

Weatherization Operations Manual

Section 8. Materials Standards

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Attachments:

Alaska CDC Weatherization Project Specifications

RurAl CAP “Attachment II Specifications for Materials Bid Package...”

Appendix A to Part 440—Standards for Weatherization Materials

The following Government standards are produced by the Consumer Product Safety Commission and are published in title 16, Code of Federal Regulations:

Thermal Insulating Materials for Building Elements Including Walls, Floors, Ceilings, Attics, and Roofs Insulation—organic fiber—conformance to Interim Safety Standard in 16 CFR part 1209;

Fire Safety Requirements for Thermal Insulating Materials According to Insulation Use—Attic Floor—insulation materials intended for exposed use in attic floors shall be capable of meeting the same flammability requirements given for cellulose insulation in 16 CFR part 1209;

Enclosed spaces—insulation materials intended for use within enclosed stud or joist spaces shall be capable of meeting the smoldering combustion requirements in 16 CFR part 1209.

The following standards which are not otherwise set forth in part 440 are incorporated by reference and made a part of part 440. The following standards have been approved for incorporation by reference by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. These materials are incorporated as they exist on April 5, 1993 and a notice of any change in these materials will be published in the Federal Register. The standards incorporated by reference are available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to:
http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

The standards incorporated by reference in part 440 can be obtained from the following sources:

Air Conditioning and Refrigeration Institute, 1501 Wilson Blvd., Arlington, VA 22209; (703) 524-8800.

American Gas Association, 1515 Wilson Blvd., Arlington, VA 22209; (703) 841-8400.
American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018; (212) 642-4900.

American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017; (212) 705-7800.

American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103; (215) 299-5400.

American Architectural Manufacturers Association, 1540 East Dundee Road, Palatine, IL 60067; (708) 202-1350.

Federal Specifications, General Services Administration, Specifications Section, Room 6654, 7th and D Streets, SW, Washington, DC 20407; (202) 708–5082.

Gas Appliance Manufacturers Association, 1901 Moore St., Arlington, VA 22209; (703) 525–9565.

National Electrical Manufacturers Association, 2101 L Street, NW, Suite 300, Washington, DC 20037; (202) 457–8400.

National Fire Protection Association, Batterymarch Park, P.O. Box 9101, Quincy, MA 02269; (617) 770–3000.

National Standards Association, 1200 Quince Orchard Blvd., Gaithersburg, MD 20878; (301) 590–2300. (NSA is a local contact for materials from ASTM).

National Wood Window and Door Association, 1400 East Touhy Avenue, Des Plaines, IL 60018; (708) 299–5200.

Sheet Metal and Air Conditioning Contractors Association, P.O. Box 221230, Chantilly, VA 22022–1230; (703) 803–2980.

Steel Door Institute, 712 Lakewood Center North, 14600 Detroit Avenue, Cleveland, OH 44107; (216) 899–0100.

Steel Window Institute, 1230 Keith Building, Cleveland, OH 44115; (216) 241–7333.
Tubular Exchanger Manufacturers Association, 25 North Broadway, Tarrytown, NY 10591; (914) 332–0040.

Underwriters Laboratories, Inc., P.O. Box 75530, Chicago, IL 60675–5330; (708) 272–8800.

More information regarding the standards in this reference can be obtained from the following sources:

Environmental Protection Agency, 401 M Street, NW, Washington, DC 20006; (202) 554–1080.

National Institute of Standards and Technology, U.S. Department of Commerce, Gaithersburg, MD 20899, (301) 975–2000

Weatherization Assistance Programs Division, Conservation and Renewable Energy, Mail Stop 5G–023, Forrestal Bldg, 1000 Independence Ave, SW, Washington, DC 20585; (202) 586–2207.

