

APPENDIX "I"

CHAPTER XXVII—CHIMNEYS, FIREPLACES AND VENTING SYSTEMS

(Excerpt from N.C. Building Code)

SECTION 2700—MASONRY CHIMNEYS—GENERAL REQUIREMENTS

2700.1—GENERAL CONSTRUCTION

Masonry chimneys shall be designed and constructed so as to be reasonably safe to persons and property. Conformance of the design and construction of chimneys to the applicable provisions of this code shall be deemed to be reasonably safe to persons and property; on matters not covered by this code, conformance to the applicable standard specified in the Appendix shall be evidence that such masonry chimneys are designed and constructed so as to be reasonably safe to persons and property.

2700.2—SUPPORT

Masonry chimneys shall be supported on foundations of masonry or reinforced concrete or other non-combustible material having a fire resistance rating of not less than 3 hours.

2700.3—CORBELING

No chimney shall be corbeled from a wall more than 6 inches; nor shall a chimney be corbeled from a wall which is less than 12 inches in thickness unless it projects equally on each side of the wall; provided that in the second story of 2-story dwellings, corbeling of chimneys on the exterior of the enclosing walls may equal the wall thickness. Corbeling shall not exceed one inch projection for each course of brick projected.

2700.4—CHANGE IN SIZE OR SHAPE AT ROOF NOT PERMITTED

No change in the size or shape of a chimney, where the chimney passes through the roof, shall be made within a distance of 6 inches above or below the roof joists or rafters.

2700.5—CLEARANCES FROM COMBUSTIBLE MATERIAL

Clearance between chimneys and combustible material shall be not less than specified in Section 1708 of N.C. Building Code, Volume I, Chapter 17.

2700.6—SMOKE TEST

Chimneys shall be proved tight by a smoke test after erection and before being put into use.

2700.7—CLEANOUT OPENINGS

Cleanout openings provided in chimneys shall be equipped with ferrous metal doors and frames arranged to remain tightly closed when not in use.

SECTION 2701—MASONRY CHIMNEYS FOR LOW HEAT APPLIANCES

2701.1—GENERAL

Masonry chimneys for low heat appliances shall conform to all the applicable provisions of Section 2700 in addition to those in this Section.

Appendix I

2701.2—APPLIANCES CLASSED AS LOW HEAT APPLIANCES

Low heat appliances shall include ranges, heating stoves, warm air heating furnaces, water heaters and hot water heating boilers, steam boilers operating at not over 50 pounds per square inch gauge pressure, steam boilers of not over 10 boiler horsepower regardless of operating pressure, domestic type incinerators, fireplaces, bakery ovens, candy furnaces, coffee roasting ovens, core ovens, lead melting furnaces, rendering furnaces, stereotype furnaces, wood drying furnaces, and other furnaces classified as low heat appliances in accordance with the provisions of section 2700.1. Appliances otherwise classed as medium heat appliances may be considered as low heat appliances if not larger than 100 cubic feet in size.

2701.3—CONSTRUCTION

(a) Masonry chimneys for low heat appliances shall be constructed of rubble stone masonry 12 inches thick or solid masonry units or reinforced concrete of the following thicknesses:

- (1) Chimney walls shall be not less than 4 inches thick in dwellings, when connected to domestic type low heat appliances and for building heat equipment for heating a total volume of occupied space not to exceed 25,000 cubic feet;
- (2) Except that other chimney walls shall be not less than 8 inches thick.

(b) Masonry chimneys for low heat appliances shall be lined with approved fire clay flue liners not less than $\frac{3}{8}$ of an inch thick, or with other approved liner of material that will resist without softening or cracking at temperature of 1800 degrees F.

(c) Fire clay flue liners shall be installed ahead of the construction of the chimney as it is carried up, carefully bedded one on the other in Type M, Type S or fire clay mortar with close fitting joints left smooth on the inside.

(d) In masonry chimneys with walls less than 8 inches thick, liners shall be separate from the chimney wall and the space between the liner and masonry shall not be filled; only enough mortar shall be used to make a good joint and hold the liners in position.

(e) Flue liners shall start from a point not less than 8 inches below the intake, or, in the case of fireplaces, from the throat of the fireplace. They shall extend, as nearly vertically as possible, for the entire height of the chimney.

(f) Where two flues adjoin each other in the same chimney with only flue lining separation between them, the joints of the adjacent flue linings shall be staggered at least 7 inches.

(g) Where more than two flues are located in the same chimney, masonry wythes at least 4 inches wide and bonded into the masonry walls of the chimney shall be built at such points between adjacent flue linings that there are not more than two flues in any group of adjoining flues without such wythe separation.

2701.4—HEIGHT

(a) Masonry chimneys for low heat appliances shall extend at least 3 feet above the highest point where they pass through the roof of a building and at least 2 feet higher than any portion of the building within 10 feet.

