First Revision No. 40-NFPA 54-2024 [Global Input]

Revise the title of paragraphs 10.2.1, 10.3.1, 10.4.1, 10.6.1, 10.7.1, 10.8.1, 10.12.1, 10.13.1, 10.16.1, 10.17.1, 10.19.1, 10.20.1, 10.21.1, 10.24.1, 10.25.1 and 10.26.1 to read:

~~**Application**~~ **Listing.**

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 13:43:16 EDT 2024

Committee Statement

Committee Statement: These paragraphs establish listing requirements, not the application of the appliance and the title is changing to reflect that. See related FR 78 and FR 79 for related changes in regards to the section content based on the proposed title changes.

Response Message: FR-40-NFPA 54-2024

Public Input No. 83-NFPA 54-2024 [Global Input]

First Revision No. 60-NFPA 54-2024 [Global Input]

Substitute “gas supplier” for “serving gas supplier” throughout the document

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 24 14:08:43 EDT 2024

Committee Statement

Committee Statement: Serving is being removed as the gas supplier is always the one serving the gas and not the customer.

Response Message: FR-60-NFPA 54-2024

Public Input No. 25-NFPA 54-2024 [Global Input]

First Revision No. 42-NFPA 54-2024 [Detail]

Revise Table 6.2.1(a), 6.2.1(b),6.2.1(h), and 6.2.1(i) to add the following intended use line:

Intended Use: Inlet gas pressure less than 8 in. w.c.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Fri Sep 20 10:43:28 EDT 2024

Committee Statement

Committee Statement: There are 24 sizing tables for natural gas in the Code. It is not unusual for the wrong table to be used because the descriptions are similar. The proposed Intended Use line will make it more evident that the tables with a 0.3 in. w.c. drop are intended for systems with the minimum inlet pressure and will help to prevent under-sizing of pipe. With the present Code, and installer can see that both Tables 6.2.1 (a) and (b) appear to be applicable, and might note that Table 6.2.1 (b) provided greater capacity, allowing the use of smaller pipe.

Response Message: FR-42-NFPA 54-2024

Public Input No. 27-NFPA 54-2024 [Global Input]

First Revision No. 43-NFPA 54-2024 [Detail]

Delete Table 6.2.1(f)

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Fri Sep 20 11:18:59 EDT 2024

Committee Statement

Committee Statement: The table is deleted as the use of 3 psi inlet pressure systems is not common. The knowledge of the submitted, gas utilities do not normally offer 3 psi pressure for building use. The deletion of the table does not intend to prohibit 3 psi piping systems, but will require the engineer or designer to identify the proper sizing table. The table will always be available in previous editions of the Code.

Response Message: FR-43-NFPA 54-2024

Public Input No. 28-NFPA 54-2024 [Global Input]

First Revision No. 44-NFPA 54-2024 [Detail]

Delete Table 6.2.1(k)

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Fri Sep 20 11:39:02 EDT 2024

Committee Statement

Committee Statement: The table is no longer needed. The combination of a less than 2 psi (<55 in. w.c.) system inlet pressure and 17 in. with a pressure drop of 17 in w.c. is unlikely today.

Response Message: FR-44-NFPA 54-2024

Public Input No. 31-NFPA 54-2024 [Global Input]

First Revision No. 45-NFPA 54-2024 [Detail]

Delete Table 6.2.1(m)

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Fri Sep 20 11:44:31 EDT 2024

Committee Statement

Committee Statement: The table is easily misused. It is limited to a total load of 150 Cu. Ft. per hour, yet the table has entries up to 2,270 Cu. Ft per hour. Only the length rows up to 60 ft. provide capacities under 150 Cu. Ft. per hour. This table covers the inlet to a line pressure regulator. The information is being provided by manufacturers of line pressure regulators; therefore, this table is not needed.

Response Message: FR-45-NFPA 54-2024

Public Input No. 32-NFPA 54-2024 [Global Input]

First Revision No. 46-NFPA 54-2024 [Detail]

Revise the following in Table 6.2.1(q)

Revise Intended Use: Initial Supply Pressure of 11.0 in. w.c. up to 14.0 in. w.c. without a line pressure regulator. ~~or Greater~~

Revise note (1): Replace "Shall" with "need to"

Add new note (2) as follows: Do not use unless the gas supplier can supply 11 in. w.c. or greater.

Move current note (2) to note (3)

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Fri Sep 20 11:46:23 EDT 2024

Committee Statement

Committee Statement:

1. The Intended Use is revise to be consistent with allowable practice.

2. Note (1) is revised to eliminate shall as requirements cannot be in table notes.

3. A new Note (2) is added to remind the user that a minimum supply pressure of 11" w.c. is needed to use this table. This reiterates the Intended Use line, as the table has been misused.

4. The proposed Note stating that the table is intended for use with engineering methods is not accepted because the table can be used without engineering methods.

Response Message: FR-46-NFPA 54-2024

Public Input No. 35-NFPA 54-2024 [Global Input]

First Revision No. 47-NFPA 54-2024 [Detail]

Revise the intended use line of Table 6.2.1(j) to read:

INTENDED USE: Tube Sizing between ~~House~~ and Line Pressure Regulator and the Appliance.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Fri Sep 20 11:57:37 EDT 2024

Committee Statement

Committee Statement: The term "line pressure regulator" is substituted for "house pressure regulator". Line pressure regulator is a defined term, and its use is preferred.

Response Message: FR-47-NFPA 54-2024

Public Input No. 40-NFPA 54-2024 [Global Input]

First Revision No. 48-NFPA 54-2024 [Detail]

Revise the following in Table 6.2.1(p)

Revise Intended Use: Supply Pressure of 8 in. w.c. up to 14.0 in. w.c. without a line pressure regulator. ~~or Greater~~

Revise note (1): Replace "Shall" with "need to"

Add new note (2) as follows: Do not use this table unless the gas supplier confirms a delivery pressure between 8 in w.c. and 14 in. w.c.

Move current note (2) to note (3)

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Fri Sep 20 12:00:29 EDT 2024

Committee Statement

Committee Statement:

1. The Intended Use is revise to be consistent with allowable practice.

2. Note (1) is revised to eliminate shall use "should" instead of "shall" as requirements cannot be in table notes.

3. A new note (2) is added to remind users that in inlet pressure between 11 in. w.c. and 14 in. w.c. is needed to use the Table.

4. The proposed Note stating that the table is intended for use with engineering methods is not accepted because the table can be used without engineering methods.

Response Message: FR-48-NFPA 54-2024

Public Input No. 41-NFPA 54-2024 [Global Input]

First Revision No. 51-NFPA 54-2024 [Detail]

Revise 1.1.1.2(5) as follow:

(5) Industrial gas applications under the scope of NFPA 51 or NFPA 55 ~~using such gases as acetylene and acetylenic compounds, hydrogen, ammonia, carbon monoxide, oxygen, and nitrogen~~

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Fri Sep 20 12:18:24 EDT 2024

Committee Statement

Committee Statement: The list in this requirement is not all inclusive and is intended to exclude gases under the scope of NFPA 51 or NFPA 55, as those gases are used outside the scope of NFPA 54.

Response Message: FR-51-NFPA 54-2024

Public Input No. 34-NFPA 54-2024 [Section No. 1.1.1.2]

First Revision No. 52-NFPA 54-2024 [Detail]

Revise 1.1.1.2(19) as follows

(19) Fuel gas systems under the scope of NFPA 2 ~~using hydrogen as a fuel~~

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Fri Sep 20 12:24:08 EDT 2024

Committee Statement

Committee Statement: NFPA 2 is the applicable code for fuel gas systems using hydrogen as a fuel. NFPA 2 lays out what is considered to be a hydrogen system fuel gas system.

Response Message: FR-52-NFPA 54-2024

Public Input No. 39-NFPA 54-2024 [Section No. 1.1.1.2]

First Revision No. 84-NFPA 54-2024 [Detail]

Detail FR-84

7.5 Field Drilled and Tapped Fittings.

7.5.1

Where pipe fittings are drilled and tapped in the field, the operation shall be performed in accordance with the following:

(1) On systems having operating pressures of 5 psi (34 kPa) or less

(2) By the gas supplier or their designated representative

(3) Using written procedures prepared by the gas supplier

7.5.2

The tapped fitting assembly shall be inspected and proven to be free of leaks.

7.5.3

Field drilled and tapped fittings shall be located outdoors only.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Mon Sep 30 15:05:31 EDT 2024

Committee Statement

Committee Statement: Field drilled and tapped fittings are moving to chapter 7 as they are installation requirements and a pointer to chapter 7 is remaining in chapter 5 to help the user navigate the requirements around these fittings appropriately. See FR 83 for revision of field drilled and tapped fittings in chapter 5.

Response Message: FR-84-NFPA 54-2024

First Revision No. 50-NFPA 54-2024 [Section No. 1.1.1.2]

Detail FR-52

Detail FR-51

Global FR-60

1.1.1.2

This code shall not apply to the following items:

(1) Portable LP-Gas appliances and equipment of all types that are not connected to a fixed fuel piping system

(2) Installation of appliances such as brooders, dehydrators, dryers, and irrigation equipment used for agricultural purposes

(3) Raw material (feedstock) applications except for piping to special atmosphere generators

(4) Oxygen–fuel gas cutting and welding systems

(5) Industrial gas applications ~~using such gases as acetylene and acetylenic compounds, hydrogen, ammonia, carbon monoxide, oxygen, and nitrogen~~under the scope of NFPA 51 or NFPA 55

(6) Petroleum refineries, pipeline compressor or pumping stations, loading terminals, compounding plants, refinery tank farms, and natural gas processing plants

(7) Large integrated chemical plants or portions of such plants where flammable or combustible liquids or gases are produced by chemical reactions or used in chemical reactions

(8) LP-Gas installations at utility gas plants

(9)* Liquefied natural gas (LNG) systems

(10) Fuel gas piping in electric utility power plants

~~Proprietary items of equipment, apparatus, or instruments such as gas generating sets, compressors, and calorimeters~~

(11) LP-Gas equipment for vaporization, gas mixing, and gas manufacturing

(12) LP-Gas piping for buildings under construction or renovations that is not to become part of the permanent building piping system — that is, temporary fixed piping for building heat

(13) Installation of LP-Gas systems for railroad switch heating

(14) Installation of LP-Gas and compressed natural gas (CNG) systems on vehicles

(15) Gas piping, meters, gas pressure regulators, and other appurtenances used by the ~~serving~~ gas supplier in distribution of gas, other than undiluted LP-Gas

~~Building design and construction, except as specified herein~~

(16) Fuel gas systems on recreational vehicles manufactured in accordance with NFPA 1192

(17) Fuel gas systems ~~using hydrogen as a fuel~~under the scope of NFPA 2

(18) Construction of appliances

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Fri Sep 20 12:13:17 EDT 2024

Committee Statement

Committee Statement: The code does cover the installation certain types of equipment and proprietary items is unclear as to what it applies to. While the code does not cover the construction of the equipment, its installation is in the scope of the code.

This code covers some building design and construction requirements (e.g. building tightness for combustion air, or floor strength when placing appliances) and it provides further clarity if this item is removed and the requirements in the code are let stand.

Response Message: FR-50-NFPA 54-2024

Public Input No. 37-NFPA 54-2024 [Section No. 1.1.1.2]

Public Input No. 38-NFPA 54-2024 [Section No. 1.1.1.2]

First Revision No. 26-NFPA 54-2024 [Section No. 1.2]

1.2 Purpose. ~~(Reserved)~~

The purpose of this code shall be to provide for the safe installation of fuel gas piping systems, appliances, equipment, and related accessories.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 11:45:07 EDT 2024

Committee Statement

Committee Statement: A purpose statement is being provided per the NFPA Manual of Style and is providing information as to the purpose of this code.

Response Message: FR-26-NFPA 54-2024

Public Input No. 86-NFPA 54-2024 [Section No. 1.2]

First Revision No. 27-NFPA 54-2024 [Section No. 1.4]

1.4 Equivalency.

1.4.1

The provisions of this code ~~are~~ shall not be intended to prevent the use of any material, appliance, equipment, method of construction, or installation procedure, provided that any such alternative is ~~acceptable to the authority having jurisdiction. The authority having jurisdiction shall require that sufficient evidence be submitted to substantiate any claims made regarding the safety of such alternatives.~~ in accordance with the following:

(1) It is equivalent or superior to that prescribed in this code in terms of quality, strength, fire resistance, durability, and safety as applicable

(2) It meets the intent of this code

(3) It is approved for the intended purpose by the AHJ

1.4.2

Technical documentation satisfactory to the AHJ shall be submitted to demonstrate equivalency

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 11:52:13 EDT 2024

Committee Statement

Committee Statement: The revised text clarifies that the AHJ needs to approve the alternate methods and adds specificity as to what equivalency might be relevant.

Response Message: FR-27-NFPA 54-2024

First Revision No. 53-NFPA 54-2024 [Section No. 2.3]

2.3 Other Publications.

2.3.1 ASME Publications.

American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990, (800) 843-2763. www.asme.org

ANSI/ASME B1.20.1, *Pipe Threads, General Purpose, Inch*, 2013 (R2018).

ANSI/ASME B16.1, *Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250,* 2020.

ANSI/ASME B16.5, *Pipe Flanges and Flanged Fittings: NPS ½ through NPS 24 Metric/Inch Standard*, 2020.

ANSI/ASME B16.20, *Metallic Gaskets for Pipe Flanges: Ring-Joint, Spiral-Wound and Jacketed,* ~~2017~~ 2023 .

ANSI/ASME B16.21, *Nonmetallic Flat Gaskets for Pipe Flanges*, 2021.

ANSI/ASME B16.24, *Cast Copper Alloy Pipe Flanges and Flanged Fittings: Classes 150, 300, 600, 900, 1500, and 2500*, 2021.

ANSI/ASME B16.33, *Manually Operated Metallic Gas Valves for Use in Gas Piping Systems up to 175 psi (Sizes NPS 1/2 through NPS 2)*, ~~2012 (R2017)~~ 2024 .

ANSI/ASME B16.42, *Ductile Iron Pipe Flanges and Flanged Fittings: Classes 150 and 300*, 2021.

ANSI/ASME B16.44, *Manually Operated Metallic Gas Valves for Use in Above Ground Piping Systems up to 5 psi*, ~~2012 (R2017)~~ 2023 .

ANSI/ASME B16.47, *Large Diameter Steel Flanges: NPS 26 through NPS 60 Metric/Inch Standard*, 2020.

ANSI/ASME B36.10M, *Welded and Seamless Wrought Steel Pipe,* 2018.

2.3.2 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, (610) 832-9585. www.astm.org

ASTM A53, *Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless,*~~2022~~ 2024 .

ASTM A106, *Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service,* 2019a.

ASTM A254, *Standard Specification for Copper-Brazed Steel Tubing,* 2012, reaffirmed 2019.

ASTM A268, *Standard Specification for Seamless and Welded Ferritic and Martensitic Stainless Steel Tubing for General Service*, ~~2022~~ 2024 .

ASTM A269, *Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service*, ~~2015a, reaffirmed 2019~~ 2024 .

ASTM A312, *Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes*, ~~2021~~ 2024a .

ASTM B88, *Standard Specification for Seamless Copper Water Tube,*~~2020~~ 2022 .

ASTM B210, *Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes,* 2019a.

ASTM B241, *Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube,*~~2016~~ 2022 .

ASTM B280, *Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service,*~~2020~~ 2023 .

ASTM D2513, *Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings,* 2020.

ASTM E136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C*, ~~2019a~~ 2024c .

ASTM E2652, *Standard Test Method for Behavior of Materials in a Tube Furnace with a Cone-shaped Airflow Stabilizer, at 750°C*, ~~2018~~ 2022 .

ASTM F1973, *Standard Specification for Factory Assembled Anodeless Risers and Transition Fittings in Polyethylene (PE) and Polyamide 11 (PA11) and Polyamide 12 (PA12) Fuel Gas Distribution Systems,* 2021.

ASTM F2509, *Standard Specification for Field-Assembled Anodeless Riser Kits for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing,*~~2015, reaffirmed 2019~~ 2024 .

ASTM F2945, *Standard Specification for Polyamide 11 Gas Pressure Pipe, Tubing, and Fittings,* 2018, reaffirmed 2023 .

2.3.3 CSA Group Publications.

CSA Group, 178 Rexdale Boulevard, Toronto, ON M9W 1R3, Canada, (216) 524-4990. www.csagroup.org

CSA/ANSIFC 1:21/CSA 22.2 NO. 62282-3-100:21, *Fuel Cell Technologies — Part 3-100: Stationary Fuel Cell Power Systems — Safety (Adopted IEC 62282-3-100:2019, second edition, 2019-2, with Canadian and U.S. deviations)*, 2021.

ANSI/CSA NGV 5.1, *Residential Fueling Appliances*, ~~2016, reaffirmed 2020~~ 2023 .

ANSI/CSA ~~NVG~~ NGV 5.2, *Vehicle Fueling Appliances (VFA)*, 2017, reaffirmed 2021.

CSA/ANSI LC 1/CSA 6.26, *Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing,* 2019.

CSA/ANSI LC 4/CSA 6.32, *Press-Connect Metallic Fittings for Use in Fuel Gas Distribution Systems,* 2022.

CSA/ANSI Z21.1/CSA 1.1, *Household Cooking Gas Appliances*, ~~2019~~ 2024 .

ANSI Z21.5.1/CSA 7.1, *Gas Clothes Dryers, Volume I, Type 1 Clothes Dryers*, ~~2017~~ 2022 .

ANSI Z21.5.2/CSA 7.2, *Gas Clothes Dryers, Volume II, Type 2 Clothes Dryers*, 2016, reaffirmed 2021.

ANSI Z21.8, *Installation of Domestic Gas Conversion Burners,* 1994, reaffirmed 2017.

CSA/ANSI Z21.10.1/CSA 4.1, *Gas Water Heaters, Volume I, Storage Water Heaters with Input Ratings of 75,000 Btu per Hour or Less*, 2019.

CSA/ANSI Z21.10.3/CSA 4.3, *Gas Water Heaters, Volume III, Storage Water Heaters with Input Ratings Above 75,000 Btu per Hour*, 2019.

CSA/ANSI Z21.11.2, *Gas-Fired Room Heaters, Volume II, Unvented Room Heaters,* 2019.

CSA/ANSI Z21.13/CSA 4.9, *Gas-Fired Low-Pressure Steam and Hot Water Boilers*, 2022.

ANSI Z21.15/CSA 9.1, *Manually operated gas valves for appliances, appliance connector valves and hose end valves*, ~~2009, reaffirmed 2019~~ 2021 .

CSA/ANSI Z21.18/CSA 6.3, *Gas Appliance Pressure Regulators*, 2019.

CSA/ANSI Z21.19/CSA 1.4, *Refrigerators Using Gas Fuel*, 2019.

ANSI Z21.22/CSA 4.4, *Relief Valves for Hot Water Supply Systems*, 2015, reaffirmed 2020.

