
The Art of Stucco Identification

EDI Seminar

March 7, 2020 by

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InterNACHI: Standards of Practice state that Home Inspection:

- “Is a non-invasive visual examination of a residential dwelling, for a fee, which is designed to identify observed material defects within the specific components of said dwelling.”
- “The Inspector shall inspect the siding, flashing and trim.....And describe the exterior wall covering.”

ASHI: Inspector shall Observe & Inspect:

- Readily accessible installed systems & components, as observed at the time of the Home Inspection.
- “The exterior wall covering, flashing and trim.”

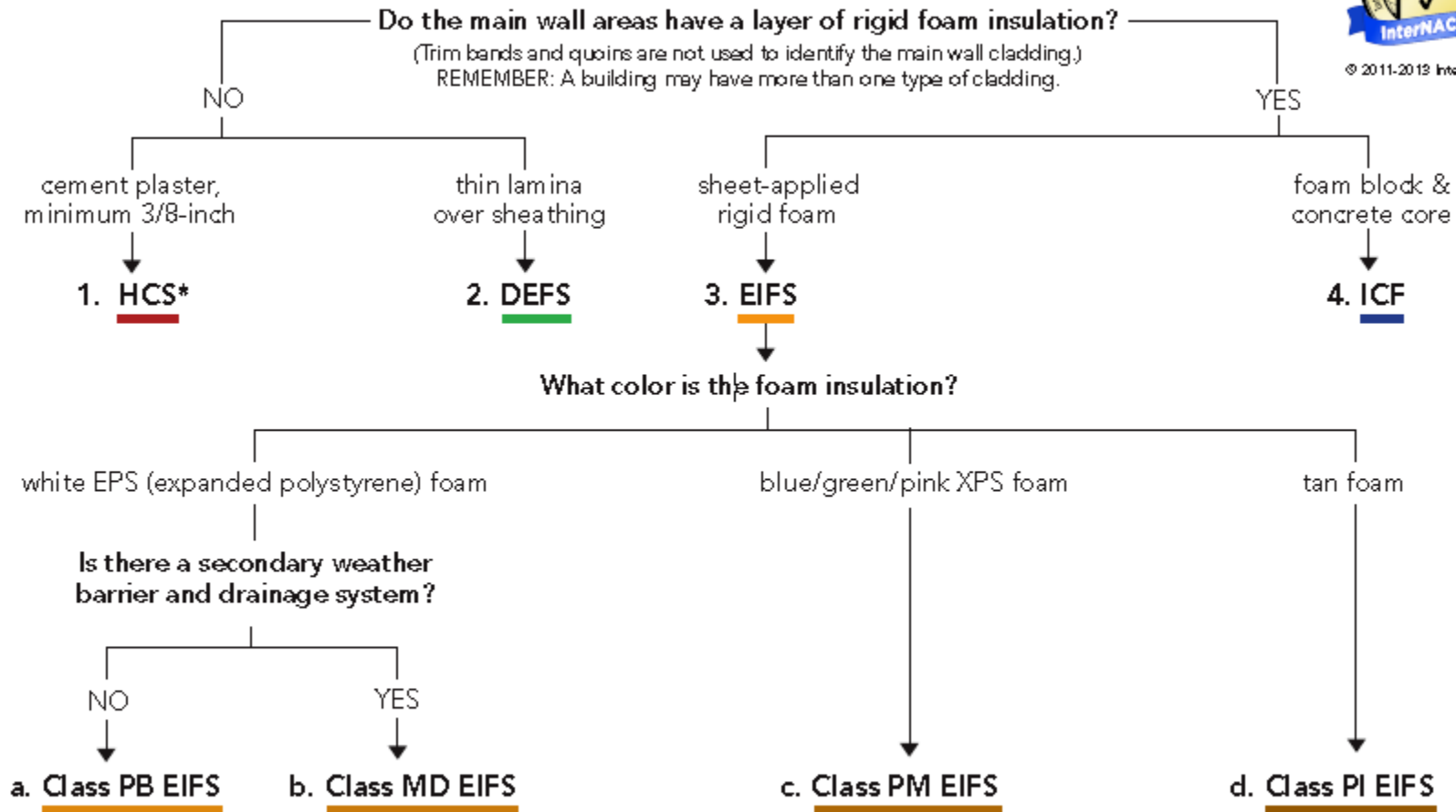
ASHI: Written Report shall:

- “Describe the exterior wall covering.”
- Report which components, in the professional opinion of the inspector, are *significantly deficient* or are near the end of their service life. Report the reason why if it is not self-evident.
- Report “the inspector’s recommendations to correct or monitor the reported deficiency.”

Identification is Key to Inspecting Stucco Clad Homes

- To be able to identify the Stucco System you must understand system components.
- This handout goes over the basic components of the most common stucco systems.
- This session reviews the Stucco ID Decision Tree
- Some homes have multiple systems on them.
- At times it may not be possible to identify the System.
- Occasionally the cladding will not be a standard system but rather a combination of components or systems.

STUCCO ID DECISION TREE



To purchase the Stucco ID Field Guide as a downloadable PDF, visit www.InspectorOutlet.com/stucco-ID-FG.aspx
 This companion to the Stucco ID Decision Tree card is a comprehensive manual that helps the inspector understand the components of various stucco systems.

NOTES & DEFINITIONS:

1. **HCS** (hard-coat stucco) is a Portland-cement plaster. This system can be applied over moisture-sensitive and non-moisture-sensitive substrates. (more information can be found in the Stucco ID Field Guide)

*All manufacturers permit the installation of hard-coat stucco over rigid foam insulation. These are often called a hybrid system.