SECTION 2702—MASONRY CHIMNEYS FOR MEDIUM HEAT APPLIANCES

2702.1—GENERAL

Masonry chimneys for medium heat appliances shall conform to all the applicable provisions of Section 2700 in addition to those in this Section 2702.

Appendix I

2702.2—APPLIANCES CLASSED AS MEDIUM HEAT APPLIANCES

Medium heat appliances shall include annealing furnaces (glass or metal), charcoal furnaces, galvanizing furnaces, gas producers and steam boilers of over 10 boiler horsepower operating at over 50 pounds per square inch gauge pressure when such appliances are larger than 100 cubic feet in size, and other furnaces classified as medium heat appliances in accordance with the provisions of Section 2701.1. Appliances otherwise classed as high heat appliances may be considered as medium heat appliances if not larger than 100 cubic feet in size.

2702.3—CONSTRUCTION

Masonry chimneys for medium heat appliances shall be constructed of solid masonry units or of reinforced concrete not less than 8 inches thick, except that stone masonry shall be not less than 12 inches thick; and in addition, shall be lined with not less than 4½ inches of fire brick laid on the 4½-inch bed in fire clay mortar, starting not less than 2 feet below the chimney connector entrance and extending for a distance of at least 25 feet above the chimney connector entrance.

2702.4—HEIGHT

Masonry chimneys for medium heat appliances shall extend not less than 10 feet higher than any portion of any building within 25 feet.

SECTION 2703—MASONRY CHIMNEYS FOR HIGH HEAT APPLIANCES

2703.1—GENERAL

Masonry chimneys for high heat appliances shall conform to all the applicable provisions of Section 2700 in addition to those in this Section 2703.

2703.2—APPLIANCES CLASSED AS HIGH HEAT APPLIANCES

High heat appliances shall include billet and bloom furnaces, blast furnaces, brass melters, cupolas, glass furnaces, open hearth furnaces, ceramic and vitreous enameling ovens when such appliances are larger than 100 cubic feet in size, and other furnaces classified as high heat appliances in accordance with the provisions of Section 2700.1.

2703.3—CONSTRUCTION

Masonry chimneys for high heat appliances shall be constructed with double walls of solid masonry units or of reinforced concrete, each not less than 8 inches in thickness, with an air space of not less than 2 inches between them. The inside of the interior walls shall be of fire brick not less than 4½ inches in thickness laid on the 4½-inch bed in fire clay mortar.

2703.4—HEIGHT

Masonry chimneys for high heat appliances shall extend not less than 20 feet higher than any portion of any building within 50 feet.

2703.5—CLEARANCE FROM COMBUSTIBLE MATERIAL

Masonry chimneys for high heat appliances shall have sufficient clearance from buildings and structures to avoid overheating combustible material, to permit inspection and for maintenance operations on the chimney. Clearances shall be based on good engineering practice and subject to approval by the Building Official.

Appendix I

SECTION 2704—MASONRY CHIMNEYS FOR INCINERATORS

2704.1—DOMESTIC TYPE INCINERATORS

Masonry chimneys for domestic type incinerators shall be constructed in accordance with the requirements for masonry chimneys for low heat appliances, Section 2701.

2704.2

(a) CONSTRUCTION

- (1) The flue of flue-fed incinerators shall serve the incinerator only and be used for no other purpose.
- (2) The flue liner shall be straight and plumb and shall be smooth on the inside.
- (3) The size of incinerator flues shall be in accordance with the following:
 - (a) Where not more than one service opening is provided, the size of flue shall be not less than 14 by 14 inches or 196 square inches, inside measurement, except that in one family dwellings the size shall be not less than 12 by 12 or 144 square inches.
 - (b) Where two to six service openings are provided, the size of flue shall be not less than 18 by 18 inches or 324 square inches, inside measurement.
 - (c) Where seven or more service openings are provided, the size of flue shall be not less than 22 by 22 inches or 484 square inches, inside measurement.
- (4) A chimney serving an incinerator with a combustion chamber having a horizontal combined hearth and grate area of 7 square feet or less shall have walls of clay or shale brickwork not less than 4 inches thick with a lining of 4½ inches of fire brick for a distance of not less than 10 feet above the roof of the combustion chamber; beyond this point chimney walls shall consist of not less than 8 inches of clay or shale brickwork with a standard fire clay liner not less than ⅝ inch in thickness extending from the top of the fire brick lining to the top of the chimney.
- (5) A chimney serving an incinerator with a combustion chamber having a horizontal combined hearth and grate area exceeding 7 square feet shall have walls of clay or shale brickwork not less than 4 inches thick with a lining of 4½ inches of fire brick for a distance of not less than 40 feet above the roof of the combustion chamber; beyond this point, chimney walls shall consist of not less than 8 inches of clay or shale brickwork with a standard fire clay flue liner extending from the top of the fire brick lining to the top of the chimney.
- (6) Other constructions may be used if equivalent to the constructions outlined in Section 2704.2(a), 4 and 5, in structural strength, insulating value and ability to withstand thermal expansion and flame impingement.
- (7) Fire brick shall be laid in high temperature cement or fire clay mortar.
- (8) A flue that is divided into two channels, one for feeding refuse and the other for the discharge of combustion gases, shall be constructed as specified in this subsection 2705.2.

