Subsection 13.2.8 highlights that no part of the common vent is allowed to be smaller than the largest connector in multiple-appliance installations, even if the common vent capacity tables would permit a smaller common vent.

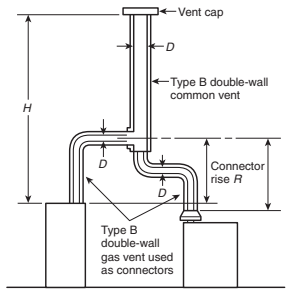
13.2.9 Tee and Wye Fittings. Tee and wye fittings connected to a common gas vent shall be considered as part of the common gas vent and constructed of materials consistent with that of the common gas vent.

Subsection 13.2.9 clarifies that tee and wye fittings are considered a part of the common vent and must be made of the same material as the common vent. For example, when tee or wye fittings connect to a Type B vent common vent system, the tee or wye fittings should also be Type B vent material.

13.2.10 Tee and Wye Sizing. At the point where tee or wye fittings connect to a common gas vent, the opening size of the fitting shall be equal to the size of the common vent. Such fittings shall not be prohibited from having reduced size openings at the point of connection of appliance gas vent connectors.

The tee and wye size must be the same as the common vent size. For example, if 3 in. × 4 in. connectors are joined to a 5 in. common vent, a 3 in. × 4 in. × 5 in. tee should be used.

See Annex F for diagrams and more information on how *R* and other dimensions called for in the venting tables are measured.



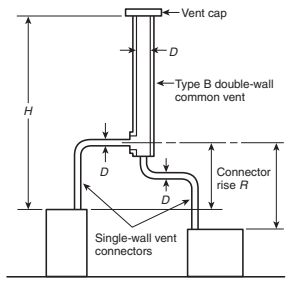
13.2.11 High-Altitude Installations. Sea level input ratings shall be used when determining maximum capacity for high-altitude installation. Actual input (derated for altitude) shall be used for determining minimum capacity for high-altitude installation.

Using the sea level input rating for the maximum capacity is a conservative measure because less draft is produced at high altitudes. The derating process will also make condensation more likely. The reduced input rate should be used for the minimum capacity.

13.2.12 Connector Rise. The connector rise *(R)* for each appliance connector shall be measured from the draft hood outlet or flue collar to the centerline where the vent gas streams come together.

Providing as much rise as the installation will permit, while still maintaining required clearance, is beneficial to overall vent performance. Additional rise helps establish and maintain flow through the venting system. Total rise is measured from the outlet of the draft hood or flue collar up to the (centerline) point where the highest connector joins the common vent. [See Figure F.1(f) through Figure F.1(l) in Annex F for specific examples.] For a given appliance, this distance may include a portion of the common vent. In addition to providing rise, it is also beneficial to provide as much vertical height as the installation will permit between the outlet of the appliance and the first elbow in the connector.

See Annex F for diagrams and more information on how *H* and other dimensions called for in the venting tables are measured.



13.2.13 Vent Height. For multiple appliances all located on one floor, available total height *(H)* shall be measured from the highest draft hood outlet or flue collar up to the level of the outlet of the common vent.

See Exhibit 13.1 for measurement of connector rise, *R,* and total vent height, *H*. Connector rise is described in 13.2.12.

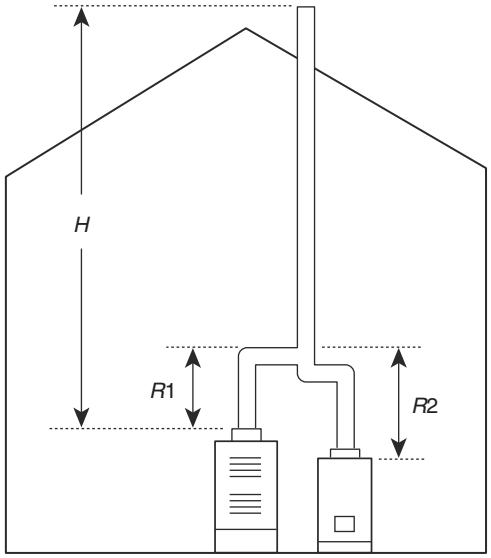


EXHIBIT 13.1

Connector rise and vent height.

13.2.14 Multistory Vent Height. For multistory installations, available total height *(H)* for each segment of the system shall be the vertical distance between the highest draft hood outlet or flue collar entering that segment and the centerline of the next higher interconnection tee.

FAQ How is vent height in a multistory venting system determined?