2. **DEFS** (direct-applied exterior finish system) is typically identified by a thin lamina applied directly to sheathing, and this system may be moisture-drainable.

3. **EIFS** (exterior insulated and finish system) is typically identified by a layer of rigid insulation foamboard.

- a. **Class PB** is a barrier or face-sealed exterior cladding that uses Expanded Polystyrene (EPS) with no secondary barrier or means of drainage.

- b. **Class MD** is a Moisture-Drainage class of EIFS that uses Expanded Polystyrene (EPS) and incorporates a secondary barrier and means of drainage.

- c. **Class PM** uses extruded polystyrene (XPS) as the rigid foam; it may be Moisture-Drainage.

- d. **Class PI** incorporates QUIK-R™ or Atlas Stucco-Shield® polyisocyanurate board; it may be Moisture-Drainage.

4. **ICF** (insulated concrete form) construction uses stacked polystyrene foam blocks with a solid reinforced poured concrete core.

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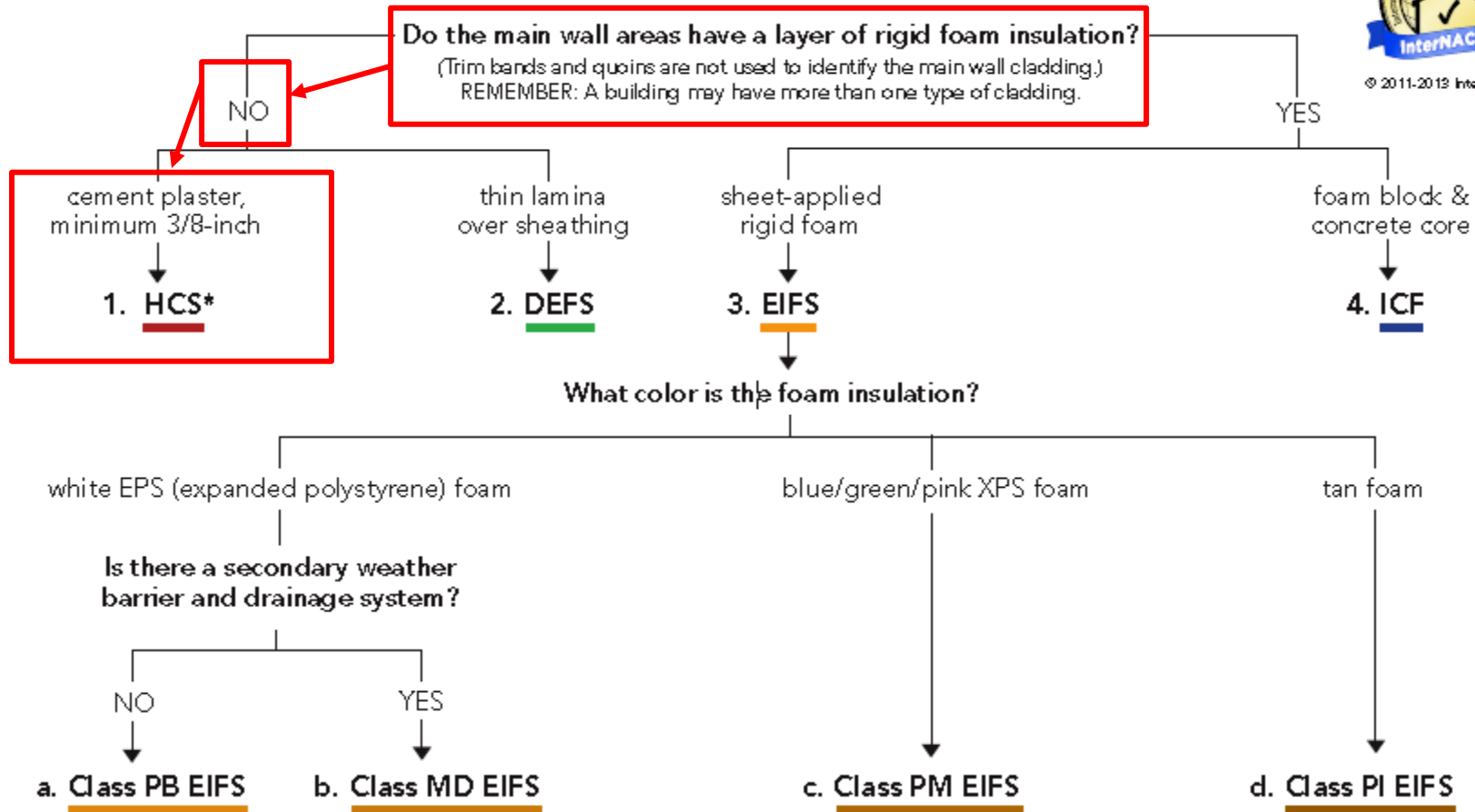


What do you see? Metal casing & thin stucco.



Observed: No rigid foam insulation. Minimum 3/8 inch thick cement plaster.

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This is wall type # 1; HCS.