Appendix I

- (9) Masonry chimneys for flue-fed incinerators shall be supported on properly designed foundations of masonry or reinforced concrete. Non-combustible material having a fire resistance rating of not less than 3 hours may be used to support masonry chimneys where such supports are independent of the floor construction and the load is transferred to the ground. They shall be so constructed as not to place excessive stress upon the roof of the combustion chamber. Masonry chimneys may be supported on incinerator walls.
- (10) All flues shall terminate in a substantially constructed spark arrester with openings not greater than $\frac{1}{2}$ inch, or be provided with other suitable means for avoiding discharge of fly particles. Expansion chambers used as a secondary combustion chamber shall be constructed equivalent to that of the incinerator combustion chamber. Those used only for settling shall be of construction equivalent to that of the upper portion of incinerator chimney and with clearances to combustible construction as specified by Section 1708. Expansion chambers shall be provided with substantial non-combustible supports. Every expansion chamber shall have a vent of cross-sectional area at least equal to that of the flue.
 - (b) HEIGHT: Chimneys of flue-fed incinerators shall extend at least 4 feet above sloping roof measured from the highest point at which the chimney passes through the roof and at least 8 feet above flat roofs. In either case, the chimney shall extend at least 2 feet higher than any portion of a building within 2 feet.

(See Chapter V, Section 518.7)

2704.3—COMMERCIAL AND INDUSTRIAL TYPE INCINERATORS

(a) CONSTRUCTION

- (1) Chimneys of commercial and industrial type incinerators, except as provided in Section 2704.3(a) (2) and (3), shall be not less than 8 inches of clay or shale brickwork or reinforced concrete or a metal chimney, lined with fire brick not less than $4\frac{1}{2}$ inches thick for the full height of the chimney.
- (2) Subject to approval by the Building Official, commercial and industrial type incinerators may be connected to chimneys constructed of 8 inches of clay or shale brickwork or reinforced concrete lined with fire clay flue liner, or to a metal chimney, where the incinerator is specially constructed to produce low flue gas temperatures.
- (3) Other constructions may be used if equivalent to the construction outlined in Section 2704.3 (a) (1) and (2) in structural strength, insulating value and ability to withstand thermal expansion and flame impingement.
- (4) Fire brick and other refractory lining shall be laid in high temperature cement or fire clay mortar.
- (5) Masonry chimneys for commercial and industrial incinerators shall be supported on properly designed foundations of masonry or reinforced concrete. Non-combustible material having a fire resistance rating of not less than 3 hours may be used to support masonry chimneys where such supports are independent of the floor construction and the load is transferred to the ground. They shall be so constructed as not to place excessive stress upon the roof of the combustion chamber. Masonry chimneys may be supported on incinerator walls.

Appendix I

- (6) Incinerators may be connected to industrial or similar chimneys serving heat-producing appliances provided the cross-sectional area of such chimney is adequate for the combined services and its construction is suitable for the chimney flue gas temperature.
- (7) Incinerators used for the burning of rubbish or other readily combustible solid waste material shall include effective means for arresting sparks and fly particles, such as an expansion chamber, baffle walls, or other effective arrangement, or the flues of such incinerators shall be provided with an approved spark arrester having openings not greater than $\frac{3}{4}$ inch.
 - (b) HEIGHT: Chimneys of commercial and industrial type incinerators shall extend at least 4 feet above sloping roofs measured from the highest point at which the chimney passes through the roof and at least 8 feet above flat roofs. In either case, the chimney shall extend at least 2 feet higher than any portion of a building within 20 feet.

SECTION 2705—LABORATORY TESTED FACTORY-BUILT CHIMNEYS

Factory-built chimneys that are approved as a result of tests and listing by a nationally recognized testing laboratory shall be installed in accordance with the conditions of the approval.

SECTION 2706—METAL CHIMNEYS (SMOKESTACKS)

2706.1—GENERAL REQUIREMENTS

- (a) Metal chimneys shall be of adequate thickness based on good engineering practice, properly riveted or welded, and securely supported.
- (b) Metal chimneys shall not be carried up inside of ventilating ducts unless such ducts are constructed and installed as required by this standard for chimneys and the ventilating ducts are used solely for exhaust of air from the room or space in which the appliance served by the metal chimney is located.
- (c) Metal chimneys shall have sufficient clearance from buildings and structures to avoid overheating combustible material, to permit inspection and maintenance operations on the chimney, and to avoid danger of burns to persons using any nearby exitway.

