401 KAR 61:015. Existing indirect heat exchangers.

RELATES TO: KRS Chapter 224, 40 C.F.R. Part 60, Subpart D, Da, Db, Dc, Part 63, Subparts DDDDD, UUUUU, JJJJJJ

STATUTORY AUTHORITY: KRS 224.10-100

NECESSITY, FUNCTION, AND CONFORMITY: KRS 224.10-100(5) requires the cabinet to promulgate administrative regulations for the prevention, abatement, and control of air pollution. This administrative regulation establishes requirements for the control of emissions from existing indirect heat exchangers.

Section 1. Definitions. As used in this administrative regulation, all terms not defined in this section shall have the meaning given them in 401 KAR 50:010 and 401 KAR 50:025.

(1) "Affected facility" means an indirect heat exchanger having a heat input capacity of more than one (1) MMBTU/hr.

(2) "Classification date" means:

(a) August 17, 1971, for affected facilities with a capacity of more than 250 MMBTU/hr heat input; or

(b) April 9, 1972, for affected facilities with a capacity of 250 MMBTU/hr heat input or less.

(3) "Fuel" means any material combusted for the purpose of creating useful heat.

(4) "GCV" means gross calorific value.

(5) "Indirect heat exchanger" means a piece of equipment, apparatus, or contrivance used for the combustion of fuel in which the energy produced is transferred to its point of usage through a medium that does not come in contact with or add to the products of combustion.

(6) "Shutdown period" means:

(a) For a source subject to 40 C.F.R. Part 63, Subpart DDDDD, UUUUU, or JJJJJJ, the period defined as "shutdown" in:

1. 40 C.F.R. 63.7575;

2. 40 C.F.R. 63.10042; or

3. 40 C.F.R. 63.11237; or

(b) For a source not subject to 40 C.F.R. Part 63, Subpart DDDDD, UUUUU, or JJJJJJ, the period:

1. Beginning when whichever occurs first:

a. The affected facility no longer supplies useful thermal energy for heating, cooling, process purposes, or generation of electricity; or

b. Fuel is not being combusted in the affected facility; and

2. Ending when:

a. The affected facility no longer supplies useful thermal energy for heating, cooling, process purposes, or generation of electricity; and

b. Fuel is not being combusted in the affected facility.

(7) "Startup period" means:

(a) For a source subject to 40 C.F.R. Part 63, Subpart DDDDD, UUUUU, or JJJJJJ, the period defined as "startup" in:

1. 40 C.F.R. 63.7575;

2. 40 C.F.R. 63.10042; or

3. 40 C.F.R. 63.11237; or

(b) For a source not subject to 40 C.F.R. Part 63, Subpart DDDDD, UUUUU, or JJJJJJ, the period:

1. Beginning with either:

a. The combustion of any fuel in an affected facility for the purpose of supplying useful

thermal energy for heating, cooling, process purposes, or generation of electricity; or

b. The combustion of fuel in an affected facility for any purpose after a shutdown event; and

2. Ending after the longest manufacturer-recommended time required to engage all control devices utilized by the affected facility applicable to the pollutant, not to exceed (4) four hours after any of the useful thermal energy from the affected facility is supplied for any purpose.

(8) "Useful thermal energy" means energy that meets the minimum operating temperature, flow, or pressure required by any energy use system that uses energy provided by the affected facility.

Section 2. Applicability. The provisions of this administrative regulation shall apply to each affected facility commenced before the applicable classification date.

Section 3. Method for Determining Allowable Emission Rates. (1) Except as established in subsection (3) of this section, the total rated heat input capacity of all affected facilities at a source, commenced before the applicable classification date within a source, shall be used as established in Sections 4 and 5 of this administrative regulation to determine the allowable emission rate in terms of lb/MMBTU heat input.

(2) The permitted allowable emission rate of an affected facility shall not be changed due to inclusion or shutdown of another affected facility at the source.

(3) A source may submit a request to the cabinet for approval of an allowable emission rate apportioned independent from individual heat input pursuant to this subsection.

