

~~2006-2018~~ Arkansas Fuel Gas
Code

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FOREWORD

The Arkansas ~~State~~-Fuel Gas Code has been prepared for the purpose of setting forth minimum uniform standards to be followed by the Arkansas Plumbing Industry.

~~The following regulation is duly adopted and promulgated by the Arkansas State Board of Health.~~

All questions/comments regarding this publication should be directed to the Arkansas Department of Health, ~~and Human Services,~~ Plumbing & Natural Gas Program, Mail Division of Health ~~& Human Services,~~ P.O. Box 1437 Slot-24, Little Rock, Arkansas 72203-1437.

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Chapter 1 SUMMARY

Scope and Administration

101.2.3 Gas utilization appliance. In this and many other sections of this code the word “equipment” has been replaced with the “appliance” or “appliances”.

101.2.4 Systems and equipment outside the scope. “10. Fuel gas piping in power and atomic energy plants” has been added.

102.1 General. Reworded to address code conflicts in favor of specific requirements.

102.8.1 Conflicts and 102.8.2 Provisions in referenced codes and standards. Have been added and were designed to resolve conflicts between this code and other referenced codes and standards in favor of this code edition.

102.10 Other laws. Clause added to avert conflict with other laws.

102.11 Application of references. This addition to gas code states that a general reference to a Chapter Section number or Section shall be viewed as a code reference to the applicable provision referenced.

103.4 Liability. This segment addresses tort immunity for code officials discharging their duties within their jurisdiction and in good faith without malice.

103.4.1 legal defense. No new language was added here, but a subdivision was added to 103.4 Liability.

104.1 General. Minor grammatical change.

105.2. Alternative materials, design and methods of construction and equipment. Renamed and rewording to expand and clarify the existing code.

105.2.1 Research reports. This was added to define a process in which unspecified materials may be approved for use.

105.4 Used material, appliance and equipment. New provision to this code to broaden the scope of the reuse of materials or equipment.

105.5 Approved materials and equipment. New code to allow discretionary approvals by the code official.

106.3.2 Time limitation of application. Code added to set expiration dates on unused or inactive applications and permits.

106.4 Preliminary inspection. New code to authorize code official to survey a project prior to permitting.

106.4.5 Previous approvals. Added code to prohibit retroactive code enforcement especially to projects that are active during a code revision.

107.1 General. An prelude added to the Inspection and Testing Section to disclaim that any inspection approval is an approval of a code violation.

107.4.1 Revocation. Added code allowing provisions to revoke an inspection approval.

SECTION 109 CODE BOOK FEES. Deleted -- Fees are in a different Rule.

SECTION 110 TEMPORARY EQUIPMENT, SYSTEMS AND USES . A new section add to allow for and provide guidance on the installation and use of temporary installations.

Chapter 2 SUMMARY DEFINITIONS

APPLIANCE. “Equipment” has been removed from this definition and fuel gas compressor has been added.

APPLIANCE, AUTOMATICALLY CONTROLLED. Added

APPROVED. Amended to referencing the code only.

BONDING JUMPER. Added.

COMBUSTIBLE ASSEMBLY. Added.

COMBUSTIBLE MATERIAL. Added.

EQUIPMENT. Changed to ‘other than appliance’.

EXCESS FLOW VALVE (EFV). Added.

EXTERIOR MASONRY CHIMNEYS. Added.

FLASHBACK ARRESTOR CHECK VALVE. Added.

FUEL GAS UTILIZATION EQUIPMENT. Deleted.

FURNACE, CENTRAL. The sub definitions (Down flow furnace, Forced air furnace, Forced air type, Gravity furnace, Gravity type, Horizontal forced-air type, Multiple position furnace and Up flow furnace) have been deleted.

JOINTS, MECHANICAL. A press joint has been added.

LABELED. This definition has been reworded to give it a broader interpretation

LEAK CHECK. Added

LISTED. “National recognition” has been replaced with “acceptable to the code official”.

NONCOMBUSTIBLE MATERIALS. Added

PIPING. “Brass” has been replaced with “copper-alloy”

REGULATOR, GAS APPLIANCE. “Equipment” replaced by “the appliance” and types of regulators have been deleted.

REGULATOR, MONITORING. Added

REGULATOR, SERIES. Added

THIRD-PARTY CERTIFICATION, AGENCY. Added

THIRD-PARTY CERTIFIED. Added

THIRD- PARTY TESTED. Added

TOILET, GAS-FIRED. Added

VALVE. Appliance shutoff definition was added

Chapter 3 SUMMARY

GENERAL REGULATIONS

303.3 Prohibited locations. Added #6, prohibited locations for gas clothes dryer.

303.3.1 Fireplaces and decorative appliances in Group I-2, Condition 2 occupancies. Added code restricting the installation of decorative gas appliances in the specified locations.

305.3.1 Installation in residential garages. Added code to outline the requirements to be met in order to install gas appliances in a garage.

305.7 Clearances from grade. Greater detail was added to the parameter of this code.

305.9 Parking structures. Code referencing the Fire Code.

305.10 Repair garages. Code referencing the Fire Code.

305.11 Installation in aircraft hangars. Code referencing the Fire Code.

305.12 Avoid strain on gas piping. Added code to protect the integrity of the pipe joints.

306.1 Access for maintenance and replacement. This section was renamed and reworded defining the parameters of the area necessary for maintenance and replacement

306.4 Appliances under floors. "Equipment" replaced with "appliance"

306.5 Equipment and appliances on roofs or elevated structures. "Equipment" added to this code section as well as additional ladder and landing requirements for safety purposes.

306.5.1 Sloped roofs. "Equipment" added as well as additional safe access requirements.

306.6 Guards. An exception to the requirements for guards has been added.

307.3 Drain pipe materials and sizes. PEX and PE pipe and tubing have been added as approved condensate drainage materials along with a reference to Chapter Seven of The Plumbing Code.

307.6 Condensate pumps. Added code to provide for the use of pumps.

308.2 Reduction table.

308.3.1 Appliances installed in rooms that are large in comparison with the size of the appliance. Deleted and replaced with 308.3.1 Appliance clearance. (See Below)

308.3.2 Appliances installed in rooms that are not large in comparison with the size of the appliance. Deleted.

308.3.1 Appliance clearances. Code to reference A/C manufacturer's instruction for clearances.

308.3.4 Clearance from supply ducts. Renumbered. "Supply air ducts connected to listed central heating furnaces" replaces "Air-condition".

308.4.1 Appliances installed in rooms that are large in comparison with the size of the appliance. Deleted.

308.4.2 Appliances installed in rooms that are not large in comparison with the size of the appliance. Deleted.

308.4.1 Appliance clearances. New code referencing manufacturer's instructions for clearances.

308.4.2 Clearance reduction. Amended code referencing manufacturer's instructions for clearances.

310.1 Pipe and tubing other than CSST. This section has been amended to exclude CSST from the assumption of being bonded through the appliance.

310.2 CSST.

310.2.1 Point of connection.

310.2.2 Size and material of jumper.

310.2.3 Bonding jumper length.

310.2.4 Bonding connections.

310.2.5 Connection devices.

310.3 Arc-resistant CSST. These are new code sections outline the bonding requirements of CSST without an approved arc-resistance jacket or coating system.

Chapter 4 SUMMARY

GAS PIPING INSTALLATIONS

401.9 Identification. New code requiring pipe and fitting manufacturer's name on all portions not listed in the exceptions.

401.10 Piping materials standards. New code requiring pipe and fitting reference standards on all portions not listed in the exceptions.

402.1 General considerations. Reworded to provide a measurable range of pressure loss.

402.2 Maximum gas demand. Notation that approved engineering methods will be use to establish load diversity. An altitude adjustment notation has also been added.

TABLE 402.2 APROXIMATE GAS INPUT FOR TYPICAL APPLIANCES. Deleted.

402.4 Sizing tables and equations. Notation added to this code section excluding noncorrugated stainless steel tubing.

Table 402.4(20) Polyethylene Plastic Pipe. Is renumbered to 402.4(22) and 3 and 4 inch pipe columns have been added.

402.5 Noncorrugated stainless steel tubing. Added code to address noncorrugated stainless steel tubing with respect to sizing equations.

402.7 Maximum design operating pressure. Two exceptions were added to this code.

403.4.1 Cast iron. The galvanized pipe restriction was deleted.

403.4.2 Steel. Stainless steel was added along with a revised minimum schedule and reference standard numbers.

403.4.5 Galvanized pipe. Deleted.

403.5.2 Stainless steel. A new code added for stainless steel tubing standards.

403.5. 3 Copper and copper alloy tubing. Copper alloy has been added.

403.5.5 Corrugated stainless steel tubing. All sub sections of this code have been deleted except for the reference standards.

403.5.5 Corrugated stainless steel tubing. All portions of this code have been deleted except for the reference standards.

403.6 Plastic pipe, tubing and fittings. Reference standards and marking requirements have been added for Polyamide pipe , tubing and fittings. An exclusion specific to PVC has been added.

403.10.1 Pipe joints. A minimum schedule was added to this section as well as press-connect fittings and a respective reference standard number.

403.10.2 Copper tubing joints. Copper was added to this section as well as press-connect fittings and a respective reference standard number.

403.10.3 Stainless steel tubing joints. New code specifying joining methods and standard number.

403.10.5 Metallic fittings. Copper allow replaces the word brass.

403.12 Flanges. New subsections added.

403.12.1. Changed to cast iron flanges including standard numbers.

403.12.2. Changed to steel flanges including standard numbers.

403.12.3. New code for nonferrous flanges including standard numbers.

403.12.4. New code for ductile-iron flanges including standard numbers.

403.12.5. New code for raised face flanges including standard numbers.

403.13 Flange gaskets. Composition replaced asbestos and rubber-faced phenolic and elastomeric

were added. Also two sub section were added to include metallic and nonmetallic gaskets.

404.1 Installation of materials. Added code pertaining to installation procedure approval.

404.2 CSST. Added code pertaining to installation procedure approval.

404.5 Piping Fittings in concealed locations. This code was rewritten to list types of fitting that can be installed in concealed location where previously it listed those that could not.

404.6 Underground penetrations prohibited. This code is the rewritten version of the deleted 404.4 Piping through foundation wall.

404.4 Piping through foundation wall. Deleted and replaced by 404.6 Underground penetrations prohibited

404.7 Protection against physical damage. This code has been edited, instead of listing a litany of frame assemblies it simply requires that gas piping in “light frame assemblies” be protected from fastener penetration and added galvanized pipe to the exemptions for additional protection.

404.7.1 Piping through holes or notches. New code outlining protection measures for non-exempt gas piping.

404.7.2 Piping installed in other locations. New code outlining protection measures for non-exempt gas piping.

404.8.1 Conduit with one end terminating outdoors. Code that outlines the conduit and venting methods for gas piping in solid floors where the conduit originates outdoors.

404.8.2 Conduit with both ends terminating indoors. Code that outlines the conduit and venting methods for gas piping in solid floors where the conduit originates and terminates indoors.

404.10 Isolation. Not Used. LP gas code.

404.11.1 Galvanization. This portion of code was split out from what is now 404.11 Protection against corrosion. Most of the code has been stricken but what remains excludes galvanization from consideration for underground protection.

404.11.2 Protection methods. New code outlining approved underground pipe protection from corrosion.

404.11.3 Dissimilar metals. Requires insulation between dissimilar metals.

404.11.4 Protection of risers. Code addresses riser anodes.

404.14 Piping underground beneath buildings. Approval for conduits specifically designed for gas piping underground beneath buildings, has been added.

404.14.1 Conduit with one end terminating outdoors. Same as 404.8.1 except pertaining to buried under buildings.

404.14.2 Conduit with both ends terminating indoors. Same as 404.8.2 except pertaining to buried under buildings.

404.17.1 Limitations. Exception to the restrictions of the original code have been added.

404.17.2 Connections. Renumbered from 404.14.2 with added standard number.

404.18 Pipe cleaning. New code prohibiting the use of flammable gas to remove debris from pipes.

404.19 Prohibited device. A second exception was added.

406.1.2 Repairs and additions. An exception to test was added when minor repairs are made.

406.1.3 New branches. An addition to this code require a leak detection test at the connection of a new branch and the existing system.

406.1.6 Pipe clearing. New code requiring gas pipe to be purged prior to testing.

406.4 Test pressure measurement. A manometer was added.

406.4.1 Test pressure. Test pressures have been reduced to mirror the national standard.

406.4.2 Test duration. The name was changed. Test duration was changed to meet the intent of the national standard.

406.7.1 Piping system required to be purged outdoors. This is new code inserted in the existing section of Purging. It references other new codes that outline safe purging practices.

406.7.1.1 Removal from service. New wording to this code has been added to outline isolation, purging and inert gas displacement for safety purposes.

Table 406.7.1.1.Size and length of Piping. Ranges of pipe sizes have replaced singular size increments.

406.7.1.3 Outdoor discharge of purged gases. This is new code that outlines the procedure to discharge purged gases to the outdoor.

406.7.1.4 Combustible gas indicator. New code that provides an outline of requirements of requirements for a combustible gas indicator.

406.7.2 Piping systems allowed to be purged indoors or outdoors. New code that outlines the parameters for of gas systems that may be purged to the outdoors or indoors.

406.7.2.1 Purging procedure. New code outlining the procedure for indoor gas purging.

406.7.2.2 Combustible gas detector. New code that provides an outline of requirements of requirements for a combustible gas detector.

409.5 Appliance shutoff valve. Appliance replaces equipment. Most of this paragraph of code has been stricken and replace with references to new code subsection addressing appliance shutoff valves.

409.5.1-409.5.3. New code outlining required locations of shutoff valves for specific areas and appliance types.

409.6 Shutoff valve for laboratories. This code specifically address shutoffs in Lab.

409.7 Shutoff valves in tubing systems. New Code. Independent bracing for in live tube valves.

410.2 MP regulators. The #6 compliance which requires the installation of a tee test port has been amended to exclude the tee where appliances served already have a test port. #7 compliance has been added requiring the installation of a union within a foot of the regulator to facilitate replacement.

410.3.1 Vent piping. This code has been edited to limit regulator vent pipe materials to be of those listed in Section 403.

410.4 Excess flow valves. New code added to for excess flow valve standards.

410.5 Flashback arrestor check valve. New code to address arrestor checks.

411.1 Connecting appliances. Connection method #7 has been edited to simply refer to the manufacturer's instructions, #8 has been edited to relegate outdoor connectors to strictly outdoor use.

#9 has been added to include flexible hose connectors for school laboratories gas burners.

411.1.1 Commercial cooking appliances. This code has been modified to included movement limiting on appliances with casters.

411.1.3.3 Prohibited locations and penetrations. Appliance housings has been added to prohibited penetrations of gas flex connectors. However, 4 exceptions have also been added to this section.

411.1.4 Movable appliances. Modified to include a connector listing standard or require a rigid connection.

411.1.5 Connection of gas engine-powered air conditioners. New code prohibiting rigid connectors due to vibration.

411.1.6 Unions. Code requiring a union on rigid gas appliance connection.

411.3 Suspended low-intensity infrared tube heaters. Code providing a reference standard for connectors for these types of heaters.

411.4 Injection Bunsen –type burners. New code that allows for the use of unlisted as well as listed hose connectors.

SECTION 413 COMPRESSED NATURAL GAS MOTOR VEHICLE FUEL-DISPENSING FACILITIES.

This section provides regulator parameters for CNG fueling facilities. It is a new addition to the Arkansas Fuel Gas Code.

SECTION 416 OVERPRESSURE PROTECTION DEVICES.

This Section has been revised to protect gas utilization equipment designed to operate at a gas pressure of 14 inches w.c. (water column) or less, from damage due to over pressurization when connected to a hybrid gas systems operating at greater than 2 psi (pounds per square inch).

Chapter 5 SUMMARY

CHIMNEYS AND VENTS

User note have been added to this Chapter.

501.15.4.1 Fireblocking. Added section addressing fireblocking.

502.7.1 Door swing. Added to prevent doors damaging or dislodging vents.

503.1 General. This paragraph has been shortened as its previous content has been redistributed throughout the respective Section.

503.2.1.Installation. Reworded to include industrial uses.

503.2.5 Incinerators. New code adding a reference standard.

503.4.1 Plastic pipe. This code has been amended to provide approval standards for plastic pipe utilization as gas exhaust venting.

503.4.1.1 Plastic vent joints. This code has been added to provide an approval standard for joints in plastic pipe utilized for gas exhaust venting and to require a primer, when needed, of a contrasting color.

503.4.2 Special gas vent. This code has been amended to provide approval standards for special gas venting.

TABLE 503.4 TYPE OF VENTING SYSTEM TO BE USED. This table has been edited to combine Category II,III and IV appliances.

503.5.6.1 Chimney lining. The exception has been edited to allow an existing chimney to continue being used only if it meets specified codes.

503.5.11 Insulation shield. New code requiring and defining the specifications for shielding insulation from factory built chimneys.

503.6.1 Materials. Added code providing industry standards for type B & BW vents for various fuel types.

503.6.14 Fastener penetrations. Code addition to protect the inner vent pipe wall and avert leakage of flue gases.

503.7.7 Single-wall connector penetrations of combustibile walls. New code that addresses safe penetration of combustibile walls.

503.8 Venting system termination location.

TABLE 503.8 THROUGH-THE WALL DIRECT-VENT TERMINATION CLEARANCES.

TABLE 503.10.2.4 MINIMUM THICKNESS FOR GALVANIZED STEEL VENT CONNECTORS FOR LOW HEAT APPLIANCES. Deleted

TABLE 503.10.2.5 MINIMUM THICKNESS FOR STEEL VENT CONNECTORS FOR MEDIUM-HEAT APPLIANCES. Replaces and updates the previous Deleted Table 503.10.2.4

503.10.3.3 Multiple appliances. An alternative has been added to this segment for where all appliances are draft hood equipped.

503.10.3.4 Common connector/manifold. An alternative has been added to this segment for where two appliances are draft hood equipped.

503.10.4.1 Two or more openings. This is new code requiring vent connections to a common vent be designed so that opposing discharges do not create excessive flow resistance.

503.10.6 Flow resistance. Deleted. Replaced by 503.10.4.1

503.10.15 Single-wall connector penetrations of combustibile walls. Deleted.

503.16 Outside wall penetration: New code requiring that gas vent wall penetrations be sealed.

504.2.9 Chimney and vent locations. New portion added to this code to outline specifics where a vent shall be provided with enclosure.

504.2.17 Height entries. This code was added to provide a standard for determining vent sizes where they fall between the chart provides lengths.

504.3.5 Common vertical vent offset. An addition to this code segment addresses the rise of multiple horizontal offsets,

504.3.20 Chimney and vent location. New portion added to this code to outline specifics where a vent shall be provided with enclosure.

504.3.28 Height entries. This code was added to provide a standard for determining vent sizes where they fall between the chart provides lengths.

505.1.1 Commercial cooking appliances vented by exhaust hoods. Code has been added to this segment requiring that the hood/ burner interlock not interfere with the appliance pilot.

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Chapter 6 SUMMARY SPECIFIC APPLIANCES

User note have been added to this Chapter.

616.1 Powered equipment. Addition made to this code to provide a standard for natural gas generators.

616.2 Gas Supply connection. New code to address effects of vibration on gas piping caused by combustion engines.

618.2 Forced-air furnaces. Deleted

618.4 Circulating air duct for forced-air furnaces. Deleted

618.5 3 Prohibited sources. (outside or return air sources for forced-air systems) In #6 ,mechanical room have been removed and unconditioned attic has been added. Also, three exceptions have been added to this section making allowances for systems that serve kitchen arears only and garage areas only. And an exception addressing transfer opening to crawl spaces by direct connection.

618.6 Furnace plenums and air ducts. This is added code that restricts the area where the furnace is installed from being included in the plenum where said furnace is outside the coverage area.

620.5 Installation in commercial garages and air-craft hangars. New code establishing installation requirements and establish parameter for "Commercial" garages and hangers.

621.4 Prohibited locations. Repeats 303.1 for ease of reference.

623.2 Prohibited location. Two exception have been added in which a commercial cooking appliance may be installed in a domestic dwelling.

623.7 Vertical clearance above cooking top. New code addressing the clearance of combustibles over a cooking top.

629.1 General. This code was rewritten to ensure kilns are listed and labeled or otherwise approve.

630.3 Combustion and ventilation air. Code to provide calculation for un-vent infrared heaters combustion and ventilation air requirements.

630.4 Installation in commercial garages and air-craft hangars. New code addressing infrared heaters in commercial garages and hangers.

SECTION 636

OUTDOOR DECORATIVE APPLIANCES

636.1 General. New code added to provide reference standards for outdoor decorative appliances

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CHAPTER 1

SCOPE AND ADMINISTRATION

User note:

About this chapter: Chapter 1 establishes the limits of applicability of the code and describes how the code is to be applied and enforced. Chapter 1 is in two parts: Part 1—Scope and Application and Part 2—Administration and Enforcement. Section 101 identifies what buildings, systems, appliances and equipment fall under its purview and references other International Codes as applicable. Standards and codes are scoped to the extent referenced.

The code is intended to be adopted as a legally enforceable document and it cannot be effective without adequate provisions for its administration and enforcement. The provisions of Chapter 1 establish the authority and duties of the code official appointed by the authority having jurisdiction and also establish the rights and privileges of the design professional, contractor.

PART 1—SCOPE AND APPLICATION

SECTION 101

GENERAL

101.1 Title. These regulations shall be known as the *Arkansas Fuel Gas Code*, hereinafter referred to as “this code.”

101.2 Scope. This code shall apply to the installation of fuel gas piping systems, fuel gas utilization equipment and related accessories in accordance with Sections 101.2. ~~12 through 101.2.5.~~

101.2.1 Deleted.

101.2.2 Piping systems. These regulations cover piping systems for natural gas with an operating pressure of 125 pounds per square inch gauge (psig) (862 kPa gauge) or less. Coverage shall extend from the point of delivery to the outlet of the equipment shutoff valves. Piping systems requirements shall include design, materials, components, fabrication, assembly, installation, testing, inspection, operation and maintenance. LP-gas piping and systems shall be regulated by the Arkansas LP-gas board.

