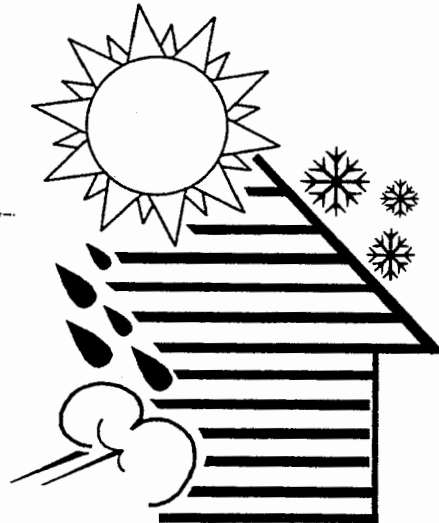


FLORIDA WEATHERIZATION HANDBOOK

MATERIALS, INSTALLATION, AND WORKMANSHIP STANDARDS

THIS HANDBOOK CONFORMS TO STANDARDS PUBLISHED IN
FEDERAL REGULATION : 10 CFR PART 440, December 8, 2000



*Weatherization
Works*

STATE OF FLORIDA
DEPARTMENT OF COMMUNITY AFFAIRS
DIVISION OF HOUSING AND COMMUNITY DEVELOPMENT
BUREAU OF COMMUNITY ASSISTANCE

Revised
February, 2001

INTRODUCTION

This handbook is a modification of the weatherization hand book prepared by Richard Heath & Associates, 2055 San Joaquin, Fresno, CA 93721.

This handbook is intended to serve as a voluntary installation and inspection guide. The standards serve as benchmarks for defining quality workmanship and performance. Users of this handbook should also consider local building codes and the Florida Energy Code, if these codes are more restrictive.

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I
RECOMMENDED MEASURES TO ADDRESS
FOR
WEATHERIZATION ASSISTANCE PROGRAM

The weatherization funds should be used wisely. Repairs and installations producing maximum benefit should be done first. A list of measures to address is provided below.

Measures Lists:

1. Repair and seal interior surfaces including walls, ceilings, floors, doors and windows to stop air infiltration.
2. Repair and insulate heating and air conditioning ducts.
3. Install adequate attic insulation and attic ventilation.
4. Repair or install weatherstripping and thresholds.
5. Caulk or seal wide cracks with appropriate materials.
6. Repair leaks in hot water line.
7. Install low-flow shower heads.
8. Install water heater insulation blanket.
9. Insulate water line out five feet from heater.
10. Inspect, repair, tune-up or modify heating and cooling system to increase efficiency.
11. Install solar screens with shade coefficient of .35 or greater on east and west facing windows as recommended by the NEAT Audit.
12. Install or increase attic ventilation with eaves, and/or gable vents not addressed under number 3 above.
13. Install floor insulation. May include belly board to support insulation in mobile homes. (North and central Florida only.)
14. Replace exterior doors with disaster resistant solid wood or metal doors and reinforce hinges by anchoring into frame members with longer screws.
Note: This anchoring requirement also applies to window installation.

Incidental repairs:

Incidental repairs may be necessary before a weatherization measure can be properly or effectively installed. The incidental repair cost will be incorporated into the total cost of the measure as reported in the material and/or labor line item on the Building Work Report (BWR). The actual costs associated with the incidental repair will be itemized in the space provided at the bottom of the BWR.

Note: The following measures listed in the handbook are not approved for installation in the Weatherization Program:

- Vapor barriers - Section 3, Item #17
- Kitchen Range Exhaust Fan - Section 3, Item # 19, only install through the wall.
- Wall Insulation - Section 5, Only to be installed in conjunction with a wall repair, and only roll insulation to match existing insulation, minimum R-11, maximum R-19.

II

ABBREVIATIONS

AAMA	Architectural Aluminum Manufacturers Association
AGA	American Gas Association
AHDD	Annual Heating Degree Days
ANSI	American National Standard Institute
NWWDA	National Wood Window and Door Association
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
CFR	Code for Federal Regulations
F. S.	Federal Specifications
GE	General Electric
HVAC	Heating Ventilation and Air Conditioning
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NFAV	Net Free Area of Venting
NFV	Net Free Venting
PSI	Pounds per Square Inch
P/T	Pressure Temperature
U. I.	United Inches: width + length in inches
UL	Underwriters Laboratories
U.V.	Ultraviolet

SECTION 1

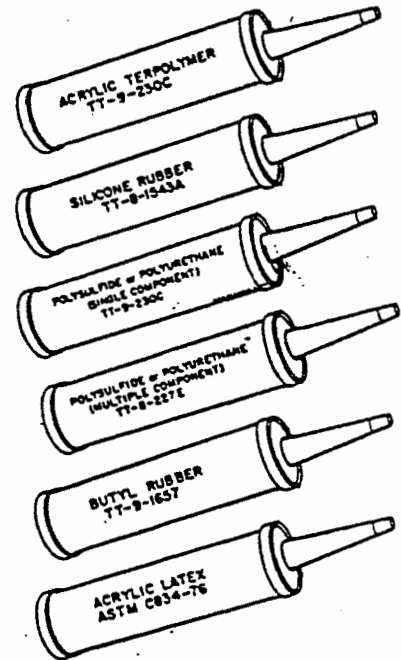
CAULKING AND SEALANT STANDARDS

1. RECOMMENDED MATERIALS:

- Acrylic (solvent type)
 - . Conformance to F.S. TT-S-0023C
- Latex Sealing Compounds
 - . Conformance to ASTM C834-76(1986)
- Butyl Rubber Sealants
 - . Conformance to F.S. TT-S-001657
- Chlorosulfonated Polyethylene Sealants
 - . Conformance to F.S. TT-S-00230C
- Polyurethane or Polysulfide
 - . Conformance to F.S. TT-S-227E
- Elastomeric Joint Sealants (normally considered to include polysulfide, polyurethane, and silicone)
 - . Conformance to ASTM C920-87
- Putty . Conformance to F.S. TT-P-00791B(1971)
- Glazing Compounds for Metal Sash
 - . Conformance to ASTM C669-75(1989)

NOT RECOMMENDED:

- Oil and resin based caulks
- Clear latex or silicone

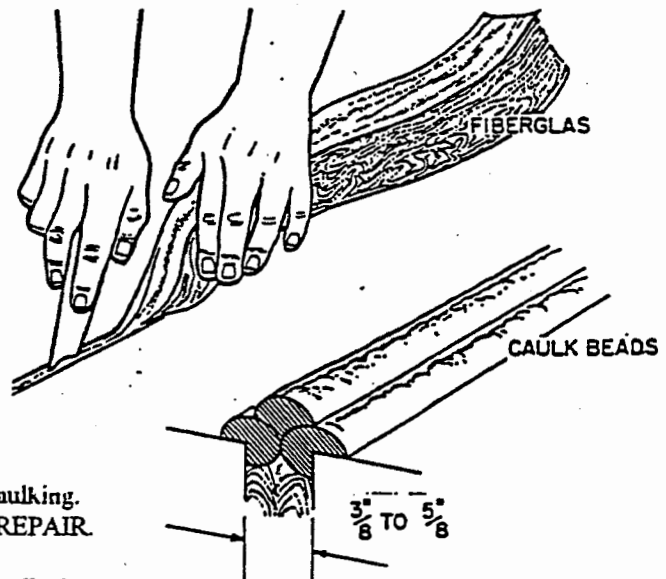


2. WHERE TO INSTALL:

- Best to caulk interior side if possible.
- Outside perimeter of prime and storm windows.
- Cracks in the existing walls.

3. FINISHED BEADS:

- Beads must be continuous and free of voids.
- All excess caulk must be removed.



4. CRACKS:

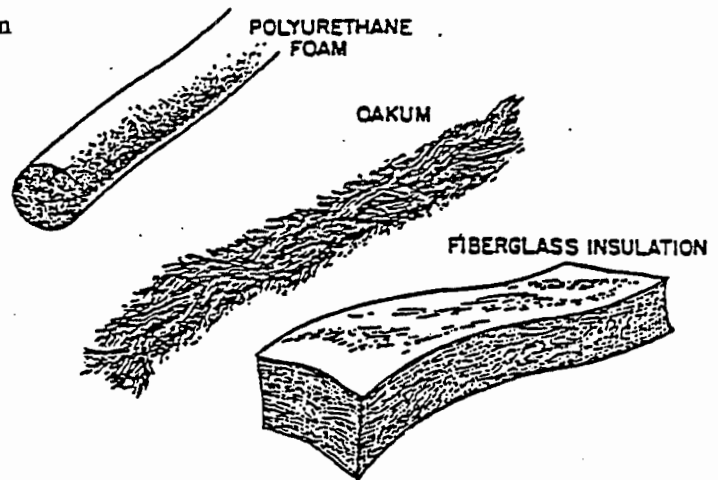
- All cracks wider than $\frac{1}{16}$ " must be caulked.
- Cracks wider than $\frac{3}{8}$ " should be filled before caulking.
- Cracks wider than $\frac{5}{8}$ " MAY NOT be caulked; REPAIR.
- Cracks must be sealed completely.
- All cracks around windows and doors must be caulked.

5. FILLER MATERIAL TYPES:

Spaces from 3/8" to 5/8" should be filled to within 3/8" of the surface with one of the following:

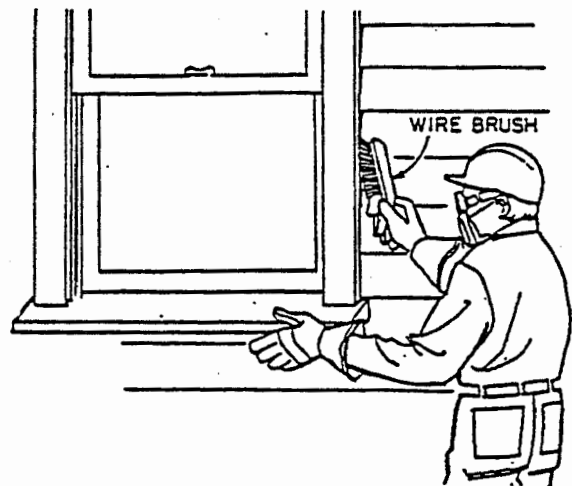
- Closed cell foam tape
- Rope caulk
- Oakum
- Pointing mortar
- Closed cell polyethylene
- Twine
- Flexible fiberglass

Filler material must be covered with caulk.



6. SURFACE PREPARATION REQUIREMENTS

- The surface must be free of loose or cracked caulking
- The surface must be free of dirt and debris.
- The surface must be free of moisture unless allowed by manufacturer's specifications.

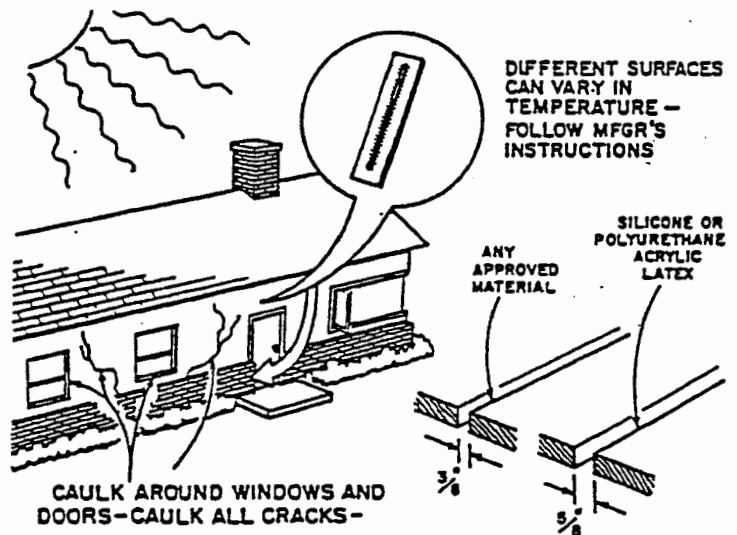


7. INSTALLATION REQUIREMENTS

- Follow manufacturer instructions.
- Pay careful attention to: application temperature limits, and primer requirements for masonry surfaces.
- Caulk cracks 3/8" to 5/8" with silicone, polyurethane, or acrylic latex caulking only after fillers have been installed.

8. EXISTING CAULKING

- Color coordinate new caulking to match existing caulk.

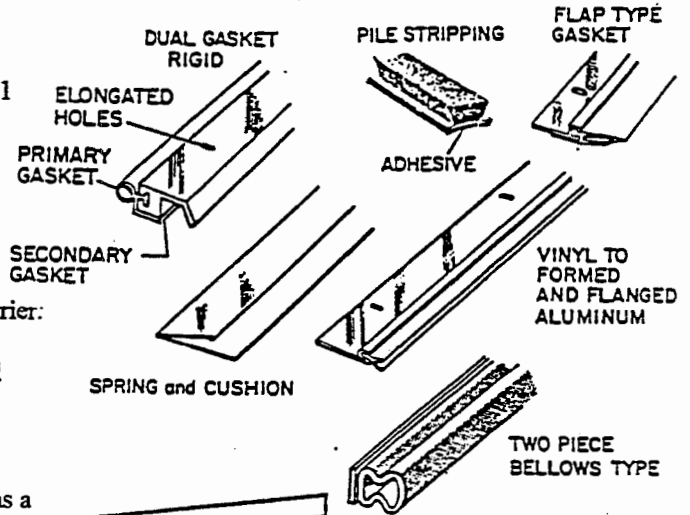


SECTION 2 WEATHERSTRIPPING STANDARDS

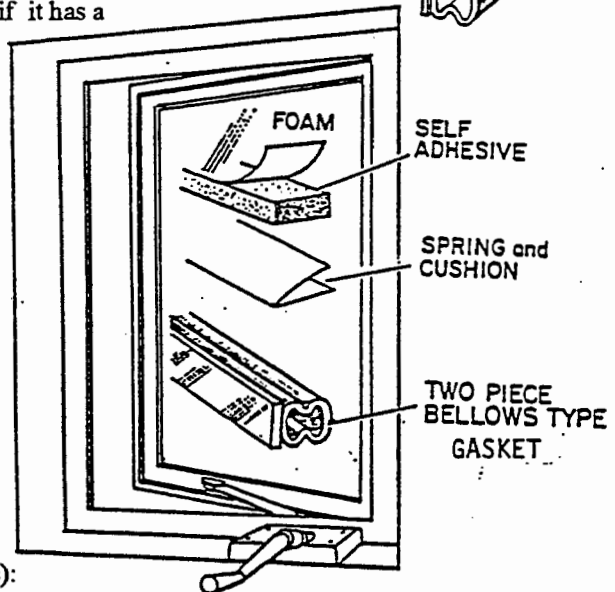
USE COMMERCIALY AVAILABLE WEATHERSTRIPPING MATERIALS.

1. RECOMMENDED MATERIALS:

- Vinyl V-strip - Use with adhesive part 3M #51135-08001 or equivalent.
- Spring and metal cushion - Attach nail every 4". Aluminum not allowed.
- Pile stripping - Use for replacement only.
- Rigid Gasket (Aluminum carrier) -
 - . Must be adjustable and attached with screws.
 - . Hollow gasket attached to an extruded aluminum carrier:
 - . Slotted holes 9" on center maximum.
 - . Secondary seal must extend 1/8" between carrier and mounting surface.
 - . Minimum elongation of 300%.
- Rigid Gasket (Plastic carrier) -
 - . UV resistant rigid plastic carrier is acceptable if it has a minimum thickness of .050".
 - . Must be adjustable and attached with screws.

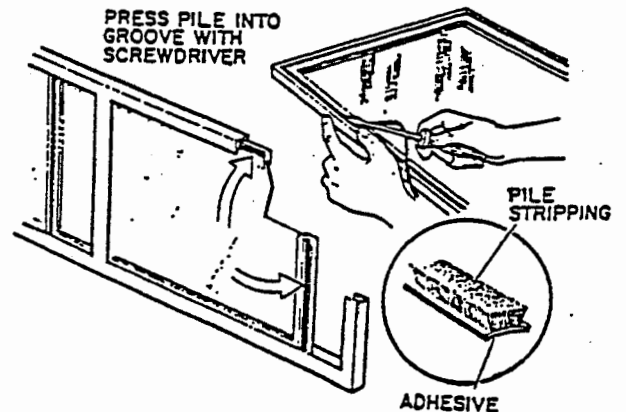


2. WARRANTY: Must have 3 years minimum warranty on materials.



3. CASEMENT WINDOWS (wood, metal, and plastic):

- Use spring and cushion or rigid gasket.
- Closed cell foam may be used in compression only.

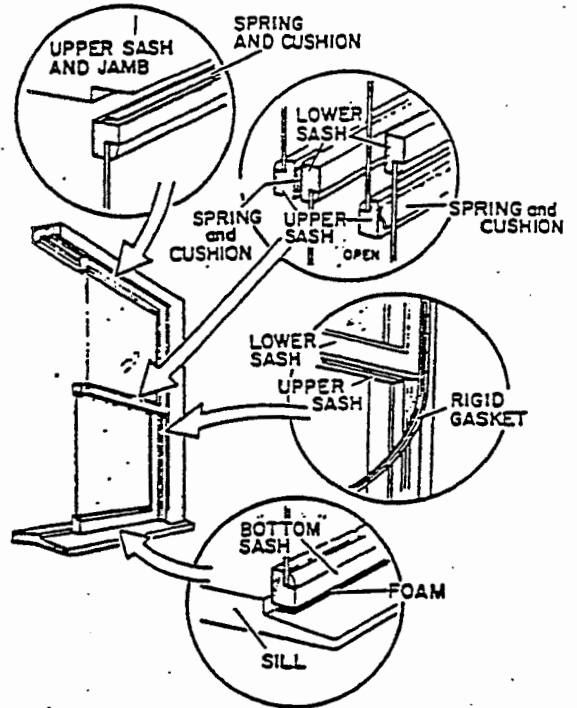


4. HORIZONTAL ALUMINUM SLIDERS

- Use replacement pile stripping.
- Flex type V-strip with adhesive.

5. DOUBLE HUNG WINDOWS (wood, metal and plastic):

- Use rigid gasket, or
- Spring and cushion metal.
- Closed cell foam may be used in compression only.

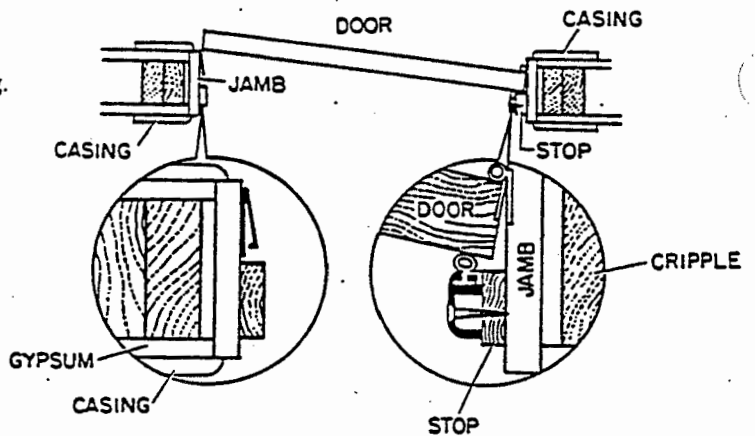


6. ALL METAL WINDOWS

- Replacement pile strip recommended.
- Replacement pile strip must be correct size, both width and height.