2706.2—METAL CHIMNEYS FOR LOW HEAT APPLIANCES

(a) HEIGHT

- (1) Metal chimneys for low heat appliances except as provided in Section 2706.2(a) 2, shall extend at least 3 feet above the highest point where they pass through the roof of a building and at least 2 feet higher than any portion of a building within 10 feet.
- (2) The outlet of a metal chimney for residential and low-heat appliances equipped with an exhauster may terminate at a location not less than 3 feet from an adjacent building or building opening and at least 10 feet above grade or walkways. In any case, the outlet shall be so arranged that the flue gases are not directed so as to jeopardize people, overheat combustible structures, or enter building openings in the vicinity of the outlet.

(b) CLEARANCES FOR EXTERIOR METAL CHIMNEYS

- (1) Exterior metal chimneys used only for low heat appliances as defined in Section 2701.2 shall have a clearance of not less than 6 inches from a wall of wood frame construction and from any combustible material.

Appendix I

- (2) Exterior metal chimneys over 18 inches in diameter shall have a clearance of not less than 4 inches, and those 18 inches or less in diameter a clearance of not less than 2 inches from non-combustible material and a building wall of other than wood frame construction.
- (3) No portion of an exterior metal chimney shall be nearer than 24 inches to any door or window or to any walk way, unless insulated or shielded in an approved manner to avoid burning a person who might touch the chimney.

(c) CLEARANCES FOR INTERIOR METAL CHIMNEYS

- (1) Where a metal chimney extends through any story above that in which the appliances connected to the chimney are located, it shall be enclosed in such upper stories with walls of non-combustible construction having a fire resistance rating of not less than one hour.
- (2) The enclosure shall provide a space on all sides of the chimney sufficient to permit inspection and repair.
- (3) The enclosing walls shall be without openings, except doorways equipped with approved self-closing fire doors at various floor levels for inspection purposes.
- (4) Where a metal chimney used for low heat appliances as defined in Section 2701.2 is located in the same story of a building as that in which the appliances connected thereto are located, it shall have a clearance of not less than 18 inches from a wall of wood frame construction and from any combustible material except as provided in Section 2708.5(b) for metal pipe gas vents.
- (5) Where a metal chimney serving only low heat appliances as defined in Section 2701.2 passes through a roof constructed of combustible material, it shall be guarded by a ventilating thimble of galvanized iron or approved corrosion resistant metal, extending not less than 9 inches below and 9 inches above the roof construction, and of a size to provide not less than 6 inches clearance on all sides of the chimney; or the combustible material in the roof construction shall be cut away so as to provide not less than 18 inches clearance on all sides of the chimney, with any material used to close up such opening entirely non-combustible.

2706.3—METAL CHIMNEYS FOR MEDIUM HEAT APPLIANCES

(a) HEIGHT: Metal chimneys for medium heat appliances shall extend not less than 10 feet higher than any portion of any building within 25 feet.

(b) CLEARANCES FOR EXTERIOR METAL CHIMNEYS

- (1) Exterior metal chimneys used for medium heat appliances as defined in Section 2702.2 shall have a clearance of not less than 24 inches from a wall of wood frame construction and from any combustible material.
- (2) Exterior metal chimneys over 18 inches in diameter shall have a clearance of not less than 4 inches, and those 18 inches or less in diameter a clearance of not less than 2 inches from non-combustible material and a building wall of other than wood frame construction.
- (3) No portion of an exterior metal chimney shall be nearer than 24 inches to any door or window or to any walkway, unless insulated or shielded in an approved manner to avoid burning a person who might touch the chimney.

(c) CLEARANCES FOR INTERIOR METAL CHIMNEYS

- (1) Where a metal chimney extends through any story of a building above

Appendix I

that in which the appliances connected to the chimney are located, it shall be enclosed in such upper stories with walls which are continuous of non-combustible construction having a fire resistance rating of not less than one hour.

- (2) The enclosure shall provide a space on all sides of the chimney sufficient to permit inspection and repair.
- (3) The enclosed walls shall be without openings, except doorways equipped with approved self-closing fire doors at various floor levels for inspection purposes.
- (4) Where a metal chimney serving a medium heat appliance as defined in Section 2702.2 passes through a roof constructed of combustible material, it shall be guarded by a ventilating thimble of galvanized iron or approved corrosion resistant metal, extending not less than 9 inches below and 9 inches above the roof construction, and of a size to provide not less than 18 inches clearance on all sides of the chimney.
- (5) Where a metal chimney used for medium heat appliances as defined in Section 2702.2 is located in the same story of a building as that in which the appliances connected are located, it shall have a clearance of not less than 36 inches from a wall of wood construction and from any combustible material.

