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| |  |  | | --- | --- | | *Hazardous Materials Services Operational* *Procedure* | ASU full_logo | |  | | |
| Gas Cabinet Functional Checklist | | | MTW-5100  Issued: 05 Jul 2019  Rev. 0  Page 1 of 8 |

Uncontrolled copy if printed valid for use on date of print**:** Print Date: 28 June 2022

# Purpose

## To guide the ASU HazMat Technician on doing a Gas Cabinet Functional Check prior to turning the gas on to a new Gas Cabinet installation.

# scope

## This document can be used for the start up of various types of gas system controllers.

# definitions

## None.

# Procedure

## After all connections have been made and installation of the gas source system is complete as per the gas system installation guidelines, follow the checklist (pages 2-8 of this procedure).

# RELATED INFORMATION

## Version History

|  |  |  |  |
| --- | --- | --- | --- |
| Rev. | Date | Subject Matter Expert | Description of Revision |
| 0 | July 5, 2019 | Randy Lewis | Original |
|  |  |  |  |

**GAS CABINET NUMBER\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**AREA\_\_\_\_\_\_\_\_\_\_\_\_**

**GAS\_\_\_\_\_\_\_\_\_\_\_\_**

**CUSTOMER\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Source System Functional Checklist**

After all connections have been made and installation of the gas source system is complete, this function test can be conducted. This functional check must be made prior to start-up. ASU HazMat Technician and/or representative from the manufactoror will ensure that all the mechanical and electrical components in the gas source systems are functioning properly and all programmed sequences are operational.

Source System Utility Checklist

1. Cabinet or rack located and mounted to floor
2. Cabinet exhaust duct installed, functioning and monitored for loss of exhaust
3. Sprinkler line installed (if applicable) and pressurized
4. Grounding wire installed (source system and controller) and checked for less than 1 ohm resistance
5. Electrical power (120/240 VAC, 50/60 Hz) connected
6. Remote I/O wiring installed and checked
7. Network wiring installed (if applicable) and configured on the host
8. Process line installed and helium leak tested
9. Vent line installed and helium leak tested
10. Venturi line installed, leak tested and 75-95 psig (5.2-6.6 barg) of nitrogen available
11. Purge line installed and helium leak tested. (If external purge cylinder utilized)
12. Pneumatic supply connected to controller and 85-95 psig max
13. Gas source system internal piping helium leak tested
14. Purge cylinder/s available
15. Hazardous gas monitor installed and operating

Source System Functional Checklist

Inspection Sign-offs\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Electrical\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mechanical\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Quality\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Safety\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Checklist Complete) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**SOURCE SYSTEM FIELD START-UP CHECKLIST**

**CUSTOMER \_\_\_\_\_\_\_\_\_\_\_\_\_ SYSTEM # \_\_\_\_\_\_\_\_\_\_\_\_ SERIAL #\_\_\_\_\_\_\_\_\_\_\_**

**DEVICE DESCRIPTION \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ MODEL# \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**GAS TYPE \_\_\_\_\_\_\_\_\_\_\_\_ START DATE \_\_\_\_\_\_\_\_\_\_ FINISH DATE \_\_\_\_\_\_\_\_\_\_\_\_**

**TOOL NAME \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ TECH REP \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**CUSTOMER SYSTEM LABEL \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**VISUAL INSPECTION**

|  |  |  |
| --- | --- | --- |
| **PIPING/MECHANICAL** | **Check off line item when completed** | |
|  | **Left side or single** | **Right side** |
| Perform visual inspection to verify all mechanical  and electrical connections have been made. |  |  |
| System labeled correctly per Specification Sheet. |  |  |
| System information received:  Specification Sheet  Flow Schematic  Customer I/O Drawing  Inspection & Test sheet(leak test and certification)  Quality InspectionTest sheet  Installation and Operation Manual |  |  |
| Verify all open connections are sealed |  |  |
| General appearance is satisfactory |  |  |
| Verify leak test from gas bottle to point of use  Complete |  |  |
| Verify corrosive/ toxic scrubber and incinerator  operational/running |  |  |
| Pitot tube installed with correct 90° orientation |  |  |
| Sprinkler line installed (except ClF3) |  |  |
| Exhaust tel tails installed |  |  |
| Verify cabinet exhaust is functioning |  |  |
| Panel under pressure |  |  |
| Correct process purifier installed per gas service |  |  |
| Cylinder connection seating surface condition  Acceptable |  |  |
| Verify and record cylinder orifice size/s |  |  |
| Shelf kit installed and adjusted |  |  |
| Cylinder chains / straps |  |  |
| Trickle purge gasket installed |  |  |
| Correct venturi pressure present Minimum 75 psig  (5.2 barg) |  |  |
| Correct pneumatic pressure present 85 psig to 95  psig max. (5.9-6.6 barg) |  |  |
| UVIR unit tested and properly shutting down panel/s – communication test |  |  |
| Purge cylinder/s installed |  |  |
| Gas detection system operational |  |  |
| Secondary containment installed - COAX |  |  |
| Pneumatics for cylinder valve or CGA Cylinder  Indicator installed |  |  |
| Verify and record EX flow switch rating | See Quality Inspection and Test Sheet | |
| High EX pressure flow switch rating |  |  |
| Low EX pressure flow switch rating |  |  |

