

CHAPTER 23.20 LOCAL AMENDMENTS TO THE INTERNATIONAL MECHANICAL CODE 2006 EDITION

Sections

23.20.100	Local amendments to the International Mechanical Code, 2006 Edition	2
23.20.101.2	Scope	2
23.20.303.4	Protection from damage	2
23.20.304.3	Elevation of ignition source	2
23.20.304.12	Aircraft hangars.....	3
23.20.306.3	Appliances in attics	3
23.20.306.4	Appliances under floors	3
23.20.306.5	Equipment and appliances on roofs or elevated structures	3
23.20.306.5.2	Electrical requirements.....	4
23.20.306.6	Mezzanines and platforms.....	4
23.20.401.4.4	Mechanical intake openings serving single-family dwelling units	4
23.20.TABLE 401.5	Opening sizes in louvers, grilles and screens protecting outdoor exhaust and air intake openings.	5
23.20.403.3	Ventilation rate.....	5
23.20.404.1	Enclosed parking garages.....	5
23.20.404.2	Minimum ventilation.....	5
23.20.406.1	General	5
23.20.501.2	Exhaust discharge.....	5
23.20.504.6.1	Maximum length	5
23.20.505.1	Domestic systems.....	6
23.20.505.2	Domestic Range make-up air	6
23.20.507.2.1.1	Operation.....	6
23.20.507.9	Clearances for Type I hood	6
23.20.511.1	Dust, stock and refuse conveying systems	6
23.20.515.1	Multi-port exhaust fans	7
23.20.601.4	Contamination prevention	7
23.20.602.1	General	8
23.20.603.9	Joints, seams and connections.....	8
23.20.701.3	Circulation of air	8
23.20.701.4.2	Attic space	8
23.20.711	Engineered combustion air systems	8
23.20.801.21	Location and support of venting systems other than masonry chimneys.....	13
23.20.802.9	Vent terminals - ice and snow protection.....	14
23.20.804.3.4	Horizontal terminations.....	14
23.20.923.2	Small ceramic kilns – ventilation	14
23.20.1001.1	Scope	14
23.20.1006.7	Boiler safety devices	14
23.20.1006.8	Electrical requirements.....	19
23.20.1007	Boiler low-water cutoff	19
23.20.1105.3	Refrigerant detector.....	19
23.20.1105.6.2	Make-up air	19
23.20.1301.1	Scope	19

23.20.100 **Local amendments to the International Mechanical Code, 2006 Edition**

The amendments to the International Mechanical Code are listed hereafter by section. The last digits of the section number (after the title and chapter digits) are the section of the International Mechanical Code to which the amendment refers, i.e., 23.20.303 refers to amendments to section 303 of the International Mechanical Code).

Delete entire chapter except for section 101 and 102.

23.20.101.2 **Scope**

Delete exception.

23.20.303.4 **Protection from damage**

Add the following section:

303.4.1 Appliances subject to vehicle impact. Appliances, including their associated piping and ductwork, subject to vehicle impact shall be protected by one or more of the following methods:

- 1 Install the appliance on a platform a minimum of 24 inches high. The appliance shall not extend beyond the face of the platform. Piping and ductwork shall not be surface mounted to the platform in a location subject to vehicle impact.
2. Protect the appliance with a barrier. The barrier shall be a minimum of 30" high and be constructed of a minimum 2" diameter schedule 40 steel pipe. The barrier must have a minimum 6" setback from the platform or appliance. The maximum unprotected distance shall not exceed five (5) feet. The barrier shall be installed per one of the following methods:
 - a. Buried a minimum of 2'0" deep in compacted soil and imbedded in concrete slab
 - b. Set in a minimum 1'0" x 1'0" square by 1'0" deep block of concrete (slab not included).
 - c. Secured to the wood framed garage floor with flange and stainless steel bolts and imbedded in concrete slab.
 - d. Secured to the concrete slab using a floor flange with a minimum of four $\frac{3}{8}$ " diameter by 3 $\frac{1}{2}$ " long galvanized or stainless anchor bolts.
3. Mount appliance and associated piping and ductwork to wall and/or suspend from the ceiling in a location clear of any potential vehicle interference.

In all cases the minimum clear width and depth of the garage shall be maintained in accordance with Title 21.