As venting system height increases, so does draft and vent capacity. However, the effect of increased height is negated when additional appliances are connected to the venting system. As dilution air enters the vent through the upper appliances, draft to lower appliances is decreased. Therefore, the vent height for a given segment is based on the distance between the appliances of that segment and the next higher connection tee (usually on the next level of the building).

13.2.15 Multistory Lowest Vent and Vent Connector Sizing. The size of the lowest connector and of the vertical vent leading to the lowest interconnection of a multistory system shall be in accordance with Table 13.1(a) or Table 13.1(b) for available total height *(H)* up to the lowest interconnection.

See Exhibit 13.2 and the examples in Annex F for more information on the multistory vents described in 13.2.14, 13.2.15, and 13.2.16. The vent on the first floor is treated like a normal venting system whose height ends at the next floor. The higher floors are treated as common vents whose height ends at the floor above. This tends to result in large-diameter vertical vents. It may be more cost-effective to use separate venting systems for groups of floors.

See Annex F for diagrams and more information on how to design multistory vents.

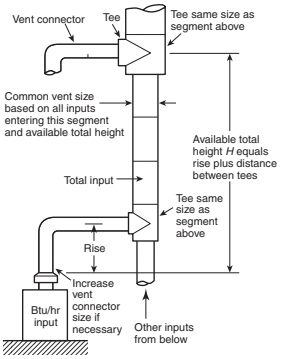
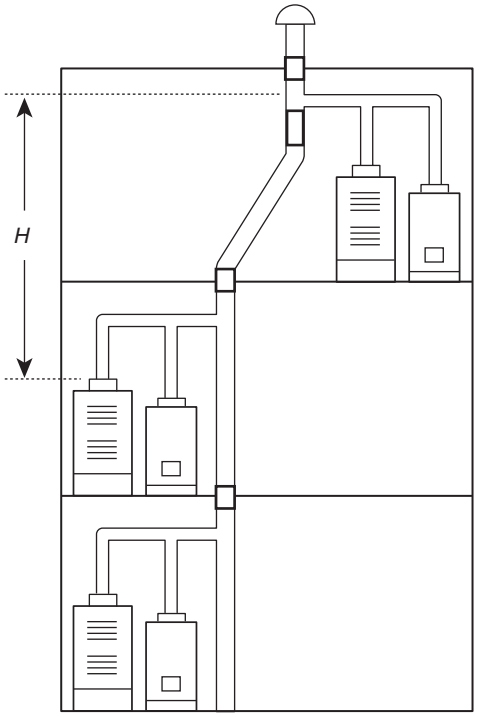


EXHIBIT 13.2

Multistory vents.



13.2.16 Multistory B Vents Required. Where used in multistory systems, vertical common vents shall be Type B double wall and shall be installed with a listed vent cap.

13.2.17 Multistory Vent Offsets and Capacity. Offsets in multistory common vent systems shall be limited to a single offset in each system, and systems with an offset shall comply with all of the following:

(1) The offset angle shall not exceed 45 degrees from vertical.
(2) The horizontal length of the offset shall not exceed 18 in./in. (18 mm/mm) of common vent diameter of the segment in which the offset is located.
(3) For the segment of the common vertical vent containing the offset, the common vent capacity listed in the common venting tables shall be reduced by 20 percent (0.80 × maximum common vent capacity).
(4) A multistory common vent shall not be reduced in size above the offset.

13.2.18 Vertical Vent Size Limitation. Where two or more appliances are connected to a vertical vent or chimney, the flow area of the largest section of vertical vent or chimney shall not exceed seven times the smallest listed appliance categorized vent areas, flue collar area, or draft hood outlet area unless designed in accordance with approved engineering methods.

The "seven times" rule covered in 13.2.18 limits the common vent diameter to seven times the diameter of the smallest connector in the vent system. For example, if a water heater with a 4 in. vent connector was the only appliance connected to a venting system, the maximum vent area would be 7 × 4 in. A 4 in. diameter vent connector has an area of about 12.5 in.^{2} [The area of a circle is Πr^2. Therefore, multiply Π, or 3.14, by the radius (½ the diameter) squared, or 3.14 × 2 × 2 = approximately 12.5 in.^{2}] The seven times rule results in 7 × 12.5, or about 88 in.^{2} maximum allowable area. A 10 in. diameter circle has an area of about 79 in.^{2} and is the largest diameter round vent that could be used with a water heater with a 4 in. vent connector.

13.2.19 Two-Stage/Modulating Appliances. For appliances with more than one input rate, the minimum vent connector capacity (FAN Min) determined from the tables shall be less than the lowest appliance input rating, and the maximum vent connector capacity (FAN Max or NAT Max) determined from the tables shall be greater than the highest appliance input rating.

