

mixing occurs in equipment located between product finishing equipment (i.e., before all the chemical and physical characteristics have been "set" by virtue of having passed through the last piece of equipment in the product finishing section), then such equipment are to be included in this process section. Equipment used to physically mix the finished product that are located after the last piece of equipment in the product finishing section are part of the product storage section.

Product storage section means the equipment that is designed to store the finished polymer or resin end product of the particular facility. For the purposes of these standards, the product storage section begins with the equipment used to transfer the finished product out of the product finishing section and ends with the containers used to store the final product. Any equipment used after the product finishing section to recover unreacted or by-product material are to be considered part of a material recovery section. Product storage does not include any intentional modification of the characteristics of any polymer or resin product, but does include equipment that provide a uniform mixture of product, provided such equipment are used after the last product finishing piece of equipment. This process section also does not include the shipment of a finished polymer or resin product to another facility for further finishing or fabrication.

Raw materials preparation section means the equipment located at a polymer manufacturing plant designed to prepare raw materials, such as monomers and solvents, for polymerization. For the purposes of these standards, this process section begins with the equipment used to transfer raw materials from storage and recovered material from material recovery process sections, and ends with the last piece of equipment that prepares the material for polymerization. The raw materials preparation section may include equipment that accomplishes purification, drying, or other treatment of raw materials or of raw and recovered materials together, activation of catalysts, and esterification including the formation of some short polymer

chains (oligomers), but does not include equipment that is designed primarily to accomplish the formation of oligomers, the treatment of recovered materials alone, or the storage of raw materials.

Recovery system means an individual unit or series of material recovery units, such as absorbers, condensers, and carbon adsorbers, used for recovering volatile organic compounds.

Total organic compounds (TOC) means those compounds measured according to the procedures specified in § 60.564.

Vent stream means any gas stream released to the atmosphere directly from an emission source or indirectly either through another piece of process equipment or a material recovery device that constitutes part of the normal recovery operations in a polymer process line where potential emissions are recovered for recycle or resale, and any gas stream directed to an air pollution control device. The emissions released from an air pollution control device are not considered a vent stream unless, as noted above, the control device is part of the normal material recovery operations in a polymer process line where potential emissions are recovered for recycle or resale.

Volatile organic compounds (VOC) means, for the purposes of these standards, any reactive organic compounds as defined in § 60.2 Definitions.

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§ 60.562-1 Standards: Process emissions.

(a) Polypropylene, low density polyethylene, and high density polyethylene. Each owner or operator of a polypropylene, low density polyethylene, or high density polyethylene process line containing a process section subject to the provisions of this subpart shall comply with the provisions in this section on and after the date on which the initial performance test required by § 60.8 is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated, or 180 days after initial startup whichever comes first.

(1) *Continuous emissions.* For each vent stream that emits continuous emissions from an affected facility as defined in § 60.560(a)(1), the owner or operator shall use the procedures identified in paragraphs (a)(1) (ii) and (iii) of this section for determining which continuous emissions are to be controlled and which level of control listed in paragraph (a)(1)(i) of this section is to be met. The owner or operator shall use the procedures identified in paragraphs (a)(1) (ii) and (iii) of this section each time a process section is constructed, modified, or reconstructed at the plant site.

(i) *Level of control.* Continuous emission streams determined to be subject to control pursuant to the procedures identified in paragraphs (a)(1) (ii) and (iii) of this section, as applicable, shall meet one of the control levels identified in paragraphs (a)(1)(i) (A) through (D) of this section. The procedures in paragraphs (a)(1) (ii) and (iii) of this section identify which level of control may be met. The level of control identified in paragraph (a)(1)(i)(D) of this section is limited to certain continuous emission streams, which are identified through the procedures in paragraphs (a)(1) (ii) and (iii) of this section.

(A) Reduce emissions of total organic compounds (minus methane and ethane) (TOC) by 98 weight percent, or to a concentration of 20 parts per million by volume (ppmv) on a dry basis, whichever is less stringent. The TOC is expressed as the sum of the actual compounds, not carbon equivalents. If an owner or operator elects to comply with the 20 ppmv standard, the concentration shall include a correction to 3 percent oxygen only when supplemental combustion air is used to combust the vent stream.

