Hach AS950 Refrigerated Samplers

Tank Farm Maintenance Procedure

EFFLUENT TREATMENT FACILITY

USQ Not Required – ETF is a <Hazard Category 3 Radiological Facility

CHANGE HISTORY (≤ LAST 5 REV-MODS )

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Figure 1 - Pump Tubing
1.0  PURPOSE AND SCOPE

1.1  Purpose

This procedure provides a safe, uniform method for performing preventive maintenance, inspection, and sample volume calibration of Hach refrigerated samplers, model AS950.

1.2  Scope

This procedure provides instructions for the preventive maintenance, inspection, and sample volume calibration of Hach refrigerated samplers, model AS950.

2.0  INFORMATION

None

3.0  PRECAUTIONS AND LIMITATIONS

3.1  Personnel Safety

3.1.1  This procedure requires sampler to be energized and de-energized at different times to perform inspection and maintenance activities. Sampler should be unplugged before performing sections 5.1 and 5.2.

3.2  Equipment Safety

CAUTION - Lubrication of Tubing or Roller will reduce tube and roller assembly life.

3.3  Radiation and Contamination Control

Work in radiological areas will be performed using a radiological work permit following review by Radiological Control per ALARA Work Planning procedure, TFC-ESHQ-RP_RWP-C-03.

3.4  Environmental Protection

In the event of a spill/leak/release, notify the SOM/FWS and respond per ETF-ERP-85B-003, Spill or Release.
4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

The following supplies may be needed to perform this procedure:

- Pump tubing, Hach® Item No. 4600-15 (15 foot roll), approximately 2 feet of tubing will be required for completion of this procedure.
- Desiccant bag, Hach Item No. 8755500 (1.5 lb bag), MSDS/SDS #076695, approximately 8 ounces will be required for completion of this procedure.
- 100-mL graduated cylinder
- Distilled water or deionized water, several gallons MSDS/SDS #0688556
- Bucket
- Sponge and Bio Renewable Glass Cleaner by Big D Industries, MSDS/SDS #065813B
- Latex gloves and Safety glasses or goggles when handling desiccant.

4.2 Field Preparation

4.2.1 ENSURE Operations personnel have configured system or equipment as required to allow performance of this procedure.
5.0  PROCEDURE

5.1  Pump Tube and Roller Inspection

5.1.1  UNPLUG sampler from electrical service.

5.1.2  REMOVE front cover of pump housing.

5.1.3  INSPECT pump roller assembly AND REPLACE worn/damaged parts.

5.1.4  CLEAN residue from the following:
   •  Rollers
   •  Interior of pump housing.

5.1.5  INSPECT tubing for the following:
   •  Wear
   •  Cracks
   •  Damage.

5.1.6  IF tubing is not sound, REPLACE as follows:

   **CAUTION**

   Lubrication of Tubing or Roller will reduce tube and roller assembly life.

   5.1.6.1  REMOVE old tubing from pump (Figure 1).

   5.1.6.2  CUT new tubing section to same length as old tubing (about 23.25 inches).

   5.1.6.3  LOCATE two black dots on old tube AND PLACE dots on new tube at same locations with ink pen (dots should be 11 inches apart).

   5.1.6.4  ATTACH longer tube end (about 8.5 inches as measured from black dot) to liquid sensor.
5.2 Sampler Cleaning (Cont.)

5.1.6.5 INSTALL tube in pump housing until black dots are visible just outside pump body (Figure 1).

5.1.6.6 ATTACH shorter tube end (about 3.75 inches as measured from black dot) to discharge tube into refrigerated sampler.