If an appliance has multiple input rates, the minimum capacity is determined with the minimum input rate and the maximum capacity is determined with the maximum input rate.

13.2.20* Corrugated Chimney Liners. Listed corrugated metallic chimney liner systems in masonry chimneys shall be sized by using Table 13.2(a) or Table 13.2(b) for Type B vents, with the maximum capacity reduced by 20 percent (0.80 × maximum capacity) and the minimum capacity as shown in Table 13.2(a) or Table 13.2(b). Corrugated metallic liner systems installed with bends or offsets shall have their maximum capacity further reduced in accordance with 13.2.5 and 13.2.6. The 20 percent reduction for corrugated metallic chimney liner systems includes an allowance for one long radius 90-degree turn at the bottom of the liner.

FAQ Does a corrugated chimney liner have the same capacity as a similar size smooth wall liner or vent?

Properly installed corrugated chimney liners have heat loss similar to that of a Type B vent, so they are sized using Table 13.2(a) or Table 13.2(b). However, corrugations of such liners and their tendency to spiral in the chimney require a 20 percent maximum capacity reduction.

FAQ Does the turn or bend at the bottom of a flexible chimney liner count as an elbow?

Many liners begin at the opening in the chimney wall and then bend up vertically. This 90-degree elbow at the beginning of the liner is included in the 20 percent reduction. The inclusion of one 90-degree elbow was clarified in the 2002 edition with the assistance of the researchers who developed the tables. Additional information about the research used as the basis for the venting guidelines can be found in Supplement 1.

See Supplement 1 for more information on the development of the vent sizing tables and requirements.

A.13.2.20 A long radius turn is a turn where the centerline radius is equal to or greater than 1.5 times the vent diameter.

13.2.21 Connections to Chimney Liners. Where double-wall connectors are required, tee and wye fittings used to connect to the common vent chimney liner shall be listed double-wall fittings. Connections between chimney liners and listed double-wall fittings shall be made with listed adapter fittings designed for such purpose.

Δ **13.2.22 Chimneys and Vent Locations.** Table 13.2(a) through Table 13.2(e) shall be used only for chimneys and vents not exposed to the outdoors below the roof line. A Type B vent or listed chimney lining system passing through an unused masonry chimney flue shall not be considered to be exposed to the outdoors. A Type B vent passing through an unventilated enclosure or chase insulated to a value of not less than R8 shall not be considered to be exposed to the outdoors. Where vents extend outdoors above the roof more than 5 ft (1.5 m) higher than required by Table 12.7.3, and where vents terminate in accordance with 12.7.3(1)(b), the outdoor portion of the vent shall be enclosed as required by this paragraph for vents not considered to be exposed to the outdoors, or such venting system shall be engineered. Table 13.2(f), Table 13.2(g), Table 13.2(h), and Table 13.2(i) shall be used for clay tile lined exterior masonry chimneys, provided all the following conditions are met:

(1) The vent connector is Type B double wall.
(2) At least one appliance is draft hood equipped.

(3) The combined appliance input rating is less than the maximum capacity given by Table 13.2(f) (for NAT+NAT) or Table 13.2(h) (for FAN+NAT).
(4) The input rating of each space-heating appliance is greater than the minimum input rating given by Table 13.2(g) (for NAT+NAT) or Table 13.2(i) (for FAN+NAT).
(5) The vent connector sizing is in accordance with Table 13.2(c).

Subsection 13.2.22 states that Table 13.2(a) through Table 13.2(e) are to be used only for venting systems that are not exposed to the outdoors below the roofline. This subsection aims to clarify that Type B vents installed in unventilated enclosures or chases insulated to a value of R8 could be sized as if they were installed indoors. This requirement permits these installations to be sized using Table 13.2(a) or Table 13.2(b).

Table 13.2(c) is used to determine the capacity of chimney connectors that are attached to chimneys exposed to the outdoors below the roofline, whereas Table 13.2(f) or Table 13.2(h) is used to determine the maximum capacity of the common vent. Table 13.2(g) and Table 13.2(i), in turn, have different minimum capacities for the common vent based on the ambient temperatures expected. The vent connectors are sized using Table 13.2(c), calculating both a minimum and maximum connector capacity for fan-assisted appliances and only the maximum connector capacity for draft hood appliances.

The alternative offered in 13.2.22 recognizes that manufacturers may produce customized products for exterior masonry chimneys and may use their own instructions.