1. Hard Coat Stucco:

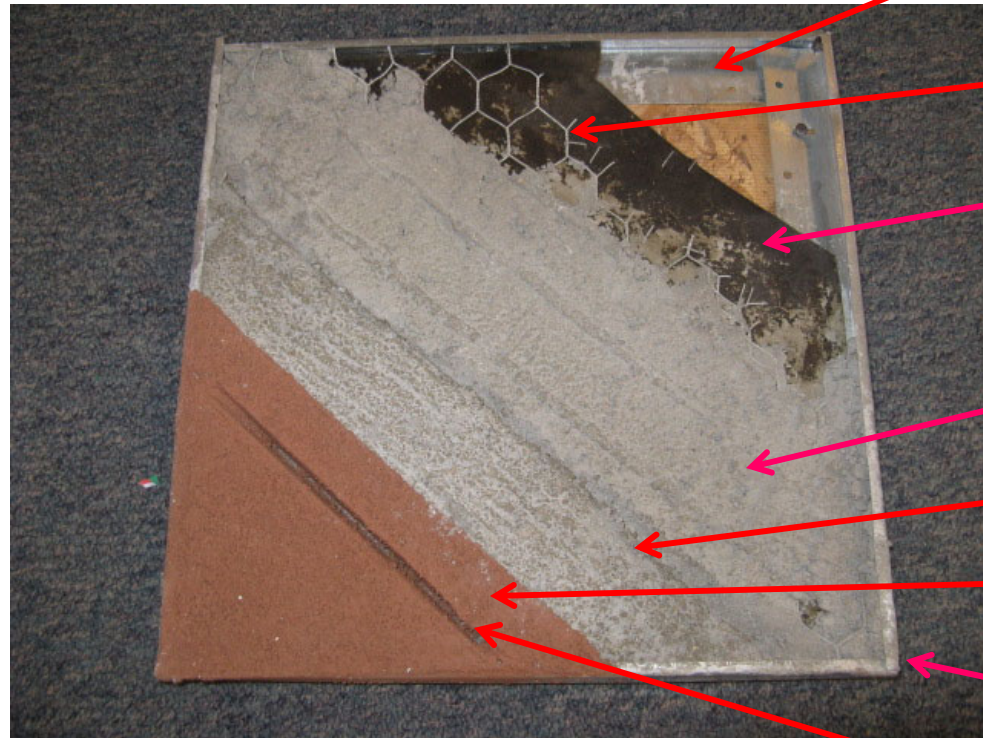
Basic components include.

- Portland Cement Stucco.
- Requires a Moisture Barrier, metal lath and accessories on Moisture Sensitive Substrates but not on raw concrete or masonry substrates.
- Hard & prone to cracking.
- Requires control or expansion joints every 144 square feet over frame.
- Metal or PVC casing bead or J-bead or weep screed.

Two General Categories.

- Three Coat Stucco:
 - Minimum of 5/8 inches thick but typically 3/4 to 7/8 inch thick.
 - Three coats: scratch coat, brown coat and finish coat.
- One Coat Stucco:
 - Minimum of 3/8 inch thick base coat.
 - Two Coats base coat and finish coat.
 - Most are proprietary with ICC Evaluation Reports and contain polymers and chopped fiberglass.

1.a. Traditional (3 Coat) Stucco Components



Substrate (OSB)

Stucco Netting (Lath)

Moisture Resistive Barrier (2 layers of D Paper)

Scratch Coat

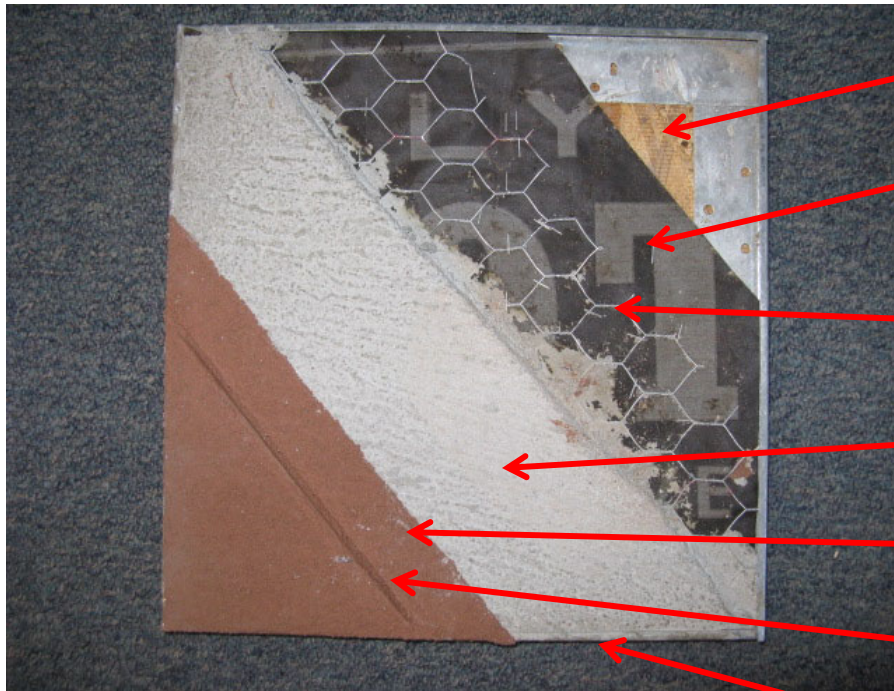
Brown Coat

Finish Coat

Accessory (Casing)

Accessory (Control Joint)

1.b. One-Coat-Stucco: Components



Substrate (OSB)

Moisture Resistive Barrier (2 layers of D Paper)

Stucco Netting (Lath)

Base Coat

Finish Coat

Accessory (Control Joint)

Accessory (Casing)