101.2.3 Gas utilization equipment ~~appliance~~. Requirements for gas utilization ~~equipment~~ appliance and related accessories shall include installation, combustion and ventilation air and venting and connections to piping systems.

101.2.4 Systems and equipment outside the scope. This code shall not apply to the following:

1. Portable LP-gas equipment of all types that is not connected to a fixed fuel piping system.
2. Installation of farm equipment such as brooders, dehydrators, dryers and irrigation equipment.
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 gases such as acetylene and acetylenic compounds, hydrogen, ammonia, carbon monoxide, oxygen and nitrogen.

6. Petroleum refineries, pipeline compressor or pumping stations, loading terminals, compounding plants, refinery tank farms and natural gas processing plants.
7. Integrated chemical plants or portions of such plants where flammable or combustible liquids or gases are produced by, or used in, chemical reactions.
8. LP-gas installations at utility gas plants.
9. Liquefied natural gas (LNG) installations.
10. Fuel gas piping in power and atomic energy plants
- ~~10-11.~~ Proprietary items of equipment, apparatus or instruments such as gas-generating sets, compressors and calorimeters.
- ~~11-12.~~ LP-gas equipment for vaporization, gas mixing and gas manufacturing.
- ~~12-13.~~ Temporary LP-gas piping for buildings under construction or renovation that is not to become part of the permanent piping system.
- ~~13-14.~~ Installation of LP-gas systems for railroad switch heating.
- ~~14-15.~~ Installation of hydrogen gas, LP-gas and compressed natural gas (CNG) systems on vehicles.
- ~~15-16.~~ Except as provided in Section 401.1.1, gas piping, meters, gas pressure regulators and other appurtenances used by the serving gas supplier in the distribution of gas, other than undiluted LP-gas.
- ~~16-17.~~ Building design and construction, except as specified herein.
- ~~17-18.~~ Piping systems for mixtures of gas and air within the flammable range with an operating pressure greater than 10 psig (69 kPa gauge).
- ~~18-19.~~ Portable fuel cell appliances that are neither connected to a fixed piping system nor interconnected to a power grid.

101.2.4.1 Variances. The Arkansas Committee of Plumbing Examiners, when so appealed to and after a hearing, may vary the application of any provision of this code to any particular case when, in its opinion, the enforcement thereof would do manifest injustice and would be contrary to the intent and purpose of this code or public interest, and also finds all of the following:

1. That special conditions and circumstances exist which are peculiar to the building, structure or service system involved and which are not applicable to others.
2. That the special conditions and circumstances do not result from action or inaction of the applicant.
3. That the variance requested will not confer on the applicant any special privilege that is denied by this code to other buildings, structures or service systems.
4. That the variance granted is the minimum variance that will make possible the reasonable use of the building, structure or service system.
5. That the granting of the variance will be in harmony with the general intent and purpose of this code and will not be detrimental to the public health, safety and general welfare.

101.2.5 Other fuels. The requirements for the design, installation, maintenance, alteration and inspection of mechanical systems operating with fuels other than fuel gas shall be regulated by the *Arkansas Mechanical Code*.

101.3 Appendices. Provisions in the appendices shall apply.

101.4 Intent. The purpose of this code is to provide minimum standards to safeguard life or limb, health, property and public welfare by regulating and controlling the design, construction, installation, quality of materials, location, operation and maintenance or use of fuel gas systems.

101.5 Severability. If a section, subsection, sentence, clause or phrase of this code is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this code.

SECTION 102 APPLICABILITY

102.1 General. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern. ~~The provisions of this code shall apply to all matters affecting or relating to structures and premises, as set forth in Section 101. Where, in a specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.~~

102.2 Existing installations. Except as otherwise provided for in this chapter, a provision in this code shall not require the removal, alteration or abandonment of, nor prevent the continued utilization and maintenance of, existing installations lawfully in existence at the time of the adoption of this code.

[EB] 102.2.1 Existing buildings. Additions, alterations, renovations or repairs related to building or structural issues shall be regulated by the *Arkansas Fire Prevention Code*.

102.3 Maintenance. Installations, both existing and new, and parts thereof shall be maintained in proper operating condition in accordance with the original design and in a safe condition. Devices or safeguards which are required by this code shall be maintained in compliance with the code edition under which

they were installed. The owner or the owner's designated agent shall be responsible for maintenance of installations. To determine compliance with this provision, the code official shall have the authority to require an installation to be reinspected.

102.4 Additions, alterations or repairs. Additions, alterations, renovations or repairs to installations shall conform to that required for new installations without requiring the existing installation to comply with all of the requirements of this code. If a gas service has been terminated because of a leak or fire the gas system shall be tested. All piping and/or appliances shall be replaced in whole or in part so that the gas system or appliance conforms to the requirements of this code, if hazardous conditions are revealed through inspection by an inspection agency. Additions, alterations or repairs shall not cause an existing installation to become unsafe, hazardous or overloaded.

102.5 Change in occupancy. It shall be unlawful to make a change in the occupancy of a structure which will subject the structure to the special provisions of this code applicable to the new occupancy without approval. The code official shall certify that such structure meets the intent of the provisions of law governing building construction for the proposed new occupancy and that such change of occupancy does not result in any hazard to the public health, safety or welfare.

102.6 Historic buildings. The provisions of this code relating to the construction, alteration, repair, enlargement, restoration, relocation or moving of buildings or structures shall not be mandatory for existing buildings or structures identified and classified by the state or local jurisdiction as historic buildings when such buildings or structures are judged by the state administrative authority to be safe and in the public interest of health, safety and welfare regarding any proposed construction, alteration, repair, enlargement, restoration, relocation or moving of buildings.

102.7 Moved buildings. Except as determined by Section 102.2, installations that are a part of buildings or structures moved into or within the jurisdiction shall comply with the provisions of this code for new installations.

102.8 Referenced codes and standards. The codes and standards referenced in this code shall be those that are listed in Chapter 8 and such codes and standards shall be considered part of the requirements of this code to the prescribed extent of each such reference. Where differences occur between provisions of this code and the referenced standards, the provisions of this code shall apply.

Exception: Where enforcement of a code provision would violate the conditions of the listing of the equipment or appliance, the conditions of the listing and the manufacturer's installation instructions shall apply.

102.8.1 Conflicts. Where conflicts occur between the provisions of this code and the referenced standards, the provisions of this code shall apply.

102.8.2 Provisions in referenced codes and standards. Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of this code, the provisions of this code, as applicable, shall take precedence over the provisions in the referenced code or standard.

102.9 Requirements not covered by code. Requirements necessary for the strength, stability or proper operation of an existing or proposed installation, or for the public safety, health and general welfare, not specifically covered by this code, shall be determined by the code official.

102.10 Other laws. The provisions of this code shall not be deemed to nullify any provisions of state or federal law.

102.11 Application of references. Reference to chapter section numbers, or to provisions not specifically identified by number, shall be construed to refer to such chapter, section or provision of this code.

PART 2—ADMINISTRATION AND ENFORCEMENT

SECTION 103 THE DEPARTMENT

103.1 General. The Department is hereby established to administer the provisions of this Code.

103.2 Appointment. The code official shall be appointed by the chief appointing authority of the jurisdiction; and the code official shall not be removed from office except for cause and after full opportunity to be heard on specific and relevant charges by and before the appointing authority.

103.3 Deputies. In accordance with the prescribed procedures of this jurisdiction and with the concurrence of the appointing authority, the code official shall have the authority to appoint a deputy code official, other related technical officers, inspectors and other employees.

103.4 Liability. The code official, officer or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered civily or criminally liable personally, and is hereby relieved from all personal liability for any damage accruing to persons or property as a result of an act required or permitted in the discharge of official duties.

~~Any suit instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by the legal representative of the jurisdiction until the final termination of the proceedings. The code official or any subordinate shall not be liable for costs in an action, suit or proceeding that is instituted in pursuance of the provisions of this code; and any officer of the Department of Health and Human Services, Plumbing and Fuel Gas Program, acting in good faith and without malice, shall be free from liability for acts performed under any of its provisions or by reason of any act or omission in the performance of official duties in connection therewith.~~

SECTION 104 DUTIES AND POWERS OF THE CODE OFFICIAL

104.1 General. The code official is hereby authorized and directed to ~~shall~~ enforce the provisions of this code and shall act on any question relative to the installation, alteration, repair, maintenance or operation of systems, except as otherwise specifically provided for by statutory requirements or as provided for in Sections 104.2 through 104.8.

104.1.1 Administrative Authority. The administrative authority (Plumbing and Fuel Gas Inspector) is hereby authorized to enforce the provisions of this code. The state administrative authority is to render interpretations of this code which are consistent with its intent and purpose.

104.2 Rule-making authority. The administrative authority ~~code official~~ shall have authority as necessary in the interest of public health, safety and general welfare to adopt and promulgate rules and regulations; interpret and implement the provisions of this code; secure the intent thereof and designate requirements applicable

because of local climatic or other conditions. Such rules shall not have the effect of waiving structural or fire performance requirements specifically provided for in this code, or of violating accepted engineering methods involving public safety.

104.3 Applications and permits. The code official shall receive applications and issue permits for installations and alterations under the scope of this code, inspect the premises for which such permits have been issued and enforce compliance with the provisions of this code.

104.4 Inspections. The code official shall make all of the required inspections, or ~~shall~~ may accept reports of inspection by approved agencies or individuals. All reports of such inspections shall be in writing and shall be certified by a responsible officer of such approved agency or by the responsible individual. The code official is authorized to engage such expert opinion as deemed necessary to report upon unusual technical issues that arise, subject to the approval of the appointing authority.

104.5 Right of entry. Whenever it is necessary to make an inspection to enforce the provisions of this code, or whenever the code official has reasonable cause to believe that there exists in a building or upon any premises any conditions or violations of this code that make the building or premises unsafe, dangerous or hazardous, the code official shall have the authority to enter the building or premises at all reasonable times to inspect or to perform the duties imposed upon the code official by this code. If such building or premises is occupied, the code official shall present credentials to the occupant and request entry. If such building or premises is unoccupied, the code official shall first make a reasonable effort to locate the owner or other person having charge or control of the building or premises and request entry. If entry is refused, the code official has recourse to every remedy provided by law to secure entry. When the code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an owner or occupant or person having charge, care or control of the building or premises shall not fail or neglect, after proper request is made as herein provided, to promptly permit entry therein by the code official for the purpose of inspection and examination pursuant to this code.

104.6 Identification. The code official shall carry proper identification when inspecting structures or premises in the performance of duties under this code.

104.7 Notices and orders. The code official shall issue all necessary notices or orders to ensure compliance with this code.

104.8 Department records. The code official shall keep official records of applications received, permits and certificates issued, fees collected, reports of inspections, and notices and orders issued. Such records shall be retained in the official records as long as the local authority deems appropriate.

SECTION 105 APPROVAL

105.1 Modifications. Whenever there are practical difficulties involved in carrying out the provisions of this code, the state administrative authority shall have the authority to grant modifications for individual cases, provided the state administrative authority shall first find that special individual reason makes the strict letter of this code impractical and that such modification is in compliance with the intent and purpose of this code and does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the Department.

105.2 Alternative materials, design and methods of construction and equipment. The provisions of this code are

not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material or method of construction shall be approved where the state administrative authority finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the code official shall respond in writing, stating the reasons why the alternative was not approved.

105.2.1 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from approved sources

105.3 Required testing. Whenever there is insufficient evidence of compliance with the provisions of this code, evidence that a material or method does not conform to the requirements of this code, or in order to substantiate claims for alternative materials or methods, the code official shall have the authority to require tests as evidence of compliance to be made at no expense to the jurisdiction.

105.3.1 Test methods. Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the code official shall approve the testing procedures.

105.3.2 Testing agency. All tests shall be performed by an approved agency.

105.3.3 Test reports. Reports of tests shall be retained by the code official for the period required for retention of public records.

105.4 ~~Used M—materials, appliances~~ and equipment reuse. The use of used materials that meet the requirements of this code for new materials is permitted. Used appliances. Materials, equipment and devices shall not be reused unless such elements have been reconditioned, tested and placed in good and proper working condition, and approved.

105.5 Approved materials and equipment. Materials, equipment and devices approved by the code official shall be constructed and installed in accordance with such approval.

SECTION 106 PERMITS

106.1 When required. An owner, authorized agent or contractor who desires to erect, install, enlarge, alter, repair, remove, convert or replace an installation regulated by this code, or to cause such work to be done, shall first make application to the code official and obtain the required permit for the work.

Exception: Where equipment replacements and repairs are required to be performed in an emergency situation, the permit application shall be submitted within the next working business day of the Department of Inspection.

106.2 Permits not required. Permits shall not be required for the following:

1. Any portable heating appliance.
2. Replacement of any minor component of equipment that does not alter approval of such equipment or make such equipment unsafe.

Exemption from the permit requirements of this code shall not be deemed to grant authorization for work to be done in violation of the provisions of this code or of other laws or ordinances of this jurisdiction.

106.3 Application for permit. Each application for a permit, with the required fee, shall be filed with the code official on a form furnished for that purpose and shall contain a general description of the proposed work and its location. The application shall be signed by the owner or an authorized agent. The permit application shall indicate the proposed occupancy of all parts of the building and of that portion of the site or lot, if any, not covered by the building or structure and shall contain such other information required by the code official.

106.3.1 Construction documents. Construction documents, engineering calculations, diagrams and other data shall be submitted for a permit. The code official shall require construction documents, computations and specifications to be prepared and designed by a registered design professional when required by state law. Construction documents shall be drawn to scale and shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that the work conforms to the provisions of this code. Construction documents for buildings more than two stories in height shall indicate where penetrations will be made for installations and shall indicate the materials and methods for maintaining required structural safety, fire-resistance rating and fireblocking.

Exception: The code official shall have the authority to waive the submission of construction documents, calculations or other data if the nature of the work applied for is such that reviewing of construction documents is not necessary to determine compliance with this code.

106.3.2 Time limitation of application. An application for a permit for any proposed work may be deemed to have been abandoned 180 days after the date of filing, unless such application has been pursued in good faith or a permit has been issued; except that the code official shall have the authority to grant one or more extensions of time for additional periods not exceeding 180 days each. The extension shall be requested in writing and justifiable cause shall be demonstrated.

106.4 Preliminary inspection. Before a permit is issued, the code official is authorized to inspect and evaluate the systems, equipment, buildings, devices, premises and spaces or areas to be used.

106.4 Permit issuance. The application, construction documents and other data filed by an applicant for a permit shall be reviewed by the code official. If the code official finds that the proposed work conforms to the requirements of this code and all laws and ordinances applicable thereto, and that the fees specified in Section 106.5 have been paid, a permit shall be issued to the applicant.

106.4.1 Approved construction documents. When the code official issues the permit where construction documents are required, the construction documents shall be endorsed in writing and stamped "APPROVED." Such approved construction documents shall not be changed, modified or altered without authorization from the code official. Work shall be done in accordance with the approved construction documents.

The code official shall have the authority to issue a permit for the construction of part of an installation before the construction documents for the entire installation have been submitted or approved, provided adequate information and detailed statements have been filed complying with all pertinent requirements of this code. The holder of such permit shall proceed at his or her own risk without assurance that the permit for the entire installation will be granted.

106.4.2 Validity. The issuance of a permit or approval of construction documents shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of this code or of other ordinances of the jurisdiction. A permit presuming to give authority to violate or cancel the provisions of this code shall be invalid.

The issuance of a permit based upon construction documents and other data shall not prevent the code official from thereafter requiring the correction of errors in said construction documents and other data or from preventing building operations from being carried on thereunder when in violation of this code or of other ordinances of this jurisdiction.

~~**106.4.3 Expiration.** Every permit issued by the code official under the provisions of this code shall expire by limitation and become null and void if the work authorized by such permit is not commenced within 180 days from the date of such permit or is suspended or abandoned at any time after the work is commenced for a period of 180 days. Before such work recommences, a new permit shall be first obtained and the fee, therefore, shall be one half the amount required for a new permit for such work, provided no changes have been or will be made in the original construction documents for such work, and further that such suspension or abandonment has not exceeded one year.~~

~~**106.4.4 Extensions.** A permittee holding an unexpired permit shall have the right to apply for an extension of the time within which he or she will commence work under that permit when work is unable to be commenced within the time required by this section for good and satisfactory reasons. The code official shall extend the time for action by the permittee for a period not exceeding 180 days if there is reasonable cause. A permit shall not be extended more than once. The fee for an extension shall be one half the amount required for a new permit for such work.~~

106.4.5-3 Suspension or revocation of permit. The code official shall revoke a permit or approval issued under the provisions of this code in case of any false statement or misrepresentation of fact in the application or on the construction documents upon which the permit or approval was based.

106.4.6-4 Retention of construction documents. The Contractor shall keep any construction documents and records of permits and certificates issued, reports of inspections, and notices and orders issued and prints used during the construction of the project. If possible, after the warranty period, the construction documents shall then be forwarded to the owner of the project.

106.4.5 Previous approvals. This code shall not require changes in the construction documents, construction or designated occupancy of a structure for which a lawful permit has been heretofore issued or otherwise lawfully authorized, and the construction of which has been pursued in good faith within 180 days after the effective date of this code and has not been abandoned.

106.5 Fees. Reasonable permit and inspection fees may be charged by the administrative authority.

106.5.1 Work commencing before permit issuance. Any person who commences work on an installation before obtaining the necessary permits shall be subject to 100 percent of the usual permit fee in addition to the required permit fees.

106.5.2 Fee schedule. Deleted.

106.5.3 Fee refunds. Deleted.

SECTION 107 INSPECTIONS AND TESTING

107.1 General. The code official is authorized to conduct such inspections as are deemed necessary to determine compliance with the provisions of this code. Construction or work for which a permit is required shall be subject to inspection by the code official, and such construction or work shall remain visible and able to be accessed for inspection purposes until approved. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction. Inspections presuming to give authority to violate or cancel the provisions of this code or of other ordinances of the jurisdiction shall not be valid.

107.1.1 Required inspections and testing. The code official, upon notification from the permit holder or the permit holder's agent, shall make the following inspections and other such inspections as necessary, and shall either release that portion of the construction or notify the permit holder or the permit holder's agent of violations that are required to be corrected. The holder of the permit shall be responsible for scheduling such inspections.

1. Underground inspection shall be made after trenches or ditches are excavated and bedded, piping is installed and before backfill is put in place. When excavated soil contains rocks, broken concrete, frozen chunks and other rubble that would damage or break the piping or cause corrosive action, clean backfill shall be on the job site.
2. Rough-in inspection shall be made after the roof, framing, fireblocking and bracing are in place and components to be concealed are complete, and prior to the installation of wall or ceiling membranes.
3. Final inspection shall be made upon completion of the installation.

The requirements of this section shall not be considered to prohibit the operation of any heating equipment installed to replace existing heating equipment serving an occupied portion of a structure in the event a request for inspection of such heating equipment has been filed with the department not more than 48 hours after replacement work is completed, and before any portion of such equipment is concealed by any permanent portion of the structure.

107.1.1-2 Qualified agency. Installation and replacement of consumer's gas piping or gas utilization equipment or accessories and repair of consumer's gas equipment shall be performed only by qualified agency. ~~By—t~~The term "qualified agency" means is meant any individual, firm, corporation or company which either in person or through

a representative is engaged in and is responsible for the installation, replacement or repair or surviving of gas utilization equipment, and who is experienced in such work and familiar with all precautions required and has complied with all requirements of the authority having jurisdiction.

Nothing herein contained shall be construed as prohibiting an individual from installing or repairing his own gas utilization equipment or installing, extending, replacing, altering or repairing consumer's piping for his own residence, or as requiring a license or bond from an individual doing such work for his own residence; provided however, all such work must be done in conformity with all provisions of this code, including those relating to permits, inspection and fees.

107.1.1.4a-3 School Survey / Inspection

Each School accredited by the Arkansas Department of Education shall have conducted an annual inspection of its gas piping and gas utilization equipment. School officials shall be responsible for ensuring these inspections are performed by a qualified agency and in accordance with the Standards of the State Plumbing and Natural Gas Code. Inspections shall be performed as frequently as necessary, but at intervals not to exceed one year and these inspection results are to be provided to the Department's Division of Protective Health Codes by September 1 each year. As it pertains to school inspections, the term "qualified agency" means persons licensed by the Department as plumbers, plumbing inspectors, restricted plumbers or gas utility servicemen.

107.1.1.b4 Electrical

The provisions of the National or State Electrical Code shall apply to the installation of electrical systems, including alterations, repairs, replacement, equipment, appliances, fixtures, fittings and appurtenances.

107.1.1-e5 Mechanical

The provision of the Arkansas ~~State~~ Mechanical Code shall apply to every mechanical installation including alterations, repairs, replacement, equipment, appliances, fixtures, fittings and/or appurtenances, including ventilating, heating, cooling, air conditioning and refrigeration systems; incinerators and other energy-related systems.

107.1.1-d6 Plumbing

The provisions of the ~~Arkansas State~~ Plumbing Code shall apply to every plumbing installation, including alterations, repairs, replacement, equipment, appliances, fixtures, fittings and appurtenances as covered in this code.

107.1.1-e7 Contractor Responsibilities

It shall be the duty of every licensed master plumber, supervisor gas fitter and the home owner who make contracts for the installations or repairs of natural gas systems for which a permit is required to comply with state or local code, rules and regulations concerning licensing which the applicable governing authority may have adopted.

107.1.1-f8 Local Regulatory

Nothing in this code shall prohibit any city, or town or county from having full authority to provide full supervision of the inspection of the installation of gas by enactment of ordinances or regulations by the local government body not in conflict and equal to or exceeding

the minimum standards prescribed by the Arkansas ~~State Plumbing Plumbers~~ Law.

