

CITY OF SACRAMENTO
1231 I Street, Sacramento, CA 95814

Permit No: 0009236
Insp Area: 2

Site Address: 1954 3RD AV SAC
Parcel No: 012-0141-006

Sub-Type: NOTHR
Housing (Y/N): N

CONTRACTOR

OWNER
DANE & MIKA RECKERS
1954 3RD AV
SACRAMENTO CA 95818

ARCHITECT

Nature of Work: NEW MASONARY FIREPLACE

CONSTRUCTION LENDING AGENCY : I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C).

Lender's Name _____ Lender's Address _____

LICENSED CONTRACTORS DECLARATION: I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with section 7000) of Division 3 of the Business and Professions Code and my license is in full force and effect.

License Class _____ License Number _____ Date _____ Contractor Signature _____

OWNER-BUILDER DECLARATION: I hereby affirm under penalty of perjury that I am exempt from the contractors License Law for the following reason (Sec. 7031.5, Business and Professions Code: any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 8 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars (\$500.00);

____ I, as a owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professional Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or herself or through his/her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he/she did not build or improve for the purpose of sale.)

I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law).

____ I am exempt under Sec. _____ B & PC for this reason: _____

Date 8/9/2000 Owner Signature _____

IN ISSUING THIS BUILDING PERMIT, the applicant represents, and the city relies on the representation of the applicant, that the applicant verified all measurements and locations shown on the application or accompanying drawings and that the improvement to be constructed does not violate any law or private agreement relating to permissible or prohibited locations for such improvements. This building permit does not authorize any illegal location of any improvement or the violation of any private agreement relating to location of improvements.

I certify that I have read this application and state that all information is correct. I agree to comply with all city and county ordinances and state laws relating to building construction and hereby authorize representative(s) of this city to enter upon the abovementioned property for inspection purposes.

Date 8/9/2000 Applicant/Agent Signature _____

WORKER'S COMPENSATION DECLARATION: I hereby affirm under penalty of perjury one of the following declarations:

____ I have and will maintain a certificate of consent to self-insure for workers' compensation as provided for by Section 3700 of the Labor Code, for the performance of work for which the permit is issued.

____ I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are:

Carrier _____ Policy Number _____ Exp Date _____

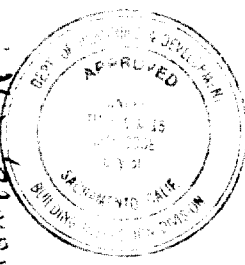
(This section need not be completed if the permit is for \$100 or less) I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the workers' compensation laws of California and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

Date 8/9/2000 Applicant Signature _____

WARNING FAILURE TO SECURE WORKER'S COMPENSATION COVERAGE IS UNLAWFUL AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS (\$100,000) IN ADDITION TO THE COST OF COMPENSATION. DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST AND ATTORNEY'S FEE.

THIS PERMIT SHALL EXPIRE BY LIMITATION IF WORK IS NOT COMMENCED WITHIN 180 DAYS.

REARERS RESIDENCE
1400 FIDELITY
1954 310 AVE.
SACRAMENTO, CA



APPROVED FOR THE CITY OF SACRAMENTO
BY THE BUILDING INSPECTOR
DATE: 10/15/08
BY: [Signature]
The approval of this plan and specification
SHALL NOT be held to permit or approve the
violation of any City Ordinance or State Law.

SPRINKLE HEADS

TOP NO LESS THAN
2' ABOVE HIGHEST
PT. WHERE REEF
10' AWAY (SEE 2005)

1/2" FLUO UAFIL
(MIN. SIZE)

ISSUED

CITY OF SACRAMENTO
DEVELOPMENT SERVICES DIV.
Full Name
Address
(Allow 2-3-4)

SEE 1997 (AND 1994 SECTIONS)
OF UBC FOR CLEARANCE / CODE
THICKNESS REQUIREMENTS.

NEW FIREPLACE OPENING
TO BE 40-48 W x 27-31

EXISTING 66" W x 48" H OPENING IN
WALL FROM PREVIOUS FIRE PLACE

Ground / concrete
must slope
away

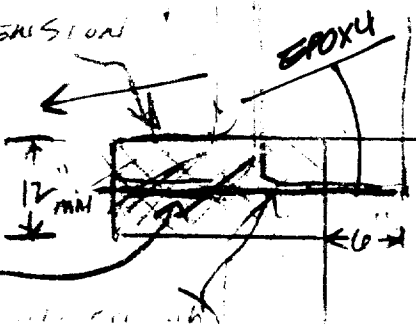
NEW FOOTING
EXTENSION

20" HEIGHT
(MIN)

36" ±

EXISTING CONCRETE
FOUNDATION

#4 DOWELS
@ 12" O.C.



CHIMNEYS, FIREPLACES AND BARBECUES

(Note: Tables appear at the end of the text.)

For details of chimney, fireplace and barbecue construction, see Figure 5, pages 80-83. The following requirements and Figure 5 are for brick construction; for other materials, the builder should consult the *Uniform Building Code*.

Reinforcing and Seismic Anchorage

Unless a specific design is provided, every masonry or concrete chimney in Seismic Zones 2, 3 and 4 shall be reinforced with not less than four No. 4 steel reinforcing bars conforming to the provisions of Chapter 19 or 21 of the *Uniform Building Code*. The bars shall extend the full height of the chimney and shall be spliced in accordance with the applicable requirements of Chapters 19 and 21. In masonry chimneys, the vertical bars shall have a minimum cover of $\frac{1}{2}$ inch (13 mm) of grout or mortar tempered to a pouring consistency. The bars shall be tied horizontally at 18-inch (457 mm) intervals with not less than $\frac{3}{4}$ -inch-diameter (6.4 mm) steel ties. The slope of the inclined portion of the offset in vertical bars shall not exceed 2 units vertical in 1 unit horizontal (200% slope). Two ties shall also be placed at each bend in vertical bars. Where the width of the chimney exceeds 40 inches (1016 mm), two additional No. 4 vertical bars shall be provided for each additional flue incorporated in the chimney or for each additional 40 inches (1016 mm) in width or fraction thereof.