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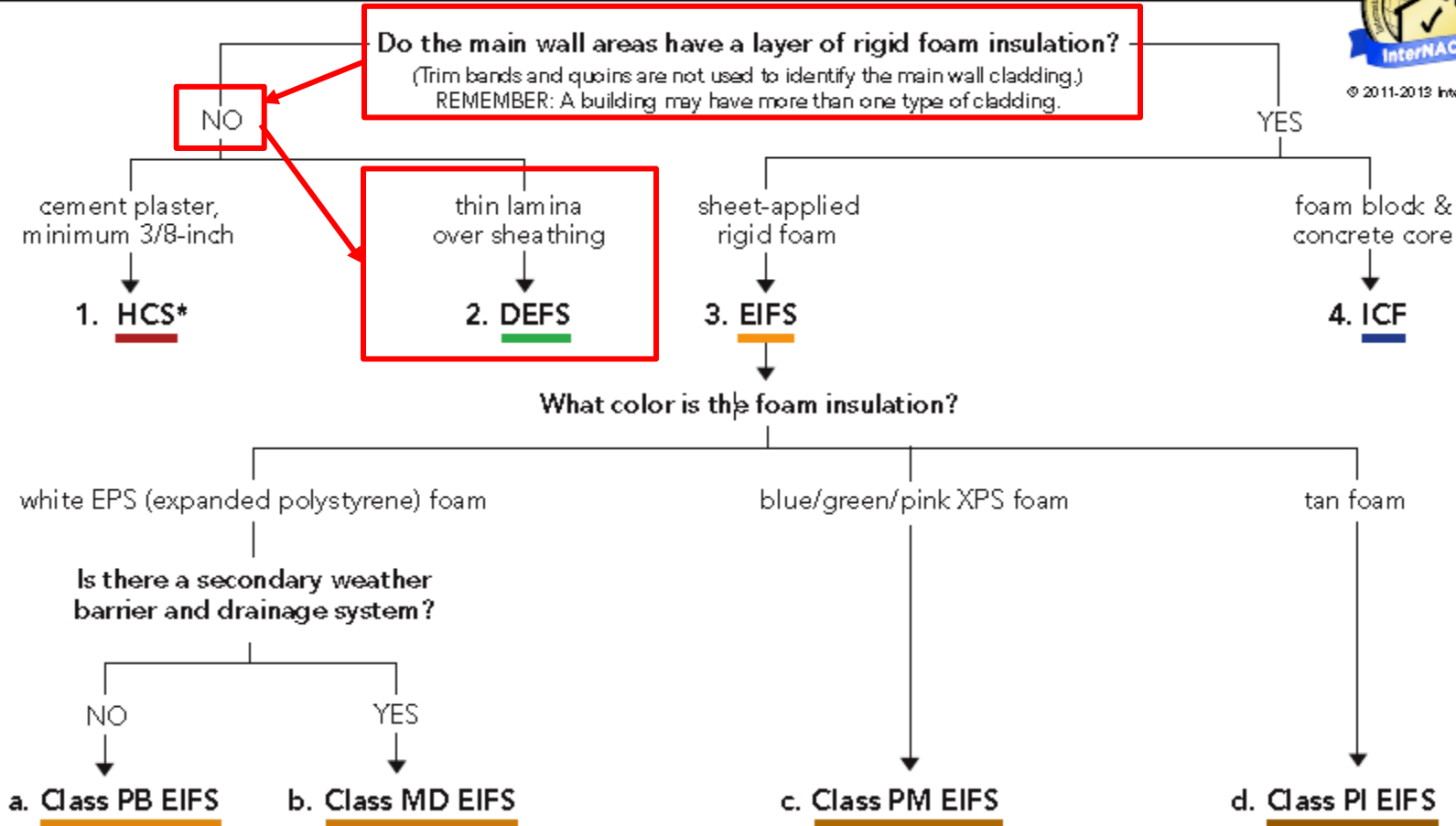
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Observed: No rigid foam insulation. Thin lamina over sheathing.

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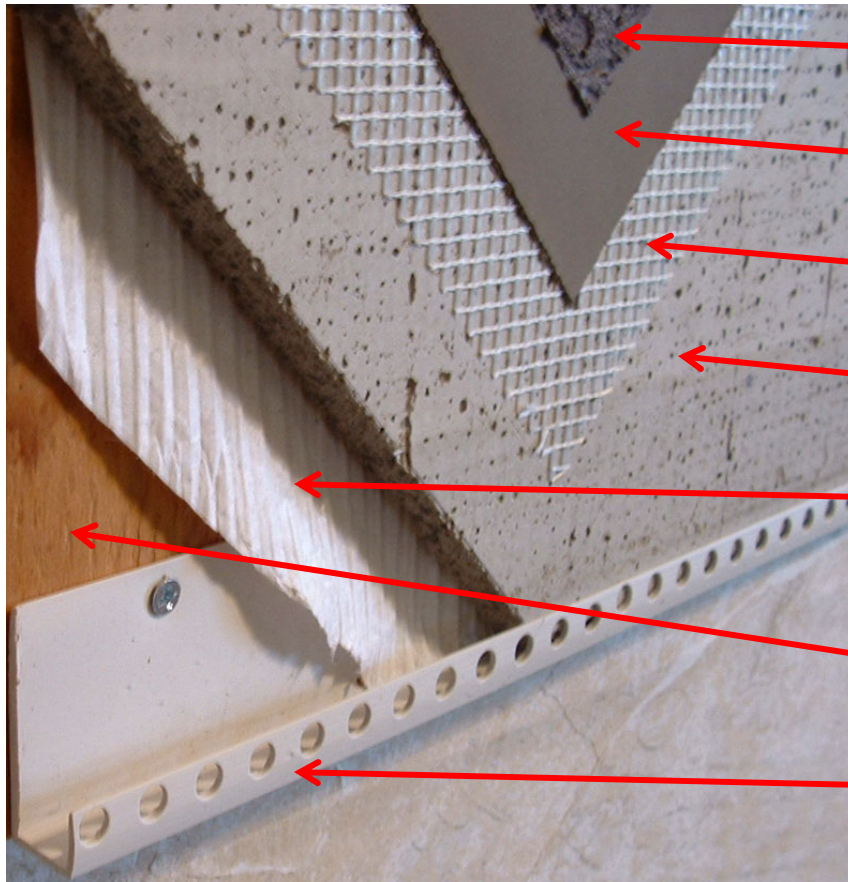
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This is Wall Type #2

2. Direct Applied Exterior Finish System (DA or DEFS)

- DEFS has lamina directly applied to an approved substrate such as DensGlass Gold or Cement Board (No insulation board).
- Originally mesh was only required at joints in approved substrate. Now all manufacturers require that the mesh cover entire wall surface.
- DEFS uses system accessories.
- Each system is proprietary thus there are a number of variations.

