

California Environmental Protection Agency



Vapor Recovery Equipment Defects List

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Vapor Recovery Equipment Defects List

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| GVR All Systems/any E.O. | | |
|--------------------------|--|--|
| equipment | defects | verification procedure |
| (a) system | (1) any equipment defect which is identified in an Executive Order (E.O.) certifying a system pursuant to the Certification Procedures incorporated in Section 94011 of Title 17, California Code of Regulations | as set forth in the applicable E.O. |
| | (2) absence, improper installation, or disconnection of any component required to be used in the E.O.(s) that certified the system | direct observation |
| | (3) installation or use of any uncertified component | direct observation |
| | (4) dispensing rate greater than ten (10.0) gallons per minute (gpm) or less than the greater of five (5.0) gpm or the limit stated in the E.O. measured at maximum fuel dispensing | when determined as part of any ARB approved test method or direct measurement for 30 seconds minimum |
| | (5) phase I vapor poppet inoperative | direct observation |
| (b) nozzles | (1) nozzle automatic liquid shutoff mechanisms which malfunction in any manner | EPO No. 26-F-1/direct observation |

note: Each defect in the tables in this list has a specific alphanumeric identification. Every identification has three parts: i) the Executive Order number for the table in which the defect appears (or GVR-general vapor recovery-for this "All Systems/any E.O." page only), ii) a sequential letter for the equipment with which the defect is associated, and iii) a sequential number for the defect itself. As the "equipment" column in the table changes, the defect number sequence that is associated with the specific equipment begins again with one ("(1)"). The same is true for the equipment letter: at the start of a new table the first identifying letter associated with the first equipment listed will be "a," the second "b," and so on. The Executive Order number (part i) is comprised of the characters which proceed the literal description of the system.

For example, the identification for the defect above which is written "installation or use of any uncertified component" is "GVR(a)(3)" and the last defect on the next table (page 2) is "G-70-7(d)(1)."

| VR-203 series VST Phase II EVR System sans <u>not Including</u> ISD | | |
|--|---|--|
| equipment | defects | verification procedure |
| (a) <u>VST nozzle</u> | (1) more than 30 percent (30%) of a nozzle face seal is missing (e.g., a triangular or similar shape in which greater than two and one half (2.5) inches of the face seal circumference is missing (accumulated)) | direct measurement/ observation |
| | (2) more than 0.375 square inches of a nozzle vapor collection sleeve is missing (e.g., a rectangular shape of greater than nine sixteenths (9/16) inch or more on each side, a circular shape of eleven sixteenths (11/16) inch or more in diameter, or a triangular shape of seven eighths (7/8) inch on the side | direct measurement/ observation |
| | (3) total slit length in the convolution exceeds 18.0 inches | direct measurement/ observation |
| (b) <u>EMCO nozzle</u> | <u>(1) more than 0.38 square inches of a nozzle boot face material is missing (e.g., a triangular or similar shape in which greater than 7/16 inches of the boot face circumference is missing (accumulated))</u> | <u>direct measurement/ observation</u> |
| | <u>(2) there is a 360 degree cut around the bellows convolution</u> | <u>direct measurement/ observation</u> |
| | <u>(3) total slit length in the convolution exceeds 18.0 inches</u> | <u>direct measurement/ observation</u> |
| (c) <u>all nozzles</u> | (41) insertion interlock mechanism which will allow dispensing when the convolution is uncompressed | direct observation/ GDF-09 |
| | (52) defective vapor valve | VR-203 Exhibit 4 <u>Exhibit 7</u> |
| | (63) vapor valve leak rate exceeds 0.07 cubic feet per minute at a pressure of two (2) water column inches | TP-201.2B |
| (d) <u>hoses</u> | (1) 475 <u>150</u> ml or more liquid in the vapor path | direct measurement/ sections 6.1 to 6.5 of VR-203 Exhibit 5 |
| | (2) any hose with a visible opening | direct observation |
| (e) <u>processor processing unit</u> | (1) unit inoperative * | direct observation |
| | (2) ball valves are not locked in the proper operating configuration as shown in Figure 2B- 23 <u>*</u> | direct observation |
| | (3) unit is not on or in the automatic vapor processor mode | diagnostic section of the Pressure Measurement Control (Section 46 <u>12</u>) of IOM |
| | (4) processor alarms for emission factor are activated for two consecutive 24 hour periods | direct observation |
| | (5) unit fails to activate when the UST pressure is less than or equal to 0.4 water column inch | VR-203 Exhibit 9 |
| | (6) hydrocarbon concentration exceeds 12 percent (12%) | vapor processor status report |

