

Advanced Building Science

- Moisture Control in Insulated Assemblies
 - Rainwater deposition & control
 - Wall categorization

- Readings
 - HPE: Chapter 3.1

Rainwater Control

Driving Rain Deposition

- Rain Deposition Factor
 - building geometry and size
 - wind turbulence and raindrop size
- Driving Rain Factor
 - coincidence of wind and rainfall
 - coincidence of wind direction and rainfall
 - coincidence of wind speed and rainfall

Rainwater Control – 4 Ds

- Design
- Deflection
- Drainage
- Drying

Design & Deflection

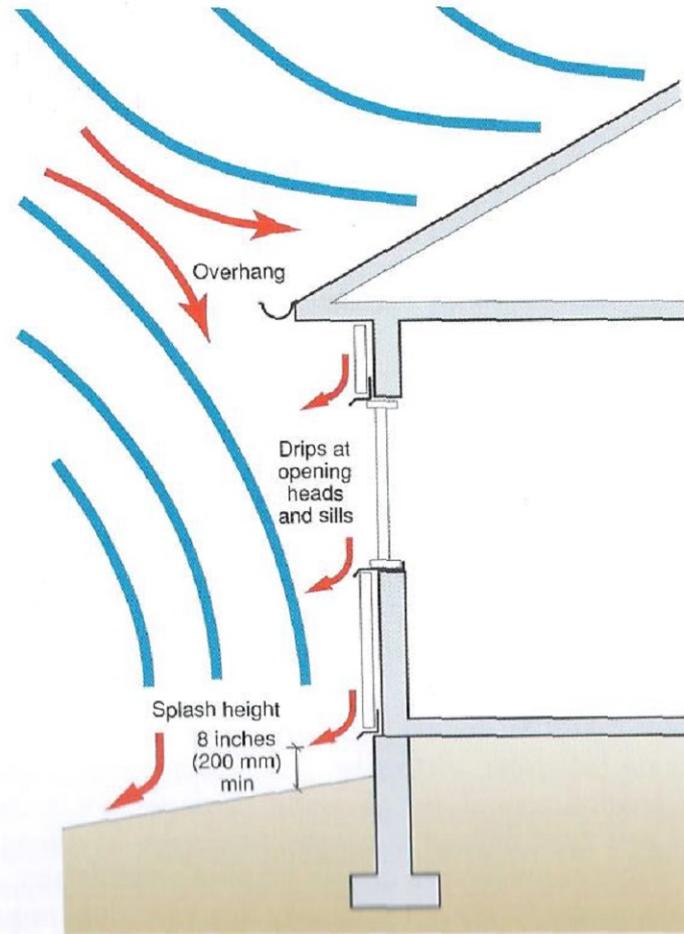


Figure 3.5

Source: Straube, High Performance Enclosures, Chapter 3

Drainage

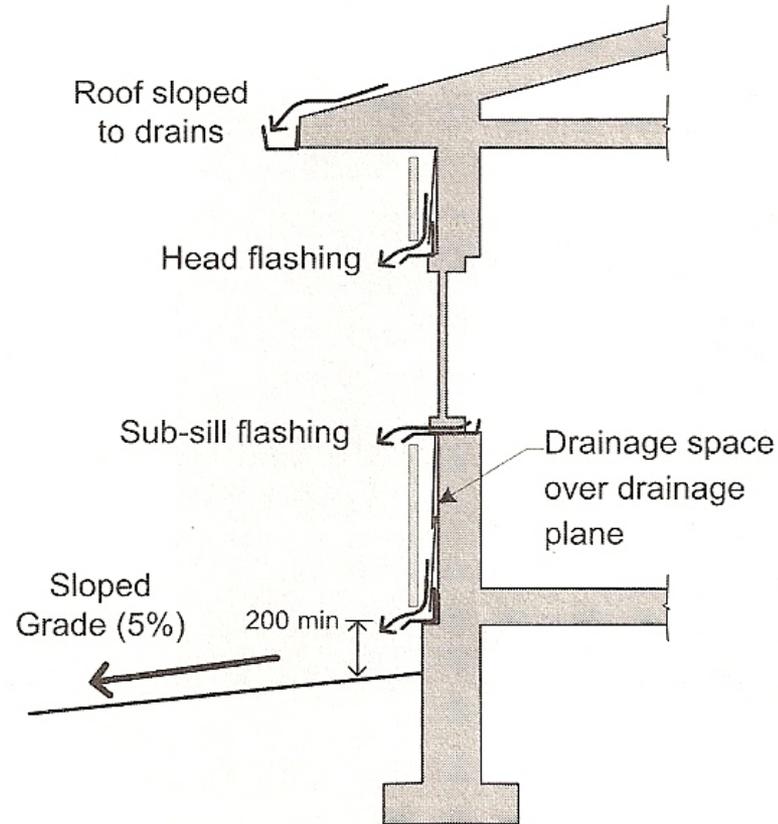


Figure 12.16: Drainage concepts applied to the building enclosure

Source: Straube & Burnett, Building Science for Building Enclosures, Chapter 12