Thermal Insulating Materials for Building Elements Including Walls, Floors, Ceilings, Attics, and Roofs

[Standards for conformance]

Insulation—mineral fiber:	
Blanket insulation	ASTM ¹ C665–88.
Roof insulation board	ASTM C726–88.
Loose-fill insulation	ASTM C764–88.
Insulation—mineral cellular:	
Vermiculite loose-fill insulation	ASTM C516–80 (1990).
Perlite loose-fill insulation	ASTM C549–81 (1986).
Cellular glass insulation block	ASTM C552–88.
Perlite insulation board	ASTM C728–89a.
Insulation—organic fiber:	
Cellulosic fiber insulating board	ASTM C208–72 (1982).
Cellulose loose-fill insulation	ASTM C739–88.
Insulation-organic cellular:	
Preformed block-type polystyrene insulation	ASTM C578–87a.
Rigid preformed polyurethane insulation board	ASTM C591–85.
Polyurethane or polyisocyanurate insulation board faced with aluminum foil on both sides	FS ² HH-I–1972/1 (1981).
Polyurethane or polyisocyanurate insulation board faced with felt on both sides	FS HH-I–1972/2 (1981). And Amendment 1, October 3, 1985.
Insulation—composite boards:	
Mineral fiber and rigid cellular polyurethane composite roof insulation board	ASTM C726–88.
Perlite board and rigid cellular polyurethane composite roof insulation	ASTM C984–83.
Gypsum board and polyurethane or polyisocyanurate composite board	FS HH-I–1972/4 (1981).
Materials used as a patch to reduce infiltration through the building envelope	Commercially available.

¹ASTM indicates American Society for Testing and Materials.

²FS indicates Federal Specifications.

Thermal Insulating Materials for Pipes, Ducts, and Equipment Such as Boilers and Furnaces

[Standards for conformance]

Insulation—mineral fiber:	
Preformed pipe insulation	ASTM ¹ C547–77.
Blanket and felt insulation (industrial type)	ASTM C553–70 (1977).
Blanket insulation and blanket type pipe insulation (metal-mesh covered) (industrial type)	ASTM C592–80.
Block and board insulation	ASTM C612–83.
Spray applied fibrous insulation for elevated temperature	ASTM C720–89.
High-temperature fiber blanket insulation	ASTM C892–89.
Duct work insulation	Selected and applied according to ASTM C971–82.
Insulation—mineral cellular:	
Diatomaceous earth block and pipe insulation	ASTM C517–71 (1979)
Calcium silicate block and pipe insulation	ASTM C533–85 (1990).
Cellular glass insulation	ASTM C552–88.
Expanded perlite block and pipe insulation	ASTM C610–85.
Insulation—Organic Cellular:	
Preformed flexible elastomeric cellular insulation in sheet and tubular form	ASTM C534–88.
Unfaced preformed rigid cellular polyurethane insulation	ASTM C591–85.
Insulation skirting	Commercially available.

¹ASTM indicates American Society for Testing and Materials.

Fire Safety Requirements for Insulating Materials According to Insulation Use

[Standards for conformance]

Attic floor	Insulation materials intended for exposed use in attic floors shall be capable of meeting the same smoldering combustion requirements given for cellulose insulation in ASTM ¹ C739–88.
Enclosed space	Insulation materials intended for use within enclosed stud or joist spaces shall be capable of meeting the smoldering combustion requirements in ASTM C739–88.
Exposed interior walls and ceilings	Insulation materials, including those with combustible facings, which remain exposed and serve as wall or ceiling interior finish, shall have a flame spread classification not to exceed 150 (per ASTM E84–89a).
Exterior envelope walls and roofs	Exterior envelope walls and roofs containing thermal insulations shall meet applicable local government building code requirements for the complete wall or roof assembly.
Pipes, ducts, and equipment	Insulation materials intended for use on pipes, ducts and equipment shall be capable of meeting a flame spread classification not to exceed 150 (per ASTM E84–89a).

¹ASTM indicates American Society for Testing and Materials.

Storm Windows

[Standards for conformance]

Storm windows:	
Aluminum insulating storm windows	ANSI/AAMA ¹ 1002.10–83.
Aluminum frame storm windows	ANSI/AAMA 1002.10–83.
Wood frame storm windows	ANSI/NWWDA ² I.S. 2–87. (Section 3)
Rigid vinyl frame storm windows	ASTM ³ D4099–89.
Frameless plastic glazing storm	Required minimum thickness windows is 6 mil (.006 inches).
Movable insulation systems for windows	Commercially available.

¹ANSI/AAMA indicates American National Standards Institute/American Architectural Manufacturers Association.

²ANSI/NWWDA indicates American National Standards Institute/National Wood Window & Door Association.

³ASTM indicates American Society for Testing and Materials.