(a) The following equation shall be used to determine the allowable emissions rate:

$$F = (AB + DE)/C$$

Where:

1. A = the allowable emission rate (in lb/MMBTU/hr heat input), as determined according to 401 KAR 59:015, Section 3(1);

2. B = the total rated heat input (in MMBTU/hr) of all affected facilities commenced on or after the applicable classification date within a source, including those for which an application to construct, modify, or reconstruct has been submitted to the cabinet;

3. C = the total rated heat input (in MMBTU/hr) of all affected facilities within a source, including those for which an application to construct, modify, or reconstruct has been submitted to the cabinet;

4. D = the total emission rate (in lb/MMBTU input) as determined according to subsection (1) of this section;

5. E = the total rated heat input (in MMBTU/hr) of all affected facilities commenced before the applicable classification date; and

6. F = the alternate allowable emission rate (in lb/MMBTU input).

(b) In determining an alternative allowable emission rate for sulfur dioxide, the formula established in paragraph (a) of this subsection shall utilize values for allowable emissions rates for affected facilities stated in terms of total rated heat input capacity based on the use of the same fuel category (solid, liquid, or gaseous fuel), which shall be determined by utilizing the formulas established in Section 5 of this administrative regulation.

(c) The total emissions in lb/hr from all affected facilities at the source subject to this administrative regulation divided by the total actual heat input expressed in MMBTU/hr of the affected facilities shall not exceed the alternate allowable emission rate as determined in paragraph (a) of this subsection.

(d) At no time shall the owner or operator of any source subject to federal new source performance standards allow the emissions from any affected facility commenced on or after the

applicable classification date to exceed the allowable emission rate determined by use of that affected facility's rated heat input (instead of the heat input as determined by subsection (1) of this section) as established in 401 KAR 59:015, Sections 4 and 5.

(e)1. The source shall demonstrate compliance with this subsection by conducting a performance test pursuant to 401 KAR 50:45 for each affected facility subject to this administrative regulation.

2. The source shall demonstrate that compliance with this subsection shall be maintained on a continuous basis.

Section 4. Standard for Particulate Matter. (1) Except as established in Sections 3(3) and 9 of this administrative regulation, an affected facility subject to this administrative regulation shall not cause emissions of particulate matter in excess of:

(a) That established in Appendix A of this administrative regulation;

(b) Greater than twenty (20) percent opacity in regions classified as Priority I, pursuant to Appendix A of this administrative regulation, with respect to particulate matter, except that, for:

1. Cyclone or pulverized fired indirect heat exchangers, a maximum of forty (40) percent opacity shall be permissible for not more than one (1) six (6) minute period in any sixty (60) consecutive minutes;

2. Stoker fired indirect heat exchangers, a maximum of forty (40) percent opacity shall be permissible for not more than six (6) consecutive minutes in any sixty (60) consecutive minutes during cleaning the fire box or blowing soot and, for indirect heat exchangers with stationary grates, a maximum of forty (40) percent opacity shall be permissible during cleaning of the grates for not more than three (3) consecutive minutes in any sixty (60) consecutive minutes for each section of grates that are cleaned; and

3. Emissions from an indirect heat exchanger during building a new fire for the period required to bring the boiler up to operating conditions if the method used is that recommended by the manufacturer and the time does not exceed the manufacturer's recommendations;

(c) Greater than forty (40) percent opacity in regions classified as Priority II or III with respect to particulate matter except that, for:

1. Cyclone or pulverized fired indirect heat exchangers, a maximum of sixty (60) percent opacity shall be permissible for not more than one (1) six (6) minute period in any sixty (60) consecutive minutes;

2. Stoker fired indirect heat exchangers, a maximum of sixty (60) percent opacity shall be permissible for not more than six (6) consecutive minutes in any sixty (60) consecutive minutes during cleaning the fire box or blowing soot and, for indirect heat exchangers with stationary grates, a maximum of sixty (60) percent opacity shall be permissible during cleaning of the grates for not more than three (3) consecutive minutes in any sixty (60) consecutive minutes for each section of grates that are cleaned; and

3. Emissions from an indirect heat exchanger during building a new fire for the period required to bring the boiler up to operating conditions if the method used is that recommended by the manufacturer and the time does not exceed the manufacturer's recommendations.