Requirements are provided in 13.2.22 for the use of exterior masonry chimneys for heating appliances. These restrictions are needed because of the high heat loss in chimneys exposed to the outdoors below the roofline in cold climates. Note that these restrictions do not apply to chimneys and vents that are not exposed to the outdoors below the roofline because these chimneys and vents are considered to be interior chimneys.

Note that only Type B double-wall vent connectors are allowed in order to minimize heat loss in the vent connector. At least one appliance, such as a water heater, must be draft hood equipped.

13.2.23 Draft Hood Conversion Accessories. Draft hood conversion accessories for use with masonry chimney venting listed Category I fan-assisted appliances shall be listed and installed in accordance with the listed accessory manufacturer's installation instructions.

Draft hood conversion accessories are add-on kits that convert a fan-assisted appliance to a draft hood appliance by providing an opening for dilution air from the room to enter the venting system. As listed components, these accessories are provided by the appliance manufacturer and must be installed according to the instructions included with the accessory. The addition of the draft hood kit allows the appliance to be sized as a draft hood appliance, which may be beneficial when venting into masonry chimneys, especially exterior masonry chimneys. Note that a draft hood should not be added to a fan-assisted appliance unless specifically approved and provided by the appliance manufacturer.

13.2.24 Vent Connector Sizing. Vent connectors shall not be increased more than two sizes greater than the listed appliance categorized vent diameter, flue collar diameter, or draft hood outlet diameter. Vent connectors for draft hood–equipped appliances shall not be smaller than the draft hood outlet diameter. Where a vent connector size(s) determined from the tables for a fan-assisted appliance(s) is smaller than the flue collar diameter, the use of the smaller size(s) shall be permitted, provided that the installation complies with all of the following conditions:

(1) Vent connectors for fan-assisted appliance flue collars 12 in. (300 mm) in diameter or smaller are not reduced by more than one table size [e.g., 12 in. to 10 in. (300 mm to 250 mm) is a one-size reduction], and those larger than 12 in. (300 mm) in diameter are not reduced more than two table sizes [e.g., 24 in. to 20 in. (610 mm to 510 mm) is a two-size reduction].

(2) The fan-assisted appliance(s) is common vented with a draft hood–equipped appliance(s).
(3) The vent connector has a smooth interior wall.

A sudden large expansion of the vent connector diameter creates a pressure drop that may limit the draft and encourage condensation. Therefore, the vent connector diameter is limited in accordance with 13.2.24.

Note that an appliance includes either a draft hood or flue collar for connection to the vent or vent connector. The term *appliance categorized vent diameter/area* is defined in 3.3.6 as follows:

> **3.3.6 Appliance Categorized Vent Diameter/Area.** The minimum vent diameter/area permissible for Category I appliances to maintain a nonpositive vent static pressure when tested in accordance with nationally recognized standards.

Therefore, where connecting an appliance to a vent connector, the vent connector must be sized using Table 13.2(a) through Table 13.2(e), as appropriate, to determine the minimum size connector permitted for the vent system configuration.

13.2.25 Multiple Vent and Connector Sizes. All combinations of pipe sizes, single-wall metal pipe, and double-wall metal pipe shall be allowed within any connector run(s) or within the common vent, provided ALL of the appropriate tables permit ALL of the desired sizes and types of pipe, as if they were used for the entire length of the subject connector or vent. Where single-wall and Type B double-wall metal pipes are used for vent connectors within the same venting system, the common vent shall be sized using Table 13.2(b) or Table 13.2(d) as appropriate.

Table 13.2(b) is the Type B vent single-wall metal connector table, and Table 13.2(d) is the masonry chimney single-wall metal connector table. Using these single-wall tables where combinations of single-wall and Type B vent connectors exist in the same installation provides a conservative factor for the entire installation.

13.2.26 Multiple Vent and Connector Sizes Permitted. Where a Chapter 13 table permits more than one diameter of pipe to be used for a connector or vent, all the permitted sizes shall be permitted to be used.

Subsections 13.2.25 and 13.2.26 require the installer to check the minimum and maximum capacities for the vent section for each vent type as if the entire vent section were of that size. For example, for a vent connector that is half single-wall and half Type B, the installer must demonstrate that a particular vent connector of that given length would be allowed if it were all single-wall and also if it were all Type B.

13.2.27 Interpolation. Interpolation shall be permitted in calculating capacities for vent dimensions that fall between table entries.

If the installation dimensions fall between two table entries for which there are defined values, the installer may calculate the "in between" value. This is called an interpolation and is addressed in the commentary following 13.1.15.