Storm Doors

[Standards for conformance]

Storm doors—Aluminum:	
Storm Doors	ANSI/AAMA ¹ 1102.7–89.
Sliding glass storm doors	ANSI/AAMA 1002.10–83.
Wood storm doors	ANSI/NWWDA ² I.S. 6–86.
Rigid vinyl storm doors	ASTM ³ D3678–88.
Vestibules:	
Materials to construct vestibules	Commercially available.
Replacement windows:	
Aluminum frame windows	ANSI/AAMA 101–88.
Steel frame windows	Steel Window Institute recommended specifications for steel windows, 1990.
Wood frame windows	ANSI/NWWDA I.S. 2–87.
Rigid vinyl frame windows	ASTM D4099–89.

¹ANSI/AAMA indicates American National Standards Institute/American Architectural Manufacturers Association.

²ANSI/NWWDA indicates American National Standards Institute/National Wood Window & Door Association.

³ASTM indicates American Society for Testing and Materials.

Replacement Doors

[Standards for conformance]

Replacement doors—Hinged doors:	
Steel doors	ANSI/SDI ¹ 100–1985.
Wood doors:	
Flush doors	ANSI/NWWDA ² I.S. 1–87. (exterior door provisions)
Pine, fir, hemlock and spruce doors	ANSI/NWWDA I.S. 6–86.
Sliding patio doors:	
Aluminum doors	ANSI/AAMA ³ 101–88.
Wood doors	NWWDA I.S. 3–83.

¹ANSI/SDI indicates American National Standards Institute/Steel Door Institute.

²ANSI/NWWDA indicates American National Standards Institute/National Wood Window & Door Association.

³ANSI/AAMA indicates American National Standards Institute/American Architectural Manufacturers Association.

Caulks and sealants:

[Standards for conformance]

Caulks and sealants:	
Putty	FS ¹ TT-P-00791B, October 16, 1969 and Amendment 2, March 23, 1971.
Glazing compounds for metal sash	ASTM ² C669-75 (1989).
Oil and resin base caulks	ASTM C570-72 (1989).
Acrylic (solvent types) sealants	FS TT-S-00230C, February 2, 1970 and Amendment 2, October 9, 1970.
Butyl rubber sealants	FS TT-S-001657, October 8, 1970.
Chlorosulfonated polyethylene sealants	FS TT-S-00230C, February 2, 1970 and Amendment 2, October 9, 1970.
Latex sealing compounds	ASTM C834-76 (1986).
Elastomeric joint sealants (normally considered to include polysulfide, polyurethane, and silicone)	ASTM C920-87.
Preformed gaskets and sealing materials	ASTM C509-84.

¹FS indicates Federal Specifications.

²ASTM indicates American Society for Testing and Materials.

Weatherstripping
[Standards for conformance]

Weatherstripping	Commercially available.
Vapor retarders	Selected according to the provisions cited in ASTM ¹ C755-85 (1990). Permeance not greater than 1 perm when determined according to the desiccant method described in ASTM E96-90.
Items to improve attic ventilation	Commercially available.
Clock thermostats	NEMA ² DC 3-1989.

¹ASTM indicates American Society for Testing and Materials.

²NEMA indicates National Electrical Manufacturers Association.

Heat Exchangers
[Standards for conformance]

Heat exchangers, water-to-water and steam-to-water	ASME ¹ Boiler and Pressure Vessel Code, 1992, Sections II, V, VIII, IX, and X, as applicable to pressure vessels. Standards of Tubular Exchanger Manufacturers Association, Seventh Edition, 1988.
Heat exchangers with gas-fired appliances ²	Conformance to AGA ³ Requirements for Heat Reclaimer Devices for Use with Gas-Fired Appliances No. 1-80, June 1, 1980. AGA Laboratories Certification Seal.
Heat pump water heating heat recovery systems	Electrical components to be listed by UL. ⁴

¹ASME indicates American Society of Mechanical Engineers.

²The heat reclaimer is for installation in a section of the vent connector from appliances equipped with draft hoods or appliances equipped with powered burners or induced draft and not equipped with a draft hood.

³AGA indicates American Gas Association.

⁴UL indicates Underwriters Laboratories.