23.20.304.3 **Elevation of ignition source**

Amend section 304.3 by adding the following to the end of the paragraph:

Rooms and spaces that are not part of the living space of a dwelling unit shall include but are not limited to utility, storage, mud, laundry, toilet and bathing rooms.

Group F, M, S-1 and S-2 occupancies with overhead doors providing access to vehicles and equipment containing combustible fuel shall comply with this section.

Ignition sources shall include any mechanical or electrical device capable of generating a spark, glow or flame.

23.20.304.12 Aircraft hangars

Amend by adding a new section as follows:

304.12 Aircraft hangars. Overhead appliances installed in aircraft storage areas shall be located at least 10' vertically above the upper surface of the wings or engine enclosure of the tallest aircraft which may be housed in the hangar.

Exception. Where a 10' vertical separation cannot be maintained in an NFPA 409 Class III hangar, a sealed combustion appliance may be used. The appliance shall be located as high and as far away from the wings and engine enclosure as possible. This exception shall not apply to NFPA 409 Class I and Class II hangars.

23.20.306.3 Appliances in attics

Add a new Exception #3 as follows:

Exception #3. The passageway and level surface are not required for replacement of horizontal furnaces located above drop ceilings in strip malls. All other code requirements apply.

23.20.306.4 Appliances under floors

Amend by adding the following as the first sentence:

Installation of fuel burning appliances in underfloor crawl spaces is prohibited unless prior written approval is obtained from the authority having jurisdiction.

23.20.306.5 Equipment and appliances on roofs or elevated structures

Amend by deleting section 306.5 and replace with the following:

Where new or replaced equipment and appliances requiring access are installed on roofs or elevated structures of new or existing buildings, such access shall be provided by a permanent approved means of access, the extent of which shall be from grade or floor level to the equipment and appliances' level service space. Such access shall be located interior to the building and shall not require climbing over obstructions greater than 30 inches high or walking on roofs having a slope greater than four (4) units vertical in twelve (12) units horizontal (33-percent slope).

Permanent ladders installed to provide the required access shall comply with the following minimum design criteria:

1. Ladders shall have rung spacing not to exceed fourteen (14) inches on center.
2. Ladders shall have a toe spacing not less than six (6) inches deep.
3. There shall be a minimum of eighteen (18) inches between rails.
4. Rungs shall have a minimum 0.75-inch diameter and be capable of withstanding a 300-pound load.
5. Ladders over thirty (30) feet in height shall be provided with offset sections and landings capable of withstanding 100 pounds per square foot.
6. Catwalks installed to provide the required access shall be not less than twenty-four (24) inches wide and shall have railings as required for service platforms.

Exceptions:

1. Replaced equipment may be accessed by portable ladder on the single story portion of an existing building not exceeding sixteen (16) feet in height. If the existing building exceeds sixteen (16) feet in height, an approved interior access shall be provided.
2. This section shall not apply to Group R-3 occupancies.
3. Existing buildings with an existing approved exterior access permanently mounted to the structure.

23.20.306.5.2 Electrical requirements

Revise the sentence to read as follows:

A receptacle outlet shall be provided as required by the N.E.C.

23.20.306.6 Mezzanines and platforms

Add a new section as follows:

306.6 Mezzanines and platforms. Every mezzanine or platform containing appliances or equipment requiring access more than ten feet, six inches above the ground or floor level shall be made accessible by a stairway or ladder fastened to the structure. The ladder shall be constructed in compliance with the provisions of Local Amendment 23.20.306.5.

23.20.401.4.4 Mechanical intake openings serving single-family dwelling units

Add a new section as follows:

401.4.4 Mechanical intake openings serving single family dwelling units. Mechanical outdoor air intake openings serving single family dwelling units shall be located a minimum of six (6) feet horizontally from a gas pressure regulator relief vent outlet. Where a vent outlet is located within six (6) feet horizontally of a mechanical outdoor intake opening, such opening shall be located a minimum of two (2) feet below the vent outlet. Measurements shall be taken from the gas pressure regulator relief vent outlet.

23.20.TABLE 401.5 **Opening sizes in louvers, grilles and screens protecting outdoor exhaust and air intake openings.**

Revise the minimum and maximum opening sizes as follows:

OUTDOOR OPENING TYPE	MINIMUM AND MAXIMUM OPENING SIZES IN LOUVERS, GRILLES AND SCREENS MEASURED IN ANY DIRECTION
Exhaust openings	½ inch
Intake openings in residential occupancies	½ inch
Intake openings in other than residential occupancies	Not < ½ inch and not > 1 inch

23.20.403.3 **Ventilation rate**

Amend by adding to the end of the first sentence the words “or in accordance with the latest version of ASHRAE Standard 62.”