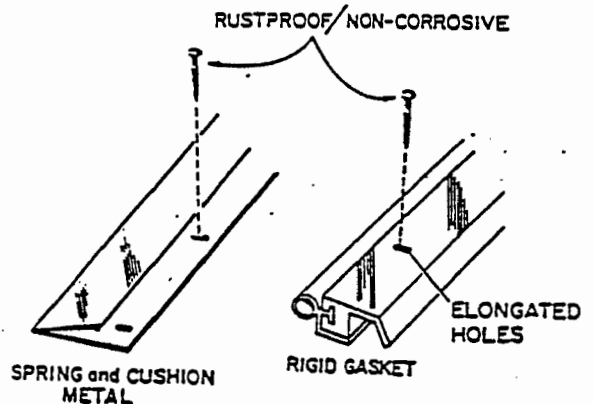
7. ENTRANCE DOOR JAMBS (wood and metal)

- Rigid gasket recommended.
- Spring and cushion metal on wood casing.
- Use vinyl V-strip with 3M adhesive part# 51135-08001 or equivalent for metal casing.



8. ATTACHMENT SYSTEM

- Rigid gasket
 - . Must be adjustable and attached with screws.
 - . Maximum 9" apart.
 - . screw placed with 3" from each end.
- Spring and cushion
 - . Must be nailed/screwed in place.
 - . Must be attached every 4".
 - . Nail or screw placed within 2" of each end.
- Replacement pile . Must fit snug.

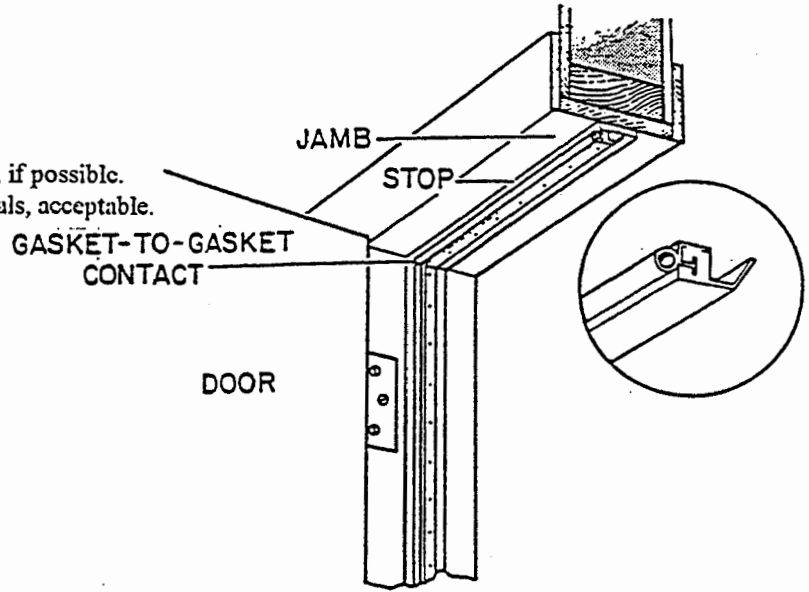


9. MOVABLE JOINTS

- Weatherstripping must be placed at movable joints and between conditioned and unconditioned space.

10. GASKET-TO-GASKET CONTACT

- Gasket-to-gasket contact at corners.
- Each joint to have one continuous strip, if possible.
- Corner "V" notch of rigid gasket materials, acceptable.

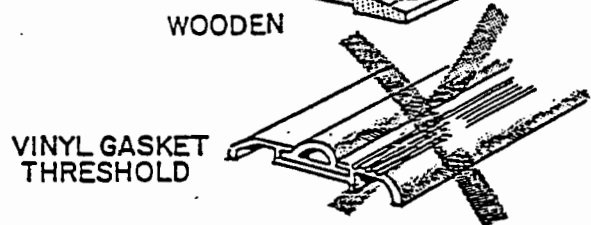
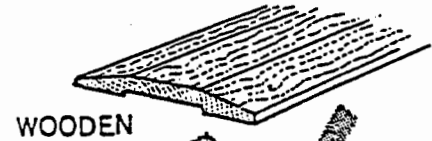
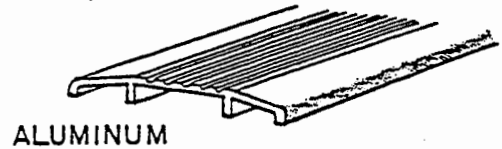


11. THRESHOLDS

- Use wood and metal only.
- Must be permanently screwed in place.
- Wood may be glued, nailed or screwed.
- Threshold must be sealed to floor.

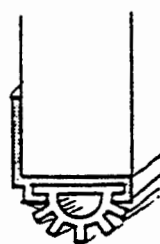
NOT ACCEPTABLE

- Gasket saddles
- Bumper thresholds

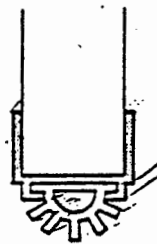


12. DOOR BOTTOM MATERIAL

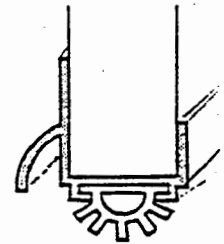
- Use door shoe with saddle threshold.
- Shoe must have vinyl or silicone gasket.
- U-type door shoes recommended.
- Shoe must have elongated mounting holes.
- Stationary door sweep bottom not allowed.



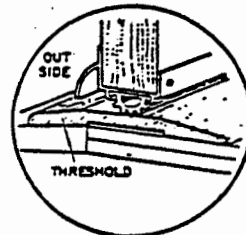
L-SHAPED



U-SHAPED



U-SHAPED WITH RAIN DRIP



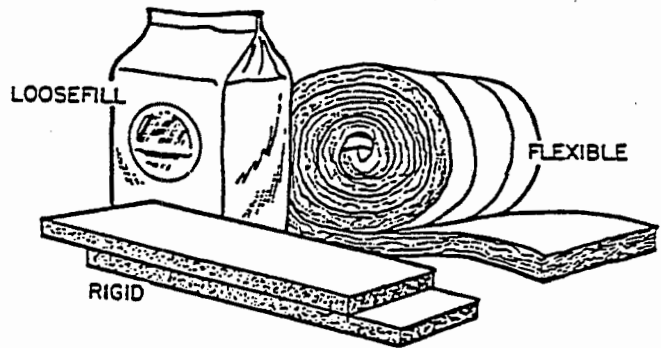
U-TYPE with DOOR SHOE

SECTION 3 CEILING INSULATION: UNDER ATTIC SPACE

Insulation installer's card must be visible from the attic access. The card must include the following information: Name of company installing, name of the installer, date, insulation type, lot or batch number, R value, number of bags, sq. ft. of coverage, and thickness in inches.

1. RECOMMENDED INSULATION MATERIALS

- Mineral Fiber Blankets
 - . Conformance to ASTM C665-88.
- Roof insulation board
 - . Conformance to ASTM C726-88
- Loose Fill
 - . Conformance to ASTM C764-88.
- Mineral Cellular - Vermiculite loose fill
 - . Conformance to ASTM C516-80(1990).
- Mineral Cellular - Perlite loose fill
 - . Conformance to ASTM C549-81(1986).
- Cellulose Loose Fill
 - . Conformance to Interim Safety Standard 16 CFR Part 1209 and ASTM C739-84.



2. R-VALUES

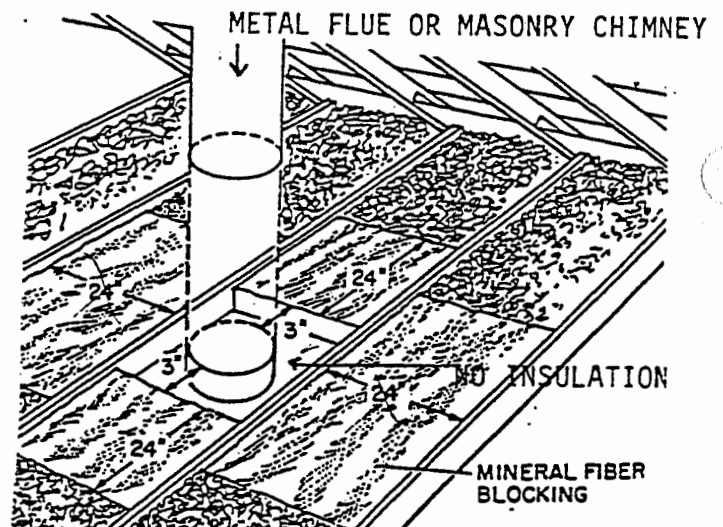
- Ceilings R-30, minimum R-19
- Kneewalls R-19, preferable.

3. LEAKS

- All roof leaks must be repaired before installing insulation.

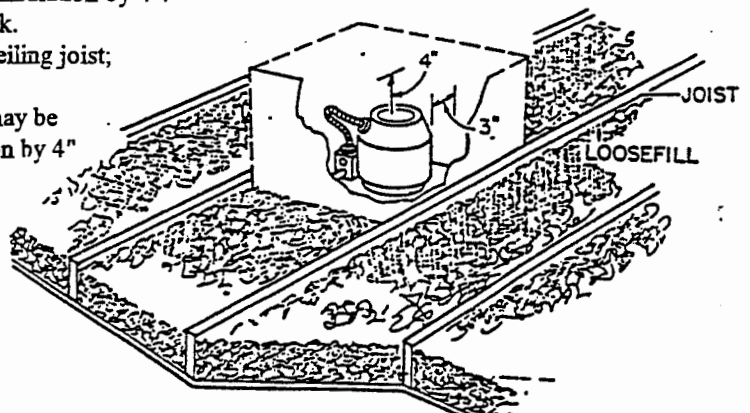
4. STRUCTURAL CAPABILITY

- Ceiling must be structurally adequate to support combined weight of insulation.



5. RECESSED FIXTURES SUCH AS MOTOR, TRANSFORMER, DOOR BELL

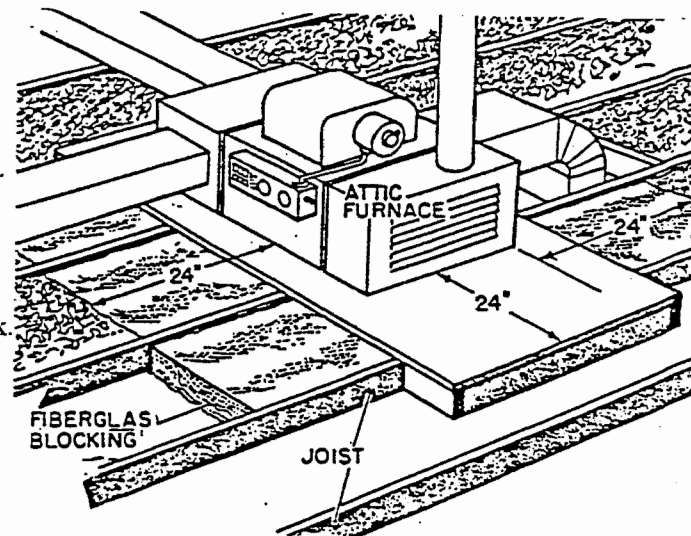
- All Loose or flexible insulation must have 3" clearance around fixtures.
- Blocking is required and it must exceed height of insulation by 4".
- Metal blocking material must be at least .007" thick.
- Metal blocking must be permanently attached to ceiling joist; stapled, nailed or screwed.
- Rock wool fiberglass or fiberglass batt blocking may be used but it must exceed the height of the insulation by 4" and extend at least 24" away in all directions.
- If covered, 24" top clearance minimum.
- Barrier must rest on ceiling sheathing.
- Temporary blocking must be removed after insulation has been installed.



Any fixture labeled I.C. does not require blocking.

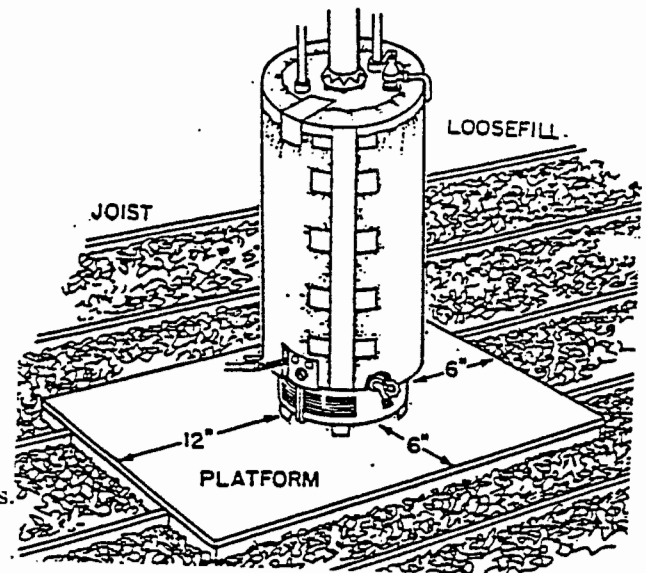
6. FURNACES LOCATED IN ATTICS

- All Loose Fill
 - . 12" clearance around back, sides, top and plenum.
 - . 24" clearance in front; 3" clearance for flue.
 - . Need blocking if bottom of unit is below top of insulation.
 - . Provide 6" clearance below unit if combustion air is taken from the bottom.
 - . Overblown (excess) insulation must be cleared from unit and clearance zone.
 - . Metal blocking material must be a minimum of .007" thick.
 - . Metal blocking must be permanently attached to ceiling joist; stapled, nailed or screwed.
 - . Mineral fiber blocking may be used but it must exceed the height of loose fill by 4" and extend at least 24" away in all directions.
 - . Barrier must rest on ceiling sheathing.
- Flexible: 12" clearance on all sides; provide 6" clearance below unit if combustion air is taken from the bottom; 3" clearance for flues.



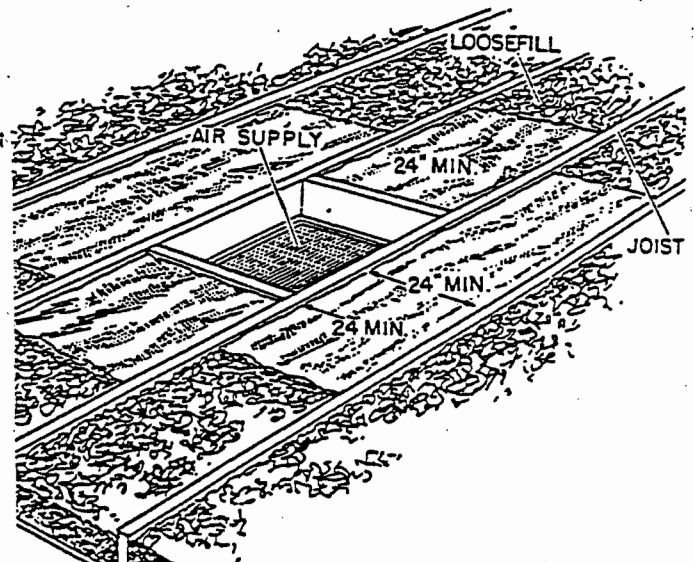
7. GAS WATER HEATERS LOCATED IN ATTIC

- All Loose Fill
 - . Clearance: 6" on sides and back, 12" in front.
 - . 3" clearance for flues.
 - . Need blocking if bottom of unit below top of insulation.
 - . Blocking material must be non-combustible.
 - . Metal blocking material must be a minimum of .007" thick.
 - . Metal blocking must be permanently attached to ceiling joist stapled, nailed or screwed.
 - . Mineral fiber blocking may be used but it must exceed the height of the insulation by 4" and extend at least 24" away in all directions.
 - . Barrier must rest on ceiling sheathing.
- Flexible: 6" clearance in all directions; 3" clearance for flues.
- Electric Water Heater - If bottom of heater is below top of loose fill, install blocking.



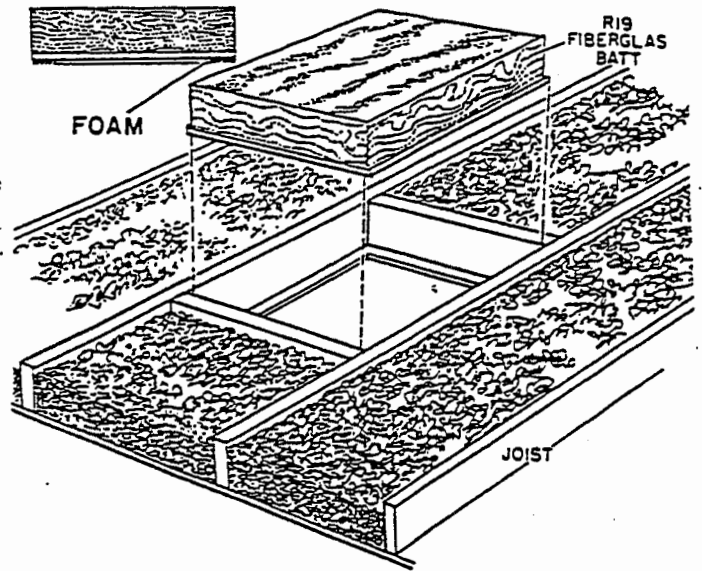
8. COMBUSTION AIR SUPPLY

- All Loose Fill
 - . Must not block air supply.
 - . Blocking must be installed 4" above insulation level.
 - . Loose fill that falls on screen during application must be removed.
 - . Metal blocking must be a minimum of .007" thick.
 - . Metal blocking must be permanently attached to ceiling joist; stapled, nailed or screwed.
 - . Batts may be used but must exceed the height of insulation by 4" and extend at least 24" away from intake in all directions.
 - . Barrier must rest on ceiling sheathing.
- Flexible
 - . Must not block air supply.



9. ATTIC ENTRY ACCESS DOOR

- All Loose Fill or Flexible
 - . Blocking must be installed.
 - . Blocking height equal to insulation, minimum.
 - . 2-by construction members are acceptable if equal to or exceed insulation height.
- . Access door with horizontal or vertical opening must be insulated with rigid or flexible insulation to R=19.
- . Insulation must be permanently attached to access door.
- . Access door must be physically accessible; framed and install away from eaves/sift for adequate head room



10. ATTIC ENTRY DOOR WEATHERSTRIPPING

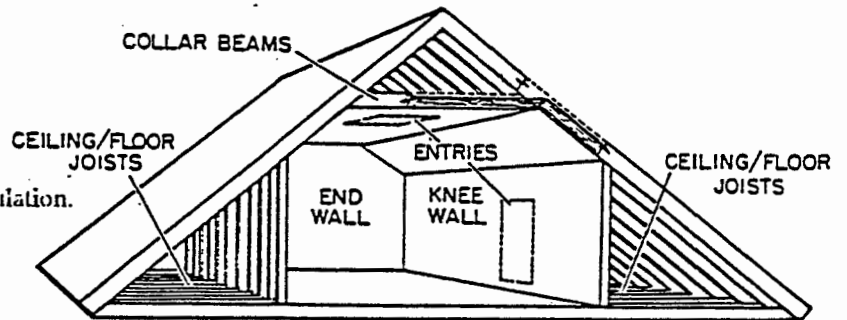
- Must be weatherstripped.
- Use rigid gasket aluminum carrier on horizontal opening or foam tape.
- On vertical openings use rigid gasket aluminum carrier for entry doors.

11. KNOB AND TUBE WIRING

- Do not insulate over knob and tube wiring.

12. OPEN JUNCTION BOXES

- Do not cover open junction boxes with insulation.

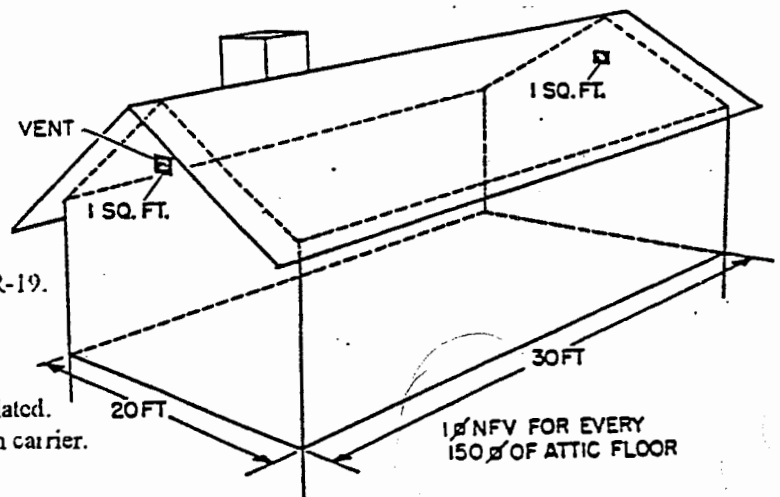


13. BALLOON FRAMING

- Prevent loose fill from falling down into crawl space or basement.