1071.1-g9 Severability

If any provision of these regulations or the application thereof to any person is held invalid, such invalidity shall not affect other provisions or application of the regulations which can give effect without the invalid provisions of the applications and to this end the provisions hereto are described to be severable.

107.1.4h-10 Repeal

All regulations and parts of regulations in conflict herewith are hereby repealed.

107.2 107.1.2 Evaluation and follow-up inspection services.

Prior to the approval of a prefabricated construction assembly having concealed work and the issuance of a permit, the code official shall require the submittal of an evaluation report on each prefabricated construction assembly, indicating the complete details of the installation, including a description of the system and its components, the basis upon which the system is being evaluated, test results and similar information and other data as necessary for the code official to determine conformance to this code.

107.1.2.42.1 Evaluation service. The state administrative authority shall designate the evaluation service of an approved agency as the evaluation agency, and review such agency's evaluation report for adequacy and conformance to this code.

107.1.2.22.3 Follow-up inspection. Except where ready access is provided to installations, service equipment and accessories for complete inspection at the site without disassembly or dismantling, the code official shall conduct the in-plant inspections as frequently as necessary to ensure conformance to the approved evaluation report or shall designate an independent, approved inspection agency to conduct such inspections. The inspection agency shall furnish the code official with the follow-up inspection manual and a report of inspections upon request, and the installation shall have an identifying label permanently affixed to the system indicating that factory inspections have been performed.

107.1.2.32.4 Test and inspection records.

Required test and inspection records shall be available to the code official at all times during the fabrication of the installation and the erection of the building; or such records as the code official designates shall be filed.

107.2-3 Testing. Installations shall be tested as required in this code and in accordance with Sections 107.32.1 through 107.32.3. Tests shall be made by the permit holder and observed by the code official.

107.2.3.1 New, altered, extended or repaired installations.

New installations and parts of existing installations, which have been altered, extended, renovated or repaired, shall be tested as prescribed herein to disclose leaks and defects. Any prefabricated, modular building or building having been relocated or moved shall be tested to ensure that the movement of the building or structure did not create a gas leak.

107.2.3.2 Apparatus, instruments, material and labor for tests. Apparatus, instruments, material and labor required

for testing an installation or part thereof shall be furnished by the permit holder.

107.23.3 Reinspection and testing. Where any work or installation does not pass an initial test or inspection, the necessary corrections shall be made so as to achieve compliance with this code. The work or installation shall then be resubmitted to the code official for inspection and testing.

107.4.3 Approval. After the prescribed tests and inspections indicate that the work complies in all respects with this code, a notice of approval shall be issued by the code official.

107.4.1 Revocation. The code official is authorized to, in writing, suspend or revoke a notice of approval issued under the provisions of this code wherever the notice is issued in error, or on the basis of incorrect information supplied or where it is determined that the building or structure, premise, or portion thereof is in violation of any ordinance or regulation or any of the provisions of this code

~~107.4 Temporary connection. Deleted.~~

SECTION 108 VIOLATIONS

108.1 Unlawful acts. It shall be unlawful for a person, firm or corporation to erect, construct, alter, repair, remove, demolish or utilize an installation, or cause same to be done, in conflict with or in violation of any of the provisions of this code.

108.2 Notice of violation. The code official shall serve a notice of violation or order to the person responsible for the erection, installation, alteration, extension, repair, removal or demolition of work in violation of the provisions of this code, or in violation of a detail statement or the approved construction documents thereunder, or in violation of a permit or certificate issued under the provisions of this code. Such order shall direct the discontinuance of the illegal action or condition and the abatement of the violation.

108.3 Prosecution of violation. If the notice of violation is not complied with promptly, the code official ~~shall~~ may request the legal counsel of the jurisdiction to institute the appropriate proceeding at law or in equity to restrain, correct or abate such violation, or to require the removal or termination of the unlawful occupancy of the structure in violation of the provisions of this code.

108.4 Violation penalties. Persons who shall violate a provision of this code, fail to comply with any of the requirements thereof or erect, install, alter or repair work in violation of the approved construction documents or directive of the code official, or of a permit or certificate issued under the provisions of this code, shall be guilty of violating Arkansas Code §17-38-102 et. seq.

108.5 Stop work orders. Upon notice from the code official that work is being done contrary to the provisions of this code or in a dangerous or unsafe manner, such work shall immediately cease. Such notice shall be in writing and shall be given to the owner of the property, the owner's agent, or the person doing the work. The notice shall state the conditions under which work is authorized to resume. Where an emergency exists, the code official shall not be required to give a written notice prior to stopping the work. Any person who shall continue any work on the system after having been served with a stop work order, except such work as that person is directed to perform to remove a violation or unsafe condition, shall be violating Arkansas Code §17-38-102 et. seq.

108.6 Abatement of violation. The imposition of the penalties herein prescribed shall not preclude the legal officer of the

jurisdiction from instituting appropriate action to prevent unlawful construction, restrain, correct or abate a violation, prevent illegal occupancy of a building, structure or premises, or stop an illegal act, conduct, business or utilization of the installations on or about any premises.

108.7 Unsafe installations. An installation that is unsafe, constitutes a fire or health hazard, or is otherwise dangerous to human life, as regulated by this code, is hereby declared an unsafe installation. Use of an installation regulated by this code constituting a hazard to health, safety or welfare by reason of inadequate maintenance, dilapidation, fire hazard, disaster, damage or abandonment is hereby declared an unsafe use. Such unsafe installations are hereby declared to be a public nuisance and shall be abated by repair, rehabilitation, demolition or removal.

108.7.1 Authority to condemn installations. Whenever the code official determines that any installation, or portion thereof, regulated by this code has become hazardous to life, health or property, he or she shall order in writing that such installations either be removed or restored to a safe condition. A time limit for compliance with such order shall be specified in the written notice. A person shall not use or maintain a defective installation after receiving such notice.

When such installation is to be disconnected, written notice as prescribed in Section 108.2 shall be given. In cases of immediate danger to life or property, such disconnection shall be made immediately without such notice.

108.7.2 Authority to disconnect service utilities. The code official shall have the authority to require disconnection of utility service to the building, structure or system regulated by the technical codes in case of emergency where necessary to eliminate an immediate hazard to life or property. The code official shall notify the serving utility, and where- ever possible, the owner and occupant of the building, structure or service system of the decision to disconnect prior to taking such action. If not notified prior to disconnection, the owner or occupant of the building, structure or service system shall be notified in writing, as soon as practicable there- after.

108.7.3 Connection after order to disconnect. A person shall not make energy source connections to installations regulated by this code which have been disconnected or ordered to be disconnected by the code official, or the use of which has been ordered to be discontinued by the code official until the code official authorizes the reconnection and use of such installations.

When an installation is maintained in violation of this code, and in violation of a notice issued pursuant to the provisions of this section, the code official shall institute appropriate action to prevent, restrain, correct or abate the violation.

108.7.4 Signs and Identification. Any person, firm, company or corporation engaged in the installation or repair of a plumbing system as defined in this code shall prominently in legible manner display on both sides of all service and installation vehicles the company name, company master plumbing or gas fitter supervisor license number in letters not less than 2 inches (51 mm) high. Additionally the company name, license number and phone number shall be displayed in all advertisements. Signs having the same requirements shall be displayed at all job sites where new plumbing work is being performed. Job site signs shall not be less than 8.5 by 11 inches (216 by 279 mm) in size. Any person installing plumbing and natural gas shall at all times

have available on the job site their personal plumbing and or natural gas fitter's license.

SECTION 109 CODE BOOK FEES

~~109.1 The price of this code book shall be: \$50.00, which includes the binder. All other regulations governing the costs of the Arkansas Fuel Gas Code are hereby repealed.~~

SECTION 110 TEMPORARY EQUIPMENT, SYSTEMS AND USES

110.1 General. The code official is authorized to issue a permit for temporary *equipment, systems and uses*. Such permits shall be limited as to time of service, but shall not be permitted for more than 180 days. The code official is authorized to grant extensions for demonstrated cause.

110.2 Conformance. Temporary *equipment, systems and uses* shall conform to the structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary requirements of this code as necessary to ensure the public health, safety and general welfare.

110.3 Temporary utilities. The code official is authorized to give permission to temporarily supply utilities before an installation has been fully completed and the final certificate of completion has been issued. The part covered by the temporary certificate shall comply with the requirements specified for temporary lighting, heat or power in the code.

110.4 Termination of approval. The code official is authorized to terminate such permit for a temporary structure or use and to order the temporary structure or use to be discontinued.

DRAFT

CHAPTER 2

DEFINITIONS

User note:

About this chapter: Codes, by their very nature, are technical documents. Every word, term and punctuation mark can add to or change the meaning of a technical requirement. It is necessary to maintain a consensus on the specific meaning of each term contained in the code. Chapter 2 performs this function by stating clearly what specific terms mean for the purposes of the code.

SECTION 201 GENERAL

201.1 Scope. Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code and standard, have the meanings indicated in this chapter.

201.2 Interchangeability. Words used in the present tense include the future; words in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

201.3 Terms defined in other codes. Where terms are not defined in this code and are defined in the *National Electrical Code*, *Arkansas Fire Prevention Code*, *Arkansas Mechanical Code* or *Arkansas Plumbing Code*, such terms shall have meanings ascribed to them as in those codes.

201.4 Terms not defined. Where terms are not defined through the methods authorized by this section, such terms shall have ordinarily accepted meanings such as the context implies.

SECTION 202 GENERAL DEFINITIONS

ACCESS (TO). That which enables a device, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel, door or similar obstruction (see also "Ready access").

ADMINISTRATIVE AUTHORITY. The administrative authority (code official) board, department or agency established and authorized by the state, city or other political subdivision to administer and enforce the provisions of the state Plumbing Code as adopted or amended. "State administrative authority" means the State Health Officer or his or her designee. The state administrative authority (code official) is hereby authorized to enforce the provisions of this code. The state administrative authority is to render interpretations of this code which are consistent with its intent and purpose.

AIR CONDITIONER, GAS-FIRED. A gas-burning, automatically operated appliance for supplying cooled and/or dehumidified air or chilled liquid.

AIR CONDITIONING. The treatment of air so as to control simultaneously the temperature, humidity, cleanness and distribution of the air to meet the requirements of a conditioned space.

AIR, EXHAUST. Air being removed from any space or piece of equipment and conveyed directly to the atmosphere by means of openings or ducts.

AIR-HANDLING UNIT. A blower or fan used for the purpose of distributing supply air to a room, space or area.

AIR, MAKEUP. Air that is provided to replace air being exhausted.

ALTERATION. A change in a system that involves an extension, addition or change to the arrangement, type or purpose of the original installation.

ANODELESS RISER. A transition assembly in which plastic piping is installed and terminated above ground outside of a building.

APPLIANCE (EQUIPMENT). Any apparatus or ~~equipment~~ device that utilizes ~~gas as a fuel~~ or raw material to produce light, heat, power, refrigeration or air conditioning. Also, an apparatus that compresses fuel gases.

APPLIANCE, AUTOMATICALLY CONTROLLED. Appliances equipped with an automatic burner ignition and safety shutoff device and other automatic devices which accomplish complete turn-on and shutoff of the gas to the main burner or burners and graduate the gas supply to the burner or burners, but do not affect complete shutoff of the gas.

APPLIANCE, FAN-ASSISTED COMBUSTION. An appliance equipped with an integral mechanical means to either draw or force products of combustion through the combustion chamber or heat exchanger.

~~APPLIANCE, AUTOMATICALLY CONTROLLED.~~ ~~Appliances equipped with an automatic burner ignition and safety shutoff device and other automatic devices which accomplish complete turn-on and shutoff of the gas to the main burner or burners, and graduate the gas supply to the burner or burners, but do not affect complete shutoff of the gas.~~

APPLIANCE TYPE.

Low-heat appliance (residential appliance). Any appliance in which the products of combustion at the point of entrance to the flue under normal operating conditions have a temperature of 1,000°F (538°C) or less.

Medium-heat appliance. Any appliance in which the products of combustion at the point of entrance to the flue under normal operating conditions have a temperature of more than 1,000°F (538°C), but not greater than 2,000°F (1093°C).

APPLIANCE, UNVENTED. An appliance designed or installed in such a manner that the products of combustion are not conveyed by a vent or chimney directly to the outside atmosphere.

APPLIANCE, VENTED. An appliance designed and installed in such a manner that all of the products of combustion are conveyed directly from the appliance to the outside atmosphere through an approved chimney or vent system.

APPROVED. Acceptable to the code. ~~official or other authority having jurisdiction.~~

APPROVED AGENCY. An established and recognized agency that is approved by the code official and regularly engaged in conducting tests or furnishing inspection services.

ATMOSPHERIC PRESSURE. The pressure of the weight of air and water vapor on the surface of the earth, approximately 14.7 pounds per square inch (psi) (101 kPa absolute) at sea level.

AUTOMATIC IGNITION. Ignition of gas at the burner(s) when the gas controlling device is turned on, including reignition if the flames on the burner(s) have been extinguished by means other than by the closing of the gas controlling device.

BAFFLE. An object placed in an appliance to change the direction of or retard the flow of air, air-gas mixtures or flue gases.

BAROMETRIC DRAFT REGULATOR. A balanced damper device attached to a chimney, vent connector, breeching or flue gas manifold to protect combustion equipment by controlling chimney draft. A double-acting barometric draft regulator is one whose balancing damper is free to move in either direction to protect combustion equipment from both excessive draft and backdraft.

BOILER, LOW-PRESSURE. A self-contained appliance for supplying steam or hot water.

Hot water heating boiler. A boiler in which no steam is generated, from which hot water is circulated for heating purposes and then returned to the boiler, and that operates at water pressures not exceeding 160 pounds per square inch gauge (psig) (1100 kPa gauge) and at water temperatures not exceeding 250°F (121°C) at or near the boiler outlet.

Hot water supply boiler. A boiler, completely filled with water, which furnishes hot water to be used externally to itself, and that operates at water pressures not exceeding 160 psig (1100 kPa gauge) and at water temperatures not exceeding 250°F (121°C) at or near the boiler outlet.

Steam heating boiler. A boiler in which steam is generated and that operates at a steam pressure not exceeding 15 psig (100 kPa gauge).

BONDING JUMPER. A conductor installed to electrically connect metallic gas piping to the grounding electrode system.

BRAZING. A metal-joining process wherein coalescence is produced by the use of a nonferrous filler metal having a melting point above 1,000°F (538°C), but lower than that of the base metal being joined. The filler material is distributed between the closely fitted surfaces of the joint by capillary action.

BROILER. A general term including salamanders, barbecues and other appliances cooking primarily by radiated heat, excepting toasters.

BTU. Abbreviation for British thermal unit, which is the quantity of heat required to raise the temperature of 1 pound (454 g) of water 1°F (0.56°C) (1 Btu = 1055 J).

BUILDING PIPING. The gas piping from the point where it enters the building to and including the outlets. This is applicable where the gas meter is located some distance from the building.

BURNER. A device for the final conveyance of the gas, or a

mixture of gas and air, to the combustion zone.

Induced-draft. A burner that depends on draft induced by a fan that is an integral part of the appliance and is located downstream from the burner.

Power. A burner in which gas, air or both are supplied at pressures exceeding, for gas, the line pressure, and for air, atmospheric pressure, with this added pressure being applied at the burner.

CHIMNEY. A primarily vertical structure containing one or more flues, for the purpose of carrying gaseous products of combustion and air from an appliance to the outside atmosphere.

Factory-built chimney. A listed and labeled chimney composed of factory-made components, assembled in the field in accordance with manufacturer's instructions and the conditions of the listing.

Masonry chimney. A field-constructed chimney composed of solid masonry units, bricks, stones or concrete.

Metal chimney. A field-constructed chimney of metal.

CLEARANCE. The minimum distance through air measured between the heat-producing surface of the mechanical appliance, device or equipment and the surface of the combustible material or assembly.

CLOTHES DRYER. An appliance used to dry wet laundry by means of heated air. Dryer classifications are as follows:

Type 1. Factory-built package, multiple production. Primarily used in family living environment. Usually the smallest unit physically and in function output.

Type 2. Factory-built package, multiple production. Used in business with direct intercourse of the function with the public. Not designed for use in individual family living environment.

CODE. These regulations, subsequent amendments thereto or any emergency rule or regulation that the administrative authority having jurisdiction has lawfully adopted.

CODE OFFICIAL. The officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative.

COMBUSTIBLE ASSEMBLY. Wall, floor, ceiling or other assembly constructed of one or more component materials that are not defined as noncombustible.

COMBUSTIBLE MATERIAL. Any material not defined as noncombustible.

COMBUSTION. In the context of this code, refers to the rapid oxidation of fuel accompanied by the production of heat or heat and light.

COMBUSTION AIR. Air necessary for complete combustion of a fuel, including theoretical air and excess air.

COMBUSTION CHAMBER. The portion of an appliance within which combustion occurs.

COMBUSTION PRODUCTS. Constituents resulting from the combustion of a fuel with the oxygen of the air, including inert gases, but excluding excess air.

CONCEALED LOCATION. A location that cannot be accessed without damaging permanent parts of the building

structure or finish surface. Spaces above, below or behind readily removable panels or doors shall not be considered as concealed.

CONCEALED PIPING. Piping that is located in a concealed location (see “Concealed location”).

CONDENSATE. The liquid that condenses from a gas (including flue gas) caused by a reduction in temperature or increase in pressure.

CONNECTOR, APPLIANCE (Fuel). Rigid metallic pipe and fittings, semirigid metallic tubing and fittings or a listed and labeled device that connects an appliance to the gas piping system.

CONNECTOR, CHIMNEY OR VENT. The pipe that connects an appliance to a chimney or vent.

CONSTRUCTION DOCUMENTS. All of the written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of the project necessary for obtaining a mechanical permit.

CONTROL. A manual or automatic device designed to regulate the gas, air, water or electrical supply to, or operation of, a mechanical system.

CONVERSION BURNER. A unit consisting of a burner and its controls for installation in an appliance originally utilizing another fuel.

COUNTER APPLIANCES. Appliances such as coffee brewers and coffee urns and any appurtenant water-heating equipment, food and dish warmers, hot plates, griddles, waffle makers and other appliances designed for installation on or in a counter.

CUBIC FOOT. The amount of gas that occupies 1 cubic foot (0.02832 m³) when at a temperature of 60°F (16°C), saturated with water vapor and under a pressure equivalent to that of 30 inches of mercury (101 kPa).

DAMPER. A manually or automatically controlled device to regulate draft or the rate of flow of air or combustion gases.

DECORATIVE APPLIANCE, VENTED. A vented appliance wherein the primary function lies in the aesthetic effect of the flames.

DECORATIVE APPLIANCES FOR INSTALLATION IN VENTED FIREPLACES. A vented appliance designed for installation within the fire chamber of a vented fireplace, wherein the primary function lies in the aesthetic effect of the flames.

DEMAND. The maximum amount of gas input required per unit of time, usually expressed in cubic feet per hour, or Btu/h (1 Btu/h = 0.2931 W).

DEPARTMENT. The Arkansas Plumbing and Natural Gas Section.

DESIGN FLOOD ELEVATION. The elevation of the “design flood,” including wave height, relative to the datum specified on the community’s legally designated flood hazard map.

DILUTION AIR. Air that is introduced into a draft hood and is mixed with the flue gases.

DIRECT-VENT APPLIANCES. Appliances that are constructed and installed so that all air for combustion is derived

directly from the outside atmosphere and all flue gases are discharged directly to the outside atmosphere.

DRAFT. The pressure difference existing between the equipment or any component part and the atmosphere, that causes a continuous flow of air and products of combustion through the gas passages of the appliance to the atmosphere.

Mechanical or induced draft. The pressure difference created by the action of a fan, blower or ejector, that is located between the appliance and the chimney or vent termination.

Natural draft. The pressure difference created by a vent or chimney because of its height, and the temperature difference between the flue gases and the atmosphere.

DRAFT HOOD. A nonadjustable device built into an appliance, or made as part of the vent connector from an appliance, that is designed to (1) provide for ready escape of the flue gases from the appliance in the event of no draft, backdraft or stoppage beyond the draft hood, (2) prevent a backdraft from entering the appliance, and (3) neutralize the effect of stack action of the chimney or gas vent upon operation of the appliance.

DRAFT REGULATOR. A device that functions to maintain a desired draft in the appliance by automatically reducing the draft to the desired value.

DRIP. The container placed at a low point in a system of piping to collect condensate and from which the condensate is removable.

DRY GAS. A gas having a moisture and hydrocarbon dew point below any normal temperature to which the gas piping is exposed.

DUCT FURNACE. A warm-air furnace normally installed in an air distribution duct to supply warm air for heating. This definition shall apply only to a warm-air heating appliance that depends for air circulation on a blower not furnished as part of the furnace.

DUCT SYSTEM. A continuous passageway for the transmission of air that, in addition to ducts, includes duct fittings, dampers, plenums, fans and accessory air-handling equipment.

DWELLING UNIT. A single unit providing complete, independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking and sanitation.

EQUIPMENT. See “Appliance.” Apparatus and devices other than appliances.

EXCESS FLOW VALVE (EFV). A valve designed to activate when the fuel gas passing through it exceeds a prescribed flow rate.

EXTERIOR MASONRY CHIMNEYS. Masonry chimneys exposed to the outdoors on one or more sides below the roof line.

FIREPLACE. A fire chamber and hearth constructed of noncombustible material for use with solid fuels and provided with a chimney.

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

Factory-built fireplace. A fireplace composed of listed factory-built components assembled in accordance with the terms of listing to form the completed fireplace.

FIRING VALVE. A valve of the plug and barrel type designed for use with gas, and equipped with a lever handle for manual operation and a dial to indicate the percentage of opening.

FLAME SAFEGUARD. A device that will automatically shut off the fuel supply to a main burner or group of burners when the means of ignition of such burners becomes inoperative, and when flame failure occurs on the burner or group of burners.