13.2.28 Extrapolation. Extrapolation beyond the table entries shall not be permitted.

Extrapolation is estimating a value outside the parameters of a table. For example, Table 13.2(a) provides common vent capacities for vents up to 100 ft (30 m). The user is not permitted to use the values in the table to estimate the capacity of a common vent that is 110 ft (34 m) high.

13.2.29 Sizing Vents Not Covered by Tables. For vent heights lower than 6 ft (1.8 m) and higher than shown in the tables, engineering methods shall be used to calculate vent capacities.

Subsection 13.2.29 requires that vent heights outside the parameters of the tables must be calculated and that the tables cannot be used for those vent heights.

13.2.30 Height Entries. Where the actual height of a vent falls between entries in the height column of the applicable table in Table 13.2(a) through Table 13.2(i), either of the following shall be used:

(1) Interpolation
(2) The lower appliance input rating shown in the table entries, for FAN Max and NAT Max column values; and the higher appliance input rating for the FAN Min column values

Section 13.2.30 clarifies sizing for vent or chimney heights that fall between table entries. The maximum (Max) input shall be based on the lower input shown in the lower height table entry while the minimum (Min) input shall be determined by the higher input of the taller height table entry. This provides conservative values for the both minimum and maximum firing rates. As an alternative, exact values may be calculated for a given height through interpolation. Interpolation is explained in commentary section 13.1.15.

TABLE 13.2(a) Type B Double-Wall Vent

Number of Appliances:	*Two or More*
Appliance Type:	*Category I*
Appliance Vent Connection:	*Type B Double-Wall Connector*

Vent Connector Capacity

Vent Height H (ft)	Connector Rise R (ft)	Type B Double-Wall Vent and Connector Diameter — D (in.)																					
		3			4			5			6			7			8			9			10		
		Appliance Input Rating Limits in Thousands of Btu per Hour																					
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max
6	1	22	37	26	35	66	46	46	106	72	58	164	104	77	225	142	92	296	185	109	376	237	128	466	289
	2	23	41	31	37	75	55	48	121	86	60	183	124	79	253	168	95	333	220	112	424	282	131	526	345
	3	24	44	35	38	81	62	49	132	96	62	199	139	82	275	189	97	363	248	114	463	317	134	575	386
8	1	22	40	27	35	72	48	49	114	76	64	176	109	84	243	148	100	320	194	118	408	248	138	507	303
	2	23	44	32	36	80	57	51	128	90	66	195	129	86	269	175	103	356	230	121	454	294	141	564	358
	3	24	47	36	37	87	64	53	139	101	67	210	145	88	290	198	105	384	258	123	492	330	143	612	402
10	1	22	43	28	34	78	50	49	123	78	65	189	113	89	257	154	106	341	200	125	436	257	146	542	314
	2	23	47	33	36	86	59	51	136	93	67	206	134	91	282	182	109	374	238	128	479	305	149	596	372
	3	24	50	37	37	92	67	52	146	104	69	220	150	94	303	205	111	402	268	131	515	342	152	642	417
15	1	21	50	30	33	89	53	47	142	83	64	220	120	88	298	163	110	389	214	134	493	273	162	609	333
	2	22	53	35	35	96	63	49	153	99	66	235	142	91	320	193	112	419	253	137	532	323	165	658	394
	3	24	55	40	36	102	71	51	163	111	68	248	160	93	339	218	115	445	286	140	565	365	167	700	444
20	1	21	54	31	33	99	56	46	157	87	62	246	125	86	334	171	107	436	224	131	552	285	158	681	347
	2	22	57	37	34	105	66	48	167	104	64	259	149	89	354	202	110	463	265	134	587	339	161	725	414
	3	23	60	42	35	110	74	50	176	116	66	271	168	91	371	228	113	486	300	137	618	383	164	764	466
30	1	20	62	33	31	113	59	45	181	93	60	288	134	83	391	182	103	512	238	125	649	305	151	802	372
	2	21	64	39	33	118	70	47	190	110	62	299	158	85	408	215	105	535	282	129	679	360	155	840	439
	3	22	66	44	34	123	79	48	198	124	64	309	178	88	423	242	108	555	317	132	706	405	158	874	494
50	1	19	71	36	30	133	64	43	216	101	57	349	145	78	477	197	97	627	257	120	797	330	144	984	403
	2	21	73	43	32	137	76	45	223	119	59	358	172	81	490	234	100	645	306	123	820	392	148	1014	478
	3	22	75	48	33	141	86	46	229	134	61	366	194	83	502	263	103	661	343	126	842	441	151	1043	538
100	1	18	82	37	28	158	66	40	262	104	53	442	150	73	611	204	91	810	266	112	1038	341	135	1285	417
	2	19	83	44	30	161	79	42	267	123	55	447	178	75	619	242	94	822	316	115	1054	405	139	1306	494
	3	20	84	50	31	163	89	44	272	138	57	452	200	78	627	272	97	834	355	118	1069	455	142	1327	555