14. CLOSET OPENINGS

- Protect or enclose with a ceiling and insulation.
- If used for combustion air supply, install barrier.



15. KNEE WALLS: Must be insulated to minimum of R-19.

16. DISAPPEARING STAIRS: Not required to be insulated.

- Must be weatherstripped with rigid gasket aluminum carrier.
- Must operate properly.

17. VAPOR BARRIER

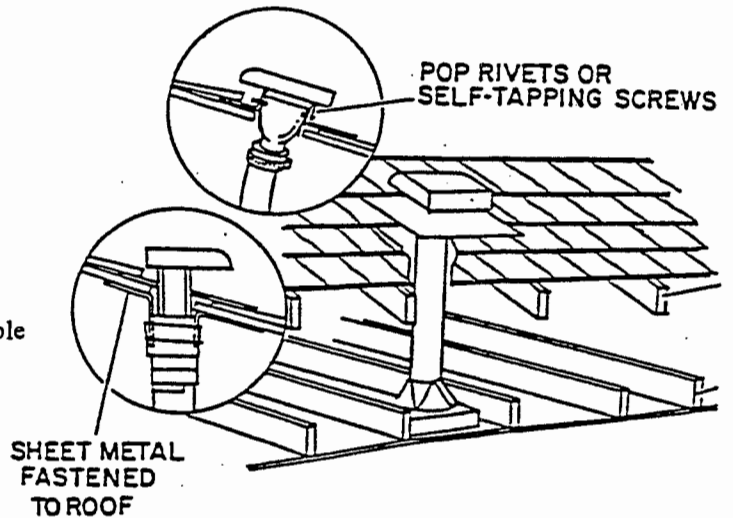
- If installed, place toward winter warm side.
- If flexible fiberglass installed must use vapor barrier.
- Maximum permeance of 1 perm.

18. UNCONDITIONED AREA

- Install insulation between heated and unheated areas only.

19. KITCHEN RANGE EXHAUST FAN

- Must be vented to the outside atmosphere.
- Must extend to roof termination; roof jack acceptable if sealed to duct.
- No horizontal runs.

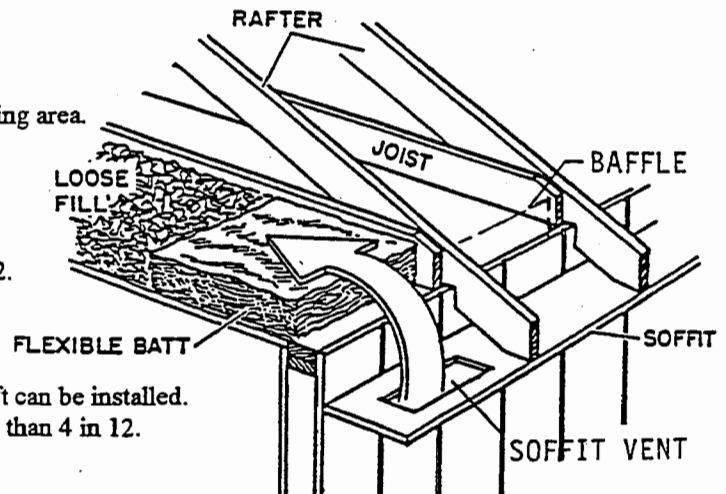


20. EAVE AND SIFT VENTS

- All Loose Fill
 - . 3" clearance between roof sheathing and blocking.
 - . Blocking must be installed.
- Flexible
 - . 3" clearance between sheathing and insulation.
 - . 24" minimum length (from the exterior wall) of butt insulation can be used as blocking.

21. ATTIC VENTING

- Must have cross ventilation for each separate space.
- 1 sq. ft. of Net Free Venting Area per 150 sq. ft. of ceiling area.
- 1 sq. ft. to 300 sq. ft. ratio is acceptable if:
 - . vapor barrier present.
 - . 50% to 75% of the venting is 3' above balance and/high/low venting the balance is eave or sift.
- Do not use plastic roof jack on slopes less than 4 and 12.
- Roof jacks for low vents NOT acceptable if eave or sift can be installed.
- Baffling required for eave, sift or frieze block vents.
- Dormer vents for low vents not acceptable if eave or sift can be installed.
- Turbine vents not recommended on roof with pitch less than 4 in 12.



NONFEASIBILITY CRITERIA FOR CEILING INSULATION STANDARDS

1. Already properly insulated to minimum R-19.
2. Attic space provides less than 36" clearance at the pick.
3. Knob and tube wiring is present.
4. Hazardous wiring.
5. Ceiling is structurally weak.

SECTION 4 FLOOR INSULATION STANDARDS

1. RECOMMENDED MATERIALS

- Flexible and rigid insulation acceptable.
- Must meet material standards as listed in Section 3.
- Foam insulation not acceptable.

2. R-VALUE: R-19 minimum.

3. DO NOT INSULATE

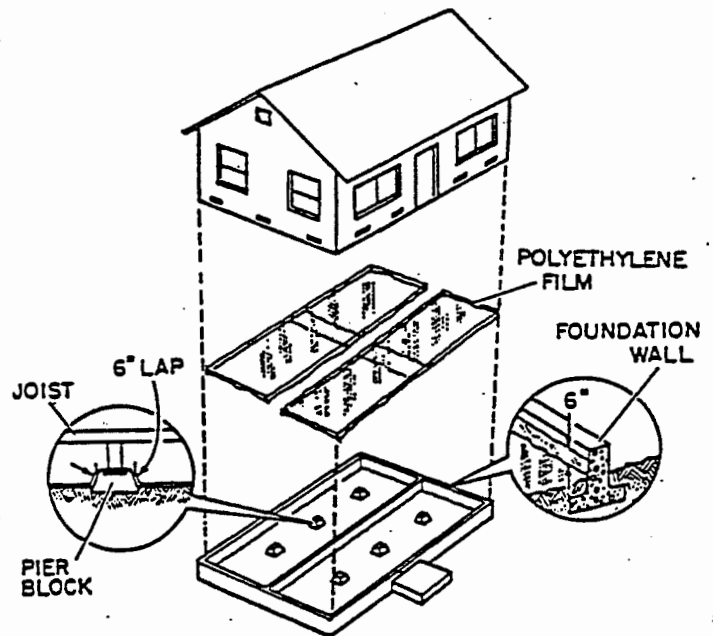
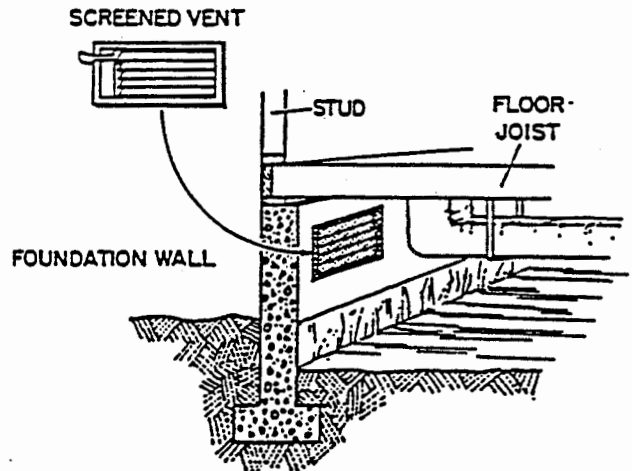
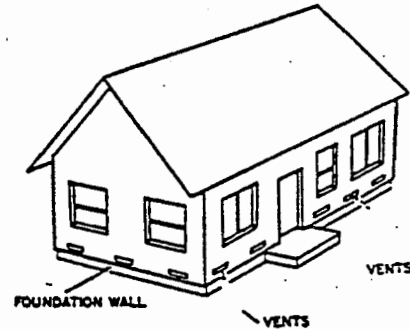
- Floors over heated space or unvented crawl space.
- Areas with insect infestation, decay or moisture damage.
- Areas with excessive ground moisture.
- Crawl space averages less than 36" from ground.

4. CRAWL SPACE VENTING

- Must be vented including basements with exposed soil.
- If proper ventilation can not be achieved, floor insulation shall not be installed.
- 1 sq. ft. of venting for every 150 sq. ft. of crawl space area
- Cross ventilation required, two opposing walls.
- 1 sq. ft. for every 300 sq. ft. allowable, if dry, well drained and no evidence of standing seasonal water.
- Minimum of four vents.
- Polygons created by vents must cover at least 70% of crawl space area.

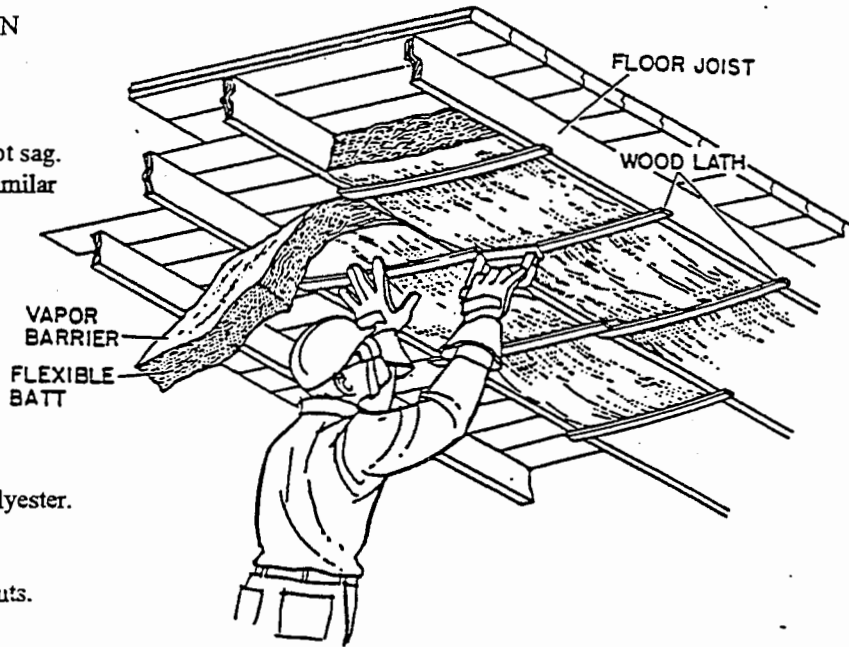
5. GROUND COVER MOISTURE BARRIER

- Must be installed if the soil not dry and free of seasonal water and the floor is to be insulated.
- 6 mil. (minimum) thick polyethylene.
- Lap all joints 12".
- Extend moisture barrier 6" up the foundation wall.
- Do not contact structural wood members.
- Existing undamaged ground cover acceptable if at least 4 mil. thick, and in good condition after insulation is installed.
- Basements with exposed soil must have ground cover over soil, unless vented and dry.
- Secure in place with brick, earth or fasteners a minimum of every 8 feet.



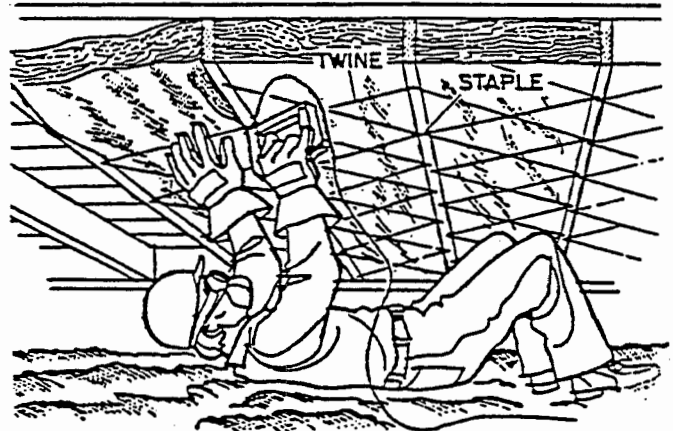
6. WOOD LATH TO SUPPORT INSULATION

- Flexible
 - . 18" on center maximum spacing.
 - . Lath sized and spaced so insulation does not sag.
 - . May be attached with galvanized nails or similar corrosion resistant staples.
 - . 10% maximum compression of insulation.



7. TWINE SUPPORT FOR INSULATION

- Joists 16" to 48" o.c.
 - . Twine must be polypropylene, nylon or polyester.
 - . 150 lb. minimum breaking strength.
 - . 48" maximum joist spacing.
 - . 12" maximum spacing between anchor points.
 - . Cavities spanned at least twice in 12".
 - . 10% maximum compression of insulation.
 - . 5" minimum distance between subfloor and twine and/or anchor points.
 - . Faced batt may be used and stapled to under floor for joist spacings of 25" to 48".



8. WIRE SUPPORT

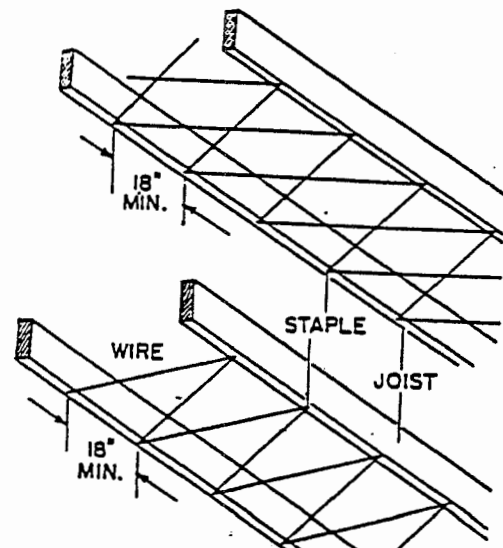
- . Zinc coated, stainless or similar corrosive resistant material.
- . .035" wire diameter, minimum.
- . 10% maximum compression of insulation.

9. WIRE SPAN AND ANCHOR POINTS

Wire Span

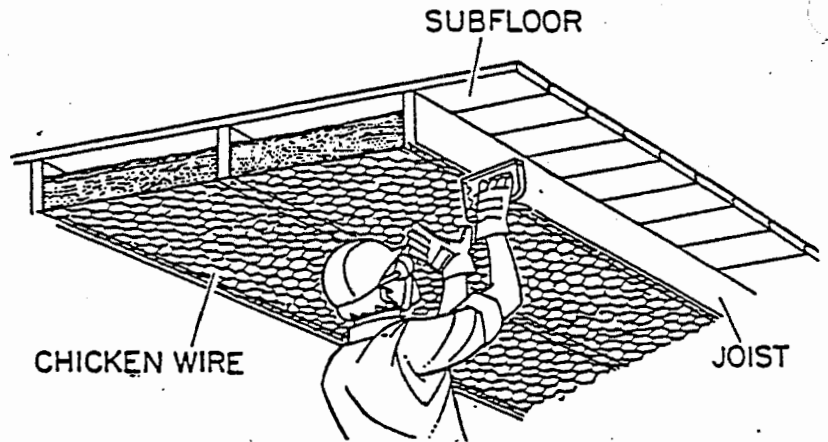
- Joists: up to 24" o.c. Twice in 18" and anchor points spaced maximum 18".
- Joists: 25" to 48" o.c. Twice in 12" and anchor points spaced maximum 12".
- Joists: 49" to 60" o.c. Four times in 12" and anchor points spaced maximum 12".

Facing stapled to subfloor.



10. WOVEN WIRE OR NETTING SUPPORT

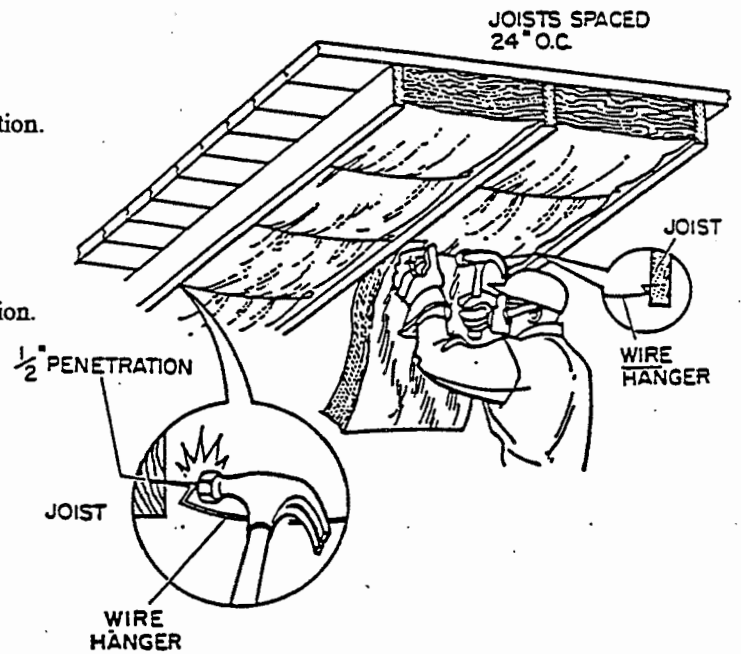
- . Wire must be galvanized.
- . Anchored to joist every 12".
- . 10% maximum compression of insulation.



11. WIRE HANGERS

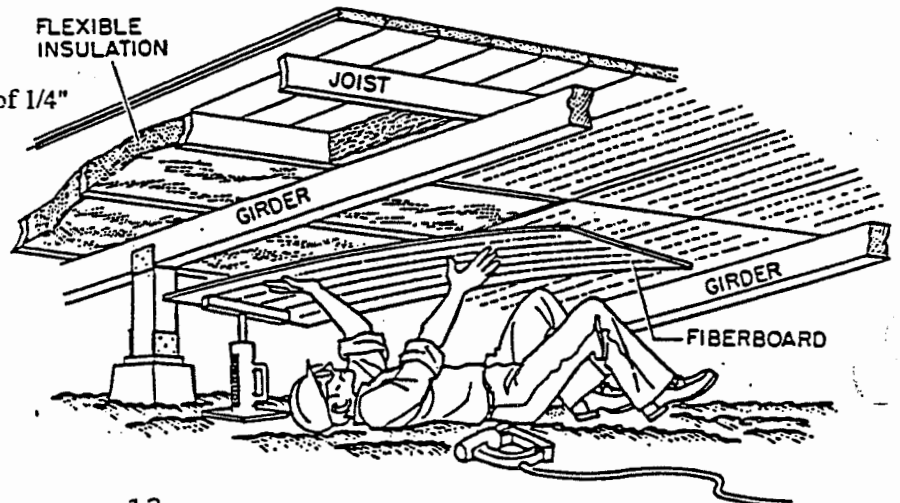
Joist spacing:

- Up to 24" . Minimum thickness of .090 inches.
 - . End must penetrate joist 1/2".
 - . Hanger spaced maximum 18" apart.
 - . 10% maximum compression of insulation.
- 25" to 48" . Minimum thickness of .090 inches.
 - . End must penetrate joist 1/2".
 - . End must be stapled.
 - . Hanger spaced maximum of 12" apart.
 - . 10% maximum compression of insulation.
- over 48" . Hangers not allowed.