Drainage

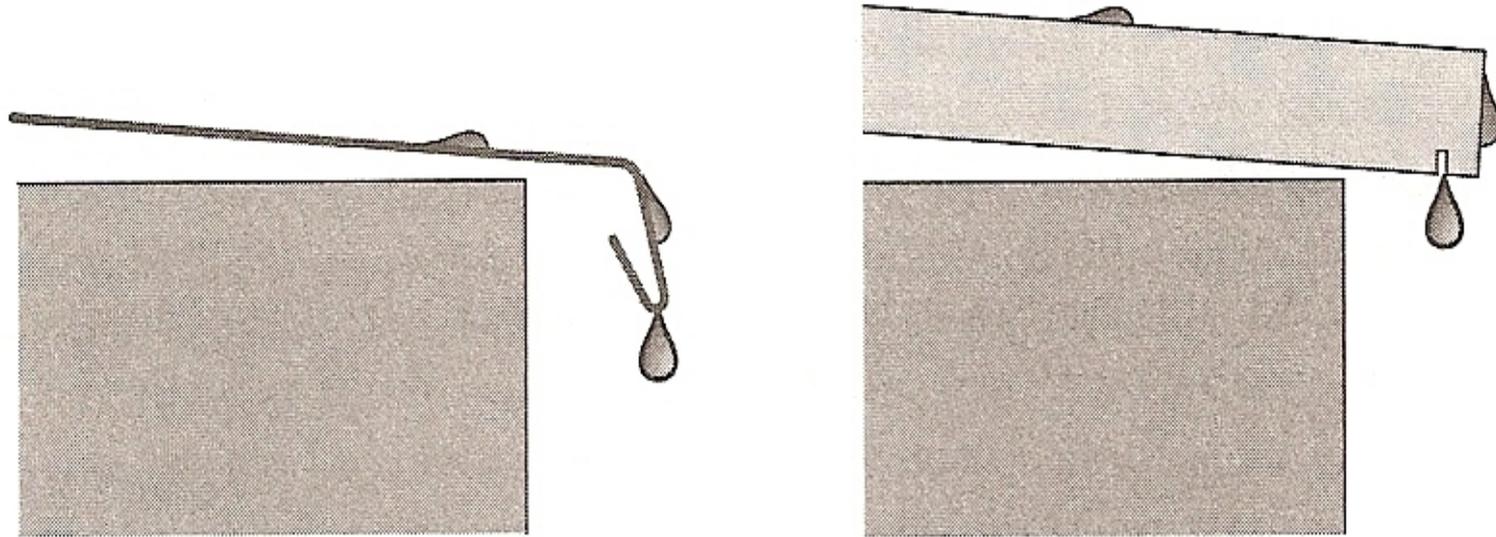


Figure 12.11: Drip edges used to control surface tension at parapets and sills

Source: Straube & Burnett, Building Science for Building Enclosures, Chapter 12

Drainage

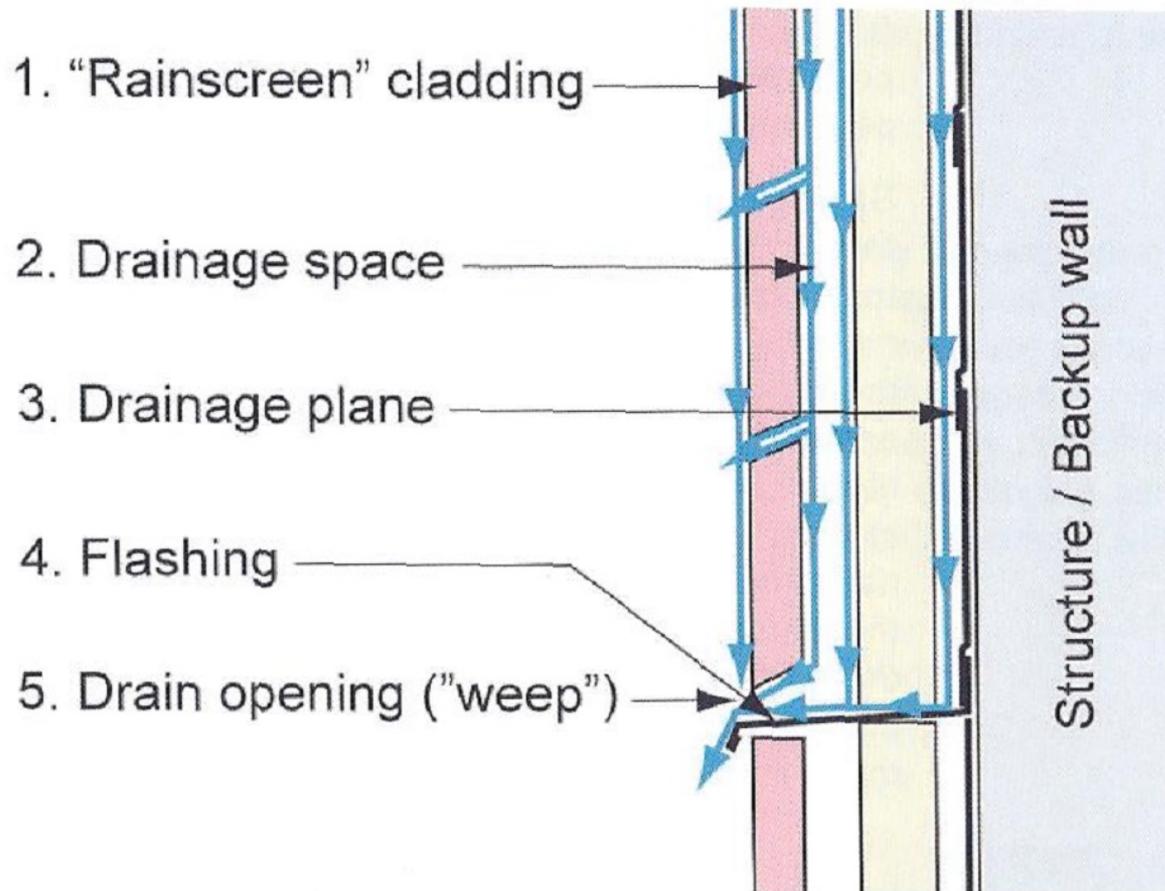


Figure 3.7

Source: Straube, High Performance Enclosures, Chapter 3

Drainage

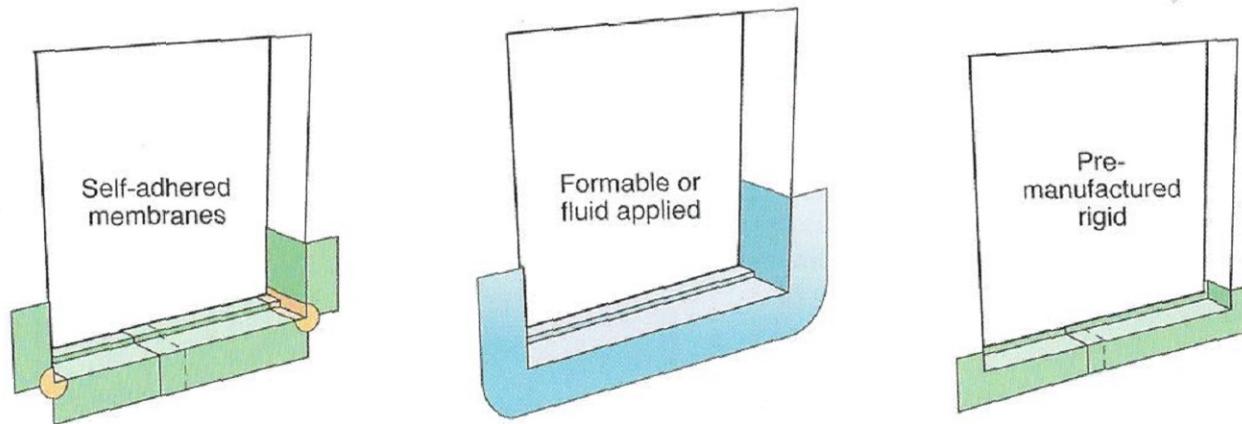
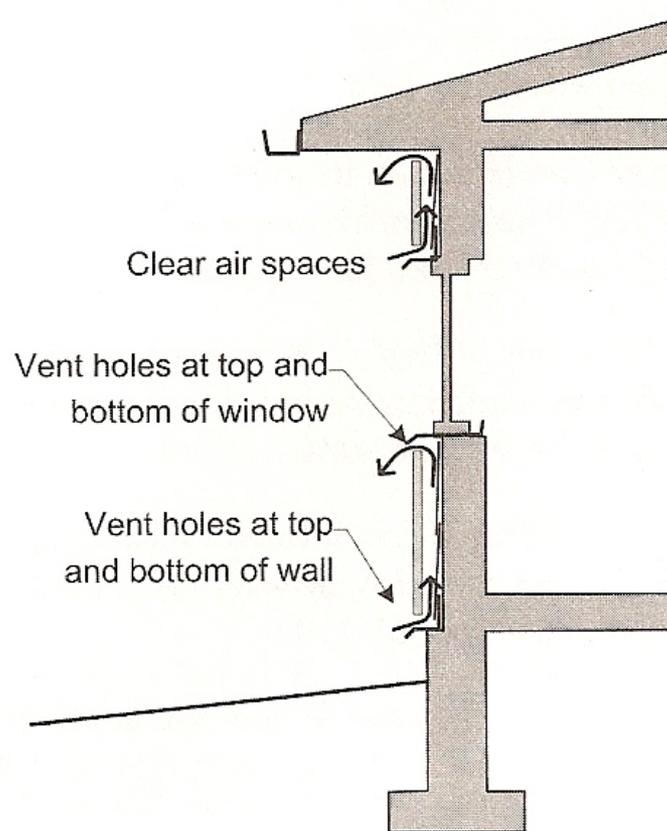


