
chapter 8. DOOR AND WINDOW FRAMES

8.1 GENERAL

8.1.1 Frames

There are two basic types of door and window frames: the traditional system of interlocking wood members and the integral-flange metal sections. Variations of the latter include metal clad and plastic coated, but they are similar in sections and dimensions and equal in performance. Also, among the metal types are those designed to be installed in wood-frame buildings and those designed for concrete openings.

We will not deal with those frames that are designed for concrete-type openings, except to mention that they are not intended (we hope) to be installed in wood-frame buildings. To use this type of section in wood-frame buildings is to invite disaster. If such installations are required, the designer must pay very close attention to the detailing.

8.1.2 Door Sills

In general, door openings should be handled in the same way at the head and jambs as are windows. Sills require somewhat different treatment. The sill portion of wood-frame door assemblies is susceptible to water penetration and must be correctly detailed. Sometimes door sills are made from decay-resistant wood or metal, and are not susceptible to decay. However, water penetration under the sill

and in the surrounding framing members is particularly troublesome.

8.1.3 Installation of Membrane Around Door Sills

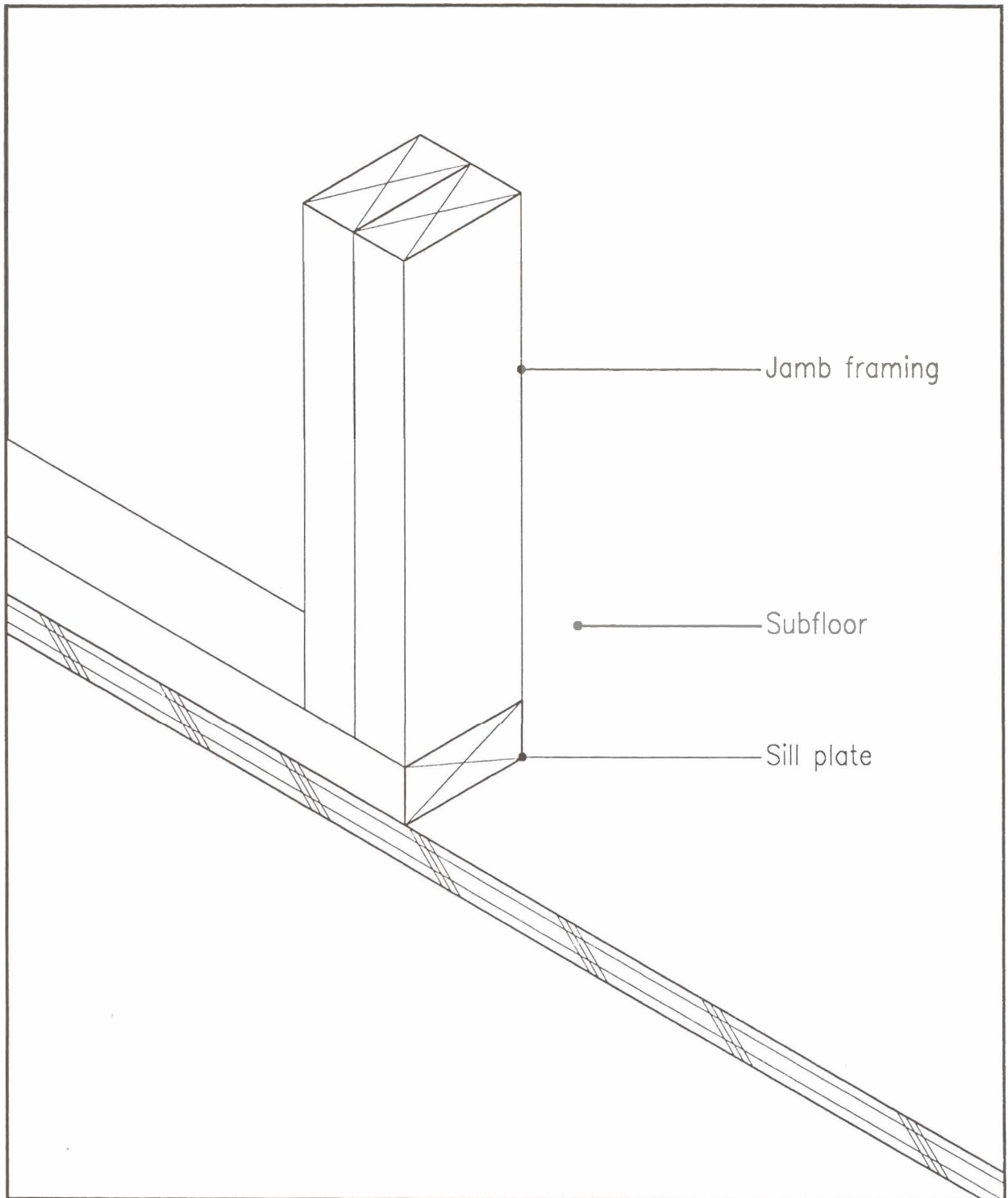
Special attention should be paid to the jamb-sill corner at the door sill. This edge condition, when not properly detailed, will allow water penetration to the wall interior. (Figures 8-1A to 8-1G) illustrate the proper installation of felt membrane around a door sill in a step-by-step manner.

8.2 WOOD FRAMES

To make a watertight frame head condition, two facts should always be remembered: water wants to run down hill, and wind will push it horizontally or up vertically. If the designer keeps these facts in mind and makes provision for them, particularly at corners or intersections, the opening probably will perform well. Other important considerations are the following:

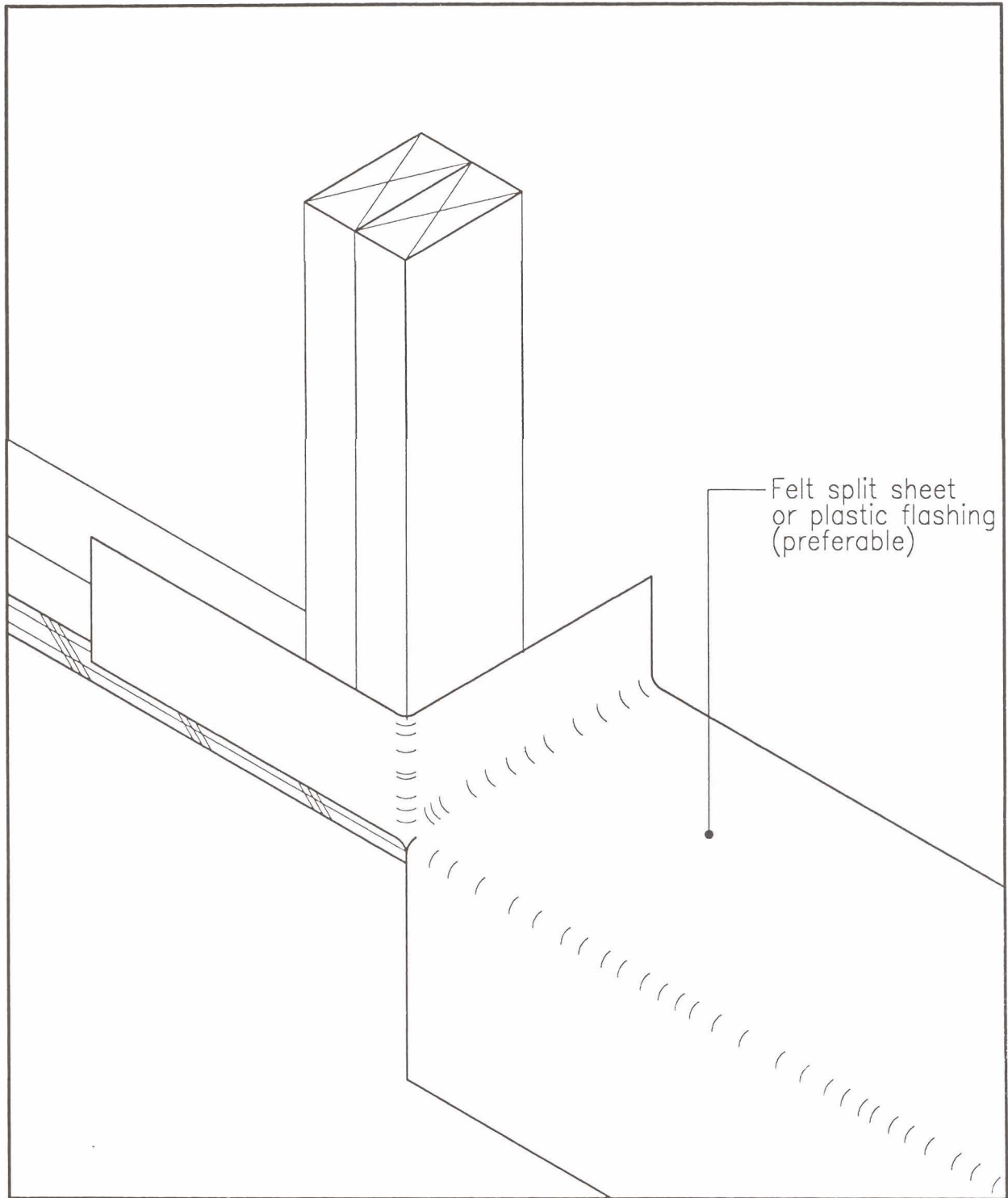
8.2.1 General

1. For general membrane sequence, see membrane installation under general detailing (Chapter 3).
2. The jambs are between the head and sill, not the other way around.



DOOR SILL DETAIL
ASSEMBLY AT JAMB-SILL CORNER

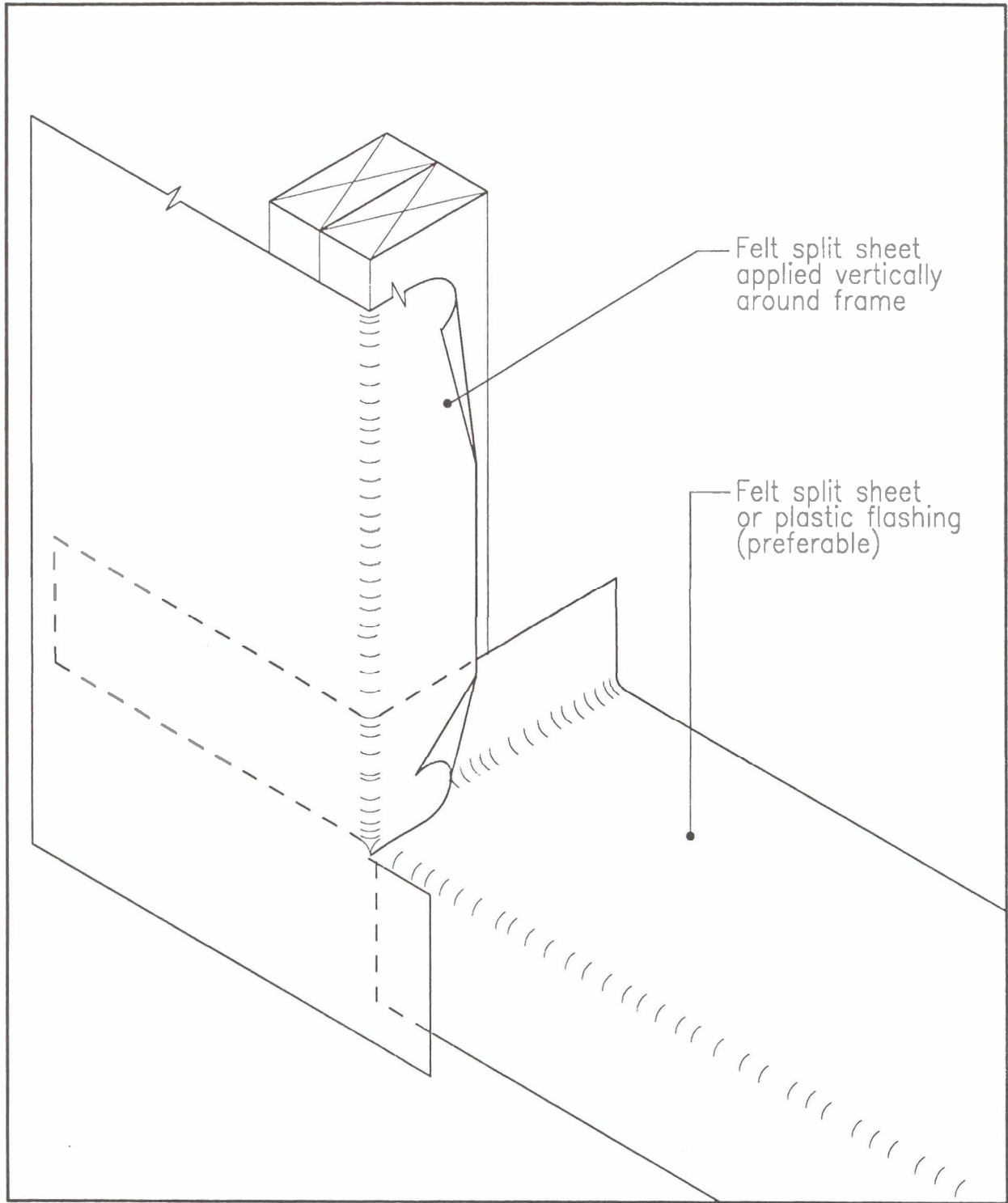
Figure 8-1A



Felt split sheet
or plastic flashing
(preferable)