5.1.7 REINSTALL front cover AND FINGER TIGHTEN screws.
5.2 Sampler Cleaning

5.2.1 ENSURE all external connections are capped.

5.2.2 CLEAN interior and exterior of sampler with sponge and cleaner noted in Section 4.1.

5.2.3 IF tubing requires cleaning, PERFORM the following:

5.2.3.1 PLUGIN Sampler

5.2.3.2 OPERATE pump in MANUAL mode.

5.2.3.3 PUMP distilled or deionized water through tubing into a bucket, OR REPLACE tubing, per Section 5.1.

5.2.4 UNPLUG sampler.

5.2.5 INSPECT condenser fins and coils on refrigerator units AND CLEAN dirty parts.

**Intake Strainer**

5.2.6 DISPOSE of any remaining liquid from bucket into the TEDF system.

5.2.7 INSPECT AND CLEAN intake strainer.
5.3 Humidity Indicator Inspection

NOTE - All of the following Sections are performed with sampler plugged in.
- Humidity indicator is located on control housing. Orange indicates dry conditions, green indicates excess humidity.

5.3.1 PLUGIN Sampler

5.3.2 INSPECT humidity indicator.

5.3.3 IF indicator is orange, indicating electronics housing is dry, GO TO Section 5.5.

5.3.4 IF handling desiccant, WEAR latex gloves and safety glasses or goggles.

5.3.5 IF indicator is green, INSPECT electronics housing for seal failure AND REPLACE desiccant in cartridge per section 5.4.
5.4 Desiccant Replacement

5.4.1 UNSCREW AND REMOVE desiccant cartridge.

5.4.2 REMOVE the plug from the desiccant cartridge AND DISCARD the spent desiccant.

5.4.3 FILL the desiccant cartridge with fresh desiccant.

5.4.4 INSTALL the plug in the desiccant cartridge.

5.4.5 APPLY silicone grease to the o-ring.

5.4.6 REINSTALL the desiccant cartridge in the controller.
5.5 Set TEDF Sampler Inlet Tubing Length

Special Instructions

This section will be performed only if the length of the tubing has been altered.