In Seismic Zones 2, 3 and 4, all masonry and concrete chimneys shall be anchored at each floor or ceiling line more than 6 feet (1829 mm) above grade, except when constructed completely within the exterior walls of the building. Anchorage shall consist of two $\frac{3}{16}$ -inch by 1-inch (4.8 mm by 25 mm) steel straps cast at least 12 inches (305 mm) into the chimney with a 180-degree bend with a 6-inch (152 mm) extension around the vertical reinforcing bars in the outer face of the chimney.

Each strap shall be fastened to the structural framework of the building with two $\frac{1}{2}$ -inch-diameter (12.7 mm) bolts per strap. Where the joists do not head into the chimney, the anchor straps shall be connected to 2-inch by 4-inch (51 mm by 102 mm) ties crossing a minimum of four joists. The ties shall be connected to each joist with two 16d nails. As an alternative to the 2-inch by 4-inch (51 mm by 102 mm) ties, each anchor strap shall be connected to the structural framework by two $\frac{1}{2}$ -inch-diameter (12.7 mm) bolts in an approved manner. (Sec. 3102.4.3)

Metal chimneys shall be anchored at each floor and roof with two $1\frac{1}{2}$ -inch by $\frac{1}{8}$ -inch (38 mm by 3.2 mm) metal straps looped around the outside of the chimney installations and nailed with six 8d nails per strap to the roof or ceiling framing. (Sec. 3102.6)

Flue Area

A flue used in connection with solid or liquid fuel shall not be smaller in area than the vent connection on the appliance attached thereto, and in no case shall be less than as set forth in Table 31-A of the *Uniform Building Code*. Metal dampers equivalent to not less than 0.097 inch (2.46 mm) (No. 12 carbon sheet metal gage) steel are required. (Secs. 3102.3.5 and 3102.7.9)

Height

Every chimney shall extend at least 2 feet (610 mm) above the part of the roof through which it passes and at least 2 feet (610 mm) above the highest elevation of any portion of the building within 10 feet (3048 mm) of the chimney. For altitudes over 2,000 feet (610 m), the building official shall be consulted in determining the height of the chimney. (Sec. 3102.3.6)

Inlets

Every inlet to any masonry chimney shall enter the side thereof and shall be of not less than $\frac{1}{8}$ -inch-thick (3.2 mm) metal or $\frac{5}{8}$ -inch-thick (16 mm) refractory material. Where there is no other

not more than 16 inches (406 mm) below the inlet and the cleanout shall be located where it is accessible above the plug. If the plug is located less than 6 inches (152 mm) below the inlet, the inlet may serve as the cleanout. (Sec. 3102.4.7)

Loads on Chimney

A chimney shall not support any structural load other than its own weight unless it is designed to act as a supporting member. (Sec. 3102.3.4)

MASONRY FIREPLACES

Fireplace Walls

Masonry walls of fireplaces shall not be less than 8 inches (203 mm) in thickness. Walls of fireboxes shall not be less than 10 inches (254 mm) in thickness, except that where a lining of firebrick is used, such walls shall not be less than 8 inches (203 mm) in thickness. The firebox shall not be less than 20 inches (508 mm) in depth. The maximum thickness of joints in firebrick shall be $\frac{1}{4}$ inch (6 mm). An exception is made for Rumford fireplaces where the depth may be reduced to 12 inches (305 mm) when:

1. The depth is at least one third of the width of the fireplace opening.
 2. The throat is at least 12 inches (305 mm) above the lintel and is at least one twentieth of the cross-sectional area of the fireplace opening. (Sec. 3102.7.3)
- Approved metal heat circulators may be installed in fireplaces. (Sec. 3102.7.5)

Lintel

Masonry over the fireplace opening shall be supported by a noncombustible lintel. (Sec. 3102.7.10)

Hearth

Masonry fireplaces shall be provided with a brick, concrete, stone or other approved noncombustible hearth slab. This slab shall not be less than 4 inches (102 mm) thick and shall be supported by noncombustible materials or reinforced to carry its own weight and all imposed loads. Combustible forms and centering shall be removed. (Sec. 3102.7.11)

Hearth Extensions

Hearths shall extend at least 16 inches (406 mm) from the front of, and at least 8 inches (203 mm) beyond each side of, the fireplace opening. Where the fireplace opening is 6 square feet (0.56 m²) or larger, the hearth extension shall extend at least 20 inches (508 mm) in front of, and at least 12 inches (305 mm) beyond each side of, the fireplace opening.

Except for fireplaces which open to the exterior of the building, hearth slabs shall be readily distinguishable from the surrounding or adjacent floor. (Sec. 3102.7.12)

Combustible Materials

Combustible materials shall not be placed within 6 inches (152 mm) of the fireplace opening. Combustible material within 12 inches (305 mm) of the fireplace opening shall not project more than $\frac{1}{8}$ inch (3 mm) for each 1-inch (25 mm) clearance from such opening. (Sec. 3102.7.8)

Support

Masonry fireplaces shall be supported on foundations designed as required in Chapters 16, 18 and 21 of the *Uniform Building Code*. (Sec. 3102.7.2)

MASONRY CHIMNEYS

Lining

Where lining is required, masonry chimneys shall be lined with fireclay flue tile not less than $\frac{5}{8}$ inch (15.9 mm) thick or with firebrick lining not less than 2 inches (51 mm) thick. Chimney liners shall be carefully bedded in approved mortar with close-fitting joints left smooth on the inside. (Sec. 3102.3.4 and Table 31-B)