(B) Combust the emissions in a boiler or process heater with a design heat input capacity of 150 million Btu/hour or greater by introducing the vent stream into the flame zone of the boiler

or process heater. (Note: A boiler or process heater of lesser design heat capacity may be used, but must demonstrate compliance with paragraph (a)(1)(i)(A) of this section.)

(C) Combust the emissions in a flare that meets the conditions specified in § 60.18. If the flare is used to control both continuous and intermittent emissions, the flare shall meet the conditions specified in § 60.18 at all times (i.e., which controlling continuous emissions alone or when controlling both continuous and intermittent emissions).

(D) Vent the emissions to a control device located on the plant site.

(ii) *Uncontrolled Continuous Emissions.* For each vent stream that emits continuous emissions from an affected facility as defined in § 60.560(a)(1) and that is not controlled in an existing control device, the owner or operator shall use the procedures identified in table 3 to identify those continuous emissions from each constructed, modified, or reconstructed affected facility that are to be controlled. The owner shall include in the procedure all uncontrolled continuous vent streams from previously constructed, modified, or reconstructed affected facilities at the plant site each time a process section is constructed, modified, or reconstructed at the plant site. In applying the procedures shown in table 3, the stream characteristics may be either measured or calculated as specified in § 60.564(d). For modified or reconstructed affected facilities, these stream characteristics are to be determined after a modification or reconstruction determination has been made by the Administrator, but before any actual changes have been undertaken, and then again after the actual changes have been made. Figure 1 provides a summary overview of the control determination procedure described in table 3.

TABLE 3—PROCEDURE FOR DETERMINING CONTROL AND APPLICABLE STANDARD FOR CONTINUOUS EMISSION STREAMS FROM NEW, MODIFIED, OR RECONSTRUCTED POLYPROPYLENE AND POLYETHYLENE AFFECTED FACILITIES

Procedure ^a	Applicable TOC weight percent range	Control/no control criteria	Applicable standard
1. Sum all uncontrolled streams with TOC weight percent within the applicable weight percent range from all affected facilities at a plant site.	0.10 5.5	1. If total combined uncontrolled emissions are equal to or greater than the calculated threshold emissions (CTE) ^b , control.	1. § 60.562-1(a)(1)(i) (A), (B), or (C).
2. Calculate total uncontrolled annual emissions for each weight percent range. For modified or affected facilities, use the total uncontrolled emissions after modification or reconstruction.		2. If total combined uncontrolled emission are less than the CTE ^b , control only individual streams with volume flow rates of 8 scfm or less.	2. § 60.562-1(a)(1)(i) (A) through (D).
3. Calculate composite TOC concentration (weight percent) for streams in the 0.10 to less than 5.5 weight percent range and for streams in the 5.5 to less than 20 weight percent range. For modified or reconstructed affected facilities, calculate the composite VOC concentration before and after modification and reconstruction.	5.5 20	1. If total combined uncontrolled emissions are equal to or greater than CTE ^b , control.	1. § 60.562-1(a)(1)(i) (A), (B), or (C) 2. If total combined uncontrolled emissions are less than the CTE ^b , control only individual streams with volume flow rates of 8 scfm or less.
4. Select the higher of the two TOC concentrations for each weight percent range for vent streams from a modified or reconstructed affected facility.	20 to 100	1. If total combined uncontrolled emissions are equal to or greater than 18.2 Mg/yr, control.	1. § 60.562-1(a)(1)(i) (A), (B), or (C).
5. Calculate the threshold emissions for the 0.10 to less than 5.5 weight percent range and for the 5.5 to less than 20 weight percent range using the respective composite TOC concentration selected above.		2. If total combined uncontrolled emissions are less than 18.2 Mg/yr, control.	2. § 60.562-1(a)(1)(i) (A) through (D).