Figure 3.11

Source: Straube, High Performance Enclosures, Chapter 3

Drying



Source: Straube & Burnett, Building Science for Building Enclosures, Chapter 12

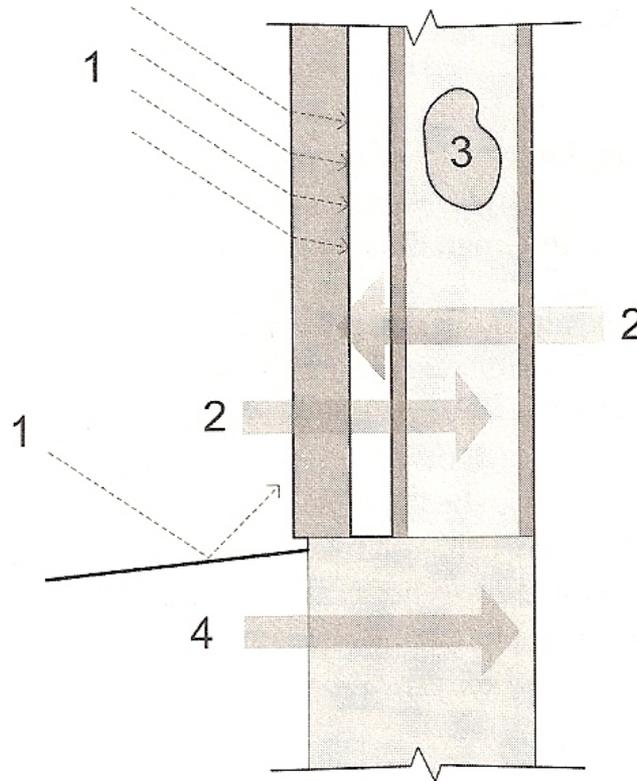
Figure 12.21: Ventilation drying concepts