23.20.404.1 **Enclosed parking garages**

Revise section to read as follows:

Mechanical ventilation systems for enclosed parking garages are not required to operate continuously where the system is arranged to operate automatically upon detection on a concentration of carbon monoxide of 25 parts per million (ppm) by approved automatic detection devices.

23.20.404.2 **Minimum ventilation**

Delete the words “not reduce the ventilation rate below 0.05cfm per square foot of the floor area and the system shall”

23.20.406.1 **General**

Delete section 406.1.

23.20.501.2 **Exhaust discharge**

Delete Exception #1 to 501.2.

23.20.504.6.1 **Maximum length**

Amend by adding a new paragraph to the beginning of Exception #1:

The maximum length of a clothes dryer exhaust duct may be increased when necessary due to location of the dryer in relationship to an exterior wall or roof; however, the length shall not exceed the dryer manufacturer’s recommendations. When exceeding the code required maximum length, a dryer placard (available at the Building Safety Division handout shelves) stating the length of the run and the amount of ninety (90) degree elbows shall be posted on the wall next to the dryer

exhaust connection. The placard shall be laminated or in a moisture resistant sleeve and be secured using screws, staples, or thumbtacks. Push pins are not acceptable. The duct shall be routed using the shortest possible distance and/or the least number of (45) and (90) degree elbows as possible.

Add a new Exception #2:

Exception #2: For distances exceeding the dryer manufacturer's recommendations, a booster fan, listed for the purpose, shall be used for lengths up to the booster fan manufacturer's recommendations.

23.20.505.1 Domestic systems

Delete the first sentence and replace with the following:

Each domestic range, fuel-fired or electric, shall be equipped with either a range hood or an integral downdraft exhaust system discharging to the exterior of the building through a duct constructed of galvanized steel, stainless steel, aluminum, or copper.

Delete Exception No. 1.

23.20.505.2 Domestic Range make-up air

Add a new section to read as follows:

505.2 Domestic range make-up air. Range hood and downdraft exhaust fans with a capacity exceeding 500 CFM shall have make-up air provided or a backdraft test shall be performed to verify proper operation of all combustion appliances. If backdraft occurs under any operational scenario, make-up shall be required. If make-up air is provided, it shall be interlocked with the exhaust device.

23.20.507.2.1.1 Operation

Delete section 507.2.1.1 in its entirety.

23.20.507.9 Clearances for Type I hood

Delete the exception, and replace with the following:

Exception: Clearances shall not be required from gypsum wallboard attached to noncombustible structures provided that a smooth, cleanable, nonabsorbent and noncombustible material is installed between the cooking surface and the hood, extending not less than 18" in all other directions; e.g. stainless steel or ceramic tile with grout sealer.

23.20.511.1 Dust, stock and refuse conveying systems

Amend by adding the following exception to section **511.1**:

#3: Listed dust collectors and separator designed and installed in accordance with NFPA 664.

23.20.515.1 Multi-port exhaust fans

Add new section as follows:

515.1 Multi-port exhaust fans. Multi-port exhaust fan installations shall comply with the following:

1. This type of fan may be used for exhausting environmental air such as bathrooms and toilet rooms and shall not be used for clothes dryer or range exhaust.
2. If this fan is installed in the attic, it shall be within three (3) feet of the attic access and the exhaust registers it serves shall be permanently labeled as to the location of the fan for service and maintenance.
3. The operating range for these fans is limited to -40 degrees F to +140 degrees F.
4. Combustion air requirements for fireplaces, water heaters, furnaces, boilers, etc., shall not be effected by the use or operation of this type of fan.
5. These fans shall not be used to exhaust combustible or flammable vapors, fumes, or dusts.
6. The exhaust fan and ductwork shall be insulated with minimum two (2) inch thick fiberglass duct insulation to minimize heat transfer to the attic space, which can result in ice damming on the roof.
7. All ceiling vapor barrier penetrations shall be sealed airtight to minimize condensation build-up in the attic and ice damming on the roof.
8. All duct seams shall be sealed airtight with duct mastic/sealer to prevent condensation damage in the attic.