CSA/ANSI Z21.24/CSA 6.10, *Connectors for Gas Appliances,* 2022.

ANSI Z21.40.1/CSA 2.91, *Gas-Fired Heat Activated Air Conditioning and Heat Pump Appliances*, 1996, reaffirmed 2022.

ANSI Z21.40.2/CSA 2.92, *Gas-Fired, Work Activated Air-Conditioning and Heat Pump Appliances (Internal Combustion)*, 1996, reaffirmed 2022.

ANSI Z21.41/CSA 6.9, *Quick-Disconnect Devices for Use with Gas Fuel Appliances,*~~2014, reaffirmed 2019~~ 2023 .

CSA/ANSI Z21.47/CSA 2.3, *Gas-Fired Central Furnaces*, 2021.

ANSI Z21.50/CSA 2.22, *Vented Decorative Gas Appliances*, 2019.

CSA/ANSI Z21.54/CSA 8.4, *Gas Hose Connectors for Portable Outdoor Gas-Fired Appliances,* 2019.

CSA/ANSI Z21.56/CSA 4.7, *Gas-Fired Pool Heaters*, 2019.

ANSI Z21.58/CSA 1.6, *Outdoor Cooking Gas Appliances*, 2022.

ANSI Z21.60/CSA 2.26, *Decorative Gas Appliances for Installation in Solid-Fuel Burning Fireplaces*, 2017, reaffirmed 2021.

ANSI Z21.69/CSA 6.16, *Connectors for Movable Gas Appliances,* 2015, reaffirmed 2020.

ANSI Z21.75/CSA 6.27, *Connectors for Outdoor Gas Appliances and Manufactured Homes,* 2016, reaffirmed 2021.

ANSI Z21.80/CSA 6.22, *Line Pressure Regulators*, 2019.

ANSI Z21.86/CSA 2.32, *Vented Gas-Fired Space Heating Appliances*, 2016, reaffirmed 2021.

CSA/ANSI Z21.88/CSA 2.33, *Vented Gas Fireplace Heaters*, 2019.

ANSI Z21.89/CSA 1.18, *Outdoor Cooking Specialty Gas Appliances*, ~~2017~~ 2023 .

ANSI Z21.90/CSA 6.24, *Gas Convenience Outlets and Optional Enclosures,* 2019.

ANSI Z21.93/CSA 6.30, *Excess Flow Valves for Natural and LP-Gas with Pressures Up to 5 psig,* 2017, reaffirmed 2022.

ANSI Z21.97/CSA 2.41, *Outdoor Decorative Gas Appliances*, 2017.

ANSI Z83.4/CSA 3.7, *Non-Recirculating Direct Gas-Fired Heating and Forced Ventilation Appliances for Commercial and Industrial Application,* 2017, reaffirmed 2022.

ANSI Z83.8/CSA 2.6, *Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters, and Gas-Fired Duct Furnaces*, 2016, reaffirmed 2021.

ANSI Z83.11/CSA 1.8, *Gas Food Service Equipment*, 2016.

ANSI Z83.18, *Recirculating Direct Gas-Fired Heating and Forced Ventilation Appliances for Commercial and Industrial Application,* 2017, reaffirmed 2021.

ANSI Z83.19/CSA 2.35, *Gas-Fired High-Intensity Infrared Heaters*, 2017, reaffirmed 2021.

ANSI Z83.20/CSA 2.34, *Gas-Fired Tubular and Low-Intensity Infrared Heaters*, 2016, reaffirmed 2021.

ANSI Z83.26/CSA 2.27, *Gas-Fired Outdoor Infrared Patio Heaters*, 2020.

2.3.4 MSS Publications.

Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry, 127 Park Street, NE, Vienna, VA 22180-4602, (703) 281-6613. www.msshq.org

ANSI/MSS SP-58, *Pipe Hangers and Supports — Materials, Design, Manufacture, Selection, Application, and Installation,* 2018.

2.3.5 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096. ~~www.ul.com~~

UL 103, *Factory-Built Chimneys for Residential Type and Building Heating Appliances*, 2010, revised 2021.

UL 353, *Limit Controls*, 1994, revised 2011 .

UL 378, *Draft Equipment*, 2006, revised 2013.

UL 441, *Gas Vents*, ~~2019~~ 2024 .

UL 467, *Grounding and Bonding Equipment*, 2022.

UL 641, *Type L Low-Temperature Venting Systems*, 2010, revised 2018.

UL 651, *Schedule 40 and 80 Type EB and A Rigid PVC Conduit and Fittings,* 2011, revised 2022.

UL 959, *Medium Heat Appliance Factory-Built Chimneys*, 2010, revised ~~2019~~ 2024 .

UL 1738, *Venting Systems for Gas Burning Appliances, Categories II, III and IV*, ~~2010, revised 2021~~ 2023 .

UL 1777, *Chimney Liners*, 2015, revised ~~2019~~ 2024 .

UL 2158A, *Clothes Dryer Transition Ducts*, 2013, revised ~~2021~~ 2023 .

UL 2561, *1400 Degree Fahrenheit Factory-Built Chimneys*, 2016, revised ~~2018~~ 2022 .

UL 2989, *Outline of Investigation for Tracer Wire*, ~~2017~~ 2022 .

UL 60730-2-6, *Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Automatic Electrical Pressure Sensing Controls Including Mechanical Requirements*, 2016, revised 2021.

2.3.6 US Government Publications.

US Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001. www.gpo.gov

Title 49, Code of Federal Regulations, Part 192, “Transportation of Natural and Other Gas by Pipeline: Minimum Federal Standards.”

2.3.7 Other Publications.

Merriam-Webster’s Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2020.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Mon Sep 23 15:26:42 EDT 2024

Committee Statement

Committee Statement: Reference standards are being updated to their latest revision year

Response Message: FR-53-NFPA 54-2024

Public Input No. 87-NFPA 54-2024 [Section No. 2.3.5]

First Revision No. 55-NFPA 54-2024 [Section No. 2.4]

2.4 References for Extracts in Mandatory Sections.

NFPA 31, *Standard for the Installation of Oil-Burning Equipment,* ~~2020~~ 2024 edition.

NFPA 70®, *National Electrical Code®,* 2023 edition.

NFPA 88A, *Standard for Parking Structures,* 2023 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems,* 2024 edition.

NFPA 101®, *Life Safety Code®,* 2021 edition.

NFPA 5000®, *Building Construction and Safety Code®,* 2021 edition.

Submitter Information Verification

Committee: NFG-AAA
Submittal Date: Mon Sep 23 16:21:12 EDT 2024

Committee Statement

Committee Statement: This revision updates extracted text in accordance with the Extract Policy.
Response Message: FR-55-NFPA 54-2024

First Revision No. 28-NFPA 54-2024 [Section No. 3.3.4.4.2]

~~**3.3.4.4.2** Gas Deep Fat Fryer.~~

~~An appliance, including a cooking vessel in which oils or fats are placed to such a depth that the cooking food is essentially supported by displacement of the cooking fluid or a perforated container immersed in the cooking fluid rather than by the bottom of the vessel, designed primarily for use in hotels, restaurants, clubs, and similar institutions.~~

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 12:50:40 EDT 2024

Committee Statement

Committee Statement: The dictionary definition of the term is sufficient to describe the term where used.

Response Message: FR-28-NFPA 54-2024

Public Input No. 5-NFPA 54-2024 [Section No. 3.3.4.4.2]

First Revision No. 29-NFPA 54-2024 [Section No. 3.3.4.4.3]

~~**3.3.4.4.3**~~ ~~Kettle.~~

~~An appliance with a cooking chamber that is heated either by a steam jacket in which steam is generated by gas heat or by direct gas heat applied to the cooking chamber.~~

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 12:51:28 EDT 2024

Committee Statement

Committee Statement: The dictionary definition of the term is sufficient to describe the term where used.

Response Message: FR-29-NFPA 54-2024

Public Input No. 2-NFPA 54-2024 [Section No. 3.3.4.4.3]

First Revision No. 30-NFPA 54-2024 [Section No. 3.3.4.4.4]

~~**3.3.4.4.4** Steam Cooker.~~

~~An appliance that cooks, defrosts, or reconstitutes food by direct contact with steam.~~

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 12:52:06 EDT 2024

Committee Statement

Committee Statement: The dictionary definition of the term is sufficient to describe the term where used.

Response Message: FR-30-NFPA 54-2024

Public Input No. 9-NFPA 54-2024 [Section No. 3.3.4.4.4]

First Revision No. 31-NFPA 54-2024 [Section No. 3.3.4.4.5]

~~**3.3.4.4.5** Steam Generator.~~

~~A separate appliance primarily intended to supply steam for use with food service appliances.~~

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 12:53:01 EDT 2024

Committee Statement

Committee Statement: The dictionary definition of the term is sufficient to describe the term where used.

Response Message: FR-31-NFPA 54-2024

Public Input No. 3-NFPA 54-2024 [Section No. 3.3.4.4.5]

First Revision No. 32-NFPA 54-2024 [Section No. 3.3.13]

~~**3.3.13** Breeching.~~

~~See 3.3.101 , Vent Connector.~~

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 12:53:57 EDT 2024

Committee Statement

Committee Statement: The term is not used in the Code.

Response Message: FR-32-NFPA 54-2024

Public Input No. 4-NFPA 54-2024 [Section No. 3.3.13]

First Revision No. 33-NFPA 54-2024 [Section No. 3.3.16.5.1]

~~**3.3.16.5.1** Fan-Assisted Power Burner.~~

~~A burner that uses either induced or forced draft.~~

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 12:54:39 EDT 2024

Committee Statement

Committee Statement: The term is not used in the code.

Response Message: FR-33-NFPA 54-2024

Public Input No. 11-NFPA 54-2024 [Section No. 3.3.16.5.1]

First Revision No. 34-NFPA 54-2024 [Section No. 3.3.83]

3.3.82 Qualified Agency.

Any individual, firm, corporation, or company that either in person or through a representative is engaged in and that is responsible for: (1) the design, installation, testing, removal, or replacement of gas piping or (2) the connection, installation, testing, repair, or servicing of appliances and equipment; ~~that is~~ experienced in such work; ~~that is~~ familiar with all precautions required; and ~~that has complied~~ compliant with all the requirements of the authority having jurisdiction.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 13:03:21 EDT 2024

Committee Statement

Committee Statement: A qualified agency can be involved in removal of piping and is being added here to reflect that.

Response Message: FR-34-NFPA 54-2024

Public Input No. 92-NFPA 54-2024 [Section No. 3.3.83]

First Revision No. 35-NFPA 54-2024 [Section No. 3.3.93]

~~**3.3.93** Steam Cooker.~~

~~See 3.3.4.4.4 , Steam Cooker.~~

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 13:06:15 EDT 2024

Committee Statement

Committee Statement: The dictionary definition of the term is sufficient. The term is also being deleted in the cross referenced section in FR 30.

Response Message: FR-35-NFPA 54-2024

Public Input No. 10-NFPA 54-2024 [Section No. 3.3.93]

First Revision No. 36-NFPA 54-2024 [Section No. 3.3.99.2]

~~**3.3.99.2** Automatic Valve.~~

~~An automatic or semiautomatic device consisting essentially of a valve and operator that control the gas supply to the burner(s) during operation of an appliance.~~

Submitter Information Verification

Committee: NFG-AAA
Submittal Date: Thu Sep 19 13:07:07 EDT 2024

Committee Statement

Committee Statement: The term is not used in the code.
Response Message: FR-36-NFPA 54-2024

Public Input No. 6-NFPA 54-2024 [Section No. 3.3.99.2]

First Revision No. 37-NFPA 54-2024 [Section No. 3.3.99.4]

~~**3.3.99.4** Manual Reset Valve.~~

~~An automatic shutoff valve installed in the gas supply piping and set to shut off when unsafe conditions occur. The device remains closed until manually reopened.~~

Submitter Information Verification

Committee: NFG-AAA
Submittal Date: Thu Sep 19 13:08:15 EDT 2024

Committee Statement

Committee Statement: The dictionary definition of the term is sufficient for where the term is used.
Response Message: FR-37-NFPA 54-2024

Public Input No. 7-NFPA 54-2024 [Section No. 3.3.99.4]

First Revision No. 1-NFPA 54-2024 [Section No. 4.1]

4.1 Qualified Agency.

The following shall be performed only by a qualified agency:

(1) The design, installation, testing, purging, and replacement of gas piping, appliances, equipment, and accessories

(2) The repair and servicing of appliances and equipment

(3) The removal of unpurged gas piping

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 09:43:27 EDT 2024

Committee Statement

Committee Statement: A qualified agency is needed for the removal of unpurged piping as there are numerous hazards around removal of unpurged piping that a qualified agency can deal with. The removal of purged piping does not need a qualified agency as it does not present the same hazards.

Response Message: FR-1-NFPA 54-2024

Public Input No. 90-NFPA 54-2024 [Section No. 4.1]

First Revision No. 2-NFPA 54-2024 [Section No. 4.2.1]

4.2.1 Notification of Interrupted Service.

When the gas supply is to be turned off, ~~it shall be~~ the ~~duty of the qualified agency to~~ qualified agency shall notify all affected users. Where two or more users are served from the same supply system, precautions shall be exercised to ensure that service only to the proper user is turned off.

Exception: In cases of emergency, affected users shall be notified as soon as possible of the actions taken by the qualified agency.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 10:31:08 EDT 2024

Committee Statement

Committee Statement: The qualified agency making the notification is the important criteria here and not the imposition of duty on the qualified agency.

Response Message: FR-2-NFPA 54-2024

Public Input No. 79-NFPA 54-2024 [Section No. 4.2.1]

First Revision No. 3-NFPA 54-2024 [Section No. 4.3.2]

~~**4.3.2** Handling of Flammable Liquids.~~

~~**4.3.2.1*** Drip Liquids.~~

~~Liquid that is removed from a drip in existing gas piping shall be handled to avoid spillage or ignition.~~

~~**A.4.3.2.1**~~

~~Gas suppliers intend to provide gas that is free of liquids. Where liquids or condensates are removed from a drip, the gas supplier can be notified if it is determined that the liquid accumulation impedes the appliance operation or if the liquid accumulation appears to be at an unusual rate. This could mean that the gas supplier's liquid removal equipment has failed or is in need of service.~~

~~Handling and disposal of liquids might need to be done with the consideration of an industrial hygienist to avoid possible contact with trace amounts of benzene. Contact the gas supplier for a safety data sheet (SDS) or consider laboratory sampling before handling or disposing of liquids.~~

~~**4.3.2.2** Other Flammable Liquids.~~

~~Flammable liquids used by the installer shall be handled with precaution and shall not be left within the premises from the end of one working day to the beginning of the next.~~

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 11:07:46 EDT 2024

Committee Statement

Committee Statement: Drip liquids are not common in fuel gas any more and the text is not relevant. NFPA 30 is the correct code document for providing requirements on the storage of flammable liquids when in use.

Response Message: FR-3-NFPA 54-2024

Public Input No. 55-NFPA 54-2024 [Section No. 4.3.2]

Public Input No. 56-NFPA 54-2024 [Section No. 4.3.2.1]

Public Input No. 57-NFPA 54-2024 [Section No. 4.3.2.2]

First Revision No. 14-NFPA 54-2024 [New Section after 4.5]

4.6* Hydrogen Admixtures.

A.4.6

The distribution of hydrogen admixtures in natural gas in building systems does not change the safety or operability of fuel gas systems where reasonable limits on hydrogen percentages (by volume), such as 20 percent, are used. Pipe system components and sizing methods currently in the code can be used to size hydrogen admixtures up to 20 percent hydrogen by volume with the different natural gas sources already used in developing the sizing methods and based upon current technical justification of admixture compatibility.

Adding hydrogen to a fuel gas affects appliance function, specifically combustion behavior. The primary safety concern of increasing hydrogen percentages is burner “flashback,” where burner flame front retreats into the burner itself (regression), leading to burner failure, failure of the burner system, and potential release of unburned gas in the building. Regression of flame fronts into burners occurs when hydrogen concentrations are increased and gas mixture flame speeds increase proportionally, exceeding the flow rate of the mixed fuel gas/air mixture to the flame within the combustion chamber. Hydrogen’s burning velocity is approximately six times faster than that of methane. A 20 percent maximum threshold for hydrogen admixtures with natural gas represents a reasonable limit to minimize the potential of flashback behavior and associated safety risks of burner failure. This admixture maximum threshold is consistent with compatibility of piping system limit of 20 percent hydrogen.

4.6.1

Hydrogen added to natural gas by blending that yields greater than 5 percent hydrogen by volume shall be recognized by this code as a hydrogen admixture.

4.6.2

Hydrogen admixtures shall not exceed 20 percent hydrogen by volume.

4.6.3

Fuel gas systems conveying hydrogen admixtures shall meet all requirements found in Chapters 5 , 6 , 7 , and 8 of this code.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 21:44:55 EDT 2024

Committee Statement

Committee Statement: The current state of knowledge around hydrogen admixtures of natural gas has concluded that 20% hydrogen by volume represents a prudent upper bound for gas suppliers used in existing and new natural gas appliances and equipment from a standpoint of appliance and gas system safety. This knowledge is based upon appliance testing, combustion properties associated with interchangeability to the baseline natural gas used for admixing, uncertainties associated with non-combustion characteristics of

admixtures upon natural gas piping systems and components, and known current gas supplier plans for hydrogen admixtures that do not exceed 20% for near term projects, higher heating value (HHV) limits of natural gas suppliers and the decrements of HHV associated with hydrogen fractions (hydrogen representing roughly one-third the HHV of methane). At a minimum, a 20% admixture limit serves as a reasonable limit for hydrogen admixtures for the current code cycle and as research and analysis continues to test this threshold as an upper bound. The addition of hydrogen up to 20% does not require any changes to the design of fuel gas systems under NFPA 54

This appendix text provides concise essential information for understanding the implications of hydrogen admixtures and practical limits on admixture rates as they relate to combustion behavior, the first-order limiting factor on practical use of hydrogen admixing in natural gas systems, which themselves exhibit higher tolerances for hydrogen in natural gas.

The inclusion of up to 5 percent hydrogen as delivered for sources of natural gas has been accepted by CSA Group for all current listings of appliance/accessories, and therefore it is unnecessary to revise the definition of natural gas within the definition of gases.

Hydrogen has been a component of natural gas as the natural gas delivered to fuel gas systems, therefore it is unnecessary to specify the composition of the gas in the definition.

The proposed definition is not needed as the requirement where hydrogen admixtures appears explains the term where used. The definition of admixture in sufficiently covered by the dictionary definition.