Wall Thickness

Masonry chimneys shall be constructed of masonry units or reinforced concrete with walls not less than 4 inches (102 mm) thick when lined or 8 inches (203 mm) thick when unlined or rubble stone masonry not less than 12 inches (305 mm) thick. (Table 31-B)

Clearance

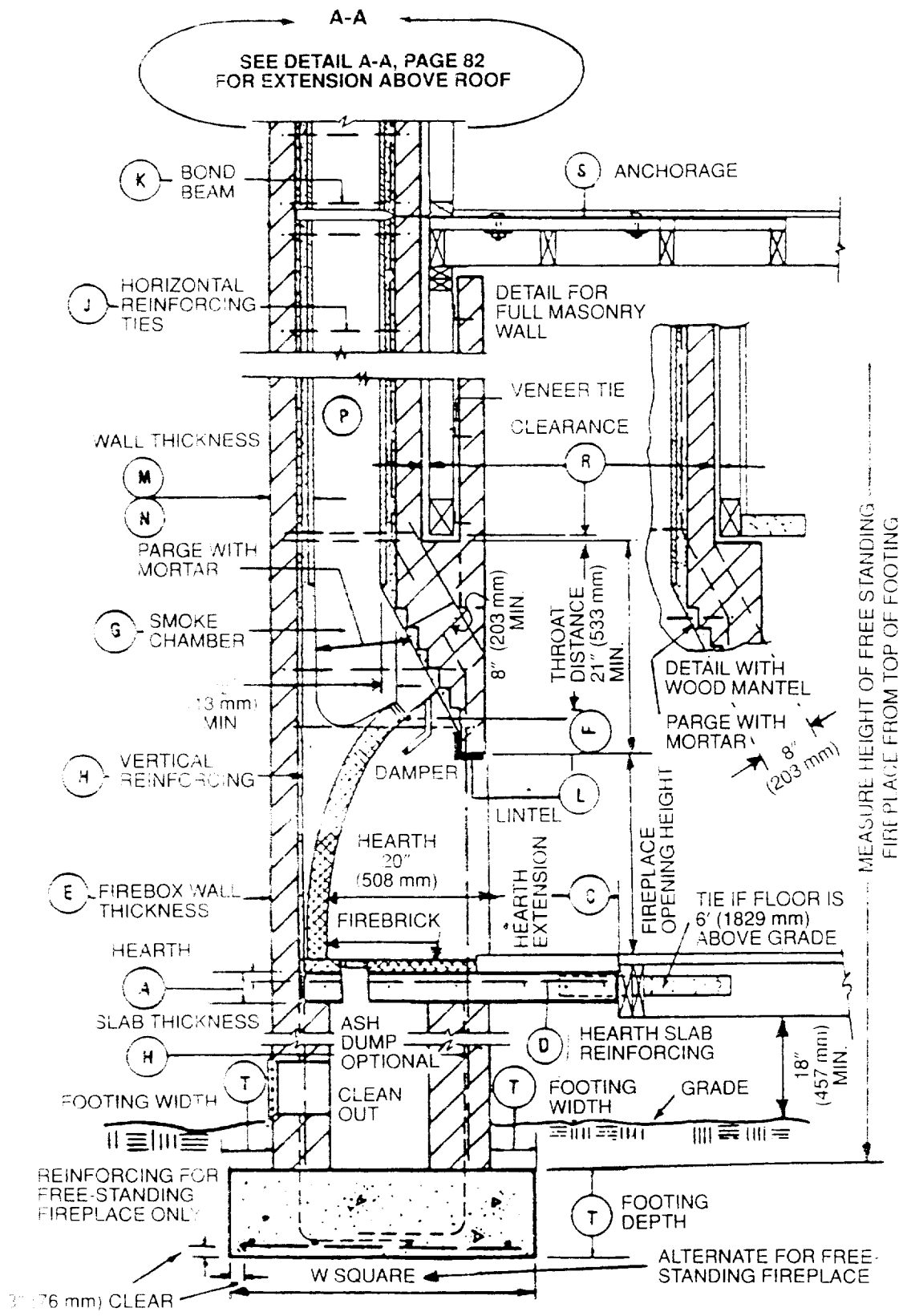
Combustible materials shall not be placed within 2 inches (51 mm) of fireplaces, smoke chambers or chimneys. For special conditions covering fireplaces, see below. (Sec. 3102.7.8)

TABLE 31-A—MINIMUM PASSAGEWAY AREAS FOR MASONRY CHIMNEYS¹

MINIMUM CROSS-SECTIONAL AREA			
• 645 for mm ²			
Type of Masonry Chimney	Tile Lined		Lined with Firebrick or Unlined
	Round	Square or Rectangle	
1. Residential	50 sq. in.	50 sq. in.	85 sq. in.
2. Fireplace ²	$\frac{1}{12}$ of opening Minimum 50 sq. in.	$\frac{1}{10}$ of opening Minimum 64 sq. in.	$\frac{1}{8}$ of opening Minimum 100 sq. in.
3. Low heat	50 sq. in.	57 sq. in.	135 sq. in.
4. Incinerator Apartment type			Not applicable
1 opening		196 sq. in.	
2 to 6 openings		324 sq. in.	
7 to 14 openings		484 sq. in.	
15 or more openings	484 sq. in. plus 10 sq. in. for each additional opening		

¹ Areas for medium- and high-heat chimneys shall be determined using accepted engineering methods and as approved by the building official.

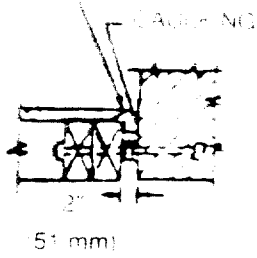
² Where fireplaces open on more than one side, the fireplace opening shall be measured along the greatest dimension.
NOTE: For altitudes over 2,000 feet (610 m) above sea level, the building official shall be consulted in determining the area of the passageway.