^a Individual streams excluded under § 60.560(g) from the requirements of § 60.562-1 are to be excluded from all calculations in this table. This paragraph exempts all individual emission streams with individual uncontrolled annual emission rates of less than 1.6 Mg/yr and all individual emission streams with individual TOC concentrations of less than 0.10 percent TOC by weight.

^b For the 0.10 to less than 5.5 weight percent range, the following equations are used:

If the percent composite TOC concentration is	Use this equation to calculate threshold emissions
0.10<0.12	(a×7.5×10 ⁶)+226
0.12<0.2	(b×58.3)+116.8
0.2<0.3	(c×3020)+71.8
0.3<0.4	(d×547)+54.5
0.4<0.6	48.3+31 (0.6 – weight percent TOC)
0.6<5.5	48.3

$$b = \frac{\left\{ \frac{0.18}{\text{weight percent TOC}} \right\}^{0.5} - 1}{\text{weight percent TOC}}$$

c=(0.3 – weight percent TOC) ²
d=(0.4 – weight percent TOC). ^{1 5}

For the 5.5 to less than 20 weight percent range, the following equations are used.

where: a = (0.12 – weight percent TOC). ^{2 5}

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If the percent composite TOC concentration is	Use this equation to calculate threshold emissions
5.5<7.0	(e×740)+31
7.0<9.0	(f×324)+25.0
9.0<20	(g×125)+18.2

where

$$e = \frac{\left\{ \frac{7.0}{\text{weight percent TOC}} \right\}^{0.5} - 1}{\text{weight percent TOC}}$$

$$f = \frac{\left\{ \frac{9.0}{\text{weight percent TOC}} \right\}^{0.5} - 1}{\text{weight percent TOC}}$$

$$g = \frac{\left\{ \frac{20.0}{\text{weight percent TOC}} \right\}^{0.5} - 1}{\text{weight percent TOC}}$$