Boiler/Furnace Control Systems

[Standards for conformance]

Automatic set back thermostats	Listed by UL. ¹ Conformance to NEMA ² DC 3–1989.
Line voltage or low voltage room thermostats	NEMA DC 3–1989.
Automatic gas ignition systems	ANSI ³ Z21.21–1987 and Z21.21a-1989. AGA ⁴ Laboratories Certification Seal.
Energy management systems	Listed by UL.
Hydronic boiler controls	Listed by UL.
Other burner controls	Listed by UL.

¹UL indicates Underwriters Laboratories.

²NEMA indicates National Electrical Manufacturers Association.

³ANSI indicates American National Standards Institute.

⁴AGA indicates American Gas Association.

Water Heater Modifications

[Standards for conformance]

Insulate tank and distribution piping	(See insulation section of this appendix).
Install heat traps on inlet and outlet piping	Applicable local plumbing code.
Install/replace water heater heating elements	Listed by UL. ¹
Electric, freeze-prevention tape for pipes	Listed by UL.
Reduce thermostat settings	State or local recommendations.
Install stack damper, gas-fueled	ANSI ² Z21.66–1988, including Exhibits A&B, and ANSI Z223.1–1988.
Install stack damper, oil-fueled	UL 17, November 28, 1988, and NFPA331–1987.
Install water flow modifiers	Commercially available.

¹UL indicates Underwriters Laboratories.

²ANSI indicates American National Standards Institute.

³NFPA indicates National Fire Prevention Association.

Waste Heat Recovery Devices

[Standards for conformance]

Desuperheater/water heaters	ARI ¹ 470–1987.
Condensing heat	Commercially available components and in new heating furnace

exchangers	systems to manufacturers' specifications.
Condensing heat exchangers	Commercially available (Commercial, multi-story building, with teflon-lined tubes institutional) to manufacturers' specifications.
Energy recovery equipment	Energy Recovery Equipment and Systems Air-to-Air (1978) Sheet Metal and Air-Conditioning Contractors National Association (SMACNA). ²

¹ARI indicates Air Conditioning and Refrigeration Institute.

²SMACNA denotes Sheet Metal and Air Conditioning Contractors' National Association.

Boiler Repair and Modifications/Efficiency Improvements

[Standards for conformance]

Install gas conversion burners	ANSI ¹ Z21.8–1984, (for gas or oil-fired systems) ANSI Z21.17–1984, ANSI Z21.17a-1990, and ANSI Z223.1–1988. AGA ² Laboratories Certification seal.
Replace oil burner	UL ³ 296, February 28, 1989 Revision and NFPA ⁴ 31–1987.
Install burners (oil/gas)	ANSI Z223.1–1988 for gas equipment and NFPA 31–1987 for oil equipment.
Re-adjust boiler water temperature or install automatic boiler temperature reset control	ASME5CSD–1–1988, ASME CSD–1a-1989, ANSI Z223.1–1988, and NFPA 31–1987.
Replace/modify boilers	ASME Boiler and Pressure Vessel Code, 1992, Sections II, IV, V, VI, VIII, IX, and X. Boilers must be Institute of Boilers and Radiation Manufacturers (IBR) equipment.
Clean heat exchanger, adjust burner air shutter(s), check smoke no. on oil-fueled equipment. Check operation of pump(s) and replacement filters	Per manufacturers' instructions.
Repair combustion chambers	Refractory linings may be required for conversions.
Replace heat exchangers, tubes	Protection from flame contact with conversion burners by refractory shield.
Install/replace thermostatic radiator valves	Commercially available. One pipe steam systems require air vents on each radiator; see manufacturers' requirements.
Install boiler duty cycle control system	Commercially available. NFPA 70, National Electrical Code (NEC) 1993 and local electrical codes provisions for wiring.

¹ANSI indicates American National Standards Institute.

²AGA indicates American Gas Association.

³UL indicates Underwriters Laboratories.

⁴NFPA indicates National Fire Prevention Association.

⁵ANSI/ASME indicates American National Standards Institute/American Society of Mechanical Engineers.