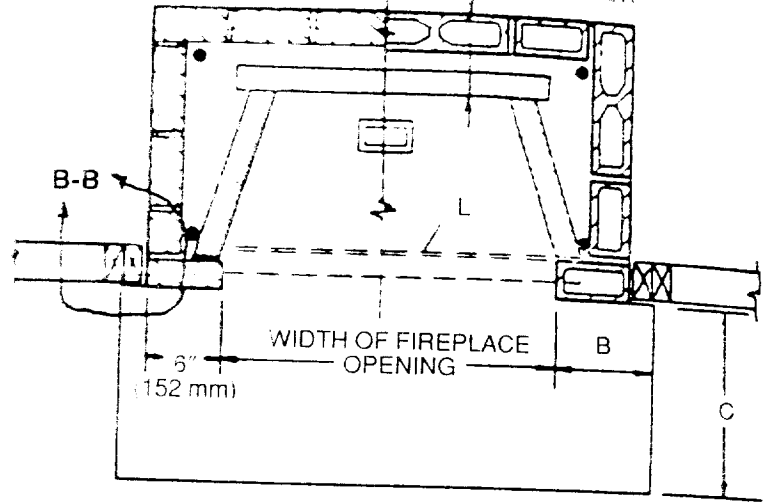
NOT TO SCALE

**BRICK FIREBOX AND CHIMNEY—
SECTIONAL SIDE VIEW ON WOOD FLOOR**

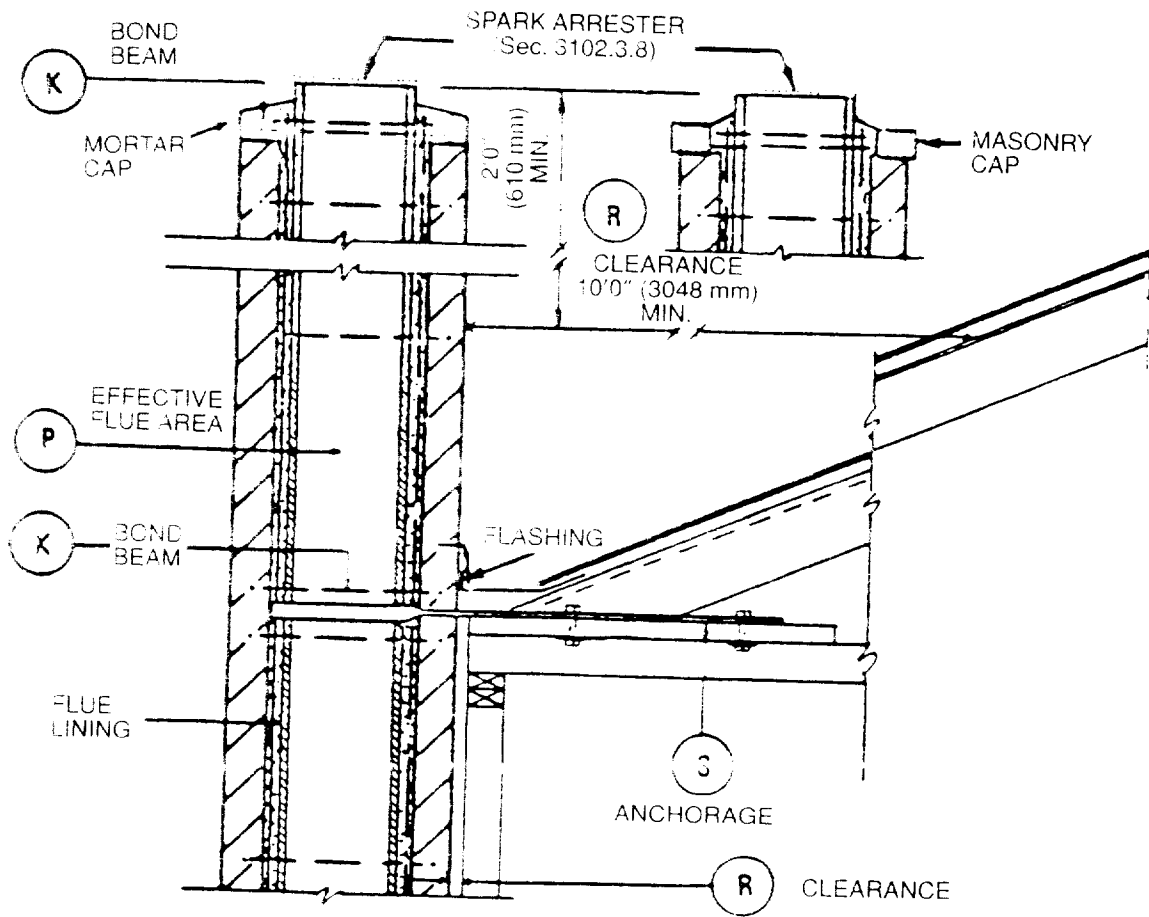
FIGURE 5—TYPICAL MASONRY FIREPLACE—(Continued)



VERTICAL FLASHING
DETAIL B-B



PLAN VIEW



NOT TO SCALE

EXTENSION ABOVE ROOF
DETAIL A-A

FIGURE 5—TYPICAL MASONRY FIREPLACE—(Continued)