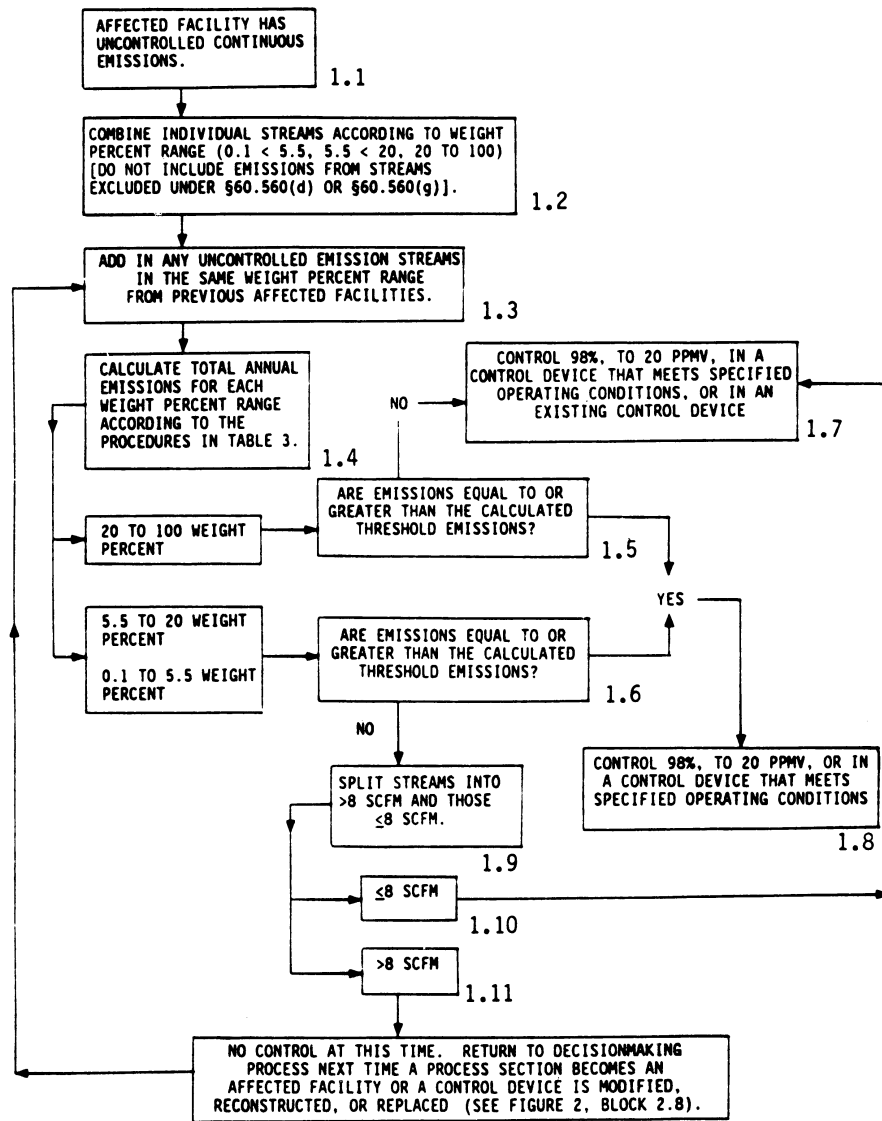


Figure 1. Decisionmaking Process for Uncontrolled Continuous Emissions from Polypropylene and Polyethylene Affected Facilities

(iii) Controlled Continuous Emissions. For each vent stream that emits continuous emissions from an affected facility as defined in §60.560(a)(1) and

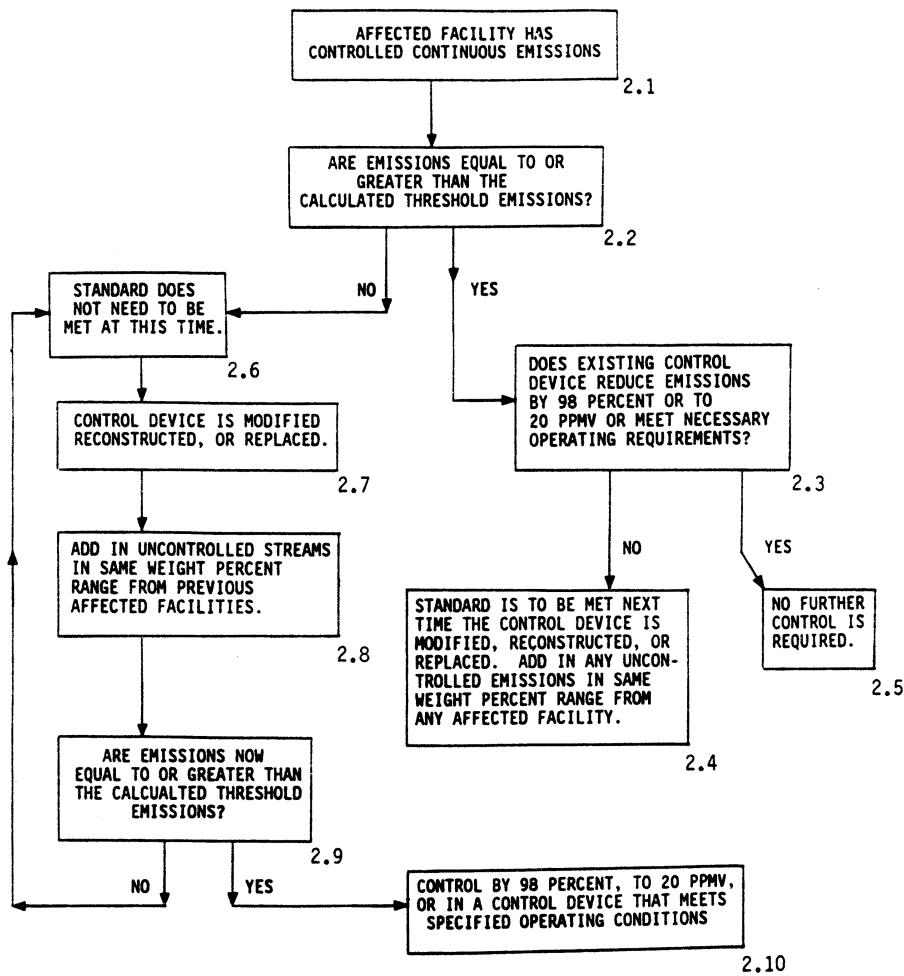
that is controlled in an existing control device, each owner or operator shall determine whether the emissions entering the control device are greater