2706.4—METAL CHIMNEYS FOR HIGH HEAT APPLIANCES

(a) **CONSTRUCTION:** Metal chimneys used for high heat appliances as defined in Section 2703.2 shall be lined with not less than 4½ inches of fire brick laid in fire clay mortar extending not less than 25 feet above the chimney connector entrance.

(b) **HEIGHT:** Metal chimneys for high heat appliances shall extend not less than 20 feet higher than any portion of any building within 50 feet.

(c) **CLEARANCE FROM COMBUSTIBLE MATERIAL:** Metal chimneys for high heat appliances shall have sufficient clearance from buildings and structures to avoid overheating combustible material, to permit inspection, maintenance operations on the chimney and to avoid danger of burns to persons using any nearby exit way. Clearances shall be based on good engineering practice and subject to the approval by the Building Official.

SECTION 2707—METAL CHIMNEYS FOR INCINERATORS

Metal chimneys not less than No. 20 galvanized sheet gage number or other equivalent non-combustible corrosion resistant material may be used for domestic type incinerators installed in locations such as sheds, breezeways or carports provided the metal chimney is exposed and readily examinable for its full length and clearances not less than 18 inches are maintained from combustible material. The metal chimney shall extend at least 3 feet above the highest point where it passes through the roof and at least 2 feet higher than any portion of the building within 10 feet. Where the metal chimney passes through a roof constructed of combustible material, clearances shall conform to the requirements for interior metal chimneys for low heat appliances, Section 2706 (c) 6.

2707.2—COMMERCIAL AND INDUSTRIAL TYPE INCINERATORS

(a) CONSTRUCTION

- (1) Metal chimneys of commercial and industrial type incinerators, shall be lined with fire brick not less than 4½ inches thick for the full height of the chimney.

Appendix I

- (2) Firebrick shall be laid in high temperature cement or fire clay mortar.
- (3) Subject to approval by the Building Official commercial and industrial type incinerators may be connected to a metal chimney without firebrick flue liner provided the incinerator is specially constructed to produce low flue gas temperatures.
 - (b) HEIGHT: Metal chimneys of commercial and industrial type incinerators shall extend at least 4 feet above sloping roofs measured from the highest point at which the metal chimney passes through the roof and at least 8 feet above flat roofs. In either case, the chimney shall extend at least 2 feet higher than any portion of a building within 20 feet.
 - (c) CLEARANCE: A clearance of not less than 4 inches shall be provided between the exterior surface of metal chimneys for commercial and industrial type incinerators and combustible material.

SECTION 2709—FIREPLACES

2709.1—FACTORY-BUILT FIREPLACES

Factory-built fireplaces shall be approved as a result of tests and listing by a nationally recognized testing laboratory and shall be installed in accordance with the conditions of the approval. Hearth extensions shall be provided in accordance with Section 2709.3(f).

2709.2—FACTORY-BUILT FIREPLACE STOVES

Factory-built fireplace stoves shall be approved as a result of tests and listing by a nationally recognized testing laboratory and shall be installed in accordance with the conditions of the approval. Hearth extensions shall be provided in accordance with section 2709.3(d).

2709.3—MASONRY FIREPLACES

(a) Fireplaces shall be constructed of solid masonry or of reinforced concrete with back and sides of the thickness specified in this paragraph, except as provided in 2701. Where a lining of firebrick at least 2 inches thick or other approved lining is provided, the total thickness of back and sides, including the lining, shall be not less than 8 inches. Where no such lining is provided, the thickness of back and sides shall be not less than 12 inches.

(b) Steel fireplace units incorporating a firebox liner of not less than ¼-inch thick steel and an air chamber may be installed with masonry to provide a total thickness at the back and sides not less than 8 inches, not less than 4 inches of which shall be solid masonry.

(c) Warm air ducts employed with steel fireplace units of the circulating air type shall be constructed of metal or masonry.

(d) Fireplace hearth extensions shall be provided of approved non-combustible materials for all fireplaces. Where the fireplace opening is less than 6 sq. ft., the hearth extension shall extend at least 16 in. in front of, and at least 8 in. beyond each side of the fireplace opening. Where the fireplace opening is 6 sq. ft., or larger, the hearth extension shall extend at least 20 in. in front of, and at least 12 in. beyond each side of the fireplace opening. Where a fireplace is elevated above or overhangs a floor, the hearth extension shall also extend over the area under the fireplace.

(e) Fireplaces constructed of masonry or reinforced concrete shall have hearth extensions of brick, concrete, stone, tile or other approved non-combustible material properly supported and with no combustible material against the underside thereof. Wooden forms or centers used during the construction of hearth and hearth extension shall be removed when the construction is completed.