FLASHBACK ARRESTOR CHECK VALVE. A device that will prevent the backflow of one gas into the supply system of another gas and prevent the passage of flame into the gas supply system.

FLOOD HAZARD AREA. The greater of the following two areas:

1. The area within a floodplain subject to a 1 percent or greater chance of flooding in any given year.
2. This area designated as a flood hazard area on a community's flood hazard map, or otherwise legally designated.

FLOOR FURNACE. A completely self-contained furnace suspended from the floor of the space being heated, taking air for combustion from outside such space and with means for observing flames and lighting the appliance from such space.

Gravity type. A floor furnace depending primarily upon circulation of air by gravity. This classification shall also include floor furnaces equipped with booster-type fans which do not materially restrict free circulation of air by gravity flow when such fans are not in operation.

Fan type. A floor furnace equipped with a fan which provides the primary means for circulating air.

FLUE, APPLIANCE. The passage(s) within an appliance through which combustion products pass from the combustion chamber of the appliance to the draft hood inlet opening on an appliance equipped with a draft hood or to the outlet of the appliance on an appliance not equipped with a draft hood.

FLUE COLLAR. That portion of an appliance designed for the attachment of a draft hood, vent connector or venting system.

FLUE GASES. Products of combustion plus excess air in appliance flues or heat exchangers.

FLUE LINER (LINING). A system or material used to form the inside surface of a flue in a chimney or vent, for the purpose of protecting the surrounding structure from the effects of combustion products and for conveying combustion products without leakage to the atmosphere.

FUEL GAS. A natural gas, manufactured gas, liquefied petroleum gas or mixtures of these gases.

~~FUEL GAS UTILIZATION EQUIPMENT.~~ See "Appliance."

FURNACE. A completely self-contained heating unit that is designed to supply heated air to spaces remote from or adjacent to the appliance location.

FURNACE, CENTRAL. A self-contained appliance for heating air by transfer of heat of combustion through metal to the air, and designed to supply heated air through ducts to spaces remote from or adjacent to the appliance location.

~~**Downflow furnace.** A furnace designed with airflow discharge vertically downward at or near the bottom of the furnace.~~

~~**Forced air furnace with cooling unit.** A single package unit, consisting of a gas fired forced air furnace of one of the types listed below combined with an electrically or fuel gas powered summer air conditioning system, contained in a common casing.~~

~~**Forced air type.** A central furnace equipped with a fan or blower which provides the primary means for circulation of air.~~

~~**Gravity furnace with booster fan.** A furnace equipped with a booster fan that does not materially restrict free circulation of air by gravity flow when the fan is not in operation.~~

~~**Gravity type.** A central furnace depending primarily on circulation of air by gravity.~~

~~**Horizontal forced air type.** A furnace with a irf low through the appliance essentially in a horizontal path.~~

~~**Multiple position furnace.** A furnace designed so that it can be installed with the airflow discharge in the upflow, horizontal or downflow direction.~~

~~**Upflow furnace.** A furnace designed with airflow discharge vertically upward at or near the top of the furnace. This classification includes "highboy" furnaces with the blower mounted below the heating element and "lowboy" furnaces with the blower mounted beside the heating element.~~

FURNACE, ENCLOSED. A specific heating, or heating and ventilating, furnace incorporating an integral total enclosure and using only outside air for combustion.

FURNACE PLENUM. An air compartment or chamber to which one or more ducts are connected and which forms part of an air distribution system.

GAS CONVENIENCE OUTLET. A permanently mounted, manually operated device that provides the means for connecting an appliance to, and disconnecting an appliance from, the supply piping. The device includes an integral, manually operated valve with a nondisplaceable valve member and is designed so that disconnection of an appliance only occurs when the manually operated valve is in the closed position.

GAS PIPING. An installation of pipe, valves or fittings installed on a premises or in a building and utilized to convey fuel gas.

GAS UTILIZATION EQUIPMENT. An appliance that utilizes gas as a fuel or raw material or both.

HAZARDOUS LOCATION. Any location considered to be a fire hazard for flammable vapors, dust, combustible fibers or other highly combustible substances. The location is not necessarily categorized in the building code as a high-hazard group classification.

HOUSE PIPING. See "Piping system."

IGNITION PILOT. A pilot that operates during the lighting cycle and discontinues during main burner operation.

IGNITION SOURCE. A flame, spark or hot surface capable of igniting flammable vapors or fumes. Such sources include appliance burners, burner ignitors, and electrical switching devices.

INCINERATOR. An appliance used to reduce combustible refuse material to ashes and which is manufactured, sold and installed as a complete unit.

INDUSTRIAL AIR HEATERS, DIRECT-FIRED NONRECIRCULATING. A heater in which all the products of combustion generated by the burners are released into the air stream being heated. The purpose of the heater is to offset building heat loss by heating only outdoor air.

INDUSTRIAL AIR HEATERS, DIRECT-FIRED RECIRCULATING. A heater in which all the products of combustion generated by the burners are released into the air stream being heated. The purpose of the heater is to offset building heat loss by heating outdoor air, and, if applicable, indoor air.

INFRARED RADIANT HEATER. A heater that directs a substantial amount of its energy output in the form of infrared radiant energy into the area to be heated. Such heaters are of either the vented or unvented type.

JOINT, FLANGED. A joint made by bolting together a pair of flanged ends.

JOINT, FLARED. A metal-to-metal compression joint in which a conical spread is made on the end of a tube that is compressed by a flare nut against a mating flare.

JOINT, MECHANICAL. A general form of gas-tight joints obtained by the joining of metal parts through a positive-holding mechanical construction, such as a press joint, flanged joint, threaded joint, flared joint or compression joint.

JOINT, PLASTIC ADHESIVE. A joint made in thermoset plastic piping by the use of an adhesive substance which forms a continuous bond between the mating surfaces without dissolving either one of them.

JOINT, PLASTIC HEAT FUSION. A joint made in thermoplastic piping by heating the parts sufficiently to permit fusion of the materials when the parts are pressed together.

JOINT, WELDED. A gas-tight joint obtained by the joining of metal parts in molten state.

LABELED. ~~Devices, equipment~~ Equipment, appliances or materials or products to which have been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, approved inspection agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and by whose label indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose. ~~the manufacturer attests to compliance with applicable nationally recognized standards.~~

LEAK CHECK. An operation performed on a gas piping system to verify that the system does not leak.

LIMIT CONTROL. A device responsive to changes in pressure, temperature or level for turning on, shutting off or throttling the gas supply to an appliance.

LIQUEFIED PETROLEUM GAS or LPG (LP-GAS). Liquefied petroleum gas composed predominately of propane, propylene, butanes or butylenes, or mixtures thereof that is gaseous under normal atmospheric conditions, but is capable of being liquefied under moderate pressure at normal temperatures.

LISTED. ~~Equipment, appliances or materials~~ products or services included in a list published by an organization acceptable to the code official and a nationally recognized testing laboratory, inspection agency or other organization concerned with product evaluation of products or services that maintains

periodic inspection of production of listed equipment, ~~appliances or materials~~ or periodic evaluation of services, and whose listing states either that the equipment, ~~appliance or material~~, product or services meets identified nationally recognized standards or has been tested and found suitable for use in a specified purpose. ~~The means for identifying listed equipment, appliances or materials may vary for each testing laboratory, inspection agency or other organization concerned with product evaluation, some of which do not recognize equipment, appliances or materials as listed unless they are also labeled. The authority having jurisdiction shall utilize the system employed by the listing organization to identify a listed product.~~

LIVING SPACE. Space within a dwelling unit utilized for living, sleeping, eating, cooking, bathing, washing and sanitation purposes.

LOG LIGHTER. A manually operated solid fuel ignition appliance for installation in a vented solid fuel-burning fireplace.

LUBRICATED PLUG-TYPE VALVE. A valve of the plug and barrel type provided with means for maintaining a lubricant between the bearing surfaces.

MAIN BURNER. A device or group of devices essentially forming an integral unit for the final conveyance of gas or a mixture of gas and air to the combustion zone, and on which combustion takes place to accomplish the function for which the appliance is designed.

METER. The instrument installed to measure the volume of gas delivered through it.

MODULATING. Modulating or throttling is the action of a control from its maximum to minimum position in either predetermined steps or increments of movement as caused by its actuating medium.

NONCOMBUSTIBLE MATERIALS. Materials that, where tested in accordance with ASTM E136, have not fewer than three of four specimens tested meeting all of the following criteria:

- 1.The recorded temperature of the surface and interior thermocouples shall not at any time during the test rise more than 54°F (30°C) above the furnace temperature at the beginning of the test.
- 2.There shall not be flaming from the specimen after the first 30 seconds.
- 3.If the weight loss of the specimen during testing exceeds 50 percent, the recorded temperature of the surface and interior thermocouples shall not at any time during the test rise above the furnace air temperature at the beginning of the test, and there shall not be flaming of the specimen.

OCCUPANCY. The purpose for which a building, or portion thereof, is utilized or occupied.

OFFSET (VENT). A combination of approved bends that makes two changes in direction bringing one section of the vent out of line but into a line parallel with the other section.

ORIFICE. The opening in a cap, spud or other device whereby the flow of gas is limited and through which the gas is discharged to the burner.

OUTLET. A threaded connection or bolted flange in a pipe system to which a gas-burning appliance is attached.

OXYGEN DEPLETION SAFETY SHUTOFF SYSTEM (ODS). A system designed to act to shut off the gas supply to the main and pilot burners if the oxygen in the surrounding atmosphere is reduced below a predetermined level.

PILOT. A small flame that is utilized to ignite the gas at the main burner or burners.

PIPING. Where used in this code, "piping" refers to either pipe or tubing, or both.

Pipe. A rigid conduit of iron, steel, copper, copper-alloy brass or plastic.

Tubing. Semirigid conduit of copper, copper-alloy, aluminum, plastic or steel.

PIPING SYSTEM. All fuel piping, valves and fittings from the outlet of the point of delivery to the outlets of the equipment shutoff valves.

PLASTIC, THERMOPLASTIC. A plastic that is capable of being repeatedly softened by increase of temperature and hardened by decrease of temperature.

POINT OF DELIVERY. For natural gas systems, the point of delivery is the outlet of the service meter assembly or the outlet of the service regulator or service shutoff valve where a meter is not provided. Where a valve is provided at the outlet of the service meter assembly, such valve shall be considered to be downstream of the point of delivery.

PORTABLE FUEL CELL APPLIANCE. A fuel cell generator of electricity, which is not fixed in place. A portable fuel cell appliance utilizes a cord and plug connection to a grid-isolated load and has an integral fuel supply.

PRESSURE DROP. The loss in pressure due to friction or obstruction in pipes, valves, fittings, regulators and burners.

PRESSURE TEST. An operation performed to verify the gas-tight integrity of gas piping following its installation or modification.

PURGE. To free a gas conduit of air or gas, or a mixture of gas and air.

QUICK-DISCONNECT DEVICE. A hand-operated device that provides a means for connecting and disconnecting an appliance or an appliance connector to a gas supply and that is equipped with an automatic means to shut off the gas supply when the device is disconnected.

READY ACCESS (TO). That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel, door or similar obstruction (see "Access").

REGISTERED DESIGN PROFESSIONAL. An individual who is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws of the state or jurisdiction in which the project is to be constructed.

REGULATOR. A device for controlling and maintaining a uniform supply pressure, either pounds-to-inches water column (MP regulator) or inches-to-inches water column (appliance regulator).

REGULATOR, GAS APPLIANCE. A pressure regulator for controlling pressure to the manifold of ~~equipment~~ the appliance. Types of regulators are as follows:

Adjustable.

~~1. Spring type, limited adjustment. A regulator in which the regulating force acting upon the diaphragm is derived principally from a spring, the loading of which is adjustable over a range of not more than 15 percent of the outlet pressure at the midpoint of the adjustment range.~~

~~2. Spring type, standard adjustment. A regulator in which the regulating force acting upon the diaphragm is derived principally from a spring, the loading of which is adjustable. The adjustment means shall be concealed.~~

~~**Multistage.** A regulator for use with a single gas whose adjustment means is capable of being positioned manually or automatically to two or more predetermined outlet pressure settings. Each of these settings shall be adjustable or nonadjustable. The regulator may modulate outlet pressures automatically between its maximum and minimum predetermined outlet pressure settings.~~

~~**Nonadjustable.**~~

~~1. Spring type, nonadjustable. A regulator in which the regulating force acting upon the diaphragm is derived principally from a spring, the loading of which is not field adjustable.~~

~~2. Weight type. A regulator in which the regulating force acting upon the diaphragm is derived from a weight or combination of weights.~~

REGULATOR, LINE GAS PRESSURE. A device placed in a gas line between the service pressure regulator and the equipment for controlling, maintaining or reducing the pressure in that portion of the piping system downstream of the device.

REGULATOR, MEDIUM-PRESSURE (MP Regulator). A line pressure regulator that reduces gas pressure from the range of greater than 0.5 psig (3.4 kPa) and less than or equal to 5 psig (34.5 kPa) to a lower pressure.

REGULATOR, MONITORING. A pressure regulator set in series with another pressure regulator for the purpose of automatically taking control of the pressure downstream of the monitored regulator when that pressure exceeds a set minimum.

REGULATOR, PRESSURE. A device placed in a gas line for reducing, controlling and maintaining the pressure in that portion of the piping system downstream of the device.

REGULATOR, SERIES. A pressure regulator in series with one or more other pressure regulators.

REGULATOR, SERVICE PRESSURE. A device installed by the serving gas supplier to reduce and limit the service line pressure to delivery pressure.

RELIEF OPENING. The opening provided in a draft hood to permit the ready escape to the atmosphere of the flue products from the draft hood in the event of no draft, back draft, or stoppage beyond the draft hood, and to permit air into the draft hood in the event of a strong chimney updraft.

RELIEF VALVE (DEVICE). A safety valve designed to forestall the development of a dangerous condition by relieving either pressure, temperature or vacuum in the hot water supply system.

RELIEF VALVE, PRESSURE. An automatic valve that opens and closes a relief vent, depending on whether the pressure is above or below a predetermined value.

RELIEF VALVE, TEMPERATURE.

Reseating or self-closing type. An automatic valve that opens and closes a relief vent, depending on whether the temperature is above or below a predetermined value.

Manual reset type. A valve that automatically opens a relief vent at a predetermined temperature and that must be manually returned to the closed position.

RELIEF VALVE, VACUUM. A valve that automatically opens and closes a vent for relieving a vacuum within the hot water supply system, depending on whether the vacuum is above or below a predetermined value.

RISER, GAS. A vertical pipe supplying fuel gas.

ROOM HEATER, UNVENTED. See “Unvented room heater.”

ROOM HEATER, VENTED. A free-standing heating unit used for direct heating of the space in and adjacent to that in which the unit is located (see also “Vented room heater”).

~~**ROOM LARGE IN COMPARISON WITH SIZE OF EQUIPMENT.** Rooms having a volume equal to at least 12 times the total volume of a furnace or air conditioning appliance and at least 16 times the total volume of a boiler. Total volume of the appliance is determined from exterior dimensions and is to include fan compartments and burner vestibules, when used. When the actual ceiling height of a room is greater than 8 feet (2438 mm), the volume of the room is figured on the basis of a ceiling height of 8 feet (2438 mm).~~

SAFETY SHUTOFF DEVICE. See “Flame safeguard.”

SHAFT. An enclosed space extending through one or more stories of a building, connecting vertical openings in successive floors, or floors and the roof.

SLEEPING UNIT. A room or space in which people sleep, which can also include permanent provisions for living, eating and either sanitation or kitchen facilities, but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.

SPECIFIC GRAVITY. As applied to gas, specific gravity is the ratio of the weight of a given volume to that of the same volume of air, both measured under the same condition.

STATIONARY FUEL CELL POWER PLANT. A self-contained package or factory-matched packages which constitute an automatically operated assembly of integrated systems for generating electrical energy and recoverable thermal energy that is permanently connected and fixed in place.

THERMOSTAT.

Electric switch type. A device that senses changes in temperature and controls electrically, by means of separate components, the flow of gas to the burner(s) to maintain selected temperatures.

~~**Integral gas valve type.** An automatic device, actuated by temperature changes, designed to control the gas supply to the burner(s) in order to maintain temperatures between predetermined limits, and in which the thermal actuating element is an integral part of the device.~~

~~1. **Graduating thermostat.** A thermostat in which the motion of the valve is approximately in direct proportion to the effective motion of the thermal element induced by temperature change.~~

~~2. **Snap-acting thermostat.** A thermostat in which the thermostatic valve travels instantly from the closed to the open position, and vice versa.~~

THIRD-PARTY CERTIFICATION AGENCY. An approved agency operating a product or material certification system that incorporates initial product testing, assessment and surveillance of a manufacturer’s quality control system.

THIRD-PARTY CERTIFICATION AGENCY, FOR FACTORY-BUILT STRUCTURES. A manufacturer of modular or factory-built structures, other than manufactured housing governed by the United States Department of Housing and Urban Development, located in the State of Arkansas must contract with an independent third-party compliance assurance and/or inspection agency that is listed with the International Accreditation Service, Inc., for the inspection of modular or factory-built buildings destined for delivery within the state for compliance with the *Arkansas Fire Protection Code* and applicable state and municipal electrical, plumbing and mechanical codes relating to construction of new buildings. No further inspection by state or local building officials is required for that part of the structure built in the factory. A copy of the third-party inspection shall accompany the building to the construction site for review. The cost of the independent third-party inspection shall be borne by the modular building manufacturer.

THIRD-PARTY CERTIFIED. Certification obtained by the manufacturer indicating that the function and performance characteristics of a product or material have been determined by testing and ongoing surveillance by an approved third-party certification agency. Assertion of certification is in the form of identification in accordance with the requirements of the third-party certification agency.

THIRD-PARTY TESTED. Procedure by which an approved testing laboratory provides documentation that a product, material or system conforms to specified requirements.

TOILET, GAS-FIRED. A packaged and completely assembled appliance containing a toilet that incinerates refuse instead of flushing it away with water.

TRANSITION FITTINGS, PLASTIC TO STEEL. An adapter for joining plastic pipe to steel pipe. The purpose of this fitting is to provide a permanent, pressure-tight connection between two materials which cannot be joined directly one to another.

UNIT HEATER.

~~**High-static pressure type.** A self-contained, automatically controlled, vented appliance having integral means for circulation of air against 0.2 inch (15mm H₂O) or greater static pressure. Such appliance is equipped with provisions for attaching an outlet air duct and, where the appliance is for indoor installation remote from the space to be heated, is also equipped with provisions for attaching an inlet air duct.~~

~~**Low-static pressure type.** A self-contained, automatically controlled, vented appliance, intended for installation in the space to be heated without the use of ducts, having integral means for circulation of air. Such units are allowed to be equipped with louvers or face extensions made in accordance with the manufacturer’s specifications.~~

UNLISTED BOILER. A boiler not listed by a nationally recognized testing agency.

UNVENTED ROOM HEATER. An unvented heating appliance designed for stationary installation and utilized to provide comfort heating. Such appliances provide radiant heat or convection heat by gravity or fan circulation directly from the heater and do not utilize ducts.

VALVE. A device used in piping to control the gas supply to any section of a system of piping or to an appliance.

Appliance shutoff. A valve located in the piping system, used to isolate individual appliances for purposes such as service or replacement.

Automatic. 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. The operator shall be actuated by application of gas pressure on a flexible diaphragm, by electrical means, by mechanical means, or by other approved means.

Automatic gas shutoff. A valve used in conjunction with an automatic gas shutoff device to shut off the gas supply to a water-heating system. It shall be constructed integrally with the gas shutoff device or shall be a separate assembly.

~~**Equipment shutoff.** A valve located in the piping system, used to isolate individual equipment for purposes such as service or replacement.~~

Individual main burner. A valve that controls the gas supply to an individual main burner.

Main burner control. A valve that controls the gas supply to the main burner manifold.

Manual main gas-control. A manually operated valve in the gas line for the purpose of completely turning on or shutting off the gas supply to the appliance, except to pilot or pilots that are provided with independent shutoff.

Manual reset. 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.

Service shutoff. A valve, installed by the serving gas supplier between the service meter or source of supply and the customer piping system, to shut off the entire piping system.

VENT. A pipe or other conduit composed of factory-made components, containing a passageway for conveying combustion products and air to the atmosphere, listed and labeled for use with a specific type or class of appliance.

Special gas vent. A vent listed and labeled for use with listed Category II, III and IV appliances.

Type B vent. A vent listed and labeled for use with appliances with draft hoods and other Category I appliances that are listed for use with Type B vents.

Type BW vent. A vent listed and labeled for use with wall furnaces.

Type L vent. A vent listed and labeled for use with appliances that are listed for use with Type L or Type B vents.

VENT CONNECTOR. See "Connector."

VENT GASES. Products of combustion from appliances plus excess air plus dilution air in the vent connector, gas vent or chimney above the draft hood or draft regulator.

VENT PIPING

Breather. Piping run from a pressure-regulating device to the outdoors, designed to provide a reference to atmospheric pressure. If the device incorporates an integral pressure relief mechanism, a breather vent can also serve as a relief vent.

Relief. Piping run from a pressure-regulating or pressure-limiting device to the outdoors, designed to provide for the safe venting of gas in the event of excessive pressure in the gas piping system.

VENTED APPLIANCE CATEGORIES. Appliances that are categorized for the purpose of vent selection are classified into the following four categories:

Category I. An appliance that operates with a nonpositive vent static pressure and with a vent gas temperature that avoids excessive condensate production in the vent.

Category II. An appliance that operates with a nonpositive vent static pressure and with a vent gas temperature that is capable of causing excessive condensate production in the vent.

Category III. An appliance that operates with a positive vent static pressure and with a vent gas temperature that avoids excessive condensate production in the vent.

Category IV. An appliance that operates with a positive vent static pressure and with a vent gas temperature that is capable of causing excessive condensate production in the vent.

VENTED ROOM HEATER. A vented self-contained, free-standing, nonrecessed appliance for furnishing warm air to the space in which it is installed, directly from the heater without duct connections.