|  |  |  |
| --- | --- | --- |
| **ELECTRICAL** | **Check off line item when completed** | |
|  | **Left side or single** | **Right side** |
| Earth ground installed |  |  |
| 120v/220v/24v electrical complete |  |  |
| Graphics panel condition satisfactory |  |  |
| Electric sealoffs poured |  |  |
| I/O wired per DWG # EE-\_\_\_\_\_\_\_ |  |  |
| Supplied temperature control unit functional |  |  |
| Verify temperature control power |  |  |
| Verify heat tape power |  |  |
|  | Jacket temp.\_\_\_\_\_\_ | Jacket temp.\_\_\_\_\_\_ |
|  | Set point \_\_\_\_\_ | Set point \_\_\_\_\_ |

|  |  |  |
| --- | --- | --- |
| **CONTROLLER** | **Left side or single** | **Right side** |
| Seat all circuit boards and eproms (caution: remove  power before removing eproms or circuit boards) |  |  |
| E-stop guard in place |  |  |
| All pneumatic valve graphics illuminating |  |  |
| Leak check panel including vent manifold | | |
| All valves operational |  |  |
| Manual mode operation |  |  |
| No audible solenoid leaks |  |  |
| Verify correct CPU eprom VERS.# \_\_\_\_\_\_\_\_\_\_ |  |  |
| Verify correct I/O eprom VERS.#\_\_\_\_\_\_\_\_ |  |  |
| Verify correct I/O eprom VERS.#\_\_\_\_\_\_\_\_ |  |  |
| Verify correct BIOS eprom VERS.#\_\_\_\_\_\_\_\_ |  |  |
| External Shutdown wired |  |  |
| Supervisory circuit utilized |  |  |
| Correct program loaded / version |  |  |
| Program name and date |  |  |
| Life safety system utilized? |  |  |
| Life safety system contact? (Normally Open) |  |  |
| Test signal communications to F.A.S for Fault/Shutdown/EMO/UVIR |  |  |
| Verify port and loop # indicated on the controller |  |  |
| Network addressed |  |  |
| Source System name \_\_\_\_\_\_\_\_\_\_\_\_ |  |  |
| Port number \_\_\_\_\_\_\_\_\_\_\_\_\_ |  |  |
| Loop number \_\_\_\_\_\_\_\_\_\_\_\_\_ |  |  |
| Gas Cabinet system communicating with site network |  |  |
| Controller door adjustment |  |  |
| Z - purge set @  0.1" H20 (24.9 Pa) |  |  |

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| **TRANSDUCER**  **CALIBRATION** | | **Verify analog scaling** | | | | | | | | | |
| **Transducers must be powered up a minimum of 15 minutes. Zero and span should be**  **checked a minimum of 3 times to insure repeatability** | | | | | | | | | | | |
| **Check and record the pressure before and after calibration in psig** | | | | | | | | | | | |
| Analog # | Label | **Left side or single** | | | | | **Right side** | | | | |
|  |  | Zero | Zero | Span | Span | Completed | Zero | Zero | Span | Span | Completed |
|  | before | after | before | after | before | after | before | After |
| 1 |  |  |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |  |  |  |  |  |