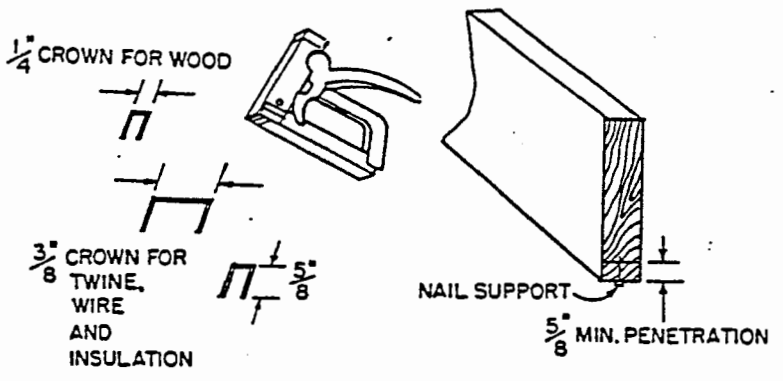
12. FIBERBOARD SHEATHING FOR INSULATION SUPPORT

- . Perm rating of 16 or more.
- . Flame spread rating of 25, maximum.
- . Maximum hole diameter and slit width of 1/4"



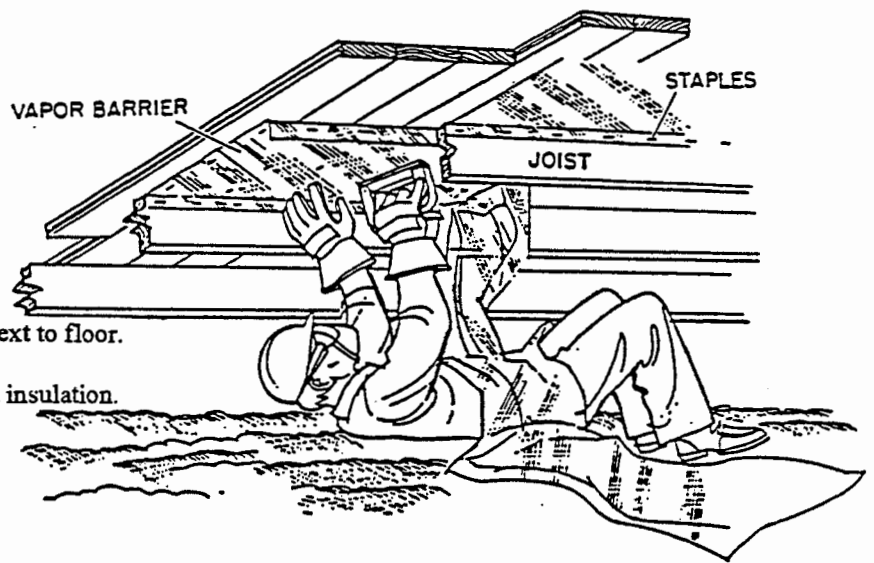
13. SUPPORTS AND ANCHORS

- Staples
 - . Zinc coated, stainless steel or similar corrosion resistant material.
 - . 1/4" crown for wood lath.
 - . 3/8" crown for insulation support systems.
 - . Penetrate wood 5/8".
 - . 18 gauge diameter.
- Nails
 - . Galvanized.
 - . Penetrate joist 5/8".



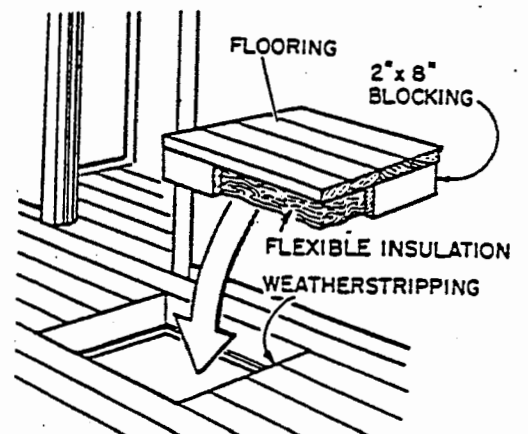
14. VAPOR BARRIER

- . When vapor barrier required, install next to floor.
- . 1.0 maximum perm rating.
- . Located between conditioned area and insulation.



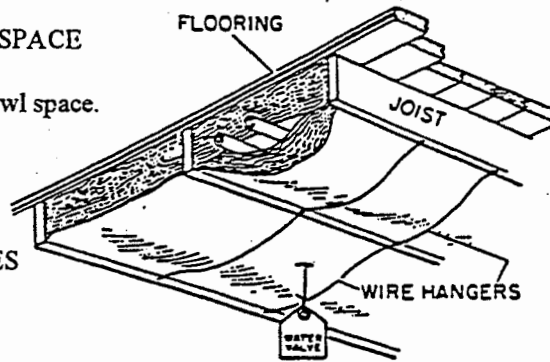
15. CRAWL SPACE ACCESS DOOR FROM CONDITIONED SPACES

- All Types
 - . Must be weatherstripped.
 - . Must be insulated, R-19 if horizontal, R-11 if vertical.
 - . Horizontal openings: use hollow vinyl tube or self-adhesive foam tape.
 - . Vertical openings: use any approved weatherstripping.
 - . Must be framed (box).
 - . Must use treated wood, sealed from weather/moisture.
 - . Must lock securely.
 - . Must open horizontally.



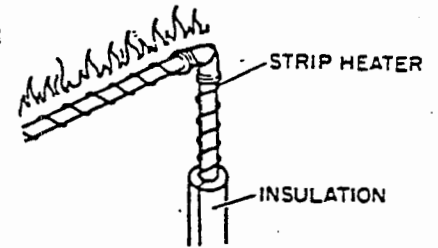
16. WATER PIPES IN CRAWL SPACE

Insulate water pipes under crawl space.



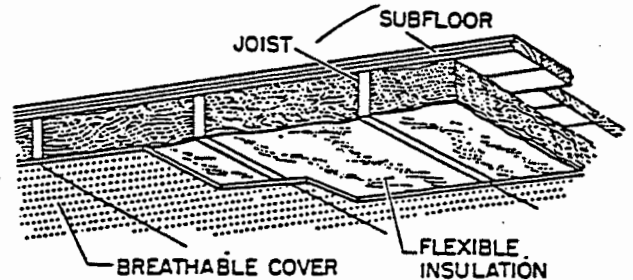
17. COVERED WATER VALVES

- Should be tagged.



18. WATER PIPE HEATERS

- May be installed in sustained freezing temperature areas only.
- Permanently attached with tape or wire.
- Thermostat recommended to be set at 35 degrees Fahrenheit.
- Installation shall conform to NEC and other applicable codes.
- If used, place around all water pipes that are likely to freeze and cannot otherwise be protected.

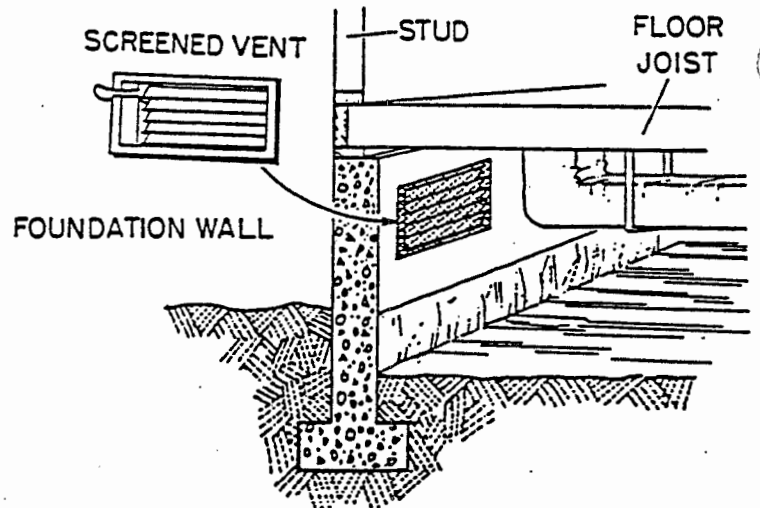


19. UNDER FLOOR INSULATION, EXPOSED TO WEATHER ELEMENTS

- Install breathable cover over fiber insulation.

20. VENT SCREEN

- Crawl space vents must have screen or mesh if floor insulation is installed.
- Corrosion resistant.
- 1/4" mesh ($\pm 1/8"$).



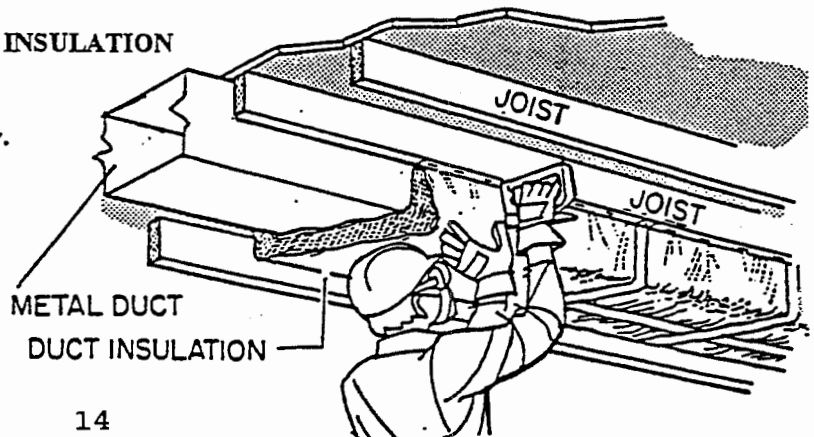
21. HVAC DUCTS

- When insulating the floor, insulate ducts per HVAC duct insulation section.

SUBFLOOR

NONFEASIBILITY CRITERIA FOR FLOOR INSULATION

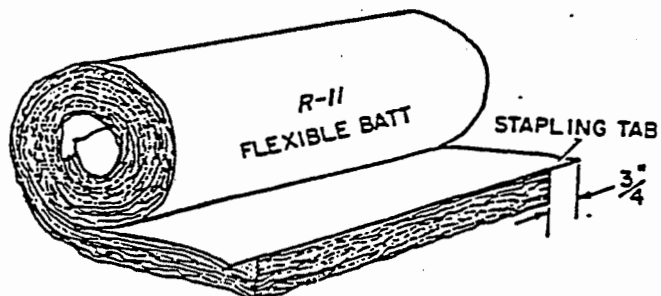
1. Floors over heated spaces.
2. Crawl spaces that cannot be vented properly.
3. Floor with insect infestation, decay or moisture and no ground cover.
4. Crawl space 36" or less.



SECTION 5 WALL INSULATION

1. RECOMMENDED MATERIALS

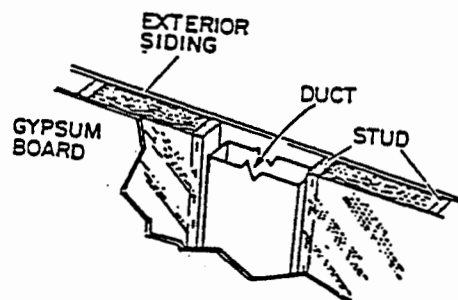
- All Insulation
 - . Must meet or exceed material standards as listed in Section 3 of this manual.
- Fiberglass; Rock Wool; Cellulose acceptable.
- Urea-Formaldehyde not acceptable.



2. R-VALUE : Minimum R-11

3. DO NOT INSULATE

- Cavities serving as HVAC ducts.
- Cavities with wall heaters.
- Do not insulate over knob and tube wiring.
- Wall with leaks or in need of repair, until repairs are complete.



4. HOLES THROUGH SIDING

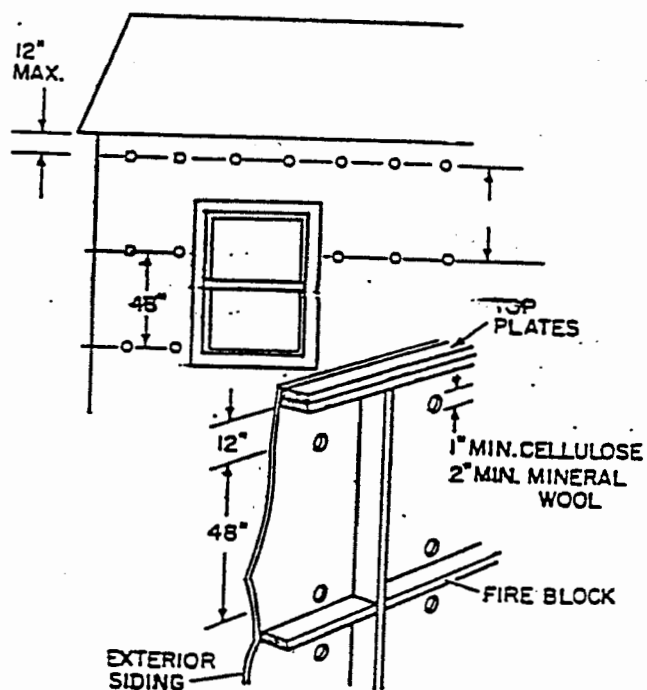
- Drilled in a straight line where possible.
- 2 per floor, minimum.
- 2 per stud cavity, minimum.
- One per cavity for walls less than 48" high.
- Fire blocking may require additional holes.

5. DISTANCE OF VERTICAL BLOW

- Down cavity 48" maximum.
- Up cavity 12" maximum.

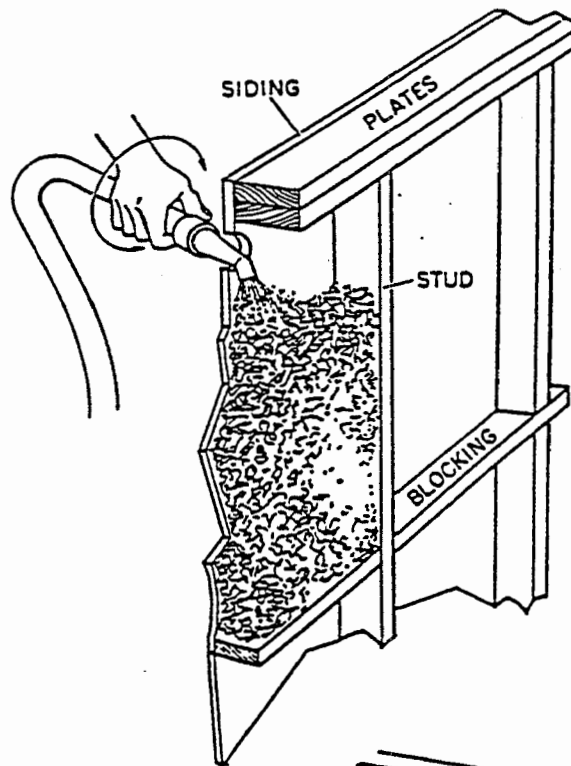
6. CAVITY/ACCESS HOLES SIZE FOR BLOWING IN INSULATION

- 2" diameter minimum for mineral wool.
- 1" diameter for cellulose.
- For other insulation materials use manufacturer's recommendations.



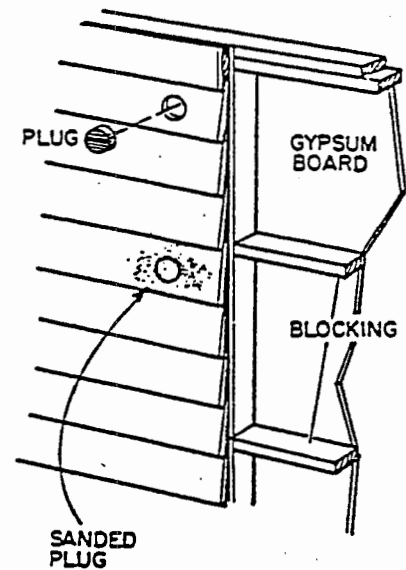
7. METHOD OF FILLING CAVITY

- Fill completely.
- Use nozzle to direct the flow of insulation to fill above and below fill-hole.
- "In progress" inspection recommended.



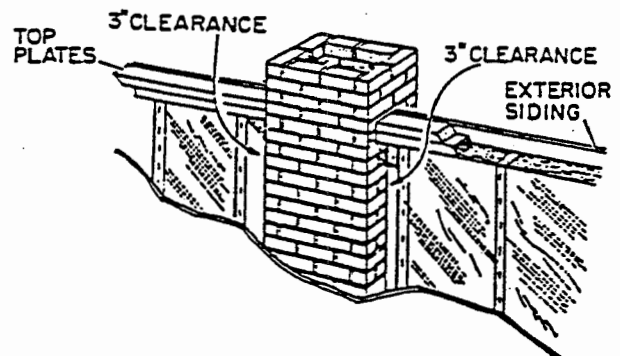
8. CAVITY HOLE PLUG

- All holes must be plugged with wood, cork or other suitable material.
- Plugs must not be vented.
- Plugs must not shrink or expand.
- Sand wooden plugs, flush if not recessed.
- Cover recessed plugs with filler to conform to siding surface.
- Bare wood and filler material must be primed.



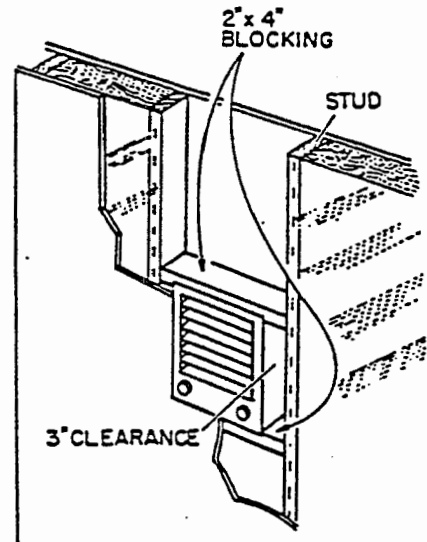
9. CAVITIES WITH CHIMNEY OR FLUE

- All Material
- . 3" clearance required.
- . Must have isolating fire blocking or do not insulate.



10. CAVITIES WITH ELECTRIC SPACE HEATERS

- All Material
- . 3" clearance required.
- . Must have isolating fire blocking or do not insulate.

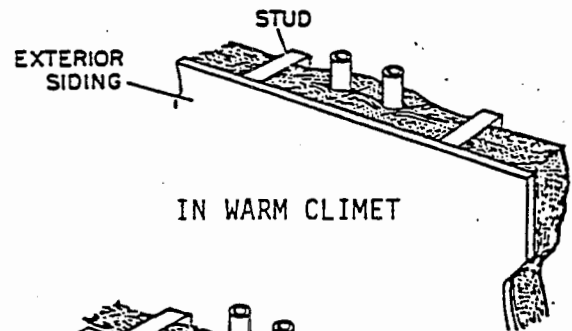


11. CAVITIES WITH RECESSED LIGHT FIXTURES AND OTHER HEAT PRODUCING DEVICES

- 3" clearance required.
- Must have isolating fire blocking or do not insulate.

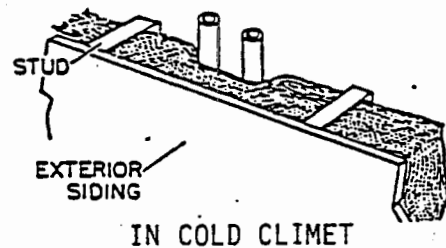
12. SMALL CAVITIES

- Insulate small cavities around windows and doors.
- Do not stuff cavities and compress insulation.



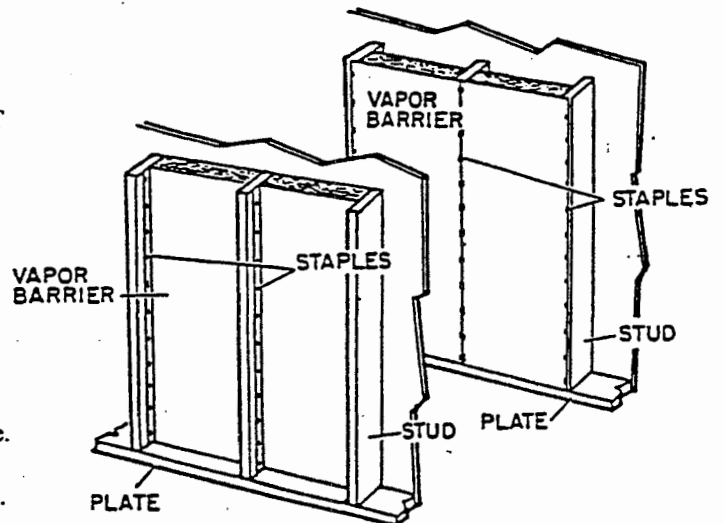
13. PIPES

- Flexible fiberglass and rigid foam
- . Do not isolate pipes from the heated side.
- . In cold climate place insulation between pipe and cold side.
- . In warm to mild climate surround pipes with insulation.