| VR-203 series VST Phase II EVR System- sans not Including ISD | | |
|--|--|---|
| equipment | defects | verification procedure |
| <u>(f) vapor polisher</u> | <u>(1) unit inoperative *</u> | <u>direct observation</u> |
| | <u>(2) ball valves are not locked in the proper operating configuration as shown in Figure 2B-4 *</u> | <u>direct observation</u> |
| | <u>(3) unit is not on or in the automatic vapor processor mode</u> | <u>diagnostic section of the Pressure Measurement Control (Section 15) of IOM</u> |
| <u>(g) thermal oxidizer</u> | <u>(1) unit inoperative *</u> | <u>direct observation</u> |
| | <u>(2) ball valves are not locked in the proper operating configuration as shown in Figure 2B-5*</u> | <u>direct observation</u> |
| <u>(h) clean air separator</u> | <u>(1) ball valves are not locked in the proper operating configuration as shown in Figures 2B-7 or 2B-7H *</u> | <u>direct observation</u> |
| | <u>(2) clean air separator static pressure performance failure *</u> | <u>VR-203 Exhibit 14</u> |
| <u>(ei) vapor return lines</u> | <u>(1) pressure drop through the vapor path exceeds five (5.00) water column inches at a flow rate of 60 cubic foot per hour (CFH) and eight (8.00) water column inches at a flow rate of 80 CFH</u> | <u>TP201.4 Methodology 1 or equivalent</u> |

* When the identified defect is detected in the listed equipment, the defect determination applies to all affected interrelated systems (which may include all systems at the motor vehicle fueling operation).

| <u>VR-204 series VST Phase II EVR System Including ISD</u> | | |
|--|--|---|
| <u>equipment</u> | <u>defects</u> | <u>verification procedure</u> |
| <u>(a) VST nozzle</u> | <u>(1) more than 30 percent (30%) of a nozzle face seal is missing (e.g., a triangular or similar shape in which greater than two and one half (2.5) inches of the face seal circumference is missing (accumulated))</u> | <u>direct measurement/ observation</u> |
| | <u>(2) more than 0.375 square inches of a nozzle vapor collection sleeve is missing (e.g., a rectangular shape of greater than nine sixteenths (9/16) inch or more on each side, a circular shape of eleven sixteenths (11/16) inch or more in diameter, or a triangular shape of seven eighths (7/8) inch on the side</u> | <u>direct measurement/ observation</u> |
| | <u>(3) total slit length in the convolution exceeds 18.0 inches</u> | <u>direct measurement/ observation</u> |
| <u>(b) EMCO nozzle</u> | <u>(1) more than 0.38 square inches of a nozzle boot face material is missing (e.g., a triangular or similar shape in which greater than 7/16 inches of the boot face circumference is missing (accumulated))</u> | <u>direct measurement/ observation</u> |
| | <u>(2) there is a 360 degree cut around the bellows convolution</u> | <u>direct measurement/ observation</u> |
| | <u>(3) total slit length in the convolution exceeds 18.0 inches</u> | <u>direct measurement/ observation</u> |
| <u>(c) all nozzles</u> | <u>(1) insertion interlock mechanism which will allow dispensing when the convolution is uncompressed</u> | <u>direct observation/ GDF-09</u> |
| | <u>(2) defective vapor valve</u> | <u>VR-204 Exhibit 7</u> |
| | <u>(3) vapor valve leak rate exceeds 0.07 cubic feet per minute at a pressure of two (2) water column inches</u> | <u>TP-201.2B</u> |
| <u>(d) hoses</u> | <u>(1) 150 ml or more liquid in the vapor path</u> | <u>direct measurement/ sections 6.1 to 6.5 of VR-204 Exhibit 5</u> |
| | <u>(2) any hose with a visible opening</u> | <u>direct observation</u> |
| <u>(e) processor</u> | <u>(1) unit inoperative *</u> | <u>direct observation</u> |
| | <u>(2) ball valves are not locked in the proper operating configuration as shown in Figure 2B-3 *</u> | <u>direct observation</u> |
| | <u>(3) unit is not on or in the automatic vapor processor mode</u> | <u>diagnostic section of the Pressure Measurement Control (Section 12) of IOM</u> |
| | <u>(4) processor alarms for emission factor are activated for two consecutive 24 hour periods</u> | <u>direct observation</u> |
| | <u>(5) unit fails to activate when the UST pressure is less than or equal to 0.4 water column inch</u> | <u>VR-204 Exhibit 9</u> |
| | <u>(6) hydrocarbon concentration exceeds 12 percent (12%)</u> | <u>vapor processor status report</u> |