U.B.C. REQUIREMENTS FOR MASONRY FIREPLACES

ITEM	LETTER*	UNIFORM BUILDING CODE REQUIREMENTS
Hearth slab thickness	A	4" (102 mm)
Hearth extension (each side of opening)	B	8" (203 mm) fireplace opening < 6 sq. ft. (0.56 m ²) 12" (305 mm) fireplace opening ≥ 6 sq. ft. (0.56 m ²)
Hearth extension (front of opening)	C	16" (406 mm) fireplace opening < 6 sq. ft. (0.56 m ²) 20" (508 mm) fireplace opening ≥ 6 sq. ft. (0.56 m ²)
Hearth slab reinforcing	D	Reinforced to carry its own weight and all imposed loads.
Thickness of wall of firebox	E	10" (254 mm) common brick or 8" (203 mm) where a firebrick lining is used. Joints in firebrick 1/4" (6 mm) max.
Distance from top of opening to throat	F	6" (152 mm)
Smoke chamber edge of shell Rear wall—thickness Front and sidewall—thickness	G	6" (152 mm) 8" (203 mm)
Chimney Vertical reinforcing	H	Four No. 4 full-length bars for chimney up to 40" (1016 mm) wide. Add two No. 4 bars for each additional 40" (1016 mm) or fraction of width or each additional flue. (Seismic Zones 2, 3 and 4.)
Horizontal reinforcing	J	3/4" (6.4 mm) ties at 18" (457 mm) and two ties at each bend in vertical steel.
Bond beams	K	No specified requirements.
Fireplace lintel	L	Noncombustible material.
Walls with flue lining	M	Brick with grout around lining, 4" (102 mm) min. from flue lining to outside face of chimney.
Walls with unlined flue	N	8" (203 mm) solid masonry.
Distances between adjacent flues		4" (102 mm)
Minimum effective flue area (based on area of fireplace opening)	P	Round lining—1/12 or 50 sq. in. (32 258 mm ²) min. Rectangular lining—1/10 or 64 sq. in. (41 290 mm ²) min. Unlined or lined with firebrick—1/8 or 100 sq. in. (64 516 mm ²) min.
Clearances Wood frame Combustible material Above roof	R	2" (51 mm) (See Figure 8) 6" (152 mm) min. to fireplace opening. 12" (305 mm) from opening when material projecting more than 1/8" for each 1" (25 mm). 2' (610 mm) at 10' (3048 mm) (See U.B.C. Table 31-B.)
Anchorage Strap Number Embedment into chimney Fasten to Bolts	S	3/16" × 1" (4.8 mm by 25 mm) 2 12" (305 mm) hooked around outer bar w/6" (152 mm) ext. 2" × 4" (51 mm by 102 mm) ties crossing a min. of 4 joists Two 1/2" (13 mm) diameter
Footing Thickness Width	F	12" (305 mm) min. 6" (152 mm) each side of fireplace wall

NOTE: *See Figure 5 for letter references.

Steel reinforcement shown is required in Seismic Zones 2, 3 and 4.

See "Chimneys, Fireplaces and Barbecues" for additional information.

FIGURE 5—TYPICAL MASONRY FIREPLACE—(Continued)

Chapter 31 SPECIAL CONSTRUCTION

SECTION 3102 — CHIMNEYS, FIREPLACES AND BARBECUES

3102.1 Scope. Chimneys, flues, fireplaces and barbecues, and their connections, carrying products of combustion shall conform to the requirements of this section.

3102.2 Definitions.

BARBECUE is a stationary open hearth or brazier, either fuel-fired or electric, used for food preparation.

CHIMNEY is a hollow shaft containing one or more passage-ways, vertical or nearly so, for conveying products of combustion to the outside atmosphere.

CHIMNEY CLASSIFICATIONS:

Chimney, High-heat Industrial Appliance-type. is a factory-built, masonry or metal chimney suitable for removing the products of combustion from fuel-burning high-heat appliances producing combustion gases in excess of 2,000°F (1,093°C) measured at the appliance flue outlet.

Chimney, Low-heat Industrial Appliance-type. is a factory-built, masonry or metal chimney suitable for removing the products of combustion from fuel-burning low-heat appliances producing combustion gases not in excess of 1,000°F (538°C) under normal operating conditions but capable of producing combustion gases of 1,400°F (760°C) during intermittent forced firing for periods up to one hour. All temperatures are measured at the appliance flue outlet.

Chimney, Medium-heat Industrial Appliance-type. is a factory-built, masonry or metal chimney suitable for removing the products of combustion from fuel-burning medium-heat appliances producing combustion gases not in excess of 2,000°F (1,093°C) measured at the appliance flue outlet.

Chimney, Residential Appliance-type. is a factory-built or masonry chimney suitable for removing products of combustion from residential-type appliances producing combustion gases not in excess of 1,000°F (538°C) measured at the appliance flue outlet.

CHIMNEY CONNECTOR is the pipe or fitting that connects a fuel-burning appliance to a chimney. (See Mechanical Code, Chapter 9.)

CHIMNEY, FACTORY-BUILT, is a chimney manufactured at a location other than the building site and composed of listed factory-built components assembled in accordance with the terms of the listing to form the completed chimney.

CHIMNEY LINER is a lining material of fireclay or approved refractory brick. For recognized standards on fireclay refractory brick see Sections 3503 and 3504; ASTM C 27, Fireclay and High-Alumina Refractory Brick; or ASTM C 1261, Firebox Brick or Residential Fireplaces.

FIREBRICK is a refractory brick.

FIREPLACE is a hearth and fire chamber or similar prepared place in which a fire may be made and which is built in conjunction with a chimney.

Factory-built Fireplace is a listed assembly of a fire chamber, its chimney and related factory-made parts designed for unit assembly without requiring field construction. Factory-built fireplaces are not dependent on mortar-filled joints for continued safe use.

Masonry Fireplace is a hearth and fire chamber of solid masonry units such as bricks, stones, masonry units or reinforced concrete provided with a suitable chimney.

MASONRY CHIMNEY is a chimney of masonry units, bricks, stones or listed masonry chimney units lined with approved flue liners. For the purpose of this chapter, masonry chimneys shall include reinforced concrete chimneys.

3102.3 Chimneys, General.

3102.3.1 Chimney support. Chimneys shall be designed, anchored, supported and reinforced as required in this chapter and applicable provisions of Chapters 16, 18, 19, 21 and 22 of this code. A chimney shall not support any structural load other than its own weight unless designed as a supporting member.

3102.3.2 Construction. Each chimney shall be so constructed as to safely convey flue gases not exceeding the maximum temperatures for the type of construction as set forth in Table 31-B and shall be capable of producing a draft at the appliance not less than that required for safe operation.

