(iv) Extensions must not terminate under an overhang with soffit vents.

(3) *Flashing*. The opening around each vent pipe shall be made watertight by an adequate flashing or flashing material.

(g) *Vent caps*. Vent caps, if provided, shall be of the removable type (without removing the flashing from the roof). When vent caps are used for roof space ventilation and the caps are identical to vent caps used for the plumbing system, plumbing system caps shall be identified with permanent markings.

[40 FR 58752, Dec. 18, 1975, as amended at 42 FR 961, Jan. 4, 1977. Redesignated at 44 FR 20679, Apr. 6, 1979, as amended at 58 FR 55015, Oct. 25, 1993; 78 FR 73986, Dec. 9, 2013]

§ 3280.612 Tests and inspection.

(a) *Water system*. All water piping in the water distribution system shall be subjected to a pressure test. The test shall be made by subjecting the system to air or water at 100 psi for 15 minutes without loss of pressure.

(b) *Drainage and vent system and plumbing fixtures*. The waste and vent system shall be tested by one of the three following alternate methods for evidence or indication of leakage:

(1) *Water test*. Before plumbing fixtures are connected, all of the openings into the piping shall be plugged and the entire piping system subjected to a static water test for 15 minutes by filling it with water to the top of the highest vent opening. There shall be no evidence of leakage.

(2) *Air test*. After all fixtures have been installed, the traps filled with water, and the remaining openings securely plugged, the entire system shall be subjected to a 2-inch (manometer) water column air pressure test. If the system loses pressure, leaks may be located with smoke pumped into the system, or with soap suds spread on the exterior of the piping (Bubble test).

(3) *Flood level test*. The manufactured home shall be in a level position, all fixtures shall be connected, and the entire system shall be filled with water to the rim of the water closet bowl. (Tub and shower drains shall be plugged). After all trapped air has been released, the test shall be sustained for not less than 15 minutes without evidence of leaks. Then the system shall be unplugged and emptied. The waste piping above the level of the water closet bowl shall then be tested and show no indication of leakage when the high fixtures are filled with water and emptied simultaneously to obtain the maximum possible flow in the drain piping.

(c) *Fixture test*. The plumbing fixtures and connections shall be subjected to a flow test by filling them with water and checking for leaks and retarded flow while they are being emptied.

(d) *Shower compartments*. Shower compartments and receptors shall be tested for leaks prior to being covered by finish material. Each pan shall be filled with water to the top of the dam for not less than 15 minutes without evidence of leakage.

[40 FR 58752, Dec. 18, 1975, as amended at 42 FR 961, Jan. 4, 1977; 42 FR 54383, Oct. 5, 1977. Redesignated at 44 FR 20679, Apr. 6, 1979, as amended at 58 FR 55015, Oct. 25, 1993]

Subpart H—Heating, Cooling and Fuel Burning Systems

§ 3280.701 Scope.

Subpart H of this standard covers the heating, cooling and fuel burning equipment installed within, on, or external to a manufactured home.

§ 3280.702 Definitions.

The definitions in this subpart apply to subpart H only.

Accessible, when applied to a fixture, connection, appliance or equipment, means having access thereto, but which may require the removal of an access panel, door or similar obstruction.

Air conditioner blower coil system means a comfort cooling appliance where the condenser section is placed external to the manufactured home and evaporator section with circulating blower attached to the manufactured home air supply duct system. Provision must be made for a return air system to the evaporator/blower section. Refrigerant connection between the two parts of the system is accomplished by tubing.

Air conditioner split system means a comfort cooling appliance where the condenser section is placed external to

the manufactured home and the evaporator section incorporated into the heating appliance or with a separate blower/coil section within the manufactured home. Refrigerant connection between the two parts of the system is accomplished by tubing.

Air conditioning condenser section means that portion of a refrigerated air cooling or (in the case of a heat pump) heating system which includes the refrigerant pump (compressor) and the external heat exchanger.

Air conditioning evaporator section means a heat exchanger used to cool or (in the case of a heat pump) heat air for use in comfort cooling (or heating) the living space.

Air conditioning self contained system means a comfort cooling appliance combining the condenser section, evaporator and air circulating blower into one unit with connecting ducts for the supply and return air systems.

Air duct means conduits or passageways for conveying air to or from heating, cooling, air conditioning or ventilation equipment, but not including the plenum.

Automatic pump (oil lifter) means a pump, not an integral part of the oil-burning appliance, that automatically pumps oil from the supply tank and delivers the oil under a constant head to an oil-burning appliance.

Btu. British thermal units means the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit.

Btuh means British thermal units per hour.

Burner means a device for the final conveyance of fuel or a mixture of fuel and air to the combustion zone.

Central air conditioning system means either an air conditioning split system or an external combination heating/cooling system.

Class 0 air ducts and air connectors means air ducts and air connectors having a fire hazard classification of zero when tested in accordance with UL 181–2003, Factory-Made Air Ducts and Air Connectors (incorporated by reference, see § 3280.4).

Class 1 air ducts and air connectors means air ducts and air connectors having a flame spread rating of not over 25 without evidence of continued progressive combustion and a smoke developed rating of not over 50 when tested in accordance with UL 181–2003, Standard for Safety Factory-Made Air Ducts and Air Connectors (incorporated by reference, see § 3280.4).

Clearance means the distance between the appliance, chimney, vent, chimney or vent connector or plenum and the nearest surface.

Combination space heating and water heating appliance means a listed unit that is designed to provide space heating and water heating from a single primary energy source.

Connector-Gas appliance: means a flexible or semi-rigid connector used to convey fuel gas between a gas outlet and a gas appliance.

Direct-vent system means a system or method of construction where all air for combustion is derived directly from the outside atmosphere and all flue gases are discharged to the outside atmosphere.

Direct-vent system appliance means an appliance that is installed with a direct vent system.

External combination heating/cooling system means a comfort conditioning system placed external to the manufactured home with connecting ducts to the manufactured home for the supply and return air systems.

Factory-built fireplace means a hearth, fire chamber and chimney assembly composed of listed factory-built components assembled in accordance with the terms of listing to form a complete fireplace.

Fireplace stove means a chimney connected solid fuel-burning stove having part of its fire chamber open to the room.

Fuel gas piping system means the arrangement of piping, tubing, fittings, connectors, valves and devices designed and intended to supply or control the flow of fuel gas to the appliance(s).

Fuel oil piping system means the arrangement of piping, tubing, fittings, connectors, valves and devices designed and intended to supply or control the flow of fuel oil to the appliance(s).

Gas clothes dryer means a device used to dry wet laundry by means of heat derived from the combustion of fuel gases.

Gas refrigerator means a gas-burning appliance which is designed to extract heat from a suitable chamber.

Gas supply connection means the terminal end or connection to which a gas supply connector is attached.

Gas supply connector, manufactured home means a listed flexible connector designed for connecting the manufactured home to the gas supply source.

Gas vents means factory-built vent piping and vent fittings listed by an approved testing agency, that are assembled and used in accordance with the terms of their listings, for conveying flue gases to the outside atmosphere.

(1) *Type B gas vent* means a gas vent for venting gas appliances with draft hoods and other gas appliances listed for use with Type B gas vents.

(2) *Type BW gas vent* means a gas vent for venting listed gas-fired vented wall furnaces.

Heat producing appliance means all heating and cooking appliances and fuel burning appliances.

Heating appliance means an appliance for comfort heating, domestic water heating, or a combination of comfort heating and domestic water heating.

Liquefied petroleum gases. The terms *Liquefied petroleum gases, LPG* and *LP-Gas* as used in this standard shall mean and include any material which is composed predominantly of any of the following hydrocarbons, or mixtures of them: propane, propylene butanes (normal butane or isobutane), and butylenes.

Plenum means an air compartment which is part of an air-distributing system, to which one or more ducts or outlets are connected.

(1) Furnace supply plenum is a plenum attached directly to, or an integral part of, the air supply outlet of the furnace.

(2) Furnace return plenum is a plenum attached directly to, or an integral part of, the return inlet of the furnace.