2. DEFS or Direct Applied



Finish Coat

Base Coat

Fiberglass Mesh

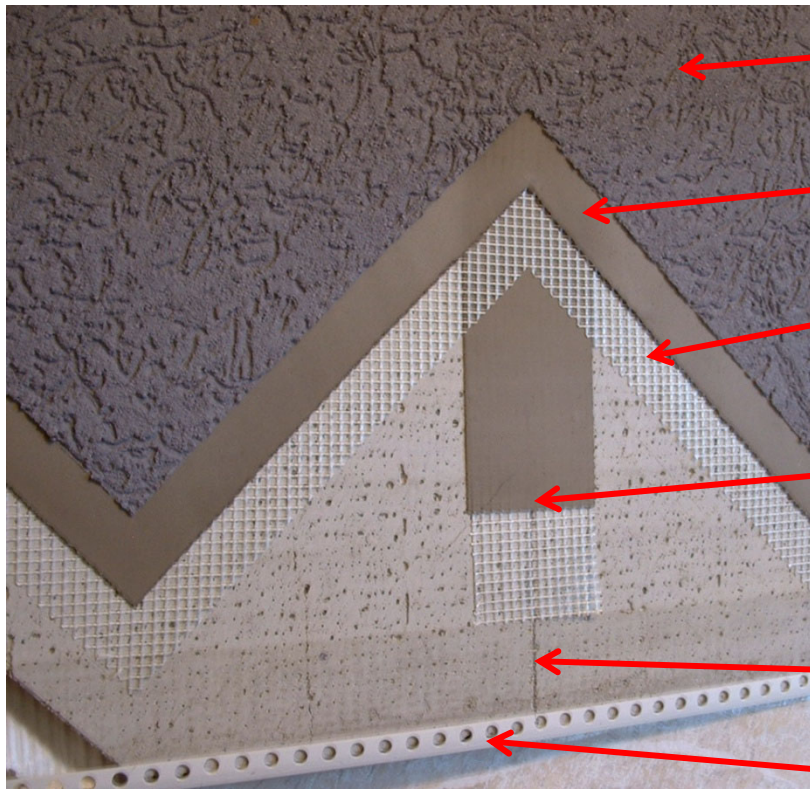
Cement Board Substrate

Moisture Resistive Barrier
(Tyvek)

Substrate (Plywood)

PVC Casing at edge.

2. DEFS or Direct Applied Cement Board Joint Treatment



Finish Coat

Base Coat

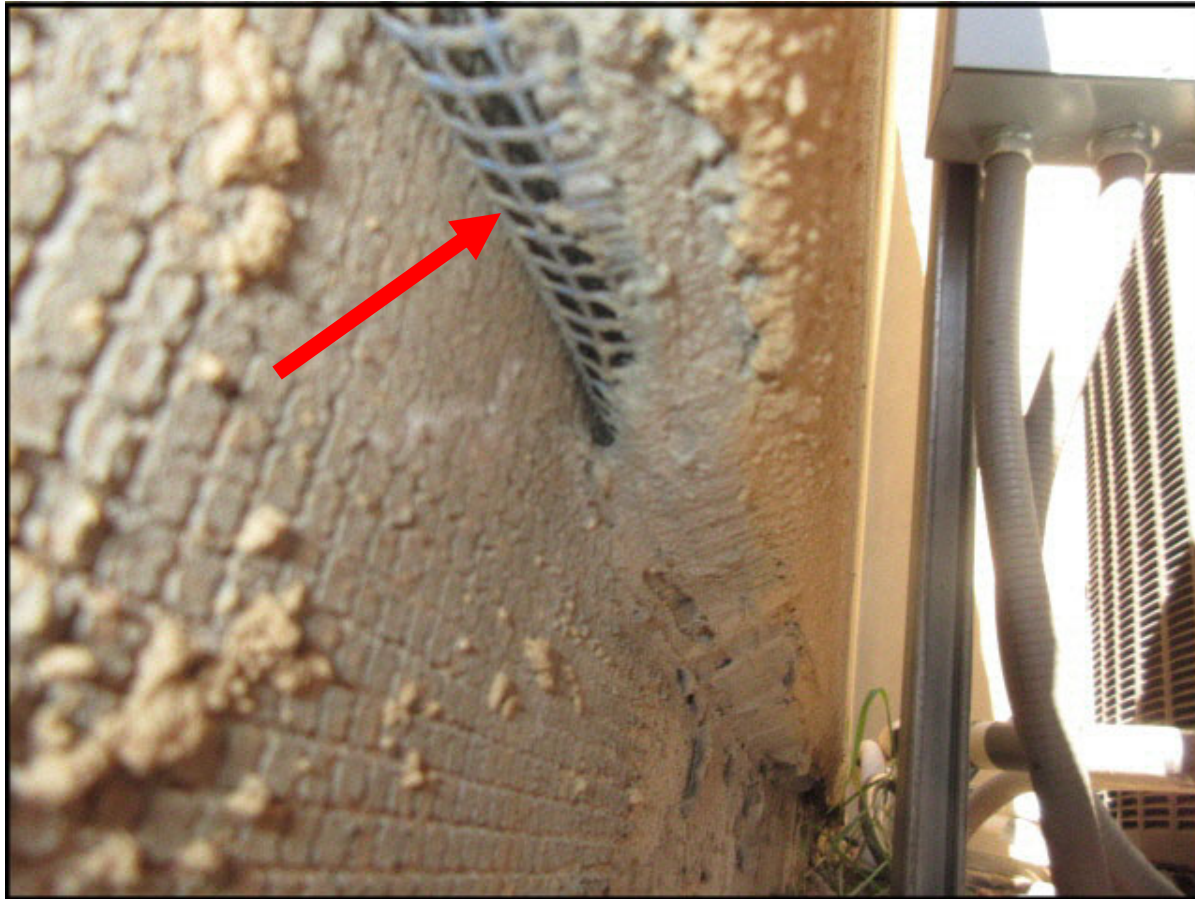
Fiberglass Mesh over all cement board.