| <u>VR-204 series VST Phase II EVR System Including ISD</u> | | |
|--|--|---|
| <u>equipment</u> | <u>defects</u> | <u>verification procedure</u> |
| <u>(f) vapor polisher</u> | <u>(1) unit inoperative *</u> | <u>direct observation</u> |
| | <u>(2) ball valves are not locked in the proper operating configuration as shown in Figure 2B-4 *</u> | <u>direct observation</u> |
| | <u>(3) unit is not on or in the automatic vapor processor mode</u> | <u>diagnostic section of the Pressure Measurement Control (Section 15) of IOM</u> |
| <u>(g) vapor return lines</u> | <u>(1) pressure drop through the vapor path exceeds five (5.00) water column inches at a flow rate of 60 cubic foot per hour (CFH) and eight (8.00) water column inches at a flow rate of 80 CFH</u> | <u>TP-201.4 Methodology 1 or equivalent</u> |

* When the identified defect is detected in the listed equipment, the defect determination applies to all affected interrelated systems (which may include all systems at the motor vehicle fueling operation).

| <u>VR-205 series VST Phase II EVR System with HIRT VCS 100 Thermal Oxidizer not Including ISD</u> | | |
|---|--|--|
| <u>equipment</u> | <u>defects</u> | <u>verification procedure</u> |
| <u>(a) nozzle</u> | <u>(1) more than 30 percent (30%) of a nozzle face seal is missing (e.g., a triangular or similar shape in which greater than two and one half (2.5) inches of the face seal circumference is missing (accumulated))</u> | <u>direct measurement/ observation</u> |
| | <u>(2) more than 0.375 square inches of a nozzle vapor collection sleeve is missing (e.g., a rectangular shape of greater than nine sixteenths (9/16) inch or more on each side, a circular shape of eleven sixteenths (11/16) inch or more in diameter, or a triangular shape of seven eighths (7/8) inch on the side</u> | <u>direct measurement/ observation</u> |
| | <u>(3) total slit length in the convolution exceeds 18.0 inches</u> | <u>direct measurement/ observation</u> |
| | <u>(4) insertion interlock mechanism which will allow dispensing when the convolution/bellows is uncompressed</u> | <u>direct observation/ GDF-09</u> |
| | <u>(5) defective vapor valve</u> | <u>VR-205 Exhibit 7</u> |
| | <u>(6) vapor valve leak rate exceeds 0.07 cubic feet per minute at a pressure of two (2) water column inches</u> | <u>TP-201.2B</u> |
| <u>(b) hoses</u> | <u>(1) 175 ml or more liquid in the vapor path</u> | <u>direct measurement/ sections 6.1 to 6.5 of VR-205 Exhibit 5</u> |
| | <u>(2) any hose with a visible opening</u> | <u>direct observation</u> |
| <u>(c) thermal oxidizer</u> | <u>(1) unit inoperative *</u> | <u>direct observation</u> |
| <u>(d) vapor return lines</u> | <u>(1) pressure drop through the vapor path exceeds five (5.00) water column inches at a flow rate of 60 cubic foot per hour (CFH) of Nitrogen and eight (8.00) water column inches at a flow rate of 80 CFH of Nitrogen</u> | <u>Methodology 1 of TP201.4 and Exhibit 6 of VR-205</u> |

* When the identified defect is detected in the listed equipment, the defect determination applies to all affected interrelated systems (which may include all systems at the motor vehicle fueling operation).

| <u>VR-207 series EMCO Wheaton Retail Phase II EVR System with HIRT VCS 100 Thermal Oxidizer not Including ISD</u> | | |
|---|---|--|
| <u>equipment</u> | <u>defects</u> | <u>verification procedure</u> |
| <u>(a) EMCO nozzle</u> | <u>(1) more than 0.38 square inches of a nozzle boot face material is missing (e.g., a triangular or similar shape in which greater than 7/16 inches of the boot face circumference is missing (accumulated))</u> | <u>direct measurement/ observation</u> |
| | <u>(2) total slit length in the convolution exceeds 7.0 inches</u> | <u>direct measurement/ observation</u> |
| | <u>(3) insertion interlock mechanism which will allow dispensing when the convolution is uncompressed</u> | <u>direct observation/ GDF-09</u> |
| | <u>(4) defective vapor valve</u> | <u>VR-207 Exhibit 7</u> |
| | <u>(5) vapor valve leak rate exceeds 0.07 cubic feet per minute at a pressure of two (2) water column inches</u> | <u>TP-201.2B</u> |
| <u>(b) hoses</u> | <u>(1) 150 ml or more liquid in the vapor path</u> | <u>direct measurement/ sections 6.1 to 6.5 of VR-207 Exhibit 5</u> |
| | <u>(2) any hose with a visible opening</u> | <u>direct observation</u> |
| <u>(c) thermal oxidizer</u> | <u>(1) unit inoperative *</u> | <u>direct observation</u> |
| | <u>(2) ball valves are not locked in the proper operating configuration as shown in Figure 2B-2 and 2B-3*</u> | <u>direct observation</u> |
| <u>(d) vapor return lines</u> | <u>(1) pressure drop through the vapor path exceeds 0.95 water column inches at a flow rate of 60 cubic foot per hour (CFH) and 1.52 water column inches at a flow rate of 80 CFH</u> | <u>TP201.4 Methodology 1 or equivalent</u> |