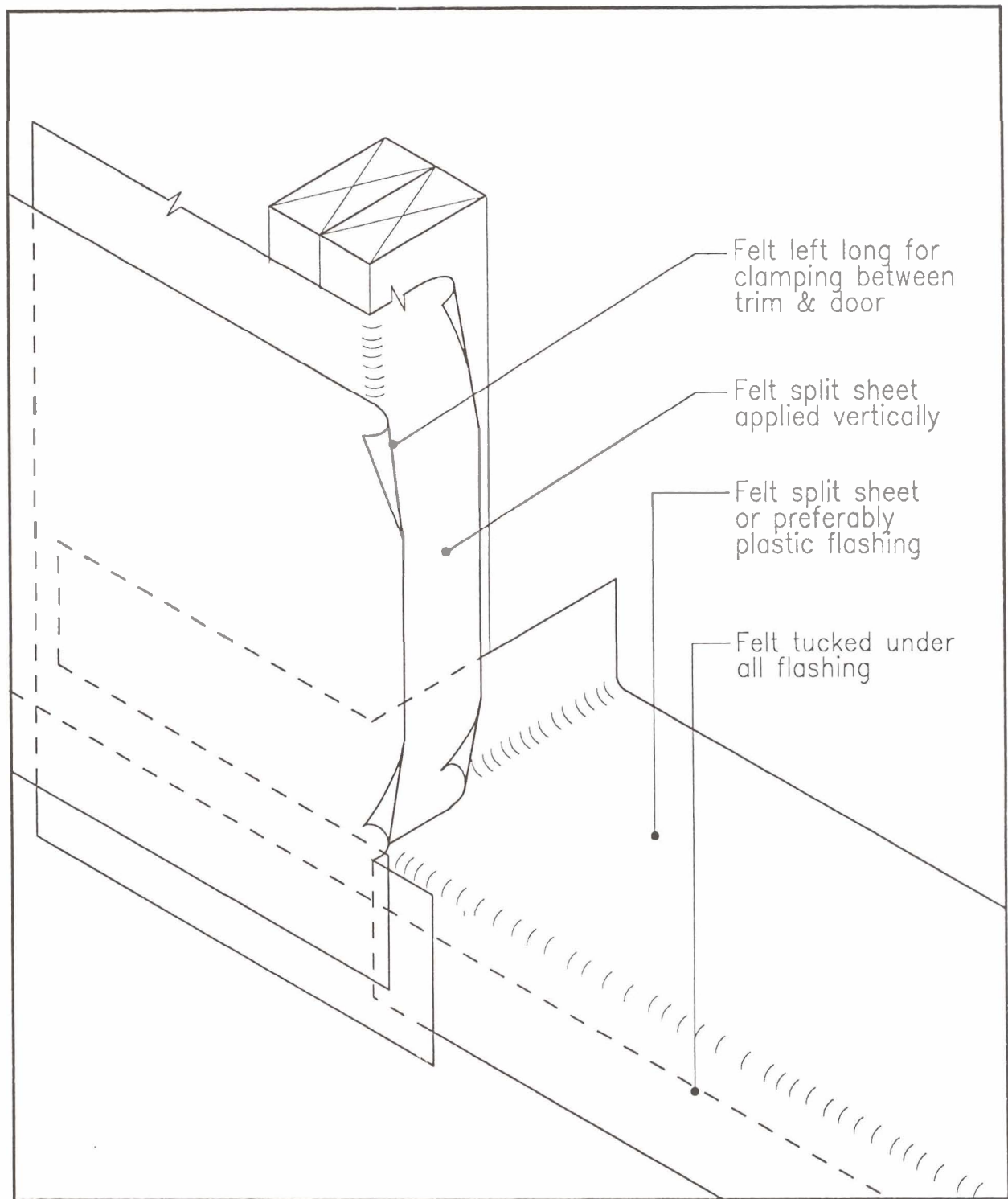
DOOR SILL DETAIL ASSEMBLY AT JAMB-SILL CORNER

Figure 8-1B



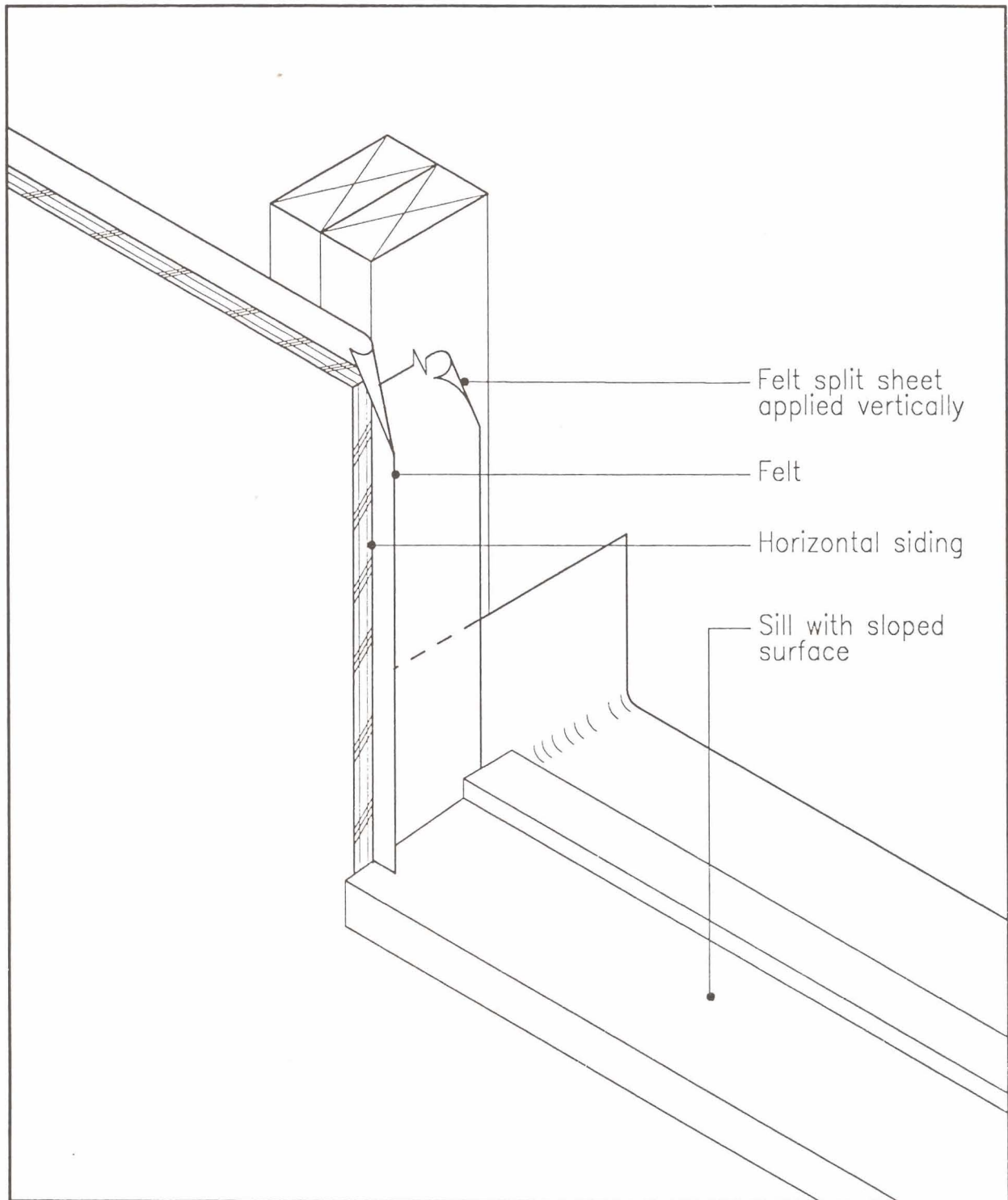
DOOR SILL DETAIL ASSEMBLY AT JAMB-SILL CORNER

Figure 8-1C



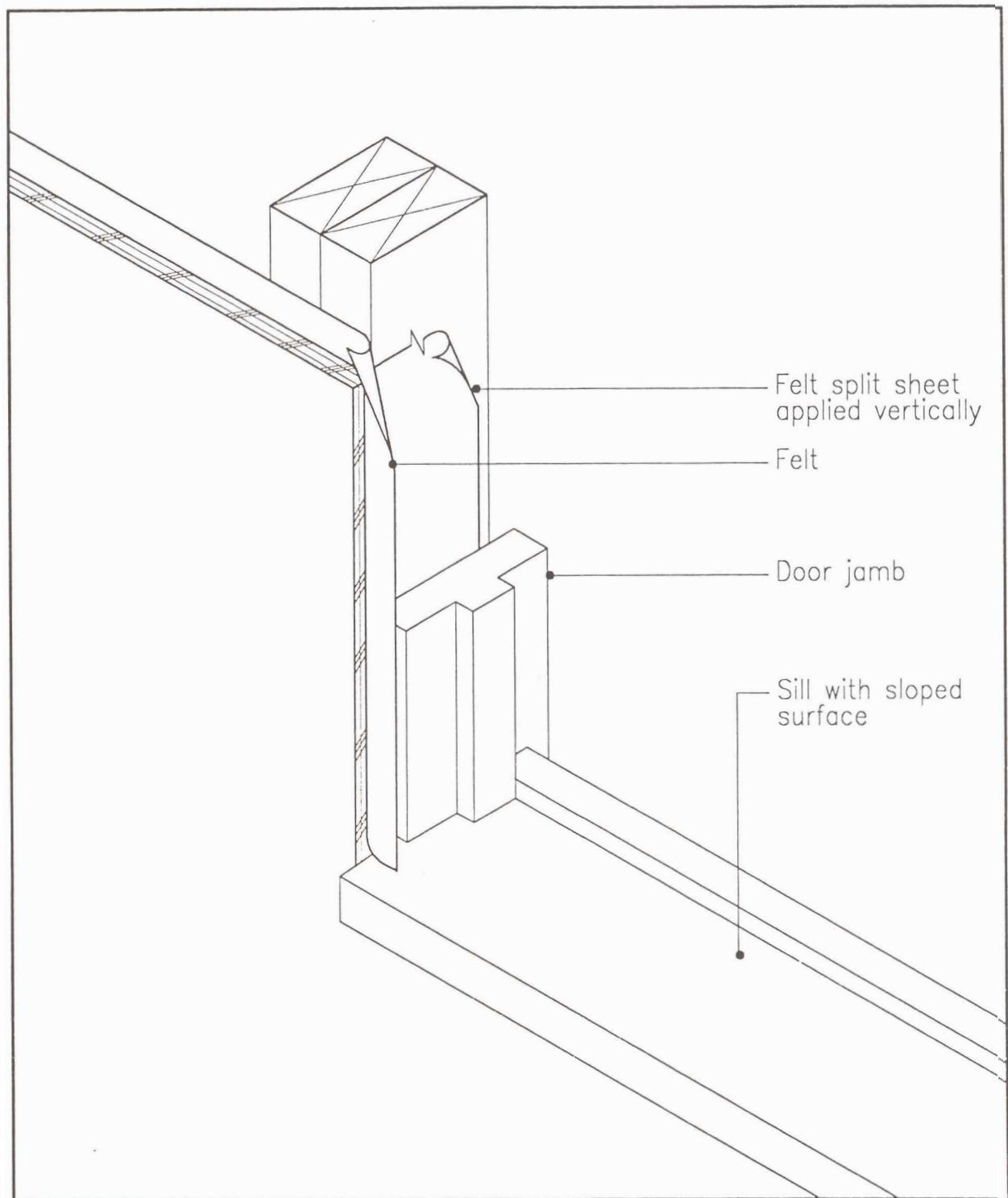
DOOR SILL DETAIL ASSEMBLY AT JAMB-SILL CORNER

Figure 8-1D



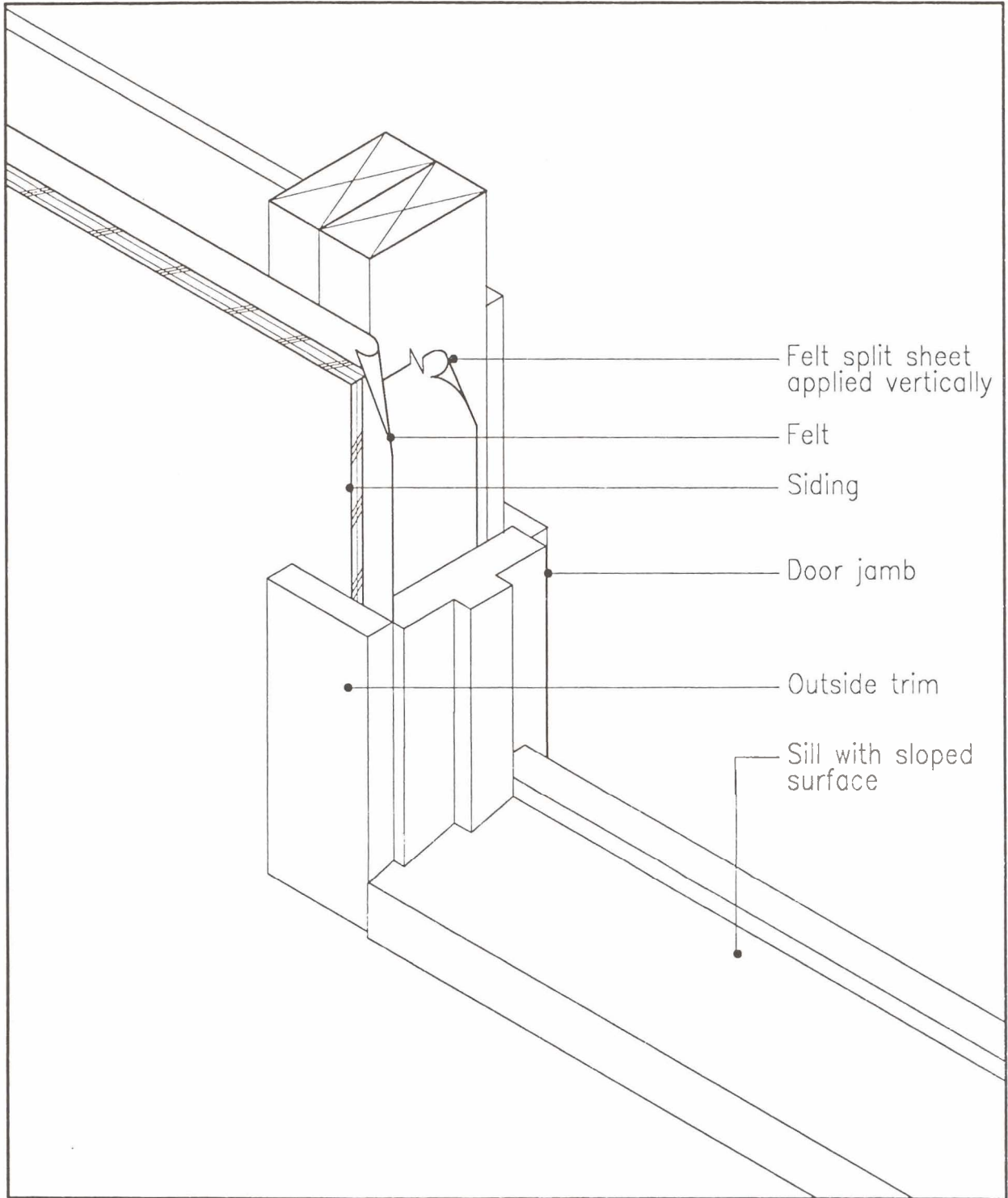
DOOR SILL DETAIL ASSEMBLY AT JAMB-SILL CORNER

Figure 8-1E



DOOR SILL DETAIL
ASSEMBLY AT JAMB-SILL CORNER

Figure 8-1F



DOOR SILL DETAIL

ASSEMBLY AT JAMB-SILL CORNER

Figure 8-1G

3. The trim holds the frame in place. The shims and frame nailing should only function only to align and temporarily place the frame.
4. Allowance must be made for some shrinkage and swelling of members.
5. Allowance must be made for adequate trim overlay on the frame to receive good nailing. In severe locations, sealant may be advisable for the joints.

8.2.1.1 Head

1. Carry the jamb membrane up and under head trim and membrane.
2. Install metal flashing under head membrane and over head trim. Extend flashing over edge of trim and turn down one inch.
