Section 9.21. Masonry and Concrete Chimneys and Flues

9.21.1. General

9.21.1.1. Application

1) This Section applies to

a) rectangular *masonry or concrete chimneys* not more than 12 m in height serving fireplaces or serving *appliances* having a combined total rated heat output of 120 kW or less, and

b) *flue pipes* connected to such *chimneys*.

2) *Chimneys*, other than those described in Sentence (1), *gas vents* and *flue pipes* serving gas-, oil- or solid-fuel-burning *appliances* and their associated equipment, including *stoves*, *cooktops*, ovens and *space heaters*, covered by the standards referenced in Sentences 9.33.5.2.(1) and 9.33.5.3.(1) shall conform to Subsection 9.33.10.

3) *Chimneys* and *flue pipes* other than those described in Sentences (1) and (2) shall conform to Section 6.3.

9.21.1.2. Chimney or Flue Pipe Walls

1) The walls of any *chimney* or *flue pipe* shall be constructed so as to be smoke- and flame-tight.

9.21.2. Chimney Flues

9.21.2.1. Chimney Flue Limitations

1) A *chimney flue* that serves a fireplace or incinerator shall not serve any other *appliance*.

2) A *chimney flue* that serves a solid-fuel-burning *appliance* shall not be connected to a natural-gas- or propane-fired *appliance*.

3) A *chimney flue* that serves a solid-fuel-burning *appliance* shall not be connected to an oil-burning *appliance* unless the solid-fuel-burning *appliance* is certified for such installation and the installation of both *appliances* meets the requirements of the relevant standards referenced in Article 9.33.5.2.

9.21.2.2. Connections of More Than One Appliance

1) Except as required by Article 9.21.2.1., where two or more fuel-burning *appliances* are connected to the same *chimney flue*, the connections shall be made as described in Sentences (2) to (4) and an adequate draft shall be provided for the connected *appliances* in conformance with the requirements of applicable provincial or municipal bylaws and regulations or, in the absence of such regulations or bylaws, with the requirements of the relevant standards listed in Subsection 9.33.10.

2) Where 2 or more fuel-burning *appliances* are connected to the same *chimney flue*, the *appliances* shall be located on the same *storey*.

3) The connection referred to in Sentence (2) for a solid-fuel-burning *appliance* shall be made below connections for *appliances* burning other fuels.

4) The connection referred to in Sentence (2) for a liquid-fuel-burning *appliance* shall be made below any connections for *appliances* burning natural gas or propane.

9.21.2.3. Inclined Chimney Flues

1) *Chimney flues* shall not be inclined more than 45° to the vertical.

9.21.2.4. Size of Chimney Flues

1) Except for *chimneys* serving fireplaces, the size of a *chimney flue* shall conform to the requirements of the *appliance* installation standards referenced in Sentences 9.33.5.2.(1) and 9.33.5.3.(1).

2) Where a *chimney flue* serves only one *appliance*, the *flue* area shall be at least equal to that of the *flue pipe* connected to it.

9.21.2.5. Fireplace Chimneys

1) The size of a *chimney flue* serving a masonry fireplace shall conform to Table 9.21.2.5.-A or 9.21.2.5.-B.

Table 9.21.2.5.-A
Diameter of Round Flues for Fireplace Chimneys
Forming Part of Sentence 9.21.2.5.(1)

Fireplace Opening, m²	Chimney Height, m							
	3.0 to 4.5		> 4.5 to 5.9		> 5.9 to 8.9		> 8.9 to 12	
	Flue Diameter, mm							
	min.	max.	min.	max.	min.	max.	min.	max.
up to 0.150	110	170	100	160	90	150	90	150
0.151 to 0.250	150	210	130	190	130	190	120	180
0.251 to 0.350	180	240	160	220	150	210	140	200
0.351 to 0.500	220	280	200	260	190	250	170	230
0.501 to 0.650	260	320	230	290	220	280	200	260
0.651 to 0.800	290	350	260	320	240	300	220	280
0.801 to 1.00	330	390	290	350	270	330	250	310
1.01 to 1.20	360	420	320	380	300	360	270	330
1.21 to 1.40	390	450	350	410	330	390	300	360
1.41 to 1.60	420	480	380	440	350	410	320	380
1.61 to 1.80	–	–	400	460	370	430	340	400
1.81 to 2.00	–	–	–	–	400	460	360	420
2.01 to 2.20	–	–	–	–	–	–	380	440