3102.3.3 Clearance. Clearance to combustible material shall be as required by Table 31-B.

3102.3.4 Lining. When required by Table 31-B, chimneys shall be lined with clay flue tile, firebrick, molded refractory units or other approved lining not less than 5/8 inch (15.9 mm) thick as set forth in Table 31-B. Chimney liners shall be carefully bedded in approved medium-duty refractory mortar with close-fitting joints left smooth on the inside. Medium-duty refractory mortar shall be in accordance with Sections 3503, 3504 and ASTM C 199.

3102.3.5 Area. The minimum net cross-sectional area of the chimney flue for fireplaces shall be determined in accordance with Figure 31-1. The minimum cross-sectional area shown or a flue size providing equivalent net cross-sectional area shall be used. The height of the chimney shall be measured from the firebox floor to the top of the last chimney flue tile. Chimney passageways for low-heat chimneys and incinerators shall not be smaller in area than the vent connection on the appliance attached thereto or not less than that set forth in Table 31-A.

EXCEPTION: Chimney passageways designed by engineering methods approved by the building official.

3102.3.6 Height and termination. Every chimney shall extend above the roof and the highest elevation of any part of a building as shown in Table 31-B. For altitudes over 2,000 feet (610 m), the building official shall be consulted in determining the height of the chimney.

3102.3.7 Cleanouts. Cleanout openings shall be provided within 6 inches (152 mm) of the base of every masonry chimney.

3102.3.8 Spark arrester. Where determined necessary by the building official due to local climatic conditions or where sparks escaping from the chimney would create a hazard, chimneys at-

attached to any appliance or fireplace that burns solid fuel shall be equipped with an approved spark arrester. The net free area of the spark arrester shall not be less than four times the net free area of the outlet of the chimney. The spark arrester screen shall have heat and corrosion resistance equivalent to 0.109-inch (2.77 mm) (No. 12 B.W. gage) wire, 0.042-inch (1.07 mm) (No. 19 B.W. gage) galvanized wire or 0.022-inch (0.56 mm) (No. 24 B.W. gage) stainless steel. Openings shall not permit the passage of spheres having a diameter larger than $\frac{1}{2}$ inch (12.7 mm) and shall not block the passage of spheres having a diameter of less than $\frac{3}{8}$ inch (9.5 mm).

Chimneys used with fireplaces or heating appliances in which solid or liquid fuel is used shall be provided with a spark arrester as required in the Fire Code.

EXCEPTION: Chimneys that are located more than 200 feet (60.960 mm) from any mountaintop, brush-covered or forest-covered land or land covered with flammable material and that are not attached to a structure having less than a Class C roof covering, as set forth in Chapter 19.

3102.4 Masonry Chimneys.

3102.4.1 Design. Masonry chimneys shall be designed and constructed to comply with Sections 3102.3.2 and 3102.4.2.

3102.4.2 Walls. Walls of masonry chimneys shall be constructed as set forth in Table 31-B.

3102.4.3 Reinforcing and seismic anchorage. Unless a specific design is provided, every masonry or concrete chimney in Seismic Zones 2, 3 and 4 shall be reinforced with not less than four No. 4 steel reinforcing bars conforming to the provisions of Chapter 19 or 21 of this code. The bars shall extend the full height of the chimney and shall be spliced in accordance with the applicable requirements of Chapter 19 or 21. In masonry chimneys, the vertical bars shall have a minimum cover of $\frac{1}{2}$ inch (12.7 mm) of grout or mortar tamped to a pouring consistency. The bars shall be tied horizontally at 18-inch (457 mm) intervals with not less than 3/16-inch-diameter (6.4 mm) steel ties. The slope of the inclined portion of the offset in vertical bars shall not exceed 2 units vertical in 1 unit horizontal (200% slope). Two ties shall also be placed between each pair of vertical bars. Where the width of the chimney exceeds 60 inches (1524 mm), two additional No. 4 vertical bars shall be provided for each additional flue incorporated in the chimney or for each additional 40 inches (1016 mm) in width or fraction thereof.

In seismic Zones 2, 3 and 4, all masonry and concrete chimneys shall be anchored at each floor or ceiling line more than 6 feet (1829 mm) above grade, except when constructed completely within the exterior walls of the building. Anchorage shall consist of two 3/8-inch-by-1-inch (4.8 mm by 25 mm) steel straps cast at least 12 inches (305 mm) into the chimney with a 180-degree bend with a 6-inch (152 mm) extension around the vertical reinforcing bars on the outer face of the chimney.

Each strap shall be fastened to the structural framework of the building with two $\frac{1}{2}$ -inch-diameter (12.7 mm) bolts per strap. Where the joists do not head into the chimney, the anchor strap shall be connected to 2-inch-by-4-inch (51 mm by 102 mm) ties crossing a minimum of four joists. The ties shall be connected to each joist with two 16d nails. As an alternative to the 2-inch-by-4-inch (51 mm by 102 mm) ties, each anchor strap shall be connected to the structural framework by two $\frac{1}{2}$ -inch diameter (12.7 mm) bolts in an approved manner.

3102.4.4 Chimney offset. Masonry chimneys may be offset at a slope of not more than 4 units vertical in 24 units horizontal (16.7% slope), but not more than one third of the dimension of the chimney, in the direction of the offset. The slope of the transition

from the fireplace to the chimney shall not exceed 2 units vertical in 1 unit horizontal (200% slope).

3102.4.5 Change in size or shape. Masonry chimneys shall not change in size or shape within 6 inches (152 mm) above or below any combustible floor, ceiling or roof component penetrated by the chimney.

3102.4.6 Separation of masonry chimney passageways. Two or more flues in a chimney shall be separated by masonry not less than 4 inches (102 mm) thick bonded into the masonry wall of the chimney.