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than or equal to the calculated threshold emissions (CTE) level, which is to be calculated using the TOC concentration of the inlet vent stream and the equations in footnote b of table 3. If the inlet stream's TOC concentration is equal to or greater than 20 weight percent, the calculated threshold emissions level is 18.2 Mg/yr (20.1 ton/yr). If multiple emission streams are vented to the control device, the individual

streams are not to be separated into individual weight percent ranges for calculation purposes as would be done for uncontrolled emission streams. Emissions vented to an existing control device are required to be controlled as described in paragraphs (a)(1)(iii) (A) and (B) of this section. Figure 2 illustrates the control determination procedure for controlled continuous emissions.



NOTE: There are no individual stream exemptions for emissions already controlled by existing control devices.

Figure 2. Decisionmaking Process for Continuous Emissions Already Controlled at Polypropylene and Polyethylene Affected Facilities

(A) If the annual emissions of the stream entering the control device are equal to or greater than the CTE levels, then compliance with one of the requirements identified in § 60.562-1(a)(1)(i) (A), (B), or (C) is required at such time the control device is reconstructed or replaced or has its oper-

ating conditions modified as a result of State or local regulations (including changes in the operating permit) including those instances where the control device is reconstructed, replaced, or modified in its operation at the same time the existing process section

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is modified or reconstructed and becomes an affected facility. If the existing control device already complies with one of the requirements identified in § 60.562-1(a)(1)(i) (A), (B), or (C), no further control is required.

(B) If the annual emissions of the stream entering the control device are less than the CTE level, then the requirements of § 60.562-1(a)(1)(i) (A), (B), or (C) are not applicable at that time. However, if the control device is replaced, reconstructed, or modified at a later date, each owner or operator shall reevaluate the applicability of these standards. This is done by combining with the vent stream entering the control device any uncontrolled vent streams in the same weight percent range as the controlled vent stream and determining whether the annual emissions of the stream entering the control device plus the applicable uncontrolled vent streams are greater than or equal to the CTE level, which is based on the weighted TOC concentration of the controlled vent stream and the uncontrolled vent streams. If the annual emissions entering the control device (including the applicable uncontrolled vent streams) are greater than or equal to the CTE level, then compliance with one of the requirements identified in § 60.562-1(a)(1)(i) (A), (B), or (C) is required at that time for both the controlled and uncontrolled vent streams. If the annual emissions are less than the CTE level, compliance with these standards is again not required at such time. However, if the control device is again replaced, reconstructed, or modified, each owner or operator shall repeat this determination procedure.

(2) *Intermittent emissions.* The owner or operator shall control each vent stream that emits intermittent emissions from an affected facility as defined in § 60.560-1(a)(1) by meeting one of the control requirements specified in paragraphs (a)(2) (i) and (ii) of this section. If a vent stream that emits intermittent emissions is controlled in an existing flare, incinerator, boiler, or process heater, the requirements of this paragraph are waived until such time the control device is reconstructed or replaced or is modified in its operating conditions as a result of

State or local regulation, including changes in the operating permit. This paragraph does not apply to emergency vent streams exempted by § 60.560(h) and as defined in § 60.561.

(i) Combust the emissions in a flare that is:

(A) Designed for and operated with no visible emissions, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours,

(B) Operated with a flame present at all times, and

(C) Designed to maintain a stable flame.

(ii) Combust the emissions in an incinerator, boiler, or process heater. Such emissions shall be introduced into the flame zone of a boiler or process heater.