Common Vent Capacity

Vent Height H (ft)	Type B Double-Wall Common Vent Diameter — D (in.)																							
	4			5			6			7			8			9			10					
	Combined Appliance Input Rating in Thousands of Btu per Hour																							
	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT			
6	92	81	65	140	116	103	204	161	147	309	248	200	404	314	260	547	434	335	672	520	410			
8	101	90	73	155	129	114	224	178	163	339	275	223	444	348	290	602	480	378	740	577	465			
10	110	97	79	169	141	124	243	194	178	367	299	242	477	377	315	649	522	405	800	627	495			
15	125	112	91	195	164	144	283	228	206	427	352	280	556	444	365	753	612	465	924	733	565			
20	136	123	102	215	183	160	314	255	229	475	394	310	621	499	405	842	688	523	1035	826	640			
30	152	138	118	244	210	185	361	297	266	547	459	360	720	585	470	979	808	605	1209	975	740			
50	167	153	134	279	244	214	421	353	310	641	547	423	854	706	550	1164	977	705	1451	1188	860			
100	175	163	NA	311	277	NA	489	421	NA	751	658	479	1025	873	625	1408	1215	800	1784	1502	975			

(Continues)

TABLE 13.2(a) *Continued*

Number of Appliances:	*Two or More*
Appliance Type:	*Category I*
Appliance Vent Connection:	*Type B Double-Wall Connector*

Vent Height H (ft)	*Connector Rise R (ft)*	*Type B Double-Wall Vent and Connector Diameter — D (in.)*																					
		12			*14*			*16*			*18*			*20*			*22*			*24*			
		Appliance Input Rating Limits in Thousands of Btu per Hour																					
		FAN		*NAT*	*FAN*		*NAT*	*FAN*		*NAT*	*FAN*		*NAT*	*FAN*		*NAT*	*FAN*		*NAT*	*FAN*		*NAT*
		Min	*Max*	*Max*	*Min*	*Max*	*Max*	*Min*	*Max*	*Max*	*Min*	*Max*	*Max*	*Min*	*Max*	*Max*	*Min*	*Max*	*Max*	*Min*	*Max*	*Max*
6	2	174	764	496	223	1046	653	281	1371	853	346	1772	1080	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4	180	897	616	230	1231	827	287	1617	1081	352	2069	1370	NA	NA	NA	NA	NA	NA	NA	NA	NA
	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8	2	186	822	516	238	1126	696	298	1478	910	365	1920	1150	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4	192	952	644	244	1307	884	305	1719	1150	372	2211	1460	471	2737	1800	560	3319	2180	662	3957	2590
	6	198	1050	772	252	1445	1072	313	1902	1390	380	2434	1770	478	3018	2180	568	3665	2640	669	4373	3130
10	2	196	870	536	249	1195	730	311	1570	955	379	2049	1205	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4	201	997	664	256	1371	924	318	1804	1205	387	2332	1535	486	2887	1890	581	3502	2280	686	4175	2710
	6	207	1095	792	263	1509	1118	325	1989	1455	395	2556	1865	494	3169	2290	589	3849	2760	694	4593	3270
15	2	214	967	568	272	1334	790	336	1760	1030	408	2317	1305	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4	221	1085	712	279	1499	1006	344	1978	1320	416	2579	1665	523	3197	2060	624	3881	2490	734	4631	2960
	6	228	1181	856	286	1632	1222	351	2157	1610	424	2796	2025	533	3470	2510	634	4216	3030	743	5035	3600
20	2	223	1051	596	291	1443	840	357	1911	1095	430	2533	1385	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4	230	1162	748	298	1597	1064	365	2116	1395	438	2778	1765	554	3447	2180	661	4190	2630	772	5005	3130
	6	237	1253	900	307	1726	1288	373	2287	1695	450	2984	2145	567	3708	2650	671	4511	3190	785	5392	3790
30	2	216	1217	632	286	1664	910	367	2183	1190	461	2891	1540	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4	223	1316	792	294	1802	1160	376	2366	1510	474	3110	1920	619	3840	2365	728	4861	2860	847	5606	3410
	6	231	1400	952	303	1920	1410	384	2524	1830	485	3299	2340	632	4080	2875	741	4976	3480	860	5961	4150
50	2	206	1479	689	273	2023	1007	350	2659	1315	435	3548	1665	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4	213	1561	860	281	2139	1291	359	2814	1685	447	3730	2135	580	4601	2633	709	5569	3185	851	6633	3790
	6	221	1631	1031	290	2242	1575	369	2951	2055	461	3893	2605	594	4808	3208	724	5826	3885	867	6943	4620
100	2	192	1923	712	254	2644	1050	326	3490	1370	402	4707	1740	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4	200	1984	888	263	2731	1346	336	3606	1760	414	4842	2220	523	5982	2750	639	7254	3330	769	8650	3950
	6	208	2035	1064	272	2811	1642	346	3714	2150	426	4968	2700	539	6143	3350	654	7453	4070	786	8892	4810