5.5.1 MEASURE actual tubing length between sampler and TEDF line.

5.5.2 IF display is not active, PRESS power button

5.5.3 SELECT “PROGRAMMING”.

5.5.4 IF prompted for password, ENTER password “1111” using arrow keys AND PRESS “OK” (twice).

5.5.5 HIGHLIGHT “SAMPLE PROGRAMMING”

5.5.6 PRESS “SELECT”.

5.5.7 HIGHLIGHT "TUBING".

5.5.8 PRESS "SELECT".

5.5.9 ENTER tubing length and tubing diameters using arrow keys.

5.5.10 PRESS "OK".

5.5.11 PRESS “MENU” button.
5.6 Calibrate TEDF Sampler

5.6.1 IF display is not active, PRESS power button

5.6.2 PRESS “CALIBRATION” button.

5.6.3 IF prompted for password, ENTER password “1111” using arrow keys AND PRESS “OK” (twice).

5.6.4 HIGHLIGHT “VOLUME” using arrow keys.

5.6.5 PRESS “SELECT”.

5.6.6 HIGHLIGHT “SAMPLE VOLUME”.

5.6.7 PRESS “SELECT”.

5.6.8 POSITION 100-mL graduated cylinder under sample arm.

5.6.9 PRESS “NEXT”

5.6.10 ENTER “90 mL” as the target sample volume using the arrow keys.

5.6.11 PRESS “GRAB” to fill graduated cylinder.

5.6.12 MEASURE sample volume in graduated cylinder AND RECORD data in “AS FOUND” portion of data sheet.

5.6.13 ENTER “MEASURED VOLUME” using the arrow keys.

5.6.14 DISPOSE of any remaining liquid into the TEDF system.

5.6.15 POSITION 100-mL graduated cylinder under sample arm.

5.6.16 PRESS “NEXT”.

5.6.17 PRESS “VERIFY”.

5.6.18 PRESS “GRAB” to fill graduated cylinder.
5.6 Calibrate TEDF Sampler (Cont.)

5.6.19 MEASURE sample volume in graduated cylinder.

5.6.20 IF volume is between 85 and 95 mL, ENTER data in “AS LEFT” portion of data sheet.

5.6.21 IF volume is not between 85 and 95 mL, REPEAT Steps 5.6.13 through 5.6.20.

5.6.22 PRESS “FINISH”.

5.6.23 PRESS “MENU”.

5.6.24 DISPOSE of any remaining liquid into the TEDF system.
5.7 TEDF Sampler Program Check

5.7.1 PRESS “MENU” key.

5.7.2 IF display requests a password, ENTER “1111” on touchpad using arrow keys AND
PRESS “SELECT” key.

5.7.3 HIGHLIGHT “PROGRAMMING” using arrow keys, AND
PRESS “SELECT” key.

5.7.4 HIGHLIGHT “SAMPLE PROGRAMMING” using arrow keys AND
PRESS “SELECT” key.

NOTE - Sampler display should now read “SAMPLE PROGRAMMING” at the top of the display and show the settings on the display.

5.7.5 ENSURE sample program settings are as follows:
  • “Custom Single”
  • “Total Bottles: 8” [or other value specified by SOM or process memo]
  • “Bottle Volume: 0.5 gal”
  • “Tubing: 13 ft. 3 in., 9.5 mm (3/8”)” [or if Section 5.5 was completed value specified from Step 5.5.9]
  • “Pacing: 3000 gal”
  • “Sample Volume: Fixed 90 ml”
  • “Distribution: 8 BPS/20 SPB”
  • “Program Start: Immediately on Run”
  • “Program End: 24 hr”.

5.7.6 SCROLL down using touchpad AND
REVIEW sample programming settings using arrow keys.

5.7.7 IF any sample programming setting is incorrect, PERFORM Section 5.8.
5.8 Sampler Program Adjustment

5.8.1 PRESS "MENU" key.

5.8.2 IF display requests a password, ENTER “1111" using arrow keys AND PRESS “SELECT” key.

5.8.3 HIGHLIGHT “PROGRAMMING” using arrow keys, AND PRESS “SELECT” key.

5.8.4 HIGHLIGHT "SAMPLE PROGRAMMING" using arrow keys, AND PRESS "SELECT" key.

5.8.5 Change total number of bottles

5.8.5 FROM Sample Programming menu, HIGHLIGHT "TOTAL BOTTLES" using arrow keys, AND PRESS "SELECT" key.

5.8.6 ENTER total number of bottles using up/down arrow keys, AND PRESS "OK" key.

5.8.7 Change individual bottle volume

5.8.7 From Sample Programming menu, HIGHLIGHT "BOTTLE VOLUME" using arrow keys, AND PRESS "SELECT" key.

5.8.8 ENTER individual bottle volume (0.5 gallons) using arrow keys, AND PRESS "OK" key.
5.8 Sampler Program Adjustment (Cont.)

NOTE - The pacing setting is the TEDF volume which must flow before the sampler starts (for example, a pacing setting of 5,000 gallons means a sample will be taken every 5,000 gallons discharged).

Adjust sample pacing

5.8.9 From Sample Programming menu, HIGHLIGHT "PACING" using arrow keys, AND

PRESS "SELECT" key.

5.8.10 HIGHLIGHT "FLOW WEIGHTED" using arrow keys, AND

PRESS "NEXT" key.

5.8.11 HIGHLIGHT "TARGET" using arrow keys, AND

PRESS "EDIT" key.

5.8.12 ENTER pacing (3000 gallons for this test) between samples using arrow keys, AND

PRESS "OK" key.

5.8.13 HIGHLIGHT "TAKE FIRST" using arrow keys, AND

PRESS "EDIT" key.

5.8.14 HIGHLIGHT "AFTER INTERVAL" using arrow keys, AND

PRESS "SELECT" key.

5.8.15 PRESS "BACK" key to return to program screen.
5.8 Sampler Program Adjustment (Cont.)

NOTE - Sample volume is the volume discharged into each bottle during a sampling and is normally fixed at 90 milliliters.

Adjust sample volume.

5.8.16 From Sample Programming menu, HIGHLIGHT “SAMPLE VOLUME” using arrow keys, AND

PRESS “SELECT” key.