Table 9.21.2.5.-B
Rectangular Flue Sizes for Fireplace Chimneys
Forming Part of Sentence 9.21.2.5.(1)

Fireplace Opening, m²	Chimney Height, m							
	3.0 to 4.5		> 4.5 to 5.9		> 5.9 to 8.9		> 8.9 to 12	
	Flue Size, mm							
	min.	max.	min.	max.	min.	max.	min.	max.
up to 0.150	200 × 200	200 × 200	100 × 200	100 × 200	100 × 200	100 × 200	100 × 200	100 × 200
0.151 to 0.250	200 × 200	200 × 200	200 × 200	200 × 200	200 × 200	200 × 200	200 × 200	200 × 200
0.251 to 0.350	200 × 300	200 × 300	200 × 200	200 × 300	200 × 200	200 × 200	200 × 200	200 × 200
0.351 to 0.500	300 × 300	300 × 300	200 × 300	200 × 300	200 × 300	200 × 300	200 × 200	200 × 300
0.501 to 0.650	300 × 300	300 × 400	300 × 300	300 × 300	300 × 300	300 × 300	200 × 300	200 × 300
0.651 to 0.800	300 × 400	300 × 400	300 × 300	300 × 400	300 × 300	300 × 300	300 × 300	300 × 300
0.801 to 1.00	400 × 400	400 × 400	300 × 400	300 × 400	300 × 400	300 × 400	300 × 300	300 × 300
1.01 to 1.20	400 × 400	400 × 400	400 × 400	400 × 400	300 × 400	300 × 400	300 × 400	300 × 400
1.21 to 1.40	–	–	400 × 400	400 × 400	400 × 400	400 × 400	300 × 400	300 × 400
1.41 to 1.60	–	–	–	–	400 × 400	400 × 400	400 × 400	400 × 400
1.61 to 1.80	–	–	–	–	–	–	400 × 400	400 × 400
1.81 to 2.00	–	–	–	–	–	–	400 × 400	400 × 400

9.21.2.6. Oval Chimney Flues

1) The width of an oval *chimney flue* shall be not less than two-thirds its breadth.

9.21.3. Chimney Lining

9.21.3.1. Lining Materials

1) Every *masonry or concrete chimney* shall have a lining of clay, concrete, firebrick or metal.

9.21.3.2. Joints in Chimney Liners

1) Joints of *chimney liners* shall be sealed to provide a barrier to the passage of *flue* gases and condensate into the cavity between the liner and the surrounding masonry.

2) Joints of clay, concrete or firebrick *chimney liners* shall be struck flush to provide a straight, smooth, aligned *chimney flue*.

9.21.3.3. Clay Liners

1) Clay liners shall conform to CAN/CSA-A324-M, "Clay Flue Liners."

2) Liners referred to in Sentence (1) shall be not less than 15.9 mm thick and shall be capable of resisting, without softening or cracking, a temperature of 1 100°C.

9.21.3.4. Firebrick Liners

1) Firebrick liners shall conform to ASTM C 27, "Fireclay and High-Alumina Refractory Brick."

2) Firebrick liners shall be laid with high temperature cement mortar conforming to CAN/CGSB-10.3, "Air Setting Refractory Mortar."

9.21.3.5. Concrete Liners

1) Concrete *flue* liners shall conform to Clause 4.2.6.4 of CAN/CSA-A405-M, "Design and Construction of Masonry Chimneys and Fireplaces."

9.21.3.6. Metal Liners

1) Metal liners shall be constructed of not less than 0.3 mm thick stainless steel.

2) Metal liners referred to in Sentence (1) shall only be used in *chimneys* serving gas- or oil-burning *appliances*. (See Note A-9.21.3.6.(2).)

9.21.3.7. Installation of Chimney Liners

1) *Chimney liners* shall be installed when the surrounding masonry or concrete is placed.