Quick-disconnect device means a hand-operated device which provides a means for connecting and disconnecting a gas supply or connecting gas systems and which is equipped with an automatic means to shut off the gas supply when the device is disconnected.

Readily accessible means direct access without the necessity of removing any panel, door, or similar obstruction.

Roof jack means that portion of a manufactured home heater flue or vent assembly, including the cap, insulating means, flashing, and ceiling plate, located in and above the roof of a manufactured home.

Sealed combustion system appliance means an appliance which by its inherent design is constructed so that all air supplied for combustion, the combustion system of the appliance, and all products of combustion are completely isolated from the atmosphere of the space in which it is installed.

Water heater means an appliance for heating water for domestic purposes.

[40 FR 58752, Dec. 18, 1975. Redesignated at 44 FR 20679, Apr. 6, 1979, as amended at 52 FR 4586, Feb. 12, 1987; 58 FR 55015, Oct. 25, 1993; 78 FR 73987, Dec. 9, 2013]

§ 3280.703 Minimum standards.

Heating, cooling and fuel burning appliances and systems in manufactured homes shall be free of defects, and shall conform to applicable standards in the following table unless otherwise specified in this standard. (See § 3280.4) When more than one standard is referenced, compliance with any one such standard shall meet the requirements of this standard.

APPLIANCES

Heating and Cooling Equipment, Second Edition, with 1999 revisions—UL 1995, 1995.

Liquid Fuel-Burning Heating Appliances for Manufactured Homes and Recreational Vehicles, Seventh Edition, with 1997 revisions—UL 307A–1995.

Fixed and Location-Dedicated Electric Room Heaters, Second Edition, with 1998 revisions—UL 2021–1997.

Electric Baseboard Heating Equipment, Fourth Edition, with 1998 revisions—UL 1042–1994.

Electric Central Air Heating Equipment—UL 1096-Fourth Edition-1986 with revisions July 16, 1986, and January 30, 1988.

Gas Burning Heating Appliances for Manufactured Homes and Recreational Vehicles, Fourth Edition, with 1998 revisions—UL 307B–1995.

Gas Clothes Dryers Volume 1, Type 1 Clothes Dryers—ANSI Z21.5.1–/CSA 7.1–M99—1999 with Addendum Z21.5.1a–1999.

Gas Fired Absorption Summer Air Conditioning Appliances—ANSI Z21.40.1/CGA 2.91–M961996.

Gas-Fired Central Furnaces (Except Direct Vent System Central Furnaces)—ANSI Z21.47–1990 with Addendum Z21.47a–1990 and Z21.47b–1992.

Decorative Gas Appliances for Installation in Solid Fuel Burning Fireplaces—RADCO DS–010–91 (incorporated by reference, see § 3280.4).

Household Cooking Gas Appliances—ANSI Z21.1–2000.

Refrigerators Using Gas Fuel—ANSI Z21.19–1990, with Addendum ANSI Z21.19a–1992 and Z21.19b–1995.

Gas Water Heaters—Volume 1, Storage Water Heaters with Input Ratings of 75,000 BTU per hour or Less—ANSI Z21.10.1–1998 with Addendum Z21.10.1a–2000.

Household Electric Storage Tank Water Heaters, Tenth Edition—UL 174–1996, with 1997 revisions.

FERROUS PIPE AND FITTINGS

Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless—ASTM A53–93.

Standard Specification for Electric-Resistance-Welded Coiled Steel Tubing for Gas and Fuel Oil Lines—ASTM A539–1999.

Pipe Threads, General Purpose (Inch)—ANSI/ASME B1.20.1–1983.

Welding and Seamless Wrought Steel Pipe—ANSI/ASME B36.10–1979.

NONFERROUS PIPE, TUBING, AND FITTINGS

Standard Specification for Seamless Copper Water Tube—ASTM B88–93.

Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service—ASTM B280–95a.

Connectors for Gas Appliances—ANSI Z21.24/CGA 6.10–M97–1997.

Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves—ANSI Z21.15/CGA 9.1–M97–1997.

Standard for Gas Supply Connectors for Manufactured Homes—IAPMO TSC 9–1997.

Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tubes—ASTM B251–93.

Standard Specification for Seamless Copper Pipe, Standard Sizes—ASTM B42–93.

MISCELLANEOUS

Factory-Made Air Ducts and Air Connectors, UL 181, Ninth Edition, April 4, 1996, with revisions through May 15, 2003 (incorporated by reference, see § 3280.4).

Standard for Safety Closure Systems for use with Rigid Air Ducts and Air Connectors, UL 181A, 1994, with 1998 revisions.

Standard for Safety Closure Systems for use with Flexible Air Ducts and Air Connectors, First Edition—UL 181B, 1995, with 1998 revisions.

Tube Fittings for Flammable and Combustible Fluids, Refrigeration Service, and Marine Use, Sixth Edition—UL 109–1997, with 2001 revisions.

Pigtails and Flexible Hose Connectors for LP-Gas, Seventh Edition—UL 569, 1995 with 2001 revisions.

Roof Jacks for Manufactured Homes and Recreational Vehicles, Eighth Edition—UL 311, 1994, with 1998 revisions.

Relief Valves for Hot Water Supply Systems, ANSI Z21.22–1999, (incorporated by reference, see § 3280.4).

Automatic Gas Ignition Systems and Components—ANSI Z21.20 with Addendum Z21.20a–2000.

Automatic Valves for Gas Appliances—ANSI Z21.21/CSA 6.5–2000.

Gas Appliance Thermostats—ANSI Z21.23–93 (incorporated by reference, see § 3280.4).

Gas Vents, Ninth Edition—UL 441, 1996 with 1999 revisions.

Standard for the Installation of Oil-Burning Equipment, NFPA 31–01 (incorporated by reference, see § 3280.4).

National Fuel Gas Code—NFPA 54–2002/ANSI Z223.1–2002.

Warm Air Heating and Air Conditioning Systems, NFPA 90B, 1996 Edition.

Liquefied Petroleum Gas Code, NFPA 58–2001 Edition.

Flares for Tubing—SAE–J533b–1992.

Factory-Built Chimneys for Residential Type and Building Heating Appliances, Ninth Edition—UL 103, 1995, with 1999 revisions.

Factory-Built Fireplaces, Seventh Edition—UL 127–1996, with 1999 revisions.

Solid-Fuel Type Room Heaters, Fifth Edition—UL 1482, 1995, with 2000 revisions.

Fireplace Stoves, Eight Edition, with 2000 revisions—UL 737, 1996.

Unitary Air-Conditioning and Air-Source Heat Pump Equipment—ANSI/ARI 210/240–89.

AGA Requirements for Gas Connectors for Connection of Fixed Appliances for Outdoor Installation, Park Trailers, and Manufactured (Mobile) Homes to the Gas Supply—No. 3–87.

[58 FR 55015, Oct. 25, 1993, as amended at 70 FR 72046, Nov. 30, 2005; 78 FR 73987, Dec. 9, 2013]

§ 3280.704 [Reserved]

§ 3280.705 Gas piping systems.

(a) *General.* The requirements of this section shall govern the installation of all fuel gas piping attached to any manufactured home. The gas piping supply system shall be designed for a pressure not exceeding 14 inch water column (½ psi) and not less than 7 inch

water column (¼ psi). The manufacturer shall indicate in his written installation instructions the design pressure limitations for safe and effective operation of the gas piping system. None of the requirements listed in this section shall apply to the piping supplied as a part of an appliance. All exterior openings around piping, ducts, plenums or vents shall be sealed to resist the entrance of rodents.

(b) *Materials.* All materials used for the installation, extension, alteration, or repair of any gas piping system shall be new and free from defects or internal obstructions. It shall not be permissible to repair defects in gas piping or fittings. Inferior or defective materials shall be removed and replaced with acceptable material. The system shall be made of materials having a melting point of not less than 1,450 F, except as provided in § 3280.705(e). They shall consist of one or more of the materials described in § 3280.705(b) (1) through (4).

(1) Steel or wrought-iron pipe shall comply with ANSI Standard B36.10–1979, Welded and Seamless Wrought Steel Pipe. Threaded brass pipe in iron pipe sizes may be used. Threaded brass pipe shall comply with ASTM B43–91, Standard Specification for Seamless Red Brass Pipe, Standard Sizes.