* When the identified defect is detected in the listed equipment, the defect determination applies to all affected interrelated systems (which may include all systems at the motor vehicle fueling operation).

| <u>VR-208 series EMCO Wheaton Retail Phase II EVR System with HIRT VCS 100 Thermal Oxidizer Including ISD</u> | | |
|---|---|--|
| <u>equipment</u> | <u>defects</u> | <u>verification procedure</u> |
| <u>(a) EMCO nozzle</u> | <u>(1) more than 0.38 square inches of a nozzle boot face material is missing (e.g., a triangular or similar shape in which greater than 7/16 inches of the boot face circumference is missing (accumulated))</u> | <u>direct measurement/ observation</u> |
| | <u>(2) total slit length in the convolution exceeds 7.0 inches</u> | <u>direct measurement/ observation</u> |
| | <u>(3) insertion interlock mechanism which will allow dispensing when the convolution is uncompressed</u> | <u>direct observation/ GDF-09</u> |
| | <u>(4) defective vapor valve</u> | <u>VR-208 Exhibit 7</u> |
| | <u>(5) vapor valve leak rate exceeds 0.07 cubic feet per minute at a pressure of two (2) water column inches</u> | <u>TP-201.2B</u> |
| <u>(b) hoses</u> | <u>(1) 150 ml or more liquid in the vapor path</u> | <u>direct measurement/ sections 6.1 to 6.5 of VR-208 Exhibit 5</u> |
| | <u>(2) any hose with a visible opening</u> | <u>direct observation</u> |
| <u>(c) thermal oxidizer</u> | <u>(1) unit inoperative *</u> | <u>direct observation</u> |
| | <u>(2) ball valves are not locked in the proper operating configuration as shown in Figure 2B-2 and 2B-3*</u> | <u>direct observation</u> |
| <u>(d) vapor return lines</u> | <u>(1) pressure drop through the vapor path exceeds 0.95 water column inches at a flow rate of 60 cubic foot per hour (CFH) and 1.52 water column inches at a flow rate of 80 CFH</u> | <u>TP201.4 Methodology 1 or equivalent</u> |

* When the identified defect is detected in the listed equipment, the defect determination applies to all affected interrelated systems (which may include all systems at the motor vehicle fueling operation).

VR-209 series VST Phase II EVR System with FFS Clean Air Separator not Including ISD

| <u>equipment</u> | <u>defects</u> | <u>verification procedure</u> |
|--------------------------------|--|--|
| <u>(a) VST nozzle</u> | <u>(1) more than 30 percent (30%) of a nozzle face seal is missing (e.g., a triangular or similar shape in which greater than two and one half (2.5) inches of the face seal circumference is missing (accumulated))</u> | <u>direct measurement/ observation</u> |
| | <u>(2) more than 0.375 square inches of a nozzle vapor collection sleeve is missing (e.g., a rectangular shape of greater than nine sixteenths (9/16) inch or more on each side, a circular shape of eleven sixteenths (11/16) inch or more in diameter, or a triangular shape of seven eighths (7/8) inch on the side</u> | <u>direct measurement/ observation</u> |
| | <u>(3) total slit length in the convolution exceeds 18.0 inches</u> | <u>direct measurement/ observation</u> |
| | <u>(4) insertion interlock mechanism which will allow dispensing when the bellow is uncompressed</u> | <u>direct observation/ GDF-09</u> |
| | <u>(5) defective vapor valve</u> | <u>VR-209 Exhibit 7</u> |
| | <u>(6) vapor valve leak rate exceeds 0.07 cubic feet per minute at a pressure of two (2) water column inches</u> | <u>TP-201.2B</u> |
| <u>(b) hoses</u> | <u>(1) 175 ml or more liquid in the vapor path</u> | <u>direct measurement/ sections 6.1 to 6.5 of VR-209 Exhibit 5</u> |
| | <u>(2) any hose with a visible opening</u> | <u>direct observation</u> |
| <u>(c) clean air separator</u> | <u>(1) ball valves are not locked in the proper operating configuration as shown in Figures 2B-2 or 2B-2H *</u> | <u>direct observation</u> |
| | <u>(2) clean air separator static pressure performance failure *</u> | <u>VR-209 Exhibit 4</u> |
| <u>(d) vapor return lines</u> | <u>(1) pressure drop through the vapor path exceeds five (5.00) water column inches at a flow rate of 60 cubic foot per hour (CFH) and eight (8.00) water column inches at a flow rate of 80 CFH</u> | <u>TP201.4 Methodology 1 or equivalent</u> |