14. UNFINISHED WALLS OF HEATED BASEMENT

- Must use flexible fiberglass of R-11 minimum.
- Provide vapor barrier of perm rating one or less on warm side.

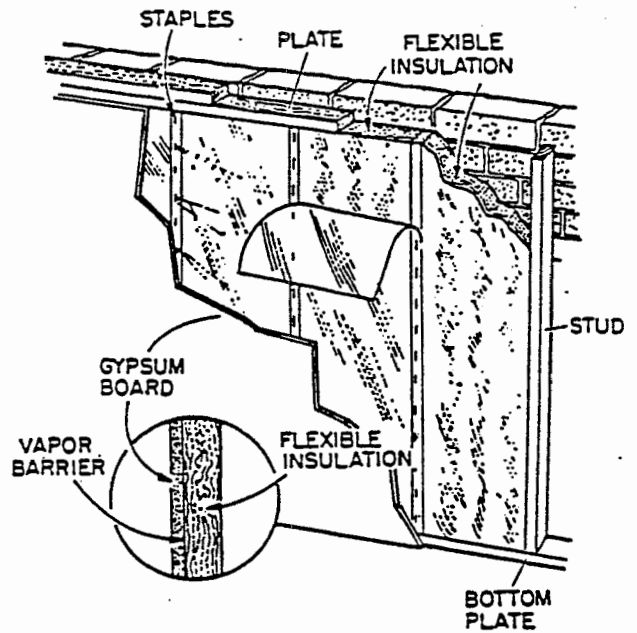


15. SECURE BATTS

- Secure flexible fiberglass batts with stapling flange.
- Batts not attached by their flange may be held in place with twine, wire or construction adhesive.

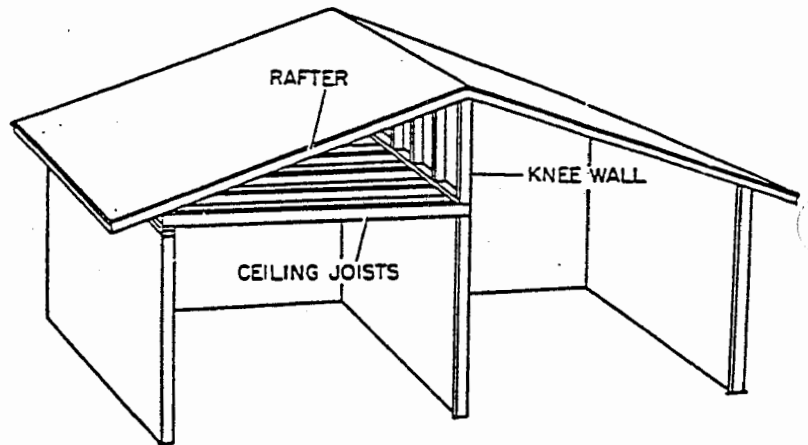
16. FACES AND EDGES

- Flexible fiberglass must be covered with a material having a maximum flame spread of 25.
- Rigid foam must be covered by 1/2" gypsum or material with equivalent fire characteristics.



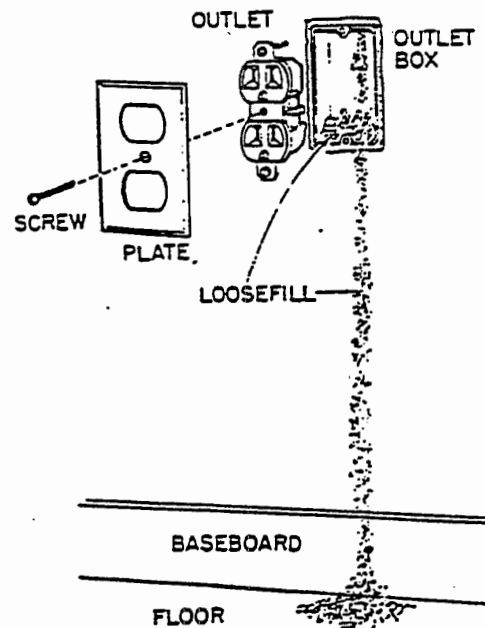
17. UNFINISHED KNEE WALLS TO UNHEATED SPACES

- Insulate as unfinished exterior wall with flexible fiberglass or rigid foam.



18. POST-INSTALLATION REQUIREMENTS

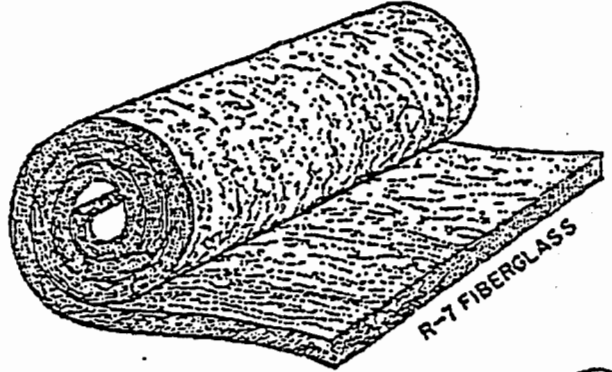
- Electrical outlets must be cleared of extraneous loose fill material.
- Check interior walls for damage and for insulation inside the home.
- Check furnace area for loose insulation and remove.



SECTION 6 WATER HEATER PIPE INSULATION

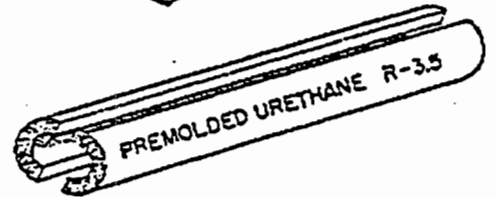
1. RECOMMENDED MATERIALS

- Mineral fiber pipe insulation ASTM C547-77.
- Product shall have a minimum life of 10 years.
- All materials used must be capable of a minimum continuous operation at 180 degrees Fahrenheit.
- Mineral fiber, elastomeric, urethane, isocyanurate, or other suitable material.
- All materials used must have a flame spread rating of 150 or less and a smoke density of 50 or less.



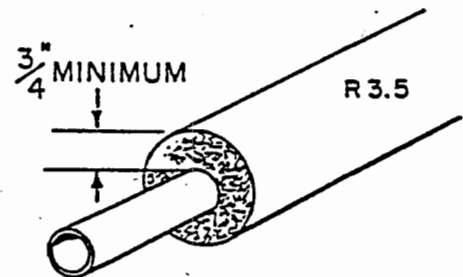
2. SHEET OR SEMI-MOLDED INSULATION

- Flat Type Material
- Must be capable of being molded to shape.



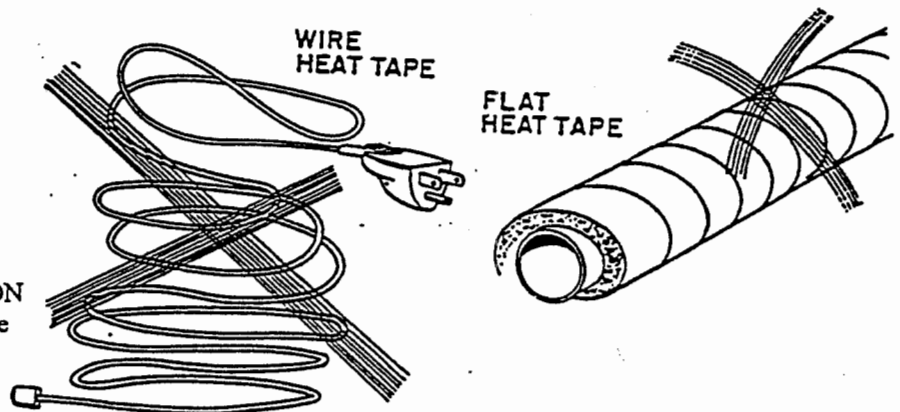
3. PRE-FORMED MATERIAL

- Must be pre-formed to fit standard pipe diameters.
- Must be appropriate for the pipe size.



4. THICKNESS AND R-VALUE

- $\frac{3}{4}$ " minimum thickness.
- R-3.5 minimum.

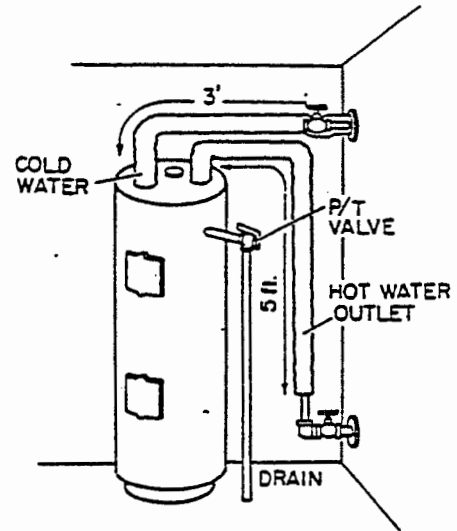


5. HEAT TAPE OR STRAP INSULATION

- All types not allowed. No real R-Value

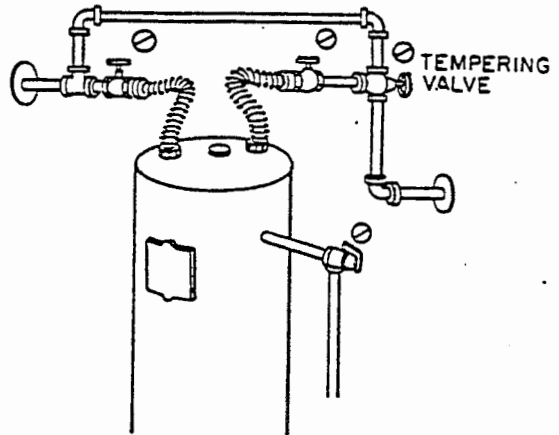
6. PIPE COVERAGE REQUIREMENTS

- Insulate hot and cold water pipes from water heating equipment only.
- Insulate cold water pipe within 5 feet of water heater.
- Insulate all accessible hot water pipes.
- Cover all elbows and curved pipe, without compression or gaps.
- Do not insulate leaking pipes.



7. DO NOT COVER

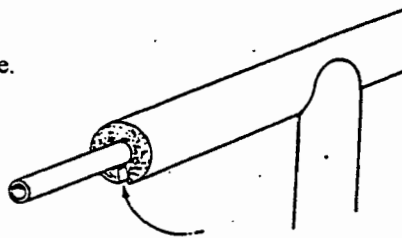
- Pressure/temperature relief valves.
- Valve handles.
- Control and safety devices.
- P/T drain line.
- Allow 3" clearance from vents.



⊘ DO NOT INSULATE

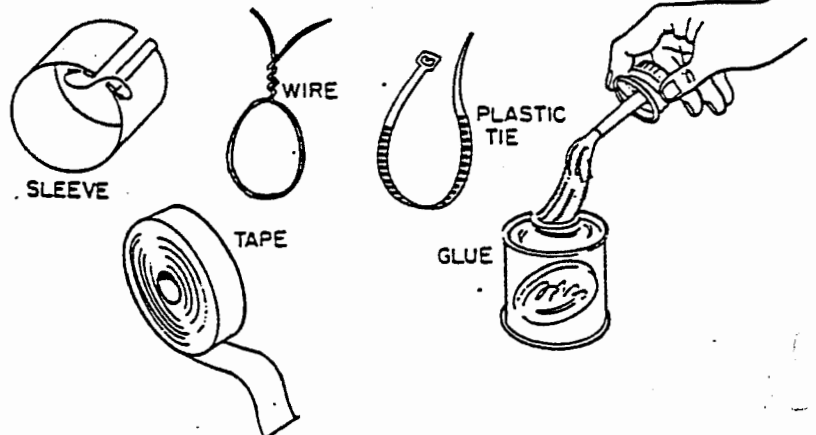
8. POSITION OF SLITS

- Pre-Formed Material
- . Position slit downward on horizontal pipe.



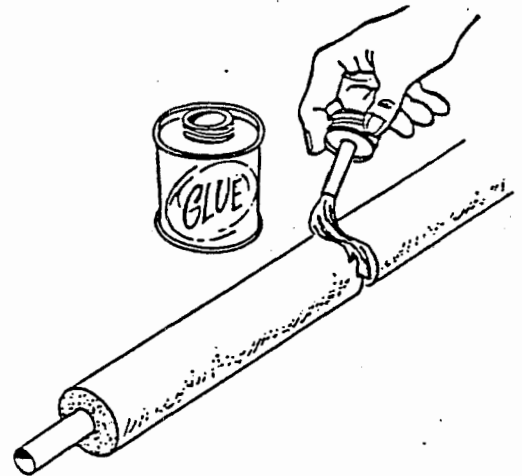
9. GENERAL ATTACHMENT REQUIREMENTS

- All Material
- . Tape or glue all slits and joints.
- . In addition, insulation must be firmly secured with tape, wire, plastic ties, or sleeves.
- . Insulation must not be compressed.



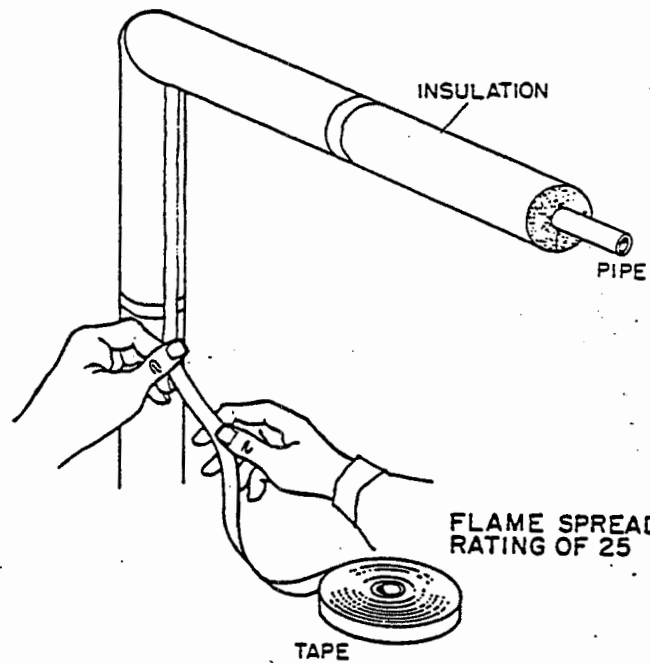
10. GLUE FOR ATTACHMENT

- Flat and Pre-Formed Material
- . Only manufacturer's recommended adhesive permitted.



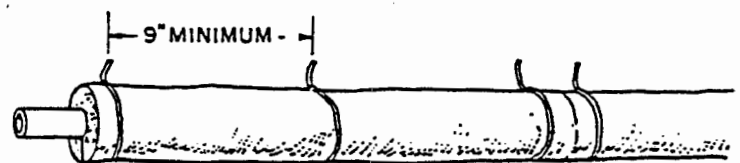
11. TAPE FOR ATTACHMENT

- All Material
- . Maximum flame spread rating of 25.



12. ATTACHMENT: TIES, CLIPS AND TAPE

- All Material
- . Galvanized wire or non-slipping plastic ties or tape permitted.
- . Locate tie 1" from each end.
- . 12" maximum between attachment.

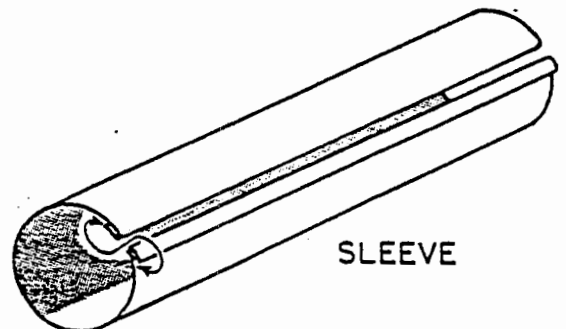


13. SLEEVE FOR ATTACHMENT

- All Material
- . If used, metal sleeves recommended.
- . Must not compress insulation.

NONFEASIBILITY CRITERIA FOR PIPE INSULATION

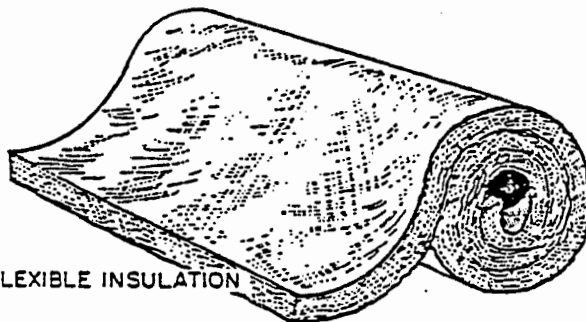
1. Pipes already properly insulated.
2. Leaks present.
3. Pipes not accessible.
4. If configuration of pipe prevents proper insulation.



SECTION 7 DUCT INSULATION STANDARDS

1. RECOMMENDED MATERIALS

- Flexible or rigid fiberglass.
- Selected and applied according to the provisions cited in ASTM C971-82.
- Duct tape - use polyethylene coated or metallic duct tape only.



FLEXIBLE INSULATION

2. R-VALUE: - R-6, minimum.

- R-11 recommended if flexible is used.

R-3 MIN.-R-11 RECOMMENDED

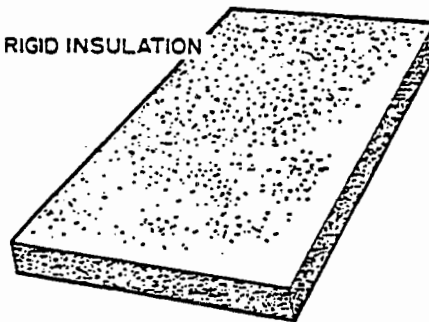
3. COVERAGE

- 100% coverage required (not including safety restrictions)
- Plenum and boots must be insulated.
- Return duct must be insulated.

RIGID INSULATION

4. VAPOR BARRIER

- Not required, if it is installed the following will apply:
- Maximum flame spread rating of 150.
- Must be placed on outermost side of insulation.

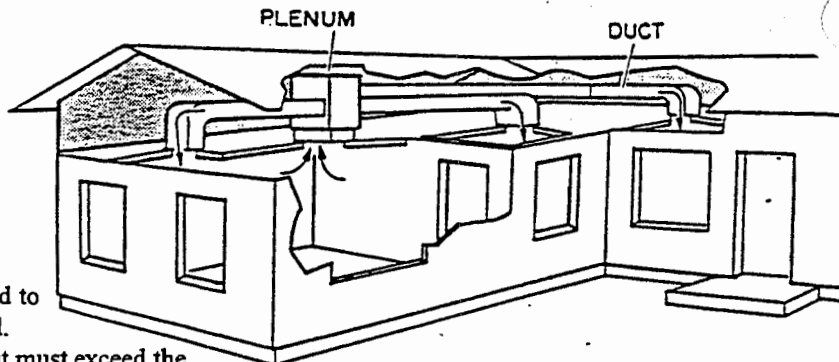


5. COMPRESSION

- No more than 50% compression is allowed in corners.

