Pressure and Vacuum Gauges Calibration

USQ # Routine Maintenance

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<th>Rev-Mod</th>
<th>Release Date</th>
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<td>11/23/2015 F-0</td>
<td>Periodic Review</td>
<td>Struck Warnings at 3.1 and prior to Step 5.1.2. Add Step 5.5.1. Changed 1st Note prior to 5.1, 5.3.2 and 5.4.2 to Special Instructions Rerword Steps 5.1.2, 5.1.3, 5.2.3, 5.2.4, 5.3.3, 5.3.4, 5.4.5, 5.4.6, 5.1.5 – 5.1.3, and 5.5.5.</td>
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<tr>
<td>11/19/2014 E-3</td>
<td>CHAMPS Removal</td>
<td>Removed reference to CHAMPS, updated records statements and removed next periodic review date.</td>
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<td>01/23/2013 E-2</td>
<td>Maintenance request.</td>
<td>Deleted WARNING for Step 5.1.1. Deleted Step 5.1.1 sign-off. Added WARNING to Step 5.1.2. Added new Steps 5.5.2 and 5.5.6. Deleted old Step 5.7.1. Modified wording in Section 5.8.</td>
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<td>06/29/2012 E-1</td>
<td>Maintenance request.</td>
<td>Deleted old Step 5.1.1. Added new Step 5.1.1. Modified wording in Steps 5.1.2 and 5.1.3. Updated Section 5.8 for addition of a signature step.</td>
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1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides instructions for a safe, uniform method to calibrate pressure and vacuum gauges.

1.2 Scope

This procedure involves the calibration of pressure and vacuum gauges.

2.0 INFORMATION

NONE

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

3.1.1 Verify pressure media (gas, water, chemicals, steam, etc.) and take necessary precaution to prevent personal injury or damage to equipment when relieving pressure.

3.1.2 Lockouts, Tagouts, or over-tagging requirements shall be performed in accordance with DOE-0336, Hanford Site Lockout/Tagout Procedure.

3.2 Radiation and Contamination Control

Work in radiological areas will be performed using a Radiological Work Permit following review by Radiological Control per the ALARA Work Planning procedure TFC-ESHQ-RP_RWP-C-03.
4.0 **PREREQUISITES**

4.1 **Special Tools, Equipment, and Supplies**

The following supplies may be needed to perform this procedure:

- Calibrated pressure/vacuum source (manometer, dead weight tester, etc.) with appropriate range
- Safety Glasses.

4.2 **Field Preparation**

4.2.1 Ensure Operations personnel have configured system/equipment, as required, to allow performance of this procedure.

4.2.2 Ensure applicable lock and tag or over-tagging requirements have been satisfied per DOE-0336, Hanford Site Lockout/Tagout Procedure.
5.0 PROCEDURE

Special Instructions

If performance of any steps in this procedure is not required for procedure completion, indicate steps not performed by entering "N/A" in appropriate Data Sheet signoff space and explain in Comments/Remarks Section of Data Sheet.

NOTE - Procedure sections may be performed independently.

- Gauges removed for shop calibration, must be controlled as radioactive material until "free released" by HPT.
- Calibration may be performed in-place or in the shop.

5.1 Pressure and Vacuum Gauges

5.1.1 ISOLATE gauge from system

OR

VERIFY system is shut down and depressurized for maintenance.

5.1.2 SLOWLY RELIEVE sensing line pressure.

5.1.3 IF gauge is to be bench calibrated, REMOVE gauge from installed location AND

TRANSPORT gauge to Shop or Calibration location.

NOTE - For all data required, use pointer tip indication for data collection.

5.1.4 GO TO appropriate section for gauge type to be tested:
- Pressure Gauge: Section 5.2
- Vacuum Gauge: Section 5.3
- Combination (Compound) Vacuum/Pressure Gauge: Section 5.4.
5.2 Pressure Gauges

5.2.1 CONNECT test equipment.

5.2.2 APPLY test input values specified by data sheet AND

RECORD output values in As-Found column of Data Sheet.

5.2.3 IF As-Found values are within tolerance per Data Sheet, RECORD As-Found values in As-Left column AND

GO TO Section 5.5, Restoration.

5.2.4 SET input pressure source to minimum value specified on Data Sheet.

5.2.5 ADJUST ZERO adjustment until pointer tip indicates minimum value.

5.2.6 IF gauge has no ZERO adjustment, REMOVE pointer from spindle without moving spindle AND

ATTACH pointer to spindle so tip indicates minimum value per Data Sheet.

5.2.7 APPLY test inputs specified on Data Sheet AND

CHECK output values for tolerance.

5.2.8 IF values are within tolerance per Data Sheet, RECORD As-Left values on Data Sheet AND

GO TO Restoration, Section 5.5.

5.2.9 IF values are not within tolerance per Data Sheet, REPEAT Steps 5.2.4 through 5.2.8 until values are within tolerance,

OR

IF unable to bring set-point value into tolerance and replacement parts are required, PERFORM Steps 5.2.9.1 thru 5.2.9.4.