3. A gap between the metal flashing and the siding is desirable to avoid wetting and possible staining of the siding. Do not seal this joint.
4. See detail, for typical condition (**Figure 8-2**).

8.2.1.2 Jamb

1. Turn the split sheet around the frame opening. Lap it over the sill sheet. The design should encourage exterior water drainage, if a leak develops.
2. The membrane sheet should be carried out and clamped between the jamb trim and the frame. This joint must be tight to avoid wind-induced water infiltration. Remember to carry this membrane up and under the ends of the head trim.

3. Jamb trim should be tight to siding. In severe exposure locations, with shiplap or other uneven surface siding, sealants or gaskets can fill voids.

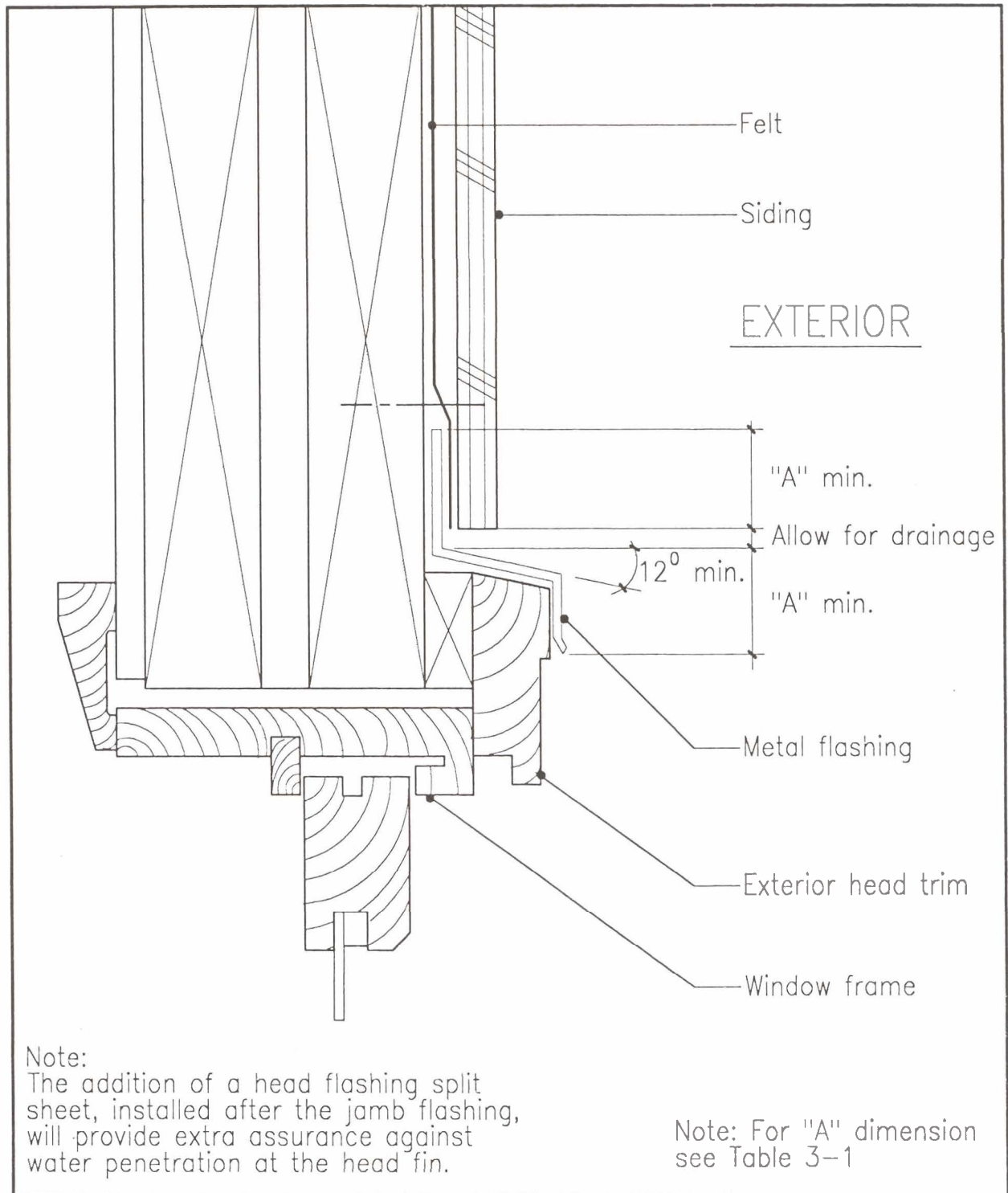
8.2.1.3 Sill

1. Portions of the sill exposed to the weather should slope at least 12 degrees from horizontal.
2. Ends of the sill should project beyond the opening over siding at least slightly more than the width of the jamb trim.
3. Ensure that the sill sets tight to the membrane.