Base Coat with Embedded Fiberglass Mesh at cement board joints.

Cement Board Substrate

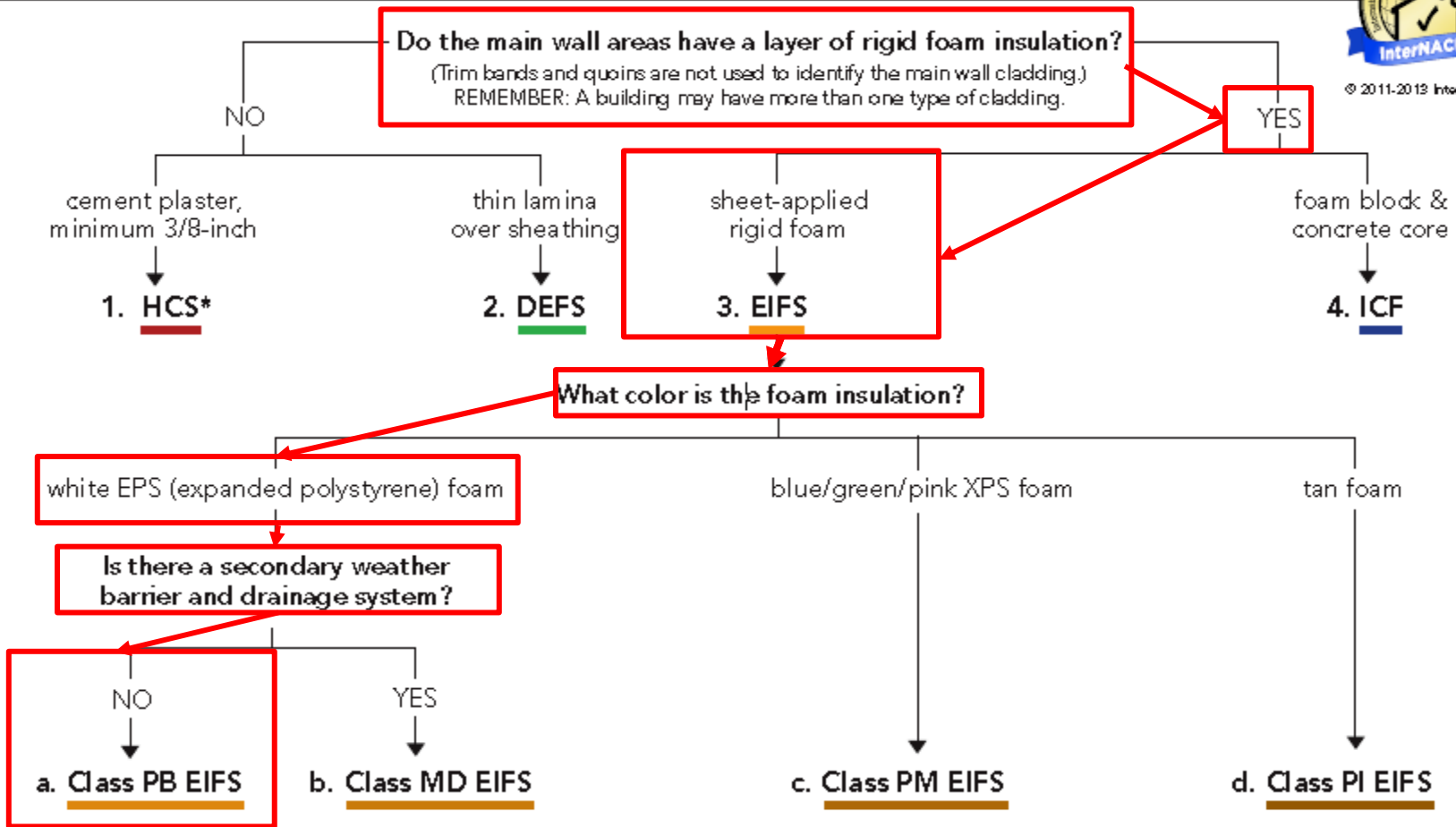
PVC Casing at edge.

White EPS visible up through mesh



Observed: Layer of rigid white foam insulation. No secondary WRB.