Wrap Up: Wall Design

- Mechanisms for ...
 - Wetting
 - Drying
 - Storage

- Wall Strategies
 - Face sealed
 - Drained-screened
 - Mass or storage

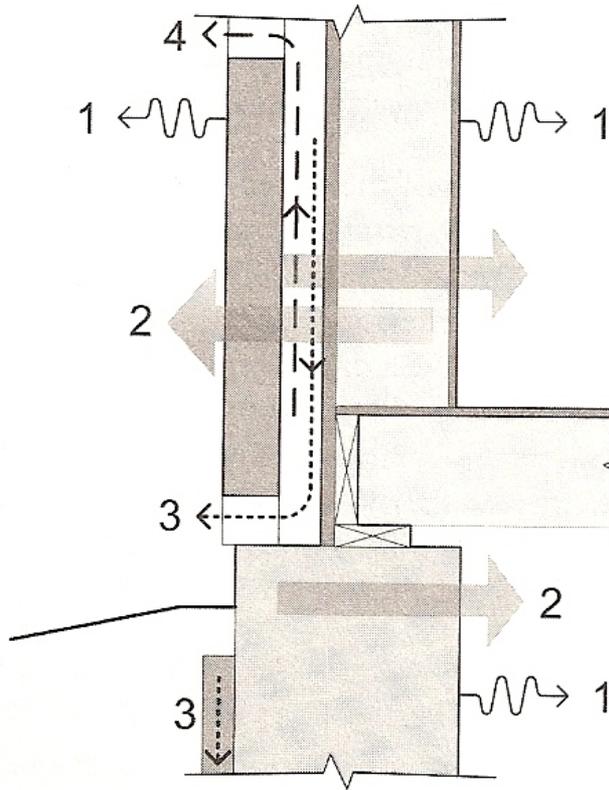
Moisture Sources



Source: Straube & Burnett, Building Science for Building Enclosures, Chapter 9

Figure 9.3: Moisture sources for the enclosure

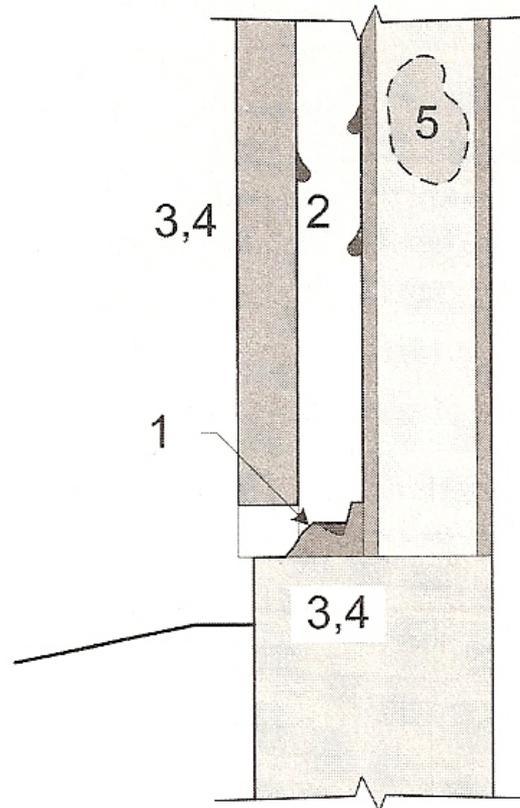
Moisture Removal



Source: Straube & Burnett, Building Science for Building Enclosures, Chapter 9

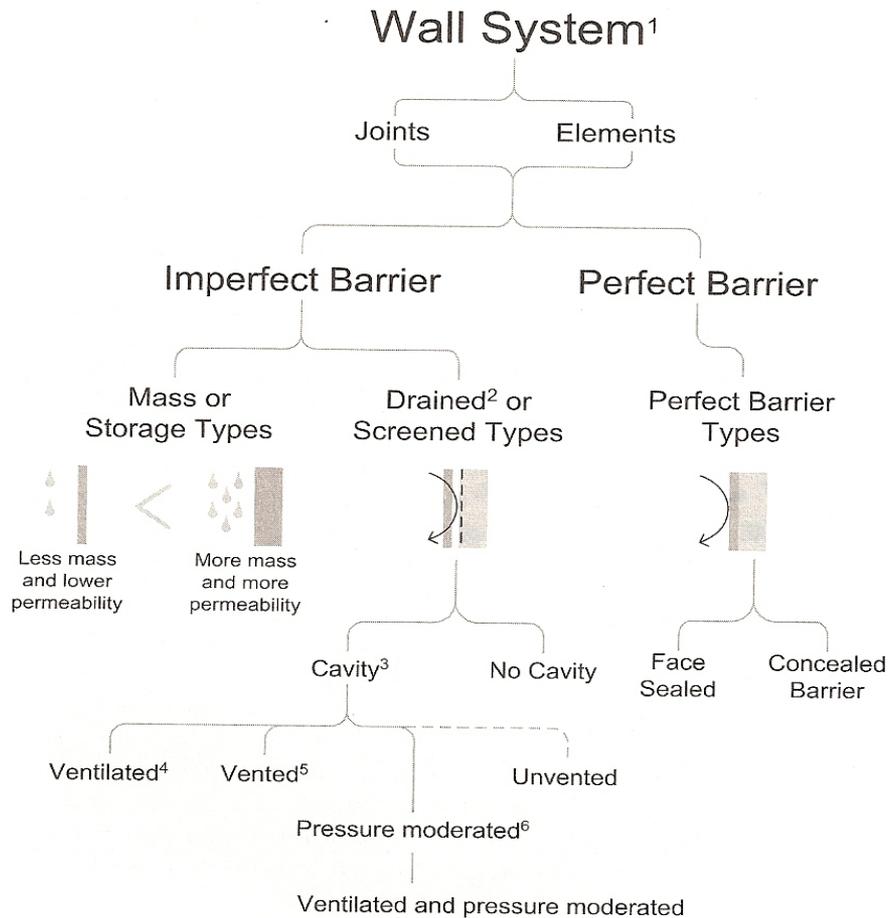
Figure 9.5: Moisture removal mechanisms for enclosures

Moisture Storage



Source: Straube & Burnett, Building Science for Building Enclosures, Chapter 9

Figure 9.6: Moisture storage in building enclosures



Notes:

1. The categorization is based on actual behaviour, not necessarily design intent.
For the purposes of this classification system, the following definitions are necessary:
2. "Drained": the large majority of the water that penetrates the screen is removed by gravity.
3. "Cavity": a clear space or a filled space that facilitates gravity drainage and air flow and resists the lateral transfer of water (a capillary break).
4. "Ventilated": allows a significant flow of air largely to promote drying by vapor movement.
5. "Vented": allows some degree of water vapor diffusion through vents and by air mixing.
6. "Pressure-moderated": an approach that moderates air pressure differences across the screen.