(2) Fittings for gas piping shall be wrought iron, malleable iron, steel, or brass (containing not more than 75 percent copper).

(3) Copper tubing must be annealed type, Grade K or L, conforming to the Standard Specification for Seamless Copper Water Tube, ASTM B88–93, or must comply with the Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Service, ASTM B280–1995. Copper tubing must be internally tinned.

(4) Steel tubing must have a minimum wall thickness of 0.032 inch for tubing of ½ inch diameter and smaller and 0.049 inch for diameters ½ inch and larger. Steel tubing must be in accordance with ASTM Standard Specification for Electric-Resistance-Welded Coiled Steel Tubing for Gas and Fuel Oil Lines, ASTM A539–1999, and must be externally corrosion protected.

(5) Corrugated stainless steel tubing (CSST) systems must be listed and installed in accordance with ANSI/IAS LC–1–1997, Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST) (incorporated by reference, see § 3280.4), and the requirements of this section.

(c) *Piping design.* Each manufactured home requiring fuel gas for any purpose shall be equipped with a natural gas piping system acceptable for LP-gas. Where fuel gas piping is to be installed in more than one section of an expandable or multiple unit home, the design and construction of the crossover(s) shall be as follows:

(1) All points of crossover shall be readily accessible from the exterior of the home.

(2) The connection(s) between units must be made with a connector(s) listed for exterior use or direct plumbing sized in accordance with § 3280.705(d). A shutoff valve of the non-displaceable rotor type conforming to ANSI Z21.15–1997, Manually Operated Gas Valves for Appliances, Appliances Connector Valves, and Hose End Valves, suitable for outdoor use must be installed at each crossover point upstream of the connection.

(3) The connection(s) may be made by a listed quick disconnect device which shall be designed to provide a positive seal of the supply side of the gas system when such device is separated.

(4) The flexible connector, direct plumbing pipe, or ''quick disconnect'' device shall be provided with protection from mechanical and impact damage and located to minimize the possibility of tampering.

(5) For gas line cross over connections made with either hard pipe or flexible connectors, the crossover point(s) shall be capped on the supply side to provide a positive seal and covered on the other side with a suitable protective covering.

(6) Suitable protective coverings for the connection device(s) when separated, shall be permanently attached to the device or flexible connector.

(7) When a quick disconnect device is installed, a 3 inch by 1¾ inch minimum size tag made of etched, metal-stamped or embossed brass, stainless steel, anodized or alcalde aluminum not less than 0.020 inch thick or other approved

material (e.g., 0.005 inch plastic laminates) shall be permanently attached on the exterior wall adjacent to the access to the ''quick disconnect'' device. Each tag shall be legibly inscribed with the following information using letters no smaller than ¼ inch high:

Do Not Use Tools To Separate the ''Quick-Disconnect'' Device

(d) *Gas pipe sizing.* Gas piping systems shall be sized so that the pressure drop to any appliance inlet connection from any gas supply connection, when all appliances are in operation at maximum capacity, is not more than 0.5 inch water column as determined on the basis of test, or in accordance with table 3280.705(d). When determining gas pipe sizing in the table, gas shall be assumed to have a specific gravity of 0.65 and rated at 1000 B.T.U. per cubic foot. The natural gas supply connection(s) shall be not less than the size of the gas piping but shall be not smaller than ¾ inch nominal pipe size.

TABLE TO PARAGRAPH (d)—MAXIMUM CAPACITY OF DIFFERENT SIZES OF PIPE AND TUBING IN THOUSANDS OF BTU/HR OF NATURAL GAS FOR GAS PRESSURES OF 0.5 PSIG OR LESS, AND A MAXIMUM PRESSURE DROP OF ½ IN. WATER COLUMN

ID (in.)	10 ft	20 ft	30 ft	40 ft	50 ft	60 ft	70 ft	80 ft	90 ft	100 ft
Iron Pipe Sizes—Length										
¼	43	29	24	20	18	16	15	14	13	12
⅜	95	65	52	45	40	36	33	31	29	27
½	175	120	97	82	73	66	61	57	53	50
¾	360	250	200	170	151	138	125	118	110	103
1	680	465	375	320	285	260	240	220	215	195

EHD[2]	ID (in.)	10 ft	20 ft	30 ft	40 ft	50 ft	60 ft	70 ft	80 ft	90 ft	100 ft
Corrugated Stainless Steel Tubing—Length[1]											
13	⅜	31	21	17	14	13	12	11	10	10	9
15	⅜	42	30	24	20	18	16	15	14	13	12
18	½	79	56	45	39	36	33	30	28	27	25
19	½	91	64	52	45	40	36	35	32	31	29
23	¾	155	111	92	80	72	65	60	58	55	52
25	¾	184	132	108	93	84	77	71	66	62	60
30	1	317	222	180	156	138	126	116	108	103	97
31	1	368	258	209	180	161	147	135	127	120	113
37	1¼	598	426	350	304	273	250	231	217	205	195

OD (in.)	10 ft	20 ft	30 ft	40 ft	50 ft	60 ft	70 ft	80 ft	90 ft	100 ft
Copper Tubing—Length										
¼	27	18	15	13	11	10	9	9	8	8
⅜	56	38	31	26	23	21	19	18	17	16
½	113	78	62	53	47	43	39	37	34	33
¾	197	136	109	93	83	75	69	64	60	57
1	280	193	155	132	117	106	98	91	85	81

[1] Includes losses for four 90-degree bends and two end fittings. Tubing runs with larger numbers of bend and/or fittings shall be increased by an equivalent length of tubing according to the following equation: $L = 1.3n$, where L is actual length (ft) of tubing and n is the number of additional fittings and/or bends.

[2] EHD (Equivalent Hydraulic Diameter)—A measure of the hydraulic efficiency between different tubing sizes.

(e) *Joints for gas pipe.* All pipe joints in the piping system, unless welded or brazed, shall be threaded joints that comply with Pipe Threads, General Purpose (Inch), adopted 25 October 1984, ANSI/ASME B1.20.1–1983. Right and left nipples or couplings shall not be used. Unions, if used, shall be of ground joint type. The material used for welding or brazing pipe connections shall have a melting temperature in excess of 1,000 F.

(f) *Joints for tubing.* (1) Tubing joints shall be made with either a single or a double flare of 45 degrees in accordance with Flares For Tubing, SAE–J533b–1992 or with other listed vibration-resistant fittings, or joints may be brazed with material having a melting point exceeding 1,000 °F. Metallic ball

sleeve compression-type tubing fittings shall not be used.

(2) Steel tubing joints shall be made with a double-flare in accordance with Flares For Tubing, SAE-J533b-1972.

(g) *Pipe joint compound.* Screw joints shall be made up tight with listed pipe joint compound, insoluble in liquefied petroleum gas, and shall be applied to the male threads only.

(h) *Concealed tubing.* (1) Copper tubing must not be run inside walls, floors, partitions, or roofs. Corrugated stainless steel tubing (CSST) may be run inside walls, floors, partitions, and roofs under the following conditions:

(i) The CSST is protected from accidental puncture by a steel strike barrier not less than 0.058 inch thick, or the barrier's equivalent, installed between the tubing and the finished wall and extending 4 inches beyond concealed penetrations of plates, firestops, and wall studs, or specified by the tubing manufacturer's instructions; and

(ii) The CSST is installed in single runs and is not rigidly secured.

(2) Where tubing passes through exterior walls, floors, partitions, or similar construction, the tubing must be protected by the use of weather-resistant grommets that snugly fit both the tubing and the hole through which the tubing passes, or protected as specified in the tubing manufacturer's instructions.

(3) Concealed joints: Piping or tubing joints must not be located in any wall, floor, partition, or similar concealed construction space.

(i) *Concealed joints.* Piping or tubing joints shall not be located in any floor, wall partition, or similar concealed construction space.

(j) *Gas supply connections.* When gas appliances are installed, at least one gas supply connection shall be provided on each home. The connection shall not be located beneath an exit door. Where more than one connection is provided, the piping system shall be sized to provide adequate capacity from each supply connection.