Response Message: FR-14-NFPA 54-2024

Public Input No. 117-NFPA 54-2024 [Section No. 3.3.49 [Excluding any Sub-Sections]]

Public Input No. 120-NFPA 54-2024 [Chapter 4]

Public Input No. 119-NFPA 54-2024 [Chapter 4]

Public Input No. 118-NFPA 54-2024 [New Section after 3.3.59]

First Revision No. 58-NFPA 54-2024 [New Section after 4.5]

4.7 Inspection and Repairs Following a Fire, Explosion, or Other Damage.

Where a gas piping system is affected by a fire, explosion, or other damage, the piping system shall be inspected in accordance with Chapter 8 and replaced or repaired using materials and methods in accordance with this code.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 24 13:37:14 EDT 2024

Committee Statement

Committee Statement: The committee was made aware that repairs to leaking piping systems post fire, explosion, or other damage are not currently addressed in the Code and this requirement specifies what must be done to place the system back in service. See related FR 59 for revisions related to this topic.

Response Message: FR-58-NFPA 54-2024

First Revision No. 4-NFPA 54-2024 [Section No. 5.2.2.2]

5.2.2.2

A three-way valve that has no intermediate position flow path and that is installed to admit the standby supply and, at the same time, shut off the regular supply shall be permitted to be used for this purpose.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 11:44:27 EDT 2024

Committee Statement

Committee Statement: Two isolation valves in series does not accomplish backflow prevention and a single isolation valve with a blind is not easily understood terminology and would produce create confusion for enforcement. The intent of the section is to prevent backflow of fluid to the alternate fuel system, and a three way valve that has no intermediate position flow path prevents this.

Response Message: FR-4-NFPA 54-2024

Public Input No. 53-NFPA 54-2024 [Section No. 5.2.2.2]

First Revision No. 5-NFPA 54-2024 [Section No. 5.3.2.3]

5.3.2.3

The total connected hourly load shall be used as the basis for piping sizing, assuming all appliances are operating at full capacity simultaneously except as provided by 5.3.2.3.1 or 5.3.2.3.2 .

~~*Exception: Sizing shall be permitted to be based upon established load diversity factors.*~~

5.3.2.3.1

Sizing shall be permitted to be based upon established load diversity factors.

5.3.2.3.2

Where appliances are interlocked to prevent simultaneous operation, sizing shall be permitted to be based on the full capacity of all those appliances that can operate simultaneously.

Supplemental Information

File Name	Description	Approved
54_FR-5_5.3.2.3.docx		

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 11:53:52 EDT 2024

Committee Statement

Committee Statement: Pipe sizing capacity can be reduced where not all appliances are operating at the same time when interlocked and that is being added to allow for that.

Response Message: FR-5-NFPA 54-2024

Public Input No. 98-NFPA 54-2024 [Section No. 5.3.2.3]

First Revision No. 6-NFPA 54-2024 [New Section after 5.5.4.1.1]

5.5.4.1.2

Polyamide mechanical fittings for use on polyethylene pipe and tubing shall comply with ASTM F1924, *Standard Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing* .

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 13:29:38 EDT 2024

Committee Statement

Committee Statement: The current standard (ASTM D2513), referenced in section 5.5.4.1.1, allows for the use of mechanical fittings, but it only covers fittings made of polyethylene. ASTM F1924, "Standard Specification for Plastic Mechanical Fittings for Use on Outside Diameter Controlled Polyethylene Gas Distribution Pipe and Tubing" is written as a supplement to D2513. It defines requirements for plastic mechanical fittings specifically for use on ASTM D2513 systems and allows for the use of fittings constructed of all plastic materials, provided they are compatible with ASTM D2513 piping systems. ASTM F1924 is an established standard with over 25 years of history.

Response Message: FR-6-NFPA 54-2024

Public Input No. 12-NFPA 54-2024 [New Section after 5.5.4.1]

First Revision No. 7-NFPA 54-2024 [Section No. 5.5.5]

5.5.5 Workmanship and Defects.

Gas pipe, tubing, and fittings at the time of installation shall meet the following requirements:

(1) Gas pipe, tubing, and fittings shall be clear and free from cutting burrs and visible defects in structure or threading.

(2) Gas pipe, tubing, and fittings shall be ~~thoroughly~~ cleaned to remove chip, scale, and debris.

~~Visible defects in pipe, tubing, and fittings shall not be repaired.~~

(3) Pipe, tubing, and fittings with visible defects shall be replaced.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 13:55:03 EDT 2024

Committee Statement

Committee Statement: The requirement for cleaning is sufficient without the the modifier. “Thoroughly” is not enforceable as degree of cleaning is subjective. (3) is redundant as they are required to be replaced in the next sub-paragraph.

Response Message: FR-7-NFPA 54-2024

Public Input No. 116-NFPA 54-2024 [Section No. 5.5.5]

First Revision No. 83-NFPA 54-2024 [Section No. 5.5.7.5]

5.5.7.5 Metallic Pipe Fittings.

Metallic fittings shall comply with the following:

(1) Threaded fittings in sizes larger than 4 in. (100 mm) shall not be used.

(2) Fittings used with steel, stainless steel, or wrought-iron pipe shall be steel, stainless steel, copper alloy, malleable iron, or cast iron.

(3) Fittings used with copper or copper alloy pipe shall be copper or copper alloy.

(4) Fittings used with aluminum alloy pipe shall be aluminum alloy.

(5) *Cast-Iron Fittings.* Cast-iron fittings shall comply with the following:

(a) Flanges shall be permitted.

(b) Bushings shall not be used.

(c) Fittings shall not be used in systems containing flammable gas–air mixtures.

(d) Fittings in sizes 4 in. (100 mm) and larger shall not be used indoors unless approved.

(e) Fittings in sizes 6 in. (150 mm) and larger shall not be used unless approved.

(6) *Aluminum Alloy Fittings.* Threads shall not form the joint seal.

(7) *Zinc–Aluminum Alloy Fittings.* Fittings shall not be used in systems containing flammable gas–air mixtures.

(8) *Special Fittings.* Fittings such as couplings, proprietary-type joints, saddle tees, gland-type compression fittings, and flared, flareless, or compression-type tubing fittings shall be as follows:

(a) Used within the fitting manufacturer's pressure–temperature recommendations

(b) Used within the service conditions anticipated with respect to vibration, fatigue, thermal expansion, or contraction

(c) Acceptable to the authority having jurisdiction

(9) *Field Drilled and Tapped Fittings.* When pipe fittings are drilled and tapped in the field, the operation shall be in accordance with the ~~following:~~ Section 7.5 .

~~The operation shall be performed on systems having operating pressures of 5 psi (34 kPa) or less.~~

~~The operation shall be performed by the gas supplier or their designated representative.~~

~~The drilling and tapping operation shall be performed in accordance with written procedures prepared by the gas supplier.~~

~~The fittings shall be located outdoors.~~

~~The tapped fitting assembly shall be inspected and proven to be free of leaks.~~

Supplemental Information

File Name	Description	Approved
54_FR-83_5.5.7.5.docx		

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Mon Sep 30 15:02:36 EDT 2024

Committee Statement

Committee Statement: The revision to create a table is unnecessary as the current text is more user friendly. Field drilled and tapped fittings are moving to chapter 7 as they are installation requirements and a pointer to chapter 7 is remaining in chapter 5 to help the user navigate the requirements around these fittings appropriately. See FR 84 related move of text to chapter 7.

Response Message: FR-83-NFPA 54-2024

Public Input No. 51-NFPA 54-2024 [Sections 5.5.7.1, 5.5.7.2, 5.5.7.3, 5.5.7.4, 5.5.7.5]

First Revision No. 8-NFPA 54-2024 [Section No. 5.5.10 [Excluding any Sub-Sections]]

The material for gaskets shall be capable of withstanding the design temperature and pressure of the piping system and the chemical constituents of the gas being conducted without change to its chemical and physical properties. ~~The effects of fire exposure to the joint shall be considered in choosing the material.~~

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 14:58:48 EDT 2024

Committee Statement

Committee Statement: Fire exposure is vague terminology and is unenforceable as it does not have actionable criteria once "fire exposure" has been considered. There is also no performance requirement on how much fire exposure the gasket is to withstand.

Response Message: FR-8-NFPA 54-2024

First Revision No. 9-NFPA 54-2024 [Section No. 5.7.2]

5.7.2 Listing.

~~Line~~ Except where serving appliances rated for inlet pressures higher than ½ psi and are covered under NFPA 37 , NFPA 85 , NFPA 86 , or NFPA 87 , line pressure regulators shall be listed in accordance with ANSI Z21.80/CSA 6.22, *Line Pressure Regulators*, where the outlet pressure is set to 2 psi or less.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 15:13:00 EDT 2024

Committee Statement

Committee Statement: It is hard for large appliance installations to comply with ANSI Z21.80/CSA 6.22 as the regulators built for these appliances are custom built and fall under other combustion equipment standards and an exemption is needed to allow unlisted regulators to be engineered as a solution. There is no regulator on the market that can comply with ANSI Z21.80 listed regulators and flow 12,500 (or more) cubic feet of natural gas at pressures less than 1/2 PSI. ANSI Z21.80 fits well for residential and light commercial appliances that are listed under the Z21/83 series standards (and most of these are all less than 5,000 CFH) , but once the appliance is a larger commercial, industrial(light or heavy), or a gas engine (e.g. larger generator engine), the requirement for an ANSI Z21.80 listed regulator is overly burdensome.

Response Message: FR-9-NFPA 54-2024

Public Input No. 13-NFPA 54-2024 [Section No. 5.7.2]

First Revision No. 10-NFPA 54-2024 [New Section after 5.7.7]

5.7.8* Regulator Pressure Test Means.

Means shall be provided upstream and downstream of the line pressure regulator to facilitate testing of the regulator after installation.

A.5.7.8

A fitting with one opening capped or plugged could be installed between the regulator and its upstream shutoff valve to allow connection of a pressure-measuring instrument. Means could also be provided downstream of, and in the same room as, the regulator for the connection of a pressure measuring instrument by any of the following:

(1) Dedicated test port on the regulator

(2) Dedicated test port on the inlet side of the appliance gas control

(3) Test port on the distribution manifold

(4) A plugged tee fitting in the piping

(5) A plugged manifold port

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 15:31:34 EDT 2024

Committee Statement

Committee Statement: Means are needed where the line pressure regulator is installed to allow the regulator to be tested to verify that it is operating properly. Improper operation can result in lower pressure than the appliance requires to operate safely and efficiently or higher pressure which can cause overfiring of the appliance.

Response Message: FR-10-NFPA 54-2024

Public Input No. 67-NFPA 54-2024 [New Section after 5.7]

First Revision No. 11-NFPA 54-2024 [Section No. 5.8.4]

5.8.4 Construction and Installation.

All overpressure protection devices shall be designed, constructed, and installed to meet the following requirements:

(1) ~~Be constructed of materials so that the~~ The operation of the device is not impaired by the ambient environment, corrosion of external parts ~~by~~ , or the ~~atmosphere or~~ corrosion of internal parts by the gas.

(2) ~~Be designed and installed so they can be operated to determine whether the valve is free. The devices shall also be designed and installed so they can be tested~~ The device is capable of being operated as designed.

(3) The device is capable of being tested to determine the pressure at which ~~they operate and be~~ it operates.

(4) The device is capable of being examined for internal leakage when in the closed position.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 16:00:23 EDT 2024

Committee Statement

Committee Statement: The language is changing to meet the NFPA Manual of Style. The term ambient environment is more descriptive and useful as ambient atmosphere does not account for moisture or water. The final requirement was modified to speak about what kind of leakage in the closed position through the device.

Response Message: FR-11-NFPA 54-2024

Public Input No. 93-NFPA 54-2024 [Section No. 5.8.4]

First Revision No. 12-NFPA 54-2024 [Section No. 5.8.7]

5.8.7 Unauthorized Operation.

Where unauthorized operation of any shutoff valve could render a pressure relieving valve or pressure limiting device inoperative, one of the following shall be accomplished:

(1)* The valve shall be locked in the open position. ~~Instruct authorized personnel in the importance of leaving the shutoff valve open and of being present while the shutoff valve is closed so that it can be locked in the open position before leaving the premises.~~

A.5.8.7(1)

Authorized personnel should be instructed in the importance of leaving the shutoff valve open and of being present while the shutoff valve is closed so that it can be locked in the open position before leaving the premises.

(2) Duplicate relief valves shall be installed, each having ~~adequate~~ the capacity to protect the system, ~~and arrange~~ with the isolating valves or three-way valve arranged so that only one relief valve can be rendered inoperative at a time.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 16:14:26 EDT 2024

Committee Statement

Committee Statement: The requirement is moving text to the annex material to conform with the NFPA Manual of Style. The term critical isolation valves are undefined in the code and it is unclear as to which valves this is referring to. The additional material being proposed requires training, tagging indicating the position of the valves and developing formal written procedures without justification as to why these additional requirements are necessary. The term duplicate overpressure control equipment is also undefined and it is unclear as to what that refers to.

Response Message: FR-12-NFPA 54-2024

Public Input No. 94-NFPA 54-2024 [Section No. 5.8.7]

First Revision No. 41-NFPA 54-2024 [Section No. 5.11]

5.11 Shutoff Valves.

Shutoff valves shall be selected in accordance with Table 5.11. Shutoff valves of size 1 in. (25 mm) National Pipe Thread and smaller shall be listed and labeled. Where used outdoors, such use shall be in accordance with the manufacturer's recommendation.

Table 5.11 Manual Gas Valve Standards

Shutoff Valve Application	Valve Meeting the Following Standards
Appliance shutoff valve up to ½ psi	ANSI Z21.15/CSA 9.1 ANSI/ASME B16.44 ANSI/ASME B16.33 marked 125 G ANSI LC 4/CSA 6.32 ANSI/ASME B16.38
Valve up to ½ psi	ANSI/ASME B16.44 ANSI/ASME B16.33 marked 125 G ANSI LC 4/CSA 6.32 ANSI/ASME B16.38
Valve up to 2 psi	ANSI/ASME B16.44 labeled 2G ANSI/ASME B16.33 marked 125 G ANSI LC 4/CSA 6.32 with ANSI/ASME B16.44 labeled 2G or labeled 5G ANSI LC 4/CSA 6.32 with ANSI/ASME B16.33 marked 125 G ANSI/ASME B16.38
Valve up to 5 psi	ANSI/ASME B16.44 labeled 5G ANSI/ASME B16.33 ANSI LC 4/CSA 6.32 with ANSI/ASME B16.44 marked 5G ANSI LC 4/CSA 6.32 with ANSI/ASME B16.33 marked 125 G ANSI/ASME B16.38
Valve up to 125 psi	ANSI/ASME B16.33 marked 125 G ANSI LC 4/CSA 6.32 with ANSI/ASME B16.33 marked 125 G ANSI/ASME B16.38

For SI units, 1 psi gauge = 6.895 kPa.

Submitter Information Verification

Committee: NFG-AAA
Submittal Date: Thu Sep 19 16:46:30 EDT 2024

Committee Statement

Committee Statement: ANSI/ASME B16.38 is being added to allow for valves above 4" to be allowed for use as there are piping systems with pipe size above 4".

Response Message:	FR-41-NFPA 54-2024

First Revision No. 13-NFPA 54-2024 [Section No. 5.14]

5.14 Pressure Regulator and Pressure Control Venting.

The venting of the atmospheric side of diaphragms in line-pressure regulators and gas-pressure-limit controls shall be in accordance with all of the following:

(1) An independent vent pipe to the outdoors, sized in accordance with the device manufacturer's instructions, shall be provided where the location of a device is such that a discharge of fuel gas from the device will cause a hazard.

(2) Independent vents for multiple regulators shall not be required where the vents are connected to a common manifold designed in accordance with engineering methods to minimize backpressure in the event of diaphragm failure and such design is approved.

(3) A regulator and vent limiting means combination listed in accordance with ANSI Z21.80/CSA 6.22, *Line Pressure Regulators,* shall not be required to be vented to the outdoors.

(4) A listed gas appliance regulator factory equipped with a vent limiting device shall not be required to be vented to the outdoors.

(5) A listed gas pressure limit control that is factory equipped with a vent limiting device and in accordance with UL 353, *Limit Controls,* or UL 60730-2-6, *Automatic Electrical Controls for Household and Similar Use, Part 2,* shall not be required to be vented to the outdoors.

(6) Materials for vent piping shall be in accordance with Section 5.5.

(7) The vent terminus shall be designed to prevent the entry of water, insects, and other foreign matter that could cause blockage.

(8) Vent piping shall be installed to minimize static loads and bending moments placed on the regulators and gas pressure control devices.

(9) Vents shall terminate not less than 3 ft (0.9 m) from a possible source of ignition.

(10) At locations where a vent termination could be submerged during floods or snow accumulations, one of the following shall apply:

(a) An antiflood-type breather vent fitting shall be installed.

(b) The vent terminal shall be located above the height of the expected flood waters or snow.

(11) Vent piping from pressure regulators and gas pressure controls shall not be connected to a common manifold that serves a bleed line from a diaphragm-type gas valve.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 17 17:11:09 EDT 2024

Committee Statement

Committee Statement: The text is being added to clarify that the discharge of concern is from the device causing a hazard and not the discharge location.

Response Message:	FR-13-NFPA 54-2024

First Revision No. 15-NFPA 54-2024 [Section No. 7.2.5]

7.2.5* Prohibited Locations.

Gas piping inside any building shall not be installed in or through a clothes chute, chimney or gas vent, dumbwaiter, elevator shaft, or air duct~~, other than combustion air ducts~~ .

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Wed Sep 18 11:20:37 EDT 2024

Committee Statement

Committee Statement: It is not safe to allow for gas piping to be installed within combustion air ducts for the same reasons that all of the other locations are prohibited. Leaks of gas into combustion air ducts could immediately communicate flammable mixtures to ignition sources. This could burn back through the duct and make for a catastrophic explosion and fire.

Response Message: FR-15-NFPA 54-2024

Public Input No. 62-NFPA 54-2024 [Section No. 7.2.5]

First Revision No. 16-NFPA 54-2024 [Section No. 7.11]

7.12 Systems Containing Flammable Gas–Air Mixtures.

7.12.1

Systems containing flammable gas–air mixtures shall be designed in accordance with engineering methods.

7.12.2

Equipment used in flammable gas–air mixtures shall be selected in accordance with engineering methods.

