

hourly SO<sub>2</sub> CEMs value and hourly flow rate value, and each hourly Btu heat input rate, hourly steam rate, or hourly electrical power output, and a record of each hourly weighted average emission rate. These records shall be kept for all periods of operation of Unit 1 or 2 under provisions of §60.43(e), including operations of Unit 1 (E1) during periods of DAFGDS startup, shutdown, and malfunction when H1 and E1 are assumed to be zero (0) (see 4.5).

5.2 The plant owner or operator shall keep a record of each hourly gas flow rate through the DAFGDS stack, each hourly stack gas flow rate through the bypass stack during any periods that the DAFGDS bypass damper is opened or flow is indicated, and reason for bypass operation.

#### 6. Reporting Requirements

6.1 The owner or operator of any affected facility shall submit the written reports required under 6.2 of this section and subpart A to the Regional Administrator of the USEPA, Region 5 and the Director, of the IEPA for every calendar quarter. All quarterly reports shall be submitted by the 30th day following the end of each calendar quarter.

6.2 For sulfur dioxide, the following data resubmitted to the Regional Administrator of the USEPA, Region 5 and the Director, of the IEPA for each 24-hour period:

##### 6.2.1 Calendar date

6.2.2 The combined average sulfur dioxide emission rate (ng/J or lb/million Btu) for the past 30 successive boiler operating days (ending with the last 30-day period in the quarter); and, for any noncompliance periods, reasons for noncompliance with the emission standards and description of corrective action taken.

6.2.3 Identification of the boiler operating days for which valid sulfur dioxide emissions data required by 4.6 have not been obtained for 75 percent of the boiler operating hours; reasons for not obtaining sufficient data; and description of corrective actions taken to prevent recurrence.

6.2.4 Identification of the time periods (hours) when Unit 1 or Unit 2 were operated but combined hourly emission rates (EC) were not calculated because of the unavailability of parameters E1, E2, H1, or H2 as described in 3.2.

6.2.5 Identification of the time periods (hours) when Unit 1 and Unit 2 were operated and where the combined hourly emission rate (EC) equalled Unit 2 (E2/H2) emissions because of the Unit 1 malfunction provisions under 3.5.3, and 3.5.4.

6.2.6 Identification of the time periods (hours) when emissions from the Unit 1 DAFGDS have been excluded from the calculation of average sulfur dioxide emission rates because of Unit 1 DAFGDS startup, shutdown, malfunction, or other reasons;

and justification for excluding data for reasons other than startup or shutdown. Reporting of hourly emission rate of Unit 1 (E1/H2) during each hour of the DAFGDS startup, malfunction under 3.5.1, 3.5.2, 3.5.3, and 3.5.4 (see 4.5).

6.2.7 Identification of the number of days in the calendar quarter that the affected facility was operated (any fuel fired).

6.2.8 Identify any periods where Unit 1 DAFGDS malfunctions occurred and the cumulative hours of Unit 1 DAFGDS malfunction for the quarter.

6.2.9 Identify any periods of time that any exhaust gases were discharged to the DAFGDS bypass stack and the hourly gas flow rate through the DAFGDS stack and through the DAFGDS bypass stack during such periods and reason for bypass operation.

##### 6.2.10 [Reserved]

[52 FR 28955, Aug. 4, 1987, as amended at 58 FR 28785, May 17, 1993; 59 FR 8135, Feb. 18, 1994]

#### APPENDIX H TO PART 60 [RESERVED]

#### APPENDIX I TO PART 60—OWNER'S MANUALS AND TEMPORARY LABELS FOR WOOD HEATERS SUBJECT TO SUBPARTS AAA AND QQQQ OF PART 60

##### 1. INTRODUCTION

The purpose of this appendix is to provide specific instructions and examples to manufacturers for compliance with the owner's manual provisions of subparts AAA and QQQQ of this part.

##### 2. INSTRUCTIONS FOR PREPARATION OF WOOD HEATER OWNER'S MANUALS

###### 2.1 Introduction

Although the owner's manuals do not require premarket approval, EPA will monitor the contents to ensure that sufficient information is included to provide heater proper operation and maintenance information affecting emissions to consumers. The manufacturer must make current and historical owner's manuals available on the company Web site and upon request to the EPA. The purpose of this section is to provide instructions to manufacturers for compliance with the owner's manual provisions of §60.536(g) of subpart AAA that applies to wood heaters and §60.5478(f) of subpart QQQQ that applies to hydronic heaters and forced-air furnaces. A checklist of topics and illustrative language is provided as instructions. Owner's manuals should be tailored to specific wood heater models, as appropriate.