(k) *Identification of gas supply connections.* Each manufactured home shall have permanently affixed to the exterior skin at or near each gas supply connection or the end of the pipe, a tag of 3 inches by 1¾ inches minimum size, made of etched, metal-stamped or embossed brass, stainless steel, anodized or alcalde aluminum not less than 0.020 inch thick, or other approved material (e.g., 0.005 inch plastic laminates), which reads as follows. The connector capacity indicated on this tag shall be equal to or greater than the total Btuh rating of all intended gas appliances.

> COMBINATION LP-GAS AND NATURAL GAS SYSTEM
>
> This gas piping system is designed for use of either liquefied petroleum gas or natural gas.
>
> NOTICE: BEFORE TURNING ON GAS BE CERTAIN APPLIANCES ARE DESIGNED FOR THE GAS CONNECTED AND ARE EQUIPPED WITH CORRECT ORIFICES. SECURELY CAP THIS INLET WHEN NOT CONNECTED FOR USE.
>
> When connecting to lot outlet, use a listed gas supply connector for mobile homes rated at □ 100,000 Btuh or more; □ 250,000 Btuh or more.
>
> Before turning on gas, make certain all gas connections have been made tight, all appliance valves are turned off, and any unconnected outlets are capped.
>
> After turning on gas, test gas piping and connections to appliances for leakage with soapy water or bubble solution, and light all pilots.

The connector capacity indicated on this tag shall be equal to or greater than the total Btuh rating of all intended gas appliances.

(l) *LP-gas supply connectors.* (1) A listed LP-Gas flexible connection conforming to UL 569–1995, Pigtails and Flexible Hose Connectors for LP Gas, or equal must be supplied when LP-Gas cylinders(s) and regulator(s) are supplied.

(2) *Appliance connections.* All gas burning appliances shall be connected to the fuel piping. Materials as provided in § 3280.705(b) or listed appliance connectors shall be used. Listed appliance connectors when used shall not run through walls, floors, ceilings or partitions, except for cabinetry, and shall be 3 feet or less in length or 6 feet or less for cooking appliances. Connectors of aluminum shall not be used outdoors. A manufactured home containing a combination LP-natural-gas-

system may be provided with a gas outlet to supply exterior appliances when installed in accordance with the following:

(i) No portion of the completed installation shall project beyond the wall of the manufactured home.

(ii) The outlet must be provided with an approved quick-disconnect device, which must be designed to provide a positive seal on the supply side of the gas system when the appliance is disconnected. A shutoff valve of the non-displaceable rotor type conforming to ANSI Z21.15–1997, Manually Operated Gas Valves, must be installed immediately upstream of the quick-disconnect device. The complete device must be provided as part of the original installation.

(iii) Protective caps or plugs for the ''quick-disconnect'' device, when disconnected, shall be permanently attached to the manufactured home adjacent to the device.

(iv) A tag shall be permanently attached to the outside of the exterior wall of the manufactured home as close as possible to the gas supply connection. The tag shall indicate the type of gas and the Btuh capacity of the outlet and shall be legibly inscribed as follows:

THIS OUTLET IS DESIGNED FOR USE WITH GAS PORTABLE APPLIANCES WHOSE TOTAL INPUT DO NOT EXCEED _____ BTUH. REPLACE PROTECTIVE COVERING OVER CONNECTOR WHEN NOT IN USE.

(3) *Valves.* A shutoff valve must be installed in the fuel piping at each appliance inside the manufactured home structure, upstream of the union or connector in addition to any valve on the appliance and so arranged to be accessible to permit servicing of the appliance and removal of its components. The shutoff valve must be located within 6 feet of any cooking appliance and within 3 feet of any other appliance. A shutoff valve may serve more than one appliance if located as required by this paragraph (3). The shutoff valve must be of the non-displaceable rotor type and conform to ANSI Z21.15–1997, Manually Operated Gas Valves.

(4) *Gas piping system openings.* All openings in the gas piping system shall be closed gas-tight with threaded pipe plugs or pipe caps.

(5) *Electrical ground.* Gas piping shall not be used for an electrical ground.

(6) *Couplings.* Pipe couplings and unions shall be used to join sections of threaded piping. Right and left nipples or couplings shall not be used.

(7) *Hangers and supports.* All gas piping shall be adequately supported by galvanized or equivalently protected metal straps or hangers at intervals of not more than 4 feet, except where adequate support and protection is provided by structural members. Solid-iron-pipe gas supply connection(s) shall be rigidly anchored to a structural member within 6 inches of the supply connection(s).

(8) *Testing for leakage.* (i) Before appliances are connected, piping systems shall stand a pressure of at least six inches mercury or three PSI gage for a period of not less than ten minutes without showing any drop in pressure. Pressure shall be measured with a mercury manometer or slope gage calibrated so as to be read in increments of not greater than one-tenth pound, or an equivalent device. The source of normal operating pressure shall be isolated before the pressure tests are made. Before a test is begun, the temperature of the ambient air and of the piping shall be approximately the same, and constant air temperature be maintained throughout the test.

(ii) After appliances are connected, the piping system shall be pressurized to not less than 10 inches nor more than 14 inches water column and the appliance connections tested for leakage with soapy water or bubble solution.

[40 FR 58752, Dec. 18, 1975, as amended at 42 FR 54383, Oct. 5, 1977. Redesignated at 44 FR 20679, Apr. 6, 1979, as amended at 52 FR 4587, Feb. 12, 1987; 58 FR 55016, Oct. 25, 1993; 70 FR 72050, Nov. 30, 2005; 78 FR 73987, Dec. 9, 2013]

§ 3280.706 Oil piping systems.

(a) *General.* The requirements of this section shall govern the installation of all liquid fuel piping attached to any manufactured home. None of the requirements listed in this section shall apply to the piping in the appliance(s).

(b) *Materials.* All materials used for the installation extension, alteration,

or repair, of any oil piping systems shall be new and free from defects or internal obstructions. The system shall be made of materials having a melting point of not less than 1,450 F, except as provided in § 280.706(d) and (e). They shall consist of one or more of the materials described in § 3280.706(b) (1) through (4).

(1) Steel or wrought-iron pipe shall comply with ANSI B 36.10–1979, Welded and Seamless Wrought Steel Pipe. Threaded copper or brass pipe in iron pipe sizes may be used.

(2) Fittings for oil piping shall be wrought-iron, malleable iron, steel, or brass (containing not more than 75 percent copper).

(3) Copper tubing must be annealed type, Grade K or L conforming to the Standard Specification for Seamless Copper Water Tube, ASTM B88–93, or shall comply with ASTM B280–1995, Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.

(4) Steel tubing shall have a minimum wall thickness of 0.032 inch for diameters up to ½ inch and 0.049 inch for diameters ½ inch and larger. Steel tubing shall be constructed in accordance with the Specification for Electric-Resistance-Welded Coiled Steel Tubing for Gas and Field Oil Lines, ASTM, A539–90a, and shall be externally corrosion protected.

(c) *Size of oil piping.* The minimum size of all fuel oil tank piping connecting outside tanks to the appliance shall be no smaller than ⅜ inch OD copper tubing or ¼ inch IPS. If No. 1 fuel oil is used with a listed automatic pump (fuel lifter), copper tubing shall be sized as specified by the pump manufacturer.

(d) *Joints for oil piping.* All pipe joints in the piping system, unless welded or brazed, shall be threaded joints which comply with ANSI/ASME B1.20.1–1983, Pipe Threads, General Purpose (Inch). The material used for brazing pipe connections shall have a melting temperature in excess of 1,000 F.

(e) *Joints for tubing.* Joints in tubing shall be made with either a single or double flare of the proper degree, as recommended by the tubing manufacturer, by means of listed tubing fittings, or brazed with materials having a melting point in excess of 1,000 F.

(f) *Pipe joint compound.* Threaded joints shall be made up tight with listed pipe joint compound which shall be applied to the male threads only.

(g) *Couplings.* Pipe couplings and unions shall be used to join sections of threaded pipe. Right and left nipples or couplings shall not be used.