Source: Straube & Burnett, Building Science for Building Enclosures, Chapter 12

Figure 12.19: Wall categorization system (by rain penetration control)

Classification of Joints

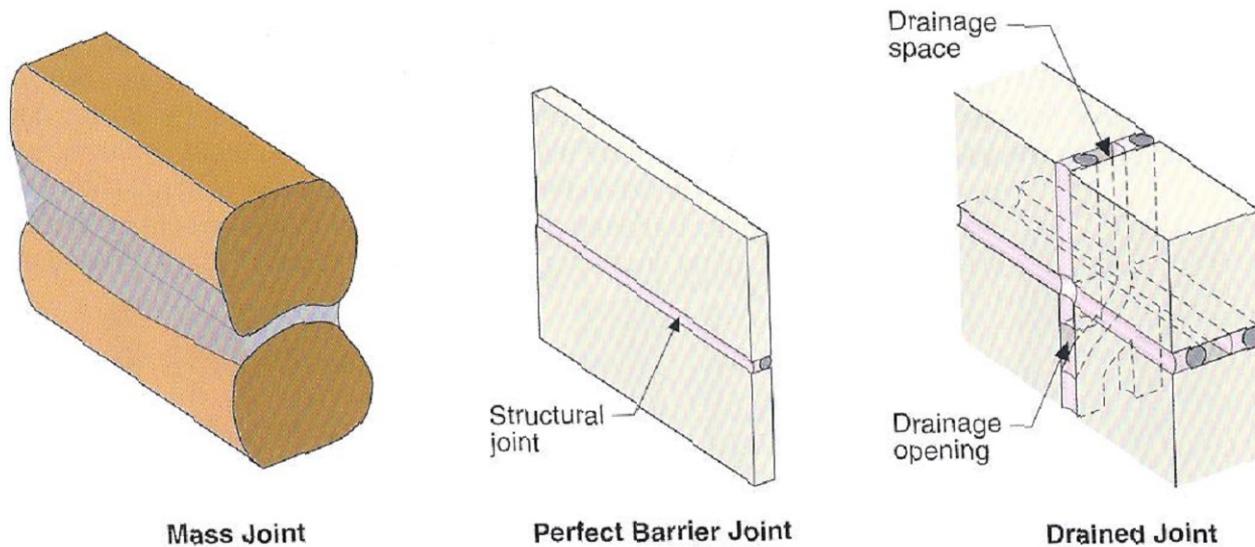


Figure 3.10

Source: Straube, High Performance Enclosures, Chapter 3

Classification of Walls: Face-Sealed