VENTED WALL FURNACE. A self-contained vented appliance complete with grilles or equivalent, designed for incorporation in or permanent attachment to the structure of a building, mobile home or travel trailer, and furnishing heated air circulated by gravity or by a fan directly into the space to be heated through openings in the casing. This definition shall exclude floor furnaces, unit heaters and central furnaces as herein defined.

VENTING SYSTEM. A continuous open passageway from the flue collar or draft hood of an appliance to the outside atmosphere for the purpose of removing flue or vent gases. A venting system is usually composed of a vent or a chimney and vent connector, if used, assembled to form the open passageway.

Mechanical draft venting system. A venting system designed to remove flue or vent gases by mechanical means, that consists of an induced draft portion under nonpositive static pressure or a forced draft portion under positive static pressure.

Forced-draft venting system. A portion of a venting system using a fan or other mechanical means to cause the removal of flue or vent gases under positive static vent pressure.

Induced draft venting system. A portion of a venting system using a fan or other mechanical means to cause the

removal of flue or vent gases under nonpositive static vent pressure.

Natural draft venting system. A venting system designed to remove flue or vent gases under nonpositive static vent pressure entirely by natural draft.

WALL HEATER, UNVENTED-TYPE. A room heater of the type designed for insertion in or attachment to a wall or partition. Such heater does not incorporate concealed venting arrangements in its construction and discharges all products of combustion through the front into the room being heated.

WATER HEATER. Any heating appliance or equipment that heats potable water and supplies such water to the potable hot water distribution system.

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CHAPTER 3

GENERAL REGULATIONS

User note:

About this chapter: Chapter 3 addresses many unrelated topics that would be out of place in other chapters that address specific subjects. Topics include listing and labeling, structural safety, appliance locations, access, combustion air, installation requirements, clearances, electrical bonding and condensate disposal.

SECTION 301

GENERAL

301.1 Scope. This chapter shall govern the approval and installation of all equipment and appliances that comprise parts of the installations regulated by this code in accordance with Section 101.2.

301.1.1 Other fuels. The requirements for combustion and dilution air for gas-fired appliances shall be governed by Section 304. The requirements for combustion and dilution air for appliances operating with fuels other than fuel gas shall be regulated by the *Arkansas Mechanical Code*.

301.2 Energy utilization. Heating, ventilating and air-conditioning systems of all structures shall be designed and installed for efficient utilization of energy in accordance with the *Arkansas Energy Code*.

301.3 Listed and labeled. Appliances regulated by this code shall be listed and labeled for the application in which they are used unless otherwise approved in accordance with Section 105. The approval of unlisted appliances in accordance with Section 105 shall be based upon approved engineering evaluation.

301.4 Labeling. Labeling shall be in accordance with the procedures set forth in Sections 301.4.1 through 301.4.2.3.

301.4.1 Testing. An approved agency shall test a representative sample of the appliances being labeled to the relevant standard or standards. The approved agency shall maintain a record of all of the tests performed. The record shall provide sufficient detail to verify compliance with the test standard.

301.4.2 Inspection and identification. The approved agency shall periodically perform an inspection, which shall be in-plant if necessary, of the appliances to be labeled. The inspection shall verify that the labeled appliances are representative of the appliances tested.

301.4.2.1 Independent. The agency to be approved shall be objective and competent. To confirm its objectivity, the agency shall disclose all possible conflicts of interest.

301.4.2.2 Equipment. An approved agency shall have adequate equipment to perform all required tests. The equipment shall be periodically calibrated.

301.4.2.3 Personnel. An approved agency shall employ experienced personnel educated in conducting, supervising and evaluating tests.

301.5 Label information. A permanent factory-applied nameplate(s) shall be affixed to appliances on which shall appear in legible lettering, the manufacturer's name or trademark, the

model number, serial number and, for listed appliances, the seal or mark of the testing agency. A label shall also include the hourly rating in British thermal units per hour (Btu/h) (W); the type of fuel approved for use with the appliance; and the minimum clearance requirements.

301.6 Plumbing connections. Potable water supply and building drainage system connections to appliances regulated by this code shall be in accordance with the *Arkansas Plumbing Code*.

301.7 Fuel types. Appliances shall be designed for use with the type of fuel gas that will be supplied to them.

301.7.1 Appliance fuel conversion. Appliances shall not be converted to utilize a different fuel gas except where complete instructions for such conversion are provided in the installation instructions, by the serving gas supplier or by the appliance manufacturer.

301.8 Vibration isolation. Where means for isolation of vibration of an appliance is installed, an approved means for support and restraint of that appliance shall be provided.

301.9 Repair. Defective material or parts shall be replaced or repaired in such a manner so as to preserve the original approval or listing.

301.10 Wind resistance. Appliances and supports that are exposed to wind shall be designed and installed to resist the wind pressures determined in accordance with the *Arkansas Fire Prevention Code*.

301.11 Flood hazard. For structures located in flood hazard areas, the appliance, equipment and system installations regulated by this code shall be located at or above the design flood elevation and shall comply with the flood-resistant construction requirements of the *Arkansas Fire Prevention Code*.

Exception: The appliance, equipment and system installations regulated by this code are permitted to be located below the design flood elevation provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the design flood elevation and shall comply with the flood-resistant construction requirements of the *Arkansas Fire Prevention Code*.

301.12 Seismic resistance. When earthquake loads are applicable in accordance with the *Arkansas Fire Prevention Code*, the supports shall be designed and installed for the seismic forces in accordance with that code.

301.13 Ducts. All ducts required for the installation of systems regulated by this code shall be designed and installed in accordance with the *Arkansas Mechanical Code*.

301.14 Rodentproofing. Buildings or structures and the walls enclosing habitable or occupiable rooms and spaces in which persons live, sleep or work, or in which feed, food or foodstuffs are stored, prepared, processed, served or sold, shall be constructed to protect against rodents in accordance with the *Arkansas Fire Prevention Code*.

301.15 Prohibited location. The appliances, equipment and systems regulated by this code shall not be located in an elevator shaft.

SECTION 302 STRUCTURAL SAFETY

[B] 302.1 Structural safety. The building shall not be weakened by the installation of any gas piping. In the process of installing or repairing any gas piping, the finished floors, walls, ceilings, tile work or any other part of the building or premises which is required to be changed or replaced shall be left in a safe structural condition in accordance with the requirements of the *Arkansas Fire Prevention Code*.

[B] 302.2 Penetrations of floor/ceiling assemblies and fire-resistance-rated assemblies. Penetrations of floor/ceiling assemblies and assemblies required to have a fire-resistance rating shall be protected in accordance with the *Arkansas Fire Prevention Code*.

[B] 302.3 Cutting, notching and boring in wood members. The cutting, notching and boring of wood members shall comply with Sections 302.3.1 through 302.3.4, except that an installer of natural gas piping and appurtenances shall comply with this section only if the building contractor has provided framing members of sufficient size to allow for the compliances of this section. Inspections concerning structural safety shall be performed by the building inspector in cities, towns, communities or areas where building inspections are performed. In all cases only the minimum amount of framing member should be removed for gas piping and appurtenances to be installed.

[B] 302.3.1 Engineered wood products. Cuts, notches and holes bored in trusses, structural composite lumber, structural glued-laminated members and I-joists are prohibited except where permitted by the manufacturer's recommendations or where the effects of such alterations are specifically considered in the design of the member by a registered design professional.

[B] 302.3.2 Joist notching and boring. Notching at the ends of joists shall not exceed one-fourth the joist depth. Holes bored in joists shall not be within 2 inches (51 mm) of the top and bottom of the joist and their diameter shall not exceed one-third the depth of the member. Notches in the top or bottom of the joist shall not exceed one-sixth the depth and shall not be located in the middle one-third of the span.

[B] 302.3.3 Stud cutting and notching. In exterior walls and bearing partitions, any wood stud is permitted to be cut or notched to a depth not exceeding 25 percent of its width. Cutting or notching of studs to a depth not greater than 40 percent of the width of the stud is permitted in nonload-bearing partitions supporting no loads other than the weight of the partition.

[B] 302.3.4 Bored holes. A hole not greater in diameter than 40 percent of the stud depth is permitted to be bored in any wood stud. Bored holes not greater than 60 percent of the depth of the stud are permitted in nonload-bearing partitions or in any wall where each bored stud is doubled, provided not more than two such successive doubled studs are so bored. In no case shall the edge of the bored hole be nearer than $\frac{5}{8}$ inch (15.9 mm) to the edge of the stud. Bored holes shall not be located at the same section of a stud as a cut or notch.

[B] 302.4 Alterations to trusses. Truss members and components shall not be cut, drilled, notched, spliced or otherwise altered in any way without the written concurrence and approval of a registered design professional. Alterations resulting in the addition of loads to any member (e.g., HVAC equipment, water heaters) shall not be permitted without verification that the truss is capable of supporting such additional loading.

[B] 302.5 Cutting, notching and boring holes in structural steel framing. The cutting, notching and boring of holes in structural steel framing members shall be as prescribed by the registered design professional.

[B] 302.6 Cutting, notching and boring holes in cold-formed steel framing. Flanges and lips of load-bearing, cold-formed steel framing members shall not be cut or notched. Holes in webs of load-bearing, cold-formed steel framing members shall be permitted along the centerline of the web of the framing member and shall not exceed the dimensional limitations, penetration spacing or minimum hole edge distance as prescribed by the registered design professional. Cutting, notching and boring holes of steel floor/roof decking shall be as prescribed by the registered design professional.

[B] 302.7 Cutting, notching and boring holes in nonstructural cold-formed steel wall framing. Flanges and lips of nonstructural cold-formed steel wall studs shall be permitted along the centerline of the web of the framing member, shall not exceed 1½ inches (38 mm) in width or 4 inches (102 mm) in length, and the holes shall not be spaced less than 24 inches (610 mm) center to center from another hole or less than 10 inches (254 mm) from the bearing end.

SECTION 303 APPLIANCE LOCATION

303.1 General. Appliances shall be located as required by this section, specific requirements elsewhere in this code and the conditions of the equipment and appliance listing.

303.2 Hazardous locations. Appliances shall not be located in a hazardous location unless listed and approved for the specific installation.

303.3 Prohibited locations. Appliances shall not be located in sleeping rooms, bathrooms, toilet rooms, storage closets or surgical rooms, or in a space that opens only into such rooms or spaces, except where the installation complies with one of the following:

1. The appliance is a direct-vent appliance installed in accordance with the conditions of the listing and the manufacturer's instructions.
2. Vented room heaters, wall furnaces, vented decorative appliances, vented gas fireplaces, vented gas fireplace heaters and decorative appliances for installation in vented solid fuel-burning fireplaces are installed in

rooms that meet the required volume criteria of Section 304.5.

3. A single wall-mounted unvented room heater is installed in a bathroom and such unvented room heater is equipped as specified in Section 621.6 and has an input rating not greater than 6,000 Btu/h (1.76 kW). The bathroom shall meet the required volume criteria of Section 304.5.
4. A single wall-mounted unvented room heater is installed in a bedroom and such unvented room heater is equipped as specified in Section 621.6 and has an input rating not greater than 10,000 Btu/h (2.93 kW). The bedroom shall meet the required volume criteria of Section 304.5.
5. The appliance is installed in a room or space that opens only into a bedroom or bathroom, and such room or space is used for no other purpose and is provided with a solid weather-stripped door equipped with an approved self-closing device. All combustion air shall be taken directly from the outdoors in accordance with Section 304.6.
6. A clothes dryer is installed in a residential bathroom or toilet room having a permanent opening with an area of not less than 100 square inches (0.06 m²) that communicates with a space outside of a sleeping room, bathroom, toilet room or storage closet.

303.3.1 Fireplaces and decorative appliances in Group I-2, Condition 2 occupancies. Gas fireplace appliances and decorative gas appliances shall be prohibited in Group I-2, Condition 2 occupancies except where such appliances are direct-vent appliances installed in public lobby and waiting areas that are not within smoke compartments containing patient sleeping areas. The appliance controls shall be located where they can be accessed only by facility staff. Such fireplaces shall comply with Sections 501.2 and 604.1 and Section 915 of the Arkansas Fire Code.

303.4 Protection from vehicle impact damage. Appliances shall not be installed in a location subject to vehicle impact damage except where protected by an approved means.

303.5 Indoor locations. Furnaces and boilers installed in closets and alcoves shall be listed for such installation.

303.6 Outdoor locations. Equipment installed in outdoor locations shall be either listed for outdoor installation or provided with protection from outdoor environmental factors that influence the operability, durability and safety of the equipment.

303.7 Pit locations. Appliances installed in pits or excavations shall not come in direct contact with the surrounding soil. The sides of the pit or excavation shall be held back a minimum of 12 inches (305 mm) from the appliance. Where the depth exceeds 12 inches (305 mm) below adjoining grade, the walls of the pit or excavation shall be lined with concrete or masonry, such concrete or masonry shall extend a minimum of 4 inches (102 mm) above adjoining grade and shall have sufficient lateral load-bearing capacity to resist collapse. The appliance shall be protected from flooding in an approved manner.

SECTION 304 COMBUSTION, VENTILATION AND DILUTION AIR

304.1 General. Air for combustion, ventilation and dilution of flue gases for appliances installed in buildings shall be provided by application of one of the methods prescribed in Sections 304.5 through 304.9. Where the requirements of Section 304.5 are not met, outdoor air shall be introduced in accordance with one of the methods prescribed in Sections 304.6 through 304.9. Direct-vent appliances, gas appliances of other than natural draft design and vented gas appliances other than Category I shall be provided with combustion, ventilation and dilution air in accordance with the appliance manufacturer's instructions.

304.2 Appliance location. Appliances shall be located so as not to interfere with proper circulation of combustion, ventilation and dilution air.

304.3 Draft hood/regulator location. Where used, a draft hood or a barometric draft regulator shall be installed in the same room or enclosure as the appliance served so as to prevent any difference in pressure between the hood or regulator and the combustion air supply.

304.4 Makeup air provisions. Makeup air requirements for the operation of exhaust fans, kitchen ventilation systems, clothes dryers and fireplaces shall be considered in determining the adequacy of a space to provide combustion air requirements for category 1 equipment installed in that space. The required makeup air shall be installed in accordance with the *Arkansas Mechanical Code*.

304.5 Indoor combustion air. The required volume of indoor air shall be determined in accordance with Section 304.5.1 or 304.5.2, except that where the air infiltration rate is known to be less than 0.40 air changes per hour (ACH), Section 304.5.2 shall be used. The total required volume shall be the sum of the required volume calculated for all appliances located within the space. Rooms communicating directly with the space in which the appliances are installed through openings not furnished with doors, and through combustion air openings sized and located in accordance with Section 304.5.3, are considered to be part of the required volume.

304.5.1 Standard method. The minimum required volume shall be 50 cubic feet per 1,000 Btu/h (4.8 m³/kW) of the appliance input rating.

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

For appliances other than fan-assisted, calculate volume using Equation 3-1.

$$\text{Required Volume}_{\text{other}} \geq \frac{21 \text{ ft}^3}{\text{ACH}} \left[\frac{I_{\text{other}}}{1,000 \text{ Btu/h}} \right]$$

(Equation 3-1)

For fan-assisted appliances, calculate volume using Equation 3-2.

$$\text{Required Volume}_{\text{fan}} \geq \frac{15 \text{ ft}^3}{\text{ACH}} \left[\frac{I_{\text{fan}}}{1,000 \text{ Btu/h}} \right]$$

(Equation 3-2)

where:

I_{other} = All appliances other than fan assisted (input in Btu/h).

I_{fan} = Fan-assisted *appliance* (input in Btu/h).

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

For purposes of this calculation, an infiltration rate greater than 0.60 ACH shall not be used in Equations 3-1 and 3-2 (see Figure 304.5.3). This method shall be verified by a licensed mechanical Engineer.

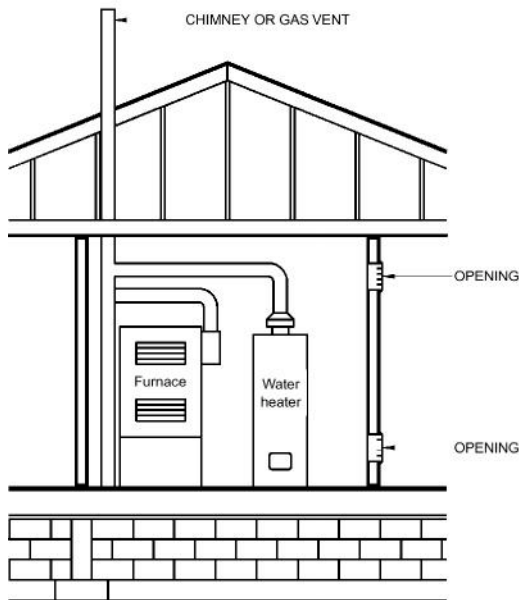


FIGURE 304.5.3
ALL AIR FROM INSIDE THE BUILDING
(see Section 304.5.3)

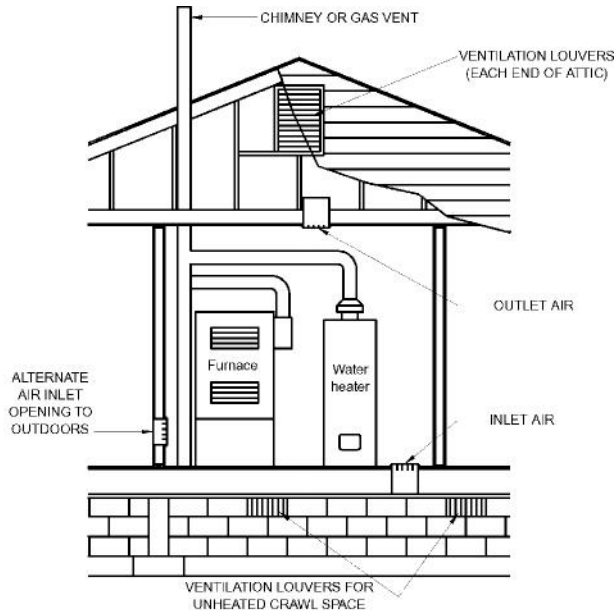


FIGURE 304.6.1(1)
ALL AIR FROM OUTDOORS—INLET AIR FROM VENTILATED CRAWL SPACE AND OUTLET AIR TO VENTILATED ATTIC
(see Section 304.6.1)

304.5.3 Indoor opening size and location. Openings used to connect indoor spaces shall be sized and located in accordance with Sections 304.5.3.1 and 304.5.3.2 (see Figure 304.5.3).

304.5.3.1 Combining spaces on the same story. Where combining spaces on the same story, eEach opening shall have a minimum free area of 1 square inch per 1,000 Btu/h (2,200 mm²/kW) of the total input rating of all appliances in the space, but not less than 100 square inches (0.06 m²). One permanent opening shall commence within 12 inches (305 mm) of the top and one permanent opening shall commence within 12 inches (305 mm) of the bottom of the enclosure. The minimum dimension of air openings shall be not less than 3 inches (76 mm).

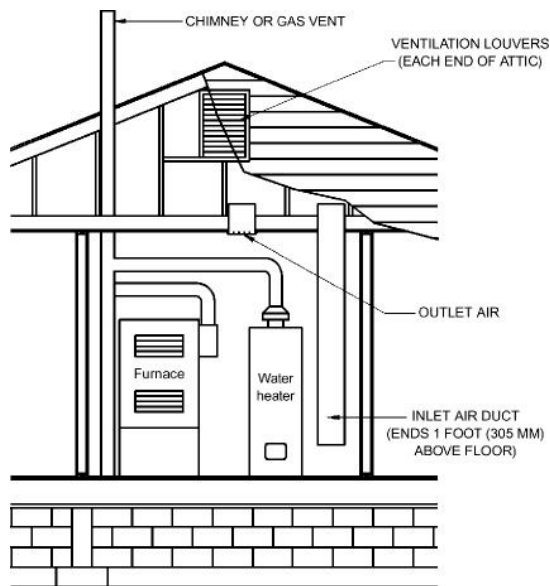
304.5.3.2 Combining spaces in different stories. The volumes of spaces in different stories shall be considered as communicating spaces where such spaces are connected by one or more permanent openings in doors or floors having a total minimum free area of 2 square inches per 1,000 Btu/h (4402 mm²/kW) of total input rating of all appliances.

304.6 Outdoor combustion air. Outdoor combustion air shall be provided through opening(s) to the outdoors in accordance with Section 304.6.1 or 304.6.2. Each opening shall have a minimum free area of 12 sq. in., and the minimum dimension of air openings shall be not less than 3 inches (76 mm).

304.6.1 Two-permanent-openings method. Two permanent openings, one commencing within 12 inches (305 mm) of the top and one commencing within 12 inches (305 mm) of the bottom of the enclosure, shall be provided. The openings shall communicate directly, or by ducts, with the outdoors or spaces that freely communicate with the outdoors.

Where directly communicating with the outdoors, or where communicating with the outdoors through vertical ducts, each opening shall have a minimum free area of 1 square inch per 4,000 Btu/h (550 mm²/kW) of total input rating of all appliances in the enclosure [see Figures 304.6.1(1) and 304.6.1(2)].

Where communicating with the outdoors through horizontal ducts, each opening shall have a minimum free area of not less than 1 square inch per 2,000 Btu/h (1,100 mm²/kW) of total input rating of all appliances in the enclosure [see Figure 304.6.1(3)].



For SI: 1 foot = 304.8 mm.