8.2.2 Wood Window in Plywood Panel Siding (**Figures 8-2 to 8-4**)

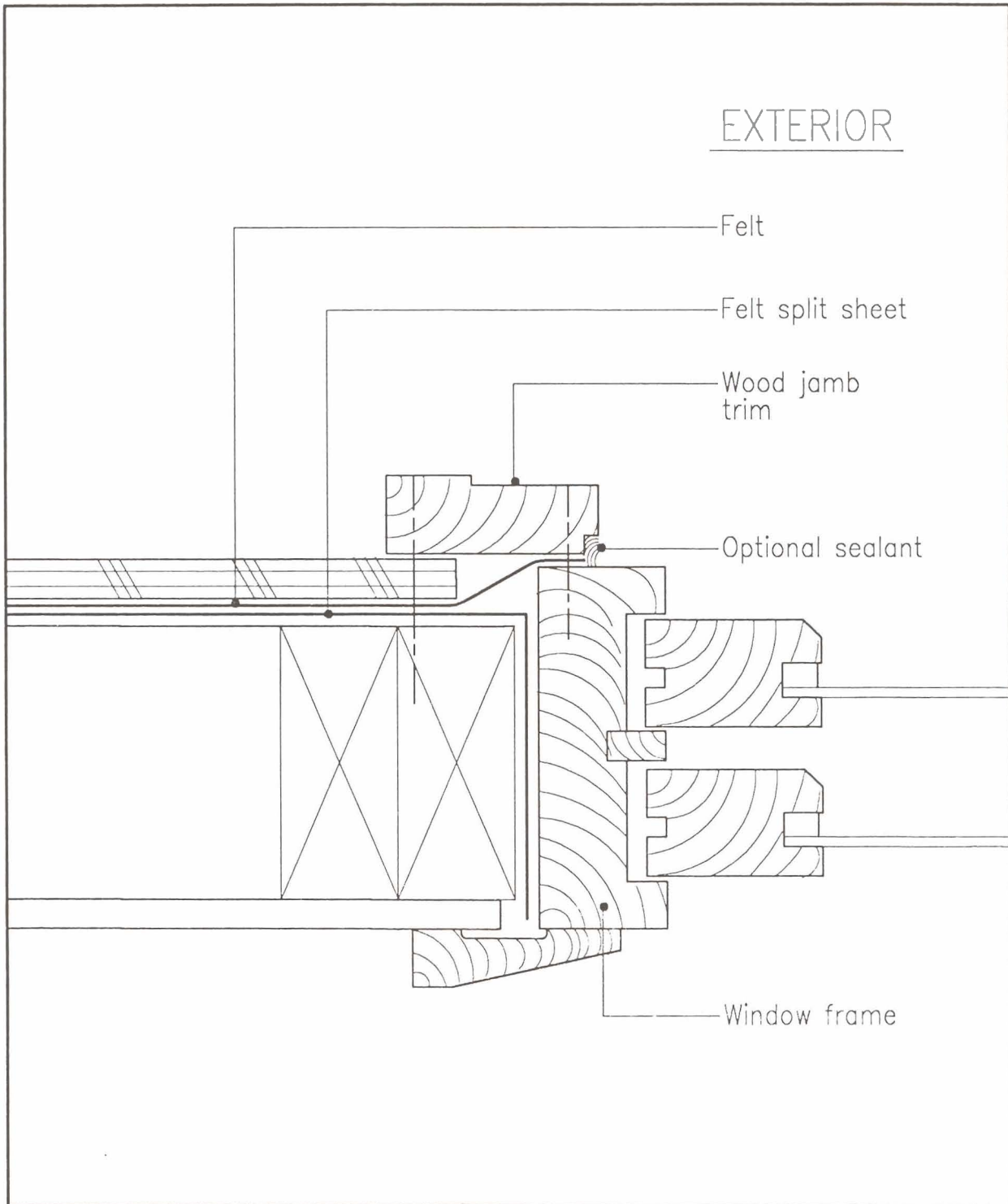
The dimensions of the head flashing legs depend on the use condition, but should be at least the "A" dimension. A 3/8 inch gap must be provided between the flashing and the plywood panel to avoid excessive wetting of the plywood by capillary action, as water will collect at this flashing edge.

The jamb detail shown in **Figure 8-3** will protect the window opening from water seepage from the side. In some cases, it may be necessary to terminate the plywood panel at the jamb over the center of a stud, so the adjoining plywood panel above and below the window can be nailed into the same stud. In these cases, the jamb trim should be wide enough to cover over the joint in the panel siding.



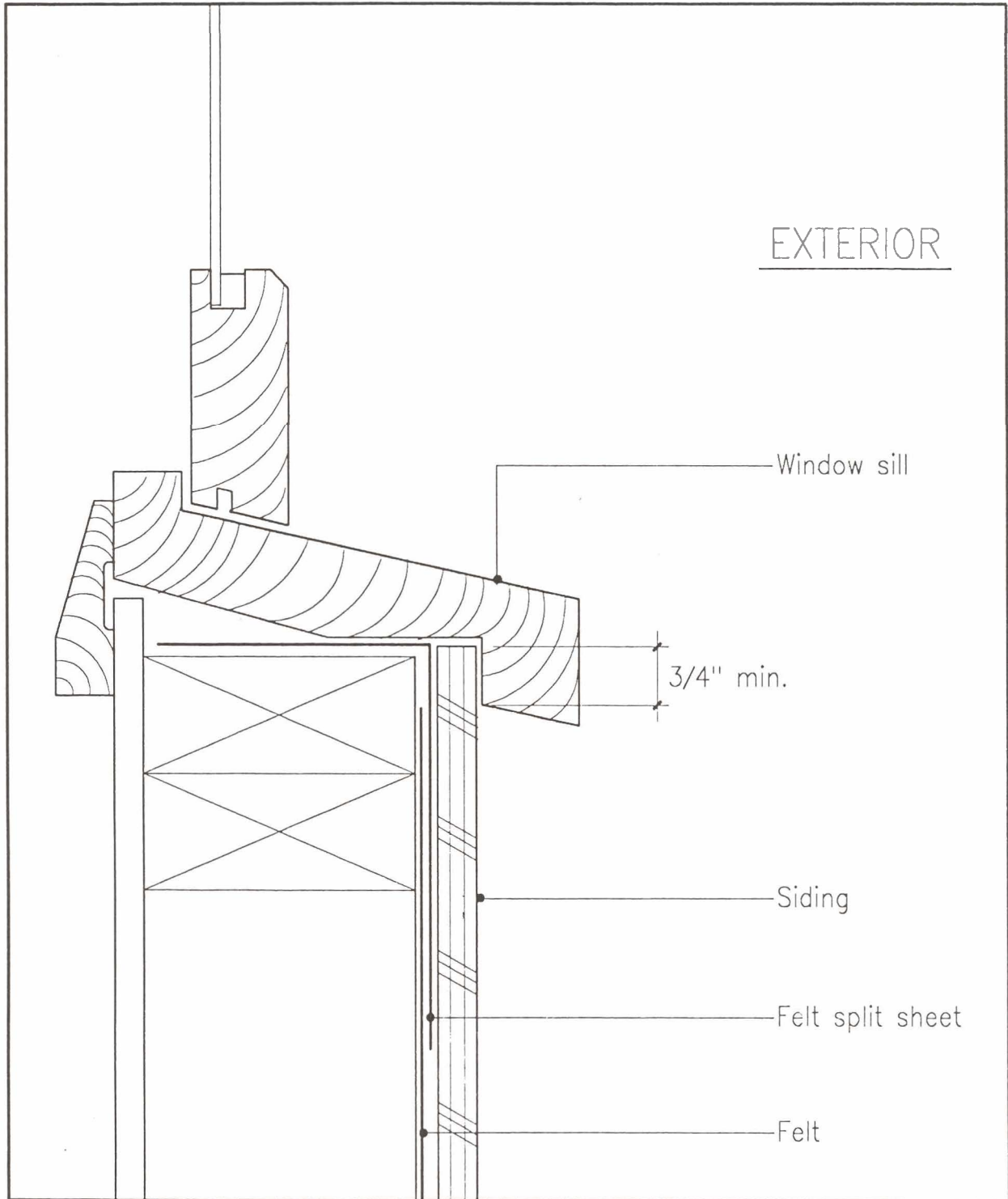
WOOD WINDOW DETAIL HEAD DETAIL IN PLYWOOD SIDING

Figure 8-2



WOOD WINDOW DETAIL
JAMB DETAIL IN PLYWOOD SIDING

Figure 8-3



WOOD WINDOW DETAIL
SILL DETAIL IN PLYWOOD SIDING

Figure 8-4

Wood window sills should cover panel siding at least 3/4 inch to protect the window opening from rain, as shown in **Figure 8-4**. If a manufactured sill is used and does not provide a 3/4 inch overlap, flashing should be added at this joint. In wind-driven rain locations, it will be necessary to provide metal flashing because the 3/4 inch lap is simply inadequate. In special cases, a trim member can be adequate, if the wall membrane is well detailed.

8.2.3 Elements of a Good Wood Door Sill Detail

The wood door sill should be made from naturally decay-resistant wood or should be chemically treated. Adequate sill sections can be milled from clear vertical grain stock (see **Figure 8-5** for a good sample section). The sill should be cut so that it covers the exterior siding material by at least 3/4 inch. If the sill does not provide such coverage, or if the sill is exposed to severe environmental conditions, metal flashing should be used to protect the joint from wind-driven rain. The underside of the sill should be sloped downward at least 12 degrees; otherwise a drip cut should be provided. To be effective, a drip cut must be at least 1/4 inch wide by 1/4 inch deep. To further protect against wind-driven rain, the felt membrane behind the siding material should continue to run under the door sill as illustrated. **Figure 8-6** illustrates a poorly designed wood door sill section.

