

NOTE

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Section 22a-174-3d. Permit-by-Rule for Combined Heat-and-Power Systems.

(a) **Definitions.** For the purposes of this section, the following definitions apply:

(1) “Actual electrical output” means the gross electrical output measured at the terminals of the generator in units of MWh or kWh;

(2) “Actual heat input” means the gross caloric value of all fuels combusted by the CHP system in MMBtu;

(3) “Actual system efficiency” means, for a CHP system, the sum of the actual thermal output and actual electrical output as MMBtu divided by the actual heat input based on the higher heating value, and measured as a percent;

(4) “Actual thermal output” means the total energy output of thermal energy of the CHP system in MMBtu;

(5) “Annual capacity factor” means the ratio between the actual heat input to a CHP system from an individual fuel or combination of fuels during a period of 12 consecutive calendar months and the potential heat input to the CHP system from all fuels had the unit been operated at 8,760 hours/year at the maximum design heat input capacity;

(6) “Combined heat-and-power system” or “CHP system” means a generation unit that simultaneously produces both electric power and thermal energy from a single source and that has a design system efficiency equal to or greater than 55%;

(7) “Design system efficiency” means, for a CHP system, the sum of the full load design actual thermal output and electric output divided by the heat input;

(8) “Federal hazardous air pollutant” means, notwithstanding the definition of “hazardous air pollutant” in section 22a-174-1 of the Regulations of Connecticut State Agencies, any air pollutant listed in section 112(b) of the Act, excluding those substances approved by the Administrator for exclusion;

(9) “ISO conditions” means the International Organization for Standardization conditions used by the gas turbine industry, which are 59°F, 14.7 pounds per square inch absolute and 60% relative humidity;

(10) “Maximum design heat input capacity” means the ability of a CHP system’s generation unit to combust a stated maximum amount of fuel, or combination of fuels, on a steady-state basis as determined by the physical design and characteristics of the generation unit;

(11) “Nameplate capacity” means, starting from the initial installation of a generator, the maximum electrical generating output (in MW) that the generator is capable of producing on a steady-state basis and during continuous operation, when not restricted by seasonal or other derates, as specified by the manufacturer of the generator. If the owner makes any subsequent physical change in the generator resulting in an increase in the maximum electrical generating output (in MW) that the generator is capable of producing on a steady-state basis and during continuous

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operation, when not restricted by seasonal or other derates, such increased maximum amount as specified by the person conducting the physical change shall be considered the “nameplate capacity;”

- (12) “Nearby” means, for a building, situated at a distance from the source less than or equal to five times the lesser of the building height or maximum projected building width;
- (13) “Shutdown” means the cessation of operation of a CHP system for any purpose;
- (14) “Startup” means the setting in operation of a CHP system for any purpose;
- (15) “Tune-up” means to perform maintenance and adjust equipment to a proper or required operating condition in accordance with the manufacturer’s written recommendations; and
- (16) “12-month rolling aggregate” means the sum of a variable over the most recent 12 calendar months, computed monthly.

(b) Applicability.

(1) An owner or operator may construct and operate a CHP system without obtaining an individual permit pursuant to section 22a-174-3a of the Regulations of Connecticut State Agencies if:

- (A) The CHP system has potential emissions of fifteen (15) tons or more per year of any individual air pollutant;
- (B) The CHP system is not a new major stationary source or major modification of an existing source;
- (C) The CHP system is not a newly constructed or reconstructed major source of federal hazardous air pollutants subject to the requirements of section 22a-174-3a(m) of the Regulations of Connecticut State Agencies; and
- (D) The owner or operator complies with all applicable provisions of this section.

(2) An owner or operator may modify a CHP system without obtaining an individual permit pursuant to section 22a-174-3a of the Regulations of Connecticut State Agencies if:

- (A) Prior to the modification, the CHP system is not authorized to operate pursuant to an individual permit issued pursuant to section 22a-174-3a or former section 22a-174-3 of the Regulations of Connecticut State Agencies;
- (B) The modification is not a major modification or a reconstruction; and
- (C) The owner or operator complies with all applicable provisions of this section.

(3) An owner or operator may only operate a CHP system pursuant to this section if construction of the CHP system commences on or after the effective date of this section.

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(c) Emissions limits and other requirements.