FIGURE 304.6.1(2)
ALL AIR FROM OUTDOORS THROUGH VENTILATED ATTIC
(see Section 304.6.1)

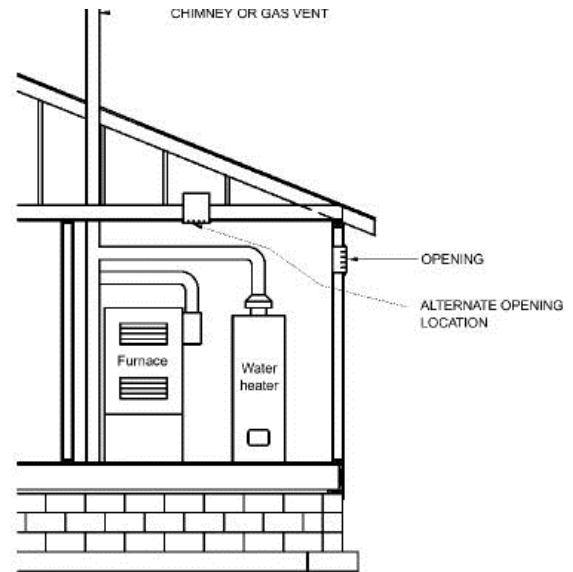


FIGURE 304.6.1(3)
ALL AIR FROM OUTDOORS
(see Section 304.6.1)

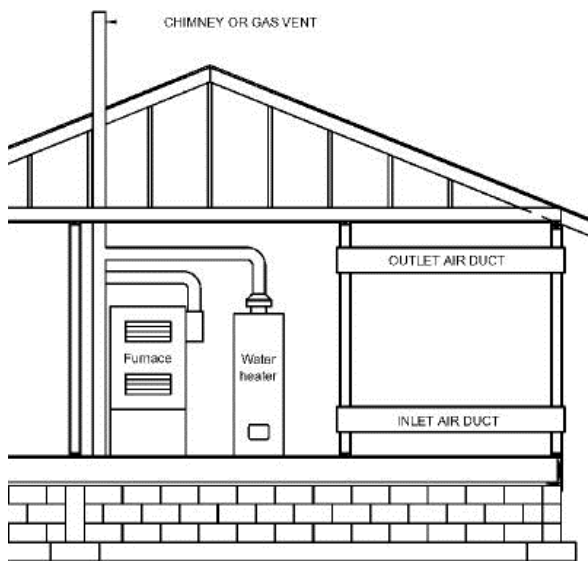


FIGURE 304.6.2
SINGLE COMBUSTION AIR OPENING,
ALL AIR FROM THE OUTDOORS
(see Section 304.6.2)

304.6.2 One-permanent-opening method. One permanent opening, commencing within 12 inches (305 mm) of the top of the enclosure, shall be provided. The appliance shall have clearances of at least 1 inch (25 mm) from the sides and back and 6 inches (152 mm) from the front of the appliance. The opening shall directly communicate with the outdoors or through a vertical or horizontal duct to the outdoors, or spaces that freely communicate with the outdoors (see Figure 304.6.2) and shall have a minimum free area of 1 square inch per 3,000 Btu/h (734 mm²/kW) of the total input rating of all appliances located in the enclosure and not less than the sum of the areas of all vent connectors in the space.

304.7 Combination indoor and outdoor combustion air. The use of a combination of indoor and outdoor combustion air shall be in accordance with Sections 304.7.1 through 304.7.3.

304.7.1 Indoor openings. Where used, openings connecting the interior spaces shall comply with Section 304.5.3.

304.7.2 Outdoor opening location. Outdoor opening(s) shall be located in accordance with Section 304.6.

304.7.3 Outdoor opening(s) size. The outdoor opening(s) size shall be calculated in accordance with the following:

1. The ratio of interior spaces shall be the available volume of all communicating spaces divided by the required volume.
2. The outdoor size reduction factor shall be one minus the ratio of interior spaces.
3. The minimum size of outdoor opening(s) shall be the full size of outdoor opening(s) calculated in accordance with Section 304.6, multiplied by the reduction factor. Each opening shall have a minimum free area of 12 sq. in., and the minimum dimension of air openings shall be not less than 3 inches (76 mm).

304.8 Engineered installations. Engineered combustion air installations shall provide an adequate supply of combustion, ventilation and dilution air and shall be approved.

304.9 Mechanical combustion air supply. Where all combustion air is provided by a mechanical air supply system, the combustion air shall be supplied from the outdoors at a rate not less than 0.35 cubic feet per minute per 1,000 Btu/h (0.034 m³/min per kW) of total input rating of all appliances located within the space.

304.9.1 Makeup air. Where exhaust fans are installed, makeup air shall be provided to replace the exhausted air.

304.9.2 Appliance interlock. Each of the appliances served shall be interlocked with the mechanical air supply system to prevent main burner operation when the mechanical air supply system is not in operation.

304.9.3 Combined combustion air and ventilation air system. Where combustion air is provided by the building's mechanical ventilation system, the system shall provide the specified combustion air rate in addition to the required ventilation air.

304.10 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 design and free area of louvers and grilles are not known, it shall be assumed that wood louvers will have 25-percent free area and metal louvers and grilles will have 75-percent free area. Screens shall have a mesh size not smaller than $\frac{1}{4}$ inch (6.4 mm). Nonmotorized louvers and grilles shall be fixed in the open position. Motorized louvers shall be interlocked with the appliance so that they are proven to be 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 if the louvers fail to open during burner start-up and to shut down the main burner if the louvers close during operation.

304.11 Combustion air ducts. Combustion air ducts shall comply with all of the following:

1. Ducts shall be constructed of galvanized steel complying with Chapter 6 of the *Arkansas Mechanical Code* or of a material having equivalent corrosion resistance, strength and rigidity.

Exception: Within dwellings units, unobstructed stud and joist spaces shall not be prohibited from conveying combustion air, provided that not more than one required fireblock is removed.

2. Ducts shall terminate in an unobstructed space allowing free movement of combustion air to the appliances.
3. Ducts shall serve a single enclosure.
4. Ducts shall not serve both upper and lower combustion air openings where both such openings are used. The separation between ducts serving upper and lower combustion air openings shall be maintained to the source of combustion air.
5. Ducts shall not be screened where terminating in an attic space.
6. Horizontal upper combustion air ducts shall not slope downward toward the source of combustion air.
7. The remaining space surrounding a chimney liner, gas vent, special gas vent or plastic piping installed within a masonry, metal or factory-built chimney shall not be used to supply combustion air.

Exception: Direct-vent gas-fired appliances designed for installation in a solid fuel-burning fireplace where installed in accordance with the manufacturer's instructions.

8. Combustion air intake openings located on the exterior of a building shall have the lowest side of such openings

located not less than 12 inches (305 mm) vertically from the adjoining grade level.

304.12 Protection from fumes and gases. Where corrosive or flammable process fumes or gases, other than products of combustion, are present, means for the disposal of such fumes or gases shall be provided. Such fumes or gases include carbon monoxide, hydrogen sulfide, ammonia, chlorine and halogenated hydrocarbons.

In barbershops, beauty shops and other facilities where chemicals that generate corrosive or flammable products, such as aerosol sprays, are routinely used, nondirect vent-type appliances shall be located in a mechanical room separated or partitioned off from other areas with provisions for combustion air and dilution air from the outdoors. Direct-vent appliances shall be installed in accordance with the appliance manufacturer's installation instructions.

SECTION 305 INSTALLATION

305.1 General. Equipment and appliances shall be installed as required by the terms of their approval, in accordance with the conditions of listing, the manufacturer's instructions and this code. Manufacturers' installation instructions shall be available on the job site at the time of inspection. Where a code provision is less restrictive than the conditions of the listing of the equipment or appliance or the manufacturer's installation instructions, the conditions of the listing and the manufacturer's installation instructions shall apply.

Unlisted appliances approved in accordance with Section 301.3 shall be limited to uses recommended by the manufacturer and shall be installed in accordance with the manufacturer's instructions, the provisions of this code and the requirements determined by the code official.

305.2 Hazardous area. Equipment and appliances having an ignition source shall not be installed in Group H occupancies or control areas where open use, handling or dispensing of combustible, flammable or explosive materials occurs.

305.3 Elevation of ignition source. Equipment and appliances having an ignition source shall be elevated such that the source of ignition is not less than 18 inches (457 mm) above the floor in hazardous locations and public garages, private garages, repair garages, motor fuel-dispensing facilities and parking garages. For the purpose of this section, rooms or spaces that are not part of the living space of a dwelling unit and that communicate directly with a private garage through openings shall be considered to be part of the private garage.

Exception: Elevation of the ignition source is not required for appliances that are listed as flammable vapor ignition resistant.

305.3.1 Installation in residential garages. In residential garages where appliances are installed in a separate, enclosed space having access only from outside of the garage, such appliances shall be permitted to be installed at floor level, provided that the required combustion air is taken from the exterior of the garage.

305.3.1-2 Parking garages. Connection of a parking garage with any room in which there is a fuel-fired appliance shall be by means of a vestibule providing a two-doorway separation, except that a single door is permitted where the sources of ignition in the appliance are elevated in accordance with Section 305.3.

Exception: This section shall not apply to appliance installations complying with Section 305.4.

305.4 Public garages. Appliances located in public garages, motor fuel-dispensing facilities, repair garages or other areas frequented by motor vehicles shall be installed a minimum of 8 feet (2438 mm) above the floor. Where motor vehicles exceed 6 feet (1829 mm) in height and are capable of passing under an appliance, appliances shall be installed a minimum of 2 feet (610 mm) higher above the floor than the height of the tallest vehicle.

Exception: The requirements of this section shall not apply where the appliances are protected from motor vehicle impact and installed in accordance with Section 305.3 and NFPA 30A.

305.5 Private garages. Appliances located in private garages shall be installed with a minimum clearance of 6 feet (1829 mm) above the floor.

Exception: The requirements of this section shall not apply where the appliances are installed in accordance with Section 305.3.

305.6 Construction and protection. Boiler rooms and furnace rooms shall be protected as required by the Arkansas Fire Prevention Code.

305.7 Clearances from grade. Equipment and appliances installed at grade level shall be supported on a level concrete slab or other approved material extending not less than 3 inches (76 mm) above adjoining grade or shall be suspended not less than 6 inches (152 mm) above adjoining grade. Such supports shall be installed in accordance with the manufacturer's instructions. ~~above adjoining grade or shall be suspended a minimum of 6 inches (152 mm) above adjoining grade.~~

305.8 Clearances to combustible construction. Heat-producing equipment and appliances shall be installed to maintain the required clearances to combustible construction as specified in the listing and manufacturer's instructions. Such clearances shall be reduced only in accordance with Section 308. Clearances to combustibles shall include such considerations as door swing, drawer pull, overhead projections or shelving and window swing. Devices, such as door stops or limits and closers, shall not be used to provide the required clearances.

305.9 Parking structures. Appliances installed in enclosed, basement and underground parking structures shall be installed in accordance with NFPA 88A.

305.10 Repair garages. Appliances installed in repair garages shall be installed in accordance with NFPA 30A.

305.11 Installation in aircraft hangars. Heaters in aircraft hangars shall be installed in accordance with NFPA 409.

305.12 Avoid strain on gas piping. Appliances shall be supported and connected to the piping so as not to exert undue strain on the connections.

SECTION 306 ACCESS AND SERVICE SPACE

~~[M] 306.1 Clearances for maintenance and replacement.~~
306.1 Access for maintenance and replacement. Appliances, control devices, heat exchangers and HVAC

components that utilize energy shall be accessible for inspection, service, repair and replacement without disabling the function of a fire-resistance-rated assembly or removing permanent construction, other appliances, or any other piping or ducts not connected to the appliance being inspected, serviced, repaired or replaced. A level working space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be provided in front of the control side to service an appliance. ~~Clearances around appliances to elements of permanent construction, including other installed appliances, shall be sufficient to allow inspection, service, repair or replacement without removing such elements of permanent construction or disabling the function of a required fire-resistance-rated assembly.~~

~~[M] 306.2 Appliances in rooms.~~ Rooms containing appliances requiring access shall be provided with a door and an unobstructed passageway measuring not less than 36 inches (914 mm) wide and 80 inches (2032 mm) high.

Exception: Within a dwelling unit, appliances installed in a compartment, alcove, basement or similar space shall be provided with access by an opening or door and an unobstructed passageway measuring not less than 24 inches (610 mm) wide and large enough to allow removal of the largest appliance in the space, provided that a level service space of not less than 30 inches (762 mm) deep and the height of the appliance, but not less than 30 inches (762 mm), is present at the front or service side of the appliance with the door open.

~~[M] 306.3 Appliances in attics.~~ Attics containing appliances requiring access shall be provided with an opening and unobstructed passageway large enough to allow removal of the largest component of the appliance. The passageway shall not be less than 30 inches (762 mm) high from the top of the walkway and 22 inches (559 mm) wide. The passageway shall have continuous solid flooring not less than 24 inches (610 mm) wide. A level service space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present at the front or service side of the equipment. The clear access opening dimensions shall be a minimum of 20 inches by 30 inches (508 mm by 762 mm), where such dimensions are large enough to allow removal of the largest component of the appliance.

Exceptions:

1. The passageway and level service space are not required where the appliance is capable of being serviced and removed through the required opening.
2. Where the passageway is not less than 6 feet (1829 mm) high for its entire length, the passageway shall be not greater than 50 feet (15 250 mm) in length.

~~[M] 306.3.1 Electrical requirements.~~ A luminaire controlled by a switch located at the required passageway opening and a receptacle outlet shall be provided at or near the equipment location in accordance with the NFPA 70, National Electrical Code.

306.3.2 Water Heaters installed in attics. Attics containing water heaters requiring access shall be provided with an opening and unobstructed passageway large enough to allow removal of the largest component of the water heater. The passageway shall not be less than 30 inches (762 mm) high from the top of the walkway and 22 inches (559 mm) wide. The passageway shall have a continuous solid flooring not less than 24 inches (610 mm) wide. A level service

space not less than 36 inches (914.4 mm) deep and 36 inches (914.4 mm) wide shall be present at the front side of the water heater. The clear access opening dimensions shall be a minimum of 20 inches by 36 inches (508mm by 914.4mm), where such dimensions are large enough to allow removal of the largest component of the water heater.

Exceptions:

1. The passageway and level service space are not required where the water heater is capable of being serviced and removed through the required opening.
2. Where the passageway is not less than 6 feet (1829 mm) high for its entire length, the passageway shall not be greater than 50 feet (15 250 mm) in length.

~~IM~~ **306.4 Appliances under floors.** Under-floor spaces containing appliances requiring access shall be provided with an access opening and unobstructed passageway large enough to remove the largest ~~component of the~~ appliance. The passageway shall not be less than 30 inches (762 mm) high and 22 inches (559 mm) wide nor more than 20 feet (6096 mm) in length when measured along the centerline of the passageway from the opening to the ~~equipment~~ **appliance**. A level service space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present at the front or service side of the appliance. If the depth of the passageway or the service space exceeds 12 inches (305 mm) below the adjoining grade, the walls of the passageway shall be lined with concrete or masonry extending 4 inches (102 mm) above the adjoining grade and having sufficient lateral-bearing capacity to resist collapse. The clear access opening dimensions shall ~~not be less than a minimum of~~ 22 inches by 30 inches (559 mm by 762 mm), where such dimensions are large enough to allow removal of the largest ~~component of the~~ appliance.

Exceptions:

1. The passageway is not required where the level service space is present when the access is open and the appliance is capable of being serviced and removed through the required opening.
2. Where the passageway is not less than 6 feet high (1829 mm) for its entire length, the passageway shall not be limited in length.

~~IM~~ **306.4.1 Electrical requirements.** A luminaire controlled by a switch located at the required passageway opening and a receptacle outlet shall be provided at or near the equipment location in accordance with the NFPA 70. National Electrical Code.

~~IM~~ **306.5 Equipment and Appliances on roofs or elevated structures.** Where appliances requiring access are installed on roofs or elevated structures at a height exceeding 16 feet (4877 mm), such access shall be provided by a permanent approved means of access, the extent of which shall be from grade or floor level to the appliance's level service space. Such access shall not require climbing over obstructions greater than 30 inches high (762 mm) or walking on roofs having a slope greater than four units vertical in 12 units horizontal (33-percent slope).

Permanent ladders installed to provide the required access shall comply with the following minimum design criteria.

1. The side railing shall extend above the parapet or roof edge not less than 30 inches (762 mm).
2. Ladders shall have a rung spacing not to exceed 14 inches (356 mm) on center. The upper-most rung shall be not more than 24 inches (610 mm) below the upper edge of the roof hatch, roof or parapet, as applicable.
3. Ladders shall have a toe spacing not less than 6 inches (152 mm) deep.
4. There shall be a minimum of 18 inches (457 mm) between rails.
5. Rungs shall have a minimum diameter of 0.75-inch (19 mm) and shall be capable of withstanding a 300-pound (136.1 kg) load.
6. Ladders over 30 feet (9144 mm) in height shall be provided with offset sections and landings capable of withstanding a load of 100 pounds per square foot (488.2 kg/m²). Landing dimensions shall be not less than 18 inches (457 mm) and not less than the width of the ladder served. A guard rail shall be provided on all open sides of the landing.
7. Climbing clearance. The distance from the centerline of the rungs to the nearest permanent object on the climbing side of the ladder shall be not less than 30 inches (762 mm) measured perpendicular to the rungs. This distance shall be maintained from the point of ladder access to the bottom of the roof hatch. A minimum clear width of 15 inches (381 mm) shall be provided on both sides of the ladder measured from the midpoint of and parallel with the rungs, except where cages or wells are installed.
8. Landing required. The ladder shall be provided with a clear and unobstructed bottom landing area having a minimum dimension of 30 inches by 30 inches (762 mm by 762 mm) centered in front of the ladder.
9. Ladders shall be protected against corrosion by approved means.
10. Access to ladders shall be provided at all times.

Catwalks installed to provide the required access shall be not less than 24 inches wide (610 mm) and shall have railings as required for service platforms.

Exception: This section shall not apply to Group R-3 occupancies.

~~IM~~ **306.5.1 Sloped roofs.** Where appliances are installed on a roof having a slope of three units vertical in 12 units horizontal (25-percent slope) or greater and having an edge more than 30 inches (762 mm) above grade at such edge, a level platform shall be provided on each side of the appliance or equipment to which access is required for service, repair or maintenance. The platform shall not be less than 30 inches (762 mm) in any dimension and shall be provided with guards. The guards shall extend not less than 42 inches (1067 mm) above the platform, shall be constructed so as to prevent the passage of a 21-inch-diameter (533 mm) sphere and shall comply with the loading requirements for guards specified in the *Arkansas Fire Prevention Code*. Access shall not require walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope). Where access involves obstructions greater than 30 inches (762 mm) in height, such obstructions shall be provided

with ladders installed in accordance with Section 306.5 or stairways installed in accordance with the requirements specified in the Arkansas Building Code in the path of travel to and from appliances, fans or equipment requiring service.

~~306.5.2~~ **Electrical requirements.** A receptacle outlet shall be provided at or near the equipment location in accordance with the NFPA 70, National Electrical Code.

~~306.6~~ **Guards.** Guards shall be provided where appliances or other components that require service and roof hatch openings are located within 10 feet (3048 mm) of a roof edge or open side of a walking surface and such edge or open side is located more than 30 inches (762 mm) above the floor, roof or grade below. The guard shall extend not less than 30 inches (762 mm) beyond each end of ~~such appliances, components~~ that require service, and roof hatch openings and the. The top of the guard shall be located not less than 42 inches (1067 mm) above the elevated surface adjacent to the guard. The guard shall be constructed so as to prevent the passage of a 21-inch-diameter (533 mm) sphere and shall comply with the loading requirements for guards specified in the *Arkansas Fire Prevention Code*.

Exception: Guards are not required where permanent fall arrest/restraint anchorage connector devices that comply with ANSI/ASSE Z 359.1 are affixed for use during the entire lifetime of the roof covering. The devices shall be reevaluated for possible replacement when the entire roof covering is replaced. The devices shall be placed not more than 10 feet (3048 mm) on center along hip and ridge lines and placed not less than 10 feet (3048 mm) from roof edges and the open sides of walking surfaces.

SECTION 307 CONDENSATE DISPOSAL

307.1 Evaporators and cooling coils. Condensate drainage systems shall be provided for equipment and appliances containing evaporators and cooling coils in accordance with the *Arkansas Mechanical Code*.

307.2 Fuel-burning appliances. Liquid combustion by-products of condensing appliances shall be collected and discharged to an approved plumbing fixture or disposal area in accordance with the manufacturer's installation instructions. Condensate piping shall be of approved corrosion-resistant material and shall not be smaller than the drain connection on the appliance. Such piping shall maintain a minimum slope in the direction of discharge of not less than one-eighth unit vertical in 12 units horizontal (1-percent slope).

~~307.3~~ **Drain pipe materials and sizes.** Components of the condensate disposal system shall be cast iron, galvanized steel, copper, cross-linked polyethylene polybutylene, polyethylene, ABS, CPVC, or PVC or polypropylene pipe or tubing. ~~All~~ Components shall be selected for the pressure and temperature rating of the installation. Joints and connections shall be made in accordance with the applicable provisions of Chapter 6 & 7 of the Arkansas Plumbing Code relative to the material type. Condensate waste and drain line size shall be not less than $\frac{3}{4}$ -inch internal diameter (19 mm) and shall not decrease in size from the drain connection to the place of condensate disposal. Where the drain pipes from more than one unit are manifolded together for condensate drainage, the pipe or tubing shall be sized in accordance with an approved method. All horizontal sections of drain piping shall be installed in uniform alignment at a uniform slope.

307.4 Traps. Condensate drains shall be trapped as required by the equipment or appliance manufacturer.

307.5 Auxiliary drain pan. Category IV condensing appliances shall be provided with an auxiliary drain pan where damage to any building component will occur as a result of stoppage in the condensate drainage system. Such pan shall be the equipment or appliance manufacturer.

Exception: An auxiliary drain pan shall not be required for appliances that automatically shut down operation in the event of a stoppage in the condensate drainage system.

307.6 Condensate pumps. Condensate pumps located in uninhabitable spaces, such as attics and crawl spaces, shall be connected to the appliance or equipment served such that when the pump fails, the appliance or equipment will be prevented from operating. Pumps shall be installed in accordance with the manufacturer's instructions.