~~**7.11.1** Required Components.~~

~~A central premix system with a flammable mixture in the blower or compressor shall consist of the following components:~~

- ~~Gas-mixing machine in the form of an automatic gas–air proportioning device combined with a downstream blower or compressor~~
- ~~Flammable mixture piping, minimum Schedule 40~~
- ~~Automatic firecheck(s)~~
- ~~Safety blowout(s) or backfire preventers for systems utilizing flammable mixture lines above 2 ½ in. (64 mm) nominal pipe size or the equivalent~~

~~**7.11.2** Optional Components.~~

~~The following components shall also be permitted to be utilized in any type of central premix system:~~

- ~~Flowmeter(s)~~
- ~~Flame arrester(s)~~

~~**7.11.3** Additional Requirements.~~

~~Gas-mixing machines shall have nonsparking blowers and shall be constructed so that a flashback does not rupture machine casings.~~

~~**7.11.4***~~ ~~Special Requirements for Mixing Blowers.~~

~~A mixing blower system shall be limited to applications with minimum practical lengths of mixture piping, limited to a maximum mixture pressure of 10 in. w.c. (2.5 kPa) and limited to gases containing no more than 10 percent hydrogen. The blower shall be equipped with a gas control valve at its air entrance arranged so that gas is admitted to the airstream, entering the blower in proper proportions for correct combustion by the type of burners employed, the said gas control valve being of either the zero governor or mechanical ratio valve type that controls the gas and air adjustment simultaneously. No valves or other obstructions shall be installed between the blower discharge and the burner or burners.~~

~~**A.7.11.4**~~

~~The mixing blower is acknowledged as a special case because of its inability to tolerate control valves or comparable restrictions between mixing blower(s) and burner(s). With these limitations, mixing blower installations are not required to utilize safety blowouts, backfire preventers, explosion heads, flame arresters, or automatic firechecks that introduce pressure losses.~~

7.11.5 Installation of Gas-Mixing Machines.

7.11.5.1* Location.

The gas-mixing machine shall be located in a well-ventilated area or in a detached building or cutoff room provided with room construction and explosion vents in accordance with engineering methods. Such rooms or belowgrade installations shall have adequate positive ventilation.

A.7.11.5.1

For information on venting of deflagrations, see NFPA 68 .

7.11.5.2 Electrical Requirements.

7.11.5.2.1

Where gas-mixing machines are installed in well-ventilated areas, the type of electrical equipment shall be in accordance with *NFPA 70* for unclassified areas unless other hazards require classification of the area.

7.11.5.2.2

Where gas-mixing machines are installed in small detached buildings or cutoff rooms, the small detached building or cutoff room shall be classified Class I, Division 2.

7.11.5.3 Air Intakes.

Air intakes for gas-mixing machines using compressors or blowers shall be taken from outdoors whenever practical.

7.11.5.4* Controls.

Controls for gas-mixing machines shall include interlocks and a safety shutoff valve of the manual reset type in the gas supply connection to each machine arranged to automatically shut off the gas supply in the event of high or low gas pressure. Except for open burner installations only, the controls shall be interlocked so that the blower or compressor stops operating following a gas supply failure. Where a system employs pressurized air, means shall be provided to shut off the gas supply in the event of air failure.

A.7.11.5.4

Additional interlocks might be necessary for safe operation of appliances supplied by the gas-mixing machine.

7.11.5.5 Installation in Parallel.

Centrifugal gas-mixing machines in parallel shall be reviewed by the user and equipment manufacturer before installation, and means or plans for minimizing the effects of downstream pulsation and equipment overload shall be prepared and utilized as needed.

7.11.6 Use of Automatic Firechecks, Safety Blowouts, or Backfire Preventers.

Automatic firechecks and safety blowouts or backfire preventers shall be provided in piping systems distributing flammable air–gas mixtures from gas-mixing machines to protect the piping and the machines in the event of flashback, in accordance with the following:

* Approved automatic firechecks shall be installed upstream as close as practical to the burner inlets following the firecheck manufacturers' instructions.

A.7.11.6(1) –

Two basic methods are generally used. One calls for a separate firecheck at each burner, the other a firecheck at each group of burners. The second method is generally more practical if a system consists of many closely spaced burners.

An approved automatic firecheck should be installed as near as practical upstream from a flame arrester used for local protection where test burners or lighting torches are employed.

A separate manually operated gas valve shall be provided at each automatic firecheck for shutting off the flow of the gas–air mixture through the firecheck after a flashback has occurred. The valve shall be located upstream as close as practical to the inlet of the automatic firecheck. Caution: these valves shall not be reopened after a flashback has occurred until the firecheck has cooled sufficiently to prevent re-ignition of the flammable mixture and has been reset properly.

A safety blowout or backfiring preventer shall be provided in the mixture line near the outlet of each gas-mixing machine where the size of the piping is larger than 2 ½ in. (64 mm) NPS, or equivalent, to protect the mixing equipment in the event of an explosion passing through an automatic firecheck. The manufacturers' instructions shall be followed when installing these devices, particularly after a disc has burst. The discharge from the safety blowout or backfire preventer shall be located or shielded so that particles from the ruptured disc cannot be directed toward personnel. Wherever there are interconnected installations of gas-mixing machines with safety blowouts or backfire preventers, provision shall be made to keep the mixture from other machines from reaching any ruptured disc opening. Check valves shall not be used for this purpose.

Large-capacity premix systems provided with explosion heads (rupture discs) to relieve excessive pressure in pipelines shall be located at and vented to a safe outdoor location. Provisions shall be provided for automatically shutting off the supply of the gas–air mixture in the event of rupture.

Supplemental Information

File Name	Description	Approved
54_FR-16_7.11.docx		

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Wed Sep 18 11:50:36 EDT 2024

Committee Statement

Committee Statement: Systems containing flammable gas-air mixtures are normally designed through engineering methods or fall under the scope of other codes (e.g. NFPA 86 for larger ovens and furnaces). In the context of how NFPA 54 is commonly used, these

requirements are not commonly applicable in residential and light commercials systems. The technical expertise of the committee is limited in this technical area and it is hard to revise the requirements to maintain the intent.

Response Message: FR-16-NFPA 54-2024

Public Input No. 81-NFPA 54-2024 [Section No. 7.11]

First Revision No. 59-NFPA 54-2024 [Section No. 8.1.1.1]

8.1.1.1

Prior to acceptance and initial operation or after repairs , all piping installations shall be visually inspected and pressure tested to determine that the materials, design, fabrication, and installation practices comply with the requirements of this code.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 24 13:39:38 EDT 2024

Committee Statement

Committee Statement: The committee was made aware that repairs to leaking piping systems post fire, explosion, or other damage are not currently addressed in the Code and this requirement specifies what must be done to place the system back in service. See related FR 58 for further revisions related to this topic.

Response Message: FR-59-NFPA 54-2024

First Revision No. 17-NFPA 54-2024 [Section No. 8.1.3.1]

8.1.3.1*

Pipe joints~~, including welds,~~ shall be left exposed for examination during the test.

~~*Exception: Covered or concealed pipe end joints that have been previously tested in accordance with this code.*~~

A.8.1.3.1

Welded pipe joints should be left exposed for examination.

8.1.3.2

Covered or concealed pipe end joints that have been previously tested in accordance with this code shall be permitted to remain covered or concealed .

Supplemental Information

File Name	Description	Approved
54_FR-17_8.1.3.1.docx		

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Wed Sep 18 14:41:30 EDT 2024

Committee Statement

Committee Statement: A weld is a pipe joint and it is moved to the annex as it is guidance material. The exception is moving to requirement language to comply with the Manual of Style.

Response Message: FR-17-NFPA 54-2024

Public Input No. 22-NFPA 54-2024 [Section No. 8.1.3.1]

First Revision No. 23-NFPA 54-2024 [Section No. 9.3.2.2]

9.3.2.2* Known Air Infiltration Rate Method.

Where the air infiltration rate of a structure is known, the minimum required volume shall be determined as follows:

(1) For all appliances ~~other than fan assisted,~~ calculate using the following equation:

~~Required Volume$_{other}$ $\geq \frac{21\ \text{ft}^3}{ACH}\left(\frac{I_{other}}{1000\ \text{Btu/hr}}\right)$~~ DELETED

$$\text{Required Volume} \geq \frac{21\ \text{ft}^3}{ACH}\left(\frac{I}{1000\ \text{Btu/hr}}\right) \qquad \text{[9.3.2.2a]}$$

where:

I_{other} = all appliances ~~other than fan-assisted~~ input (Btu/hr)

~~I_{fan} = fan-assisted appliance input (Btu/hr)~~

ACH = air change per hour (percent of volume of space exchanged per hour, expressed as a decimal)

~~For fan-assisted appliances, calculate using the following equation:~~

~~Required Volume$_{fan}$ $\geq \frac{15\ \text{ft}^3}{ACH}\left(\frac{I_{fan}}{1000\ \text{Btu/hr}}\right)$~~ DELETED

~~[9.3.2.2b]~~

~~For purposes of these calculations, an infiltration rate greater than 0.60 ACH shall not be used in Equations 9.3.2.2a and 9.3.2.2b.~~

A.9.3.2.2

See Table A.9.3.2.2(a) ~~and Table A.9.3.2.2(b)~~ .

Table A.9.3.2.2(a) Known Air Infiltration Rate Method: Minimum Space Volume for Appliances ~~Other than Fan-Assisted for Specified Infiltration Rates~~ ***~~(ACH)~~***

Appliance Input (Btu/hr)	**Space Volume (ft^3)**		
	0.25 *ACH*	**0.30 *ACH***	**0.35 *ACH***
5,000	420	350	300
10,000	840	700	600
15,000	1,260	1,050	900
20,000	1,680	1,400	1,200
25,000	2,100	1,750	1,500
30,000	2,520	2,100	1,800
35,000	2,940	2,450	2,100
40,000	3,360	2,800	2,400
45,000	3,780	3,150	2,700
50,000	4,200	3,500	3,000
55,000	4,620	3,850	3,300
60,000	5,040	4,200	3,600
65,000	5,460	4,550	3,900
70,000	5,880	4,900	4,200
75,000	6,300	5,250	4,500
80,000	6,720	5,600	4,800
85,000	7,140	5,950	5,100
90,000	7,560	6,300	5,400
95,000	7,980	6,650	5,700
100,000	8,400	7,000	6,000
105,000	8,820	7,350	6,300
110,000	9,240	7,700	6,600
115,000	9,660	8,050	6,900
120,000	10,080	8,400	7,200
125,000	10,500	8,750	7,500
130,000	10,920	9,100	7,800
135,000	11,340	9,450	8,100
140,000	11,760	9,800	8,400
145,000	12,180	10,150	8,700
150,000	12,600	10,500	9,000
160,000	13,440	11,200	9,600
170,000	14,280	11,900	10,200
180,000	15,120	12,600	10,800
190,000	15,960	13,300	11,400
200,000	16,800	14,000	12,000
210,000	17,640	14,700	12,600
220,000	18,480	15,400	13,200
230,000	19,320	16,100	13,800
240,000	20,160	16,800	14,400

Appliance Input (Btu/hr)	Space Volume (ft^3)		
	0.25 *ACH*	0.30 *ACH*	0.35 *ACH*
250,000	21,000	17,500	15,000
260,000	21,840	18,200	15,600
270,000	22,680	18,900	16,200
280,000	23,520	19,600	16,800
290,000	24,360	20,300	17,400
300,000	25,200	21,000	18,000

For SI units, 1 ft^3 = 0.028 m^3, 1000 Btu/hr = 0.293 kW.

ACH: Air change per hour.

~~Table A.9.3.2.2(b) Known Air Infiltration Rate Method: Minimum Space Volume for Fan-Assisted Appliance, for Specified Infiltration Rates *(ACH)*~~

~~Appliance Input (Btu/hr)~~	~~Required Volume (ft^3)~~		
	~~0.25 *ACH*~~	~~0.30 *ACH*~~	~~0.35 *ACH*~~
~~5,000~~	~~300~~	~~250~~	~~214~~
~~10,000~~	~~600~~	~~500~~	~~429~~
~~15,000~~	~~900~~	~~750~~	~~643~~
~~20,000~~	~~1,200~~	~~1,000~~	~~857~~
~~25,000~~	~~1,500~~	~~1,250~~	~~1,071~~
~~30,000~~	~~1,800~~	~~1,500~~	~~1,286~~
~~35,000~~	~~2,100~~	~~1,750~~	~~1,500~~
~~40,000~~	~~2,400~~	~~2,000~~	~~1,714~~
~~45,000~~	~~2,700~~	~~2,250~~	~~1,929~~
~~50,000~~	~~3,000~~	~~2,500~~	~~2,143~~
~~55,000~~	~~3,300~~	~~2,750~~	~~2,357~~
~~60,000~~	~~3,600~~	~~3,000~~	~~2,571~~
~~65,000~~	~~3,900~~	~~3,250~~	~~2,786~~
~~70,000~~	~~4,200~~	~~3,500~~	~~3,000~~
~~75,000~~	~~4,500~~	~~3,750~~	~~3,214~~
~~80,000~~	~~4,800~~	~~4,000~~	~~3,429~~
~~85,000~~	~~5,100~~	~~4,250~~	~~3,643~~
~~90,000~~	~~5,400~~	~~4,500~~	~~3,857~~
~~95,000~~	~~5,700~~	~~4,750~~	~~4,071~~
~~100,000~~	~~6,000~~	~~5,000~~	~~4,286~~
~~105,000~~	~~6,300~~	~~5,250~~	~~4,500~~
~~110,000~~	~~6,600~~	~~5,500~~	~~4,714~~
~~115,000~~	~~6,900~~	~~5,750~~	~~4,929~~
~~120,000~~	~~7,200~~	~~6,000~~	~~5,143~~
~~125,000~~	~~7,500~~	~~6,250~~	~~5,357~~
~~130,000~~	~~7,800~~	~~6,500~~	~~5,571~~
~~135,000~~	~~8,100~~	~~6,750~~	~~5,786~~
~~140,000~~	~~8,400~~	~~7,000~~	~~6,000~~

Appliance Input (Btu/hr)	Required Volume (ft^3)		
	0.25 *ACH*	0.30 *ACH*	0.35 *ACH*
145,000	8,700	7,250	6,214
150,000	9,000	7,500	6,429
160,000	9,600	8,000	6,857
170,000	10,200	8,500	7,286
180,000	10,800	9,000	7,714
190,000	11,400	9,500	8,143
200,000	12,000	10,000	8,571
210,000	12,600	10,500	9,000
220,000	13,200	11,000	9,429
230,000	13,800	11,500	9,857
240,000	14,400	12,000	10,286
250,000	15,000	12,500	10,714
260,000	15,600	13,000	11,143
270,000	16,200	13,500	11,571
280,000	16,800	14,000	12,000
290,000	17,400	14,500	12,429
300,000	18,000	15,000	12,857

For SI units, 1 ft^3 = 0.028 m^3, 1000 Btu/hr = 0.293 kW.

ACH : Air change per hour.

Meeting the requirements of the “known air infiltration rate method” is not a guarantee that the equipment will pass the Section 11.6 draft test with current tighter construction, remodeling, and weatherization methods. There are also factors related to building airflows and combustion air that cannot be quantified or predicted, including leakage of supply and return ducts in unconditioned spaces, multiple appliances operating at the same time, operation of exhaust fans, wind and weather conditions, and isolation of appliance areas from sources of combustion air by the closing of doors. This code is not a design manual and should not be considered as such. The formula used to determine the required indoor air volume is meant to provide you with the best guidance available at the time of publication of this edition of NFPA 54. Even tracer gas methods, for determining air infiltration rates, which require specialized equipment, can only determine rates of flow for the time and conditions when the test is conducted.

Air changes per hour (ACH) in this formula is the number of air changes that occur within the building by natural means (ACH_{NAT}). There are several methods to measure ACH, although many factors can affect this value, such as wind velocities, wind direction, barometric pressure, and the number and type of appliances installed and operated within the building.

Tracer gas methods have been developed to determine ACH. Such methods produce the most reliable values for ACH. However, these methods can be expensive and cumbersome, making them out of reach of most contractors or installers. Other published methods for estimating ACHs include ASHRAE estimating methods and those developed by the *Air Conditioning Contractors of America Manual J, Residential Load Calculations*, which includes tightness categories and estimated ACH for each category. The most prevalent technology in use today for evaluating air leakage characteristics associated with structures is through the use of blower door testing. This tool, called ACH_{50}, provides a somewhat consistent and quantifiable means for arriving at the air leakage for a uniform depressurization of a building compared to atmosphere—normally 50 pascals. This method has been successfully correlated to tracer-gas-measured natural air infiltration rates.

ASHRAE 62.2 provides a method for converting ACH_{50} to an ACH value that ~~reflects~~ estimates the actual number of air changes under normal conditions, called ACH_{NAT}.

Many buildings constructed to current building and energy codes can achieve very low ACH_{NAT} values, which need a relatively large indoor volume for naturally drafted appliances. Designers, builders, installers, and inspectors should know that these kinds of values might need indoor air volumes that are greater than structures have available. In such cases, draft testing per Section 11.6 might fail. This could necessitate an alternate means of appliance venting, replacing the appliance, or other remedies for achieving the necessary combustion air other than using indoor air.

The following is intended to provide guidance on developing the ACH factor for use in the "known air infiltration rate" *(see 9.3.2.1)* method of providing combustion air. It supports converting commonly used ACH_{50} blower door air change measurements to estimated natural air infiltration rates.

ASHRAE 62.2, *Ventilation and Acceptable Indoor Air Quality in Residential Buildings*, provides an infiltration credit formula used with single-point blower door testing for estimating natural infiltration rates. ~~A.9.3.2.2(b)~~ Table A.9.3.2.2(b) represents one set of simplified ASHRAE method calculations for a single-story building for an ACH_{50} of 3. The formula should be used to calculate ACH_{NAT} for buildings with ~~larger~~ other ACH_{50} leakage rates. A design professional should be consulted to validate calculations before they are used as the basis for providing combustion air.

$$ACH_{NAT} = .052 \times Q_{50} \times wsf \times (H / Hr)^{Z} \times 60 / \text{volume}$$ **[A.9.3.2.~~3~~ 2 a]**

where:

wsf = Weather and shielding factor (from ASHRAE 62.2)

H = Conditioned height above grade

Hr = Reference height, 8.2 ft

Z = 0 .4

$$Q_{50} = CFM_{50} \text{ blower door reading or } ACH_{50} \times \text{volume}/60$$

[A.9.3.2.~~3 a~~ 2 b]

Table A.9.3.2.2(b) ACH_{50} to ACH_{NAT} Sample Calculations

$$ACH_{NAT} = .052 \times Q_{50} \times wsf \times (H / Hr)^{Z} \times 60 / \text{volume}$$ *

Single story		
ACH_{50}	**Wsf†**	**ACH_{nat}**
3	0.30	0.05
	0.35	0.06
	0.40	0.07
	0.45	0.08
	0.50	0.08
	0.55	0.09
	0.60	0.10
	0.65	0.10
	0.70	0.10
	0.75	0.10
	0.80	0.10

$$ACH_{NAT} = .052 \times Q_{50} \times wsf \times (H / Hr)^{Z} \times 60 / \text{volume}$$ *

Single story

ACH_{50}	Wsf†	ACH_{nat}
	0.85	0.15
	0.90	0.15
	0.95	0.15
	1.00	0.15
	1.05	0.175
	1.10	0.20
	1.15	0.20

*H/Hr was derived from an average of 10 ft. This made for a representative factor for facilities with 8 ft to 12 ft conditioned heights.

†Created with selected weather shielding factors.

9.3.2.2.1

For purposes of these calculations, an infiltration rate greater than 0.60 *ACH* shall not be used in Equations ~~s~~ 9.3.2.2~~a and 9.3.2.2b~~ .