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| **PANEL COMPONENT INFORMATION** | | | |
|  | | | |
| Component | Component Description | Component Part # |  |
|  |  |  |  |
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| --- | --- | --- | --- |
| **FUNCTIONAL TEST - DIGITAL ALARMS** | | | |
| **Record or attach photo of the label from software documentation. Record, verify and test the digital**  **alarms and the hardwire shutdowns. Location of the hardwire jumper is**  **designated by an "E".** | | | |
| Digital In  # | Label  (Left / Right) if applicable | Hardwire SD  loc. | Checked |
| 1 | Emergency Stop | E1 |  |
| 2 |  | E2 |  |
| 3 |  | E3 |  |
| 4 |  | E4 |  |
| 5 |  | E5 |  |
| 6 |  | E12 |  |
| 7 |  |  |  |
| 8 |  |  |  |
| 9 |  |  |  |
| 10 |  | E11 |  |
| 11 |  | E10 |  |
| 12 |  | E9 |  |
| 13 |  | E8 |  |
| 14 |  | E7 |  |
| 15 |  | E6 |  |
| 16 |  | E5 |  |
| 17 |  | E20 |  |
| 18 |  | E19 |  |
| 19 |  | E18 |  |
| 20 |  | E17 |  |
| 21 |  | E16 |  |
| 22 |  | E15 |  |
| 23 |  | E14 |  |
| 24 |  | E13 |  |
| 25 |  | E1 |  |
| 26 |  | E2 |  |
| 27 |  | E3 |  |
| 28 |  | E4 |  |
| 29 |  | E5 |  |
| 30 |  | E6 |  |
| 31 |  | E7 |  |
| 32 |  | E8 |  |
| 33 |  | E9 |  |
| 34 |  | E10 |  |
| 35 |  | E11 |  |
| 36 |  | E12 |  |
| 37 |  | E13 |  |
| 38 |  | E14 |  |
| 39 |  | E15 |  |

|  |  |  |
| --- | --- | --- |
| **FUNCTIONAL TEST – RELAY**  **OUTPUTS** | **Check off line item when**  **completed** | |
|  | **Left side or single** | **Right side** |
| Relay digital outputs tested |  |  |
| Relay # 1 |  |  |
| Relay # 2 |  |  |
| Relay # 3 |  |  |
| Relay # 4 |  |  |
| Relay # 5 |  |  |
| Relay # 6 |  |  |
| Relay # 7 |  |  |
| Relay # 8 |  |  |
| Verify First Security |  |  |
| Verify Second security |  |  |
| Verify Third security |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **FUNCTIONAL TEST –**  **USER SET POINTS** | | | | **Check off line item when completed** | | | | |
|  | | | | **Left side or single** | | | **Right side** | |
| User Alarm set points listed and verified | | | |  | | |  | |
|  | **Left side or single** | | | | **Right side** | | | |
| **List changes in**  **this column** | Alarm # | Label | Setpoint | | Alarm # | Label | | Setpoint |
|  |  |  |  | |  |  | |  |
|  |  |  |  | |  |  | |  |
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| **FUNCTIONAL TEST –**  **PROGRAM MODES** | **Check off line item when completed** | | | |
|  | **Left side or single** | | **Right side** | |
| Process |  | |  | |
| Pre-purge |  | |  | |
| Change cylinder |  | |  | |
| Post purge |  | |  | |
| Vacuum decay test |  | |  | |
| Aux purge |  | |  | |
| Lamp test |  | |  | |
| Crossover signal tested |  | |  | |
| Crossover line purge lockout tested |  | |  | |
| Low process delivery |  | |  | |
| Process response for very low purge |  | |  | |
| Test shutdowns for process line and aux purge while other side is in gas to tool \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | |
|  | | | | |
| **FUNCTIONAL TEST – FILE**  **VERIFICATION** | | Check off line item when completed | | |
|  | | Left side or single | | Right side |
| Verify purge parameters per software documentation | |  | |  |
| Verify alarm conditions per software documentation | |  | |  |
| Verify set points per software documentation | |  | |  |
| Source system cleaned inside and out | |  | |  |
| Suggested Customer Signoff | | Date | | Signature |
| Section: Required / Not required | |  | |  |
| Exhaust signed off | |  | |  |
| Electrical Signed off | |  | |  |
| Safety signed off | |  | |  |
| Environmental documentation submitted | |  | |  |
| Plumbing signed off | |  | |  |
| Environmental sign off | |  | |  |

Comments\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

I have completed the verification of the operation of this gas source system on the date given below.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name Date

## Start up an Equipment maintence log (DOC ID MTW 3005) for any/all new equipment,

## document the start up date.