23.20.601.4 Contamination prevention

Amend by adding the following exceptions:

Exceptions:

1. Environmental air exhaust ducts under positive pressure may extend into or through ducts or plenums if one of the following design approaches is used:
 - a. Route environmental air exhaust ducts inside a shaft when passing through a duct or plenum.
 - b. Install a second duct around the environmental air exhaust duct where passing through ducts and plenums to minimize leakage to the duct or plenum; seal both ends of the outer duct to outside.
 - c. Seal the environmental air exhaust ducts along all seams and joints using a listed low to medium pressure duct sealant, typically applied by brush, trowel, or caulking gun; install sealant per manufacturer's recommendations.
 - d. Provide flexible duct with no seams in the duct or plenum only to a limit of eight (8) feet. The eight (8) feet limit is due to high static losses. Also, sleeving the metal duct with flexible seamless duct is acceptable.
2. Gas vents installed in accordance with section 503.3.6 in the International Fuel Gas Code.

23.20.602.1 General

Delete from the first sentence the words “uninhabited crawl spaces.”

Add the following sentence to the end of the paragraph:

Underfloor crawlspaces shall not be used as plenums.

23.20.603.9 Joints, seams and connections

Add the following exception:

Exception: Continuously welded and locking-type longitudinal joints and seams on ducts operating at static pressures less than 2 inches w.g. pressure classification.

23.20.701.3 Circulation of air

Amend by adding the following paragraph to section **701.3**:

Fuel burning appliances may be required to pass a back draft test as a part of the final plumbing or mechanical inspection. This test shall be conducted with all exhaust fans operating and with fireplace draft open.

23.20.701.4.2 Attic space

Delete the wording of this section and replace with the following:

Combustion air shall not be obtained from the attic unless prior written approval is obtained from the authority having jurisdiction.

23.20.711 Engineered combustion air systems

Amend chapter 7 by adding new section 711:

Section 711 Cold climate alternate requirements for combustion and ventilation air

711.1 Purpose. The purpose of this section is to provide alternate methods of designing combustion air and ventilation air systems for fuel burning appliances in cold climate regions. Only persons registered to practice engineering in the applicable jurisdiction shall be permitted to use these alternate design methods.

711.2 Scope. The requirements of this section apply to all fuel gas burning appliances.

Exception: Direct vent appliances, listed cooking appliances, appliances with separated combustion system, enclosed furnaces, refrigerators and domestic clothes dryers.

711.3 Definitions.

Certain words and terms used in this section shall have meanings as listed. The definitions listed below shall apply to this section only, even though they may differ with broader definitions found elsewhere in the code.

Combustion air is air required for stoichiometric combustion, plus excess air, plus flue dilution air.

Free area is the net actual open area of a louver, screen, duct, or intake grille.

Ventilation air is air required for cooling of the appliance enclosure to maintain temperatures required for proper equipment operation.

711.4 General.

711.4.1 Air supply. Fuel-burning equipment shall be provided with a sufficient supply of combustion and ventilation air.

711.4.1.1 Enclosures containing fuel burning appliances. Enclosures shall be provided with minimum unobstructed combustion air openings as specified in section 711.9, and arranged as specified in sections 711.5 and 711.6, and ventilation air systems as specified in section 711.10.

711.4.1.2 Existing buildings. When fuel-burning appliances are installed in an existing building containing other fuel-burning equipment, the enclosure shall be provided with sufficient combustion and ventilation air for all fuel-burning equipment contained therein as specified in sections 711.9 and 711.10.

711.5 Combustion air openings

711.5.1 Location. The combustion air opening(s) may be located anywhere in the enclosure provided there is an unobstructed area extended to the fire box that does not increase the total combustion air system static pressure requirements.

711.5.2 Dampers prohibited. Combustion air openings shall not be installed so as to open into construction where fire dampers are required. Volume dampers shall not be installed in combustion air openings.

Exception: Motor operated dampers interlocked with appliance controls to open damper prior to firing appliance are permitted, if damper blade actuated end switches are provided to prevent appliance operation should dampers fail to open.

711.5.3 Screening. Combustion air openings shall be covered with corrosion-resistant screen of 1/2 inch mesh, except as provided in section 711.7.3.

Exception: Combustion air openings serving a nonresidential portion of a building may be covered with a screen having openings larger than 1/2 inch but in no case larger than 1 inch.