3102.4.7 Inlets. Every inlet to any masonry chimney shall enter the side thereof and shall not be of less than $\frac{1}{8}$ -inch-thick (3.2 mm) metal or $\frac{5}{8}$ -inch-thick (15.9 mm) refractory material. Where there is no other opening below the inlet other than the cleanout, a masonry plug shall be constructed in the chimney not more than 16 inches (406 mm) below the inlet and the cleanout shall be located where it is accessible above the plug. If the plug is located less than 6 inches (152 mm) below the inlet, the inlet may serve as the cleanout.

3102.5 Factory-built Chimneys and Fireplaces.

3102.5.1 General. Factory-built chimneys and factory-built fireplaces shall be listed and shall be installed in accordance with the terms of their listings and the manufacturer's instructions as specified in the Mechanical Code.

3102.5.2 Hearth extensions. Hearth extensions of listed factory-built fireplaces shall conform to the conditions of listing and the manufacturer's installation instructions.

3102.5.3 Multiple venting in vertical shafts. Factory-built chimneys utilized with listed factory-built fireplaces may be used in a common vertical shaft having the required fire-resistance rating.

3102.6 Metal Chimneys. Metal chimneys shall be constructed and installed to meet the requirements of the Mechanical Code.

Metal chimneys shall be anchored at each floor and roof with two $\frac{1}{2}$ -inch-by- $\frac{1}{8}$ -inch (38 mm by 3.2 mm) metal straps looped around the outside of the chimney installation and nailed with not less than six 8d nails per strap at each joist.

3102.7 Masonry and Concrete Fireplaces and Barbecues.

3102.7.1 General. Masonry fireplaces, barbecues, smoke chambers and fireplace chimneys shall be of masonry or reinforced concrete and shall conform to the requirements of this section.

3102.7.2 Support. Masonry fireplaces shall be supported on foundations designed as specified in Chapters 16, 18 and 21.

When an approved design is not provided, foundations for masonry and concrete fireplaces shall not be less than 12 inches (305 mm) thick, extend not less than 6 inches (152 mm) outside the fireplace wall and project below the natural ground surface in accordance with the depth of foundations set forth in Table 18-I-C.

3102.7.3 Fireplace walls. Masonry walls of fireplaces shall not be less than 8 inches (203 mm) in thickness. Walls of fireboxes shall not be less than 10 inches (254 mm) in thickness, except that where a lining of firebrick is used, such walls shall not be less than a total of 8 inches (203 mm) in thickness. The firebox shall not be less than 20 inches (508 mm) in depth. Joints in firebrick shall not exceed $\frac{1}{4}$ inch (6.4 mm).

EXCEPTION: For Rumford fireplaces, the depth may be reduced to 12 inches (305 mm) when

The depth is at least one third the width of the fireplace opening.

The throat is at least 12 inches (305 mm) above the lintel and is at least 1/3 of the cross-sectional area of the fireplace opening.

3102.7.4 Hoods. Metal hoods used as part of a fireplace or barbecue shall not be less than 0.036-inch (0.92 mm) (No. 19 carbon sheet steel gage) copper, galvanized steel or other equivalent corrosion-resistant ferrous metal with all seams and connections in smokeproof unsoldered constructions. The hoods shall be sloped at an angle of 45 degrees or less from the vertical and shall extend horizontally at least 6 inches (152 mm) beyond the limits of the firebox. Metal hoods shall be kept a minimum of 18 inches (457 mm) from combustible materials unless approved for reduced clearances.

3102.7.5 Metal heat circulators. Approved metal heat circulators may be installed in fireplaces.

3102.7.6 Smoke chamber. Front and side walls shall not be less than 8 inches (203 mm) in thickness. Smoke chamber back walls shall not be less than 6 inches (152 mm) in thickness. A minimum 8-inch-thick (16 mm) clay flue lining, complying with Sections 3503, 3504 and ASTM C 315, shall be permitted to form the inside surface of the 8-inch (203 mm) and 6-inch (152 mm) smoke chamber walls.

3102.7.7 Chimneys. Chimneys for fireplaces shall be constructed as specified in Sections 3102.7.1, 3102.7.4 and 3102.7.5 for residential-type appliances.

3102.7.8 Clearance to combustible material. Combustible materials shall not be placed within 2 inches (51 mm) of fireplace, smoke chamber or chimney walls. Combustible material shall not be placed within 6 inches (152 mm) of the fireplace opening. No such combustible material within 12 inches (305 mm) of the fireplace opening shall project more than 1/8 inch (3.2 mm) for each 1-inch (25 mm) clearance from such opening.

No part of metal hoods used as part of a fireplace or barbecue shall be less than 18 inches (457 mm) from combustible material. This clearance may be reduced to the minimum requirements specified in the Mechanical Code.

3102.7.9 Areas of flues, throats and dampers. The throat shall be at least 8 inches (203 mm) above the fireplace opening and shall be at least 4 inches (102 mm) in depth. The net cross-sectional area of the flue and of the throat between the firebox and the smoke chamber of a fireplace shall not be less than that set forth in Figure 31-1 or Table 31-A. Metal dampers equivalent to not less than 0.097-inch (2.46 mm) (No. 12 carbon sheet metal gage) steel shall be installed. When fully opened, damper openings shall not be less than 90 percent of the required flue area.

3102.7.10 Lintel. Masonry over the fireplace opening shall be supported by a noncombustible lintel unless the masonry is self-supporting.

3102.7.11 Hearth. Masonry fireplaces shall be provided with a brick, concrete, stone or other approved noncombustible hearth slab. This slab shall not be less than 4 inches (102 mm) thick and shall be supported by noncombustible materials or reinforced to carry its own weight and all imposed loads. Combustible forms and centering shall be removed.