Common Vent Capacity

Vent Height H (ft)	*Type B Double-Wall Common Vent Diameter — D (in.)*																					
	12			*14*			*16*			*18*			*20*			*22*			*24*		
	Combined Appliance Input Rating in Thousands of Btu per Hour																					
	FAN +FAN	*FAN +NAT*	*NAT +NAT*	*FAN +FAN*	*FAN +NAT*	*NAT +NAT*	*FAN +FAN*	*FAN +NAT*	*NAT +NAT*	*FAN +FAN*	*FAN +NAT*	*NAT +NAT*	*FAN +FAN*	*FAN +NAT*	*NAT +NAT*	*FAN +FAN*	*FAN +NAT*	*NAT +NAT*	*FAN +FAN*	*FAN +NAT*	*NAT +NAT*
6	900	696	588	1284	990	815	1735	1336	1065	2253	1732	1345	2838	2180	1660	3488	2677	1970	4206	3226	2390
8	994	773	652	1423	1103	912	1927	1491	1190	2507	1936	1510	3162	2439	1860	3890	2998	2200	4695	3616	2680
10	1076	841	712	1542	1200	995	2093	1625	1300	2727	2113	1645	3444	2665	2030	4241	3278	2400	5123	3957	2920
15	1247	986	825	1794	1410	1158	2440	1910	1510	3184	2484	1910	4026	3133	2360	4971	3862	2790	6016	4670	3400
20	1405	1116	916	2006	1588	1290	2722	2147	1690	3561	2798	2140	4548	3552	2640	5573	4352	3120	6749	5261	3800
30	1658	1327	1025	2373	1892	1525	3220	2558	1990	4197	3326	2520	5303	4193	3110	6539	5157	3680	7940	6247	4480
50	2024	1640	1280	2911	2347	1863	3964	3183	2430	5184	4149	3075	6567	5240	3800	8116	6458	4500	9837	7813	5475
100	2569	2131	1670	3732	3076	2450	5125	4202	3200	6749	5509	4050	8597	6986	5000	10,681	8648	5920	13,004	10,499	7200

For SI units, 1 in. = 25.4 mm, 1 in.^{2} = 645 mm^2, 1 ft = 0.305 m, 1000 Btu/hr = 0.293 kW.

TABLE 13.2(b) *Type B Double-Wall Vent*

Number of Appliances:	*Two or More*
Appliance Type:	*Category I*
Appliance Vent Connection:	*Single-Wall Metal Connector*