711.6 Sources of combustion and ventilation air

711.6.1 Air from outside. Combustion and ventilation air obtained from outside the building shall be supplied as follows:

1. Through permanent openings of the required area directly to the outside of the building through the floor, roof, or walls of the appliance enclosure; or
2. Through continuous ducts of the required cross-sectional area extending from the appliance enclosure to the outside of the building.

711.6.2 Under-floor supply. Combustion and ventilation air openings may connect with under-floor areas conforming to the following requirements:

1. Under-floor spaces having unobstructed openings to the exterior which are sized to not exceed the maximum system static pressure requirements specified in sections 711.9 and 711.10.
2. The height of the under-floor space shall comply with the requirements of the Building Code and shall be without obstruction to the free flow of air.

711.6.3 Interior spaces. Large indoor areas may be used for combustion and/or ventilation air if sufficient infiltration or other outside air supply is available by nature of the building construction, system design, or building use.

711.6.4 Prohibited sources. Openings and ducts shall not connect appliance enclosures with space where the operation of a fan may adversely affect the flow of combustion air. Combustion and ventilation air shall not be obtained from a hazardous location or from any area in which objectionable quantities of flammable vapor, lint or dust are given off. Combustion and ventilation air shall not be taken from a machinery room.

711.7 Combustion and ventilation air ducts

711.7.1 General. Combustion and ventilation air ducts shall:

1. Be of galvanized steel complying with chapter 6 or equivalent corrosion-resistant material approved for this use;
2. Have a minimum cross-sectional dimension of three (3) inches; and
3. Serve a single appliance enclosure.

711.7.2 Dampers. Combustion air ducts shall not be installed so as to pass through construction where fire dampers are required, unless properly enclosed in a rated shaft. Volume dampers shall not be installed in combustion air ducts.

Exception: Motor operated dampers interlocked with appliance controls to open damper prior to firing appliance are permitted, if damper blade actuated end switches are provided to prevent appliance operation should dampers fail to open.

711.7.3 Screen. Neither end of ducts terminating in an attic shall be screened.

711.8 Special conditions created by mechanical exhausting or fireplaces.

Operation of exhaust fans, kitchen ventilation systems, clothes dryers or fireplaces shall be considered in determining combustion and ventilation air requirements to avoid unsatisfactory operation of installed fuel burning appliances.

711.9 Area of combustion air openings.

711.9.1 General. The free area of openings, ducts or plenums, screens and louvers supplying combustion air to enclosures containing fuel-burning appliances shall be as required: The opening(s) shall communicate directly or by means of ducts with outdoors or to such spaces (crawl space) that freely communicate with outdoors and shall be sized in accordance with Table No. 7-1.

711.10 Ventilation air.

711.10.1 General. In addition to the combustion air required, sufficient ventilation shall be supplied for proper operation of equipment. Ventilation system shall be designed to maintain positive or atmospheric pressures within the enclosure. If exhaust fans are provided, mechanical make-up air fan shall be installed to make-up exhausted air. Natural or gravity make-up air is not allowed.

TABLE NO. 7-1 COMBUSTION AIR SYSTEM DESIGN CRITERIA

Fuels	System Static Pressure Limits ¹			Combustion Air Requirements
	Atmospheric		Forced Draft	
	Draft Hoods	Barometric Dampers		All Types
GAS (Natural, Propane, Butane)	0.02" WG	0.02" WG	0.05" WG	24 CFM 100,000 BTUH
LIQUID (Light Oil, Heavy Oil)	0.02" WG	0.02" WG	0.05" WG	27.1 CFM 100,000 BTUH
SOLID (Coal, Coke)	0.02" WG	0.02" WG	0.05" WG	30.8 CFM 100,000 BTUH

Note 1: Static pressure values represent maximum static pressure losses across all components of the combustion air system including screens, louvers, ducts and fittings.

Note 2: For enclosures containing both atmospheric and forced draft appliances, the most restrictive design requirements shall apply.