Appendix I

(f) Hearth extensions of approved factory built fireplaces and fireplace stoves shall be not less than $\frac{3}{8}$ in. thick of asbestos, concrete, hollow metal, stone, tile or other approved non-combustible material. Such hearth extensions may be placed on the slab of finished flooring whether the flooring is combustible or not. The hearth extension shall be readily distinguishable from the surrounding floor.

(g) Clearances between fireplaces of masonry or reinforced concrete and combustible material shall be not less than specified in Section 1708.

(h) Spaces between fireplaces and combustible material shall be fire-stopped as specified in Section 1708.

810.0 CHIMNEY SELECTION CHART (Excerpt from NFPA No. 211)

Chimneys for LOW HEAT Appliances			Chimneys for HIGH HEAT Appliances ³
Chimneys for Residential Type Appliances	Building Heating Appliances	Industrial Type Low Heat Appliances	Chimneys for MEDIUM HEAT Appliances ¹
1. Factory built, residential type). 2. Masonry (residential type).	1. Factory built, low heat type). 2. Masonry (low heat type). 3. Metal (low heat type).	1. Factory built (industrial low heat type). 2. Masonry (low heat type). 3. Metal (low heat type).	1. Masonry (high heat type). 2. Metal (high heat type).
TYPES OF APPLIANCES TO BE USED WITH EACH TYPE CHIMNEY			
Column I	Column II	Column III	Column IV
A. Residential type appliances, such as: 1. Ranges 2. Warm air furnaces. 3. Water heaters. 4. Hot water heating boilers. 5. Low pressure steam heating boilers (not over 15 psig). 6. Domestic incinerators. 7. Floor furnaces. 8. Wall furnaces. 9. Room heaters. 10. Fireplace stoves. B. Fireplaces.	A. All appliances shown in Column I. B. Nonresidential type building heating appliances for heating a total volume of space exceeding 25,000 cubic feet.* C. Steam boilers operating at not over 50 lb. per sq. in. gage pressure; pressing machine boilers.	All appliances shown in Columns I and II, and appliances such as: 1. Annealing baths for hard glass (fats, paraffine, salts, or metals). 2. Bake ovens (in bakeries). 3. Boiling vats, for wood fibre, straw, lignin, etc. 4. Candy furnaces. 5. Coffee roasting ovens. 6. Core ovens. 7. Cruller furnaces. 8. Feed drying ovens. 9. Fertilizer drying ovens.	All appliances shown in Columns I, II, III, and IV and appliances ² such as: 1. Bessemer retorts. 2. Billet and bloom furnaces. 3. Blast furnaces. 4. Bone calcining furnaces. 5. Brass furnaces. 6. Carbon point furnaces. 7. Cement brick and tile kilns. 8. Ceramic kilns. 9. Coal and water gas retorts. 10. Cupolas.

* Nonresidential type building heating appliances for heating a total volume of space not to exceed 25,000 cubic feet may be connected to chimneys for residential type appliances.
 NOTE 1: Appliances otherwise classed as high heat appliances may be considered as medium heat appliances if not larger than 100 cubic feet in size.
 NOTE 2: When such appliances are larger than 100 cubic feet in size, and other furnaces classified as high heat appliances in accordance with nationally recognized good practice.
 NOTE 3: Continuous operating equipment of the counter current type may not require the type of flue indicated by general types of appliances.