5.2.9.1 NOTIFY FWS.

5.2.9.2 CONTACT Planning for BOM.

5.2.9.3 REQUEST planning to print new Data Sheet(s).

5.2.9.4 ACQUIRE new part(s) from material coordinator.

5.2.10 RE-PERFORM Steps 5.2.4 through 5.2.9.
5.3 Vacuum Gauges

5.3.1 CONNECT test equipment.

Special Instructions

If maximum vacuum per Data Sheet cannot be achieved, engineering should be consulted for directions with those directions being recorded on the Comments Section of Data Sheet or Work Record.

5.3.2 APPLY test input values specified by Data Sheet AND

RECORD output values in As-Found column of Data Sheet.

5.3.3 IF As-Found values are within tolerance per Data Sheet, RECORD As-Found values in As-Left column AND

GO TO Section 5.5, Restoration.

5.3.4 SET test input vacuum source to minimum value specified on Data Sheet.

5.3.5 ADJUST ZERO adjustment until pointer tip indicates minimum value.

5.3.6 IF gauge has no ZERO adjustment, REMOVE pointer from spindle without moving spindle AND

ATTACH pointer to spindle so tip indicates minimum value per Data Sheet.

5.3.7 APPLY test inputs specified on Data Sheet AND

CHECK output values for tolerance.

5.3.8 IF values are within tolerance per Data Sheet, RECORD As-Left values on Data Sheet AND

GO TO Restoration, Section 5.5.
5.3 Vacuum Gauges (Cont.)

5.3.9 IF values are not within tolerance per Data Sheet, REPEAT Steps 5.3.4 through 5.3.8 until values are within tolerance,

OR

IF unable to bring set-point value into tolerance and replacement parts are required, PERFORM Steps 5.3.9.1 thru 5.3.9.4.

5.3.9.1 NOTIFY FWS.

5.3.9.2 CONTACT Planning for BOM.

5.3.9.3 REQUEST planning to print new Data Sheet(s).

5.3.9.4 ACQUIRE new part(s) from material coordinator.

5.3.10 RE-PERFORM Steps 5.3.4 through 5.4.9.
5.4  Combination (Compound) Vacuum and Pressure Gauges

5.4.1  CONNECT input vacuum source.

Special Instructions

If maximum vacuum per Data Sheet cannot be achieved, engineering should be consulted for directions with those directions being recorded on the Comments Section of Data Sheet or Work Record.

5.4.2  APPLY test input vacuum values specified by Data Sheet AND
        RECORD output values in As-Found column of Data Sheet.

5.4.3  DISCONNECT input vacuum source AND
        CONNECT input pressure source.

5.4.4  APPLY test input pressure values specified by Data Sheet AND
        RECORD output values in As-Found column of Data Sheet.

5.4.5  IF As-Found values are within tolerance per Data Sheet, RECORD As-
        Found values in As-Left column AND
        GO TO Section 5.5, Restoration.

5.4.6  SET input vacuum source to minimum value specified on Data Sheet.

5.4.7  ADJUST ZERO adjustment until pointer tip indicates minimum value.

5.4.8  IF gauge has no ZERO adjustment, REMOVE pointer from spindle without
        moving spindle AND
        ATTACH pointer to spindle so tip indicates minimum value.
5.4 Combination (Compound) Vacuum and Pressure Gauges (Cont.)

5.4.9 APPLY test inputs specified on Data Sheet AND CHECK output values for tolerance.

5.4.10 IF values are within tolerance per Data Sheet, RECORD As-Left values on Data Sheet AND GO TO Restoration, Section 5.5.

5.4.11 IF values are not within tolerance per Data Sheet, REPEAT Steps 5.4.6 through 5.4.10 until values are within tolerance

OR

IF unable to bring set-point value into tolerance AND replacement parts are required, PERFORM Steps 5.4.11.1 thru 5.4.11.4.

5.4.11.1 NOTIFY FWS.

5.4.11.2 CONTACT Planning for BOM.

5.4.11.3 REQUEST planning print new Data Sheet(s).

5.4.11.4 ACQUIRE new part(s) from material coordinator.

5.4.12 RE-PERFORM Steps 5.4.6 through 5.4.11.
5.5 Restoration

5.5.1 IF any problems were encountered with calibration, INFORM FWS.

5.5.2 IF not already removed; DISCONNECT AND REMOVE Test Equipment.

5.5.3 IF gauge was removed for bench calibration, TRANSPORT gauge to original location AND

REINSTALL gauge.

5.5.4 RECORD Test Equipment information and calibration status on Data Sheet.

5.5.5 CHECK equipment restoration by observing indications are consistent with expected conditions.

5.5.6 CHECK for leaks.

5.5.7 NOTIFY Operations and FWS Maintenance/Testing has been completed.

5.6 Acceptance Criteria

Acceptance Criteria has been met when Steps in this procedure have been satisfactorily performed and As-Left values meet the specifications and tolerance(s) per the Data Sheet.

5.7 Review

5.7.1 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.

5.8 Records

The performance of this procedure generates no records. However, PM Data Sheets associated with the procedure, are records and are maintained in the work package as record material.

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.