Heating and Cooling System Repairs and Tune-ups/Efficiency Improvements

[Standards for conformance]

Install duct insulation	FS ¹ HH-I-558C, January 7, 1992 (see insulation sections of this appendix).
Reduce input of burner; derate gas-fueled equipment	Local utility company and procedures if applicable for gas-fueled furnaces and ANSI ² Z223.1-1988 (NFPA ³ 54-1988) including Appendix H.
Repair/replace oil-fired equipment	NFPA 31-1987.
Replace combustion chamber in oil-fired furnaces or boilers	NFPA 31-1987.
Clean heat exchanger and adjust burner: adjust air shutter and check CO ₂ and stack temperature. Clean or replace air filter on forced air furnace	ANSI Z223.1-1988 (NFPA 54-1988) including Appendix H.
Install vent dampers for gas-fueled heating systems	Applicable sections of ANSI Z223.1-1988 (NFPA 54-1988) including Appendices H, I, J, and K. ANSI Z21.66-1988 and Exhibits A & B for electrically operated dampers.
Install vent dampers for oil-fueled heating systems	Applicable sections of NFPA 31-1987 for installation and in conformance with UL ⁴ 17, November 28, 1988.
Reduce excess combustion air:	
A: Reduce vent connector size of gas-fueled appliances	ANSI Z223.1-1988 (NFPA 54-1988) Part 9 and Appendices G & H.
B: Adjust barometric draft regulator for oil fuels	NFPA 31-1987 and per manufacturers' (furnace or boiler) instructions.
Replace constant burning pilot with electric ignition device on gas-fueled furnaces or boilers	ANSI Z21.71-1981, Z21.71a-1985, and Z21.71b-1989.
Readjust fan switch on forced air gas or oil-fueled furnaces	Applicable sections and Appendix H of ANSI Z223.1-1988 (NFPA 54-1988) for gas furnaces and NFPA 31-1987 for oil furnaces.
Replace burners	See power burners (oil/gas).
Install/replace duct furnaces (gas)	ANSI Z223.1-1988 (NFPA 54-1988).
Install/replace heat pumps	Listed by UL.
Replace air diffusers, intakes, registers, and grilles	Commercially available.
Install/replace warm air heating metal ducts	Commercially available.

Filter alarm units	Commercially available.
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¹FS indicates Federal Specifications.

²ANSI indicates American National Standards Institute.

³NFPA indicates National Fire Prevention Association.

⁴UL indicates Underwriters Laboratories.

Replacement Furnaces, Boilers, and Wood Stoves

[Standards for conformance]

Chimneys, fireplaces, vents and solid fuel burning appliances	NFPA ¹ 211–1988.
Gas-fired furnaces	ANSI ² Z21.47–1987, Z21.47a–1988, and Z21.47b–1989. ANSI Z223.1–1988 (NFPA 54–1988).
Oil-fired furnaces	UL ³ 727, August 27, 1991 Revision and NFPA 31–1987.
Liquified petroleum gas storage	NFPA 58–1989.
Ventilation fans:	
Including electric attic, ceiling, and whole house fans	UL 507, August 23, 1990 Revision.

¹NFPA indicates National Fire Prevention Association.

²ANSI indicates American National Standards Institute.

³UL indicates Underwriters Laboratories.

Air Conditioners and Cooling Equipment

[Standards for conformance]

Air conditioners:	
Central air conditioners	ARI ¹ 210/240–1989.
Room size units	ANSI/AHAM ² RAC–1–1982.
Other cooling equipment:	
Including evaporative coolers, heat pumps and other equipment	UL ³ 1995, November 30, 1990. ⁴

¹ARI indicates Air Conditioning and Refrigeration Institute.

²AHAM/ANSI indicates American Home Appliance Manufacturers/American National Standards Institute.

³UL indicates Underwriters Laboratories.

⁴This standard is a general standard covering many different types of heating and cooling equipment.

Screens, Window Films, and Reflective Materials

[Standards for conformance]

Insect screens	Commercially available.
Window films	Commercially available.
Shade screens:	

Fiberglass shade screens	Commercially available.
Polyester shade screens	Commercially available.
Rigid awnings:	
Wood rigid awnings	Commercially available.
Metal rigid awnings	Commercially available.
Louver systems:	
Wood louver systems	Commercially available.
Metal louver systems	Commercially available.
Industrial-grade white paint used as a heat-reflective measure on awnings, window louvers, doors, and exterior duct work (exposed)	Commercially available.

[58 FR 12529, Mar. 4, 1993, as amended at 69 FR 18803, Apr. 9, 2004]