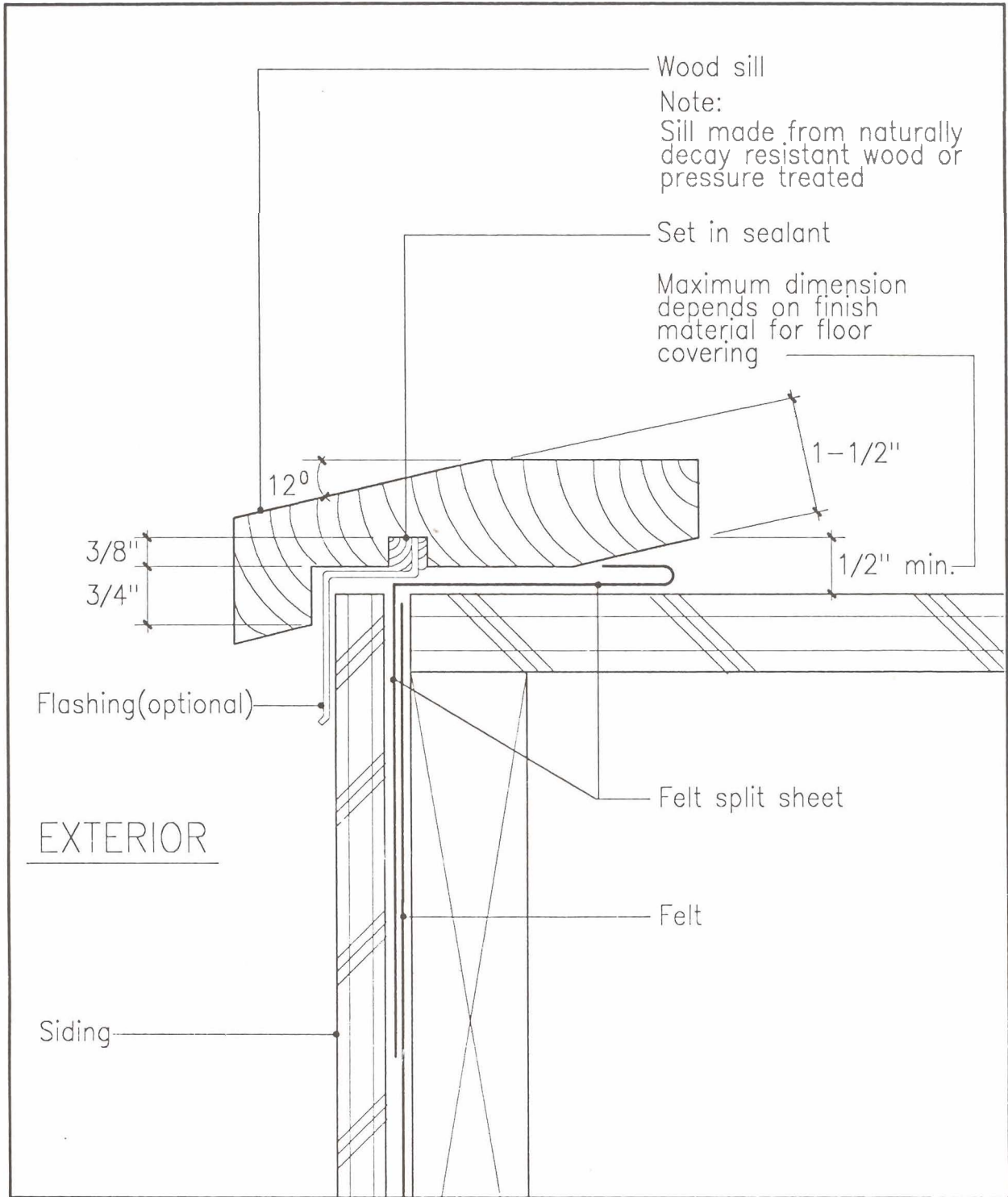
8.3 METAL FRAMES

8.3.1 General

Because of the wide detail variation in metal doors and windows, it is almost

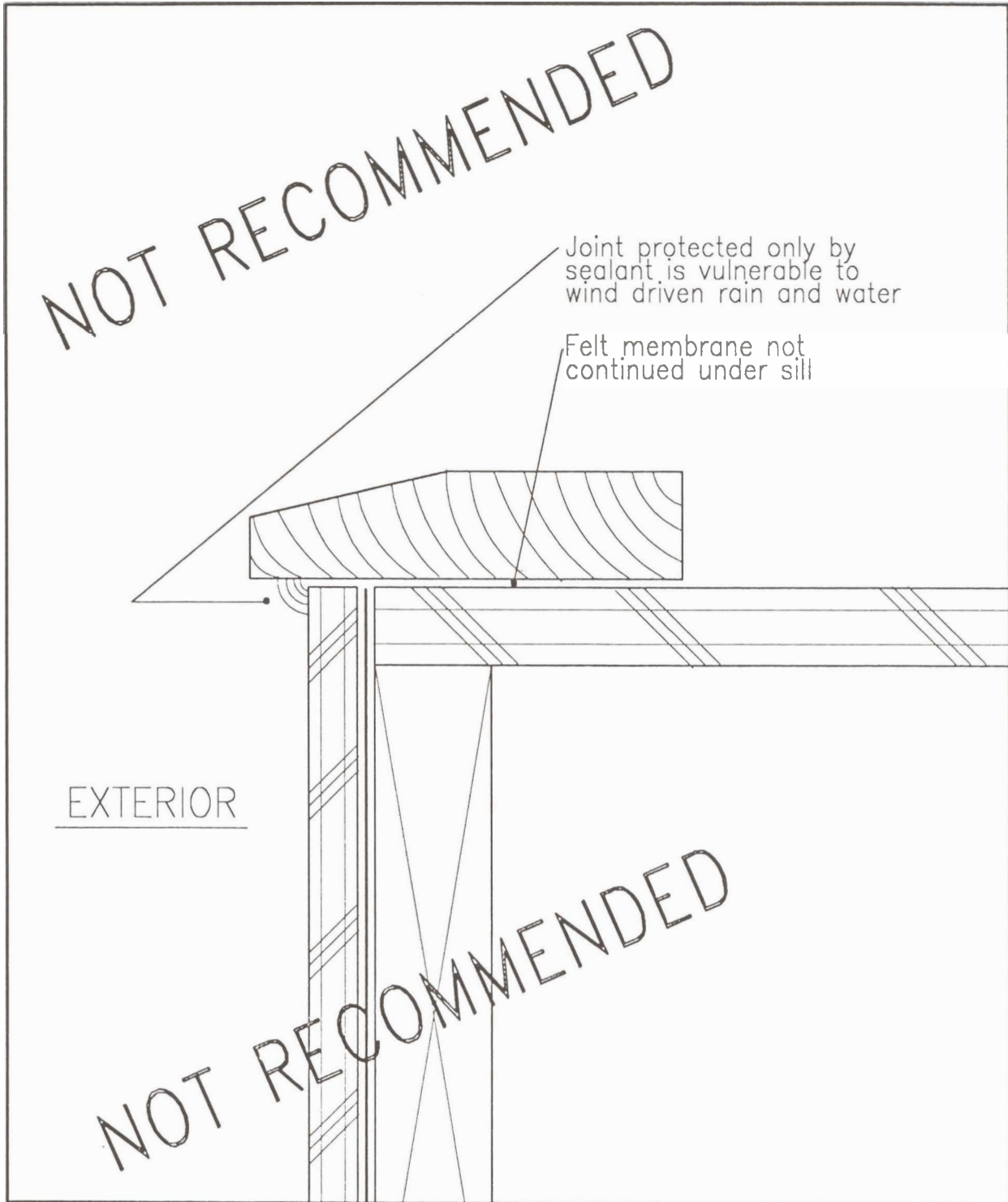
impossible to give general guidelines that will govern all conditions. However, having said that, now let us try. At the risk of being repetitious; water wants to run down hill and that wind will push it both horizontally and vertically. Pay attention and make provisions for this, particularly at corners and intersections.

1. When possible, use units with welded corners that have a continuous, unbroken nailing flange. These units provide an easier task of keeping the water out of the building framing. Simply follow the guidelines set forth in membrane installation in Chapter 3.
2. When welded corners are not feasible, such as in sliding door units and other knockdown assemblies, other steps must be taken:
 - On the backside of the frame, apply large, heavy globs of sealant continuously along all metal-to-metal joints. This sealant must be applied to clean metal and must lap surfaces at least 3/8 inch to obtain good adherence to both legs. Sealant must also have enough body to withstand the racking of the frame during installation, plus future movement.
 - Sealant can also be used when nailing flanges are mitered.
 - When nailing flanges are notched (as in most door cases), a metal corner piece set in sealant is the most foolproof. However, pressure-sensitive waterproof tape can also do a good job. Again, allow lots of overlap of tape to metal.



**WOOD DOOR SILL
 RECOMMENDED SECTION**

Figure 8-5



**WOOD DOOR SILL
POOR PRACTICE**

Figure 8-6

- Sliding door sills often do not come with nailing flanges. When this occurs, metal flashing should be used, and it must be integrated with the jamb condition. Fastenings must be properly sealed.

8.3.2 Windows

Figure 8-7 illustrates the desirable characteristics of a good metal window with nailing flanges. The length of the flange should be "A" dimension (see **Table 3-1** in Chapter 3). The horizontal ledges should be sloped a minimum of 12 degrees. Weep slots and drip edges are also desirable to remove collected water.

8.3.2.1 Metal Window in Plywood Panel Siding (Figures 8-8 to 8-10)

If trim is desired in a plywood panel system, it should be of a solid lumber stock (i.e., not plywood) and should be sloped on top at least 12 degrees. In addition, sealant should be provided at the top of the trim to keep moisture away from the inner surface in between the siding and the trim; this area is vulnerable to decay. Sill trim should also be sloped on the top surface and sealant applied to this area to protect against wind-driven rain that pushes moisture over the edge of the panel and wets the backside.

8.3.2.2 Metal Window in Lumber Siding (Figures 8-11 to 8-13)

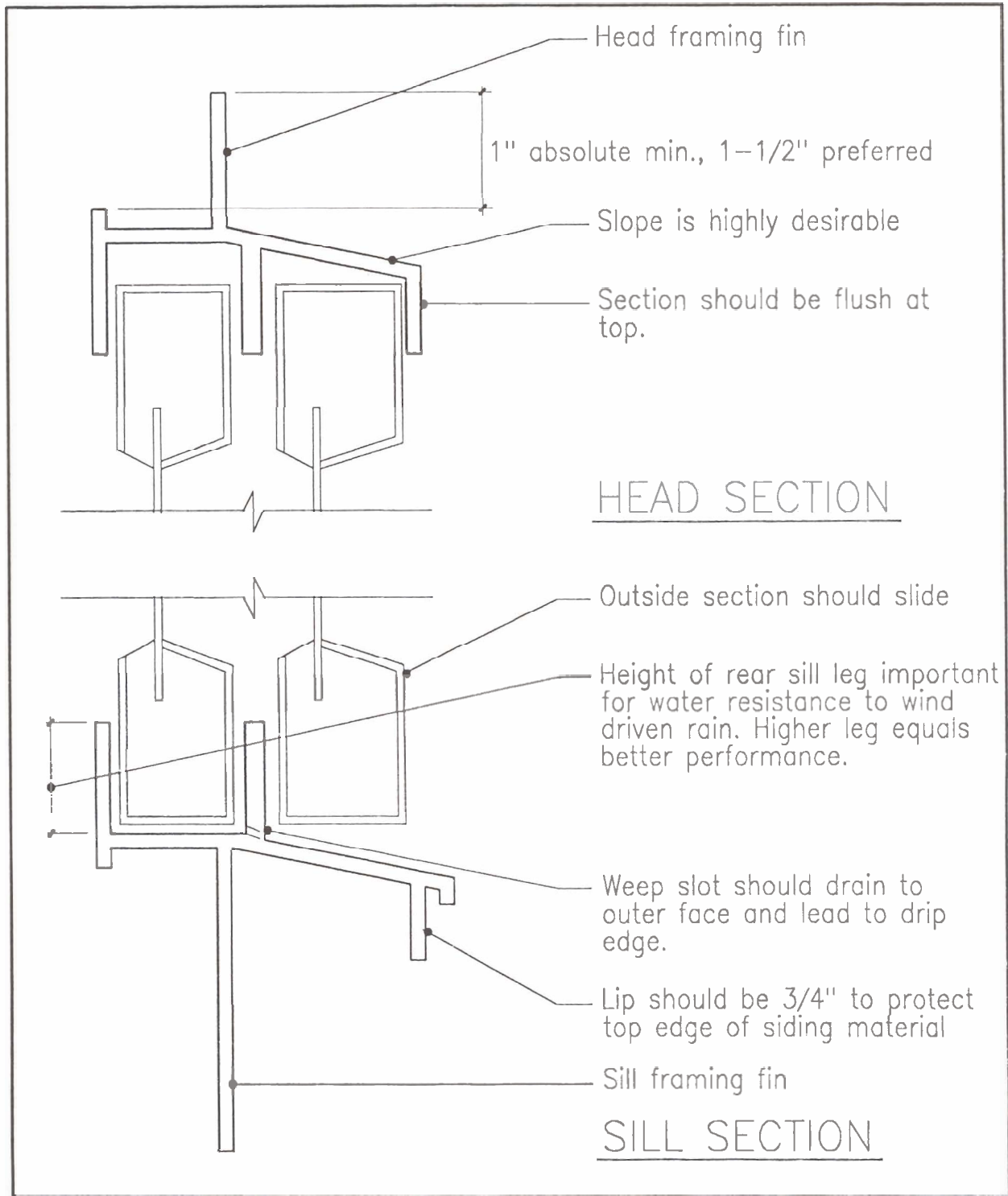
In a lumber siding system, flashing should be provided over the head trim. Optimally,

the top of the head trim should be sloped and should extend to the outer edge of the jamb trim. Lumber siding should be butted against the head while it is covered by the jamb trim. This avoids an open joint between the jamb trim and the siding, where the membrane will be exposed. As usual, drip cuts should be provided where needed, and all horizontal ledges should be sloped to aid drainage.