SECTION 308 CLEARANCE REDUCTION

308.1 Scope. This section shall govern the reduction in required clearances to combustible materials and combustible assemblies for chimneys, vents, appliances, devices and equipment. Clearance requirements for air-conditioning equipment and central heating boilers and furnaces shall comply with the *Arkansas Mechanical Code*.

308.2 Reduction table. The allowable clearance reduction shall be based on one of the methods specified in Table 308.2 or shall utilize a reduced clearance protective assembly listed and labeled in accordance with UL 1618. ~~an assembly listed for such application.~~ Where required clearances are not listed in Table 308.2, the reduced clearances shall be determined by linear interpolation between the distances listed in the table. Reduced clearances shall not be derived by extrapolation below the range of the table. The reduction of the required clearances to combustibles for listed and labeled appliances and equipment shall be in accordance with the requirements of this section except that such clearances shall not be reduced where reduction is specifically prohibited by the terms of the appliance or equipment listing [see Figures 308.2(1) through 308.2(3)].

308.3 Clearances for indoor air-conditioning appliances. Clearance requirements for indoor air-conditioning appliances shall comply with the *Arkansas Mechanical Code*.

~~**308.3.1 Appliances installed in rooms that are large in comparison with the size of the appliance.** Air-conditioning appliances installed in rooms that are large in comparison with the size of the appliance shall be installed with clearances in accordance with the manufacturer's instructions.~~

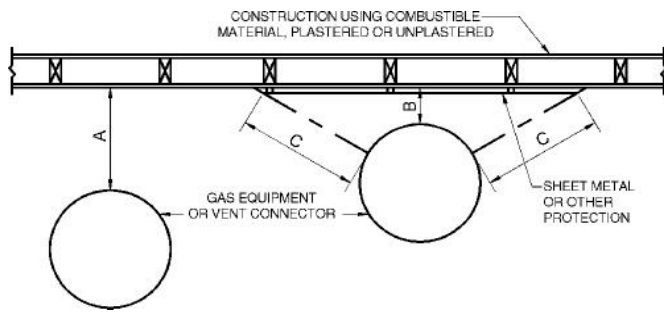
~~**308.3.2 Appliances installed in rooms that are not large in comparison with the size of the appliance.** Air-conditioning appliances installed in rooms that are not large in comparison with the size of the appliance, such as alcoves and closets, shall be listed for such installations and installed in accordance with the manufacturer's instructions. Listed clearances shall not be reduced by the protection methods described in Table 308.2, regardless of whether the enclosure is of combustible or noncombustible material.~~

TABLE 308.2 a through k
REDUCTION OF CLEARANCES WITH SPECIFIED FORMS OF PROTECTION

TYPE OF PROTECTION APPLIED TO AND COVERING ALL SURFACES OF COMBUSTIBLE MATERIAL WITHIN THE DISTANCE SPECIFIED AS THE REQUIRED CLEARANCE WITH NO PROTECTION [see Figures 308.2(1), 308.2(2), and 308.2(3)]	WHERE THE REQUIRED CLEARANCE WITH NO PROTECTION FROM APPLIANCE, VENT CONNECTOR, OR SINGLE-WALL METAL PIPE IS: (inches)									
	36		18		12		9		6	
	Allowable clearances with specified protection (inches)									
	Use Column 1 for clearances above appliance or horizontal connector. Use Column 2 for clearances from appliance, vertical connector, and single-wall metal pipe.									
	Above Col. 1	Sides and rear Col. 2	Above Col. 1	Sides and rear Col. 2	Above Col. 1	Sides and rear Col. 2	Above Col. 1	Sides and rear Col. 2	Above Col. 1	Sides and rear Col. 2
1. 3 ¹ / ₂ -inch-thick masonry wall without ventilated airspace	—	24	—	12	—	9	—	6	—	5
2. 1/2-inch insulation board over 1-inch glass fiber or mineral wool batts	24	18	12	9	9	6	6	5	4	3
3. 0.024-inch (nominal 24 gage) sheet metal over 1-inch glass fiber or mineral wool batts reinforced with wire on rear face with ventilated airspace	18	12	9	6	6	4	5	3	3	3
4. 3 ¹ / ₂ -inch-thick masonry wall with ventilated airspace	—	12	—	6	—	6	—	6	—	6
5. 0.024-inch (nominal 24 gage) sheet metal with ventilated airspace	18	12	9	6	6	4	5	3	3	2
6. 1/2-inch-thick insulation board with ventilated airspace	18	12	9	6	6	4	5	3	3	3
7. 0.024-inch (nominal 24 gage) sheet metal with ven- tilated airspace over 0.024-inch (nominal 24 gage) sheet metal with ventilated airspace	18	12	9	6	6	4	5	3	3	3
8. 1-inch glass fiber or mineral wool batts sandwiched between two sheets 0.024-inch (nominal 24 gage) sheet metal with ventilated airspace	18	12	9	6	6	4	5	3	3	3

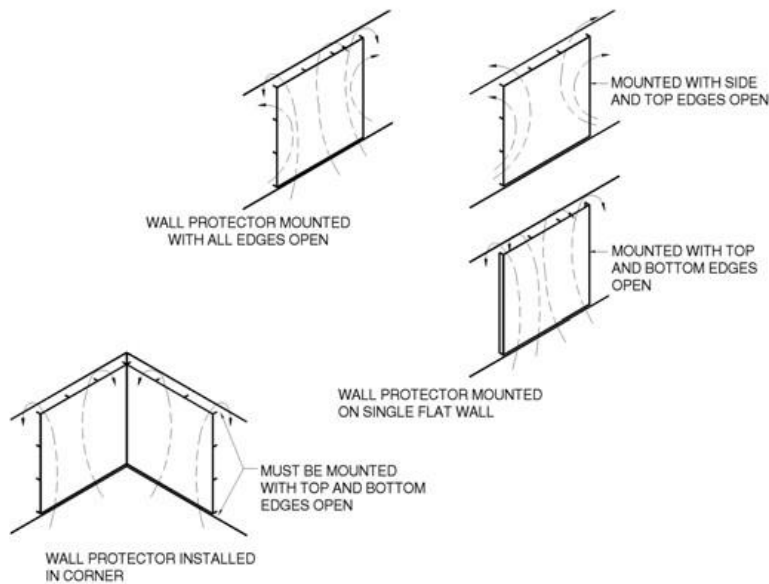
For SI: 1 inch = 25.4 mm, °C = [(°F - 32)/1.8], 1 pound per cubic foot = 16.02 kg/m³, 1 Btu per inch per square foot per hour per °F = 0.144 W/m² K.

- a. Reduction of clearances from combustible materials shall not interfere with combustion air, draft hood clearance and relief, and accessibility of servicing.
- b. All clearances shall be measured from the outer surface of the combustible material to the nearest point on the surface of the appliance, disregarding any intervening protection applied to the combustible material.
- c. Spacers and ties shall be of noncombustible material. No spacer or tie shall be used directly opposite an appliance or connector.
- d. For all clearance reduction systems using a ventilated airspace, adequate provision for air circulation shall be provided as described [see Figures 308.2(2) and 308.2(3)].
- e. There shall be at least 1 inch between clearance reduction systems and combustible walls and ceilings for reduction systems using ventilated airspace.
- f. Where a wall protector is mounted on a single flat wall away from corners, it shall have a minimum 1-inch air gap. To provide air circulation, the bottom and top edges, or only the side and top edges, or all edges shall be left open.
- g. Mineral wool batts (blanket or board) shall have a minimum density of 8 pounds per cubic foot and a minimum melting point of 1500°F.
- h. Insulation material used as part of a clearance reduction system shall have a thermal conductivity of 1.0 Btu per inch per square foot per hour per °F or less.
- i. There shall be at least 1 inch between the appliance and the protector. In no case shall the clearance between the appliance and the combustible surface be reduced below that allowed in this table.
- j. All clearances and thicknesses are minimum; larger clearances and thicknesses are acceptable.
- k. Listed single-wall connectors shall be installed in accordance with the manufacturer's installation instructions.



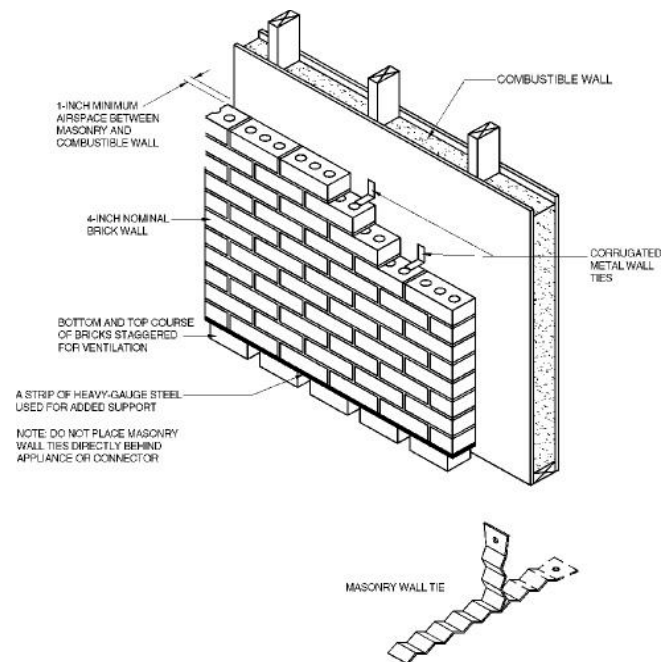
"A" equals the reduced clearance with no protection
 "B" equals the reduced clearance permitted in accordance with Table 308.2. The protection applied to the construction using combustible material shall extend far enough in each direction to make "C" equal to "A."

FIGURE 308.2(1)
EXTENT OF PROTECTION NECESSARY TO
REDUCE CLEARANCES FROM APPLIANCE OR
VENT CONNECTIONS



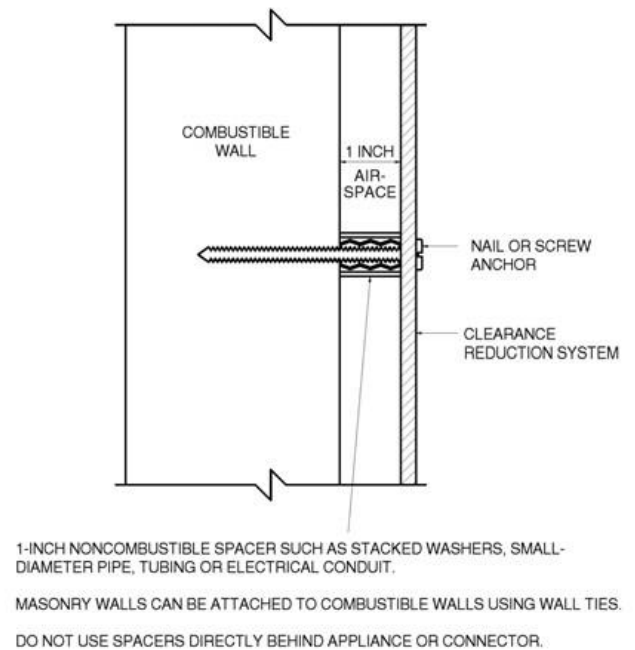
For SI: 1 inch = 25.4 mm.

FIGURE 308.2(2)
WALL PROTECTOR CLEARANCE REDUCTION SYSTEM



For SI: 1 inch = 25.4 mm.

FIGURE 308.2(3)
MASONRY CLEARANCE REDUCTION SYSTEM



308.3.1 Appliance clearances. Air-conditioning appliances shall be installed with clearances in accordance with the manufacturer's instructions.

308.3.3-2 Clearance reduction. Air-conditioning appliances installed in rooms that are large in comparison with the size of the appliance shall be permitted to be installed with reduced clearances to combustible material, provided the combustible material or appliance is protected as described in Table 308.2.

308.3.4-3 Plenum clearances. Where the furnace plenum is adjacent to plaster on metal lath or noncombustible material attached to combustible material, the clearance shall be measured to the surface of the plaster or other noncombustible finish where the clearance specified is 2 inches (51 mm) or less.

308.3.5-4 Clearance from supply ducts. Supply air ducts connecting to listed central heating furnaces shall have the same minimum clearance to combustibles as required for ~~from supply ducts within 3 feet (914 mm) of the furnace supply plenum, be not less than that specified from the furnace plenum.~~ Clearance is not necessary beyond this distance.

308.4 Central-heating boilers and furnaces. Clearance requirements for central-heating boilers and furnaces shall comply with Sections 308.4.1 through 308.4.6. The clearance to these appliances shall not interfere with combustion air; draft hood clearance and relief; and accessibility for servicing.

~~308.4.1 Appliances installed in rooms that are large in comparison with the size of the appliance. Central heating furnaces and low pressure boilers installed in rooms large in comparison with the size of the appliance shall be installed with clearances in accordance with the manufacturer's instructions.~~

~~308.4.2 Appliances installed in rooms that are not large in comparison with the size of the appliance. Central heating furnaces and low pressure boilers installed in rooms that are not large in comparison with the size of the appliance, such as alcoves and closets, shall be listed for such installations. Listed clearances shall not be reduced by the protection methods described in Table 308.2 and illustrated in Figures 308.2(1) through 308.2(3), regardless of whether the enclosure is of combustible or noncombustible material.~~

308.4.1 Appliance clearances. Central-heating furnaces and low-pressure boilers shall be installed with clearances in accordance with the manufacturer's instructions.

308.4.3-2 Clearance reduction. Central-heating furnaces and low-pressure boilers ~~installed in rooms that are large in comparison with the size of the appliance~~ shall be permitted to be installed with reduced clearances to combustible material provided that the combustible material or appliance is protected as described in Table 308.2 and such reduction is allowed by the manufacturer's instructions.

308.4.4-3 Clearance for servicing appliances. Front clearance shall be sufficient for servicing the burner and the furnace or boiler.

308.4.5-4 Plenum clearances. Where the furnace plenum is adjacent to plaster on metal lath or noncombustible material attached to combustible material, the clearance shall be

measured to the surface of the plaster or other noncombustible finish where the clearance specified is 2 inches (51 mm) or less.

~~308.4.6-5 Clearance from supply ducts. Central heating furnaces shall have the clearance from s~~ Supply air ducts connecting to listed central heating furnaces shall have the same minimum clearance to combustibles as required for within 3 feet (914 mm) of the furnace plenum for a distance of not less than 3 feet (914 mm) from the supply plenum, be not less than that specified from the furnace plenum. Clearance is not required beyond the 3-foot (914 mm) distance. No clearance is necessary beyond this distance.

SECTION 309 ELECTRICAL

309.1 Grounding. Gas piping shall not be used as a grounding electrode.

309.2 Connections. Electrical connections between equipment and the building wiring, including the grounding of the equipment, shall conform to the NFPA 70 ~~National Electrical Code~~.

SECTION 310 ELECTRICAL BONDING

310.1 Pipe and tubing other than CSST Gas pipe bonding. Each above-ground portion of a gas piping system other than corrugated stainless steel tubing (CSST) that is likely to become energized shall be electrically continuous and bonded to an effective ground-fault current path. Gas piping other than CSST shall be considered to be bonded where it is connected to appliances that are connected to the equipment grounding conductor of the circuit supplying that appliance.

310.2 CSST. This section applies to corrugated stainless steel tubing (CSST) that is not listed with an arc-resistant jacket or coating system in accordance with ANSI LC 1/CSA 6.26. CSST gas piping systems and piping systems containing one or more segments of CSST shall be electrically continuous and bonded to the electrical service grounding electrode system or, where provided, the lightning protection grounding electrode system.

310.2.1 Point of connection. The bonding jumper shall connect to a metallic pipe, pipe fitting or CSST fitting.

310.2.2 Size and material of jumper. The bonding jumper shall be not smaller than 6 AWG copper wire or equivalent.

310.2.3 Bonding jumper length. The length of the bonding jumper between the connection to a gas piping system and the connection to a grounding electrode system shall not exceed 75 feet (22 860 mm). Any additional grounding electrodes installed to meet this requirement shall be bonded to the electrical service grounding electrode system or, where provided, the lightning protection grounding electrode system.

310.2.4 Bonding connections. Bonding connections shall be in accordance with NFPA 70.

310.2.5 Connection devices. Devices used for making the bonding connections shall be listed for the application in accordance with UL 467.

310.3 Arc-resistant CSST. This section applies to corrugated stainless steel tubing (CSST) that is listed with an arc-resistant jacket or coating system in accordance with ANSI LC 1/CSA 6.26. The CSST shall be electrically continuous and bonded to an effective ground fault current path. Where any CSST component of a piping system does not have an arc-resistant jacket or coating system, the bonding requirements of Section 310.2 shall apply. Arc-resistant-jacketed

CSST shall be considered to be bonded where it is connected to an appliance that is connected to the appliance grounding conductor of the circuit that supplies that appliance.

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CHAPTER 4

GAS PIPING INSTALLATIONS

User note:

About this chapter: Chapter 4 addresses all aspects of fuel gas piping including the allowed materials, design and sizing, piping support, pressure requirements, controls, connections to appliances, installation requirements, purging and testing. Also addressed are motor vehicle fuel dispensing systems. The overarching intent is to prevent gas leakage, overpressures and underpressures and prevent accidents.

SECTION 401

GENERAL

401.1 Scope. This chapter shall govern the design, installation, modification and maintenance of piping systems. The applicability of this code to piping systems extends from the point of delivery to the connections with the appliances equipment and includes the design, materials, components, fabrication, assembly, installation, testing, inspection, operation and maintenance of such piping systems.

401.1.1 Utility piping systems located within buildings. Utility service piping located within buildings shall be installed in accordance with the structural safety and fire protection provisions of the *Arkansas Fire Prevention Code*.

401.1.2 Meter Location accessible and acceptable. A meter location, when required, shall be provided for the building or premises to be served. The location shall be such that the meter and connections are accessible in order that the meter may be read or changed. Location, space requirements, dimensions and type of installation shall be acceptable to the gas company.

401.2 ~~Liquefied~~ Liquefied Petroleum gas storage. Deleted.

401.3 Modifications to existing systems. In modifying or adding to existing piping systems, sizes shall be maintained in accordance with this chapter.

401.4 Additional appliances. Where an additional appliance is to be served, the existing piping shall be checked to determine if it has adequate capacity for all appliances served. If inadequate, the existing system shall be enlarged as required or separate piping of adequate capacity shall be provided.

401.45 Identification. For other than steel pipe, exposed piping shall be identified by a yellow label marked "Gas" in black letters. The marking shall be spaced at intervals not exceeding 5 feet (1524 mm). The marking shall not be required on pipe located in the same room as the equipment served.

401.6 Interconnections. Where two or more meters are installed on the same premises but supply separate consumers, the piping systems shall not be interconnected on the outlet side of the meters.

401.7 Piping meter identification. Piping from multiple meter installations shall be marked with an approved permanent identification by the installer so that the piping system supplied by each meter is readily identifiable.

401.8 Minimum sizes. All pipe utilized for the installation, extension and alteration of any piping system shall be sized to supply the full number of outlets for the intended purpose and shall be sized in accordance with Section 402.

TABLE 402.2
APPROXIMATE GAS INPUT FOR TYPICAL APPLIANCES

APPLIANCE	INPUT BTU/H (Approx.)
Space Heating Units	
Hydronic boiler	
Single-family	100,000
Multifamily, per unit	60,000
Warm-air furnaces	
Single-family	100,000
Multifamily, per unit	60,000
Space and Water Heating Units	
Hydronic boiler	
Single-family	120,000
Multifamily, per unit	75,000
Water Heating Appliances	
Water heater, automatic instantaneous	
Capacity at 2 gal./minute	142,800
Capacity at 4 gal./minute	285,000
Capacity at 6 gal./minute	428,400
Water heater, automatic storage, 30- to 40-gal. tank	35,000
Water heater, automatic storage, 50-gal. tank	50,000
Water heater, domestic, circulating or side-arm	35,000
Cooling Appliances	
Built-in oven or broiler unit, domestic	25,000
Built-in top unit, domestic	40,000
Range, free-standing, domestic	65,000
Other Appliances	
Barbecue	40,000
Clothes dryer, Type 1 (domestic)	35,000
Gas fireplace, direct-vent	40,000
Gas light	2,500
Gas log	80,000
Refrigerator	3,000

For SI: 1 British thermal unit per hour = 0.293 W, 1 gallon = 3.785 L,

1 gallon per minute = 3.785 L/m.

401.9 Identification. Each length of pipe and tubing and each pipe fitting, utilized in a fuel gas system, shall bear the identification of the manufacturer.

Exceptions:

1. Steel pipe sections that are 2 feet (610 mm) and less in length and are cut from longer sections of pipe.
2. Steel pipe fittings 2 inches and less in size.
3. Where identification is provided on the product packaging or crating.
4. Where other approved documentation is provided.

401.10 Piping materials standards. Piping, tubing and fittings shall be manufactured to the applicable referenced standards, specifications and performance criteria listed in Section 403 and shall be identified in accordance with Section 401.9.

SECTION 402 PIPE SIZING

402.1 General considerations. Piping systems shall be of such size and so installed as to provide a supply of gas sufficient to meet the maximum demand and supply gas to each appliance inlet at not less than the minimum supply pressure required by the appliance, without undue loss of pressure between the point of delivery and the appliance.

402.2 Maximum gas demand. The volumetric flow rate of gas to be provided shall be the sum of the maximum input of the appliances served. The volume of gas to be provided, in cubic feet per hour, shall be determined directly from the manufacturer's input ratings of the appliances served. Where an input rating is not indicated, the gas supplier, appliance manufacturer or a qualified agency shall be contacted, or the rating from Table 402.2 shall be used for estimating the volume of gas to be supplied.

The total connected hourly load shall be used as the basis for pipe sizing, assuming that all appliances could be operating at full capacity simultaneously. Where a diversity of load can be established by approved engineering methods, pipe sizing shall be permitted to be based on such loads.

The volumetric flow rate of gas to be provided shall be adjusted for altitude where the installation is above 2,000 feet (610 m) in elevation.