(h) *Grade of piping.* Fuel oil piping installed in conjunction with gravity feed systems to oil heating equipment shall slope in a gradual rise upward from a central location to both the oil tank and the appliance in order to eliminate air locks.

(i) *Strap hangers.* All oil piping shall be adequately supported by galvanized or equivalently protected metal straps or hangers at intervals of not more than 4 feet, except where adequate support and protection is provided by structural members. Solid-iron-pipe oil supply connection(s) shall be rigidly anchored to a structural member within 6 inches of the supply connection(s).

(j) *Testing Tag.* A tag must be affixed to each oil-fired appliance stating: ''Before setting the system in operation, tank installations and piping must be checked for oil leaks with fuel oil of the same grade that will be burned in the appliance. No other material may be used for testing fuel oil tanks and piping. Tanks must be filled to maximum capacity for the final check for oil leakage.''

[40 FR 58752, Dec. 18, 1975. Redesignated at 44 FR 20679, Apr. 6, 1979, as amended at 52 FR 4588, Feb. 12, 1987; 58 FR 55017, Oct. 25, 1993; 70 FR 72050, Nov. 30, 2005; 78 FR 73988, Dec. 9, 2013]

§ 3280.707 Heat producing appliances.

(a) Heat-producing appliances and vents, roof jacks and chimneys necessary for their installation in manufactured homes shall be listed or certified by a nationally recognized testing agency for use in manufactured homes.

(1) A manufactured home shall be provided with a comfort heating system.

(i) When a manufactured home is manufactured to contain a heating appliance, the heating appliance shall be installed by the manufacturer of the

manufactured home in compliance with applicable sections of this subpart.

(ii) When a manufactured home is manufactured for field application of an external heating or combination heating/cooling appliance, preparation of the manufactured home for this external application shall comply with the applicable sections of this part.

(2) Each gas and oil burning comfort heating appliance must have an Annual Fuel Utilization Efficiency of not less than that specified in 10 CFR part 430, Energy Conservation Program for Consumer Products: Test Procedures for Furnaces/Boilers, Vented Home Heating Equipment and Pool Heaters.

(b) Fuel-burning heat-producing appliances and refrigeration appliances, except ranges and ovens, shall be of the vented type and vented to the outside.

(c) Fuel-burning appliances shall not be converted from one fuel to another fuel unless converted in accordance with the terms of their listing and the appliance manufacturer's instructions.

(d) *Performance efficiency*. Each automatic storage water heater must comply with the efficiency requirements of 10 CFR part 430, Energy Conservation Program for Consumer Products: Energy Conservation Standards for Water Heaters.

(1) All automatic electric storage water heaters installed in manufactured homes shall have a standby loss not exceeding 43 watts/meter^2 (4 watts/ft^2) of tank surface area. The method of test for standby loss shall be as described in section 4.3.1 of Household Automatic Electric Storage Type Water Heaters, ANSI C72.1–1972.

(2) All gas and oil-fired automatic storage water heaters shall have a recovery efficiency, E, and a standby loss, S, as described below. The method of test of E and S shall be as described in section 2.7 of Gas Water heaters, Vol. I, Storage Water Heaters with Input/Ratings of 75,000 BTU per hour or less, ANSI Z21.10.1–1998 with addendums Z21.10.1a–2000, and Z21.10.1b–1992, except that for oil-fired units. CF=1.0, Q=total gallons of oil consumed and H=total heating value of oil in BTU/gallon.

Storage capacity in gallons	Recovery efficiency	Standby loss
Less than 25	At least 75 percent..	Not more than 7.5 percent.
25 up to 35 ..	00	Not more than 7 percent.
35 or more ...	00	Not more than 6 percent.

(e) Each space heating, cooling or combination heating and cooling system shall be provided with at least one readily adjustable automatic control for regulation of living space temperature. The control shall be placed a minimum of 3 feet from the vertical edge of the appliance compartment door. It shall not be located on an exterior wall or on a wall separating the appliance compartment from a habitable room.

(f) *Oil-fired heating equipment*. All oil-fired heating equipment must conform to Liquid Fuel-burning Heating Appliances for Manufactured Homes and Recreational Vehicles, UL 307A–1995, with 1997 revisions, and be installed in accordance with Standard for the Installation of Oil Burning Equipment, NFPA 31–01 (incorporated by reference, see § 3280.4). Regardless of the requirements of the above-referenced standards, or any other standards referenced in this part, the following are not required:

(1) External switches or remote controls which shut off the burner or the flow of oil to the burner, or

(2) An emergency disconnect switch to interrupt electric power to the equipment under conditions of excessive temperature.

[40 FR 58752, Dec. 17, 1975, as amended at 42 FR 54383, Oct. 5, 1977. Redesignated at 44 FR 20679, Apr. 6, 1979, as amended at 47 FR 49391, Nov. 1, 1982; 52 FR 4588, Feb. 12, 1987; 52 FR 47553, Dec. 15, 1987; 58 FR 55017, Oct. 25, 1993; 70 FR 72050, Nov. 30, 2005; 78 FR 73988, Dec. 9, 2013]

§ 3280.708 Exhaust duct system and provisions for the future installation of a clothes dryer.

(a) *Clothes dryers*. (1) All gas and electric clothes dryers shall be exhausted to the outside by a moisture-lint exhaust duct and termination fitting. When the clothes dryer is supplied by the manufacturer, the exhaust duct and termination fittings shall be completely installed by the manufacturer. However, if the exhaust duct system is

subject to damage during transportation, it need not be completely installed at the factory when:

(i) The exhaust duct system is connected to the clothes dryer, and

(ii) A moisture lint exhaust duct system is roughed in and installation instructions are provided in accordance with paragraph (b)(3) or (c) of this section.

(2) A clothes dryer moisture-lint exhaust duct shall not be connected to any other duct, vent or chimney.

(3) The exhaust duct shall not terminate beneath the manufactured home.

(4) Moisture-lint exhaust ducts shall not be connected with sheet metal screws or other fastening devices which extend into the interior of the duct.

(5) Moisture-lint exhaust duct and termination fittings shall be installed in accordance with the appliance manufacturer's printed instructions.

(b) *Provisions for future installation of a gas clothes dryer.* A manufactured home may be provided with ''stubbed in'' equipment at the factory to supply a gas clothes dryer for future installation by the owner provided it complies with the following provisions:

(1) The ''stubbed in'' gas outlet shall be provided with a shutoff valve, the outlet of which is closed by threaded pipe plug or cap;

(2) The ''stubbed in'' gas outlet shall be permanently labeled to identify it for use only as the supply connection for a gas clothes dryer;

(3) A moisture lint duct system consisting of a complete access space (hole) through the wall or floor cavity with a cap or cover on the interior and exterior of the cavity secured in such a manner that they can be removed by a common household tool shall be provided. The cap or cover in place shall limit air infiltration and be designed to resist the entry of water or rodents. The manufacturer is not required to provide the moisture-lint exhaust duct or the termination fitting. The manufacturer shall provide written instructions to the owner on how to complete the exhaust duct installation in accordance with provisions of § 3280.708(a)(1) through (5).

(c) *Provisions for future installation of electric clothes dryers.* When wiring is installed to supply an electric clothes dryer for future installation by the owner, the manufacturer shall:

(1) Provide a roughed in moisture-lint exhaust duct system consisting of a complete access space (hole) through the wall or floor cavity with a cap or cover on the interior and exterior of the cavity which are secured in such a manner that they can be removed by the use of common household tools. The cap or cover in place shall limit air filtration and be designed to resist the entry of water or rodents into the home. The manufacturer is not required to provide the moisture-lint exhaust duct or the termination fitting;

(2) Install a receptacle for future connection of the dryer;

(3) Provide written instructions on how to complete the exhaust duct installation in accordance with the provisions of paragraphs (a)(1) through (5) of this section.

[42 FR 54383, Oct. 5, 1977. Redesignated at 44 FR 20679, Apr. 6, 1979, as amended at 58 FR 55018, Oct. 25, 1993]

§ 3280.709 Installation of appliances.