(2) The emission limitations established in subsection (1) of this section shall not apply to any affected facility (with more than 250 MMBTU/hr heat input capacity, which was in being or under construction before August 17, 1971, or any affected facility with 250 MMBTU/hr capacity or less, which was in being or under construction prior to April 9, 1972) if that affected facility was in compliance prior to April 9, 1972, with, or has a valid permit to operate within the provisions of the previous Kentucky Air Pollution Control Commission Regulation No. 7 Prevention and Control of Emissions of Particulate Matter from Combustion of Fuel in Indirect Heat Exchangers. These affected facilities shall comply with the emission limitations in that administra-

tive regulation except that replacement of the particulate emissions control device associated with the affected facility shall subject it to the standard established in this section.

Section 5. Standard for Sulfur Dioxide. (1) Except as established in Sections 3(3) and 9 of this administrative regulation and subsection (5) of this section, an affected facility subject to this administrative regulation shall not cause emissions of gases that contain sulfur dioxide in excess of that established in Appendix B of this administrative regulation.

(2) If different fuels are burned simultaneously in any combination, the applicable standard shall be determined by proration using the following formula:

Allowable Sulfur Dioxide Emission,

$$\frac{lb}{MMBTU} = \frac{[x(a) + y(b) + z(c)]}{x + y + z}$$

Where:

(a) x is the percent of total heat input derived from liquid fuel;

(b) y is the percent of total heat input derived from gaseous fuel;

(c) z is the percent of total heat input derived from solid fuel;

(d) a is the allowable sulfur dioxide emission in lb/MMBTU heat input derived from liquid fuel;

(e) b is the allowable sulfur dioxide emissions in lb/MMBTU heat input derived from gaseous fuel; and

(f) c is the allowable sulfur dioxide emissions in lb/MMBTU heat input derived from solid fuel.

(3) Compliance shall be based on the total heat input from all fuels burned, including gaseous fuels.

(4) In counties classified as VA with respect to sulfur dioxide, for a source having a total heat input greater than 1,500 MMBTU/hr as determined by Section 3(1) of this administrative regulation, an owner or operator shall not allow the annual average sulfur dioxide emission rate from all existing and new affected facilities combined at the source to exceed six-tenths (0.60) pounds per million BTU.

(5) In counties classified as IA with respect to sulfur dioxide, at a source having a total rated heat input greater than 1,500 MMBTU/hr as determined by Section 3(1) of this administrative regulation, the cabinet shall allow one (1) affected facility, as stated on the operating permit, to emit sulfur dioxide at a rate not to exceed a twenty-four (24) hour average of eight and zero-tenths (8.0) lb/MMBTU, during those periods of time when the affected facility is being operated for the purpose of generating high sulfur dioxide content flue gases for use in any experimental sulfur dioxide removal system.

Section 6. Monitoring of Operations. (1) The sulfur content of solid fuels, as burned, shall be determined in accordance with the methods specified by the cabinet.

(2) The sulfur content of liquid fuels, as burned, shall be determined in accordance with the methods specified by the cabinet.

(3)(a) The rate of fuel burned for each fuel shall be measured daily or at shorter intervals and recorded.

(b) The heating value and ash content of fuels shall be ascertained at least once per week and recorded.

(c) If the indirect heat exchanger is used to generate electricity, the average electrical output and the minimum and maximum hourly generation rate shall be measured and recorded daily.

(4) The owner or operator of an indirect heat exchanger of more than 250 MMBTU/hr heat input subject to the provisions of this administrative regulation shall maintain a file of all measurements required by this administrative regulation and summarized monthly. The record of all measurements and summary shall be retained for at least two (2) years following the date of

measurements and summaries.

(5) The cabinet may require for an indirect heat exchanger of less than 250 MMBTU/hr heat input, any or all the fuel monitoring required by this section.

(6) For an indirect heat exchanger that does not use a flue gas desulfurization device, a continuous monitoring system as established in 401 KAR 61:005 for measuring sulfur dioxide emissions shall not be required if the owner or operator monitors the emissions by fuel sampling and analysis.

Section 7. Test Methods and Procedures. (1) Except as established in 401 KAR 50:045, performance tests used to demonstrate compliance with Sections 4 and 5 of this administrative regulation shall be conducted according to the following methods, incorporated by reference in 401 KAR 50:015:

(a) Reference Method 1 for the selection of sampling site and sample traverses;

(b) Reference Method 3 for gas analysis to be used when applying Reference Methods 5 and 6;

(c) Reference Method 5 for the concentration of particulate matter and the associated moisture content;

(d) Reference Method 6 for the concentration of sulfur dioxide; and

(e) Reference Method 9 for visible emissions.