Supplemental Information

File Name	Description	Approved
54_FR-23_9.3.2.2.docx		

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 07:45:39 EDT 2024

Committee Statement

Committee Statement: Building construction has gotten tighter and the permissible reduction of ventilation air for fan assisted requirements is not warranted. The key aspect is that the input rating of the appliance dictates the ventilation air required rather than the appliance drafting mechanism, as the drafting can malfunction. All appliances, whether fan assisted or natural draft, require roughly the same amount of air for combustion and ventilation air. Ventilation air is a necessary safety to protect against unintended emissions. All appliances should share the same equation for air requirements.

Response Message: FR-23-NFPA 54-2024

Public Input No. 20-NFPA 54-2024 [Section No. A.9.3.2.2]

Public Input No. 29-NFPA 54-2024 [Section No. 9.3.2.2]

Public Input No. 30-NFPA 54-2024 [Section No. A.9.3.2.2]

Public Input No. 21-NFPA 54-2024 [Section No. A.9.3.2.2]

First Revision No. 21-NFPA 54-2024 [Section No. 9.3.7.1]

9.3.7.1 Louvers and Grilles.

~~The required size of openings for combustion, ventilation, and dilution air shall be based on the net free area of each opening. Where the free area through a design of louver, grille, or screen is known, it shall be used in calculating the size opening required to provide the free area specified. Where the louver and grille design and free area are not known, it shall be assumed that wood louvers have 25 percent free area, and metal louvers and grilles have 75 percent free area. Nonmotorized louvers and grilles shall be fixed in the open position.~~

9.3.7.1.1

The required size of openings for combustion, ventilation, and dilution air shall be based on the net free area of each opening.

9.3.7.1.2

Where the free area through a design of louver, grille, or screen is known, it shall be used in calculating the size opening required to provide the free area specified.

9.3.7.1.3

Where the louver and grille design and free area are not known, it shall be assumed that wood louvers have 25 percent free area, and metal louvers and grilles have 75 percent free area.

9.3.7.1.4

Nonmotorized louvers and grilles shall be fixed in the open position.

Supplemental Information

File Name	Description	Approved
54_FR-21_9.3.7.1.docx		

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Wed Sep 18 20:35:17 EDT 2024

Committee Statement

Committee Statement: The requirement is splitting out to multiple sections to meet the NFPA Manual of Style.

Response Message: FR-21-NFPA 54-2024

Public Input No. 113-NFPA 54-2024 [Section No. 9.3.7.1]

First Revision No. 22-NFPA 54-2024 [Section No. 9.3.7.3]

9.3.7.3 Motorized Louvers.

~~Motorized louvers shall be interlocked with the appliance so they are proven in the full open position prior to main burner ignition and during main burner operation. Means shall be provided to prevent the main burner from igniting should the louver fail to open during burner startup and to shut down the main burner if the louvers close during burner operation.~~

9.3.7.3.1

Motorized louvers shall be interlocked with the appliance so they are proven in the full open position prior to main burner ignition and during main burner operation.

9.3.7.3.2

Means shall be provided to prevent the main burner from igniting should the louver fail to open during burner startup and to shut down the main burner if the louvers close during burner operation.

Supplemental Information

File Name	Description	Approved
54_FR-22_9.3.7.3.docx		

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Wed Sep 18 20:38:37 EDT 2024

Committee Statement

Committee Statement: The requirement is breaking out into multiple sections to comply with the NFPA Manual of Style.

Response Message: FR-22-NFPA 54-2024

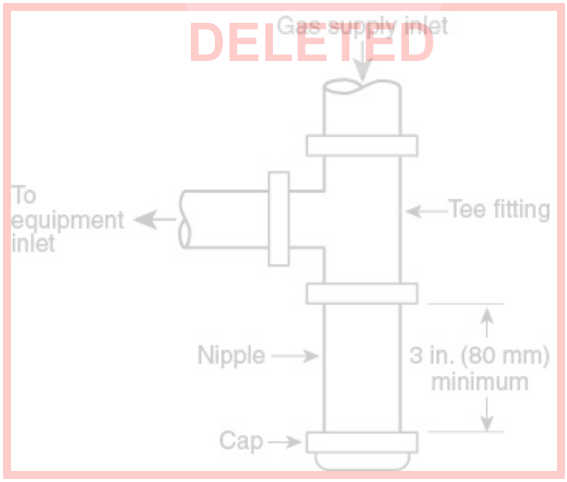
Public Input No. 114-NFPA 54-2024 [Section No. 9.3.7.3]

First Revision No. 25-NFPA 54-2024 [Section No. 9.6.8]

9.6.8 Sediment Trap.

~~Where a sediment trap is not incorporated as a part of the appliance, a sediment trap shall be installed downstream of the appliance shutoff valve as close to the inlet of the appliance as practical at the time of appliance installation. The sediment trap shall be either a tee fitting with a capped nipple in the bottom outlet, as illustrated in~~ Figure 9.6.8 ~~, or another device recognized as an effective sediment trap. Illuminating appliances, gas ranges, clothes dryers, decorative appliances for installation in vented fireplaces, gas fireplaces, and outdoor cooking appliances shall not be required to be so equipped.~~

~~Figure 9.6.8 Method of Installing a Tee Fitting Sediment Trap.~~



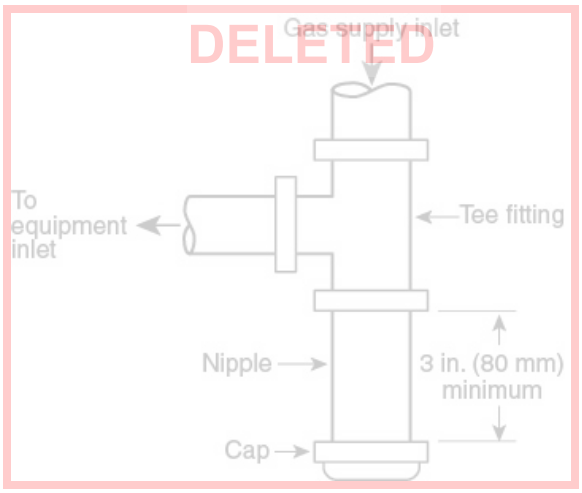
9.6.8.1

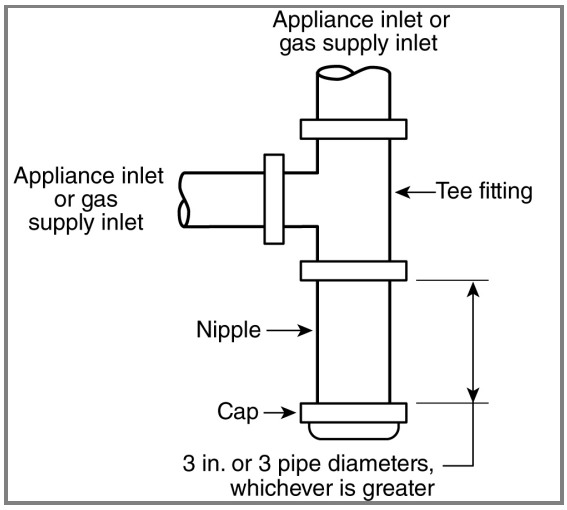
Where a sediment trap is not incorporated as a part of the appliance, a sediment trap shall be installed downstream of the appliance shutoff valve as close to the inlet of the appliance as practical at the time of appliance installation.

9.6.8.2

The sediment trap shall be either a tee fitting with a capped nipple in the bottom outlet, as illustrated in Figure 9.6.8.2, or another device recognized as an effective sediment trap.

Figure 9.6.8.2 Method of Installing a Tee Fitting Sediment Trap.





9.6.8.3

Illuminating appliances, gas ranges, clothes dryers, decorative appliances for installation in vented fireplaces, gas fireplaces, and outdoor cooking appliances shall not be required to be ~~so~~ equipped with a sediment trap .

Supplemental Information

File Name	Description	Approved
Figure_9.6.8.2_Mod.pdf	See comments on attached PDF for revisions to Figure 9.6.8. Note that the figure is also moving sections.	
54_FR-25_9.6.8.docx	For prod use	

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 09:17:35 EDT 2024

Committee Statement

Committee Statement:	The sediment trap can operate in either direction to accomplish the intended function of a sediment trap. The addition of 3 pipe lengths or whichever is greater is to accomplish the sediment trap function for larger diameter piping.
Response Message:	FR-25-NFPA 54-2024

First Revision No. 18-NFPA 54-2024 [New Section after 10.18]

10.18.1

Manufacturers shall construct venting in all premade cabinetry or doors utilized for permanently installed outdoor cooking equipment meeting the following:

(1) Have a minimum of two vents.

(2) Each vent has minimum dimensions of 4 × 4 in. (102 × 102 mm), 4.5 in. (114 mm) diameter, or equivalent with a minimum of 16 in.^{2} (0.01 m^2) of unrestricted opening.

10.18.2

Where manufacturer-designed cabinetry or doors are not purchased, the installer shall comply with all of the following:

(1) Install venting within the enclosure located based on the fuel gas utilized as follows:

(a) For natural gas, within 3 in. (76 mm) of the top

(b) For LP-Gas, within 3 in. (76 mm) of the bottom

(2) Install a minimum of two vents.

(3) Each vent has minimum dimensions of 4 × 4 in. (102 x 102 mm), 4.5 in. (114 mm) diameter, or equivalent with a minimum of 16 in.^{2} (0.01 m^2) of unrestricted opening.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Wed Sep 18 17:30:54 EDT 2024

Committee Statement

Committee Statement: Ventilation requirements are needed for cabinets below outdoor cooking appliances are needed to prevent accumulation of fuel gas under these appliances. Guides demonstrate methods for venting in stone or other installation guides, but the simplest solution to ensuring sufficient venting exists is to place the vents in the manufacturers equipment that is sold as an accessory.

Response Message: FR-18-NFPA 54-2024

Public Input No. 122-NFPA 54-2024 [New Section after 10.18]

First Revision No. 76-NFPA 54-2024 [Section No. 10.24.1]

Global FR-40

10.24.1 ~~Application~~Listing.

Unit heaters shall be listed in accordance with ANSI Z83.8/CSA 2.6, *Gas Unit Heaters, Gas Packaged Heaters, Gas Utility Heaters, and Gas-Fired Duct Furnaces*~~, and installed in accordance with the manufacturer's installation instructions~~.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Wed Sep 25 15:50:31 EDT 2024

Committee Statement

Committee Statement: The text is being deleted to match the rest of the 10.XX.1 sections. Additionally the text is redundant to 10.1.1 as all appliances have to be installed in accordance with the manufacturer's instructions. See Related FR 40 for related changes on the section titles.

Response Message: FR-76-NFPA 54-2024

First Revision No. 19-NFPA 54-2024 [Section No. 10.24.2]

10.24.2 Support.

~~Suspended~~ Hangers and brackets used to support suspended -type unit heaters shall be ~~safely and adequately supported, with due consideration given to their weight and vibration characteristics. Hangers and brackets shall be~~ of noncombustible material.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Wed Sep 18 17:54:08 EDT 2024

Committee Statement

Committee Statement: The sentence proposed to be deleted does not contain a specific requirement and is unenforceable.

Response Message: FR-19-NFPA 54-2024

Public Input No. 84-NFPA 54-2024 [Section No. 10.24.2]

First Revision No. 77-NFPA 54-2024 [Section No. 10.26.1]

Global FR-40

10.26.1 ~~Application~~Listing.

Water heaters shall be listed in accordance with ANSI Z21.10.1/CSA 4.1, *Gas Water Heaters, Volume I, Storage Water Heaters with Input Ratings of 75,000 Btu per Hour or Less*, or ANSI Z21.10.3/CSA 4.3, *Gas Water Heaters, Volume III, Storage Water Heaters with Input Ratings Above 75,000 Btu per Hour, Circulating or Instantaneous*~~, and shall be installed in accordance with the manufacturer's installation instructions~~.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Wed Sep 25 15:58:30 EDT 2024

Committee Statement

Committee Statement: The text is being deleted to match the rest of the 10.XX.1 sections. Additionally the text is redundant to 10.1.1 as all appliances have to be installed in accordance with the manufacturer's instructions. See Related FR 40 for related changes on the section titles.

Response Message: FR-77-NFPA 54-2024

First Revision No. 61-NFPA 54-2024 [Section No. 13.1 [Excluding any Sub-Sections]]

This section shall apply where Table 13.1(a) through Table 13.1(g) are used to size single appliance venting systems. Subsections 13.1.1 through 13.1.18 apply to Table 13.1(a) through Table 13.1(g).

Table 13.1(a) Type B Double-Wall Gas Vent

Number of Appliance																	
Appliance Typ																	
Appliance Vent Connectio																	
Vent Diameter —*D* (in.)																	
3			4			5			6			7					
Appliance Input Rating in Thousands of Btu per																	
Height *H* (ft)	Lateral *L* (ft)	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NA		
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Ma		
6	0	0	78	46	0	152	86	0	251	141	0	375	205	0	524	285		
	2	13	51	36	18	97	67	27	157	105	32	232	157	44	321	217		
	4	21	49	34	30	94	64	39	153	103	50	227	153	66	316	211		
	6	25	46	32	36	91	61	47	149	100	59	223	149	78	310	205		
8	0	0	84	50	0	165	94	0	276	155	0	415	235	0	583	320		
	2	12	57	40	16	109	75	25	178	120	28	263	180	42	365	247		
	5	23	53	38	32	103	71	42	171	115	53	255	173	70	356	237		
	8	28	49	35	39	98	66	51	164	109	64	247	165	84	347	227		
10	0	0	88	53	0	175	100	0	295	166	0	447	255	0	631	345		
	2	12	61	42	17	118	81	23	194	129	26	289	195	40	402	273		
	5	23	57	40	32	113	77	41	187	124	52	280	188	68	392	263		
	10	30	51	36	41	104	70	54	176	115	67	267	175	88	376	245		
15	0	0	94	58	0	191	112	0	327	187	0	502	285	0	716	390		
	2	11	69	48	15	136	93	20	226	150	22	339	225	38	475	316		
	5	22	65	45	30	130	87	39	219	142	49	330	217	64	463	300		
	10	29	59	41	40	121	82	51	206	135	64	315	208	84	445	288		
	15	35	53	37	48	112	76	61	195	128	76	301	198	98	429	275		
20	0	0	97	61	0	202	119	0	349	202	0	540	307	0	776	430		
	2	10	75	51	14	149	100	18	250	166	20	377	249	33	531	346		
	5	21	71	48	29	143	96	38	242	160	47	367	241	62	519	337		
	10	28	64	44	38	133	89	50	229	150	62	351	228	81	499	321		
	15	34	58	40	46	124	84	59	217	142	73	337	217	94	481	308		
	20	48	52	35	55	116	78	69	206	134	84	322	206	107	464	295		
30	0	0	100	64	0	213	128	0	374	220	0	587	336	0	853	475		
	2	9	81	56	13	166	112	14	283	185	18	432	280	27	613	394		
	5	21	77	54	28	160	108	36	275	176	45	421	273	58	600	385		
	10	27	70	50	37	150	102	48	262	171	59	405	261	77	580	371		
	15	33	64	NA	44	141	96	57	249	163	70	389	249	90	560	357		
	20	56	58	NA	53	132	90	66	237	154	80	374	237	102	542	343		
	30	NA	NA	NA	73	113	NA	88	214	NA	104	346	219	131	507	321		
50	0	0	101	67	0	216	134	0	397	232	0	633	363	0	932	518		

											Number of Appliance								
											Appliance Typ								
											Appliance Vent Connectio								
		Vent Diameter —*D* (in.)																	
		3			4			5			6			7					
		Appliance Input Rating in Thousands of Btu per																	
Height *H* (ft)	Lateral *L* (ft)	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NA			
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Ma			
	2	8	86	61	11	183	122	14	320	206	15	497	314	22	715	445			
	5	20	82	NA	27	177	119	35	312	200	43	487	308	55	702	438			
	10	26	76	NA	35	168	114	45	299	190	56	471	298	73	681	426			
	15	59	70	NA	42	158	NA	54	287	180	66	455	288	85	662	413			
	20	NA	NA	NA	50	149	NA	63	275	169	76	440	278	97	642	401			
	30	NA	NA	NA	69	131	NA	84	250	NA	99	410	259	123	605	376			
100	0	NA	NA	NA	0	218	NA	0	407	NA	0	665	400	0	997	560			
	2	NA	NA	NA	10	194	NA	12	354	NA	13	566	375	18	831	510			
	5	NA	NA	NA	26	189	NA	33	347	NA	40	557	369	52	820	504			
	10	NA	NA	NA	33	182	NA	43	335	NA	53	542	361	68	801	493			
	15	NA	NA	NA	40	174	NA	50	321	NA	62	528	353	80	782	482			
	20	NA	NA	NA	47	166	NA	59	311	NA	71	513	344	90	763	471			
	30	NA	NA	NA	NA	NA	NA	78	290	NA	92	483	NA	115	726	449			
	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	147	428	NA	180	651	405			

Table 13.1(b) ***Continued***

											Number of App								
											Applian								
											Appliance Vent Con								
		Vent Diameter — *D* (i																	
		10			12			14			16			18					
		Appliance Input Rating in Thousand																	
Height *H* (ft)	Lateral *L* (ft)	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		N			
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	I			
6	0	0	1121	570	0	1645	850	0	2267	1170	0	2983	1530	0	3802	1			
	2	75	675	455	103	982	650	138	1346	890	178	1769	1170	225	2250	1			
	4	110	668	445	147	975	640	191	1338	880	242	1761	1160	300	2242	1			
	6	128	661	435	171	967	630	219	1330	870	276	1753	1150	341	2235	1			
8	0	0	1261	660	0	1858	970	0	2571	1320	0	3399	1740	0	4333	2			
	2	71	770	515	98	1124	745	130	1543	1020	168	2030	1340	212	2584	1			
	5	115	758	503	154	1110	733	199	1528	1010	251	2013	1330	311	2563	1			
	8	137	746	490	180	1097	720	231	1514	1000	289	2000	1320	354	2552	1			
10	0	0	1377	720	0	2036	1060	0	2825	1450	0	3742	1925	0	4782	2			
	2	68	852	560	93	1244	850	124	1713	1130	161	2256	1480	202	2868	1			