2.2 Topics Required To Be Addressed in Owner’s Manual

- (a) Wood heater description and compliance status;
- (b) Tamper warnings;
- (c) Overall heater warranty information and catalyst information and warranty (if catalyst-equipped);
- (d) Fuel selection;
- (e) Achieving and maintaining catalyst light-off (if catalyst-equipped);
- (f) Catalyst monitoring (if catalyst-equipped);
- (g) Troubleshooting catalytic-equipped heaters (if catalyst-equipped);
- (h) Catalyst replacement (if catalyst-equipped);
- (i) Wood heater proper operation and maintenance, including minimizing visible emissions;
- (j) Wood heater proper installation, including location, stack height and achieving proper draft;
- (k) Use of smoke detectors and carbon monoxide monitors; and
- (l) Efficiency.

2.3 Sample Text/Descriptions

(a) The following are example texts and/or further descriptions illustrating the topics identified above. Although the regulation requires manufacturers to address (where applicable) the 10 topics identified above, the exact language is not specified. Manuals should be written specific to the model and design of the wood heater. The following instructions are composed of generic descriptions and texts.

(b) If manufacturers choose to use the language provided in the example, the portion in italics should be revised as appropriate. Any manufacturer electing to use the EPA example language will be considered to be in compliance with owner’s manual requirements provided that the particular language is printed in full with only such changes as are necessary to ensure accuracy.

Example language is not provided for certain topics, since these areas are generally heater specific. For these topics, manufacturers should develop text that is specific to the proper operation and maintenance of their particular products.

2.3.1 Wood Heater Description and Compliance Status

Owner’s manuals must include:

- (a) Manufacturer and model;
  - (b) Compliance status (2015 standard, 2016 standard, 2017 standard, 2020 standard, crib wood standard or cord wood alternative standard, last allowable sell date, etc.); and
  - (c) Heat output range.
- Exhibit 1—Example Text covering 2.3.1(a), (b), and (c) of this appendix:

“This manual describes the installation and operation of the Brand X, Model 0 catalytic equipped wood heater. This heater meets the 2015 U.S. Environmental Protection Agency’s crib wood emission limits for wood heaters sold after May 15, 2015. Under specific test conditions this heater has been shown to deliver heat at rates ranging from 8,000 to 35,000 Btu/hr.”

2.3.2 Tamper Warnings

(a) The following statement must be included in the owner’s manual for all units:

“This wood heater has a manufacturer-set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this wood heater in a manner inconsistent with operating instructions in this manual.”

(b) The following statement must be included in the owner’s manual for catalyst-equipped units:

“This wood heater contains a catalytic combustor, which needs periodic inspection and replacement for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual, or if the catalytic element is deactivated or removed.”

2.3.3 Overall Heater Warranty Information and Catalyst Information and Warranty (if catalyst-equipped)

The following information must be included with or supplied in the owner’s and warranty manuals:

- (a) Manufacturer and model, including catalyst if catalyst-equipped;
- (b) Warranty details, including catalyst if catalyst-equipped; and
- (c) Instructions for warranty claims.

Exhibit 2—Example Text covering 2.3.3(a), (b), and (c) of this appendix for catalysts:

“The combustor supplied with this heater is a *Brand Z, Long Life Combustor*. Consult the catalytic combustor warranty also supplied with this wood heater. Warranty claims should be addressed to:

Stove or Catalyst Manufacturer \_\_\_\_\_  
 Address \_\_\_\_\_  
 Phone # \_\_\_\_\_”

2.3.3.1 This section should also provide clear instructions on how to exercise the warranty (how to package parts for return shipment, etc.).

2.3.4 Fuel Selection

Owner’s manuals must include:

- (a) Instructions on acceptable fuels;
- (b) Warning against inappropriate fuels; and

(c) How to determine seasoned wood compared to unseasoned wood, how to use moisture meters and other techniques and the importance of seasoned wood.

Exhibit 3—Example Text covering 2.3.4(a) and (b) of this appendix:

“This heater is designed to burn natural wood only. Higher efficiencies and lower emissions generally result when burning air dried seasoned hardwoods, as compared to softwoods or to green or freshly cut hardwoods. DO NOT BURN:

- (1) Garbage;
- (2) Lawn clippings or yard waste;
- (3) Materials containing rubber, including tires;
- (4) Materials containing plastic;
- (5) Waste petroleum products, paints or paint thinners, or asphalt products;
- (6) Materials containing asbestos;
- (7) Construction or demolition debris;
- (8) Railroad ties or pressure-treated wood;
- (9) Manure or animal remains;
- (10) Salt water driftwood or other previously salt water saturated materials;
- (11) Unseasoned wood; or
- (12) Paper products, cardboard, plywood, or particleboard. The prohibition against burning these materials does not prohibit the use of fire starters made from paper, cardboard, saw dust, wax and similar substances for the purpose of starting a fire in an affected wood heater.