(b) *Polystyrene.* Each owner or operator of a polystyrene process line containing process sections subject to the provisions of this subpart shall comply with the provisions in this section on and after the date on which the initial performance test required by § 60.8 is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated, or 180 days after initial startup, whichever comes first. Each owner or operator of a polystyrene process line using a continuous process shall:

(1) Limit the continuous TOC emissions from the material recovery section by complying with one of the following:

(i) Not allow continuous TOC emissions to be greater than 0.0036 kg TOC/Mg (0.0072 lb TOC/ton) product; or

(ii) Not allow the outlet gas stream temperature from each final condenser in the material recovery section to exceed -25°C (-13°F). For purposes of this standard, temperature excursions above this limit shall not be considered a violation when such excursions occur during periods of startup, shutdown, or malfunction; or

(iii) Comply with § 60.562-1(a)(1)(i) (A), (B), or (C).

(2) If continuous TOC emissions from the material recovery section are routed through an existing emergency vapor recovery system, then compliance with these standards is required when the emergency vapor recovery

system undergoes modification, reconstruction, or replacement. In such instances, compliance with these standards shall be achieved no later than 180 days after completion of the modification, reconstruction, or replacement.

(c) *Poly(ethylene terephthalate)*. Each owner or operator of a poly(ethylene terephthalate) process line containing process sections subject to the provisions of this subpart shall comply with the provisions in this section on and after the date on which the initial performance test required by § 60.8 is completed, but not later than 60 days after achieving the maximum production rate at which the affected facility will be operated, or 180 days after initial startup, whichever comes first.

(1) Each owner or operator of a PET process line using a dimethyl terephthalate process shall:

(i) Limit the continuous TOC emissions from the material recovery section (i.e., methanol recovery) by complying with one of the following:

(A) Not allow the continuous TOC emissions to be greater than 0.018 kg TOC/Mg (0.036 lb TOC/ton) product; or

(B) Not allow the outlet gas stream temperature from each final condenser in the material recovery section (i.e., methanol recovery) to exceed +3 °C (+37 °F). For purposes of this standard, temperature excursions above this limit shall not be considered a violation when such excursions occur during periods of startup, shutdown, or malfunction.

(ii) Limit the continuous TOC emissions and, if steam-jet ejectors are used to provide vacuum to the polymerization reactors, the ethylene glycol concentration from the polymerization reaction section by complying with the appropriate standard set forth below. The ethylene glycol concentration limits specified in paragraphs (c)(1)(ii) (B) and (C) of this section shall be determined by the procedures specified in § 60.564(j).

(A) Not allow continuous TOC emissions from the polymerization reaction section (including emissions from any equipment used to further recover the ethylene glycol, but excluding those emissions from the cooling tower) to be greater than 0.02 kg TOC/Mg (0.04 lb TOC/ton) product; and

(B) If steam-jet ejectors are used as vacuum producers and a low viscosity product is being produced using single or multiple end finishers or a high viscosity product is being produced using a single end finisher, maintain the concentration of ethylene glycol in the liquid effluent exiting the vacuum system servicing the polymerization reaction section at or below 0.35 percent by weight, averaged on a daily basis over a rolling 14-day period of operating days; or

(C) If steam-jet ejectors are used as vacuum producers and a high viscosity product is being produced using multiple end finishers, maintain an ethylene glycol concentration in the cooling tower at or below 6.0 percent by weight, averaged on a daily basis over a rolling 14-day period of operating days.

(2) Each owner or operator of a PET process line using a terephthalic acid process shall:

(i) Not allow the continuous TOC emissions from the esterification vessels in the raw materials preparation section to be greater than 0.04 kg TOC/Mg (0.08 lb TOC/ton) product.

(ii) Limit the continuous TOC emissions and, if steam-jet ejectors are used to provide vacuum to the polymerization reactors, the ethylene glycol concentration from the polymerization reaction section by complying with the appropriate standard set forth below. The ethylene glycol concentration limits specified in paragraphs (c)(2)(ii) (B) and (C) of this section shall be determined by the procedures specified in § 60.564(j).