												Number of App					
												Applian					
												Appliance Vent Con					
		Vent Diameter — *D* (i															
		10			12			14			16			18			
		Appliance Input Rating in Thousand															
Height *H* (ft)	Lateral *L* (ft)	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN			
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max		
	5	112	839	547	149	1229	829	192	1696	1105	243	2238	1461	300	2849	1	
	10	142	817	525	187	1204	795	238	1669	1080	298	2209	1430	364	2818	1	
15	0	0	1596	840	0	2380	1240	0	3323	1720	0	4423	2270	0	5678	2	
	2	63	1019	675	86	1495	985	114	2062	1350	147	2719	1770	186	3467	2	
	5	105	1003	660	140	1476	967	182	2041	1327	229	2696	1748	283	3442	2	
	10	135	977	635	177	1446	936	227	2009	1289	283	2659	1712	346	3402	2	
	15	155	953	610	202	1418	905	257	1976	1250	318	2623	1675	385	3363	2	
20	0	0	1756	930	0	2637	1350	0	3701	1900	0	4948	2520	0	6376	3	
	2	59	1150	755	81	1694	1100	107	2343	1520	139	3097	2000	175	3955	2	
	5	101	1133	738	135	1674	1079	174	2320	1498	219	3071	1978	270	3926	2	
	10	130	1105	710	172	1641	1045	220	2282	1460	273	3029	1940	334	3880	2	
	15	150	1078	688	195	1609	1018	248	2245	1425	306	2988	1910	372	3835	2	
	20	167	1052	665	217	1578	990	273	2210	1390	335	2948	1880	404	3791	2	
30	0	0	1977	1060	0	3004	1550	0	4252	2170	0	5725	2920	0	7420	3	
	2	54	1351	865	74	2004	1310	98	2786	1800	127	3696	2380	159	4734	3	
	5	96	1332	851	127	1981	1289	164	2759	1775	206	3666	2350	252	4701	3	
	10	125	1301	829	164	1944	1254	209	2716	1733	259	3617	2300	316	4647	2	
	15	143	1272	807	187	1908	1220	237	2674	1692	292	3570	2250	354	4594	2	
	20	160	1243	784	207	1873	1185	260	2633	1650	319	3523	2200	384	4542	2	
	30	195	1189	745	246	1807	1130	305	2555	1585	369	3433	2130	440	4442	2	
50	0	0	2231	1195	0	3441	1825	0	4934	2550	0	6711	3440	0	8774	4	
	2	41	1620	1010	66	2431	1513	86	3409	2125	113	4554	2840	141	5864	3	
	5	90	1600	996	118	2406	1495	151	3380	2102	191	4520	2813	234	5826	3	
	10	118	1567	972	154	2366	1466	196	3332	2064	243	4464	2767	295	5763	3	
	15	136	1536	948	177	2327	1437	222	3285	2026	274	4409	2721	330	5701	3	
	20	151	1505	924	195	2288	1408	244	3239	1987	300	4356	2675	361	5641	3	
	30	183	1446	876	232	2214	1349	287	3150	1910	347	4253	2631	412	5523	3	
100	0	0	2491	1310	0	3925	2050	0	5729	2950	0	7914	4050	0	10,485	5	
	2	30	1975	1170	44	3027	1820	72	4313	2550	95	5834	3500	120	7591	4	
	5	82	1955	1159	107	3002	1803	136	4282	2531	172	5797	3475	208	7548	4	
	10	108	1923	1142	142	2961	1775	180	4231	2500	223	5737	3434	268	7478	4	
	15	126	1892	1124	163	2920	1747	206	4182	2469	252	5678	3392	304	7409	4	
	20	141	1861	1107	181	2880	1719	226	4133	2438	277	5619	3351	330	7341	4	
	30	170	1802	1071	215	2803	1663	265	4037	2375	319	5505	3267	378	7209	4	
	50	241	1688	1000	292	2657	1550	350	3856	2250	415	5289	3100	486	6956	4	

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

NA: Not ~~applicable~~ allowed .

Table 13.1(c) Type B Double-Wall Vent

											Numl								
											Appliance								
		Vent Diameter —																	
		3			4			5			6			7					
		Appliance Input Rating in Thous																	
Height *H* (ft)	Lateral *L* (ft)	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NA			
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Ma			
6	0	38	77	45	59	151	85	85	249	140	126	373	204	165	522	28			
	2	39	51	36	60	96	66	85	156	104	123	231	156	159	320	21			
	4	NA	NA	33	74	92	63	102	152	102	146	225	152	187	313	20			
	6	NA	NA	31	83	89	60	114	147	99	163	220	148	207	307	20			
8	0	37	83	50	58	164	93	83	273	154	123	412	234	161	580	31			
	2	39	56	39	59	108	75	83	176	119	121	261	179	155	363	24			
	5	NA	NA	37	77	102	69	107	168	114	151	252	171	193	352	23			
	8	NA	NA	33	90	95	64	122	161	107	175	243	163	223	342	22			
10	0	37	87	53	57	174	99	82	293	165	120	444	254	158	628	34			
	2	39	61	41	59	117	80	82	193	128	119	287	194	153	400	27			
	5	52	56	39	76	111	76	105	185	122	148	277	186	190	388	26			
	10	NA	NA	34	97	100	68	132	171	112	188	261	171	237	369	24			
15	0	36	93	57	56	190	111	80	325	186	116	499	283	153	713	38			
	2	38	69	47	57	136	93	80	225	149	115	337	224	148	473	31			
	5	51	63	44	75	128	86	102	216	140	144	326	217	182	459	29			
	10	NA	NA	39	95	116	79	128	201	131	182	308	203	228	438	28			
	15	NA	NA	NA	NA	NA	72	158	186	124	220	290	192	272	418	26			
20	0	35	96	60	54	200	118	78	346	201	114	537	306	149	772	42			
	2	37	74	50	56	148	99	78	248	165	113	375	248	144	528	34			
	5	50	68	47	73	140	94	100	239	158	141	363	239	178	514	33			
	10	NA	NA	41	93	129	86	125	223	146	177	344	224	222	491	31			
	15	NA	NA	NA	NA	NA	80	155	208	136	216	325	210	264	469	30			
	20	NA	NA	NA	NA	NA	NA	186	192	126	254	306	196	309	448	28			
30	0	34	99	63	53	211	127	76	372	219	110	584	334	144	849	47			
	2	37	80	56	55	164	111	76	281	183	109	429	279	139	610	39			
	5	49	74	52	72	157	106	98	271	173	136	417	271	171	595	38			
	10	NA	NA	NA	91	144	98	122	255	168	171	397	257	213	570	36			
	15	NA	NA	NA	115	131	NA	151	239	157	208	377	242	255	547	34			
	20	NA	NA	NA	NA	NA	NA	181	223	NA	246	357	228	298	524	33			
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	389	477	30			
50	0	33	99	66	51	213	133	73	394	230	105	629	361	138	928	51			
	2	36	84	61	53	181	121	73	318	205	104	495	312	133	712	44			

												Numl							
												Appliance							
		Vent Diameter —																	
		3			4			5			6			7					
		Appliance Input Rating in Thous																	
Height H (ft)	Lateral L (ft)	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NA			
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Ma			
	5	48	80	NA	70	174	117	94	308	198	131	482	305	164	696	43			
	10	NA	NA	NA	89	160	NA	118	292	186	162	461	292	203	671	42			
	15	NA	NA	NA	112	148	NA	145	275	174	199	441	280	244	646	40			
	20	NA	NA	NA	NA	NA	NA	176	257	NA	236	420	267	285	622	38			
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	315	376	NA	373	573	N/			
100	0	NA	NA	NA	49	214	NA	69	403	NA	100	659	395	131	991	55			
	2	NA	NA	NA	51	192	NA	70	351	NA	98	563	373	125	828	50			
	5	NA	NA	NA	67	186	NA	90	342	NA	125	551	366	156	813	50			
	10	NA	NA	NA	85	175	NA	113	324	NA	153	532	354	191	789	48			
	15	NA	NA	NA	132	162	NA	138	310	NA	188	511	343	230	764	47			
	20	NA	NA	NA	NA	NA	NA	168	295	NA	224	487	NA	270	739	45			
	30	NA	NA	NA	NA	NA	NA	231	264	NA	301	448	NA	355	685	N/			
	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	540	584	N/			

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

NA: Not ~~applicable~~ allowed .

Table 13.1(d) Masonry Chimney

												Numl							
												Appliance							
		Type B Double-Wall Connecto To be used with chimney areas withi																	
		3			4			5			6			7					
		Appliance Input Rating in Thous																	
Height H (ft)	Lateral L (ft)	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NA			
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Ma			
6	2	NA	NA	28	NA	NA	52	NA	NA	86	NA	NA	130	NA	NA	18			
	5	NA	NA	25	NA	NA	49	NA	NA	82	NA	NA	117	NA	NA	16			
8	2	NA	NA	29	NA	NA	55	NA	NA	93	NA	NA	145	NA	NA	19			
	5	NA	NA	26	NA	NA	52	NA	NA	88	NA	NA	134	NA	NA	18			
	8	NA	NA	24	NA	NA	48	NA	NA	83	NA	NA	127	NA	NA	17			
10	2	NA	NA	31	NA	NA	61	NA	NA	103	NA	NA	162	NA	NA	22			
	5	NA	NA	28	NA	NA	57	NA	NA	96	NA	NA	148	NA	NA	20			

												Numl								
												Appliance								
		Type B Double-Wall Connecto To be used with chimney areas withi																		
		3			4			5			6			7						
		Appliance Input Rating in Thous																		
Height H (ft)	Lateral L (ft)	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NA				
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Ma				
	10	NA	NA	25	NA	NA	50	NA	NA	87	NA	NA	139	NA	NA	19				
15	2	NA	NA	35	NA	NA	67	NA	NA	114	NA	NA	179	53	475	25(				
	5	NA	NA	35	NA	NA	62	NA	NA	107	NA	NA	164	NA	NA	23				
	10	NA	NA	28	NA	NA	55	NA	NA	97	NA	NA	153	NA	NA	21(				
	15	NA	NA	NA	NA	NA	48	NA	NA	89	NA	NA	141	NA	NA	20				
20	2	NA	NA	38	NA	NA	74	NA	NA	124	NA	NA	201	51	522	27				
	5	NA	NA	36	NA	NA	68	NA	NA	116	NA	NA	184	80	503	25				
	10	NA	NA	NA	NA	NA	60	NA	NA	107	NA	NA	172	NA	NA	23				
	15	NA	NA	NA	NA	NA	NA	NA	NA	97	NA	NA	159	NA	NA	22(				
	20	NA	NA	NA	NA	NA	NA	NA	NA	83	NA	NA	148	NA	NA	20(				
30	2	NA	NA	41	NA	NA	82	NA	NA	137	NA	NA	216	47	581	30				
	5	NA	NA	NA	NA	NA	76	NA	NA	128	NA	NA	198	75	561	28				
	10	NA	NA	NA	NA	NA	67	NA	NA	115	NA	NA	184	NA	NA	26				
	15	NA	NA	NA	NA	NA	NA	NA	NA	107	NA	NA	171	NA	NA	24				
	20	NA	NA	NA	NA	NA	NA	NA	NA	91	NA	NA	159	NA	NA	22				
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	18				
50	2	NA	NA	NA	NA	NA	92	NA	NA	161	NA	NA	251	NA	NA	35				
	5	NA	NA	NA	NA	NA	NA	NA	NA	151	NA	NA	230	NA	NA	32				
	10	NA	NA	NA	NA	NA	NA	NA	NA	138	NA	NA	215	NA	NA	30				
	15	NA	NA	NA	NA	NA	NA	NA	NA	127	NA	NA	199	NA	NA	28				
	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	185	NA	NA	26				
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				
Minimum internal area of chimney (in.^{2})		12			19			28			38			50						
Maximum internal area of chimney (in.^{2})		Seven times the listed appliance categorized vent area																		

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

NA: Not ~~applicable~~ allowed .

Table 13.1(e) Masonry Chimney

												Numl								
												Appliance								
		Single-Wall Metal Connector																		
		To be used with chimney areas withi																		
		3			4			5			6			7						
		Appliance Input Rating in Thous																		
Height H (ft)	Lateral L (ft)	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NA				
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Ma				
6	2	NA	NA	28	NA	NA	52	NA	NA	86	NA	NA	130	NA	NA	18(				
	5	NA	NA	25	NA	NA	48	NA	NA	81	NA	NA	116	NA	NA	16-				
8	2	NA	NA	29	NA	NA	55	NA	NA	93	NA	NA	145	NA	NA	19				
	5	NA	NA	26	NA	NA	51	NA	NA	87	NA	NA	133	NA	NA	18				
	8	NA	NA	23	NA	NA	47	NA	NA	82	NA	NA	126	NA	NA	17-				
10	2	NA	NA	31	NA	NA	61	NA	NA	102	NA	NA	161	NA	NA	22(				
	5	NA	NA	28	NA	NA	56	NA	NA	95	NA	NA	147	NA	NA	20				
	10	NA	NA	24	NA	NA	49	NA	NA	86	NA	NA	137	NA	NA	18				
15	2	NA	NA	35	NA	NA	67	NA	NA	113	NA	NA	178	166	473	24				
	5	NA	NA	32	NA	NA	61	NA	NA	106	NA	NA	163	NA	NA	23(				
	10	NA	NA	27	NA	NA	54	NA	NA	96	NA	NA	151	NA	NA	21-				
	15	NA	NA	NA	NA	NA	46	NA	NA	87	NA	NA	138	NA	NA	19				
20	2	NA	NA	38	NA	NA	73	NA	NA	123	NA	NA	200	163	520	27				
	5	NA	NA	35	NA	NA	67	NA	NA	115	NA	NA	183	NA	NA	25				
	10	NA	NA	NA	NA	NA	59	NA	NA	105	NA	NA	170	NA	NA	23				
	15	NA	NA	NA	NA	NA	NA	NA	NA	95	NA	NA	156	NA	NA	21				
	20	NA	NA	NA	NA	NA	NA	NA	NA	80	NA	NA	144	NA	NA	20				
30	2	NA	NA	41	NA	NA	81	NA	NA	136	NA	NA	215	158	578	30				
	5	NA	NA	NA	NA	NA	75	NA	NA	127	NA	NA	196	NA	NA	27				
	10	NA	NA	NA	NA	NA	66	NA	NA	113	NA	NA	182	NA	NA	26(				
	15	NA	NA	NA	NA	NA	NA	NA	NA	105	NA	NA	168	NA	NA	24(				
	20	NA	NA	NA	NA	NA	NA	NA	NA	88	NA	NA	155	NA	NA	22				
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	18				
50	2	NA	NA	NA	NA	NA	91	NA	NA	160	NA	NA	250	NA	NA	35(				
	5	NA	NA	NA	NA	NA	NA	NA	NA	149	NA	NA	228	NA	NA	32				
	10	NA	NA	NA	NA	NA	NA	NA	NA	136	NA	NA	212	NA	NA	30				
	15	NA	NA	NA	NA	NA	NA	NA	NA	124	NA	NA	195	NA	NA	27				
	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	180	NA	NA	25				
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA				
Minimum internal area of chimney (in.^{2})		12			19			28			38			50						

																					Numl	
																					Appliance	
		Single-Wall Metal Connector																				
		To be used with chimney areas withi																				
		3			4			5			6			7								
		Appliance Input Rating in Thous																				
Height H (ft)	Lateral L (ft)	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NA						
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Ma						
Maximum internal area of chimney (in.^{2})		Seven times the listed appliance categorized vent area																				

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

NA: Not ~~applicable~~ allowed .

Table 13.1(f) Single-Wall Metal Pipe or Type B Asbestos Cement Vent

				Number of Appliances:	Single				
				Appliance Type:	Draft Hood–Equipped				
				Appliance Vent Connection:	Connected Directly to Pipe or Vent				
		Diameter — *D* (in.)							
		To be used with chimney areas within the size limits at bottom							
Height H (ft)	Lateral L (ft)	3	4	5	6	7	8	10	12
		Appliance Input Rating in Thousands of Btu per Hour							
		Maximum Appliance Input Rating in Thousands of Btu per Hour							
6	0	39	70	116	170	232	312	500	750
	2	31	55	94	141	194	260	415	620
	5	28	51	88	128	177	242	390	600
8	0	42	76	126	185	252	340	542	815
	2	32	61	102	154	210	284	451	680
	5	29	56	95	141	194	264	430	648
	10	24	49	86	131	180	250	406	625
10	0	45	84	138	202	279	372	606	912
	2	35	67	111	168	233	311	505	760
	5	32	61	104	153	215	289	480	724
	10	27	54	94	143	200	274	455	700
	15	NA	46	84	130	186	258	432	666
15	0	49	91	151	223	312	420	684	1040
	2	39	72	122	186	260	350	570	865
	5	35	67	110	170	240	325	540	825
	10	30	58	103	158	223	308	514	795
	15	NA	50	93	144	207	291	488	760

				Number of Appliances:			Single		
				Appliance Type:			Draft Hood–Equipped		
				Appliance Vent Connection:			Connected Directly to Pipe or Vent		
		Diameter — *D* (in.) To be used with chimney areas within the size limits at bottom							
Height *H* (ft)	Lateral *L* (ft)	3	4	5	6	7	8	10	12
		Appliance Input Rating in Thousands of Btu per Hour							
		Maximum Appliance Input Rating in Thousands of Btu per Hour							
	20	NA	NA	82	132	195	273	466	726
20	0	53	101	163	252	342	470	770	1190
	2	42	80	136	210	286	392	641	990
	5	38	74	123	192	264	364	610	945
	10	32	65	115	178	246	345	571	910
	15	NA	55	104	163	228	326	550	870
	20	NA	NA	91	149	214	306	525	832
30	0	56	108	183	276	384	529	878	1370
	2	44	84	148	230	320	441	730	1140
	5	NA	78	137	210	296	410	694	1080
	10	NA	68	125	196	274	388	656	1050
	15	NA	NA	113	177	258	366	625	1000
	20	NA	NA	99	163	240	344	596	960
	30	NA	NA	NA	NA	192	295	540	890
50	0	NA	120	210	310	443	590	980	1550
	2	NA	95	171	260	370	492	820	1290
	5	NA	NA	159	234	342	474	780	1230
	10	NA	NA	146	221	318	456	730	1190
	15	NA	NA	NA	200	292	407	705	1130
	20	NA	NA	NA	185	276	384	670	1080
	30	NA	NA	NA	NA	222	330	605	1010

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

NA: Not ~~applicable~~ allowed .