**PER ASHRAE 1993 FUNDAMENTALS HANDBOOK
CHAPTER 15 TABLE 11 (Pg 15.10)**

1 cu. ft. natural gas requires 9.6 cu. ft. air
 1 gallon No. 2 fuel oil requires 106 lbs. air
 1 lb. semi bituminous coal requires 11.2 lbs. air
 Convert to CF/1000 Btu

GAS: $9.6 \text{ cu. ft. air} \times 1 \text{ cu. ft. gas} = 9.6 \text{ cu. ft. air/1000 btu}$
 $1 \text{ cu. ft. gas} \quad 1000 \text{ Btuh} \quad (14.4 @ 50\% \text{ excess})$

OIL: $106 \text{ lbs. air} \times 1 \text{ cu. ft. air} \times 1 \text{ gallon oil} \times 1000 = 10.85 \text{ cu. ft. air/1000 Btu}$
 $1 \text{ gallon oil} \quad 0.0698 \text{ lbs.*} \quad 140,000 \text{ Btu} \quad (16.3 @ 50\% \text{ excess})$

COAL**: $11.2 \text{ lbs. air} \times 1 \text{ cu. ft. air} \times 1 \text{ lb. coal} \times 1000 = 12.3 \text{ cu. ft. air/1000 Btu}$
 $1 \text{ lb. coal} \quad 0.0698 \text{ lbs.*} \quad 13,000 \text{ Btu} \quad (18.5 @ 50\% \text{ excess})$

* Air at 2000 feet above sea level. Installations above this shall derate appliance output 4%/1000 feet.

** Confirm heat capacity of coal, since it varies with type of coal.

EXAMPLE: Combustion Air Flow Rates (CFM) per 100,000 Btuh input. Verify heating values and adjust CFM as required.

	STOICHIOMETRIC 0% Excess air	COMBUSTION @ 50% Excess air
Natural Gas 1000 Btu/cu. ft.	16.0 CFM 100,000 Btuh	24 CFM 100,000 Btuh
No. 2 Fuel Oil 140,000 Btu/gal.	18.1 CFM 100,000 Btuh	27.1CFM 100,000 Btuh
Coal - Semi Bituminous 13,000 Btu/lb	20.5 CFM 100,000 Btuh	30.8 CFM 100,000 Btuh

23.20.801.21 Location and support of venting systems other than masonry chimneys

Add a new section as follows:

801.21 Location and support of venting systems other than masonry chimneys.
 Unless a vent or chimney listed for exterior use in cold weather climates is installed, a vent or chimney system installed exterior to the building outside the thermal envelope shall be enclosed in an insulated (R-19 minimum) chase. The portion of the system above the last roof and its projected plane need not be enclosed. The portion of the system passing through an attic space need not be insulated or enclosed.

23.20.802.9 Vent terminals - ice and snow protection

Amend by adding the following section:

802.9 Vent terminals – ice and snow protection. Vent terminations penetrating a metal roof with a pitch shall be protected by an ice or snow deflector of an approved type acceptable to the Administrative Authority.

23.20.804.3.4 Horizontal terminations

Add the following two sentences to Item 6:

An anticipated snow depth of twelve (12) inches shall be used when determining the manufacturer’s minimum vent termination height. Measurements shall be made to the bottom of the vent outlet.

23.20.923.2 Small ceramic kilns – ventilation

Amend by adding the following section:

923.2 Small ceramic kilns - ventilation. A canopy-type hood shall be installed directly above each kiln. The face opening area of the hood shall be equal to or greater than the top horizontal surface area of the kiln. The hood shall be constructed of not less than 0.024-inch (No. 24 U.S. gauge) galvanized steel or equivalent and be supported at a height of between twelve (12) inches and thirty (30) inches above the kiln by noncombustible supports.

Exception: Electric kilns installed with listed exhaust blowers may be used when marked as being suitable for the kiln and installed in accordance with manufacturer's instructions.

Each hood shall be connected to a gravity ventilation duct extending in a vertical direction to outside the building. This duct shall be of the same construction as the hood and shall have a minimum cross-sectional area of not less than one-fifteenth of the face opening area of the hood. The duct shall terminate a minimum of twelve (12) inches above any portion of a building within four (4) feet and terminate no less than four (4) feet from any openable windows or other openings into the building or adjacent property line. The duct opening to the outside shall be shielded, without reduction of duct area, to prevent entrance of rain into the duct. The duct shall be supported at each section by noncombustible supports.

Provisions shall be made for air to enter the room in which a kiln is installed at a rate at least equal to the air being removed.

23.20.1001.1 Scope

Amend Exception 7 by deleting the words “or state”.