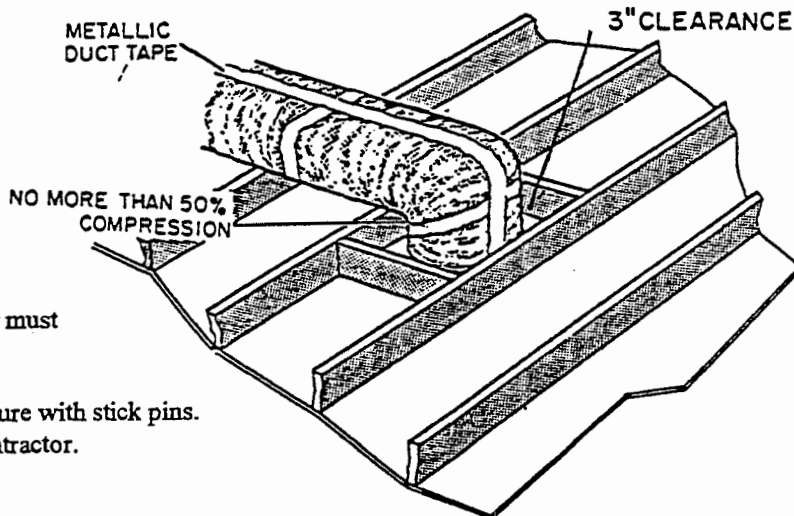
6. COMBUSTION AIR SUPPLY VENTS

- All Loose Fill
 - . Must not block air supply.
 - . Blocking must be installed.
 - . Loose fill that falls on screen during application must be removed.
 - . Blocking material must be metal a minimum of .007" thick.
 - . Blocking must be permanently attached to ceiling joist; stapled, nailed or screwed.
- Mineral fiber blocking may be used but it must exceed the height of insulation by 4" and extend at least 15" away from intake in all directions.
- Barrier must rest on ceiling sheathing.
- Flexible . Must not block air supply.



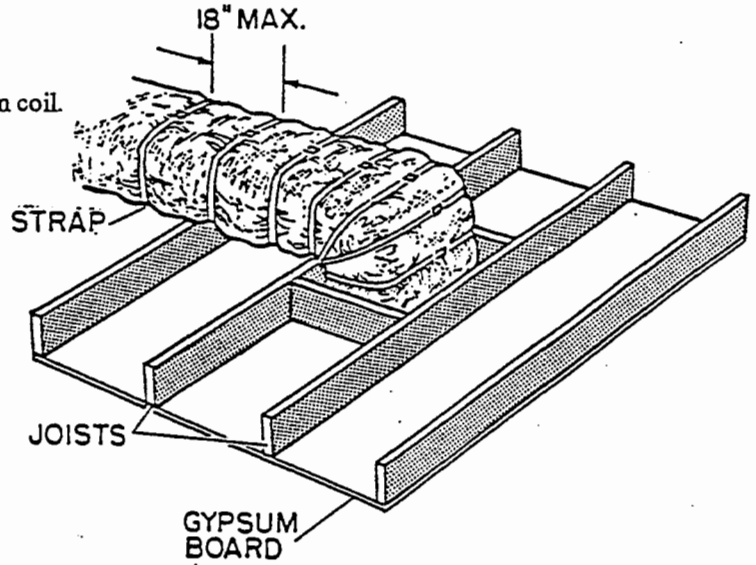
7. ATTACHMENT REQUIREMENTS

- Flexible
 - Permanently secured with:
 - . stick pins, or
 - . rot resistant, stretch-proof twine, or
 - . rust-proof wire, or
 - . rust resistant staples, or
 - . metallic duct tape.
 - . insulation must butt tightly, vapor barrier must overlap by 2" and be taped.
- Rigid
 - . For interior application, permanently secure with stick pins.
 - . For exterior application, use licensed contractor.



8. SPIRAL STRAPPING

- All Material
- . Must be installed with no more than 18" between coil.
- . If wire is used, it must be at least 18 gauge wire.

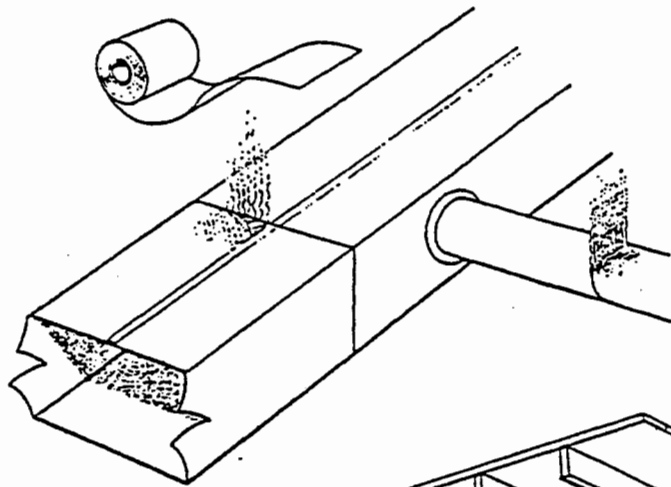


9. PREPARATORY REQUIREMENT

- All Material
- . Seal leaks before insulating.
- . Make support repairs before insulating.

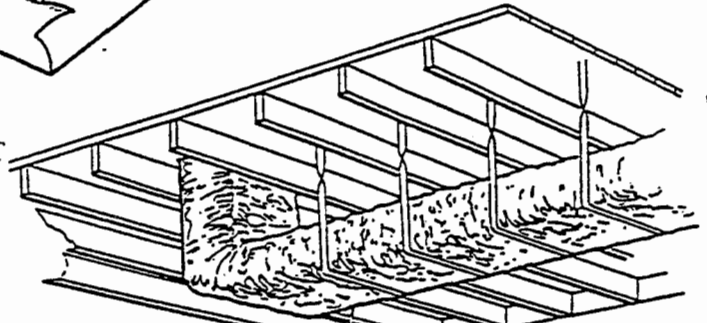
10. DO NOT INSULATE

- All Material
- . Ducts in conditioned space.
- . Leaking ducts.
- . Ducts with missing or broken supports.



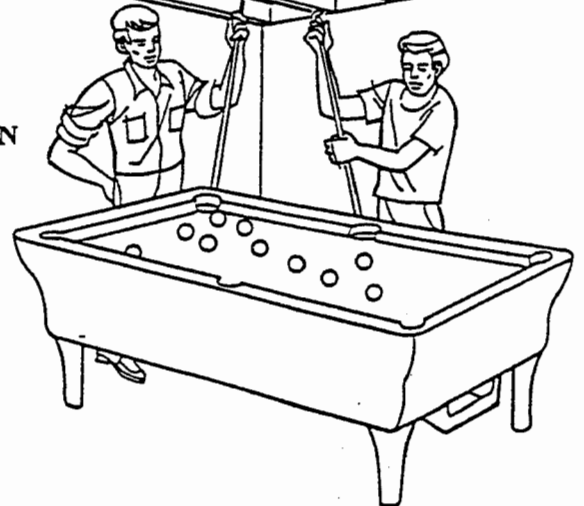
11. DUCTS SUBJECT TO ROUTINE HUMAN CONTACT

- All Material
- . Insulation to be classified Type 2 or 3, Class A material.
- . Facing required with flame spread rating of 50 or less.



NONFEASIBILITY CRITERIA FOR DUCT WRAP INSULATION

1. Already properly installed.
2. Inaccessible ducts.
3. Ducts with non-repairable damage.
4. Ducts located in conditioned space.
5. Ducts with missing or broken supports.
6. Ducts exposed to weather.
7. Abandoned ducts.
8. Crawl or attic space less than 36".



SECTION 8 WATER HEATER INSULATION STANDARDS

1. RECOMMENDED MATERIALS

- Blanket Insulation
 - . Conformance to ASTM C592-80.
- High Temperature
 - . Conformance to ASTM 892-78.
- Fiber Blanket
 - . Mineral fiber only, facing required.
- Facing Material
 - . Must have foil or vinyl facing.

2. R-VALUE: R-6, minimum.

3. TAPE: Maximum allowable flame spread rating of 25.

4. SEAMS: Top and sides must be sealed with tape. Duct tape is not allowed.

5. SECURE BLANKETS: Locate one strap at maximum of 1" from top and one 1" from bottom of blanket.

6. PRESSURE/TEMPERATURE RELIEF VALVE

- All units must have a relief valve.
 - . Do not insulate tank if relief valve not present.
 - . Must not be covered.
 - . Must be located within 6" of tank.
 - . P/T valve can be installed as part of incidental repairs including heat trap.

7. PIPES FROM PRESSURE/TEMPERATURE VALVE

- . End of drain line must not be covered with insulation.

8. THERMOSTAT, CONTROLS, AND ACCESS DOOR

- Gas Units
 - . Must not be covered.
 - . Must have 3" clearance for access door and vents.

9. APPLIANCE VALVE

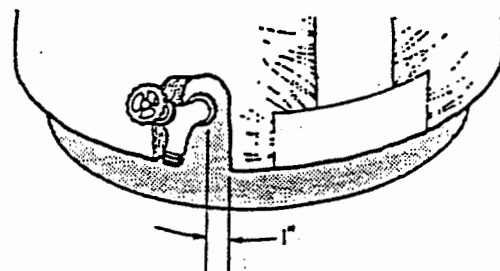
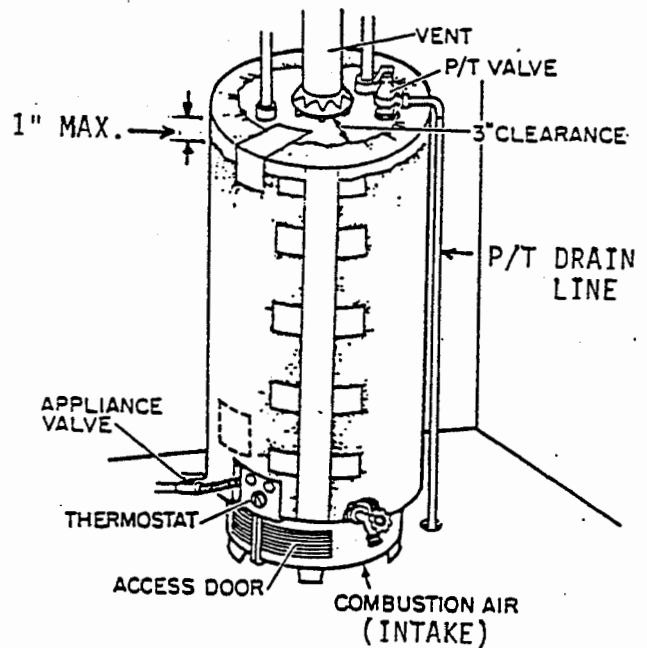
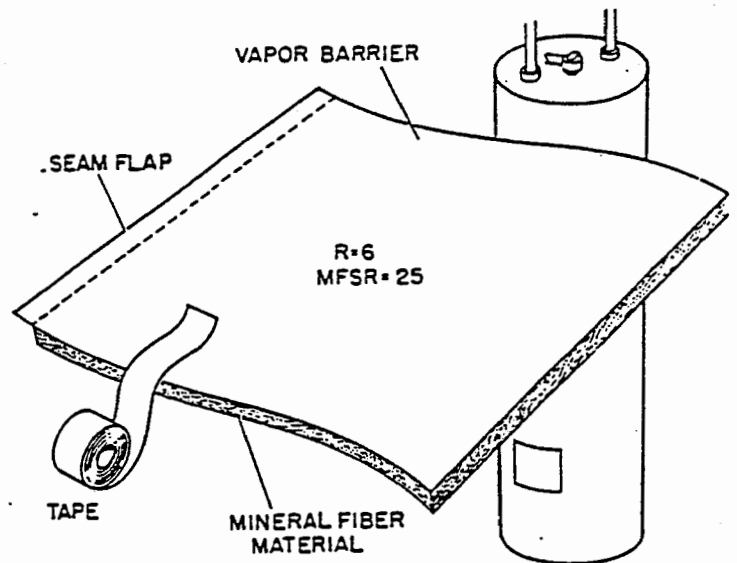
- Gas Units
 - . Must not be covered.

10. COMBUSTION AIR INTAKE

- Gas Units
 - . Must not be covered.
 - . If in attic, install barrier if loose fill present.

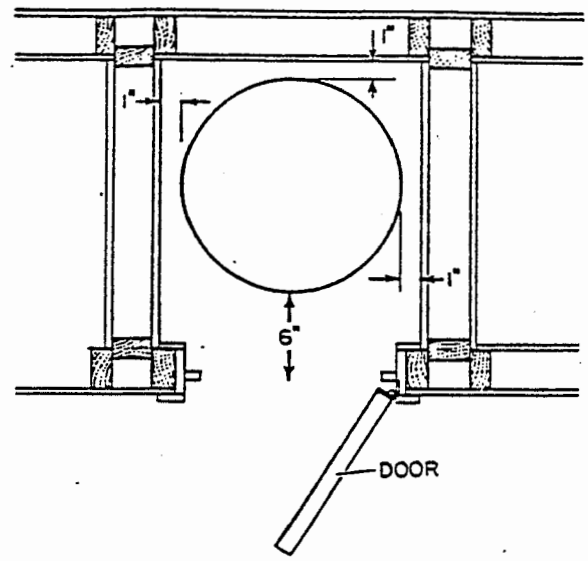
11. DRAIN VALVE

- All Units
 - . Maintain 1" clearance.
 - . Do not cover.



12. UNIT LOCATION

- All Units
 - . Do not insulate if located in uncovered area.
 - . Must have minimum 1" clearance on sides and back, and 6" for front.
 - . May be insulated if located in conditioned or unconditioned area.

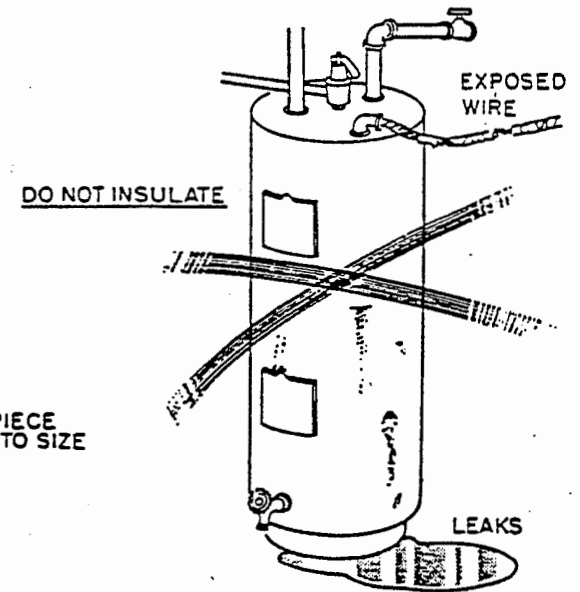


13. VENTS AND SAFETY INSTRUCTIONS

- Gas Units
 - . 3" clearance between vent and blanket or tape.
 - . Cut on at least three edges and taped.

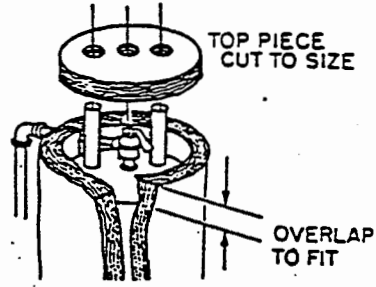
14. DO NOT INSULATE

- All Units
 - . If existing R-value is R-12 or greater.
 - . If tank or pipes are leaking.
 - . If units meet ASHRAE standard 90-75 or 90-80.
 - . If access plates are missing.
 - . If label on tank warns against it
- Gas Units
 - . If unit has excessive soot.
 - . If unit is missing flue or draft diverter.
 - . If combustion air is blocked.
- Electric Units
 - . If unit has exposed electrical wire.



15. TOP OF UNIT

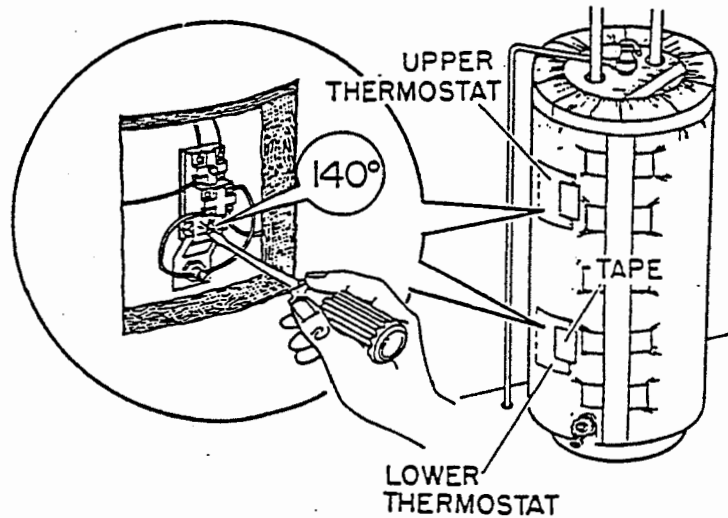
- Electric Units must be insulated unless inaccessible.
- Gas Units must not be insulated.



FOR ELECTRIC UNITS ONLY

16. UPPER AND LOWER THERMOSTAT

- Electric Units
 - . Must not be covered unless location is cut on at least three edges and taped.



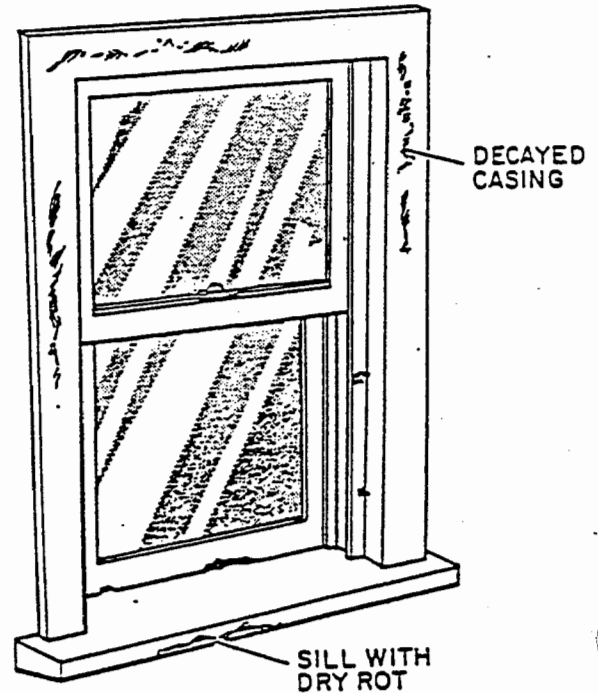
17. TEMPERATURE SETTINGS

- All Units
 - . Set temperature to medium range unless dishwasher has built-in heating element.
 - . Suggestion: 120 degrees unless heavy use.
 - . 140 degrees for heavy use/ smaller tank/or if DW is without built in heating element.

SECTION 9 STORM WINDOWS AND DOORS STANDARDS

1. RECOMMENDED MATERIALS

- Window Glazing
 - . Glass recommended.
- Door Glazing
 - . Must be safety glass or polycarbonate.
- Caulking
 - . See Caulking Section for requirements.
- Hardware and Fasteners
 - . Shall be aluminum, stainless steel or other noncorrosive material.
- Aluminum Frame
 - . Conformance to ANSI/AAMA 1002.10-83.
- Wood Frame
 - . Conformance to Section 3 of ANSI/NWWDA IS 2-85.



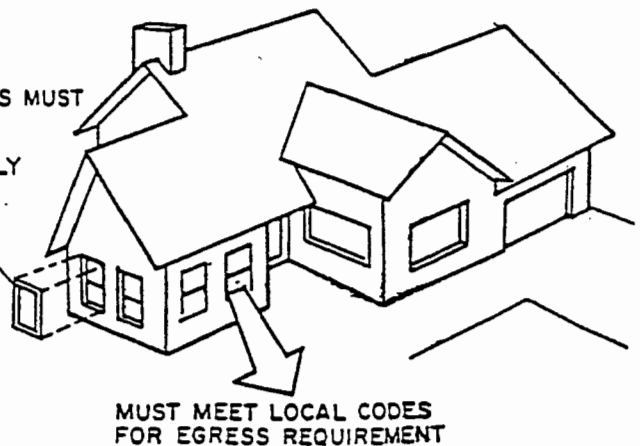
2. PRE-INSTALLATION REQUIREMENTS

- Windows and Doors
 - . Existing units, pane, frame, and/or sash must be structurally sound.
 - . Contact area must be free of protrusions.
 - . Water penetration points must be sealed.
 - . Dry rot damage must be replaced.
 - . Replace loose and missing glazing compound.