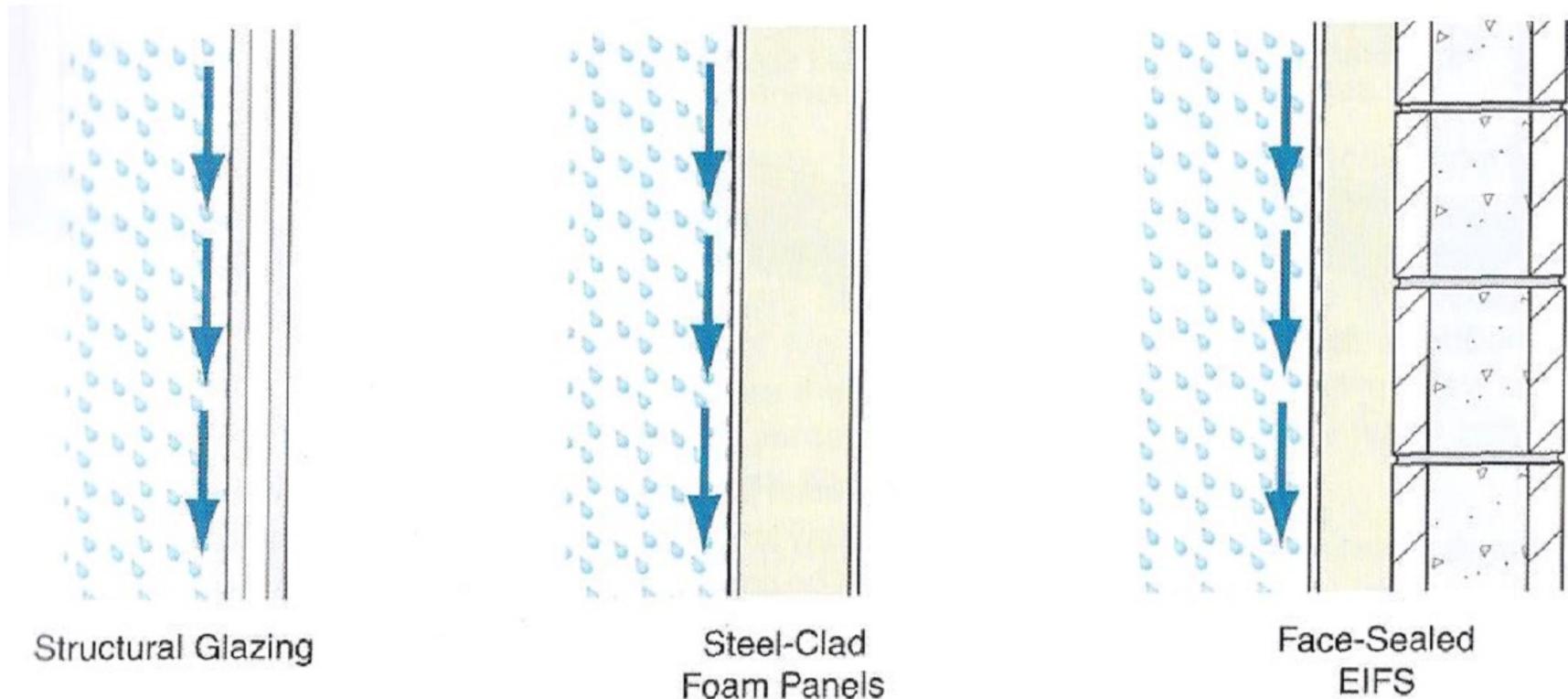


Figure 3.9

Source: Straube, High Performance Enclosures, Chapter 3

Classification of Walls: Drained or Screened

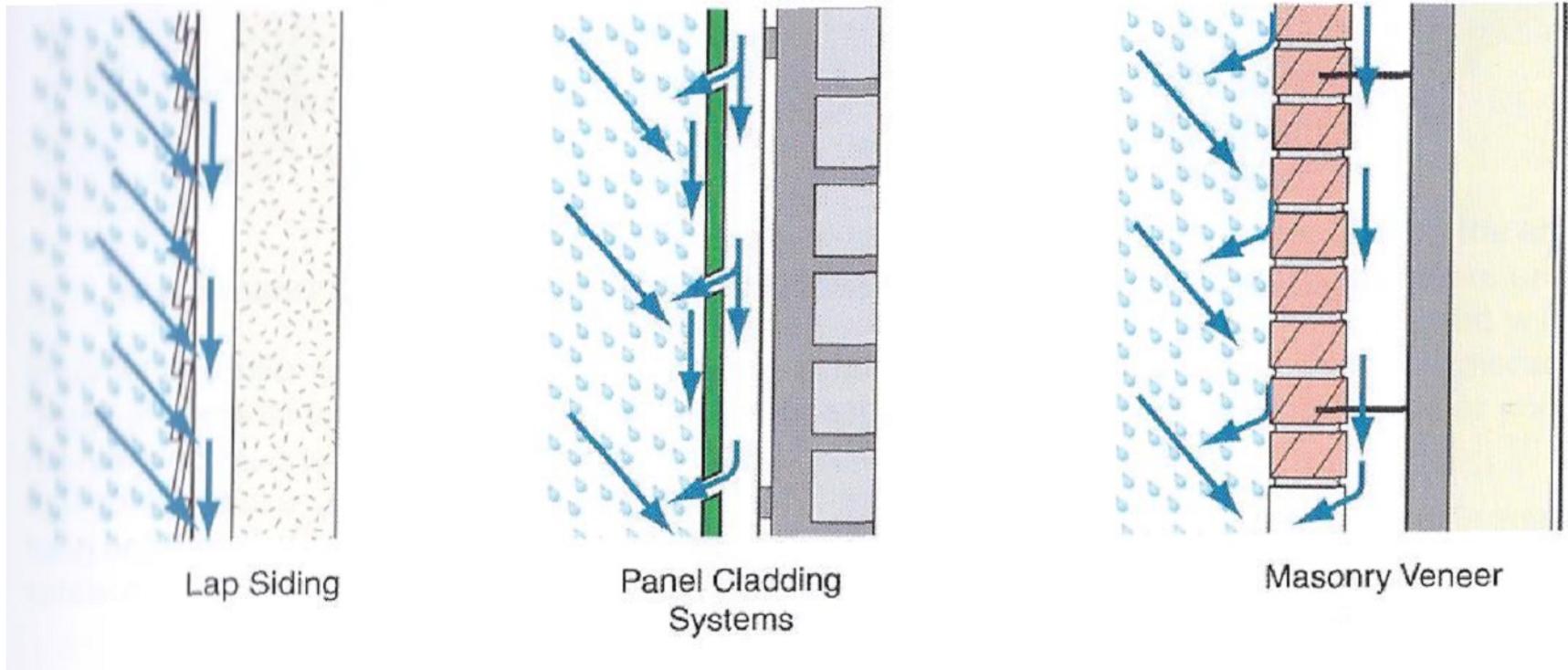


Figure 3.8

Source: Straube, High Performance Enclosures, Chapter 3

Classification of Walls: Mass Storage

