FIELD PROCEDURE 102
Particulate and Gaseous Mercury Emissions
Chlor-Alkali Plants (Hydrogen Streams)

Note: Although similar to Method 101, Method 102 requires changes to accommodate the sample being extracted from a hydrogen stream. Conduct the test according to Method 101, except as shown below:

1. Do not use the probe heating system, unless otherwise specified.
2. Do not use the glass fiber filter, unless otherwise specified.
3. Conduct the test in a safe manner.
   a. Remove the meter box cover to avoid possible explosive mixtures.
   b. Operate only the vacuum pump during the test. Avoid use of other electrical equipment, e.g., heaters, fans, and timers.
   c. Seal the sample port to minimize leakage of H_2 from the stack.
   d. Connect ≥0.50-inch ID Tygon tubing to the exhaust from the orifice meter and vent exhaust at least 10 ft away. A smaller ID tubing may affect the orifice meter calibration. Ensure that the exhaust line is not bent or pinched.
4. ***Optional:*** Calibrate the meter box (see CP 5) at flow conditions that simulate the conditions at the source using either hydrogen or some other gas having similar Reynolds Number. (A smaller orifice diameter will help.)
5. If a nomograph is used,
   a. Calculate the C factor to account for the differences in molecular weights (29 vs. 2) as follows:

$$C = 0.00154\,\Delta H_@\,C_p^2\,T_m\,\frac{P_s}{P_m}\,\frac{(1-B_{ws})^2}{\left[(1-B_{ws})+\frac{18\,B_{ws}}{M_d}\right]}$$

where:

$\Delta H_@$ = Meter box calibration factor, in. H_2O.

C_p = Pitot tube calibration coefficient, dimensionless.

T_m = Absolute temperature of gas at the orifice, °R.

P_s = Absolute pressure of stack gas, in. Hg.

P_m = Absolute pressure of gas at the meter, in. Hg.

B_{ws} = Fraction by volume of water vapor in the stack gas.

M_d = Dry molecular weight of stack gas, lb/lb-mole.

   b. If the C factor exceeds the values specified on the existing operating nomograph, expand the C scale logarithmically.
6. If a calculator is used to set isokinetic rates, use the isokinetic equation.