Burning these materials may result in release of toxic fumes or render the heater ineffective and cause smoke.”

### 2.3.5 Achieving and Maintaining Catalyst Light-Off

Owner’s manuals must describe in detail proper procedures for:

- (a) Operation of catalyst bypass (stove specific);
- (b) Achieving catalyst light-off from a cold start; and
- (c) Achieving catalyst light-off when refueling.

2.3.5.1 No example text is supplied for describing operation of catalyst bypass mechanisms (Item 2.3.5(a) of this appendix) since these are typically stove-specific. Manufacturers must provide instructions specific to their model describing:

- (1) Bypass position during startup;
- (2) Bypass position during normal operation; and
- (3) Bypass position during reloading.

Exhibit 4—Example Text for Item 2.3.5(b) of this appendix:

“The temperature in the stove and the gases entering the combustor must be raised to between 500° to 700 °F for catalytic activity to be initiated. During the startup of a cold stove, a medium to high firing rate must be maintained for about 20 minutes. This ensures that the stove, catalyst, and fuel are all stabilized at proper operating

temperatures. Even though it is possible to have gas temperatures reach 600 °F within 2 to 3 minutes after a fire is started, if the fire is allowed to die down immediately, it may go out or the combustor may stop working. Once the combustor starts working, heat generated in it by burning the smoke will keep it working.”

Exhibit 5—Example Text for Item 2.3.5(c) of this appendix:

“REFUELING: During the refueling and rekindling of a cool fire, or a fire that has burned down to the charcoal phase, operate the stove at a medium to high firing rate for about 10 minutes to ensure that the catalyst reaches approximately 600 °F.”

### 2.3.6 Catalyst Monitoring

Owner’s manuals must include:

- (a) Recommendation to visually inspect combustor at least three times during the heating season;
- (b) Discussion on expected combustor temperatures for monitor-equipped units; and
- (c) Suggested monitoring and inspection techniques and importance of ensuring catalyst is operating properly.

Exhibit 6—Example Text covering 2.3.6(a), (b) and (c) of this appendix:

“It is important to periodically monitor the operation of the catalytic combustor to ensure that it is functioning properly and to determine when it needs to be replaced. A non-functioning combustor will result in a loss of heating efficiency, and an increase in creosote and emissions. Following is a list of items that should be checked on a periodic basis:

- Combustors should be visually inspected at least three times during the heating season to determine if physical degradation has occurred. Actual removal of the combustor is not recommended unless more detailed inspection is warranted because of decreased performance. If any of these conditions exists, refer to Catalyst Troubleshooting section of this owner’s manual.

- This catalytic (*or hybrid*) heater is equipped with a temperature probe to monitor catalyst operation. Properly functioning combustors typically maintain temperatures in excess of 500 °F, and often reach temperatures in excess of 1,000 °F. If catalyst temperatures are not in excess of 500 °F, refer to Catalyst Troubleshooting section of this owner’s manual.

- You can get an indication of whether the catalyst is working by comparing the amount of smoke leaving the chimney when the smoke is going through the combustor and catalyst light-off has been achieved, to the amount of smoke leaving the chimney when the smoke is not routed through the combustor (bypass mode).

Step 1—Light stove in accordance with instructions in section 3.3.5.

Step 2—With smoke routed through the catalyst, go outside and observe the emissions leaving the chimney.

Step 3—Engage the bypass mechanism and again observe the emissions leaving the chimney.

Significantly more smoke will be seen when the exhaust is not routed through the combustor (bypass mode)."

#### 2.3.7 Catalyst Troubleshooting

The owner's manual must provide clear descriptions of symptoms and remedies to common combustor problems and importance. It is recommended that photographs of catalyst peeling, plugging, thermal cracking, mechanical cracking, and masking be included in the manual to aid the consumer in identifying problems and to provide direction for corrective action.

#### 2.3.8 Catalyst Replacement

The owner's manual must provide clear step-by-step instructions on how to remove and replace the catalytic combustor. The section should include diagrams and/or photographs.

#### 2.3.9 Wood Heater Proper Operation and Maintenance

The owner's manual must provide clear descriptions of symptoms and remedies to common heater problems and importance. The owner's manual information must be adequate to enable consumers to achieve optimal emissions performance. Such information must be consistent with the operating instructions provided by the manufacturer to the approved test laboratory for operating the wood heater during certification testing, except for details of the certification test that would not be relevant to the user.