Table 13.1(g) Exterior Masonry Chimney

	Number of Appliances:	**Single**
	Appliance Type:	**NAT**
	Appliance Vent Connection:	**Type B Double-Wall Connector**

Minimum Allowable Input Rating of Space-Heating Appliance in Thousands of Btu per Hour

Vent Height *H* (ft)	**Internal Area of Chimney (in.^{2})**							
	12	**19**	**28**	**38**	**50**	**63**	**78**	**113**
	Local 99% winter design temperature: 37°F or greater							
6	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	NA	0	0	0	0	0	0	0
20	NA	NA	123	190	249	184	0	0
30	NA	NA	NA	NA	NA	393	334	0
50	NA	NA	NA	NA	NA	NA	NA	579
	Local 99% winter design temperature: 27°F to 36°F							
6	0	0	68	116	156	180	212	266
8	0	0	82	127	167	187	214	263
10	0	51	97	141	183	201	225	265
15	NA	NA	NA	NA	233	253	274	305
20	NA	NA	NA	NA	NA	307	330	362
30	NA	NA	NA	NA	NA	419	445	485
50	NA	NA	NA	NA	NA	NA	NA	763
	Local 99% winter design temperature: 17°F to 26°F							
6	NA	NA	NA	NA	NA	215	259	349
8	NA	NA	NA	NA	197	226	264	352
10	NA	NA	NA	NA	214	245	278	358
15	NA	NA	NA	NA	NA	296	331	398
20	NA	NA	NA	NA	NA	352	387	457
30	NA	NA	NA	NA	NA	NA	507	581
50	NA	NA	NA	NA	NA	NA	NA	NA
	Local 99% winter design temperature: 5°F to 16°F							
6	NA	NA	NA	NA	NA	NA	NA	416
8	NA	NA	NA	NA	NA	NA	312	423
10	NA	NA	NA	NA	NA	289	331	430
15	NA	NA	NA	NA	NA	NA	393	485
20	NA	NA	NA	NA	NA	NA	450	547
30	NA	NA	NA	NA	NA	NA	NA	682
50	NA	NA	NA	NA	NA	NA	NA	972
	Local 99% winter design temperature: −10°F to 4°F							
6	NA	NA	NA	NA	NA	NA	NA	484
8	NA	NA	NA	NA	NA	NA	NA	494

	Number of Appliances:	Single
	Appliance Type:	NAT
	Appliance Vent Connection:	Type B Double-Wall Connector

Minimum Allowable Input Rating of Space-Heating Appliance in Thousands of Btu per Hour

Vent Height *H* (ft)	Internal Area of Chimney (in.^{2})							
	12	19	28	38	50	63	78	113
10	NA	NA	NA	NA	NA	NA	NA	513
15	NA	NA	NA	NA	NA	NA	NA	586
20	NA	NA	NA	NA	NA	NA	NA	650
30	NA	NA	NA	NA	NA	NA	NA	805
50	NA	NA	NA	NA	NA	NA	NA	1003
	Local 99% winter design temperature: −11°F or lower Not recommended for any vent configurations							

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, °C = (°F - 32)/1.8.

Note: See Figure F.2.4 for a map showing local 99 percent winter design temperatures in the United States.

NA: Not ~~applicable~~ allowed .

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 24 15:48:26 EDT 2024

Committee Statement

Committee Statement: The note is changing from not applicable to not allowed because the venting conditions that are specified in the tables would create unsafe venting conditions and are therefore not allowed rather than not applicable.

Response Message: FR-61-NFPA 54-2024

First Revision No. 62-NFPA 54-2024 [Section No. 13.2 [Excluding any Sub-Sections]]

This section shall apply where Table 13.2(a) through Table 13.2(j) are used to size multiple appliance venting systems. Subsections 13.2.1 through 13.2.30 apply to Table 13.2(a) through Table 13.2(j).

Table 13.2(a) Type B Double-Wall Vent

										Numbe
										Appliance V

Vent Connector Capacity

Vent Height *H* (ft)	Connector Rise *R* (ft)	Type B Double-Wall Vent and Connecto													
		3			4			5			6			7	
		Appliance Input Rating Limits in Thousa													
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN	
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max
6	1	22	37	26	35	66	46	46	106	72	58	164	104	77	225
	2	23	41	31	37	75	55	48	121	86	60	183	124	79	253
	3	24	44	35	38	81	62	49	132	96	62	199	139	82	275
8	1	22	40	27	35	72	48	49	114	76	64	176	109	84	243
	2	23	44	32	36	80	57	51	128	90	66	195	129	86	269
	3	24	47	36	37	87	64	53	139	101	67	210	145	88	290
10	1	22	43	28	34	78	50	49	123	78	65	189	113	89	257
	2	23	47	33	36	86	59	51	136	93	67	206	134	91	282
	3	24	50	37	37	92	67	52	146	104	69	220	150	94	303
15	1	21	50	30	33	89	53	47	142	83	64	220	120	88	298
	2	22	53	35	35	96	63	49	153	99	66	235	142	91	320
	3	24	55	40	36	102	71	51	163	111	68	248	160	93	339
20	1	21	54	31	33	99	56	46	157	87	62	246	125	86	334
	2	22	57	37	34	105	66	48	167	104	64	259	149	89	354
	3	23	60	42	35	110	74	50	176	116	66	271	168	91	371
30	1	20	62	33	31	113	59	45	181	93	60	288	134	83	391
	2	21	64	39	33	118	70	47	190	110	62	299	158	85	408
	3	22	66	44	34	123	79	48	198	124	64	309	178	88	423
50	1	19	71	36	30	133	64	43	216	101	57	349	145	78	477
	2	21	73	43	32	137	76	45	223	119	59	358	172	81	490
	3	22	75	48	33	141	86	46	229	134	61	366	194	83	502
100	1	18	82	37	28	158	66	40	262	104	53	442	150	73	611
	2	19	83	44	30	161	79	42	267	123	55	447	178	75	619
	3	20	84	50	31	163	89	44	272	138	57	452	200	78	627

Common Vent Capacity

Vent Height *H* (ft)	Type B Double-Wall Common Vent Diam												
	4			5			6			7			
	Combined Appliance Input Rating in Thousand												
	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FA +FA
6	92	81	65	140	116	103	204	161	147	309	248	200	404
8	101	90	73	155	129	114	224	178	163	339	275	223	444
10	110	97	79	169	141	124	243	194	178	367	299	242	477
15	125	112	91	195	164	144	283	228	206	427	352	280	556
20	136	123	102	215	183	160	314	255	229	475	394	310	621
30	152	138	118	244	210	185	361	297	266	547	459	360	720
50	167	153	134	279	244	214	421	353	310	641	547	423	854
100	175	163	NA	311	277	NA	489	421	NA	751	658	479	102

Table 13.2(b) ***Continued***

	Number of Appliances:
	Appliance Type:
	Appliance Vent Connection:

Vent Connector Capacity

Vent Height *H* (ft)	Connector Rise *R* (ft)	Type B Double-Wall Vent and Connector Diame														
		12			14			16			18			20		
		Appliance Input Rating Limits in Thousands of														
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	
6	2	174	764	496	223	1046	653	281	1371	853	346	1772	1080	NA	NA	
	4	180	897	616	230	1231	827	287	1617	1081	352	2069	1370	NA	NA	
	6	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	
	4	192	952	644	244	1307	884	305	1719	1150	372	2211	1460	471	2737	
	6	198	1050	772	252	1445	1072	313	1902	1390	380	2434	1770	478	3018	
10	2	196	870	536	249	1195	730	311	1570	955	379	2049	1205	NA	NA	
	4	201	997	664	256	1371	924	318	1804	1205	387	2332	1535	486	2887	
	6	207	1095	792	263	1509	1118	325	1989	1455	395	2556	1865	494	3169	
15	2	214	967	568	272	1334	790	336	1760	1030	408	2317	1305	NA	NA	
	4	221	1085	712	279	1499	1006	344	1978	1320	416	2579	1665	523	3197	
	6	228	1181	856	286	1632	1222	351	2157	1610	424	2796	2025	533	3470	
20	2	223	1051	596	291	1443	840	357	1911	1095	430	2533	1385	NA	NA	
	4	230	1162	748	298	1597	1064	365	2116	1395	438	2778	1765	554	3447	
	6	237	1253	900	307	1726	1288	373	2287	1695	450	2984	2145	567	3708	
30	2	216	1217	632	286	1664	910	367	2183	1190	461	2891	1540	NA	NA	
	4	223	1316	792	294	1802	1160	376	2366	1510	474	3110	1920	619	3840	

	Number of Appliances:
	Appliance Type:
	Appliance Vent Connection:

Vent Connector Capacity

		Type B Double-Wall Vent and Connector Diame														
		12			14			16			18			20		
Vent Height *H* (ft)	Connector Rise *R* (ft)	Appliance Input Rating Limits in Thousands of														
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	
	6	231	1400	952	303	1920	1410	384	2524	1830	485	3299	2340	632	4080	
50	2	206	1479	689	273	2023	1007	350	2659	1315	435	3548	1665	NA	NA	
	4	213	1561	860	281	2139	1291	359	2814	1685	447	3730	2135	580	4601	
	6	221	1631	1031	290	2242	1575	369	2951	2055	461	3893	2605	594	4808	
100	2	192	1923	712	254	2644	1050	326	3490	1370	402	4707	1740	NA	NA	
	4	200	1984	888	263	2731	1346	336	3606	1760	414	4842	2220	523	5982	
	6	208	2035	1064	272	2811	1642	346	3714	2150	426	4968	2700	539	6143	

Common Vent Capacity

	Type B Double-Wall Common Vent Diam												
	12			14			16			18			
Vent Height *H* (ft)	Combined Appliance Input Rating in Thousan												
	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FA +FA
6	900	696	588	1284	990	815	1735	1336	1065	2253	1732	1345	283
8	994	773	652	1423	1103	912	1927	1491	1190	2507	1936	1510	316
10	1076	841	712	1542	1200	995	2093	1625	1300	2727	2113	1645	344
15	1247	986	825	1794	1410	1158	2440	1910	1510	3184	2484	1910	402
20	1405	1116	916	2006	1588	1290	2722	2147	1690	3561	2798	2140	454
30	1658	1327	1025	2373	1892	1525	3220	2558	1990	4197	3326	2520	530
50	2024	1640	1280	2911	2347	1863	3964	3183	2430	5184	4149	3075	656
100	2569	2131	1670	3732	3076	2450	5125	4202	3200	6749	5509	4050	859

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.

NA: Not allowed.

Table 13.2(c) Type B Double-Wall Vent

-	-	-	-	-	-	-	-	-	-	-	-	-	-	N
	-					-						-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	Applia

Vent Connector Capacity

Vent Height *H* (ft)	Connector Rise *R* (ft)	Single-Wall Metal Vent Connector D													
		3			4			5			6			7	
		Appliance Input Rating Limits in Thous													
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN	
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max
6	1	NA	NA	26	NA	NA	46	NA	NA	71	NA	NA	102	207	223
	2	NA	NA	31	NA	NA	55	NA	NA	85	168	182	123	215	251
	3	NA	NA	34	NA	NA	62	121	131	95	175	198	138	222	273
8	1	NA	NA	27	NA	NA	48	NA	NA	75	NA	NA	106	226	240
	2	NA	NA	32	NA	NA	57	125	126	89	184	193	127	234	266
	3	NA	NA	35	NA	NA	64	130	138	100	191	208	144	241	287
10	1	NA	NA	28	NA	NA	50	119	121	77	182	186	110	240	253
	2	NA	NA	33	84	85	59	124	134	91	189	203	132	248	278
	3	NA	NA	36	89	91	67	129	144	102	197	217	148	257	299
15	1	NA	NA	29	79	87	52	116	138	81	177	214	116	238	291
	2	NA	NA	34	83	94	62	121	150	97	185	230	138	246	314
	3	NA	NA	39	87	100	70	127	160	109	193	243	157	255	333
20	1	49	56	30	78	97	54	115	152	84	175	238	120	233	325
	2	52	59	36	82	103	64	120	163	101	182	252	144	243	346
	3	55	62	40	87	107	72	125	172	113	190	264	164	252	363
30	1	47	60	31	77	110	57	112	175	89	169	278	129	226	380
	2	51	62	37	81	115	67	117	185	106	177	290	152	236	397
	3	54	64	42	85	119	76	122	193	120	185	300	172	244	412
50	1	46	69	34	75	128	60	109	207	96	162	336	137	217	460
	2	49	71	40	79	132	72	114	215	113	170	345	164	226	473
	3	52	72	45	83	136	82	119	221	123	178	353	186	235	486
100	1	45	79	34	71	150	61	104	249	98	153	424	140	205	585
	2	48	80	41	75	153	73	110	255	115	160	428	167	212	593
	3	51	81	46	79	157	85	114	260	129	168	433	190	222	603

Common Vent Capacity

-	Type B Double-Wall Vent Diameter –												
-	4			5			6			7			
Vent Height *H* (ft)	Combined Appliance Input Rating in Thousan												
	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FA +FA
6	NA	78	64	NA	113	99	200	158	144	304	244	196	398
8	NA	87	71	NA	126	111	218	173	159	331	269	218	436
10	NA	94	76	163	137	120	237	189	174	357	292	236	467

Common Vent Capacity

	Type B Double-Wall Vent Diameter –												
	4			5			6			7			
Vent Height *H* (ft)	Combined Appliance Input Rating in Thousan												
	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FA +FA
15	121	108	88	189	159	140	275	221	200	416	343	274	544
20	131	118	98	208	177	156	305	247	223	463	383	302	606
30	145	132	113	236	202	180	350	286	257	533	446	349	703
50	159	145	128	268	233	208	406	337	296	622	529	410	833
100	166	153	NA	297	263	NA	469	398	NA	726	633	464	999

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.

NA: Not allowed.

Table 13.2(d) Masonry Chimney

	N
	Applia

Vent Connector Capacity

		Type B Double-Wall Vent Connector I														
		3			4			5			6			7		
Vent Height *H* (ft)	Connector Rise *R* (ft)	Appliance Input Rating Limits in Thousa														
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	
6	1	24	33	21	39	62	40	52	106	67	65	194	101	87	274	
	2	26	43	28	41	79	52	53	133	85	67	230	124	89	324	
	3	27	49	34	42	92	61	55	155	97	69	262	143	91	369	
8	1	24	39	22	39	72	41	55	117	69	71	213	105	94	304	
	2	26	47	29	40	87	53	57	140	86	73	246	127	97	350	
	3	27	52	34	42	97	62	59	159	98	75	269	145	99	383	
10	1	24	42	22	38	80	42	55	130	71	74	232	108	101	324	
	2	26	50	29	40	93	54	57	153	87	76	261	129	103	366	
	3	27	55	35	41	105	63	58	170	100	78	284	148	106	397	
15	1	24	48	23	38	93	44	54	154	74	72	277	114	100	384	
	2	25	55	31	39	105	55	56	174	89	74	299	134	103	419	
	3	26	59	35	41	115	64	57	189	102	76	319	153	105	448	
20	1	24	52	24	37	102	46	53	172	77	71	313	119	98	437	
	2	25	58	31	39	114	56	55	190	91	73	335	138	101	467	
	3	26	63	35	40	123	65	57	204	104	75	353	157	104	493	
30	1	24	54	25	37	111	48	52	192	82	69	357	127	96	504	
	2	25	60	32	38	122	58	54	208	95	72	376	145	99	531	

-	-	-	-	-	-	-	-	-	-	-	-	-	-	N
	-						-						-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	Applia

Vent Connector Capacity

-	-	Type B Double-Wall Vent Connector I														
-	-	3			4			5			6			7	
Vent Height *H* (ft)	**Connector Rise *R* (ft)**	Appliance Input Rating Limits in Thous													
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN	
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max
	3	26	64	36	40	131	66	56	221	107	74	392	163	101	554
50	1	23	51	25	36	116	51	51	209	89	67	405	143	92	582
	2	24	59	32	37	127	61	53	225	102	70	421	161	95	604
	3	26	64	36	39	135	69	55	237	115	72	435	180	98	624
100	1	23	46	24	35	108	50	49	208	92	65	428	155	88	640
	2	24	53	31	37	120	60	51	224	105	67	444	174	92	660
	3	25	59	35	38	130	68	53	237	118	69	458	193	94	679

Common Vent Capacity

-	Minimum Internal Area of Maso												
-	12			19			28			38			
Vent Height *H* (ft)	Combined Appliance Input Rating in												
	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FA +FA
6	NA	74	25	NA	119	46	NA	178	71	NA	257	103	NA
8	NA	80	28	NA	130	53	NA	193	82	NA	279	119	NA
10	NA	84	31	NA	138	56	NA	207	90	NA	299	131	NA
15	NA	NA	36	NA	152	67	NA	233	106	NA	334	152	523
20	NA	NA	41	NA	NA	75	NA	250	122	NA	368	172	565
30	NA	NA	NA	NA	NA	NA	NA	270	137	NA	404	198	615
50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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.

NA: Not allowed.

Table 13.2(e) Masonry Chimney

Vent Connector Capacity

Vent Height H (ft)	Connector Rise R (ft)	Single-Wall Metal Vent Connector: 3 — Appliance Input Rating Limits in Thou: FAN Min	FAN Max	NAT Max	4: FAN Min	FAN Max	NAT Max	5: FAN Min	FAN Max	NAT Max	6: FAN Min	FAN Max	NAT Max	FAN Min
6	1	NA	NA	21	NA	NA	39	NA	NA	66	179	191	100	231
	2	NA	NA	28	NA	NA	52	NA	NA	84	186	227	123	239
	3	NA	NA	34	NA	NA	61	134	153	97	193	258	142	247
8	1	NA	NA	21	NA	NA	40	NA	NA	68	195	208	103	250
	2	NA	NA	28	NA	NA	52	137	139	85	202	240	125	258
	3	NA	NA	34	NA	NA	62	143	156	98	210	264	145	266
10	1	NA	NA	22	NA	NA	41	130	151	70	202	225	106	267
	2	NA	NA	29	NA	NA	53	136	150	86	210	255	128	276
	3	NA	NA	34	97	102	62	143	166	99	217	277	147	284
15	1	NA	NA	23	NA	NA	43	129	151	73	199	271	112	268
	2	NA	NA	30	92	103	54	135	170	88	207	295	132	277
	3	NA	NA	34	96	112	63	141	185	101	215	315	151	286
20	1	NA	NA	23	87	99	45	128	167	76	197	303	117	265
	2	NA	NA	30	91	111	55	134	185	90	205	325	136	274
	3	NA	NA	35	96	119	64	140	199	103	213	343	154	282
30	1	NA	NA	24	86	108	47	126	187	80	193	347	124	259
	2	NA	NA	31	91	119	57	132	203	93	201	366	142	269
	3	NA	NA	35	95	127	65	138	216	105	209	381	160	277
50	1	NA	NA	24	85	113	50	124	204	87	188	392	139	252
	2	NA	NA	31	89	123	60	130	218	100	196	408	158	262
	3	NA	NA	35	94	131	68	136	231	112	205	422	176	271
100	1	NA	NA	23	84	104	49	122	200	89	182	410	151	243
	2	NA	NA	30	88	115	59	127	215	102	190	425	169	253
	3	NA	NA	34	93	124	67	133	228	115	199	438	188	262

Common Vent Capacity

Vent Height H (ft)	Minimum Internal Area of Maso: 12 — Combined Appliance Input Rating in: FAN +FAN	FAN +NAT	NAT +NAT	19: FAN +FAN	FAN +NAT	NAT +NAT	28: FAN +FAN	FAN +NAT	NAT +NAT	38: FAN +FAN	FAN +NAT	NAT +NAT	FA +FA
6	NA	NA	25	NA	118	45	NA	176	71	NA	255	102	NA
8	NA	NA	28	NA	128	52	NA	190	81	NA	276	118	NA

Common Vent Capacity

	Minimum Internal Area of Maso												
	12			19			28			38			
Vent Height *H* (ft)	Combined Appliance Input Rating in												
	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FA +FA
10	NA	NA	31	NA	136	56	NA	205	89	NA	295	129	NA
15	NA	NA	36	NA	NA	66	NA	230	105	NA	335	150	NA
20	NA	NA	NA	NA	NA	74	NA	247	120	NA	362	170	NA
30	NA	NA	NA	NA	NA	NA	NA	NA	135	NA	398	195	NA
50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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.