3102.7.12 Hearth extensions. Hearths shall extend at least 16 inches (406 mm) from the front of, and at least 8 inches (203 mm) beyond each side of, the fireplace opening. Where the fireplace opening is 6 square feet (0.56 m²) or larger, the hearth extension shall extend at least 20 inches (508 mm) in front of, and at least 12 inches (305 mm) beyond each side of, the fireplace opening.

Except for fireplaces that open to the exterior of the building, the hearth slab shall be readily distinguishable from the surrounding or adjacent floor.

3102.7.13 Fire blocking. Fire blocking between chimneys and combustible construction shall meet the requirements specified in Section 708.

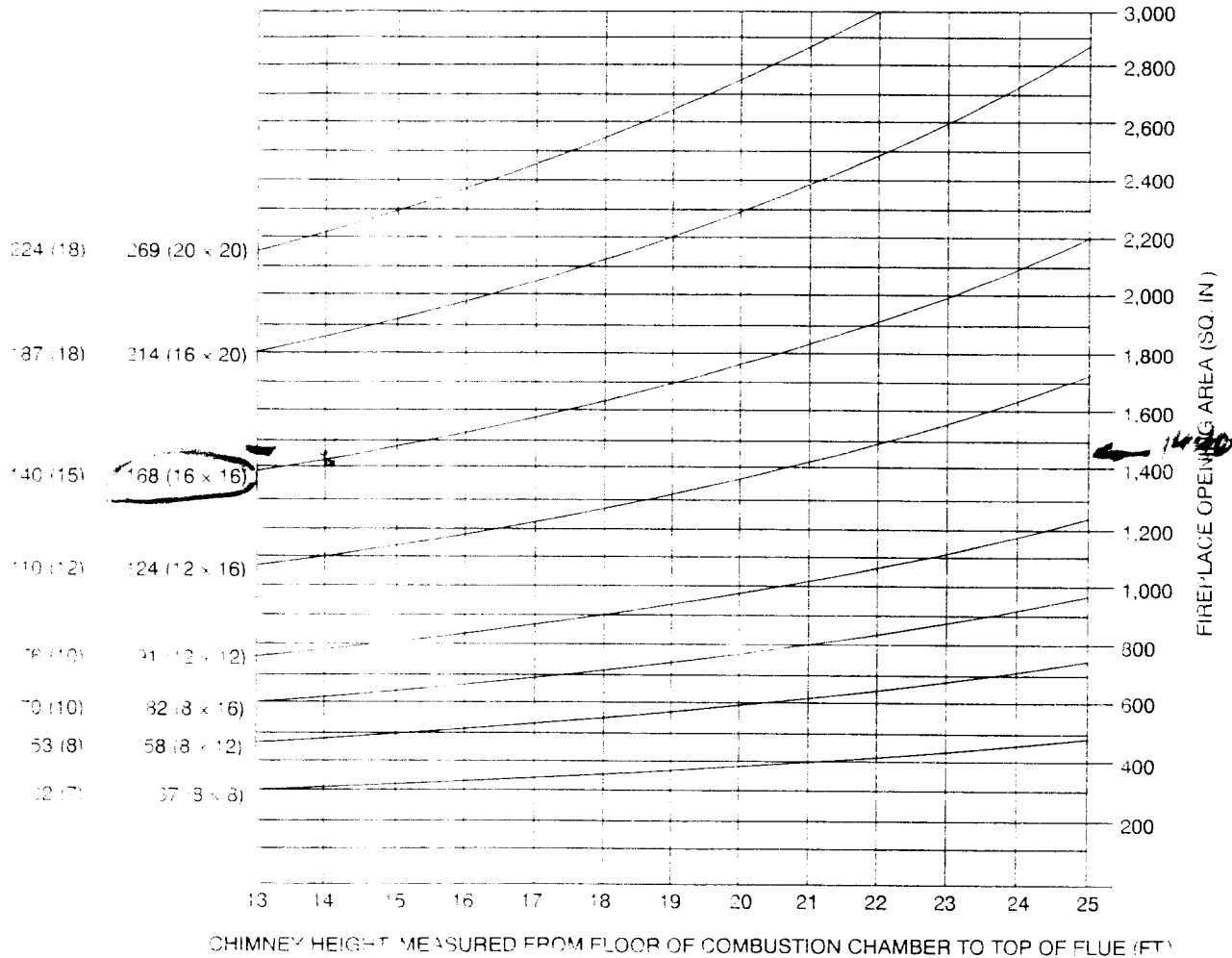
TABLE 31-A—MINIMUM PASSAGEWAY AREAS FOR MASONRY CHIMNEYS¹

MINIMUM CROSS-SECTIONAL AREA			
= 645 for mm ²			
Type of Masonry Chimney	Tile Lined		Lined with Firebrick or Unlined
	Round	Square or Rectangle	
Residential	50 square inches	50 square inches	85 square inches
Fireplace	See Figure 31-1	See Figure 31-1	1/8 of opening minimum 100 square inches
Low heat	50 square inches	57 square inches	135 square inches
Incinerator			Not applicable
Apartment type			
1 opening		196 square inches	
1 to 6 openings		324 square inches	
7 to 14 openings		484 square inches	
15 or more openings	84 square inches plus 10 square inches for each additional opening		

NOTE: For altitudes over 2,000 feet (610 m) above sea level, the building official shall be consulted in determining the area of the passageway. Areas for medium- and high-heat chimneys shall be determined using accepted engineering methods and as approved by the building official.

MINIMUM CROSS-SECTIONAL
FLUE AREA (SQ. IN.)

ROUND FLUES NOMINAL FLUE SIZE DIAMETER, IN.	SQUARE OR RECTANGULAR FLUES NOMINAL FLUE SIZE, IN.
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1 inch = 25.4 mm, 1 square inch = 645.16 mm², 1 foot = 304.8 mm.

FIGURE 31-1—FLUE SIZES FOR MASONRY CHIMNEYS¹

The smaller flue area shall be utilized where the fireplace opening area and the chimney height selected intersect between flue area curves.