Vent Connector Capacity

		Single-Wall Metal Vent Connector Diameter — D (in.)																					
		3			*4*			*5*			*6*			*7*			*8*			*9*			*10*		
		Appliance Input Rating Limits in Thousands of Btu per Hour																					
Vent Height H (ft)	*Connector Rise R (ft)*	*FAN*		*NAT*	*FAN*		*NAT*	*FAN*		*NAT*	*FAN*		*NAT*	*FAN*		*NAT*	*FAN*		*NAT*	*FAN*		*NAT*	*FAN*		*NAT*
		Min	*Max*	*Max*	*Min*	*Max*	*Max*	*Min*	*Max*	*Max*	*Min*	*Max*	*Max*	*Min*	*Max*	*Max*	*Min*	*Max*	*Max*	*Min*	*Max*	*Max*	*Min*	*Max*	*Max*
6	1	NA	NA	26	NA	NA	46	NA	NA	71	NA	NA	102	207	223	140	262	293	183	325	373	234	447	463	286
	2	NA	NA	31	NA	NA	55	NA	NA	85	168	182	123	215	251	167	271	331	219	334	422	281	458	524	344
	3	NA	NA	34	NA	NA	62	121	131	95	175	198	138	222	273	188	279	361	247	344	462	316	468	574	385
8	1	NA	NA	27	NA	NA	48	NA	NA	75	NA	NA	106	226	240	145	285	316	191	352	403	244	481	502	299
	2	NA	NA	32	NA	NA	57	125	126	89	184	193	127	234	266	173	293	353	228	360	450	292	492	560	355
	3	NA	NA	35	NA	NA	64	130	138	100	191	208	144	241	287	197	302	381	256	370	489	328	501	609	400
10	1	NA	NA	28	NA	NA	50	119	121	77	182	186	110	240	253	150	302	335	196	372	429	252	506	534	308
	2	NA	NA	33	84	85	59	124	134	91	189	203	132	248	278	183	311	369	235	381	473	302	517	589	368
	3	NA	NA	36	89	91	67	129	144	102	197	217	148	257	299	203	320	398	265	391	511	339	528	637	413
15	1	NA	NA	29	79	87	52	116	138	81	177	214	116	238	291	158	312	380	208	397	482	266	556	596	324
	2	NA	NA	34	83	94	62	121	150	97	185	230	138	246	314	189	321	411	248	407	522	317	568	646	387
	3	NA	NA	39	87	100	70	127	160	109	193	243	157	255	333	215	331	438	281	418	557	360	579	690	437
20	1	49	56	30	78	97	54	115	152	84	175	238	120	233	325	165	306	425	217	390	538	276	546	664	336
	2	52	59	36	82	103	64	120	163	101	182	252	144	243	346	197	317	453	259	400	574	331	558	709	403
	3	55	62	40	87	107	72	125	172	113	190	264	164	252	363	223	326	476	294	412	607	375	570	750	457
30	1	47	60	31	77	110	57	112	175	89	169	278	129	226	380	175	296	497	230	378	630	294	528	779	358
	2	51	62	37	81	115	67	117	185	106	177	290	152	236	397	208	307	521	274	389	662	349	541	819	425
	3	54	64	42	85	119	76	122	193	120	185	300	172	244	412	235	316	542	309	400	690	394	555	855	482
50	1	46	69	34	75	128	60	109	207	96	162	336	137	217	460	188	284	604	245	364	768	314	507	951	384
	2	49	71	40	79	132	72	114	215	113	170	345	164	226	473	223	294	623	293	376	793	375	520	983	458
	3	52	72	45	83	136	82	119	221	123	178	353	186	235	486	252	304	640	331	387	816	423	535	1013	518
100	1	45	79	34	71	150	61	104	249	98	153	424	140	205	585	192	269	774	249	345	993	321	476	1236	393
	2	48	80	41	75	153	73	110	255	115	160	428	167	212	593	228	279	788	299	358	1011	383	490	1259	469
	3	51	81	46	79	157	85	114	260	129	168	433	190	222	603	256	289	801	339	368	1027	431	506	1280	527

Common Vent Capacity

	Type B Double-Wall Vent Diameter — D (in.)																							
	4			*5*			*6*			*7*			*8*			*9*			*10*					
	Combined Appliance Input Rating in Thousands of Btu per Hour																							
Vent Height H (ft)	*FAN +FAN*	*FAN +NAT*	*NAT +NAT*	*FAN +FAN*	*FAN +NAT*	*NAT +NAT*	*FAN +FAN*	*FAN +NAT*	*NAT +NAT*	*FAN +FAN*	*FAN +NAT*	*NAT +NAT*	*FAN +FAN*	*FAN +NAT*	*NAT +NAT*	*FAN +FAN*	*FAN +NAT*	*NAT +NAT*	*FAN +FAN*	*FAN +NAT*	*NAT +NAT*			
6	NA	78	64	NA	113	99	200	158	144	304	244	196	398	310	257	541	429	332	665	515	407			
8	NA	87	71	NA	126	111	218	173	159	331	269	218	436	342	285	592	473	373	730	569	460			
10	NA	94	76	163	137	120	237	189	174	357	292	236	467	369	309	638	512	398	787	617	487			
15	121	108	88	189	159	140	275	221	200	416	343	274	544	434	357	738	599	456	905	718	553			
20	131	118	98	208	177	156	305	247	223	463	383	302	606	487	395	824	673	512	1013	808	626			
30	145	132	113	236	202	180	350	286	257	533	446	349	703	570	459	958	790	593	1183	952	723			
50	159	145	128	268	233	208	406	337	296	622	529	410	833	686	535	1139	954	689	1418	1157	838			
100	166	153	NA	297	263	NA	469	398	NA	726	633	464	999	846	606	1378	1185	780	1741	1459	948			

For SI units, 1 in. = 25.4 mm, 1 in.^{2} = 645 mm^2, 1 ft = 0.305 m, 1000 Btu/hr = 0.293 kW.