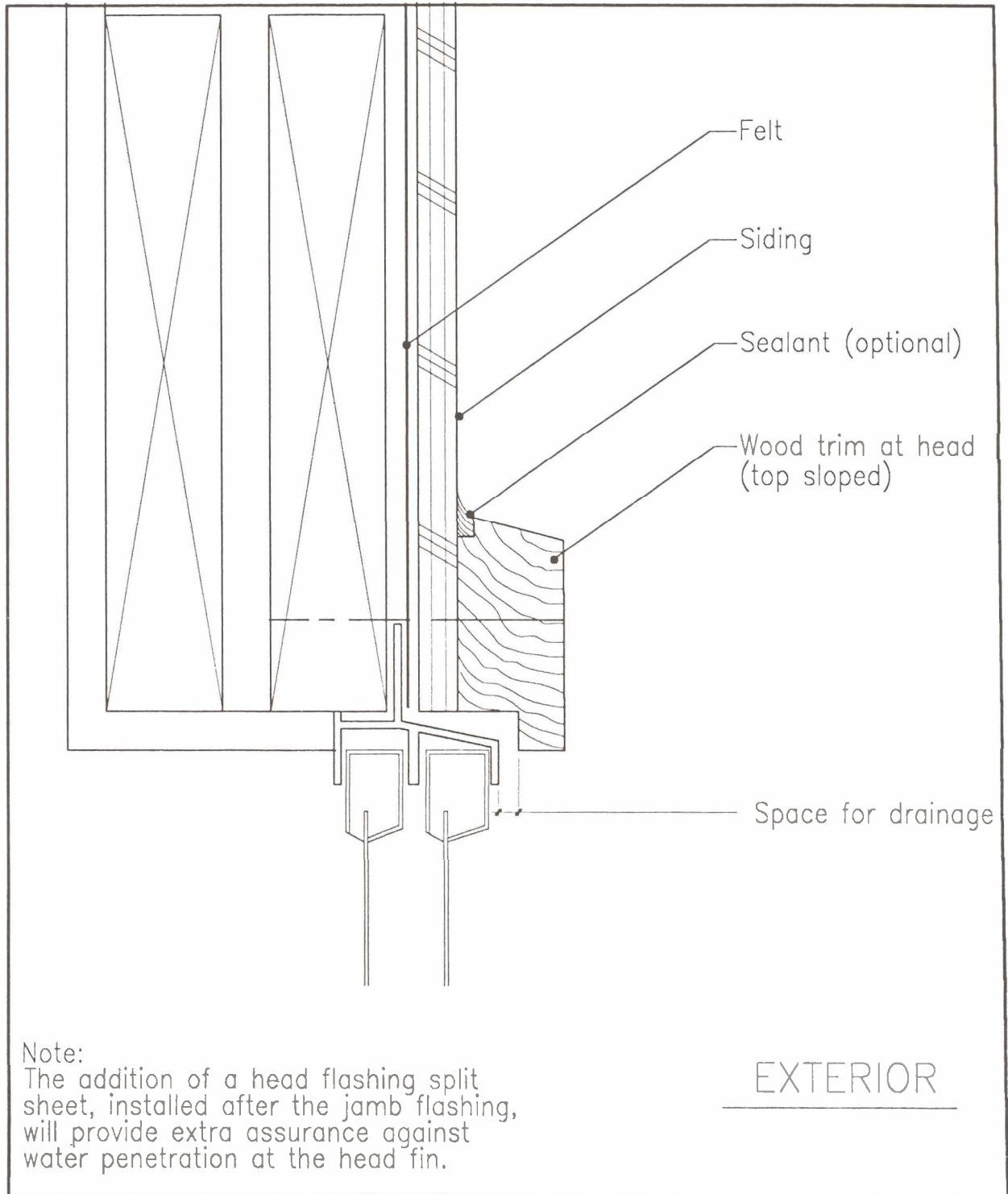
8.3.3 Elements of a Good Metal Door Sill Detail

Extruded aluminum sills are good alternatives for wood sills because they are unaffected by moisture. From the many commercially available sections, sill sections with a longer "leg" on the exterior side are preferable. This leg covers the upper edge of the exterior siding material and protects this joint from wind-driven rain (see **Figure 8-14**). If a sill without a leg is used, or if the leg covers less than 3/4 inch of the exterior material, flashing should be provided (see **Figure 8-15**). **Figure 8-16** illustrates a poorly designed metal door sill detail.

Metal sills are usually fastened to the subfloor by long screws. The screw penetration holes are vulnerable points because they are not watertight. The felt membrane should be continuous under the sill and extend beyond the screw holes.