5.8.17 On new screen, HIGHLIGHT “SAMPLE VOLUME” using arrow keys, AND

PRESS “SELECT” key.

5.8.18 HIGHLIGHT “FIXED” using arrow keys, AND

PRESS “SELECT” key.

5.8.19 HIGHLIGHT “VOLUME” using arrow keys, AND

PRESS “EDIT” key.

5.8.20 ENTER sample volume (90 milliliters) using arrow keys, AND

PRESS “OK” key.

5.8.21 PRESS "BACK" key to return to program screen.
5.8 Sampler Program Adjustment (Cont.)

NOTE - Sample distribution settings determine “bottles per sampling event (BPS)” and the “samples per bottle (SPB)”. To obtain the same composite material in every bottle, the BPS must be equal to the number of bottles in the sampler (set in Step 5.8.6). The SPB is the number of sample volumes (90 milliliters) that will be distributed in each bottle. The number is normally fixed at 20.

Adjust sample distribution

5.8.22 From Sample Programming menu, HIGHLIGHT “DISTRIBUTION” using arrow keys, AND

PRESS “SELECT” key.

5.8.23 HIGHLIGHT “BOTTLES PER SAMPLE” using arrow keys, AND

PRESS “EDIT” key.

5.8.24 ENTER number of bottles per sample event (8) using arrow keys, AND

PRESS “OK” key.

5.8.25 HIGHLIGHT “SAMPLES PER BOTTLE” using arrow keys, AND

PRESS “EDIT” key.

5.8.26 ENTER number of sample added to each bottle (20) using arrow keys, AND

PRESS “OK” key.

5.8.27 PRESS ”BACK” key to return to program screen

Adjust program start

5.8.28 From Sample Programming menu, HIGHLIGHT “PROGRAM START” using arrow keys, AND

PRESS “SELECT” key.

5.8.29 HIGHLIGHT “IMMEDIATELY ON RUN” using arrow keys, AND

PRESS “NEXT” key
5.8 Sampler Program Adjustment (Cont.)

Adjust program end

5.8.30 From Sample Programming menu, **HIGHLIGHT** “PROGRAM END” using arrow keys, **AND**

**PRESS** “SELECT” key.

5.8.31 **HIGHLIGHT** “TYPE” using arrow keys, **AND**

**PRESS** “EDIT” key.

5.8.32 **HIGHLIGHT** “TIME DURATION” using arrow keys, **AND**

**PRESS** “SELECT” key.

5.8.33 **HIGHLIGHT** “DURATION” using arrow keys, **AND**

**PRESS** “EDIT” key.

5.8.34 **ENTER** duration time (24 hours) using arrow keys, **AND**

**PRESS** “OK” key.

5.8.35 **PRESS** "BACK" key to return to program screen.
5.9 Restoration

5.9.1 RESTORE to as-found conditions.

5.9.2 INFORM SOM test is complete and instrument/equipment/system may be returned to service.

5.10 Acceptance Criteria

Acceptance criteria has been met when steps in this procedure have been satisfactorily performed and results are recorded on the data sheet(s).

5.11 Review

5.11.1 INFORM FWS test is complete.

5.11.2 (FWS) REVIEW AND ENSURE the following:

- Completed data sheets meet the acceptance criteria
- Comments sections are filled out appropriately
- Work requests needed as a result of this procedure are identified and generated
- Work request number(s) of any work documents generated as a result of this procedure, are recorded in the Comments/Remarks section of the data sheet.

5.12 Records

This procedure is performed within a work package, as such, the procedure in its entirety will be maintained as a record per the Work Control process.

The record custodian identified in the Company-level Records Inventory and Disposition Schedule (RIDS) is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.
Figure 1 - Pump Tubing
Clean the rotor

Clean the rotor, pump tube tracks and pump housing with a mild detergent. Refer to Replace the pump tubing on page 20 and the illustrated steps that follow.