- (1) The nameplate capacity for any CHP system shall be less than 10 MW.
- (2) The aggregate of the nameplate capacity for the CHP system and the nameplate capacity for all other fossil fuel-fired electricity generating units, excluding emergency generators, located at the same premises shall, at the time of construction, be less than 10 MW.
- (3) Except during periods of startup, shutdown, malfunction, and, as allowed by the Commissioner during performance testing, the actual system efficiency of any CHP system operated pursuant to this section shall be no less than 55% per each consecutive 12-month period.
- (4) The owner or operator of a CHP system shall use only the following fuels in the specified generation unit:
 - (A) Natural gas shall be the primary fuel combusted by a combustion turbine and the only fuel combusted by an internal combustion engine; and
 - (B) Distillate fuel oil may be combusted as an auxiliary fuel by a combustion turbine, as follows:
 - (i) Distillate fuel oil combusted shall contain less than or equal to 0.0015% sulfur, by weight, and
 - (ii) The annual capacity factor for all distillate fuel oil combusted in a combustion turbine shall not exceed 10% on a heat input basis.
- (5) The height of any stack associated with the CHP system shall be no less than the greater of:
 - (A) 10 meters; or
 - (B) The lesser of:
 - (i) The maximum nearby building projected width, or
 - (ii) The maximum nearby building height multiplied by a factor of 1.3.
- (6) If a combustion turbine is used as the generation unit of a CHP system, emissions shall not exceed the emission limits set forth in Table 3d-1 of this section, except during periods of startup, shutdown or malfunction.
- (7) If an internal combustion engine is used as the generation unit of a CHP system, emissions shall not exceed the emission limits set forth in Table 3d-2 of this section, except during periods of startup, shutdown or malfunction.
- (8) The emission limits for NO_x, CO and ammonia set forth in Table 3d-1 of this section are corrected to ISO conditions at 15% oxygen.

Table 3d-1. CHP system combustion turbine emissions limits.

| Pollutant | Emission limit while firing natural gas | Emission limit while firing distillate fuel | Averaging time, except as specified for a performance test approved by the Department |
|------------------|--|--|--|
| NOx | 2.5 ppmvd @ 15% oxygen | 9.6 ppmvd @ 15% oxygen | 1-hour block |
| CO | 10 ppmvd @ 15% oxygen | 10 ppmvd @ 15% oxygen | 3-hour block |
| PM10/2.5 | 2 lbs/hr | 3 lbs/hr | 1-hour block |
| Ammonia | 5.0 ppmvd @ 15% oxygen | 5.0 ppmvd @ 15% oxygen | 1-hour block |

Table 3d-2. CHP system internal combustion engine emissions limits while firing natural gas.

| Pollutant | Emission limit lbs/MMBtu | Averaging time, except as specified for a performance test approved by the Department |
|------------------|---------------------------------|--|
| NOx | 0.08 | 1-hour block |
| CO | 0.17 | 3-hour block |
| PM10/2.5 | 0.02 | 1-hour block |

(9) An owner or operator shall operate a CHP system in compliance with the applicable emissions limits set forth in Table 3d-1 or Table 3d-2 of this section.

(10) An owner or operator shall determine compliance with the applicable emissions limits set forth in Table 3d-1 or Table 3d-2 of this section through performance testing or continuous monitoring as specified in subsections (e) and (f) of this section.

(11) Annual emissions limitations. An owner or operator of a CHP system:

- (A) With a combustion turbine shall not allow the emissions of NOx, CO, PM10, PM2.5 or ammonia to exceed 15 tons per pollutant in any 12-month rolling aggregate;
- (B) With an internal combustion engine shall not allow the emissions of NOx, CO, PM10 or PM2.5 to exceed 15 tons per pollutant in any 12-month rolling aggregate; and
- (C) Shall not allow the aggregate emissions of federal hazardous air pollutants to exceed 3 tons in any 12-month rolling aggregate.

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(d) Operating practices.