* When the identified defect is detected in the listed equipment, the defect determination applies to all affected interrelated systems (which may include all systems at the motor vehicle fueling operation).

Defect Identification Methods Used In the Verification Procedure Column

1. TP201.5: Determination (by Volume Meter) of Air to Liquid (A/L) Volume Ratio of Vapor Recovery Systems of Dispensing Facilities, Adopted April 12, 1996
2. TP201.4: Determination of Dynamic Pressure Performance of Vapor Recovery Systems of Dispensing Facilities
3. TP201.3: Determination of Two-Inch WC Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities
4. GDF-01: Bag Test for Multi-Nozzle Vacuum Assist Systems
5. Method 9: 40 Code Federal Regulations Part 60 Appendix A: Reference Method 9/EPA Section 3.12 Visible Determination of the Opacity of Emissions from Stationary Sources
6. G-70--187 Exhibit 5: Fillneck Vapor Pressure Regulation Fueling Test
7. EPO No. 26-F-1: Vapor Recovery Systems Field Compliance Testing
8. GDF-02: Bag Test for Single-Nozzle Vacuum Assist Systems
9. GDF-09: Phase II Balance System Nozzle Insertion Interlock Operation Determination
10. G-70-191 Exhibit 2: Specifications for the Healy ORVR Phase II Vapor Recovery System (4.a-4.d)
11. G-70-204 Exhibit 2: System Specifications/Vaporsaver (1.A-1.D)
12. G-70-209 Exhibit 5: Determination (by Volume Meter) of Air to Liquid Volume Ratio of Vapor Recovery Systems of Dispensing Facilities
13. VR-201 Exhibit 4: Determination of Static Pressure Performance of the Healy Clean Air Separator
14. VR-201 Exhibit 5: Vapor to Liquid Volume Ratio for Healy Phase II EVR System
15. VR-201 Exhibit 7: Nozzle Bag Test Procedure
16. VR-202 Exhibit 4: Determination of Static Pressure Performance of the Healy Clean Air Separator
17. VR-202 Exhibit 5: Vapor to Liquid Volume Ratio for Healy Phase II EVR System
18. VR-202 Exhibit 7: Nozzle Bag Test Procedure
19. VR-203 Exhibit 407: Nozzle Bag Test Procedure
20. VR-203 Exhibit 5: Liquid Removal Test Procedure
21. VR-203 Exhibit 9: Determination of VST Processor Activation Pressure
22. VR-203: Installation, Operation and Maintenance Manual (IOM) section 15
23. VR-203: Installation, Operation and Maintenance Manual (IOM) section 12
24. VR-203 Exhibit 14: Static Pressure Performance of the Healy Clean Air Separator
25. TP201.2B: Flow and Pressure Measurement of Vapor Recovery Equipment
26. VR-204 Exhibit 7: Nozzle Bag Test Procedure
27. VR-204 Exhibit 5: Liquid Removal Test Procedure

28. VR-204 Exhibit 9: VST ECS Determination of Processor Activation Pressure
29. VR-204: Installation, Operation and Maintenance Manual (IOM) section 12
30. VR-205 Exhibit 7: Nozzle Bag Test Procedure
31. VR-205 Exhibit 5: Liquid Removal Test Procedure
32. VR-205 Exhibit 6: Required Items in conducting TP201.4
33. VR-207 Exhibit 7: Nozzle Bag Test Procedure
34. VR-207 Exhibit 5: Liquid Removal Test Procedure
35. VR-207 Exhibit 8: Indicator Panel Operability Test Procedure
36. VR-208 Exhibit 7: Nozzle Bag Test Procedure
37. VR-208 Exhibit 5: Liquid Removal Test Procedure
38. VR-208 Exhibit 8: Indicator Panel Operability Test Procedure
39. VR-209 Exhibit 4: Determination of Static Pressure Performance of the Healy Clean Air Separator
40. VR-209 Exhibit 7: Nozzle Bag Test Procedure
41. VR-209 Exhibit 5: Liquid Removal Test Procedure