(A) Not allow continuous TOC emissions from the polymerization reaction section (including emissions from any equipment used to further recover the ethylene glycol, but excluding those emissions from the cooling tower) to be greater than 0.02 kg TOC/Mg (0.04 lb TOC/ton) product; and

(B) If steam-jet ejectors are used as vacuum producers and a low viscosity product is being produced using single or multiple end finishers or a high viscosity product is being produced using a single end finisher, maintain the concentration of ethylene glycol in the

liquid effluent exiting the vacuum system servicing the polymerization reaction section at or below 0.35 percent by weight, averaged on a daily basis over a rolling 14-day period of operating days; or

(C) If steam-jet ejectors are used as vacuum producers and a high viscosity product is being produced using multiple end finishers, maintain an ethylene glycol concentration in the cooling tower at or below 6.0 percent by weight, averaged on a daily basis over a rolling 14-day period of operating days.

(d) Closed vent systems and control devices used to comply with this subpart shall be operated at all times when emissions may be vented to them.

(e) Vent systems that contain valves that could divert a vent stream from a control device shall have car-sealed opened all valves in the vent system from the emission source to the control device and car-sealed closed all valves in vent system that would lead the vent stream to the atmosphere, either directly or indirectly, bypassing the control device.

[55 FR 51035, Dec. 11, 1990; 56 FR 9178, Mar. 5, 1991, as amended at 56 FR 12299, Mar. 22, 1991; 65 FR 61767, Oct. 17, 2000]

§ 60.562-2 Standards: Equipment leaks of VOC.

(a) Each owner or operator of an affected facility subject to the provisions of this subpart shall comply with the requirements specified in § 60.482-1 through § 60.482-10 as soon as practicable, but no later than 180 days after initial startup, except that indications of liquids dripping from bleed ports in existing pumps in light liquid service are not considered to be a leak as defined in § 60.482-2(b)(2). For purposes of this standard, a "bleed port" is a technologically-required feature of the pump whereby polymer fluid used to provide lubrication and/or cooling of the pump shaft exits the pump, thereby resulting in a visible leak of fluid. This exemption expires when the existing pump is replaced or reconstructed.

(b) An owner or operator may elect to comply with the requirements specified in § 60.483-1 and § 60.483-2.

(c) An owner or operator may apply to the Administrator for a determination of equivalency for any means of emission limitation that achieves a reduction in emissions of VOC at least equivalent to the reduction in emissions of VOC achieved by the controls required in this subpart. In doing so, the owner or operator shall comply with requirements specified in § 60.484.

(d) Each owner or operator subject to the provisions of this subpart shall comply with the provisions specified in § 60.485 except an owner or operator may use the following provision in addition to § 60.485(e): Equipment is in light liquid service if the percent evaporated is greater than 10 percent at 150 °C (302 °F) as determined by ASTM Method D86-78, 82, 90, 95, or 96 (incorporated by reference as specified in § 60.17).

(e) Each owner or operator subject to the provisions of this subpart shall comply with § 60.486 and § 60.487.

[55 FR 51035, Dec. 11, 1990; 56 FR 12299, Mar. 22, 1991, as amended at 65 FR 61767, Oct. 17, 2000]

§ 60.563 Monitoring requirements.

(a) Whenever a particular item of monitoring equipment is specified in this section to be installed, the owner or operator shall install, calibrate, maintain, and operate according to manufacturer's specifications that item as follows:

(1) A temperature monitoring device to measure and record continuously the operating temperature to within 1 percent (relative to degrees Celsius) or ± 0.5 °C (± 0.9 °F), whichever is greater.

(2) A flame monitoring device, such as a thermocouple, an ultraviolet sensor, an infrared beam sensor, or similar device to indicate and record continuously whether a flare or pilot light flame is present, as specified.

(3) A flow monitoring indicator to indicate and record whether or not flow exists at least once every fifteen minutes.

(4) An organic monitoring device (based on a detection principle such as infrared, photoionization, or thermal conductivity) to indicate and record continuously the concentration level of organic compounds.