- (1) The owner or operator of a CHP system shall perform a tune-up of the combustion unit and all air pollution control equipment at least once per calendar year and in accordance with the manufacturer's written specifications.
- (2) The owner or operator of a CHP system shall operate air pollution control equipment at all times that the system is in operation and maintain such control equipment according to the manufacturer's written recommendations.
- (3) In the event of a malfunction of air pollution control equipment that cannot be corrected within three hours of the discovery of the malfunction, the owner or operator shall immediately shutdown the CHP system.
- (4) To minimize emissions during periods of startup and shutdown, the owner or operator shall:
 - (A) If ammonia injection is used, commence ammonia injection as soon as the minimum catalyst temperature is reached;
 - (B) If using an oxidation catalyst system, not bypass the oxidation catalyst except during such time as bypass may be recommended in the manufacturer's written recommendations for operation;
 - (C) Limit the duration of startup to 60 minutes or less, unless a longer time period is specified in the manufacturer's written recommendations; and
 - (D) Limit the duration of shutdown to 30 minutes or less, unless a longer time period is specified in the manufacturer's written recommendations.

(e) Performance testing.

- (1) The owner or operator of a CHP system shall conduct an initial performance test to determine compliance with the applicable emissions limits of this section. A performance test conducted in accordance with the applicable provisions of 40 CFR 60, 61 or 63 for the pollutants listed in Tables 3d-1 and 3d-2 of this section shall satisfy the initial performance test requirements on a per pollutant basis, provided the testing is performed in accordance with subdivision (3) of this subsection. The initial performance test shall be conducted no later than the earlier of the dates determined by subparagraph (A) or (B) of this subdivision, as follows:
 - (A) 60 days after achieving the maximum production rate; or
 - (B) 180 days after initial startup.

- (2) Following the initial performance test, the owner or operator of the CHP system shall conduct subsequent performance testing at least once every 60 months for each pollutant to which an emission limit applies, except that the owner or operator of a CHP system shall not be required to conduct performance tests subsequent to the initial performance test for any pollutant that the owner or operator monitors using continuous emissions monitoring. A performance test conducted in accordance with the applicable provisions of 40 CFR 60, 61 or 63 for the pollutants listed in Tables

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3d-1 and 3d-2 shall satisfy the subsequent performance test requirements on a per pollutant basis, provided the testing is performed in accordance with subdivision (3) of this subsection.

(3) Unless otherwise specified in this subsection, all performance testing shall be conducted in accordance with the Department's Source Emissions Monitoring Test Guidelines, section 22a-174-5 of the Regulations of Connecticut State Agencies and the following:

- (A) Ammonia testing shall be conducted in accordance with EPA Conditional Test Method (CTM) 027 or an equivalent method approved by the Commissioner and the Administrator;
- (B) PM₁₀/2.5 testing shall be conducted in accordance with 40 CFR 60, Appendix A, Reference Method 201A or an equivalent method approved by the Commissioner and the Administrator; and
- (C) Any test conducted under this section shall be completed within 24 hours of initiation unless completion in such time would endanger public health or safety.

(f) Monitoring.

(1) An owner or operator of a CHP system shall demonstrate compliance for each pollutant to which an emission limit applies in Table 3d-1 or 3d-2, as follows:

- (A) By performing an initial performance test as required by subsection (e) of this section;
- (B) Through performance testing conducted at least once every 60 months subsequent to the initial performance test, as required by subsection (e) of this section, or through continuous emissions monitoring. If continuous emissions monitoring is used to determine compliance with an emissions limitation of this section, the owner or operator of a CHP system shall meet the requirements of section 22a-174-4 of the Regulations of Connecticut State Agencies; and
- (C) Through continuous parameter monitoring, by which the owner or operator shall monitor appropriate parameters to verify the proper operation of the emission controls. The range for such parameters shall be determined during the initial performance test required pursuant to subsection (e)(1) of this section.

(2) The owner or operator of a CHP system shall monitor the actual system efficiency on an hourly basis.