Appendix I

810.0 CHIMNEY SELECTION CHART (Continued)

Chimneys for LOW HEAT Appliances			Chimneys for HIGH HEAT Appliances
Chimneys for Residential Type Appliances	Building Heating Appliances	Industrial Type Low Heat Appliances	
<ol style="list-style-type: none"> 1. Factory built. 2. Masonry (residential type) 	<ol style="list-style-type: none"> 1. Factory built. 2. Masonry (low heat type) 3. Metal (low heat type). 	<ol style="list-style-type: none"> 1. Factory built industrial low heat type). 2. Masonry (low heat type) 3. Metal (low heat type). 	<ol style="list-style-type: none"> 1. Masonry (high heat type). 2. Metal (high heat type).
TYPES OF APPLIANCES TO BE USED WITH EACH TYPE CHIMNEY			
<ol style="list-style-type: none"> 1. Factory built. 2. Masonry (residential type) 	<ol style="list-style-type: none"> 10. Fireplaces, other than residential type. 11. Forge furnaces (solid fuel). 12. Gypsum kilns. 13. Hardening furnaces (below dark red). 14. Hot air engine furnaces. 15. Ladle drying furnaces. 16. Lead melting furnaces. 17. Nickel plate (drying) furnaces. 18. Paraffine furnaces. 19. Recuperative furnaces (spent materials). 20. Rendering furnaces. 21. Restaurant type cooking appliances using solid or liquid fuel. 22. Rosin melting furnaces. 23. Stereotype furnaces. 24. Sulphur furnaces. 25. Tripoli kilns. (clay, coke and gypsum). 26. Type foundry Furnaces. 	<ol style="list-style-type: none"> 10. Incinerators, commercial and industrial type. 11. Lehrs and glory holes. 12. Lime kilns. 13. Linseed oil boiling furnaces. 14. Porcelain biscuit kilns. 15. Pulp driers (direct fire heated). 16. Steam boilers operating at over 50 lb. per sq. in. gage pressure except pressing machine boilers. 17. Water-glass kiln. 18. Wood-distilling furnaces. 19. Wood-gas retorts. 	<ol style="list-style-type: none"> 11. Earthenware kilns. 12. Glass blow furnaces. 13. Glass furnaces (smelting). 14. Glass kilns. 15. Open hearth furnaces. 16. Ore roasting furnaces. 17. Porcelain baking and glazing kilns. 18. Pot-arches. 19. Puddling furnaces. 20. Regenerative furnaces. 21. Reverberatory furnaces. 22. Stacks, carburetor or superheating furnaces (in water gas works). 23. Vitreous enameling ovens (ferrous metals). 24. Wood carbonizing furnaces.

- | | | | |
|---|--|--|--|
| 27. Wood drying furnaces.
28. Wood impregnating furnaces.
29. Zinc amalgamating furnaces. | | | |
|---|--|--|--|

Appendix I

VENTING SYSTEM SELECTION CHART (Excerpt from NFPA No. 211)

Type of Venting System			
Type B—Gas	Type BW—Gas	Type L—Oil	Metal Pipe
<p>Column I</p> <p>All listed gas appliances with draft hoods such as:</p> <ol style="list-style-type: none"> 1. Central furnaces. 2. Duct furnaces. 3. Floor furnaces. 4. Heating boilers. 5. Ranges 6. Built-in ovens. 7. Vented wall furnaces listed for use with Type B vents. 8. Room heaters. 9. Water heaters. 10. Horizontal furnaces. 11. Unit heaters. 	<p>Column II</p> <ol style="list-style-type: none"> 1. Vented wall furnaces listed for use with Type BW vents only. 	<p>Column III</p> <ol style="list-style-type: none"> 1. Low temperature flue gas appliances listed for use with Type L venting systems. 2. Gas appliances shown in Column I. 	<p>Column IV</p> <ol style="list-style-type: none"> 1. Incinerators used outdoors, such as in open sheds, breezeways or carports as provided in 705.A. 2. Gas appliances shown in Column I. 3. Listed residential and low heat gas appliances without draft hoods and unlisted residential and low heat gas appliances with or without draft hoods.

Appendix I

**Thickness and Termination Above Roof of Masonry Chimneys
(Excerpt from NFPA No. 211)**

	<i>Thickness in Inches (minimum)</i>		<i>Termination Above</i>
	<i>Walls</i>	<i>Lining</i>	<i>Roof, Feet</i>
Residential Type Appliances (appendix A, Col. I)			
Stoves, cooking ranges, warm air furnaces, water heaters, low pressure steam boilers, fireplaces, and other low heat appliances in dwellings only and for heaters not heating more than 25,000 cu. ft.:			
Solid masonry units or reinforced concrete with fire clay lining extending 8 in. below connector or above throat of fireplace	4	5/8	} ³ 2 ft. from any portion of building within 10 ft.
Rubble stone masonry with similar lining	12	5/8	
Low Heat Appliances (Appendix A, Col. II)			
Stoves, cooking ranges, warm air furnaces, water heaters, low pressure steam boilers, fireplaces, and other low heat appliances other than in dwellings and heaters heating more than 25,000 cu. ft.:			
Solid masonry units or reinforced concrete with fire clay lining extending 8 in. below connector or above throat of fireplace	8	5/8	} ³ 2 ft. from any portion of building within 10 ft.
Rubble stone masonry with similar lining	12	5/8	
Medium Heat Appliances (Appendix A, Col. III)			
Solid masonry units of reinforced concrete with fire brick lining laid in fire clay mortar, lining extending 2 ft. below and 25 ft. above connector entrance to chimney			
	8	4 1/2	} 10 ft. higher than any portion of building within 25 ft.
Rubble stone masonry with similar lining	12	4 1/2	
High Heat Appliances (Appendix A, Col. III)			
Double Walls:			
Outer wall of solid masonry units or reinforced concrete	8	}	} 20 ft. higher than any portion of building within 50 ft.
Air space	2		
Inner wall, total thickness 8 in., of solid masonry units or reinforced concrete with fire clay brick lining laid in fire clay mortar	3 1/2		

continued . . .