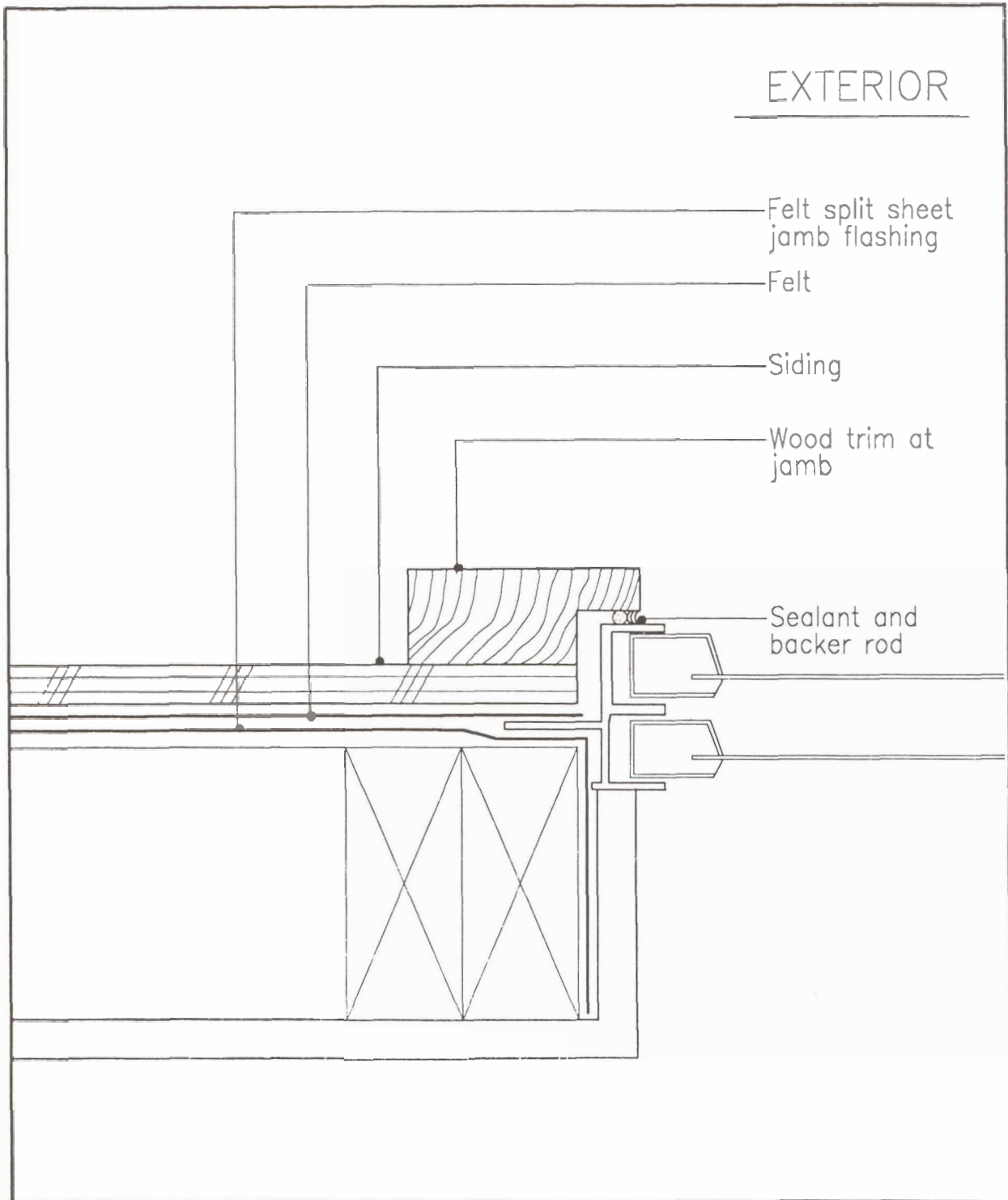


METAL WINDOW DETAIL
DESIRABLE PROPERTIES OF A
HORIZONTAL SLIDING WINDOW
 Figure 8-7



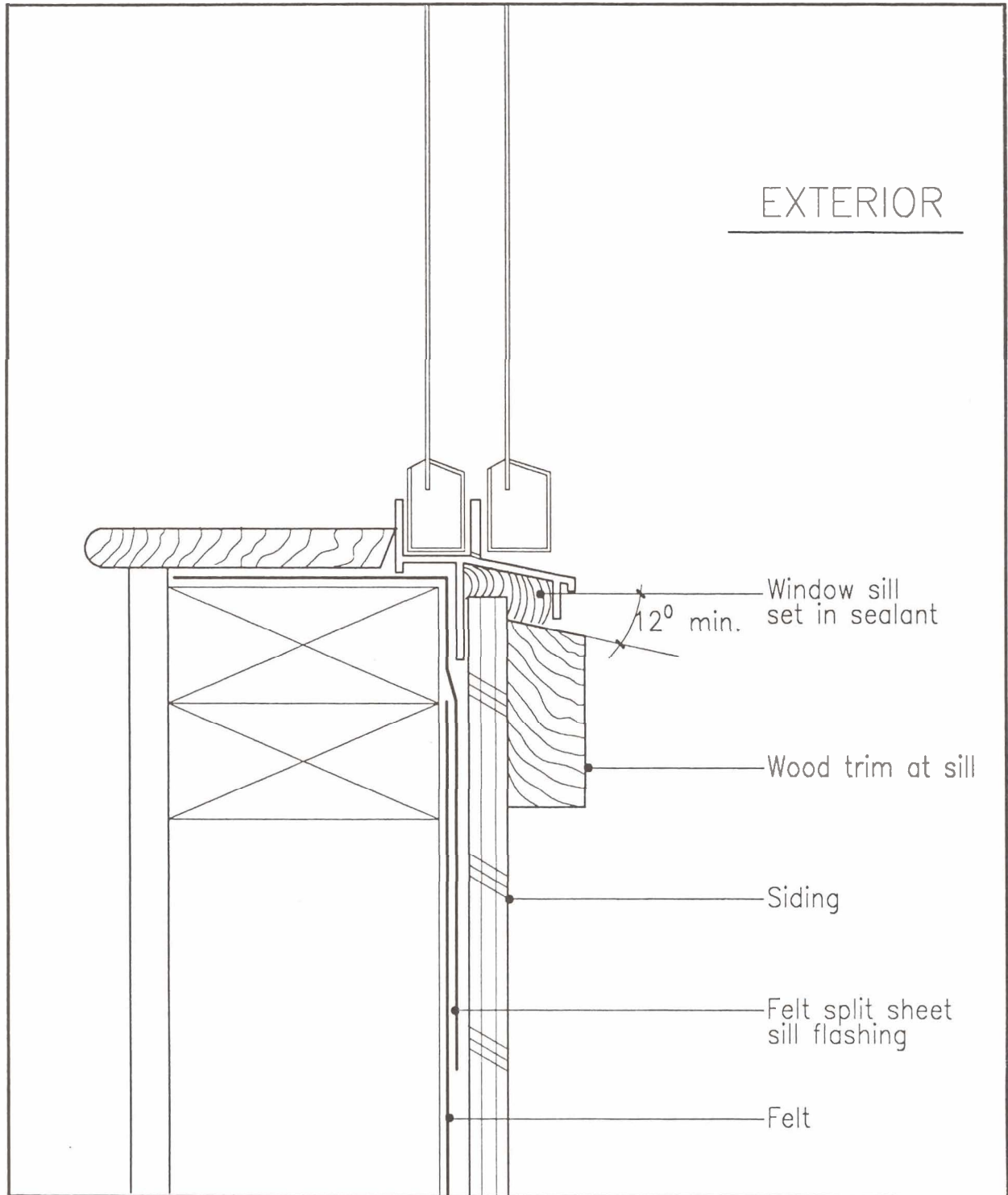
METAL WINDOW DETAIL HEAD DETAIL IN PLYWOOD SIDING

Figure 8-8



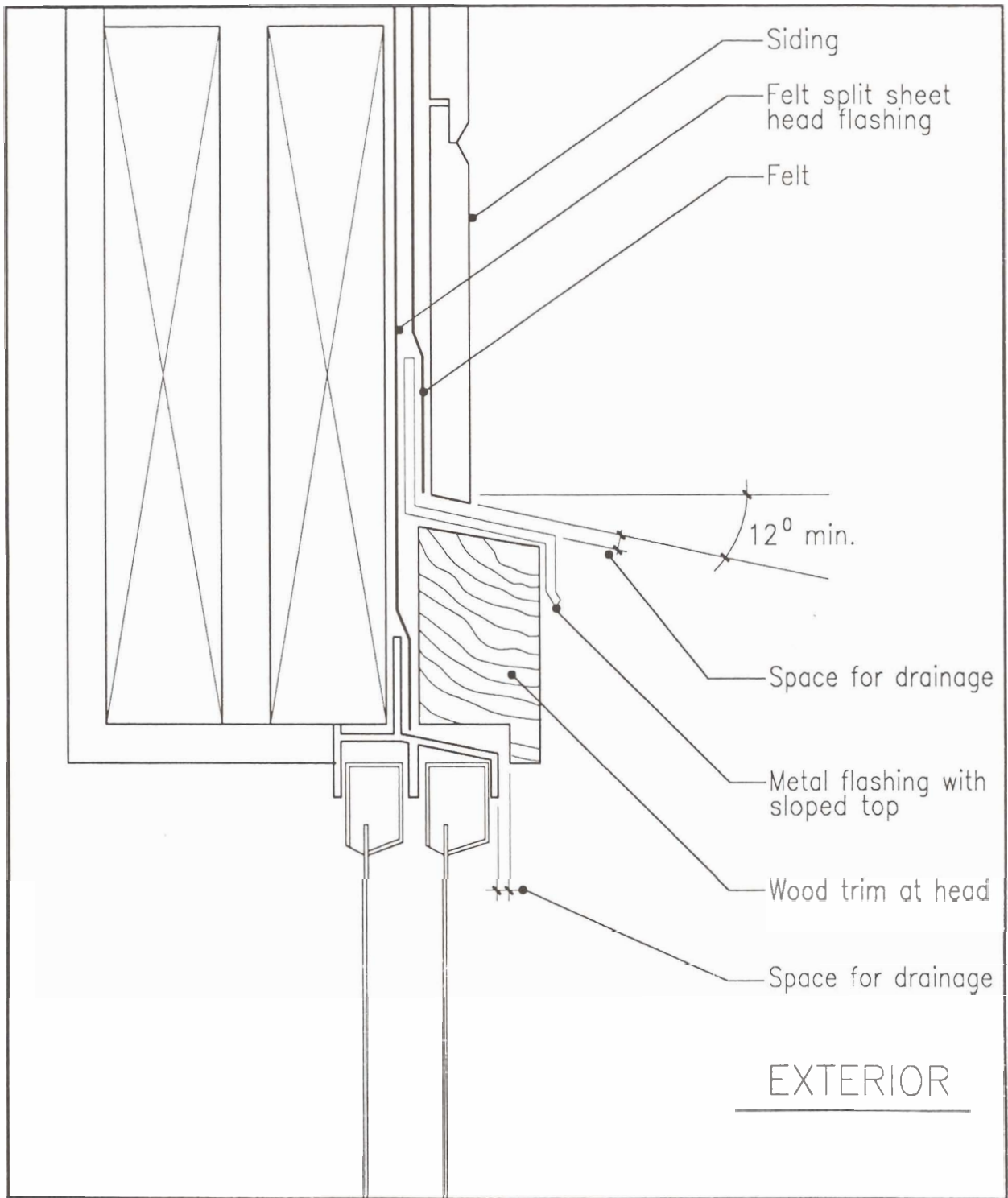
METAL WINDOW DETAIL
JAMB DETAIL IN PLYWOOD SIDING

Figure 8-9



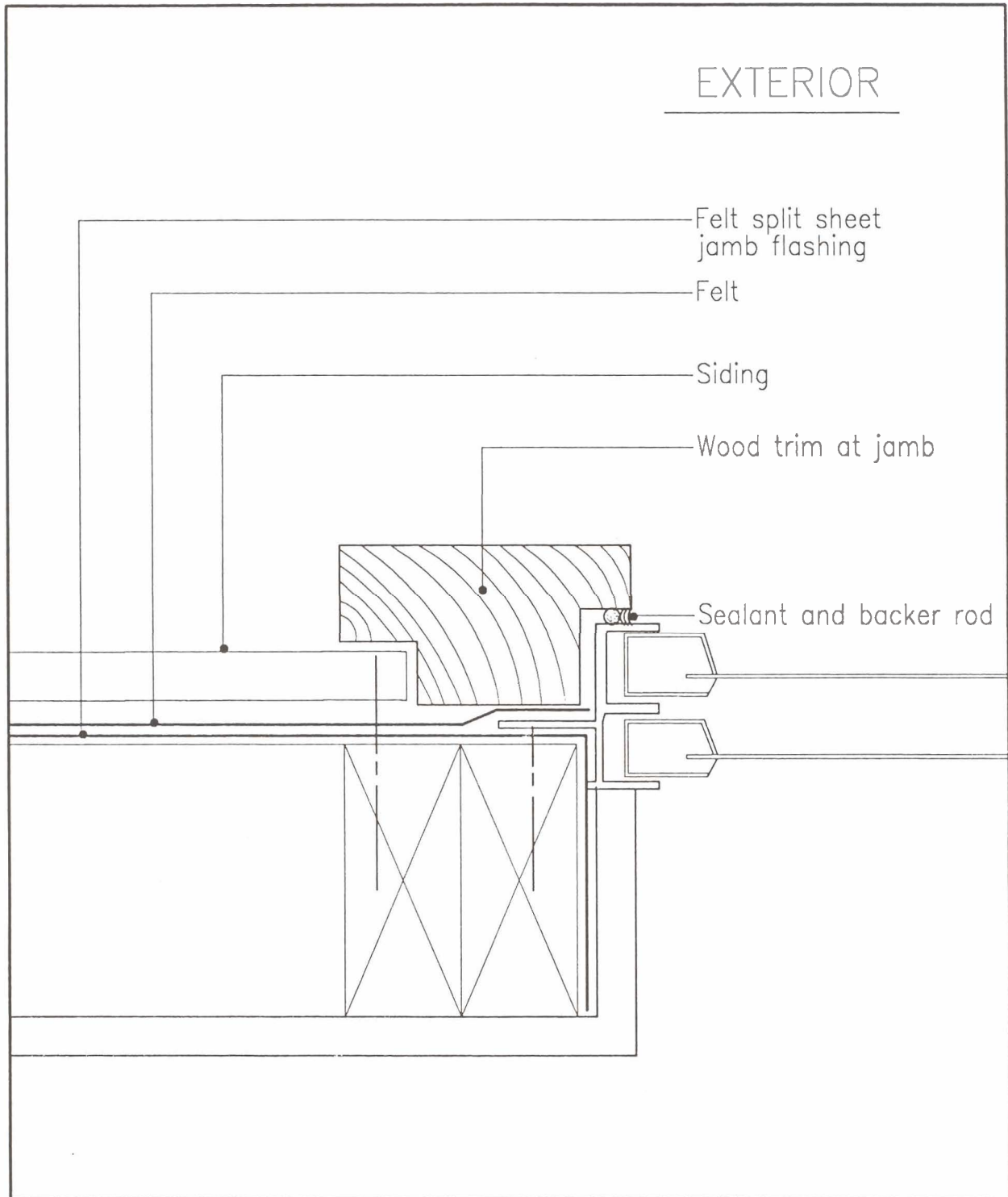
METAL WINDOW DETAIL SILL DETAIL IN PLYWOOD SIDING

Figure 8-10



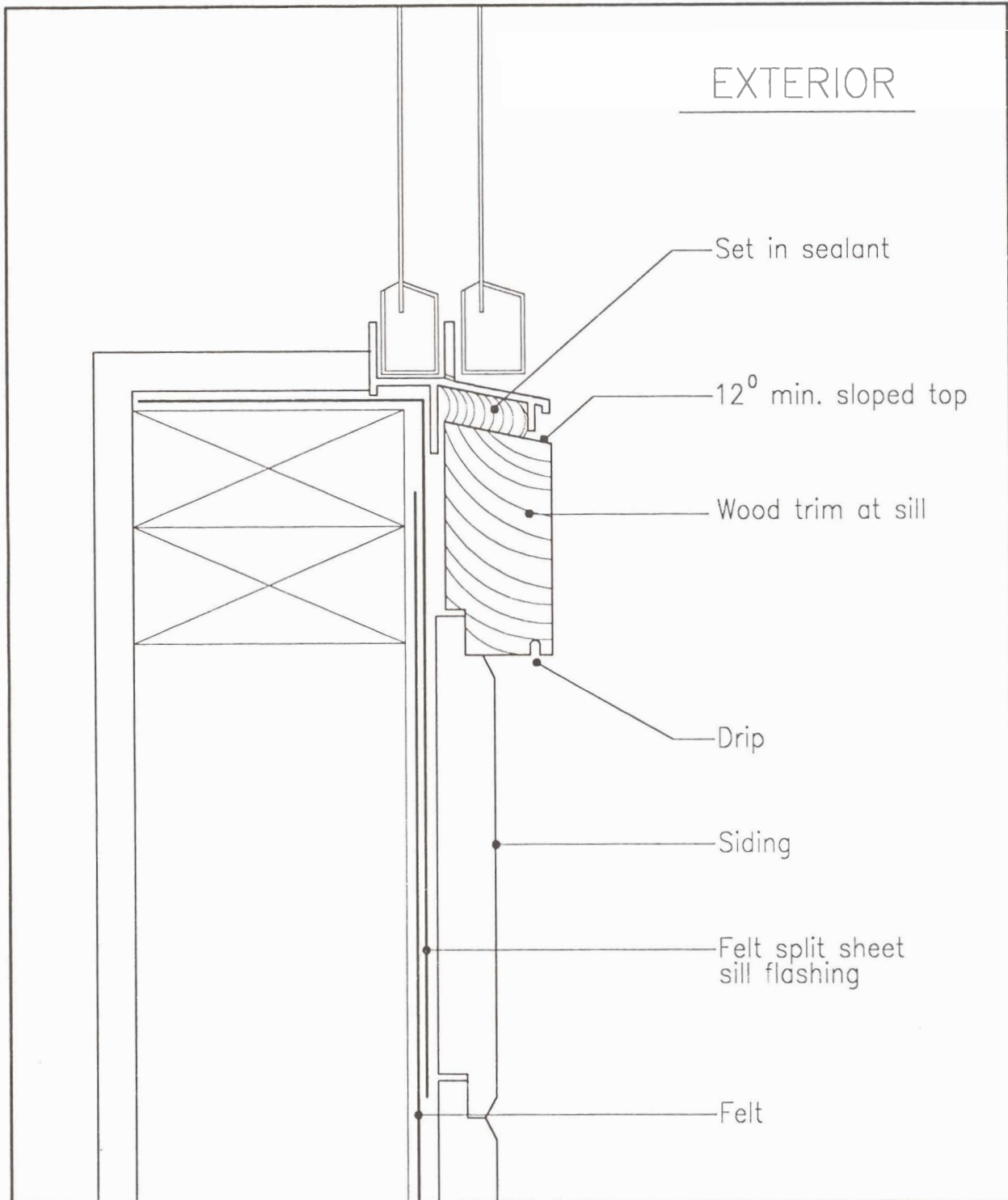