23.20.1006.7 Boiler safety devices

Amend by replacing section 1006.7 with the following:

1006.7 Boiler safety devices. Boilers shall be equipped with controls and limit devices as required by the manufacturer's installation instructions, Table 1006.7 and the conditions of the listing.

23.20. Table 1006.7 –CONTROLS AND LIMIT DEVICES FOR AUTOMATIC BOILERS

Trial for Main Burner Flame

**Safety Control Timing
(Nominal Maximum Time in Seconds)**

Boiler Group	Fuel	Fuel Input Range ¹ (Inclusive) (x0.293071 for W)	Type Of Pilot ²	Trial for Pilot	Direct Electric Ignition	Flame Pilot	Main Burner Flame Failure ³	Assured Fuel Supply Control ⁴	Assured Air Supply Control ⁵	Low Fire Start Up Control ⁶	Pre-Purging Control ⁷	Hot Water Temp. and Low Water Limit Controls ⁸	Steam Pressure and Low Water Limit Controls ⁹	Approved Fuel Shutoff ¹⁰	Control and Limit Device System Design ¹¹
A	Gas	0-400,000 Btu/h	Any type	90	Not required	90	90	Not required	Required	Not required	Not required	Required	Required	Not required	Required
B	Gas	400,001-2,500,000Btu/h	Interrupted or intermittent	15	15	15	2-4	Not required	Required	Not required	Not required	Required	Required	Not required	Required
C	Gas	2,500,001-5,000,000Btu/h	Interrupted or intermittent	15	15	15	2-4	Required	Required	Required	Required	Required	Required	Required	Required
D	Gas	Over 5,000,000 Btu/h	Interrupted	15	15	15	2-4	Required	Required	Required	Required	Required	Required	Required	Required
E	Oil	0-400,000 Btu/h	Any type	Not required	90	90	90	Not required	Required	Not required	Not required	Required	Required	Not required	Required
F	Oil	400,001-1,000,000 Btu/h	Interrupted	Not required	30	30	2-4	Required	Required	Not required	Not required	Required	Required	Not required	Required
G	Oil	1,000,001-3,000,000 Btu/h	Interrupted	Not required	15	15	2-4	Required	Required	Not required	Not required	Required	Required	Not required	Required
H	Oil	Over 3,000,000 Btu/h	Interrupted	15	15	60	2-4	Required	Required	Required	Required	Required	Required	Required	Required
K	Elec.	All	Not required	Not required	Not required	Not required	Not required	Not required	Not Required	Not required	Not required	Required	Required	Not required	Required

- 1 Fuel input shall be determined by one of the following:
 - 1.1 The maximum burner input as shown on the burner nameplate or as otherwise identified by the manufacturer.
 - 1.2 The nominal boiler rating, as determined by the building official, plus 25 percent.
- 2 Automatic boilers shall have one flame failure device on each burner which shall prove the presence of a suitable ignition source at the point where it will reliably ignite the main burner, except that boiler Groups A, B, E, F and G which are equipped with direct electric ignition shall monitor the main burner, and all boiler groups using interrupted pilots shall monitor only the main burner after the prescribed limited trial and ignition periods. Boiler Group A equipped with continuous pilot shall accomplish 100 percent shutoff within 90 seconds upon pilot flame failure. The use of intermittent pilots in boiler Group C is limited to approved burner units.
- 3 In boiler Groups B, C and D, a 90-second main burner flame failure limit may apply if continuous pilots are provided on manufacturer-assembled boiler-burner units approved by an approved testing agency as complying with nationally recognized standards approved by the building official. Boiler Groups F and G equipped to reenergize their ignition system within 0.8 second after main burner flame failure shall be permitted 30 seconds for Group F or 15 seconds for Group G to reestablish its main burner flame.
- 4 Boiler Groups C and D shall have controls interlocked to accomplish a nonrecycling fuel shutoff upon high or low gas pressure, and boiler Groups F, G and H using steam or air for fuel atomization shall have controls interlocked to accomplish a nonrecycling fuel shutoff upon low atomizing steam or air pressure. Boiler Groups F, G and H equipped with a preheated oil system shall have controls interlocked to provide fuel shutoff upon low oil temperature.
- 5 Automatic boilers shall have controls interlocked to shut off the fuel supply in the event of draft failure if forced or induced draft fans are used or, in the event of low combustion airflow, if a gas power burner is used. Where a single motor directly driving both the fan and the oil pump is used, a separate control is not required.
- 6 Boiler Groups C, D and H, when firing in excess of 400,000 Btu per combustion chamber, shall be provided with low fire start of its main burner system to permit smooth light off. This shall normally be a rate of approximately one-third of its maximum firing rate.
- 7 Boiler Groups C, D and H shall not permit pilot or main burner trial for ignition operation before a purging operation of sufficient duration to permit a minimum of four complete air changes through the furnace, including combustion chamber and the boiler passes. Where this is not readily determinable, five (5) complete air changes of the furnace, including combustion chamber up to the first pass, shall be considered equivalent. An atmospheric gas burner with no mechanical means of creating air movement or an oil burner which obtains two-thirds or more of the air required for combustion without mechanical means of creating air movement shall not require purge by means of four (4) air changes so long as its secondary air openings are not provided with means of closing. If such burners