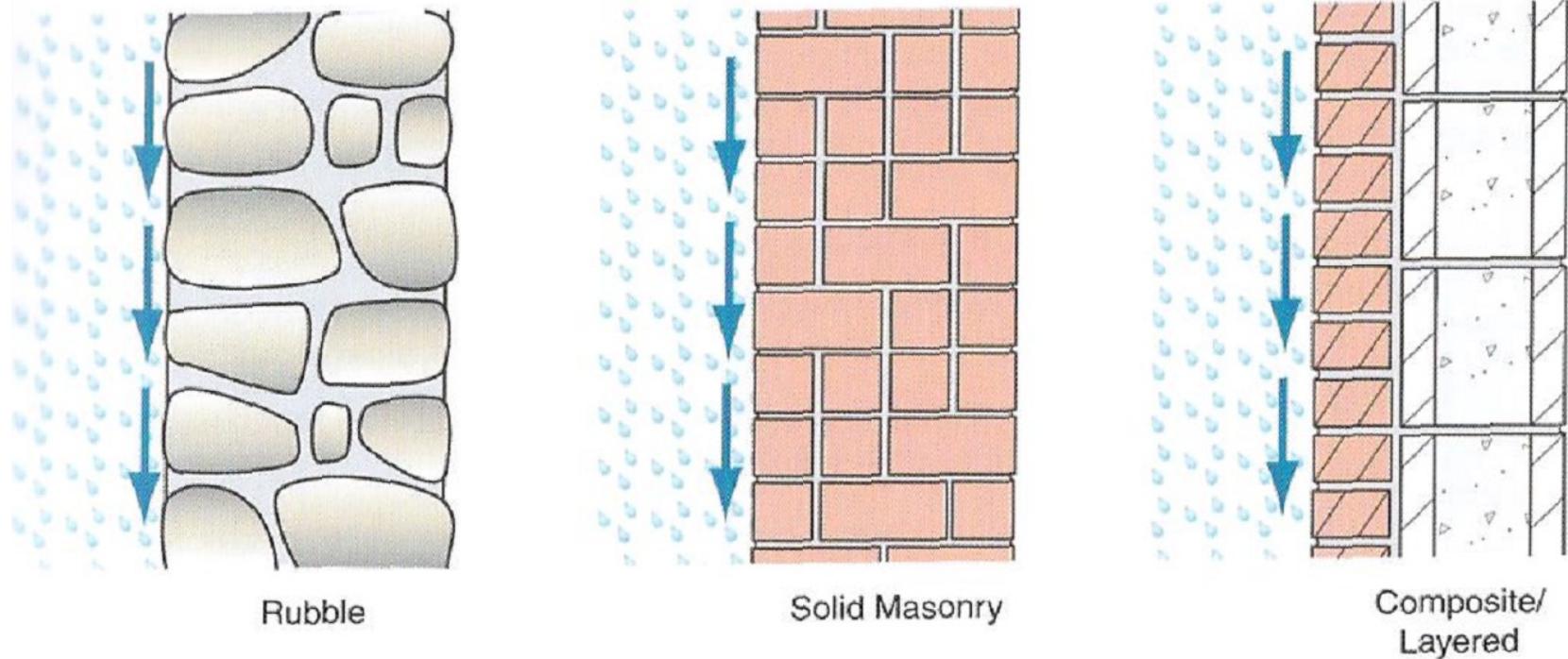


Figure 3.6

Source: Straube, High Performance Enclosures, Chapter 3

In Summary

Questions and Discussion

Next Class

- Moisture Control in Insulated Assemblies
 - Evaluating various wall assemblies
 - Preserving drying potential

- Readings
 - HPE: Chapter 4