). The test run only needs to include one port change.
- 36.) If the filter becomes plugged to the point in which isokinetics can no longer be maintained pause the inlet and outlet sampling. Leak check the sampling system with the clogged filter; replace the filter; repeat the check the sampling system; make note of the dry gas meter's volume displacement caused by the leak checks; and continue testing. Correct the final sample volume by the amount collected during the leak checks and use the corrected sample volume amount for emissions calculations.
- 37.) For ODEQ Method 5, the method quantifiable limit (MQL) is 7 mg of PM, which should be taken into consideration when targeting a minimum sample volume and when calculating results. If less than 7 mg is collected, calculations shall be based not on the actual mass of PM collected but on the MQL of 7 mg as a "less than quantifiable limit" value.
- 38.) For both the inlet and outlet of the baghouse provide filterable, condensable and total PM test results. The results must be reported as follows for each test run and averaged for all three test runs. Complete hand calculations must be provided for at least one test run.
- gr/dscf
 - lb/hour
 - lb/ton of glass produced
 - % removal efficiency based on lb/hour of the inlet and outlet results

GENERAL TESTING CONDITIONS

- 39.) The ODEQ must be notified of any changes in the source test plan and/or the specified methods prior to testing. Significant changes not acknowledged by the DEQ could be basis for invalidating an entire test run and potentially the entire testing program. Documentation of any deviations must include an evaluation of the impact of the deviation on the test data. Deviations may result in rejection of the data, requiring a retest.
- 40.) Method-specific quality assurance/quality control (QA/QC) procedures must be performed to ensure that the data is valid. Documentation of the procedures and results shall be presented in the source test report for review. Omission of this critical information will result in rejection of the data, requiring a retest.
- 41.) A copy of a completed Source Test Audit Report (STAR) for all applicable Methods performed must accompany the submittal of the Source Test Report. A copy of the STAR forms is available electronically from the regional source test coordinator.
- 42.) In an attempt to conserve natural resources and to minimize storage space requirements, the test report should be printed on both sides of each page within the document. DEQ recognizes this may not be feasible for some supporting documentation (i.e. figures, maps, etc.).
- 43.) The source test report shall be submitted to the DEQ within 45 days following the completion of the source test.

DEQ understands that the source test is scheduled for April 26-28, 2016. If you have any questions, please contact me at (503) 378-5070.

Sincerely,

Mike Eisele, PE
AQ Source Test Coordinator
Western Region-Salem

cc: George Davis, DEQ: NWR-AQ File



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Eric Durrin
Bullseye Glass Company
3722 SE 21st Ave
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Thomas Rhodes
Horizon Engineering
13585 NE Whitaker Way
Portland, OR 97230

Re: Bullseye Glass Company
ACDP Permit 26-3135-ST-01
Alternative Sample Probe Liner

Eric Durrin and Thomas Rhodes:

On April 14, 2016 DEQ received an email from Horizon Engineering requesting approval to use a glass lined probe in lieu of the Teflon lined probe required in the test method and by condition 10 in the test plan approval letter. According to EPA, glass was not included as an approved liner material in Method 0061 due to suspected chromium VI contamination. Using a glass lined probe, based on the information from EPA, introduces the possibility of directionally biasing the final results higher than otherwise measured. This approach would result in a conservative estimation of emissions; the measured amount could be higher, but not lower than actual concentrations in the stack. DEQ is approving your request for this substitution, but will not approve any proposed corrections for contamination introduced by the use of glass liners.

Sincerely,

Mike Eisele, PE
AQ Source Test Coordinator
Western Region-Salem

cc: George Davis, DEQ: NWR-AQ File