(2) For Reference Method 5:

(a) Reference Method 1 shall be used to select the sampling site and the number of traverse sampling points;

(b) The sampling time for each run shall be at least sixty (60) minutes and the minimum sampling volume shall be 0.85 dscm (thirty (30) dscf), except that smaller sampling times or volumes, if necessitated by process variables or other factors, may be requested by the source; and

(c) The probe and filter holder heating systems in the sampling train shall be set to provide a gas temperature not greater than 160°C (320°F).

(3) For Reference Methods 6:

(a) The sampling site shall be the same as that selected for Reference Method 5;

(b) The sampling point in the duct shall be at the centroid of the cross section or at a point no closer to the walls than one (1) m (3.28 ft.);

(c) The sample shall be extracted at a rate proportional to the gas velocity at the sampling point;

(d) The minimum sampling time shall be twenty (20) minutes, and the minimum sampling volume shall be 0.02 dscm (0.71 dscf) for each sample;.

(e) The arithmetic mean of two (2) samples shall constitute one (1) run; and

(f) Samples shall be taken at approximately thirty (30) minute intervals.

(4)(a) For each run using the methods established by subsection (1) of this section, the emissions expressed in g/million cal (lb/MMBTU) shall be determined by the following equation:

$$E = CF\frac{20.9}{20.9 - \%O2}$$

Where:

1. E = pollutant emission, g/million cal (lb/MMBTU);
2. C = pollutant concentration, g/dscm (lb/dscf) determined by Reference Method 5, or 6;
3. F = a factor as determined in 40 C.F.R. 60.45(f); and
4. $\%O_2$ = oxygen content by volume (expressed as percent), dry basis.

Percent oxygen shall be determined by using the integrated or grab sampling and analysis

procedures for Reference Method 3 as applicable. The sample shall be obtained as established in paragraphs (b) and (c) of this subsection.

(b) For determination of sulfur dioxide and nitrogen oxides emissions, the oxygen sample shall be obtained simultaneously at the same point for Reference Method 6 determinations.

(c)1. For determination of particulate emissions, the oxygen sample shall be obtained simultaneously by traversing the duct at the same sampling location used for each run of Reference Method 5 pursuant to subsection (2) of this section.

2. Reference Method 1 shall be used for selection of the number of traverse points except that no more than twelve (12) sample points shall be required.

(5) If combinations of fossil fuels are fired, the heat input, expressed in cal/hr. (BTU/hr.), shall be determined during each testing period by multiplying the gross calorific value of each fuel fired by the rate of each fuel burned. GCV shall be determined in accordance with ASTM methods D2015-66(72) (solid fuels), D240-64(73) (liquid fuels), or D1826-64(70) (gaseous fuels), as applicable (ASTM designations incorporated by reference in 401 KAR 50:015). The rate of fuels burned during each testing period shall be determined by suitable methods and shall be confirmed by a material balance over the steam generation system.

Section 8. Compliance Timetable. (1) An affected facility located in an area designated as attainment for sulfur dioxide or particulate matter shall be in compliance as of June 6, 1979.

(2)(a) In Class IA counties, the owner or operator of any affected facility in any source with a total rated capacity of 16,000 MMBTU/hr or more shall be required to:

1. Submit a final control plan for achieving compliance with this administrative regulation no later than May 1, 1978;

2. Award contracts for complying coal by January 1, 1979;

3. Initiate use of complying coal on or before December 1, 1979; and

4. Demonstrate compliance by performance tests on or before October 1, 1981.

(b) In Class IVA counties designated as nonattainment for sulfur dioxide, the owner or operator of any affected facility in any source with a total rated capacity of greater than 1,500 MMBTU/hr but less than 21,000 MMBTU/hr shall be required to:

1. Submit a final control plan for achieving compliance with this administrative regulation no later than May 1, 1979;

2. Award contracts for complying coal by August 1, 1979;

3. Initiate use of complying coal on or before January 1, 1980; and

4. Demonstrate compliance by performance tests on or before March 1, 1980.

(c) In Class IVA counties designated as nonattainment for sulfur dioxide, the owner or operator of any affected facility in any source with a total rated capacity of greater than 21,000 MMBTU/hr shall be required to:

1. Submit a control plan for flue gas desulfurization and initiate construction of a coal washing plant on or before June 1, 1978;

2. Issue invitations for bids for construction and installation of flue gas desulfurization equipment on or before October 1, 1978;

3. Award contract for construction and installation of flue gas desulfurization equipment on or before March 1, 1979;

4. Initiate construction of flue gas desulfurization equipment on or before December 1, 1979;

5. Complete construction of coal washing plant on or before December 1, 1980;

6. Complete construction of flue gas desulfurization equipment on or before June 1, 1982; and

7. Demonstrate compliance by performance tests on or before September 1, 1982.

Section 9. Standards During a Startup Period or a Shutdown Period. During a startup period or a shutdown period, an owner or operator shall comply with the work practice standards established in this section.

(1)(a) The owner or operator shall comply with 401 KAR 50:055, Section 2(5);

(b) The frequency and duration of startup periods or shutdown periods shall be minimized by the affected facility;

(c) All reasonable steps shall be taken by the owner or operator to minimize the impact of emissions on ambient air quality from the affected facility during startup periods and shutdown periods;

(d) The actions, including duration of the startup period, of the owner or operator of each affected facility during startup periods and shutdown periods, shall be documented by signed, contemporaneous logs or other relevant evidence; and

(e) Startups and shutdowns shall be conducted according to either:

1. The manufacturer's recommended procedures; or

2. Recommended procedures for a unit of similar design, for which manufacturer's recommended procedures are available, as approved by the cabinet based on documentation provided by the owner or operator of the affected facility; or

(2)(a) An affected facility subject to 40 C.F.R. 63.7500 shall meet the work practice standards established in 40 C.F.R. Part 63, Table 3 to Subpart DDDDD, as established in 401 KAR 63:002, Section 2(4)(iiii);

(b) An affected facility subject to 40 C.F.R. 63.9991 shall meet the work practice standards established in 40 C.F.R. Part 63, Table 3 to Subpart UUUUU, as established in 401 KAR 63:002, Section 2(4)(yyyy); or

(c) An affected facility subject to 40 C.F.R. 63.11201 shall meet the work practice standards established in 40 C.F.R. Part 63, Table 2 to Subpart JJJJJJ, as established in 401 KAR 63:002, Section 2(4)(jjjjj).

Section 10. Incorporation by Reference. (1) "Kentucky Air Pollution Control Commission Regulation No. 7 Prevention and Control of Emissions of Particulate Matter from Combustion of Fuel in Indirect Heat Exchangers" (November 1969), is incorporated by reference.

(2) This material may be inspected, copied, or obtained, subject to applicable copyright law, at the Division of Air Quality, 300 Sower Boulevard, Frankfort, Kentucky 40601, Monday through Friday, 8 a.m. to 4:30 p.m.

APPENDIX A TO 401 KAR 61:015
ALLOWABLE PARTICULATE EMISSION RATES

For sources having a total heat input capacity (as determined by Section 3(1) of:	The standard (in pounds per million BTU actual heat input) is (based upon the Priority classification with respect to particulates of the region in which the source is located):		
(MM BTU/Hr.)	Priority I	Priority II	Priority III
10 or less	0.56	0.75	0.80
50	0.38	0.52	0.57
100	0.33	0.44	0.49
250	0.26	0.35	0.40
500	0.22	0.30	0.34
1000	0.19	0.26	0.30
2500	0.15	0.21	0.24
5000	0.13	0.18	0.21

7500	0.12	0.16	0.19
10000 or more	0.11	0.15	0.18

Interpolation of allowable emissions for intermediate heat input values not established above may be accompanied by use of the equations shown below for the appropriate heat input range. In all equations X = MMBTU/hr heat input as determined by Section 3(1), and Y = allowable particulate emissions in pounds per MMBTU actual heat input.