(a) The installation of each appliance shall conform to the terms of its listing and the manufacturer's instructions. The installer shall leave the manufacturer's instructions attached to the appliance. Every appliance shall be secured in place to avoid displacement. For the purpose of servicing and replacement, each appliance shall be both accessible and removable.

(b) Heat-producing appliances shall be so located that no doors, drapes, or other such material can be placed or swing closer to the front of the appliance than the clearances specified on the labeled appliances.

(c) Clearances surrounding heat producing appliances shall not be less than the clearances specified in the terms of their listings.

(1) Prevention of storage. The area surrounding heat producing appliances installed in areas with interior or exterior access shall be framed-in or guarded with noncombustible material such that the distance from the appliance to the framing or guarding material is not greater than three inches unless the appliance is installed in compliance with paragraph (c)(2), of this section. When clearance required by the listing

is greater than three inches, the guard or frame shall not be closer to the appliance than the distance provided in the listing.

(2) Clearance spaces surrounding heat producing appliances are not required to be framed-in or guarded when:

(i) A space is designed specifically for a clothes washer or dryer;

(ii) Dimensions surrounding the appliance do not exceed three inches; or

(iii) The manufacturer affixes either to a side of an alcove or compartment containing the appliance, or to the appliance itself, in a clearly visible location, a 3″ × 5″ adhesive backed plastic laminated label or the equivalent which reads as follows:

''Warning''

This compartment is not to be used as a storage area. Storage of combustible materials or containers on or near any appliance in this compartment may create a fire hazard. Do not store such materials or containers in this compartment.

(d) All fuel-burning appliances, except ranges, ovens, illuminating appliances, clothes dryers, solid fuel-burning fireplaces and solid fuel-burning fireplace stoves, shall be installed to provide for the complete separation of the combustion system from the interior atmosphere of the manufactured home. Combustion air inlets and flue gas outlets shall be listed or certified as components of the appliance. The required separation may be obtained by:

(1) The installation of direct vent system (sealed combustion system) appliances, or

(2) The installation of appliances within enclosures so as to separate the appliance combustion system and venting system from the interior atmosphere of the manufactured home. There shall not be any door, removable access panel, or other opening into the enclosure from the inside of the manufactured home. Any opening for ducts, piping, wiring, etc., shall be sealed.

(e) A forced air appliance and its return-air system shall be designed and installed so that negative pressure created by the air-circulating fan cannot affect its or another appliance's combustion air supply or act to mix products of combustion with circulating air.

(1) The air circulating fan of a furnace installed in an enclosure with another fuel-burning appliance shall be operable only when any door or panel covering an opening in the furnace fan compartment or in a return air plenum or duct is in the closed position. This does not apply if both appliances are direct vent system (sealed combustion system) appliances.

(2) If a warm air appliance is installed within an enclosure to conform to § 3280.709(d)(2), each warm-air outlet and each return air inlet shall extend to the exterior of the enclosure. Ducts, if used for that purpose, shall not have any opening within the enclosure and shall terminate at a location exterior to the enclosure.

(3) Cooling coils installed as a portion of, or in connection with, any forced-air furnace shall be installed on the downstream side unless the furnace is specifically otherwise listed.

(4) An air conditioner evaporator section shall not be located in the air discharge duct or plenum of any forced-air furnace unless the manufactured home manufacturer has complied with certification required in § 3280.511.

(5) If a cooling coil is installed with a forced-air furnace, the coil shall be installed in accordance with its listing. When a furnace-coil unit has a limited listing, the installation must be in accordance with that listing.

(6) When an external heating appliance or combination cooling/heating appliance is to be field installed, the home manufacturer shall make provision for proper location of the connections to the supply and return air systems. The manufacturer is not required to provide said appliance(s). The preparation by the manufacturer for connection to the home's supply and return air system shall include all fittings and connection ducts to the main duct and return air system such that the installer is only required to provide:

(i) The appliance;

(ii) Any appliance connections to the home; and

(iii) The connecting duct between the external appliance and the fitting installed on the home by the manufacturer. The above connection preparations by the manufacturer do not apply

to supply or return air systems designed only to accept external cooling (i.e., self contained air conditioning systems, etc.)

(7) The installation of a self contained air conditioner comfort cooling appliance shall meet the following requirements:

(i) The installation on a duct common with an installed heating appliance shall require the installation of an automatic damper or other means to prevent the cooled air from passing through the heating appliance unless the heating appliance is certified or listed for such application and the supply system is intended for such an application.

(ii) The installation shall prevent the flow of heated air into the external cooling appliance and its connecting ducts to the manufactured home supply and return air system during the operation of the heating appliance installed in the manufactured home.

(iii) The installation shall prevent simultaneous operation of the heating and cooling appliances.

(f) *Vertical clearance above cooking top.* Ranges shall have a vertical clearance above the cooking top of not less than 24 inches. (See § 3280.204).

(g) Solid fuel-burning factory-built fireplaces and fireplace stoves listed for use in manufactured homes may be installed in manufactured homes provided they and their installation conform to the following paragraphs. A fireplace or fireplace stove shall not be considered as a heating facility for determining compliance with subpart F.

(1) A solid fuel-burning fireplace or fireplace stove shall be equipped with integral door(s) or shutter(s) designed to close the fireplace or fireplace stove fire chamber opening and shall include complete means for venting through the roof, a combustion air inlet, a hearth extension, and means to securely attach the fireplace or the fireplace stove to the manufactured home structure. The installation shall conform to the following paragraphs (g)(1)(i) to (vii) inclusive:

(i) A listed factory-built chimney designed to be attached directly to the fireplace or fireplace stove shall be used. The listed factory built chimney shall be equipped with and contain as part of its listing a termination device(s) and a spark arrester(s).

(ii) A fireplace or fireplace stove, air intake assembly, hearth extension and the chimney shall be installed in accordance with the terms of their listings and their manufacturer's instructions.

(iii) The combustion air inlet shall conduct the air directly into the fire chamber and shall be designed to prevent material from the hearth dropping onto the area beneath the manufactured home.

(iv) The fireplace or fireplace stove shall not be installed in a sleeping room.

(v) Hearth extension shall be of noncombustible material not less than ⅜-inch thick. The hearth shall extend at least 16 inches in front or and at least 8 inches beyond each side of the fireplace or fireplace stove opening. Furthermore the hearth shall extend over the entire surface beneath a fireplace stove and beneath an elevated or overhanging fireplace.

(vi) The label on each solid fuel-burning fireplace and solid fuel-burning fireplace stove shall include the following wording: For use with solid fuel only.

(vii) The chimney shall extend at least three feet above the part of the roof through which it passes and at least two feet above the highest elevation of any part of the manufactured home within 10 feet of the chimney. Portions of the chimney and termination that exceed an elevation of 13½ ft. above ground level may be designed to be removed for transporting the manufactured home.

(h) A corrosion resistant water drip collection and drain pan must be installed under each water heater that will allow water leaking from the water heater to drain to the exterior of the manufactured home, or to a drain.

[40 FR 58752, Dec. 18, 1975. Redesignated at 44 FR 20679, Apr. 6, 1979, as amended at 44 FR 66195, Nov. 19, 1979; 58 FR 55018, Oct. 25, 1993; 70 FR 72050, Nov. 30, 2005]

§ 3280.710 Venting, ventilation and combustion air.

(a) The venting as required by § 3280.707(b) shall be accomplished by

one or more of the methods given in (a)(1) and (2) of this section:

(1) An integral vent system listed or certified as part of the appliance.

(2) A venting system consisting entirely of listed components, including roof jack, installed in accordance with the terms of the appliance listing and the appliance manufacturer's instructions.

(b) Venting and combustion air systems shall be installed in accordance with the following:

(1) Components shall be securely assembled and properly aligned at the factory in accordance with the appliance manufacturer's instructions except vertical or horizontal sections of a fuel fired heating appliance venting system that extend beyond the roof line or outside the wall line may be installed at the site. Sectional venting systems shall be listed for such applications and installed in accordance with the terms of their listings and manufacturers' instructions. In cases where sections of the venting system are removed for transportation, a label shall be permanently attached to the appliance indicating the following:

Sections of the venting system have not been installed. Warning-do not operate the appliance until all sections have been assembled and installed in accordance with the manufacturer's instructions.