9.21.3.8. Spaces between Liners and Surrounding Masonry

1) A space not less than 10 mm wide shall be left between a *chimney liner* and surrounding masonry.

2) The space required in Sentence (1) shall not be filled with mortar.

9.21.3.9. Mortar for Chimney Liners

1) *Chimney liners* used in *chimneys* for solid-fuel-burning *appliances* shall be laid in a full bed of

a) high temperature cement mortar conforming to CAN/CGSB-10.3, "Air Setting Refractory Mortar," or

b) mortar consisting of 1 part Portland cement to 3 parts sand by volume.

2) *Chimney liners* used in *chimneys* for oil- or gas-burning *appliances* shall be laid in a full bed of mortar consisting of 1 part Portland cement to 3 parts sand by volume.

9.21.3.10. Extension of Chimney Liners

1) *Chimney liners* shall extend from a point not less than 200 mm below the lowest *flue pipe* connection to a point not less than 50 mm or more than 100 mm above the *chimney* cap.

9.21.4. Masonry and Concrete Chimney Construction

9.21.4.1. Unit Masonry

1) Unit masonry shall conform to Section 9.20.

9.21.4.2. Concrete

1) Concrete shall conform to Section 9.3.

9.21.4.3. Footings

1) Footings for *masonry chimneys* and *concrete chimneys* shall conform to Section 9.15.

9.21.4.4. Height of Chimney Flues

1) A *chimney flue* shall extend not less than

a) 900 mm above the highest point at which the *chimney* comes in contact with the roof, and

b) 600 mm above the highest roof surface or structure within 3 m of the *chimney*.

(See Note A-9.21.4.4.(1).)

9.21.4.5. Lateral Stability

1) Except as provided in Sentence (2), *chimneys* shall be braced in accordance with Subsection 4.3.2. to provide lateral stability under wind loads.

2) A *chimney* need not be laterally braced provided

a) no horizontal outside dimension is less than 400 mm, and

b) the *chimney* extends not more than 3.6 m above a roof or the masonry wall of which it forms a part.

(See Note A-9.21.4.5.(2).)

9.21.4.6. Chimney Caps

1) The top of a *chimney* shall have a waterproof cap of reinforced concrete, masonry or metal.

2) The cap required in Sentence (1) shall slope from the lining and be provided with a drip not less than 25 mm from the *chimney* wall.

3) Cast-in-place concrete caps shall be separated from the *chimney liner* by a bond break and be sealed at that location.

4) Jointed precast concrete or masonry *chimney* caps shall have flashing installed beneath the cap extending from the liner to the drip edge.

9.21.4.7. Cleanout

1) A cleanout opening with a metal frame and a tight-fitting metal door shall be installed near the base of the *chimney flue*.

9.21.4.8. Wall Thickness

1) The walls of a masonry *chimney* shall be built of *solid masonry units* not less than 75 mm thick.

9.21.4.9. Separation of Flue Liners

1) *Flue* liners in the same *chimney* shall be separated by not less than 75 mm of masonry or concrete exclusive of liners where clay liners are used, or 90 mm of firebrick where firebrick liners are used.

2) *Flue* liners referred to in Sentence (1) shall be installed to prevent significant lateral movement.

9.21.4.10. Flashing

1) Junctions with adjacent materials shall be adequately flashed to shed water.

9.21.5. Clearance from Combustible Construction

9.21.5.1. Clearance from Combustible Materials

1) The clearance between *masonry or concrete chimneys* and *combustible* framing shall be not less than

a) 50 mm for interior *chimneys*, and

b) 12 mm for exterior *chimneys*.

(See Note A-9.21.5.1.(1).)

2) A clearance of not less than 150 mm shall be provided between a cleanout opening and *combustible* material.

3) *Combustible* flooring and subflooring shall have not less than a 12 mm clearance from *masonry or concrete chimneys*.

9.21.5.2. Sealing of Spaces

1) All spaces between *masonry or concrete chimneys* and *combustible* framing shall be sealed top or bottom with *noncombustible* material.

9.21.5.3. Support of Joists or Beams

1) Joists or beams may be supported on masonry walls which enclose *chimney flues* provided the *combustible* members are separated from the *flue* by not less than 290 mm of *solid masonry*.