STORM WINDOWS MUST
MATCH PRIME
WINDOWS AND
ALIGN CORRECTLY

3. TYPE, SIZE, AND SHAPE

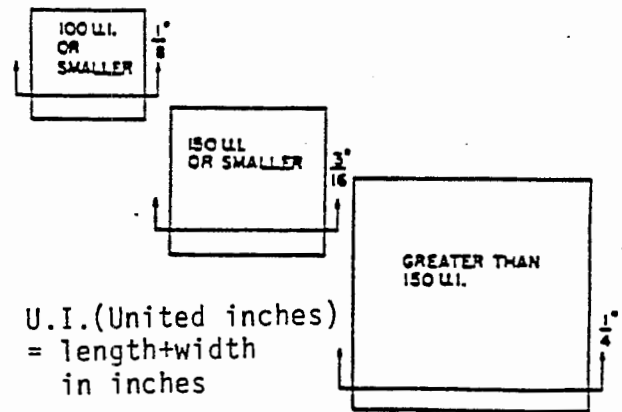
- Windows
 - . Must meet applicable building codes egress requirements.
 - . Size and shape must match the prime window opening.
 - . No size requirement if egress has been met.



4. GLASS THICKNESS REQUIREMENTS

WINDOWS:

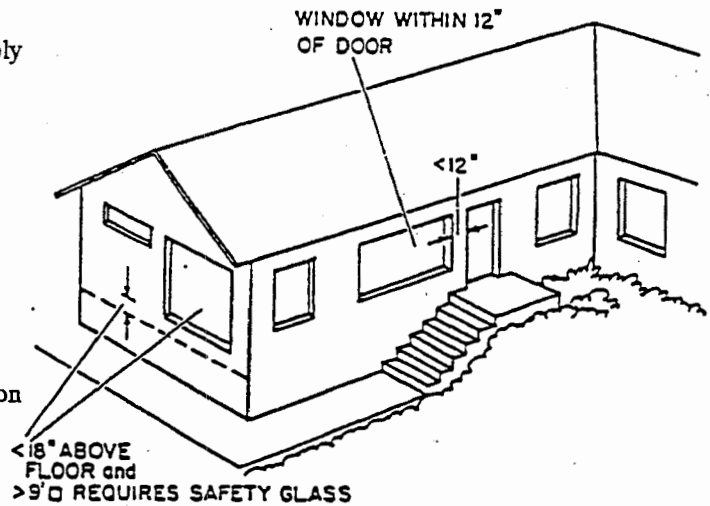
<u>Frame Type</u>	<u>Pane Thickness</u>	<u>Max. Pane Size in United Inches</u>
-wood or alum.	double strength	up to 100 U.I.
-wood or alum.	3/16"	101-150 U.I.
-wood or alum.	1/4"	151-192 U.I.
-vinyl	double strength	up to 100; over 100 requires vertical support
-vinyl	3/16"	up to 120; over 120 require separate panel.



DOORS: Install safety glass or polycarbonate and comply with local code.

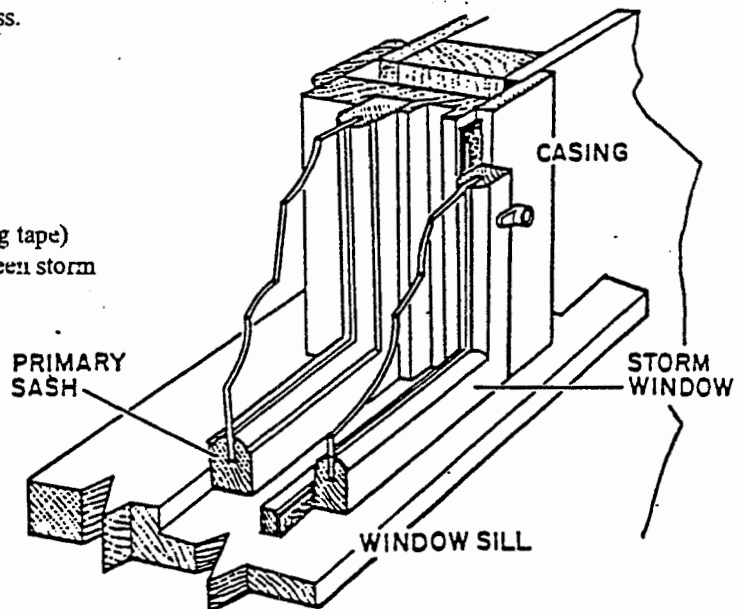
5. SAFETY GLASS

- Windows
 - . Required in windows located within 12" of door and less than 60" off floor.
 - . Required in fixed panes larger than 9 sq. ft. and located less than 18" above floor.
 - . Not required for windows protected with 1-1/2" mullion or guard rail between 2 and 3 feet above the walking surface.
- Doors
 - . When repairing glass in a door, use safety glass.
 - . Glass must be permanently labeled as safety glass.



6. THERMAL BARRIERS/GLAZING TAPE

- Metal Frames
 - . 1/8" vinyl or elasticmeric thermal barrier (glazing tape) required to prevent metal-to-metal contact between storm and existing window frames.

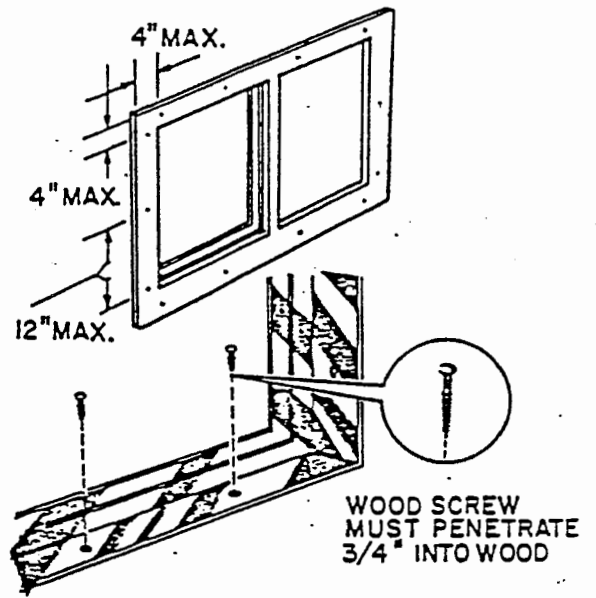


7. BARE WOOD

- All Wood
 - . All bare wood, except redwood and cypress shall be sealed before installation.

8. EXTERIOR ATTACHMENT

- Windows and Doors
 - . Screws must reach into structural framing of residence or 3/4" solid wood.
 - . Secured within 4" of corners.
 - . Minimum of 3 screws or clips on each side.

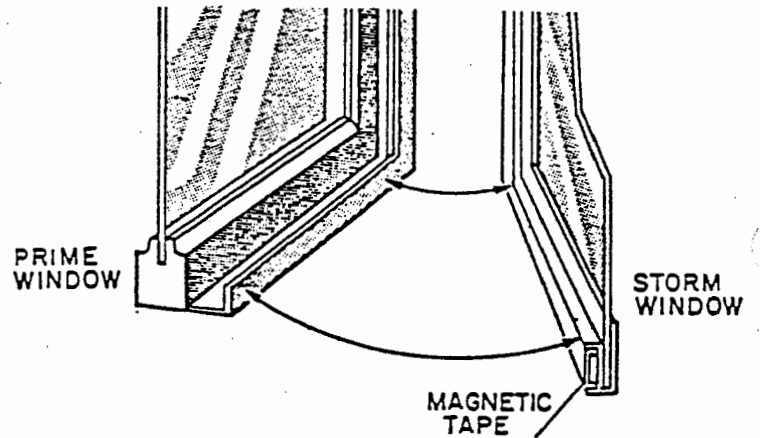
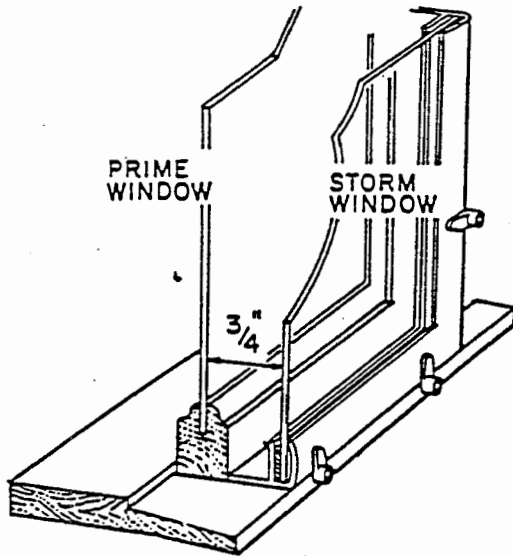


9. SEALING

- Exterior Mounted Windows and Doors Units
 - . Permanent caulking or gasket required between existing and new unit.
 - . Seal all joints and gaps over 1/32".
 - . Seal all holes and penetrations except weep holes.

10. AIR SPACE

- Interior or Exterior Storms
 - . air space may not be less than 1/2"

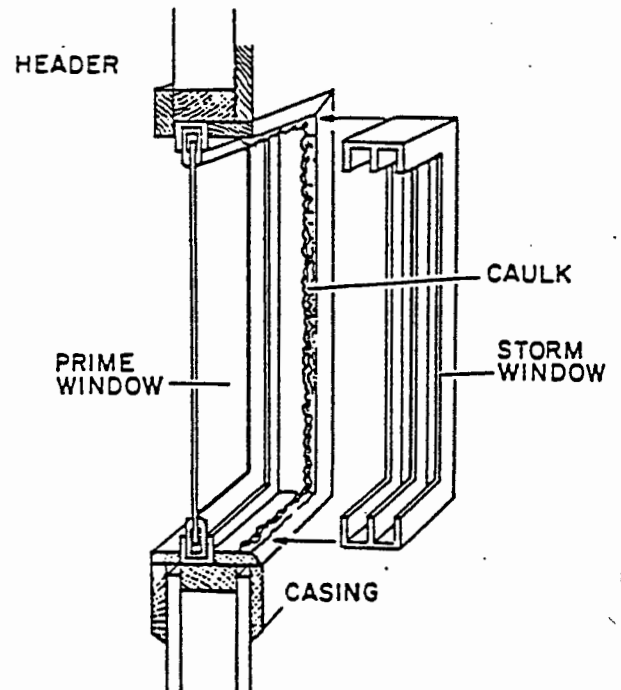


11. INTERIOR MOUNTING

- All Materials
 - . Mount inside existing window jamb, when possible.
 - . Use screws, clips or magnetic strips.

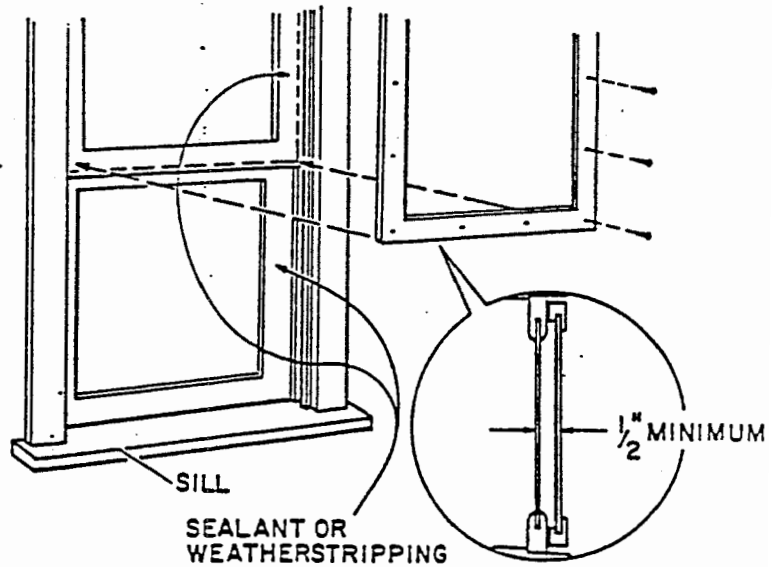
12. INTERIOR SEALING

- Interior Storms
 - . All joints between storm and existing window must be airtight.



13. SASH MOUNTED STORM WINDOWS, INSTALLATION

- Windows
 - . Permanently attached to sash or edge of glazing.
 - . 1/2" air space, minimum.
 - . Weather resistant seal between sash and storm window.
 - . Permanently mounted units must have watertight seal.



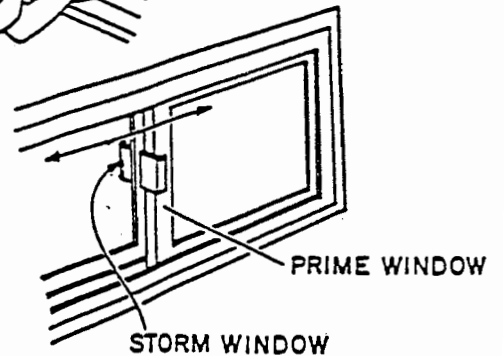
14. GENERAL OPERATIONAL REQUIREMENTS

- Permanently Mounted Units
 - . Operable existing window shall remain operable without removal of storm window frame.
 - . Interior access to latches must not be impaired.



15. GENERAL POST-INSTALLATION REQUIREMENT

- All Storms
 - . All panes shall be cleaned inside and out.



SECTION 10 REPLACEMENT DOORS AND WINDOWS

1. REPLACEMENT DOORS

- Wood - Conformance to ANSI/NWWDA I.S. 1-87 or I.S. 6-86.
- Metal - Conformance to SDI 100-1985.

2. DIMENSION

- . Match existing thickness.
- . Use 1-3/4" thick door if possible.
- . Wood foam filled doors not allowed.

3. DOOR COMPOSITION

- Veneer . Exterior grade glue.
- Core . Solid core required.

4. DOOR FINISH

- Wood
 - . Must be sealed on both sides and four edges.
 - . Acceptable sealers are: Paint, urethane, water repellent
- Metal - Must be primed and painted.
 - . Oil based or epoxy paint only.

5. HINGE TYPES (all doors)

- . Minimum 3-1/2" x 3-1/2" for 1 3/8" doors
and 4" x 4" for 1 3/4" doors.
- . Loose-pin unless mounted toward exterior.
- . Brass finish or stainless steel.
- . Minimum 3 per door.
- . Square or rounded edges acceptable.
- . Conformance to ANSI A8133.

6. SCREWS FOR HINGES

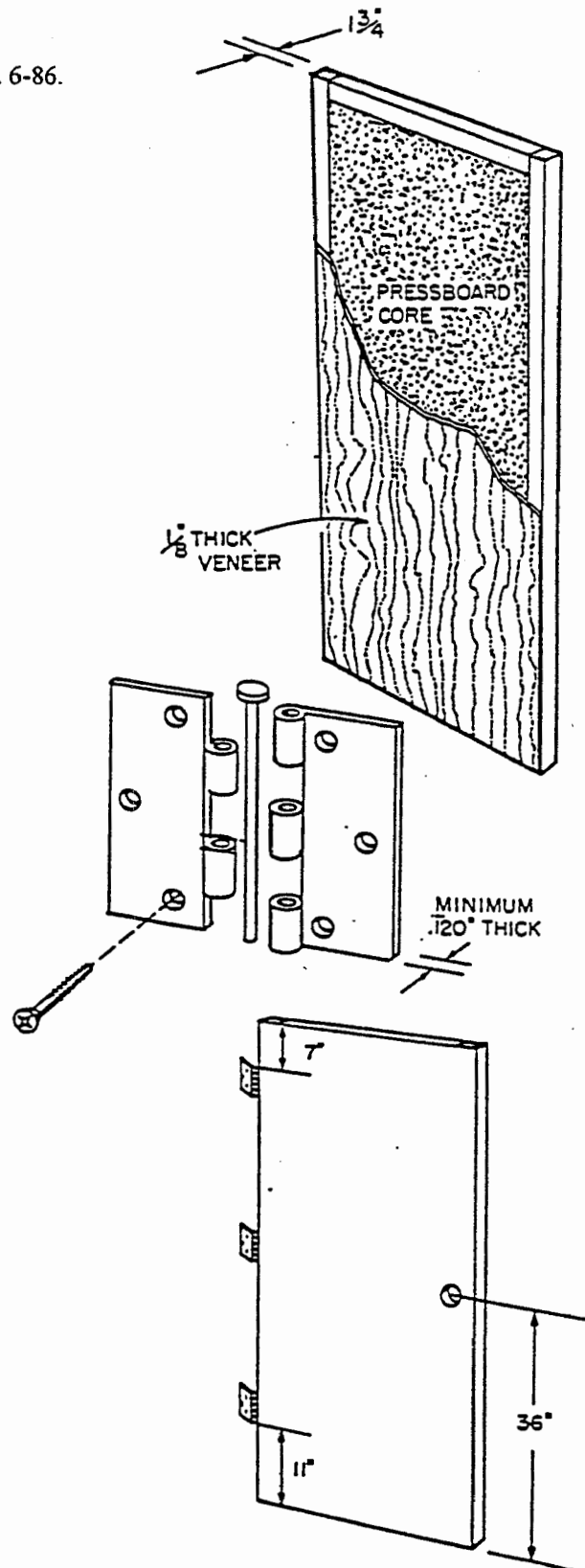
- Wood Jamb
 - . Flathead only.
 - . Brass or stainless steel.
 - . Minimum 5/8" penetration.
 - . Phillips head preferable.
- Metal Jamb
 - . Flathead only.

7. HINGE LOCATION (all doors)

- . Three hinges required.
- . Lower hinge located 11" (+1.5") from floor.
- . Upper hinge located 7" (+1.5") from upper jamb.
- . Center middle hinge between upper and lower hinges.

8. LOCKSET LOCATION

- Entrance Lock
 - . Match existing height if only door is replaced (+2").
 - . 36" from floor if both door and jamb are replaced.

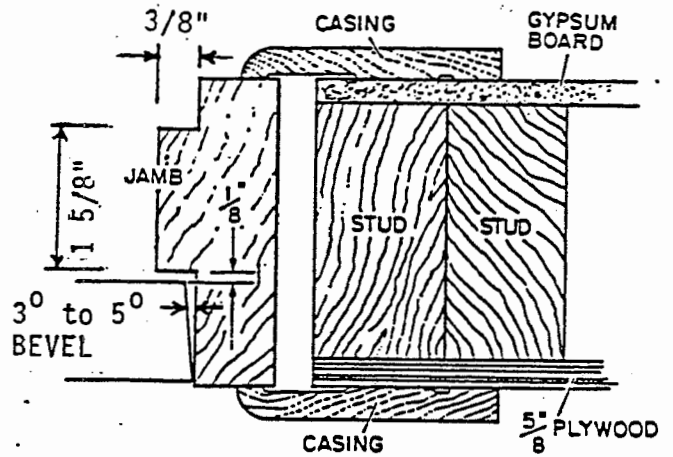


9. ALIGNMENT

- Striker Plate and Latchbolt
 - . 1/8" max. distance from door to door stop when latchbolt and striker plate engaged.

10. DOOR STOP

- Wood
 - . Paint grade acceptable unless existing jamb is finished natural.
 - . 5/16" x 1-1/4" minimum dimension.
 - . Wood only unless metal jamb.
 - . Must be exterior grade.
 - . Can be fingerjointed.