(2) Draft hood connectors shall be firmly attached to draft hood outlets or flue collars by sheet metal screws or by equivalent effective mechanical fasteners.

(3) Every joint of a vent, vent connector, exhaust duct and combustion air intake shall be secure and in alignment.

(c) Venting systems shall not terminate underneath a manufactured home.

(d) Venting system terminations shall be not less than three feet from any motor-driven air intake discharging into habitable areas.

(e) The area in which cooking appliances are located shall be ventilated by a metal duct which may be single wall, not less than 12.5 square inches in cross-sectional area (minimum dimension shall be two inches) located above the appliance(s) and terminating outside the manufactured home, or by listed mechanical ventilating equipment discharging outside the home, that is installed in accordance with the terms of listing and the manufacturer's instructions. Gravity or mechanical ventilation shall be installed within a horizontal distance of not more than ten feet from the vertical front of the appliance(s).

(f) Mechanical ventilation which exhausts directly to the outside atmosphere from the living space of a home shall be equipped with an automatic or manual damper. Operating controls shall be provided such that mechanical ventilation can be separately operated without directly energizing other energy consuming devices.

[49 FR 32012, Aug. 9, 1984, as amended at 58 FR 55018, Oct. 25, 1993]

§ 3280.711 Instructions.

Operating instructions must be provided with each appliance. The operating and installation instructions for each appliance must be provided with the homeowner's manual.

[78 FR 73989, Dec. 9, 2013]

§ 3280.712 Marking.

(a) Information on clearances, input rating, lighting and shutdown shall be attached to the appliances with the same permanence as the nameplate, and so located that it is easily readable when the appliance is properly installed or shutdown for transporting of manufactured home.

(b) Each fuel-burning appliance shall bear permanent marking designating the type(s) of fuel for which it is listed.

§ 3280.713 Accessibility.

Every appliance shall be accessible for inspection, service, repair, and replacement without removing permanent construction. For those purposes, inlet piping supplying the appliance shall not be considered permanent construction. Sufficient room shall be available to enable the operator to observe the burner, control, and ignition means while starting the appliance.

[58 FR 55018, Oct. 25, 1993]

§ 3280.714 Appliances, cooling.

(a) Every air conditioning unit or a combination air conditioning and heating unit shall be listed or certified by a

nationally recognized testing agency for the application for which the unit is intended and installed in accordance with the terms of its listing.

(1) Mechanical air conditioners shall be rated in accordance with the ARI Standard 210/240–89 Unitary Air Conditioning and Air Source Unitary Heat Pump Equipment (incorporated by reference, see § 3280.4) and certified by ARI or other nationally recognized testing agency capable of providing follow-up service.

(i) Electric motor-driven unitary air-cooled air conditioners and heat pumps in the cooling mode with rated capacity less than 65,000 BTU/hour (19,045 watts), when rated at ARI standard rating conditions in ARI Standard 210/240–89, Unitary Air-Conditioning and Air-Source Heat Pump Equipment, must have seasonal energy efficiency (SEER) values not less than as specified in 10 CFR Part 430, Energy Conservation Program for Consumer Products: Central Air Conditioners and Heat Pumps Energy Conservation Standards.

(ii) Heat pumps must be certified to comply with all requirements of the ARI Standard 210/240–89, Unitary Air Conditioning and Air-Source Heat Pump Equipment. Electric motor-driven vapor compression heat pumps with supplemental electrical resistance heat must be sized to provide by compression at least 60 percent of the calculated annual heating requirements for the manufactured home being served. A control must be provided and set to prevent operation of supplemental electrical resistance heat at outdoor temperatures above 40 °F (4 °C), except for defrost conditions. Electric motor-driven vapor compression heat pumps with supplemental electric resistance heat conforming to ARI Standard 210/240–89, Unitary Air-Conditioning and Air-Source Heat Pump Equipment, must have Heating Season Performance Factor (HSPF) efficiencies not less than as specified in the 10 CFR Part 430, Energy Conservation Program for Consumer Products: Central Air Conditioners and Heat Pumps Energy Conservation Standards.

(iii) Electric motor-driven vapor compression heat pumps with supplemental electric resistance heat conforming to ARI Standard 210/240–89 Unitary Air-Conditioning and Air-Source Heat Pump Equipment shall show coefficient of performance ratios not less than shown below:

COP

Temperature degrees fahrenheit	Coefficient of performance
47	2.5
17	1.7
0	1.0

(2) Gas fired absorption air conditioners must be listed or certified in accordance with ANSI Z21.40.1–1996, Gas Fired, Heat Activated, Air Conditioning and Heat Pump Appliances (incorporated by reference, see § 3280.4), and certified by a nationally recognized testing agency capable of providing follow-up service.

(3) Direct refrigerating systems serving any air conditioning or comfort-cooling system installed in a manufactured home shall employ a type of refrigerant that ranks no lower than Group 5 in the Underwriters' Laboratories, Inc. ''Classification of Comparative Life Hazard of Various Chemicals.''

(4) When a cooling or heat pump coil and air conditioner blower are installed with a furnace or heating appliance, they shall be tested and listed in combination for heating and safety performance by a nationally recognized testing agency.

(5) Cooling or heat pump indoor coils and outdoor sections shall be certified, listed and rated in combination for capacity and efficiency by a nationally recognized testing agency(ies). Rating procedures shall be based on U.S. Department of Energy test procedures.

(b) *Installation and instructions.* (1) The installation of each appliance shall conform to the terms of its listing as specified on the appliance and in the manufacturer's instructions. The installer shall include the manufacturer's installation instructions in the manufactured home. Appliances shall be secured in place to avoid displacement and movement from vibration and road shock.

(2) Operating instructions shall be provided with the appliance.

(c) Fuel-burning air conditioners shall also comply with § 280.707.

(d) The appliance rating plate shall be so located that it is easily readable when the appliance is properly installed.

(e) Every installed appliance shall be accessible for inspection, service, repair and replacement without removing permanent construction.

[40 FR 58752, Dec. 18, 1975. Redesignated at 44 FR 20679, Apr. 6, 1979, as amended at 58 FR 55018, Oct. 25, 1993; 70 FR 72051, Nov. 30, 2005; 78 FR 73989, Dec. 9, 2013]

§ 3280.715 Circulating air systems.

(a) *Supply system.* (1) Supply air ducts, fittings, and any dampers contained therein must be made of galvanized steel, tin-plated steel, or aluminum, or must be listed as Class 0 or Class 1 air ducts and air connectors in accordance with UL 181–2003, Factory-Made Air Ducts and Air Connectors (incorporated by reference, see § 3280.4). Class 1 air ducts and air connectors must be located at least 3 feet from the furnace bonnet or plenum. Air connectors must not be used for exterior manufactured home duct connection. A duct system integral with the structure must be of durable construction that can be demonstrated to be equally resistant to fire and deterioration as required by this section. Furnace supply plenums must be constructed of metal that extends a minimum of 3 feet from the heat exchanger measured along the centerline of airflow. Ducts constructed from sheet metal must be in accordance with the following table:

MINIMUM METAL THICKNESS FOR DUCTS [1]

Duct type	Diameter 14 in. or less	Width over 14 in.
Round	0.013	0.016
Enclosed rectangular	.013	.016
Exposed rectangular	.016	.019

[1] When "nominal" thicknesses are specified, 0.003 in. shall be added to these "minimum" metal thicknesses.

(2) *Sizing of ducts for heating.* (i) Ducts shall be so designed that when a labeled forced-air furnace is installed and operated continuously at its normal heating air circulating rate in the manufactured home, with all registers in the full open position, the static pressure measured in the casing shall not exceed 90% of that shown on the label of the appliance. For upflow furnaces the static pressure shall be taken in the duct plenum. For external heating or combination heating/cooling appliances the static pressure shall be taken at the point used by the agency listing or certifying the appliance.