Owner's manual must include:

- (a) Recommendations about building and maintaining a fire, especially for cold starts and the effectiveness of the top-down approach for starting fires;
- (b) Instruction on proper use of air controls, including how to establish good combustion and how to ensure good combustion at the lowest burn rate for which the heater is warranted;
- (c) Ash removal and disposal;
- (d) Instruction replacement of gaskets, air tubes and other parts that are critical to the emissions performance of the unit, and other maintenance and repair instructions;
- (e) Warning against overfiring; and
- (f) Suggested monitoring and inspection techniques and importance of ensuring heater is operating properly, including ensuring visible emissions are minimized.

2.3.9.1 No example text is supplied for 2.3.9(a), (b), (d) and (f) of this appendix since these items are model specific. Manufacturers should provide detailed instructions on

building and maintaining a fire including selection of fuel pieces, fuel quantity and stacking arrangement. Manufacturers should also provide instruction on proper air settings (both primary and secondary) for attaining minimum and maximum heat outputs and any special instructions for operating thermostatic controls. Step-by-step instructions on inspection and replacement of gaskets should also be included. Manufacturers should provide diagrams and/or photographs to assist the consumer. Gasket type and size should be specified.

Exhibit 7—Example Text for Item 2.3.9(c) of this appendix:

"Whenever ashes get 3 to 4 inches deep in your firebox or ash pan, and when the fire has burned down and cooled, remove excess ashes. Leave an ash bed approximately 1 inch deep on the firebox bottom to help maintain a hot charcoal bed."

"Ashes should be placed in a metal container with a tight-fitting lid. The closed container of ashes should be placed on a non-combustible floor or on the ground, away from all combustible materials, pending final disposal. The ashes should be retained in the closed container until all cinders have thoroughly cooled."

Exhibit 8—Example Text covering Item 2.3.9(e) of this appendix:

"DO NOT OVERFIRE THIS HEATER"

"Attempts to achieve heat output rates that exceed heater design specifications can result in permanent damage to the heater and to the catalytic combustor if so equipped."

#### 2.3.10 Wood Heater Installation, Including Stack Height, Heater Locations and Achieving Proper Draft

Owner's manual must include:

- (a) Importance of proper draft;
- (b) Conditions indicating inadequate draft;
- (c) Conditions indicating excessive draft; and
- (d) Guidance on proper stack height and proper heater locations, *i.e.*, not too close to neighbors or in valleys that would cause unhealthy air quality or nuisance conditions.

2.3.10.1 No example text is supplied for (d) because state, local and tribal requirements are model and location specific.

Exhibit 9—Example Text for Item (a):

"Draft is the force which moves air from the appliance up through the chimney. The amount of draft in your chimney depends on the length of the chimney, local geography, nearby obstructions and other factors. Too much draft may cause excessive temperatures in the appliance and may damage the catalytic combustor. Inadequate draft may cause backpuffing into the room and 'plugging' of the chimney or the catalyst."

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Exhibit 10—Example Text for Item (b):

“Inadequate draft will cause the appliance to leak smoke into the room through appliance and chimney connector joints.”

Exhibit 11—Example Text for Item (c):

“An uncontrollable burn or excessive temperature indicates excessive draft.”

### 2.3.11 Efficiency

Owner’s manual must include:

(a) Description of how the efficiency was determined, *e.g.*, use higher heating value of the fuel instead of lower heating value of the fuel, discuss sweet spot versus annual average versus annual fuel usage efficiency (AFUE);

(b) How operation and fuels affect efficiency, *e.g.*, seasoned wood versus high moisture fuel; operation at sweet spot versus low-burn rates; and

(c) How location affects the efficiency, *e.g.*, in main living area versus basement versus outdoors in sub-freezing temperatures.

### 2.3.12 Smoke and Carbon Monoxide Emissions and Monitors

Owner’s manual must include:

(a) Discussion of smoke and carbon monoxide (CO) emissions, including the CO data submitted in the certification application

and expected variations for different operating conditions;

(b) Recommendation to have smoke monitors; and

(c) Recommendation to have monitors for areas that are expected to generate CO, *e.g.*, heater fueling areas, pellet fuel bulk storage areas, sheds containing hydronic heaters.

## 3. INSTRUCTIONS FOR PREPARATION OF WOOD HEATER TEMPORARY LABELS

3.1 Temporary labels that show the values for emissions, efficiency, recommended heating area and the compliance status may (voluntarily) be affixed by the manufacturer to wood heaters that meet the 2020 particulate matter emission standards early or that meet the cord wood alternative compliance options in subparts AAA and QQQQ of this part.

3.2 The seller of each heater covered by section 3.1 may ensure that the temporary label remains affixed until each heater is purchased by the end user.

3.3 The temporary label option for the 2020 particulate matter emission standards end as of May 15, 2020.

3.4 The template for the temporary labels will be supplied by the Administrator upon request.

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