402.3 Sizing. Gas piping shall be sized in accordance with one of the following:

1. Pipe sizing tables or sizing equations in accordance with Section 402.4 or 402.5 as applicable.
2. The sizing tables included in a listed piping system's manufacturer's installation instructions.
3. Other approved engineering methods.

402.4 Sizing tables and equations. This section applies to piping materials other than noncorrugated stainless steel tubing. Where Tables 402.4(2) through 402.4(20) are used to size piping or tubing, the pipe length shall be determined in accordance with Section 402.4.1 or 402.4.3.

Table 402.4(1) Schedule 40 Metallic Pipe. Deleted.

Table 402.4(4) Schedule 40 Metallic Pipe. Deleted.

Table 402.4(6) Semirigid Copper Tubing. Deleted.

Table 402.4(8) Semirigid Copper Tubing. Deleted.

Table 402.4(9) Semirigid Copper Tubing. Deleted.

Table 402.4(11) Semirigid Copper Tubing. Deleted.

Table 402.4(13) through 402.4(18). Deleted.

Table 402.4(21) through 402.4(35). Deleted.

402.4.1 Longest length method. The pipe size of each section of gas piping shall be determined using the longest length of piping from the point of delivery to the most remote outlet and the load of the section (see Appendix A).

402.4.2 Branch length method. Deleted.

402.4.3 Hybrid pressure. The pipe size for each section of higher pressure gas piping shall be determined using the longest length of piping from the point of delivery to the most remote line pressure regulator. The pipe size from the line pressure regulator to each outlet shall be determined using the length of piping from the regulator to the most remote outlet served by the regulator (see Appendix A).

402.5 Noncorrugated stainless steel tubing. Noncorrugated stainless steel tubing shall be sized in accordance with Equations 4-1 and 4-2 of Section 402.4 in conjunction with Section 402.4.1 or 402.4.3.

402.5-6 Allowable pressure drop. The design pressure loss in any piping system under maximum probable flow conditions, from the point of delivery to the inlet connection of the appliance, shall be such that the supply pressure at the appliance is greater than the minimum pressure required for proper appliance operation.

402.6-7 Maximum design operating pressure. The maximum design operating pressure for piping systems located inside buildings shall not exceed 5 pounds per square inch gauge (psig) (34 kPa gauge) except where one or more of the following conditions are met:

1. The piping system joints is are welded or brazed.
2. The piping joints are flanged and pipe-to-flange connections are made by welding or brazing.
23. The piping is located in a ventilated chase or otherwise enclosed for protection against accidental gas accumulation.
- 3-4. The piping is located inside buildings or separate areas of buildings used exclusively for:
 - 3.1. Industrial processing or heating;
 - 3.2. Research;
 - 3.3. Warehousing; or
 - 3.4. Boiler or mechanical rooms.
- 4-5. The piping is a temporary installation for buildings under construction.
6. The piping serves appliances or equipment used for agricultural purposes.

402.67.1 Liquefied petroleum gas systems. Deleted.

SECTION 403 PIPING MATERIALS

403.1 General. Materials used for piping systems shall comply with the requirements of this chapter or shall be approved.

403.2 Used materials. Pipe, fittings, valves and other materials shall not be used again except where they are free of foreign materials and have been ascertained to be adequate for the service intended.

403.3 Other materials. Material not covered by the standards specifications listed herein shall be investigated and tested to

determine that it is safe and suitable for the proposed service, and, in addition, shall be recommended for that service by the manufacturer and shall be approved by the code official.

403.4 Metallic pipe. Metallic pipe shall comply with Sections 403.4.1 through 403.4.4.

403.4.1 Cast iron. Cast-iron pipe shall not be used. ~~Galvanized pipe shall not be used.~~

403.4.2 Steel. Steel, stainless steel and wrought-iron pipe shall be not lighter than Schedule 10 and shall comply with the dimensional standards of ASME B36.10M and at least of standard weight (Schedule 40) and shall comply with one of the following standards:

1. ASTM A53 / ASME B 36.10, 10M;
2. ASTM A106 A 53; or
3. ASTM A 312 406.

403.4.3 Copper and brass. Copper and brass pipe shall not be used if the gas contains more than an average of 0.3 grains of hydrogen sulfide per 100 standard cubic feet of gas (0.7 milligrams per 100 liters). Threaded copper, brass and aluminum-alloy pipe shall not be used with gases corrosive to such materials.

403.4.4 Aluminum. Aluminum-alloy pipe shall comply with ASTM B 241 ~~(except that the use of alloy 5456 is prohibited.)~~, Aluminum-alloy pipe and shall be marked at each end of each length indicating compliance. Aluminum-alloy pipe shall be coated to protect against external corrosion where it is in contact with masonry, plaster or insulation, or is subject to repeated wettings by such liquids as water, detergents or sewage. Aluminum-alloy pipe shall not be used in exterior locations or underground.

~~**403.4.5 Galvanized pipe.** Except as allowed in Section 102.2 and 102.4 galvanized pipe shall not be used in new construction.~~

403.5 Metallic tubing. Seamless copper, aluminum alloy and steel tubing shall not be used with gases corrosive to such materials. Permission to use aluminum or aluminum alloy pipe or fittings or copper pipe, copper tubing or copper fittings for natural gas distribution piping shall be approved by the gas supplier prior to the installation of the piping or fittings.

403.5.1 Steel tubing. Steel tubing shall comply with ASTM A 254 or ASTM A 539.

~~**403.5.2 Stainless steel.** Stainless steel tubing shall comply with ASTM A268 or ASTM A269.~~

~~**403.5.2-3 Copper and copper alloy brass tubing.** Copper tubing shall comply with Standard Type K or L of ASTM B 88 or ASTM B 280.~~

Copper and copper alloy brass tubing shall not be used if the gas contains more than an average of 0.3 grain of hydrogen sulfide per 100 standard cubic feet of gas (0.7 milligram per 100 liters).

~~**403.5.3-4 Aluminum tubing.** Aluminum-alloy tubing shall comply with ASTM B 210 or ASTM B 241. Aluminum-alloy tubing shall be coated to protect against external corrosion where it is in contact with masonry, plaster or insulation, or is subject to repeated wettings by such liquids as water, detergent or sewage.~~

Aluminum-alloy tubing shall not be used in exterior locations or underground.

~~**403.5.4-5 Corrugated stainless steel tubing.** Corrugated stainless steel tubing shall be listed in accordance with ANSI LC 1/CSA 6.26, and shall be sized and installed in accordance with the manufacturer's installation instructions. Corrugated stainless steel tubing shall not be installed in the following prohibited locations:~~

~~a. Fuel gas piping shall not be installed or run through a circulating air duct, clothes chute, chimney, or gas vent, ventilating duct, dumb waiter or elevator shaft.~~

~~b. Corrugated stainless steel shall not be installed outside unless it is fully protected from the effects of the weather and physical abuse. Corrugated stainless steel when routed outside, shall be completely encased in solid steel corrugated stainless, coated pipe at least 1 inch (25 mm) larger than the diameter of the tubing for the entire outside length. When passing through an outside wall, the casing or sleeve will be at least 1 inch (25 mm) larger in diameter than the tubing and be sealed at both ends and supported by a cross brace. When tubing is connected to a meter, the meter and piping shall be completely self-supporting by the use of mounting brackets. All such outside installations shall first be approved by the administrative authority.~~

~~c. Tubing routed in crawl spaces underneath buildings shall be adequately supported and shall not come in contact with the ground or other pipes.~~

~~d. Corrugated stainless steel tubing shall not be used with any other type tubing unless recommended by the manufacturer and approved by the administrative authority.~~

~~e. This regulation applies to piping systems for use with fuel gas at maximum allowable operating pressures not exceeding 5 psig (34.5 kPa).~~

~~f. This regulation applies to piping systems not exceeding a size of 1-inch (25 mm) nominal inside diameter of the tubing.~~

~~g. This regulation does not apply to gas connectors for appliances. Standards for final connectors to gas utilization equipment are found in Section 411.1 of the Arkansas State Fuel Gas Code.~~

~~**403.5.4.1 Materials.**~~

~~a. Piping system components shall be constructed entirely of new and unused parts and materials. Tubing of austenitic stainless steel alloy of the 300 series shall be used. Any deviation shall be approved in writing by the authority having jurisdiction.~~

~~b. Piping system components and material shall have been evaluated and found to be suitable for their intended use by a testing agency recognized by the authority having jurisdiction.~~

~~c. When requested, the manufacturer shall furnish evidence acceptable to the authority having jurisdiction concerning the composition of the materials used in all components of the piping system.~~

~~d. The construction of parts not specifically covered by this regulation shall be in accordance with reasonable concepts of safety, substantiality and durability.~~

**TABLE 402.4(2)
SCHEDULE 40 METALLIC PIPE**

Gas	Natural
Inlet Pressure	Less than 2 psi
Pressure Drop	0.5 in. w.c.
Specific Gravity	0.60

PIPE SIZE (inch)														
Nominal	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12
Actual ID	0.622	0.824	1.049	1.380	1.610	2.067	2.469	3.068	4.026	5.047	6.065	7.981	10.020	11.938
Length (ft)	Capacity in Cubic Feet of Gas Per Hour													
10	172	360	678	1,390	2,090	4,020	6,400	11,300	23,100	41,800	67,600	139,000	252,000	399,000
20	118	247	466	957	1,430	2,760	4,400	7,780	15,900	28,700	46,500	95,500	173,000	275,000
30	95	199	374	768	1,150	2,220	3,530	6,250	12,700	23,000	37,300	76,700	139,000	220,000
40	81	170	320	657	985	1,900	3,020	5,350	10,900	19,700	31,900	65,600	119,000	189,000
50	72	151	284	583	873	1,680	2,680	4,740	9,660	17,500	28,300	58,200	106,000	167,000
60	65	137	257	528	791	1,520	2,430	4,290	8,760	15,800	25,600	52,700	95,700	152,000
70	60	126	237	486	728	1,400	2,230	3,950	8,050	14,600	23,600	48,500	88,100	139,000
80	56	117	220	452	677	1,300	2,080	3,670	7,490	13,600	22,000	45,100	81,900	130,000
90	52	110	207	424	635	1,220	1,950	3,450	7,030	12,700	20,600	42,300	76,900	122,000
100	50	104	195	400	600	1,160	1,840	3,260	6,640	12,000	19,500	40,000	72,600	115,000
125	44	92	173	355	532	1,020	1,630	2,890	5,890	10,600	17,200	35,400	64,300	102,000
150	40	83	157	322	482	928	1,480	2,610	5,330	9,650	15,600	32,100	58,300	92,300
175	37	77	144	296	443	854	1,360	2,410	4,910	8,880	14,400	29,500	53,600	84,900
200	34	71	134	275	412	794	1,270	2,240	4,560	8,260	13,400	27,500	49,900	79,000
250	30	63	119	244	366	704	1,120	1,980	4,050	7,320	11,900	24,300	44,200	70,000
300	27	57	108	221	331	638	1,020	1,800	3,670	6,630	10,700	22,100	40,100	63,400
350	25	53	99	203	305	587	935	1,650	3,370	6,100	9,880	20,300	36,900	58,400
400	23	49	92	189	283	546	870	1,540	3,140	5,680	9,190	18,900	34,300	54,300
450	22	46	86	177	266	512	816	1,440	2,940	5,330	8,620	17,700	32,200	50,900
500	21	43	82	168	251	484	771	1,360	2,780	5,030	8,150	16,700	30,400	48,100
550	20	41	78	159	239	459	732	1,290	2,640	4,780	7,740	15,900	28,900	45,700
600	19	39	74	152	228	438	699	1,240	2,520	4,560	7,380	15,200	27,500	43,600
650	18	38	71	145	218	420	669	1,180	2,410	4,360	7,070	14,500	26,400	41,800
700	17	36	68	140	209	403	643	1,140	2,320	4,190	6,790	14,000	25,300	40,100
750	17	35	66	135	202	389	619	1,090	2,230	4,040	6,540	13,400	24,400	38,600
800	16	34	63	130	195	375	598	1,060	2,160	3,900	6,320	13,000	23,600	37,300
850	16	33	61	126	189	363	579	1,020	2,090	3,780	6,110	12,600	22,800	36,100
900	15	32	59	122	183	352	561	992	2,020	3,660	5,930	12,200	22,100	35,000
950	15	31	58	118	178	342	545	963	1,960	3,550	5,760	11,800	21,500	34,000
1,000	14	30	56	115	173	333	530	937	1,910	3,460	5,600	11,500	20,900	33,100
1,100	14	28	53	109	164	316	503	890	1,810	3,280	5,320	10,900	19,800	31,400
1,200	13	27	51	104	156	301	480	849	1,730	3,130	5,070	10,400	18,900	30,000
1,300	12	26	49	100	150	289	460	813	1,660	3,000	4,860	9,980	18,100	28,700
1,400	12	25	47	96	144	277	442	781	1,590	2,880	4,670	9,590	17,400	27,600
1,500	11	24	45	93	139	267	426	752	1,530	2,780	4,500	9,240	16,800	26,600
1,600	11	23	44	89	134	258	411	727	1,480	2,680	4,340	8,920	16,200	25,600
1,700	11	22	42	86	130	250	398	703	1,430	2,590	4,200	8,630	15,700	24,800
1,800	10	22	41	84	126	242	386	682	1,390	2,520	4,070	8,370	15,200	24,100
1,900	10	21	40	81	122	235	375	662	1,350	2,440	3,960	8,130	14,800	23,400
2,000	NA	20	39	79	119	229	364	644	1,310	2,380	3,850	7,910	14,400	22,700

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1-inch water column = 0.2488 kPa,

1 British thermal unit per hour = 0.2931 W, 1 cubic foot per hour = 0.0283 m³/h, 1 degree = 0.01745 rad.

Notes:

1. NA means a flow of less than 10 cfh.
2. All table entries have been rounded to three significant digits.

Gas	Natural
Inlet Pressure	2.0 psi
Pressure Drop	1.0 psi
Specific Gravity	0.60

TABLE 402.4(35)
SCHEDULE 40 METALLIC PIPE

PIPE SIZE (inch)									
Nominal	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
Actual ID	0.622	0.824	1.049	1.380	1.610	2.067	2.469	3.068	4.026
Length (ft)	Capacity in Cubic Feet of Gas Per Hour								
10	1,510	3,040	5,560	11,400	17,100	32,900	52,500	92,800	189,000
20	1,070	2,150	3,930	8,070	12,100	23,300	37,100	65,600	134,000
30	869	1,760	3,210	6,590	9,880	19,000	30,300	53,600	109,000
40	753	1,520	2,780	5,710	8,550	16,500	26,300	46,400	94,700
50	673	1,360	2,490	5,110	7,650	14,700	23,500	41,500	84,700
60	615	1,240	2,270	4,660	6,980	13,500	21,400	37,900	77,300
70	569	1,150	2,100	4,320	6,470	12,500	19,900	35,100	71,600
80	532	1,080	1,970	4,040	6,050	11,700	18,600	32,800	67,000
90	502	1,010	1,850	3,810	5,700	11,000	17,500	30,900	63,100
100	462	934	1,710	3,510	5,260	10,100	16,100	28,500	58,200
125	414	836	1,530	3,140	4,700	9,060	14,400	25,500	52,100
150	372	751	1,370	2,820	4,220	8,130	13,000	22,900	46,700
175	344	695	1,270	2,601	3,910	7,530	12,000	21,200	43,300
200	318	642	1,170	2,410	3,610	6,960	11,100	19,600	40,000
250	279	583	1,040	2,140	3,210	6,180	9,850	17,400	35,500
300	253	528	945	1,940	2,910	5,600	8,920	15,800	32,200
350	232	486	869	1,790	2,670	5,150	8,210	14,500	29,600
400	216	452	809	1,660	2,490	4,790	7,640	13,500	27,500
450	203	424	759	1,560	2,330	4,500	7,170	12,700	25,800
500	192	401	717	1,470	2,210	4,250	6,770	12,000	24,400
550	182	381	681	1,400	2,090	4,030	6,430	11,400	23,200
600	174	363	650	1,330	2,000	3,850	6,130	10,800	22,100
650	166	348	622	1,280	1,910	3,680	5,870	10,400	21,200
700	160	334	598	1,230	1,840	3,540	5,640	9,970	20,300
750	154	322	576	1,180	1,770	3,410	5,440	9,610	19,600
800	149	311	556	1,140	1,710	3,290	5,250	9,280	18,900
850	144	301	538	1,100	1,650	3,190	5,080	8,980	18,300
900	139	292	522	1,070	1,600	3,090	4,930	8,710	17,800
950	135	283	507	1,040	1,560	3,000	4,780	8,460	17,200
1,000	132	275	493	1,010	1,520	2,920	4,650	8,220	16,800
1,100	125	262	468	960	1,440	2,770	4,420	7,810	15,900
1,200	119	250	446	917	1,370	2,640	4,220	7,450	15,200
1,300	114	239	427	878	1,320	2,530	4,040	7,140	14,600
1,400	110	230	411	843	1,260	2,430	3,880	6,860	14,000
1,500	106	221	396	812	1,220	2,340	3,740	6,600	13,500
1,600	102	214	382	784	1,180	2,260	3,610	6,380	13,000
1,700	99	207	370	759	1,140	2,190	3,490	6,170	12,600
1,800	96	200	358	736	1,100	2,120	3,390	5,980	12,200
1,900	93	195	348	715	1,070	2,060	3,290	5,810	11,900
2,000	91	189	339	695	1,040	2,010	3,200	5,650	11,500

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1-inch water column = 0.2488 kPa,

1 British thermal unit per hour = 0.2931 W, 1 cubic foot per hour = 0.0283 m³/h, 1 degree = 0.01745 rad.

Note: All table entries have been rounded to three significant digits.

TABLE 402.4(57)
SCHEDULE 40 METALLIC PIPE

Gas	Natural
Inlet Pressure	5.0 psi
Pressure Drop	3.5 psi
Specific Gravity	0.60

PIPE SIZE (inch)									
Nominal	¹ / ₂	³ / ₄	1	1 ¹ / ₄	1 ¹ / ₂	2	2 ¹ / ₂	3	4
Actual ID	0.622	0.824	1.049	1.380	1.610	2.067	2.469	3.068	4.026
Length (ft)	Capacity in Cubic Feet of Gas Per Hour								
10	3,190	6,430	11,800	24,200	36,200	69,700	111,000	196,000	401,000
20	2,250	4,550	8,320	17,100	25,600	49,300	78,600	139,000	283,000
30	1,840	3,720	6,790	14,000	20,900	40,300	64,200	113,000	231,000
40	1,590	3,220	5,880	12,100	18,100	34,900	55,600	98,200	200,000
50	1,430	2,880	5,260	10,800	16,200	31,200	49,700	87,900	179,000
60	1,300	2,630	4,800	9,860	14,800	28,500	45,400	80,200	164,000
70	1,200	2,430	4,450	9,130	13,700	26,400	42,000	74,300	151,000
80	1,150	2,330	4,260	8,540	12,800	24,700	39,300	69,500	142,000
90	1,060	2,150	3,920	8,050	12,100	23,200	37,000	65,500	134,000
100	979	1,980	3,620	7,430	11,100	21,400	34,200	60,400	123,000
125	876	1,770	3,240	6,640	9,950	19,200	30,600	54,000	110,000
150	786	1,590	2,910	5,960	8,940	17,200	27,400	48,500	98,900
175	728	1,470	2,690	5,520	8,270	15,900	25,400	44,900	91,600
200	673	1,360	2,490	5,100	7,650	14,700	23,500	41,500	84,700
250	558	1,170	2,200	4,510	6,760	13,000	20,800	36,700	74,900
300	506	1,060	1,990	4,090	6,130	11,800	18,800	33,300	67,800
350	465	973	1,830	3,760	5,640	10,900	17,300	30,600	62,400
400	433	905	1,710	3,500	5,250	10,100	16,100	28,500	58,100
450	406	849	1,600	3,290	4,920	9,480	15,100	26,700	54,500
500	384	802	1,510	3,100	4,650	8,950	14,300	25,200	51,500
550	364	762	1,440	2,950	4,420	8,500	13,600	24,000	48,900
600	348	727	1,370	2,810	4,210	8,110	12,900	22,900	46,600
650	333	696	1,310	2,690	4,030	7,770	12,400	21,900	44,600
700	320	669	1,260	2,590	3,880	7,460	11,900	21,000	42,900
750	308	644	1,210	2,490	3,730	7,190	11,500	20,300	41,300
800	298	622	1,170	2,410	3,610	6,940	11,100	19,600	39,900
850	288	602	1,130	2,330	3,490	6,720	10,700	18,900	38,600
900	279	584	1,100	2,260	3,380	6,520	10,400	18,400	37,400
950	271	567	1,070	2,190	3,290	6,330	10,100	17,800	36,400
1,000	264	551	1,040	2,130	3,200	6,150	9,810	17,300	35,400
1,100	250	524	987	2,030	3,030	5,840	9,320	16,500	33,600
1,200	239	500	941	1,930	2,900	5,580	8,890	15,700	32,000
1,300	229	478	901	1,850	2,770	5,340	8,510	15,000	30,700
1,400	220	460	866	1,780	2,660	5,130	8,180	14,500	29,500
1,500	212	443	834	1,710	2,570	4,940	7,880	13,900	28,400
1,600	205	428	806	1,650	2,480	4,770	7,610	13,400	27,400
1,700	198	414	780	1,600	2,400	4,620	7,360	13,000	26,500
1,800	192	401	756	1,550	2,330	4,480	7,140	12,600	25,700
1,900	186	390	734	1,510	2,260	4,350	6,930	12,300	25,000
2,000	181	379	714	1,470	2,200	4,230	6,740	11,900	24,300

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1-inch water column = 0.2488 kPa,

1 British thermal unit per hour = 0.2931 W, 1 cubic foot per hour = 0.0283 m³/h, 1 degree = 0.01745 rad.

Note: All table entries have been rounded to three significant digits.