(3) An owner or operator shall prepare a written monitoring plan to address monitoring of emissions, CHP system operating parameters and air pollution control equipment operating parameters. The plan shall be prepared no later than 60 days following the completion of the initial performance test required by this section. The monitoring plan shall include, at a minimum, the following information as may be applicable to the CHP system and chosen methods of determining compliance with the requirements of this section:

- (A) A description of how all pollutants and parameters will be monitored to demonstrate compliance with the emissions limits set forth in Tables 3d-1 and 3d-2, as applicable, of this section;
 - (B) Definitions of startup, shutdown and malfunction;
 - (C) A description of the method and a sample calculation by which emissions during startup, shutdown and malfunction will be determined;
 - (D) An identification of all the parameters to be monitored, including the following:
 - (i) For CHP systems that use selective catalytic or non-catalytic reduction to meet the NO_x limits of this section, monitored parameters shall include but not be limited to the hourly ammonia injection rate, oxygen content of the exhaust, exhaust temperature, fuel firing rate and pressure drop across the catalyst,
 - (ii) For turbine CHP systems that use low-NO_x burner technology, monitored parameters shall include, but not be limited to, the operating characteristics specified by the burner manufacturer to indicate the unit is operating in low-NO_x mode, and
 - (iii) For CHP systems that use an oxidation catalyst to meet the CO limits of this section, monitored parameters shall include, but not be limited to, the exhaust gas temperature and the pressure drop across the catalyst;
 - (E) A specification of the ranges or designated conditions of the parameters, and a description of the process by which such ranges or designated conditions have been established during the initial performance test;
 - (F) An explanation of the process used to ensure that the data obtained is representative of the emissions or parameters being monitored using such considerations as detector location or the installation specification;
 - (G) A description of the quality assurance and control practices to ensure the continuing validity of the data; and
 - (H) A description of the frequency of monitoring and the data collection procedures that the owner or operator will use.
- (4) A monitoring plan established to satisfy requirements of 40 CFR 60, 61 or 63 applicable to the CHP system may be used to satisfy the monitoring plan requirements of this section, provided the plan is supplemented to address all the requirements of this section.
- (5) The owner or operator shall maintain the monitoring plan at the facility where the CHP system is located and make the plan available to the Commissioner upon request. The owner or operator shall review the monitoring plan on an annual basis and update the plan as needed.

(g) Record keeping.

(1) The owner or operator of a CHP system shall maintain records of the information specified in this subsection. All records made to determine compliance with the requirements of this section shall be:

- (A) Made available to the Commissioner to inspect and copy upon request; and
- (B) Maintained for five (5) years from the date such record is created, unless another time is specified.

(2) The owner or operator of a CHP system shall record:

- (A) The fuel type and quantity used, in gallons or cubic feet, for each month and each 12-month rolling aggregate;
- (B) The hours of operation for each fuel fired for each month and each 12-month rolling aggregate;
- (C) Data from all continuous monitoring conducted pursuant to this section;
- (D) The test reports and supporting calculations documenting the results of the initial and all subsequent performance tests conducted to determine compliance with the emission limits specified in this section;
- (E) The monthly and 12-month rolling aggregate emissions of PM10, PM2.5, NO_x, CO, aggregate federal hazardous air pollutants and ammonia, as applicable, in units of tons and including emissions during startups, shutdowns and malfunctions. Such records shall include a sample calculation for each pollutant. The owner or operator shall record each month's emissions data within 30 days of the end of the month for which the data is recorded;
- (F) If distillate fuel is used, the sulfur content for each fuel shipment received;
- (G) The air pollution control equipment design specifications including:
 - (i) Type(s) of control equipment,
 - (ii) Make and model number,
 - (iii) Pollutants controlled, and
 - (iv) Catalyst type and configuration, if applicable;
- (H) Inspections and tune-ups of the CHP system or air pollution control equipment including:
 - (i) The date performed,

- (ii) The name of person performing tune-up and/or inspection,
 - (iii) The procedures followed, and
 - (iv) The results and any corrective actions taken;
- (I) The occurrence and duration of any startup, shutdown, or malfunction in the operation of the CHP system and any malfunction of the air pollution control equipment including:
- (i) The type of event (startup, shutdown or malfunction),
 - (ii) The equipment affected,
 - (iii) The date of event,
 - (iv) The duration of event in minutes,
 - (v) The fuel used during event,
 - (vi) The corrective actions take to address malfunction, and
 - (vii) The total NO_x and CO emissions emitted (lbs) during the event using either uncontrolled emission rates or manufacturer supplied data;
- (J) The actual CHP system efficiency for each month and each 12-month rolling period. Such records shall include a sample calculation. The owner or operator shall record each month's actual system efficiency and each 12-month rolling actual system efficiency within 30 days of the end of each month;
- (K) The nameplate capacity for the CHP system and every other electric generating unit at the premises, individually and in aggregate;
- (L) The annual capacity factor for all distillate fuel oil combusted, if the CHP system uses a turbine; and
- (M) A plot plan of the facility and CHP system with information sufficient to demonstrate compliance with the stack height requirements of subsection (c)(5) of this section. Such a plot plan shall be maintained for the operating life of the CHP system.