have means of closing secondary air openings, a time delay shall be provided which puts these closures in a normally open position for four (4) minutes before an attempt for ignition. An installation with a trapped combustion chamber shall in every case be provided with a mechanical means of creating air movement for purging.

- 8 Every automatic hot-water-heating boiler, low-pressure hot-water-heating boiler, and power hot-water boiler shall be equipped with two (2) high-temperature limit controls with a manual reset on the control with the higher setting interlocked to shut off the main fuel supply, except the manual reset on the high-temperature limit control shall not be required on any automatic package boiler not exceeding 400,000 Btu/h input and approved by an approved testing agency. Every automatic hot-water heating, power boiler and package hot-water supply boiler shall be equipped with one low-water-level limit control with a manual reset interlocked to shut off the fuel supply, installed to prevent damage to the boiler and to permit testing of the control without draining the heating system except on boilers used in Group R Occupancies of less than six (6) units and in Group M Occupancies and further, except the low-water-level limit control is not required on package hot-water-supply boilers approved by a nationally recognized testing agency. However, a low-water-flow limit control installed in the circulating water line may be used instead of the low-water-level limit control for the same purpose on coil-type boilers.
- 9 Every automatic low-pressure steam-heating boiler, small power boiler and power steam boiler shall be equipped with two high-steam pressure limit controls interlocked to shut off the fuel supply to the main burner with manual reset on the control with the higher setting, and two (2) low-water-level limit controls, one of which shall be provided with a manual reset device and independent of the feed water controller. Coil-type flash steam boilers may use two (2) high-temperature limit controls, one of which shall be manually reset in the hot-water coil section of the boiler instead of the low-water-level limit control.
- 10 Boiler Groups C, D and H shall use an approved automatic reset safety shutoff valve for the main burner fuel shutoff, which shall be interlocked to the programming control devices required. On oil burners where the safety shutoff valve shall be subjected to pressures in excess of ten (10) psi when the burner is not firing, a second safety shutoff valve shall be provided in series with the first. Boiler Groups C and D, using gas in excess of 1-pound-per-square-inch pressure or having a trapped combustion chamber or employing horizontal fire tubes, shall be equipped with two (2) approved safety shutoff valves, one of which shall be an automatic-reset type, one of which may be used as an operating control, and both of which shall be interlocked to the limit-control devices required. Boiler Groups C and D using gas in excess of 1-pound-per-square-inch pressure shall be provided with a permanent and ready means for making periodic tightness checks of the main fuel safety shutoff valves.
- 11 Control and limit device systems shall be grounded with operating voltage not to exceed 150 volts except, on approval by the building official, existing control equipment to be reused in an altered boiler control system may use 220-volt single phase with one side grounded, provided such voltage is used for all

controls. Control and limit devices shall interrupt the ungrounded side of the circuit. A readily accessible means of manually disconnecting the control circuit shall be provided with controls so arranged that when they are de-energized the burner shall be inoperative.

23.20.1006.8 Electrical requirements

Delete section in its entirety.

23.20.1007 Boiler low-water cutoff

Delete section in its entirety.

23.20.1105.3 Refrigerant detector

Add a second sentence to read as follows:

Refrigerant detectors shall alarm audibly and visually both inside and outside the machinery room or refrigerated space.

23.20.1105.6.2 Make-up air

Amend last sentence by changing ¼ -inch to ½ -inch..

23.20.1301.1 Scope

Revise the first sentence of the section to read as follows:

The design, installation, construction, and repair of fuel oil storage and piping systems shall be in accordance with this chapter and NFPA 31.