Region Classification with respect to Particulate Matter	Range (MM BTU/Hr.)	Allowable (Lb.s/MM BTU)
Priority I	10 to 10,000	$Y = 0.9634 X^{-0.2356}$
Priority II	10 to 10,000	$Y = 1.2825 X^{-0.2330}$
Priority III	10 to 10,000	$Y = 1.3152 X^{-0.2159}$

APPENDIX B TO 401 KAR 61:015
All Standards shall be twenty-four (24) hour averages

For sources having a total heat input (as determined by Section 3(1)) of:	The standard (in pounds per million BTU actual heat input) is (based upon the classification with respect to sulfur dioxide of the county in which the source is located):															
	CLASS I		CLASS IA		CLASS II		CLASS III		CLASS IV		CLASS IVA		CLASS V		CLASS VA	
(MM BTU/Hr.)	Liquid/ Gaseous Fuel	Solid Fuel	Liquid/ Gaseous Fuel	Solid Fuel	Liquid/ Gaseous Fuel	Solid Fuel	Liquid/ Gaseous Fuel	Solid Fuel	Liquid/ Gaseous Fuel	Solid Fuel	Liquid/ Gaseous Fuel	Solid Fuel	Liquid/ Gaseous Fuel	Solid Fuel	Liquid/ Gaseous Fuel	Solid Fuel
10 or less	3.0	5.0	3.0	5.0	4.0	6.0	4.6	7.0	5.4	8.0	5.4	8.0	6.0	9.0	6.0	9.0
50	1.5	2.4	1.5	3.9	2.4	3.7	3.2	4.8	4.3	6.4	4.3	6.4	4.9	7.3	4.9	7.3
100	1.2	1.8	1.2	3.6	2.0	3.0	2.7	4.1	4.0	5.9	4.0	5.9	4.5	6.7	4.5	6.7
150	1.0	1.5	1.0	3.3	1.8	2.7	2.5	3.7	3.7	5.6	3.7	5.6	4.3	6.4	4.3	6.4
200	0.9	1.3	0.9	3.2	1.6	2.5	2.3	3.5	3.6	5.4	3.6	5.4	4.1	6.2	4.1	6.2
250-1500	0.8	1.2	0.8	3.1	1.5	2.3	2.2	3.3	3.5	5.2	3.5	5.2	4.0	6.0	4.0	6.0
greater than 1,500 but less than 21,000	0.8	1.2	0.8	1.2	1.5	2.3	2.2	3.3	3.5	5.2	2.3	3.5	4.0	6.0	1.1	1.1
21,000 or more	0.8	1.2	0.8	1.2	1.5	2.3	2.2	3.3	3.5	5.2	2.1	3.1	4.0	6.0	1.1	1.1

Interpolation of allowable emissions for rated capacity values between 10 and 250 million BTU heat input may be accomplished by use of the equations shown below for the appropriate fuel specified. In all equations Y = allowable sulfur dioxide emission in pounds per million BTU actual heat input, X = millions of BTU per hour heat input capacity rating as determined by Section 3(1).

COUNTY CLASS	FUEL	ALLOWABLE (POUNDS/MM BTU)
I	Liquid/Gaseous	$Y = 7.7223\ X^{-0.4106}$
	Solid	$Y = 13.8781\ X^{-0.4434}$
IA	Liquid/Gaseous	$Y = 7.7223\ X^{-0.4106}$
	Solid	$Y = 7.0382\ X^{-0.1485}$
II	Liquid/Gaseous	$Y = 8.0681\ X^{-0.3047}$
	Solid	$Y = 11.9134\ X^{-0.2979}$
III	Liquid/Gaseous	$Y = 7.7966\ X^{-0.2291}$
	Solid	$Y = 11.9872\ X^{-0.2336}$
IV	Liquid/Gaseous	$Y = 7.3639\ X^{-0.1347}$
	Solid	$Y = 10.8875\ X^{-0.1338}$
IVA	Liquid/Gaseous	$Y = 7.3639\ X^{-0.1260}$
	Solid	$Y = 10.8875\ X^{-0.1338}$
V	Liquid/Gaseous	$Y = 8.0189\ X^{-0.1260}$
	Solid	$Y = 12.0284\ X^{-0.1260}$
VA	Liquid/Gaseous	$Y = 8.0189\ X^{-0.1260}$
	Solid	$Y = 12.0284\ X^{-0.1260}$

471; Am. 1045; eff. 6-6-1979; 8 Ky.R. 1434; 9 Ky.R. 577; eff. 12-1-1982; 935; eff. 6-1-83; 10 Ky.R. 434; 1072; eff. 4-1-1984; TAm eff. 8-9-2007; 44 Ky.R.803, 1539; eff. 3-9-2018.)