(ii) When an evaporator-coil specifically designed for the particular furnace is installed between the furnace and the duct plenum, the total static pressure shall be measured downstream of the coil in accordance with the appliance label and shall not exceed 90 percent of that shown on the label of the appliance.

(iii) When any other listed air-cooler coil is installed between the furnace and the duct plenum, the total static pressure shall be measured between the furnace and the coil and it shall not exceed 90 percent of that shown on the label of the furnace.

(iv) The minimum dimension of any branch duct shall be at least 1½ inches, and of any main duct, 2½ inches.

(3) *Sizing of ducts.* (i) The manufactured home manufacturer shall certify the capacity of the air cooling supply duct system for the maximum allowable output of ARI certified central air conditioning systems. The certification shall be at operating static pressure of 0.3 inches of water or greater. (See § 3280.511).

(ii) The refrigerated air cooling supply duct system including registers must be capable of handling at least 300 cfm per 10,000 btuh with a static pressure no greater than 0.3 inches of water when measured at room temperature. In the case of application of external self contained comfort cooling appliances or the cooling mode of combination heating/cooling appliances, either the external ducts between the appliance and the manufactured home supply system shall be considered part of, and shall comply with the requirements for the refrigerated air cooling supply duct system, or the connecting duct between the external appliance and the mobile supply duct system shall be a part of the listed appliance. The minimum dimension of any branch duct shall be at least 1½ inches, and of any main duct, 2½ inches.

(4) *Airtightness of supply duct systems.* A supply duct system shall be considered substantially airtight when the static pressure in the duct system, with all registers sealed and with the furnace air circulator at high speed, is at least 80 percent of the static pressure measured in the furnace casing, with its outlets sealed and the furnace air circulator operating at high speed. For the purpose of this paragraph and § 3280.715(b) pressures shall be measured with a water manometer or equivalent device calibrated to read in increments not greater than 1/10 inch water column.

(5) *Expandable or multiple manufactured home connections.* (i) An expandable or multiple manufactured home may have ducts of the heating system installed in the various units. The points of connection must be so designed and constructed that when the manufactured home is fully expanded or coupled, the resulting duct joint will conform to the requirements of this part.

(ii) The manufacturer must provide installation instructions for supporting, mechanically fastening, sealing, and insulating each crossover duct. The instructions must indicate that no portion of the crossover duct is to be in contact with the ground, and must describe the means to support the duct without compressing the insulation and restricting airflow.

(6) Air supply ducts shall be insulated with material having an effective thermal resistance (R) of not less than 4.0 unless they are within manufactured home insulation having a minimum effective value of R–4.0 for floors or R–6.0 for ceilings.

(7) Unless installed in a basement, supply and return ducts, fittings, and crossover duct plenums exposed directly to outside air, such as those under-chassis crossover ducts or ducts connecting external heating, cooling, or combination heating/cooling appliances, must be insulated with material having a minimum thermal resistance of R–8 in all Thermal Zones. All such insulating materials must have a continuous vapor barrier retarder having a perm rating of not more than 1 perm. Where ducts are exposed underneath the manufactured home, they must comply with paragraph (a)(5)(ii) of this section, and shall be listed for exterior use.

(b) *Return air systems*—(1) *Return air openings.* Provisions shall be made to permit the return of circulating air from all rooms and living spaces, except toilet room(s), to the circulating air supply inlet of the furnace.

(2) *Duct material.* Return ducts and any diverting dampers contained therein shall be in accordance with the following:

(i) Portions of return ducts directly above the heating surfaces, or closer than 2 feet from the outer jacket or casing of the furnace shall be constructed of metal in accordance with § 3280.715(a)(1) or shall be listed Class 0 or Class 1 air ducts.

(ii) Return ducts, except as required by paragraph (a) of this section, shall be constructed of one-inch (nominal) wood boards (flame spread classification of not more than 200), other suitable material no more flammable than one-inch board or in accordance with § 3280.715(a)(1).

(iii) The interior of combustible ducts shall be lined with noncombustible material at points where there might be danger from incandescent particles dropped through the register or furnace such as directly under floor registers and the bottom return.

(iv) Factory made air ducts used for connecting external heating, cooling or combination heating/cooling appliances to the supply system and return air system of a manufactured home shall be listed by a nationally recognized testing agency. Ducts applied to external heating appliances or combination heating/cooling appliances supply system outlets shall be constructed of metal in accordance with § 3280.715(a)(1) or shall be listed Class 0 or Class 1 air ducts for those portions of the duct closer than 2 feet from the outer casing of the appliance.

(v) Ducts applied to external appliances shall be resistant to deteriorating environmental effects, including but not limited to ultraviolet rays, cold weather, or moisture and shall be resistant to insects and rodents.

(3) *Sizing.* The cross-sectional areas of the return air duct shall not be less than 2 square inches for each 1,000 Btu per hour input rating of the appliance.

Dampers shall not be placed in a combination fresh air intake and return air duct so arranged that the required cross-sectional area will not be reduced at all possible positions of the damper.

(4) *Permanent uncloseable openings.* Living areas not served by return air ducts or closed off from the return opening of the furnace by doors, sliding partitions, or other means shall be provided with permanent uncloseable openings in the doors or separating partitions to allow circulated air to return to the furnace. Such openings may be grilled or louvered. The net free area of each opening shall be not less than 1 square inch for every 5 square feet of total living area closed off from the furnace by the door or partition serviced by that opening. Undercutting doors connecting the closed-off space may be used as a means of providing return air area. However, in the event that doors are undercut, they shall be undercut a minimum of 2 inches and not more than 2½ inches, as measured from the top surface of the floor decking to the bottom of the door and no more than one half of the free air area so provided shall be counted as return air area.

(c) *Joints and seams.* Joints and seams of sheet metal and factory-made flexible ducts, including trunks, branches, risers, crossover ducts, and crossover duct plenums, shall be mechanically secured and made substantially airtight. Slip joints in sheet metal ducts shall have a lap of at least one inch and shall be mechanically fastened. Tapes or caulking compounds shall be permitted to be used for sealing mechanically secure joints. Sealants and tapes shall be applied only to surfaces that are dry and dust-, dirt-, oil-, and grease-free. Tapes and mastic closure systems for use with factory-made rigid fiberglass air ducts and air connectors shall be listed in accordance with UL Standard 181A–1994, with 1998 revisions. Tapes and mastic closure systems used with factory-made flexible air ducts and air connectors shall be listed in accordance with UL Standard 181B–1995, with 1998 revisions.

(d) *Supports and protection.* Ducts must be securely supported. Nails or other fasteners must not be driven or penetrate through duct walls. Where vertical ducts are installed within closets or rooms, they must be enclosed with materials equivalent to those used in the closet or room construction.

(e) *Registers and grilles.* Fittings connecting the registers and grilles to the duct system must be constructed of metal or material that complies with the requirements of Class 1 or 2 ducts under UL 181–1996 with 1998 revisions, Factory Made Air Ducts and Connectors. Air supply terminal devices (registers) when installed in kitchen, bedrooms, and bathrooms must be equipped with adjustable closeable dampers. Registers or grilles must be constructed of metal or conform with the following:

(1) Be made of a material classified 94V–0 or 94V–1, when tested as described in UL 94–1996, with 2001 revisions, Test for Flammability of Plastic Materials for Parts in Devices and Appliances, Fifth Edition; and

(2) Floor registers or grilles shall resist without structural failure a 200 lb. concentrated load on a 2-inch diameter disc applied to the most critical area of the exposed face of the register or grille. For this test the register or grille is to be at a temperature of not less than 165 °F and is to be supported in accordance with the manufacturer's instructions.

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Subpart I—Electrical Systems

§ 3280.801 Scope.

(a) Subpart I of this part and Part II of Article 550 of the National Electrical Code (NFPA No. 70–2005) cover the electrical conductors and equipment installed within or on manufactured homes and the conductors that connect manufactured homes to a supply of electricity.

(b) In addition to the requirements of this part and Part II of Article 550 of the National Electrical Code (NFPA No. 70–2005), the applicable portions of other Articles of the National Electrical Code must be followed for electrical installations in manufactured