Appendix I

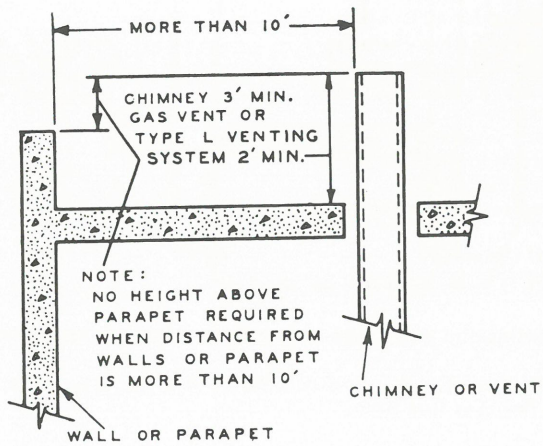
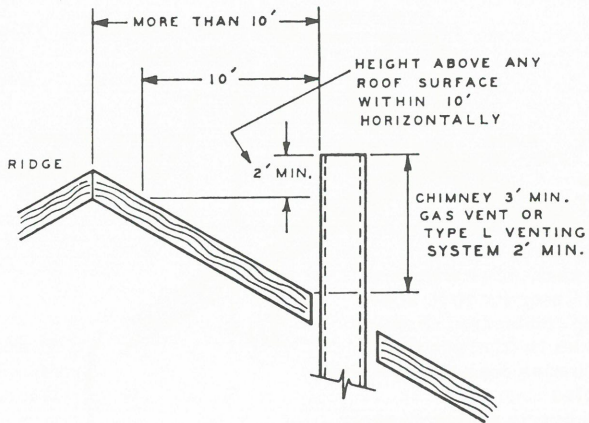
continued . . .

	<i>Thickness in Inches (Minimum)</i>		<i>Termination Above Roof, Feet</i>
	<i>Walls</i>	<i>Lining</i>	
Incinerators			
Residential Type—same as for low heat appliances			
Apartment Type			
Combined hearth and grate area 7 sq. ft. or less			
Clay or shale brick with fire brick lining for 10 ft. above roof of combustion chamber	4	4½	} 4 ft. above sloping roofs, 8 ft. above flat roofs
More than 10 ft. above roof of combustion chamber with fire clay flue liner	8	5⅝	
Combined hearth and grate area over 7 sq. ft.			
Clay or shale brick with fire brick lining for 40 ft. above roof of combustion chamber	4	4½	} 2 ft. higher than any portion of roof within 20 ft.
More than 40 ft. above roof of combustion chamber with fire clay flue liner	8	5⅝	
Commercial or Industrial Types			
Clay or shale brick lined with fire brick full height	8	4½*	} Same as for apartment type
Reinforced concrete or metal		4½*	

See also Metal Chimney,
Section 2707 N.C. Bldg. Code

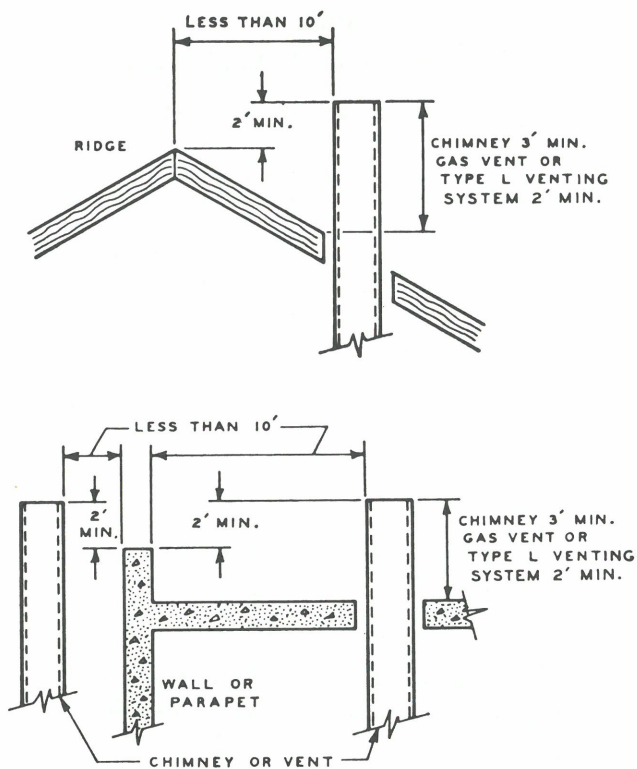
* Incinerators specially designed to produce low flue gas temperatures may be lined with fire clay flue liner.

Appendix I



Termination less than 10 feet from ridge, wall or parapet.
(From NFPA No. 211, 1969.)

Appendix I



Termination more than 10 feet from ridge, wall or parapet.