NA: Not allowed.

Table 13.2(f) Single-Wall Metal Pipe or Type B Asbestos Cement Vent

Number of Appliances:	Two or More
Appliance Type:	Draft Hood–Equipped
Appliance Vent Connection:	Direct to Pipe or Vent

Vent Connector Capacity

Total Vent Height *H* (ft)	Connector Rise *R* (ft)	Vent Connector Diameter — *D* (in.)					
		3	4	5	6	7	8
		Maximum Appliance Input Rating in Thousands of Btu per Hour					
6–8	1	21	40	68	102	146	205
	2	28	53	86	124	178	235
	3	34	61	98	147	204	275
15	1	23	44	77	117	179	240
	2	30	56	92	134	194	265
	3	35	64	102	155	216	298
30 and up	1	25	49	84	129	190	270
	2	31	58	97	145	211	295
	3	36	68	107	164	232	321

Common Vent Capacity

Total Vent Height *H* (ft)	Common Vent Diameter — *D* (in.)						
	4	5	6	7	8	10	12
	Combined Appliance Input Rating in Thousands of Btu per Hour						
6	48	78	111	155	205	320	NA
8	55	89	128	175	234	365	505
10	59	95	136	190	250	395	560
15	71	115	168	228	305	480	690

Common Vent Capacity							
Total Vent Height *H* (ft)	Common Vent Diameter — *D* (in.)						
	4	5	6	7	8	10	12
	Combined Appliance Input Rating in Thousands of Btu per Hour						
20	80	129	186	260	340	550	790
30	NA	147	215	300	400	650	940
50	NA	NA	NA	360	490	810	1190

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.

Note: See Figure F.1(f) and Section 13.2.

NA: Not allowed.

Table 13.2(g) Exterior Masonry Chimney

	Number of Appliances:	Two or More
	Appliance Type:	NAT + NAT
	Appliance Vent Connection:	Type B Double-Wall Connector

Combined Appliance Maximum Input Rating in Thousands of Btu per Hour								
Vent Height *H* (ft)	Internal Area of Chimney (in.^{2})							
	12	19	28	38	50	63	78	113
6	25	46	71	103	143	188	246	NA
8	28	53	82	119	163	218	278	408
10	31	56	90	131	177	236	302	454
15	NA	67	106	152	212	283	365	546
20	NA	NA	NA	NA	NA	325	419	648
30	NA	NA	NA	NA	NA	NA	496	749
50	NA	NA	NA	NA	NA	NA	NA	922
100	NA	NA	NA	NA	NA	NA	NA	NA

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.

NA: Not allowed.

Table 13.2(h) Exterior Masonry Chimney

	Number of Appliances:	Two or More
	Appliance Type:	NAT + NAT
	Appliance Vent Connection:	Type B Double-Wall Connector

Minimum Allowable Input Rating of Space-Heating Appliance in Thousands of Btu per Hour								
Vent Height *H* (ft)	Internal Area of Chimney (in.^{2})							
	12	19	28	38	50	63	78	113
	Local 99% winter design temperature: 37°F or greater							

	Number of Appliances:	Two or More
	Appliance Type:	NAT + NAT
	Appliance Vent Connection:	Type B Double-Wall Connector

Minimum Allowable Input Rating of Space-Heating Appliance in Thousands of Btu per Hour

Vent Height *H* (ft)	Internal Area of Chimney (in.^{2})							
	12	19	28	38	50	63	78	113
6	0	0	0	0	0	0	0	NA
8	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	NA	0	0	0	0	0	0	0
20	NA	NA	NA	NA	NA	184	0	0
30	NA	NA	NA	NA	NA	393	334	0
50	NA	NA	NA	NA	NA	NA	NA	579
100	NA	NA	NA	NA	NA	NA	NA	NA
	Local 99% winter design temperature: 27°F to 36°F							
6	0	0	68	NA	NA	180	212	NA
8	0	0	82	NA	NA	187	214	263
10	0	51	NA	NA	NA	201	225	265
15	NA	NA	NA	NA	NA	253	274	305
20	NA	NA	NA	NA	NA	307	330	362
30	NA	NA	NA	NA	NA	NA	445	485
50	NA	NA	NA	NA	NA	NA	NA	763
100	NA	NA	NA	NA	NA	NA	NA	NA
	Local 99% winter design temperature: 17°F to 26°F							
6	NA	NA	NA	NA	NA	NA	NA	NA
8	NA	NA	NA	NA	NA	NA	264	352
10	NA	NA	NA	NA	NA	NA	278	358
15	NA	NA	NA	NA	NA	NA	331	398
20	NA	NA	NA	NA	NA	NA	387	457
30	NA	NA	NA	NA	NA	NA	NA	581
50	NA	NA	NA	NA	NA	NA	NA	862
100	NA	NA	NA	NA	NA	NA	NA	NA
	Local 99% winter design temperature: 5°F to 16°F							
6	NA	NA	NA	NA	NA	NA	NA	NA
8	NA	NA	NA	NA	NA	NA	NA	NA
10	NA	NA	NA	NA	NA	NA	NA	430
15	NA	NA	NA	NA	NA	NA	NA	485
20	NA	NA	NA	NA	NA	NA	NA	547
30	NA	NA	NA	NA	NA	NA	NA	682
50	NA	NA	NA	NA	NA	NA	NA	NA
100	NA	NA	NA	NA	NA	NA	NA	NA
	Local 99% winter design temperature: 4°F or lower							

	Number of Appliances:	Two or More
	Appliance Type:	NAT + NAT
	Appliance Vent Connection:	Type B Double-Wall Connector

Minimum Allowable Input Rating of Space-Heating Appliance in Thousands of Btu per Hour

Vent Height *H* (ft)	Internal Area of Chimney (in.^{2})							
	12	19	28	38	50	63	78	113
	Not recommended for any vent configurations							

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, °C = (°F - 32)/1.8.

Note: See Figure F.2.4 for a map showing local 99 percent winter design temperatures in the United States.

NA: Not allowed.

Table 13.2(i) Exterior Masonry Chimney

	Number of Appliances:	Two or More
	Appliance Type:	FAN + NAT
	Appliance Vent Connection:	Type B Double-Wall Connector

Combined Appliance Maximum Input Rating in Thousands of Btu per Hour

Vent Height *H* (ft)	Internal Area of Chimney (in.^{2})							
	12	19	28	38	50	63	78	113
6	74	119	178	257	351	458	582	853
8	80	130	193	279	384	501	636	937
10	84	138	207	299	409	538	686	1010
15	NA	152	233	334	467	611	781	1156
20	NA	NA	250	368	508	668	858	1286
30	NA	NA	NA	404	564	747	969	1473
50	NA	NA	NA	NA	NA	831	1089	1692
100	NA	NA	NA	NA	NA	NA	NA	1921

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.

NA: Not allowed.

Table 13.2(j) Exterior Masonry Chimney

	Number of Appliances:	Two or More
	Appliance Type:	FAN + NAT
	Appliance Vent Connection:	Type B Double-Wall Connector

Minimum Allowable Input Rating of Space-Heating Appliance in Thousands of Btu per Hour

Vent Height *H* (ft)	Internal Area of Chimney (in.^{2})							
	12	19	28	38	50	63	78	113
	Local 99% winter design temperature: 37°F or greater							
6	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
15	NA	0	0	0	0	0	0	0
20	NA	NA	123	190	249	184	0	0
30	NA	NA	NA	334	398	393	334	0
50	NA	NA	NA	NA	NA	714	707	579
100	NA	NA	NA	NA	NA	NA	NA	1600
	Local 99% winter design temperature: 27°F to 36°F							
6	0	0	68	116	156	180	212	266
8	0	0	82	127	167	187	214	263
10	0	51	97	141	183	201	225	265
15	NA	111	142	183	233	253	274	305
20	NA	NA	187	230	284	307	330	362
30	NA	NA	NA	330	319	419	445	485
50	NA	NA	NA	NA	NA	672	705	763
100	NA	NA	NA	NA	NA	NA	NA	1554
	Local 99% winter design temperature: 17°F to 26°F							
6	0	55	99	141	182	215	259	349
8	52	74	111	154	197	226	264	352
10	NA	90	125	169	214	245	278	358
15	NA	NA	167	212	263	296	331	398
20	NA	NA	212	258	316	352	387	457
30	NA	NA	NA	362	429	470	507	581
50	NA	NA	NA	NA	NA	723	766	862
100	NA	NA	NA	NA	NA	NA	NA	1669
	Local 99% winter design temperature: 5°F to 16°F							
6	NA	78	121	166	214	252	301	416
8	NA	94	135	182	230	269	312	423
10	NA	111	149	198	250	289	331	430
15	NA	NA	193	247	305	346	393	485
20	NA	NA	NA	293	360	408	450	547
30	NA	NA	NA	377	450	531	580	682
50	NA	NA	NA	NA	NA	797	853	972
100	NA	NA	NA	NA	NA	NA	NA	1833

	Number of Appliances:	Two or More
	Appliance Type:	FAN + NAT
	Appliance Vent Connection:	Type B Double-Wall Connector

Minimum Allowable Input Rating of Space-Heating Appliance in Thousands of Btu per Hour

Vent Height *H* (ft)	Internal Area of Chimney (in.^{2})							
	12	19	28	38	50	63	78	113
	Local 99% winter design temperature: −10°F to 4°F							
6	NA	NA	145	196	249	296	349	484
8	NA	NA	159	213	269	320	371	494
10	NA	NA	175	231	292	339	397	513
15	NA	NA	NA	283	351	404	457	586
20	NA	NA	NA	333	408	468	528	650
30	NA	NA	NA	NA	NA	603	667	805
50	NA	NA	NA	NA	NA	NA	955	1003
100	NA	NA	NA	NA	NA	NA	NA	NA
	Local 99% winter design temperature: −11°F or lower Not recommended for any vent configurations							

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.

NA: Not allowed.

Note: See Figure F.2.4 for a map showing local 99 percent winter design temperatures in the United States.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 24 15:57:47 EDT 2024

Committee Statement

Committee Statement: The descriptor of NA is being added per the NFPA Manual of Style to specify not allowed because the venting conditions that are specified in the tables would create unsafe venting conditions and are therefore not allowed rather than not applicable.

Response Message: FR-62-NFPA 54-2024

First Revision No. 38-NFPA 54-2024 [Section No. G.3.3]

G.3.3 Piping ~~Support~~ Inspection .

Inspect piping to determine that it is adequately supported, that there is no undue stress on the piping, and ~~if~~ that there are ~~any~~ no improperly capped or uncapped pipe openings.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Thu Sep 19 13:22:49 EDT 2024

Committee Statement

Committee Statement: The title is changing to match the content of the section. Uncapped lines are also of concern for the inspection and are being added here.

Response Message: FR-38-NFPA 54-2024

Public Input No. 1-NFPA 54-2024 [Section No. G.3.3]

First Revision No. 56-NFPA 54-2024 [Section No. K.1.2]

K.1.2 Other Publications.

K.1.2.1 API Publications.

American Petroleum Institute, 200 Massachusetts Avenue NW, Suite 1100, Washington, DC 20001-5571.

API STD 1104, *Welding Pipelines and Related Facilities,* 2021.

K.1.2.2 ASHRAE Publications.

ASHRAE, 180 Technology Parkway, Peachtree Corners, GA 30092. www.ashrae.org

ASHRAE 62.2, *Ventilation and Acceptable Indoor Air Quality in Residential Buildings*, 2022.

ASHRAE Handbook — Fundamentals, 2021.

ASHRAE Handbook — HVAC Systems and Equipment, ~~2020~~ 2024 .

K.1.2.3 ASME Publications.

American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990, (800) 843-2763. www.asme.org

ASME PCC-1, *Guidelines for Pressure Boundary Bolted Flanged Joint Connections*, 2022.

Boiler and Pressure Vessel Code, Section IX and Section IV, ~~2021~~ 2023 .

K.1.2.4 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, (610) 833-9585. www.astm.org

ASTM D2385, *Test Method for Hydrogen Sulfide and Mercaptan Sulfur in Natural Gas (Cadmium Sulfate — Iodometric Titration Method)*, 1981, reaffirmed 1990 (withdrawn 1995).

ASTM D2420, *Test Method of for Hydrogen Sulfide in Liquefied Petroleum (LP) Gases (Lead Acetate Method)*, 2013, reaffirmed 2018.

K.1.2.5 AWS Publications.

American Welding Society, 8669 NW 36 Street, #130, Miami, FL 33166-6672, (800) 443-9353. www.aws.org

AWS B2.1/B2.1M, *Specification for Welding Procedure and Performance Qualification*, 2014.

AWS B2.2/B2.2M, *Specification for Brazing Procedure and Performance Qualification*, 2016.

K.1.2.6 CSA Group Publications.

CSA Group, 178 Rexdale Boulevard, Toronto, ON M9W 1R3, Canada, (216) 524-4990. www.csagroup.org

ANSI Z21.13/CSA 4.9, *Gas-Fired Low Pressure Steam and Hot Water Boilers*, 2017(R2022) .

CSA/ANSI Z21.50/CSA 2.22, *Vented Decorative Gas Appliances*, 2022.

ANSI Z21.60/CSA 2.26, *Decorative Gas Appliances for Installation in Solid-Fuel Burning Fireplaces*, 2017(R2021) .

K.1.2.7 NACE Publications.

NACE International, 15835 Park Ten Place, Houston, TX 77084-4906. www.nace.org

NACE SP0169, *Control of External Corrosion on Underground or Submerged Metallic Piping Systems*, ~~2013~~ 2024 .

K.1.2.8 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096. ~~www.ul.com~~

UL 651, *Schedule 40 and 80, Type EB and A Rigid PVC Conduit and Fittings*, 2011, revised 2022.

UL 795, *Commercial-Industrial Gas Heating Equipment*, ~~2016, revised 2022~~ 2024 .

K.1.2.9 US Government Publications.

US Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001. www.gpo.gov

Responding to Residential Carbon Monoxide Incidents, Guidelines for Fire and Other Emergency Response Personnel, US Consumer Product Safety Commission, July 23, 2002.

K.1.2.10 Other Publications.

Air Conditioning Contractors of America Manual J, Residential Load Calculations, 2016.

Piping Handbook, 2000, New York: McGraw-Hill Book Company.

Project Number 21323, *Validation of Installation Methods for CSST Gas Piping to Mitigate Indirect Lightning Related Damage*, Gas Technology Institute 2015.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 24 11:16:26 EDT 2024

Committee Statement

Committee Statement: Reference standards are updating to the latest revision year.

Response Message: FR-56-NFPA 54-2024

Public Input No. 88-NFPA 54-2024 [Section No. K.1.2.8]

First Revision No. 57-NFPA 54-2024 [Section No. K.2.2]

K.2.2 CSA Group Publications.

CSA Group, 178 Rexdale Boulevard, Toronto, ON M9W 1R3, Canada, (216) 524-4990. www.csagroup.org

ANSI/AGA NGV 3.1/CSA 12.3, *Fuel System Components for Compressed Natural Gas Powered Vehicles*, 2020.

AGA/CSA NGV 1, *Compressed Natural Gas Vehicle (NGV) Fueling Connection Devices*, 2017(R2021) .

CSA/ANSI NGV 2, *Compressed Natural Gas Vehicle Fuel Containers*, ~~2019~~ 2023 .

ANSI/LC 2A, *Direct Gas-Fired Circulating Heaters for Agricultural Animal Confinement Buildings*, 1998, reaffirmed 2020.

ANSI/LC 2, *Direct Gas-Fired Circulating Heaters for Agricultural Animal Confinement Buildings*, 1996, reaffirmed 2020.

ANSI Z21.12, *Draft Hoods*, 1990, reaffirmed 2020.

ANSI Z21.17/CSA 2.7, *Domestic Gas Conversion Burners*, 1998, reaffirmed 2019.

CSA/ANSI Z21.20/CSA C22.2 — No. 60730-2– 5, *Automatic Electrical Controls — Part 2-5: Particular Requirements for Automatic Electrical Burner Control Systems*, 2014, reaffirmed 2022.

CSA/ANSI Z21.21/CSA 6.5, *Automatic Gas Valves for Gas Appliances*, ~~2019~~ 2023 .

CSA/ANSI Z21.23/CSA 6.6, *Gas Appliance Thermostats*, 2022.

ANSI Z21.35/CSA 6.8, *Pilot Gas Filters*, 2005, reaffirmed 2020.

ANSI Z21.40.4/CSA 2.94, *Performance Testing and Rating of Gas-Fired, Air-Conditioning and Heat Pump Appliances*, ~~1996, reaffirmed 2022~~ 2023 .

ANSI Z21.42, *Gas-Fired Illuminating Appliances*, ~~2013, reaffirmed 2018~~ 2024 .

ANSI Z21.57, *Recreational Vehicle Cooking Gas Appliances*, 2010, reaffirmed 2021.

ANSI Z21.58/CSA 1.6, *Outdoor Cooking Gas Appliances*, ~~2018~~ 2022 .

ANSI Z21.61, *Gas-Fired Toilets*, 1993, reaffirmed 2013.

ANSI Z21.66/CSA 6.14, *Automatic Vent Damper Devices for Use with Gas-Fired Appliances*, ~~2015, reaffirmed 2020~~ 2023 .

ANSI Z21.71, *Automatic Intermittent Pilot Ignition Systems for Field Installations*, 1993, reaffirmed 2021.

ANSI Z21.77/CSA 6.23, *Manually-Operated Piezo-Electric Spark Gas Ignition Systems and Components*, 2005, reaffirmed 2020.

ANSI Z21.78/CSA 6.20, *Combination Gas Controls for Gas Appliances*, 2010, reaffirmed 2020.

ANSI Z21.84, *Manually Lighted, Natural Gas Decorative Gas Appliances for Installation in Solid-Fuel Burning Appliances*, 2017, reaffirmed 2021.

ANSI Z21.87/CSA 4.6, *Automatic Gas Shutoff Devices for Hot Water Supply Systems*, 2007, reaffirmed 2021.

ANSI Z21.88/CSA 2.33, *Vented Gas Fireplace Heaters*, 2019.

CSA/ANSI Z21.91, *Ventless Firebox Enclosures for Gas-Fired Unvented Gas Log-Type Room Heaters*, 2020.

CSA/ANSI Z83.21/CSA C 22.2 No.168, *Commercial Dishwashers*, 2020.

Submitter Information Verification

Committee: NFG-AAA

Submittal Date: Tue Sep 24 11:27:43 EDT 2024

Committee Statement

Committee Statement: Reference standards are being updated to the latest editions.

Response Message: FR-57-NFPA 54-2024