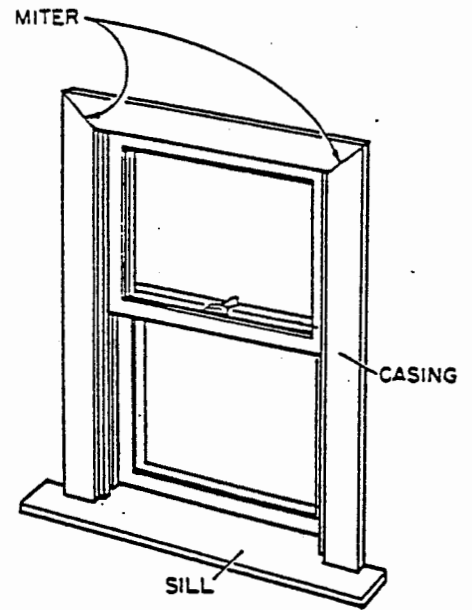


11. DOOR JAMB

- Replacement Material
 - . Minimum 3/4" thick.
 - . Use exterior type if entire jamb is replaced.
 - . Must equal finish wall width ($\pm 1/8"$).

12. DOOR MODIFICATIONS

- Veneer Type Doors
 - . A maximum of 1" may be cut from sides and top and 2" from bottom if expanded rails and doors not used.
- All Types
 - . Must have 3 to 5 degree bevel on lock set edge.

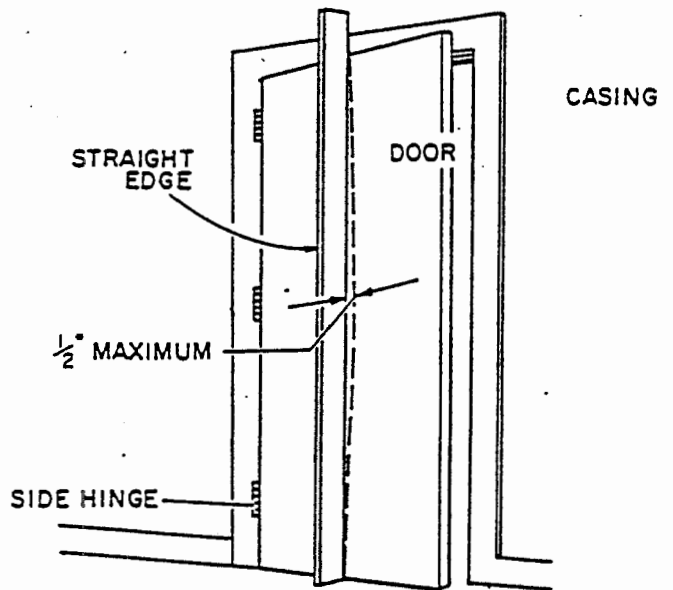


13. WINDOW AND DOOR CASING

- Wood
 - . Paint grade acceptable unless existing jamb is natural finish.
 - . Match existing casing.
 - . Match existing miters.
- Nails
 - . Use finishing or casing nails for interior casing.
 - . Corrosion resistant casing nails for exterior.
 - . Miter corners to match the existing structure.

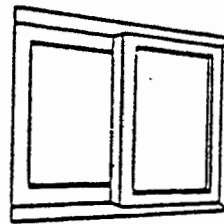
14. STANDARD

- Does the door fit or is it warped?
 - . Must not have warpage greater than 1/8" from end to end.

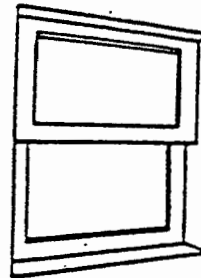


15. SUGGESTED WINDOW REPLACEMENTS

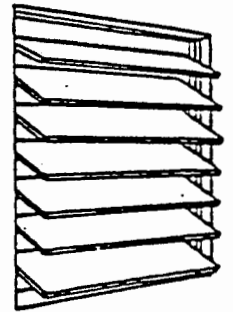
- Aluminum Slider
 - . Replace with aluminum slider.
 - . Conformance to ANSI/AAMA 101-85.
- Double Hung
 - . Replace with double hung, single hung, or aluminum slider.
 - . Wood: Conformance to ANSINWWDA 1.S. 2-86.
 - . Vinyl: Conformance to ASTM D4099-88.
- Jalousie
 - . Replace with double hung or single hung.
 - . Replace with next available size within 2" if exact size is not available.



ALUMINUM SLIDER



DOUBLE HUNG



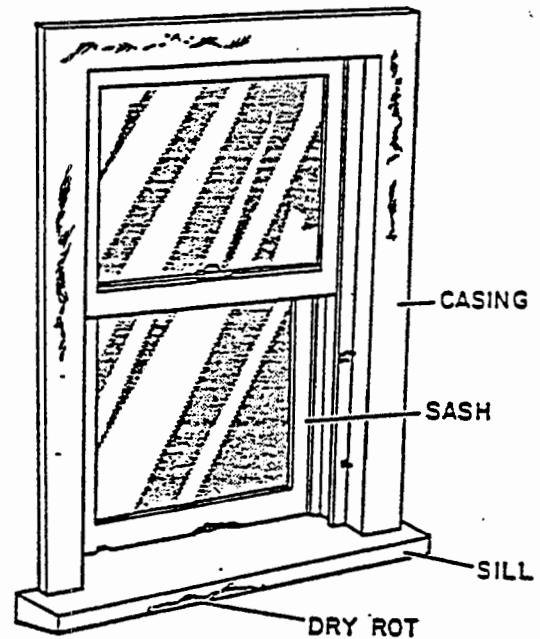
JALOUSIE

6. SASH

- . Decayed or deteriorated sashes must be replaced.

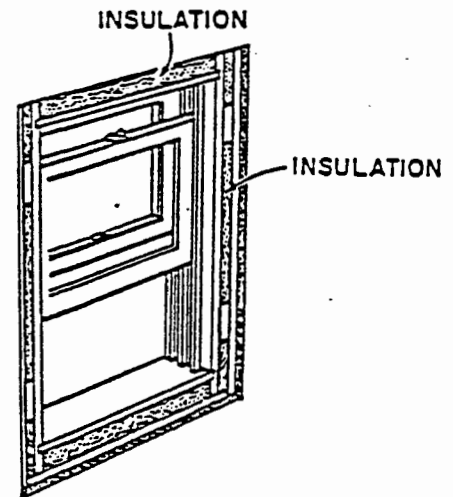
17. STRUCTURAL INTEGRITY

- Rough Window Frame
 - . Structural framing members must be replaced or repaired before replacing window.
 - . All dry rot and pest damage must be repaired.



18. CAVITIES

- . Opening between rough framing and window jamb shall be insulated unless window weights are being used.



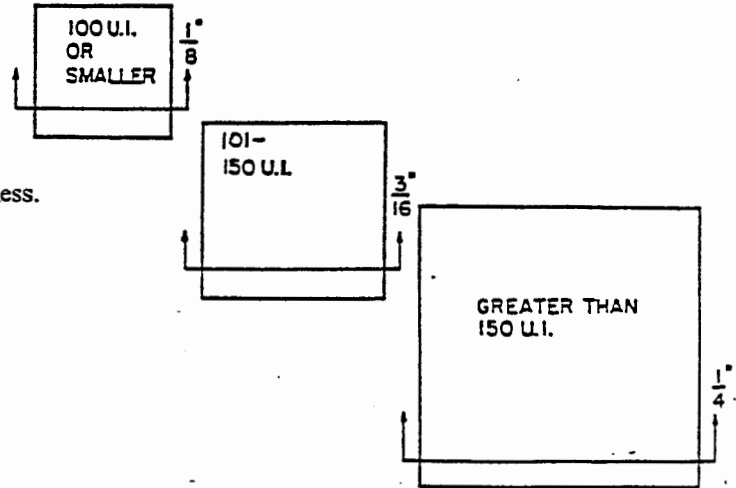
19. ALUMINUM WINDOWS

- . Flange around aluminum window must be caulked before attaching to rough frame.

SECTION 11 GLASS REPLACEMENT STANDARDS

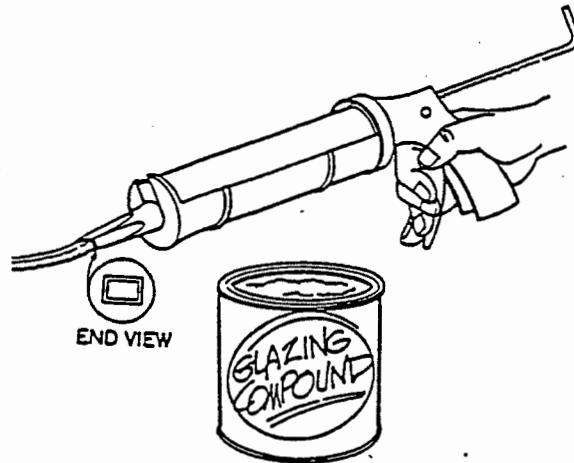
1. RECOMMENDED MATERIALS

- Single Strength (SS)
 - . Should not be used unless DS is too thick for frame.
- Double Strength (DS)
 - . For openings of 100 U.I. or smaller.
- Plate Glass (3/16")
 - . For window openings between 101 and 150 U.I. or less.
- Plate Glass (1/4")
 - . For window openings greater than 151 U.I.
- Safety Glass: Laminated, wired, tempered.
 - . Can use rigid plastic sheets in lieu of safety glass, in doors only.
- Plastic Sheets
 - . Must be UV treated.
 - . Polycarbonate recommended.
- Plastic Film
 - . Not allowed.



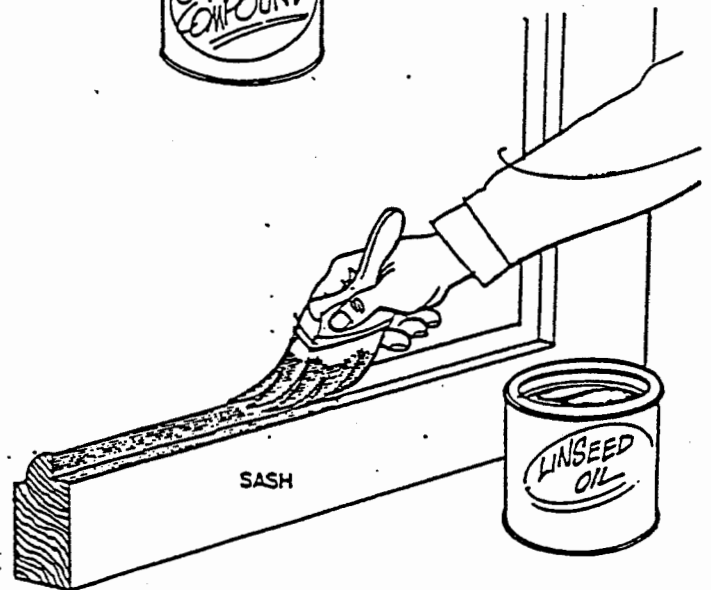
2. GLAZING COMPOUND

- Wood Sash
 - . Conformance to FS TT-P-00791B. DAP 33
- Metal Sash
 - . Conformance to ASTM C669-75(1981).
- Wood and Metal
 - . Must remain pliable.
 - . Caulk not allowed.



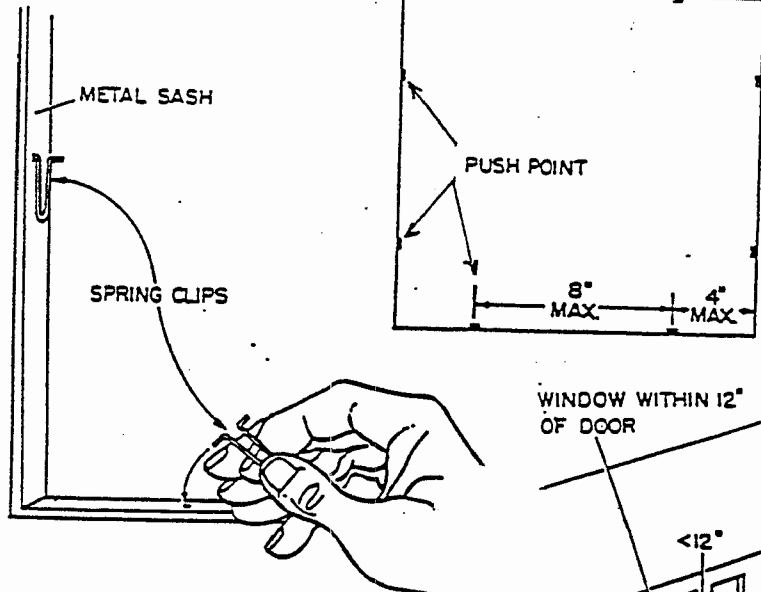
3. TREATMENT OF SASH

- Wood Sash
 - . Wood that will be in contact with the glazing compound, must be treated with linseed oil before installing glazing compound.
 - . Sealing
 - . Keeps oil in glazing compound from leeching.
- Metal Sash
 - . Must be painted if rusted or bare.
 - . Remove rust before painting



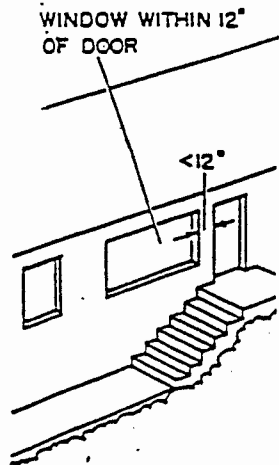
4. PUSH POINTS

- Wood Sash
 - . Must be installed.
 - . Points spaced a maximum of 8" apart.
 - . Points located within 4" of each corner.



5. SPRING CLIPS

- Metal Sash
 - . Must be installed.
 - . Spaced a maximum of 12" apart.
 - . Clips located within 4" of each corner.

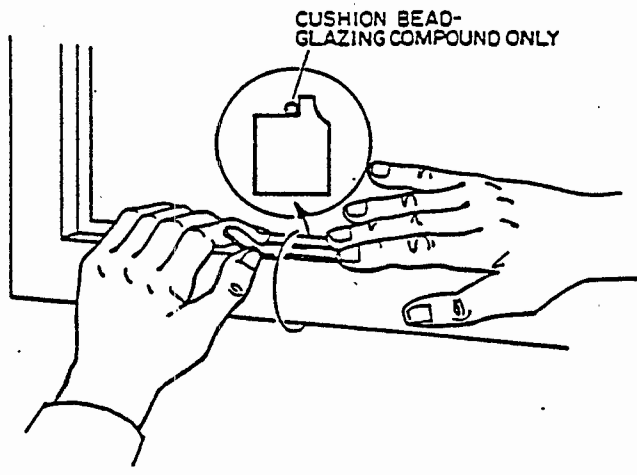


6. SAFETY GLASS

- Windows
 - . Required in windows located within 12" of door and within 60" of floor.
 - . Safety glass is required in fixed panes larger than 9 sq. ft. and less than 18" above floor.
- Doors
 - . Required when replacing lites in doors.

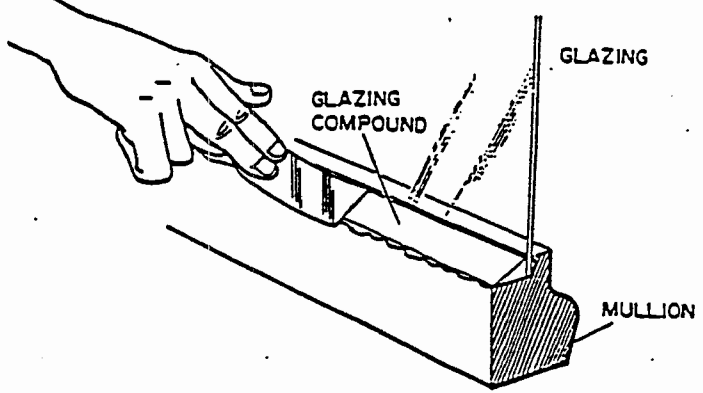
7. CUSHION BEAD

- Wood and Metal
 - . Must be continuous and free of voids.
- Wood
 - . Use glazing compound only.
 - . Do not use caulking.
- Glass
 - . Must be at least 1/8" smaller than opening.



8. FINISH BEAD

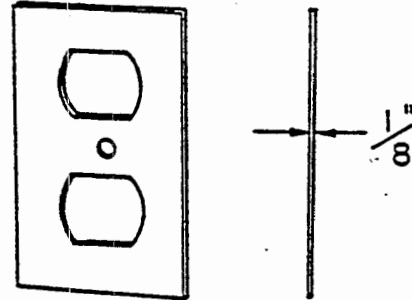
- Wood and Metal
 - . Finish Bead must not be visible from reverse side.



SECTION 12 ELECTRICAL OUTLET AND SWITCH GASKETS

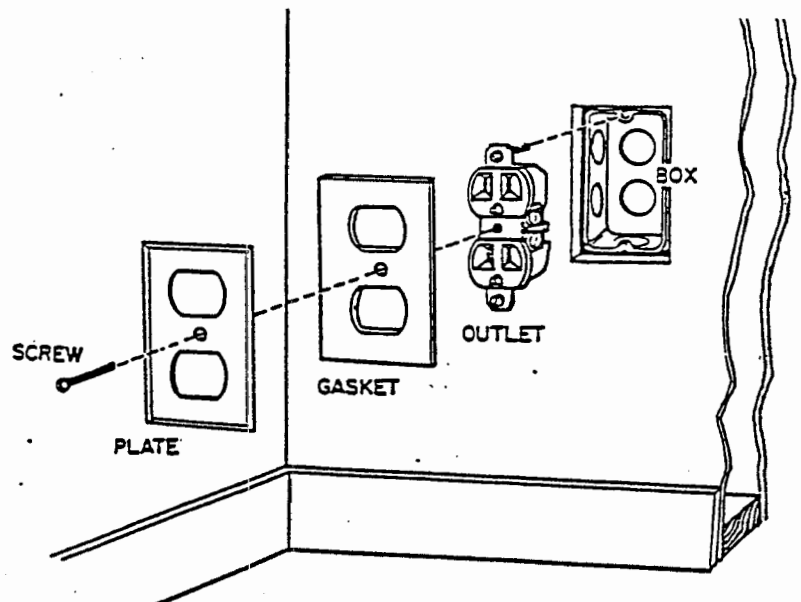
1. RECOMMENDED MATERIALS

- Must be fire resistant
- Must be precut to fit.
- Must be minimum 1/8" thick.
- Open cell foam not acceptable.



2. LOCATION

- Install under utility plates only.
- Install on wall between conditioned and unconditioned space only.



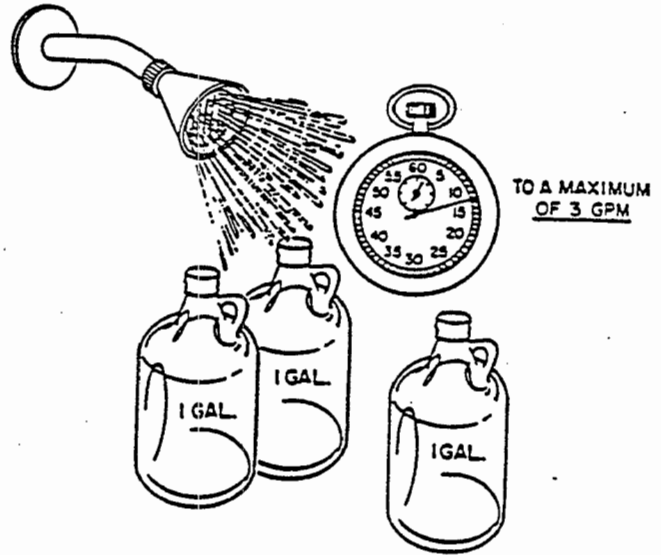
3. PLATE

- Plates cracked during reinstallation must be replaced.
- Plate must cover gasket completely.

SECTION 13 LOW-FLOW SHOWERHEAD STANDARDS

1. RECOMMENDED MATERIALS

- Showerhead
 - . Conformance to ANSI A112.18.1M-1979.
 - . Cleanable without head removal.



2. FLOW RATE

- Showerhead
 - . 3 gpm maximum flow rate.
 - . Not less than 2.0 gpm at 40 psi.

3. FUNCTIONAL

- Showerhead
 - . Do not install if shower is nonfunctional.