METAL WINDOW DETAIL
HEAD DETAIL IN LUMBER SIDING

Figure 8-11



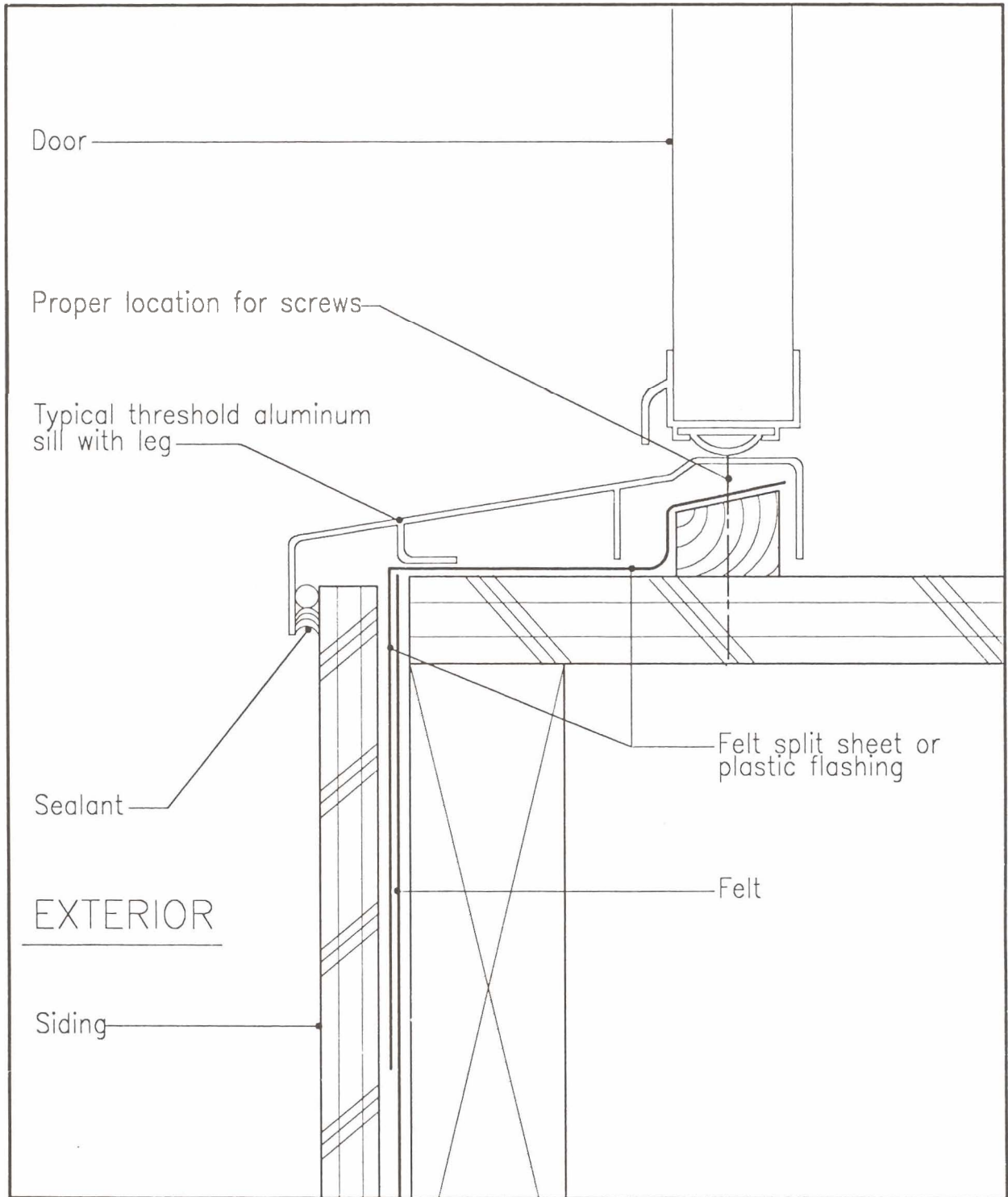
METAL WINDOW DETAIL
JAMB DETAIL IN LUMBER SIDING

Figure 8-12



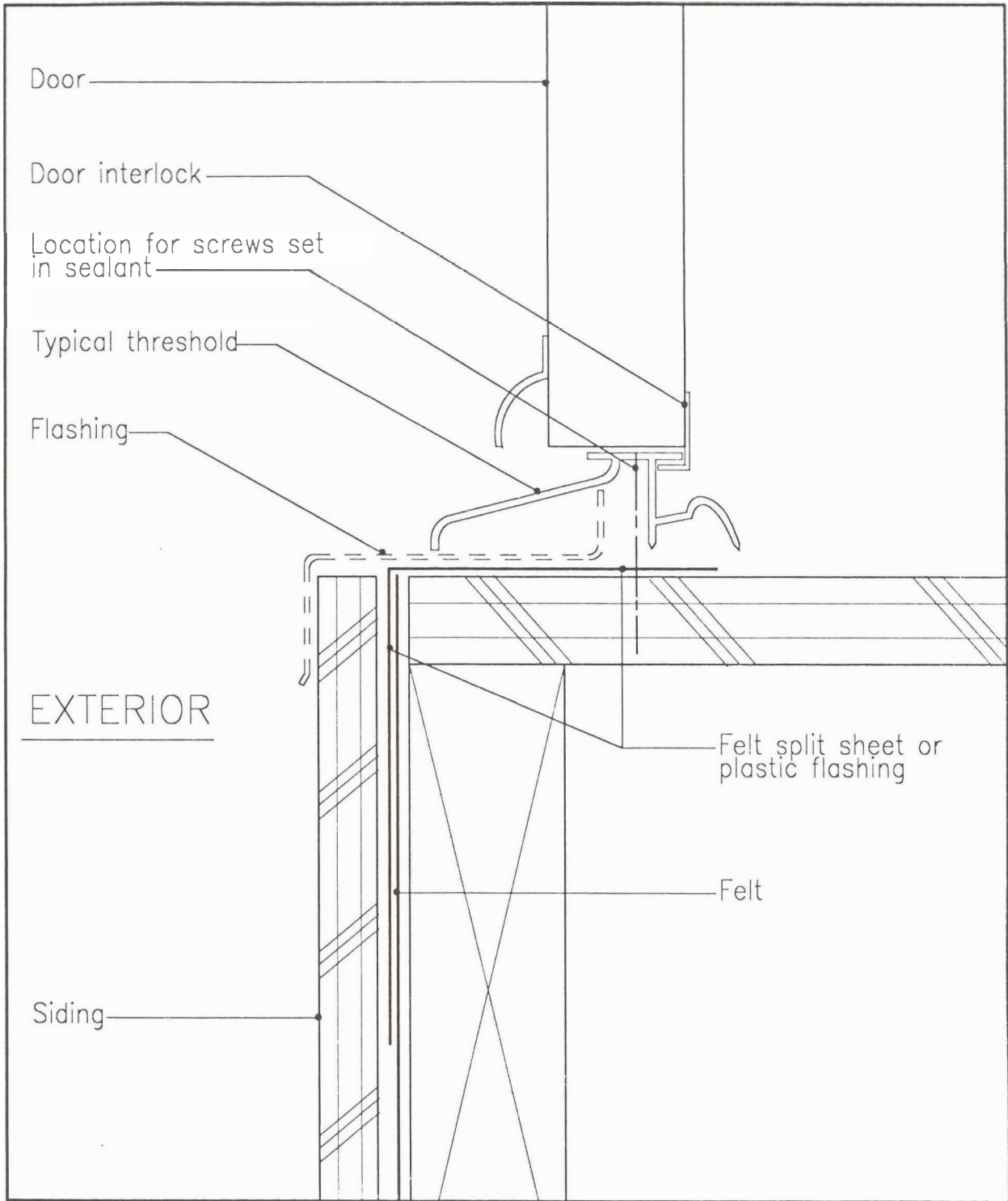
**METAL WINDOW DETAIL
SILL DETAIL IN LUMBER SIDING**

Figure 8-13



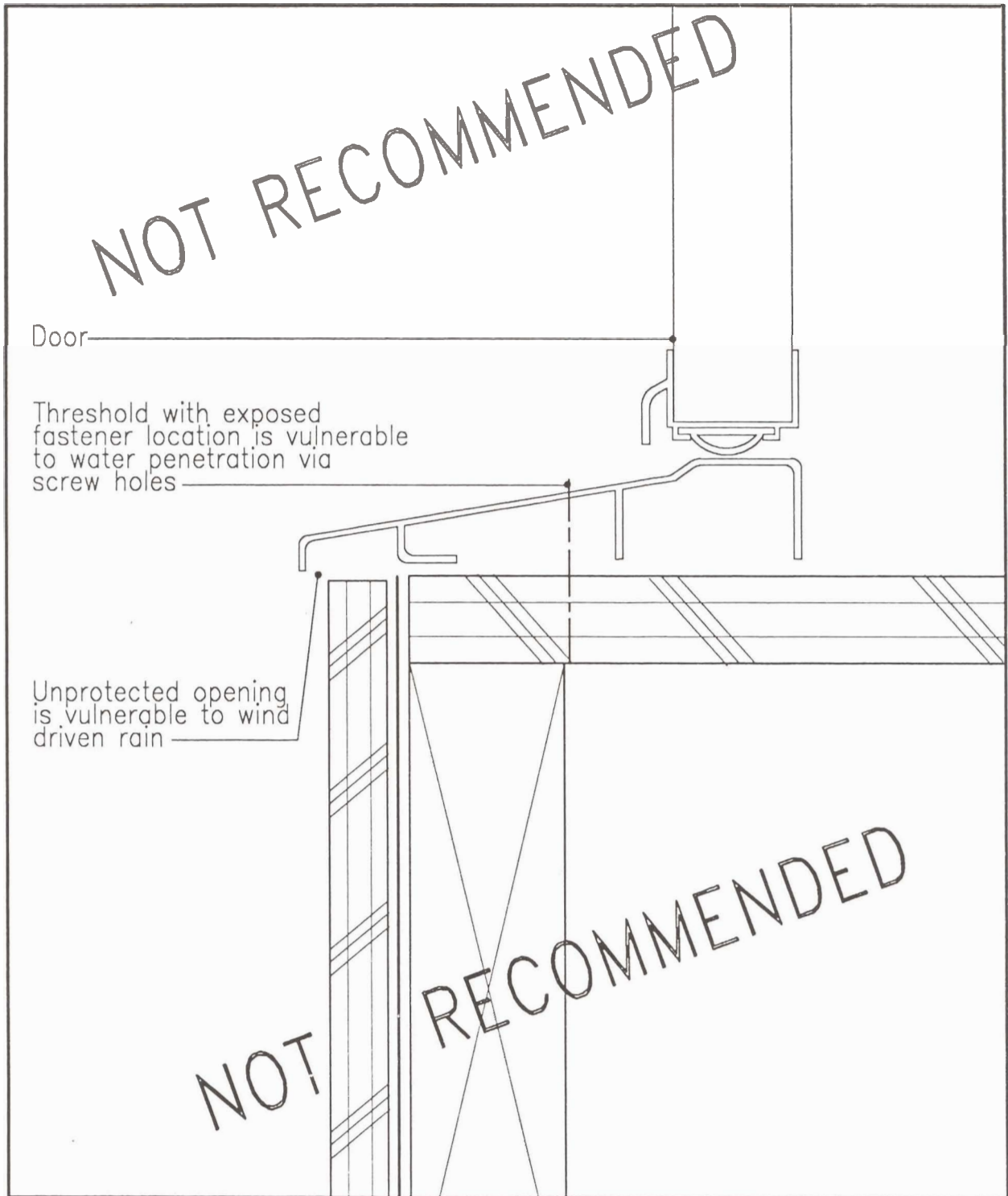
METAL DOOR SILL DETAIL

Figure 8-14



METAL DOOR SILL DETAIL

Figure 8-15



METAL DOOR SILL DETAIL POOR PRACTICE

Figure 8-16