(h) Reporting.

- (1) Any person intending to operate a CHP system pursuant to this section shall submit a notification to the Commissioner on a form designated by the Commissioner no later than 30 days after beginning actual construction.

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(2) No later than 60 days after the completion of a performance test conducted pursuant to this section, the owner or operator shall submit to the Commissioner a complete performance test report detailing the operating parameters and emissions results of that performance test.

(3) The owner or operator of a CHP system operating pursuant to this section shall, upon request by the Commissioner, submit information regarding air pollutant emissions from the CHP system and any other stationary sources located on the premises.

(4) The owner or operator of a CHP system operating pursuant to this section shall submit a notification to the Commissioner within 15 days of any violation of a requirement in this section.

(5) The owner or operator shall notify the Commissioner within 30 days after removing or rendering non-operational a CHP system for which a notification of operation was submitted pursuant to subsection (h)(1) of this section.

(6) Any report required to be submitted to the Commissioner by this section shall include a certification signed in accordance with section 22a-174-2a(a)(4) of the Regulations of Connecticut State Agencies.

(7) Any document required to be submitted to the Commissioner pursuant to this section shall, unless otherwise specified in writing by the Commissioner, be directed to: Supervisor; Compliance Assurance and Coordination Unit; Bureau of Air Management; Department of Energy and Environmental Protection; 79 Elm Street, 5th Floor; Hartford, Connecticut 06106-5127.

(i) Application for an individual permit.

(1) Nothing in this section shall preclude the Commissioner from requiring an owner or operator of a CHP system to obtain an individual permit pursuant to section 22a-174-3a of the Regulations of Connecticut State Agencies.

(2) Nothing in this section shall preclude an owner or operator of a CHP system from applying for an individual permit pursuant to section 22a-174-3a of the Regulations of Connecticut State Agencies, if applicable.

Statement of Purpose

(1) The purpose of the regulation, including the problems, issues or circumstances that the regulation proposes to address:

Since 2002, the Department has used a permit-by-rule, in lieu of the requirement to obtain an individual permit, for categories of sources for which the Department may develop standardized permit conditions that limit actual pollutant emissions to levels protective of public health and air quality. The use of permits-by-rule has reduced workload, reduced permitting timeframes and provided a fair and consistent basis for source operations.

Based on our experience with recently issued individual permits for combined heat-and-power (CHP) systems, the Department has determined that CHP systems of less than 10 MW of capacity are suitable for a permit-by-rule. The adoption of this permit-by-rule will reduce the time for the owner of a new CHP system to obtain a permit from about seven months to zero days.

(2) A summary of the main provisions of the regulation:

The rule includes all the restrictions necessary to limit emissions of air pollutants from a regulated CHP system to a level that protects air quality and public health. The regulation includes limitations for nitrogen oxides, particulate emissions and carbon monoxide; restrictions on hazardous air emissions; monitoring requirements sufficient to measure compliance with the emissions limitations; and record keeping and reporting requirements sufficient to ensure that compliance with the limits may be evaluated and enforced. Large CHP installations or CHP systems added to facilities that are major sources may not operate under this regulation. CHP systems that trigger environmental justice review may not operate under this regulation.

(3) The legal effects of the regulation, including all the ways that the regulation would change existing regulations or other law:

Absent this permit-by-rule, the owner of a new CHP system would need to apply for and obtain an individual permit prior to beginning construction. Issuance of an individual permit typically takes about seven months, creates regulatory uncertainty and places an administrative and financial burden on the CHP system owner.

The permit-by-rule allows the owner of a qualifying CHP system to satisfy the need to obtain an individual permit by operating in accordance with the permit-by-rule. The time to obtain a permit is reduced to zero and the result is certain, thereby saving time and money and increasing certainty for Connecticut businesses.

As operation under the permit-by-rule is voluntary, an owner of a CHP system eligible for this permit-by-rule may opt to apply for an individual permit.