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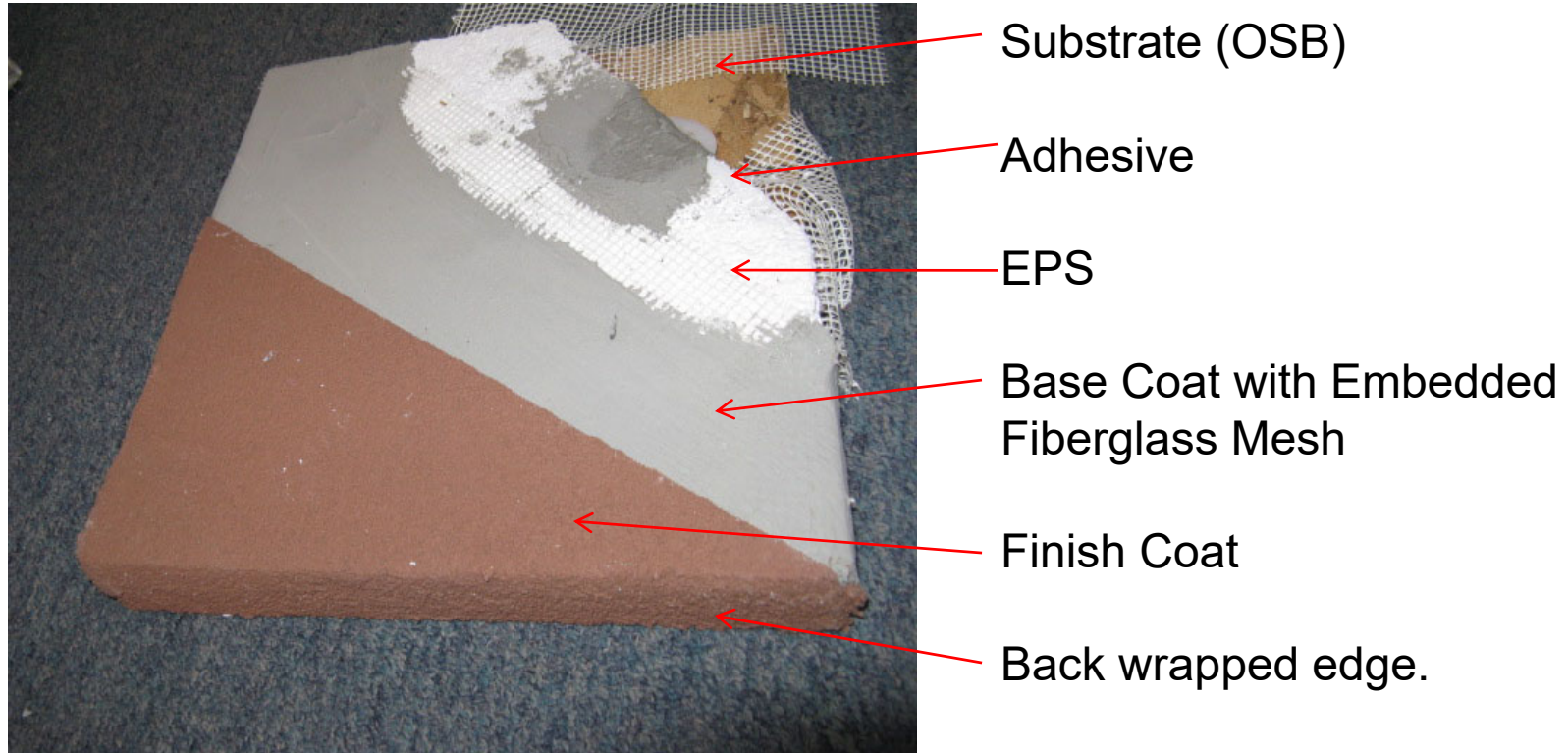
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This is Wall Type 3.a; PB EIFS

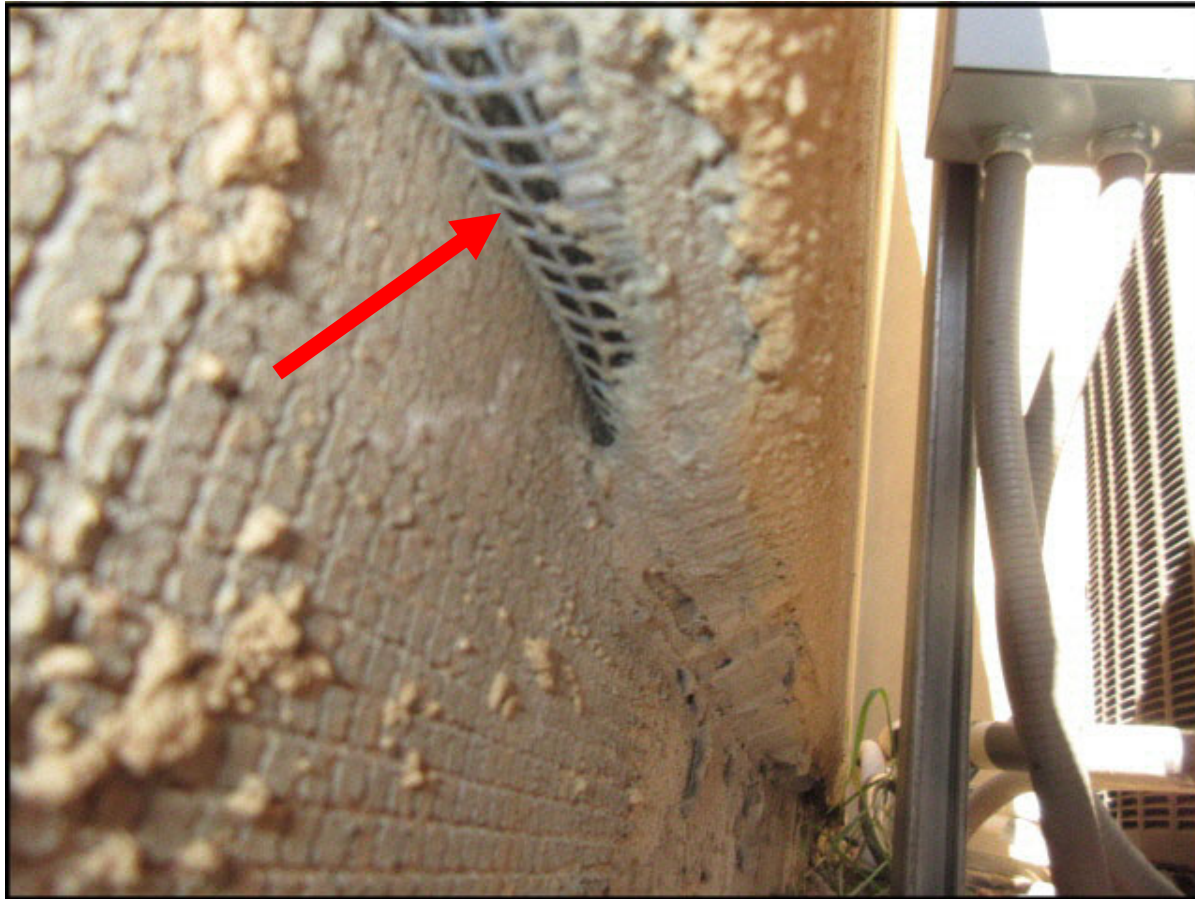
3.a. Things to look for to Identify a Face Sealed or Barrier EIFS Clad Home:

- EPS foam insulation (by itself EPS does not mean the cladding is EIFS).
- EPS insulation adhesively or mechanically attached to a substrate.
- Fiberglass mesh.
- Thin lamina (base coat, mesh & finish coat); about 1/16 inch .
- The wall surface gives slightly to hand pressure.
- Typically no accessories although PVC starter tracks or casing beads are allowed.
- Sounds hollow when tapped.
- Typically adhesively attached to substrate (OSB, plywood, etc.)
- Face Sealed or Barrier means that the system is designed such that water should not get behind the exterior surface.

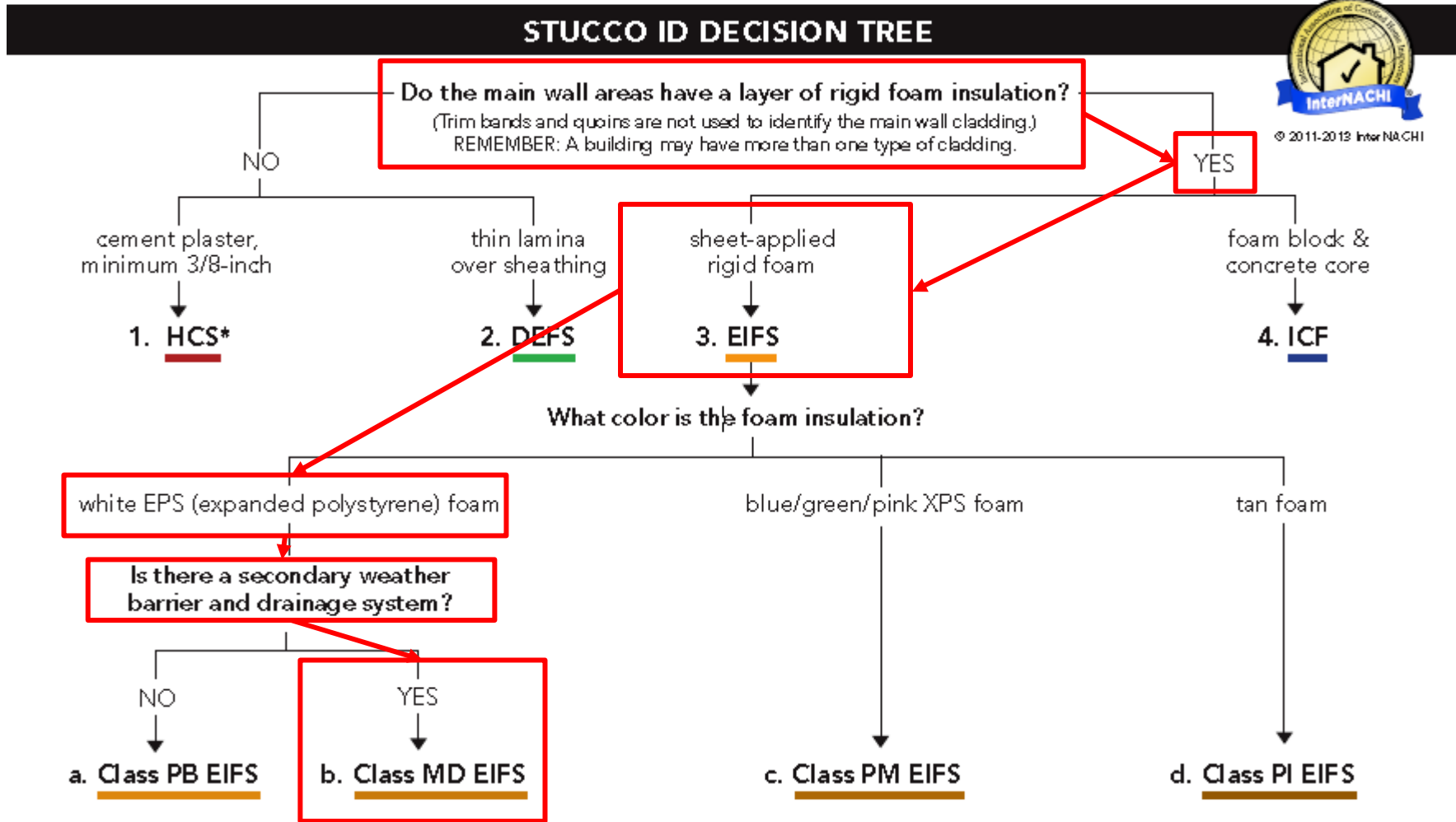
3.a. Sample of Barrier PB EIFS



White EPS visible up through mesh



Observed: Layer of rigid **white** foam insulation. There is a secondary WRB.



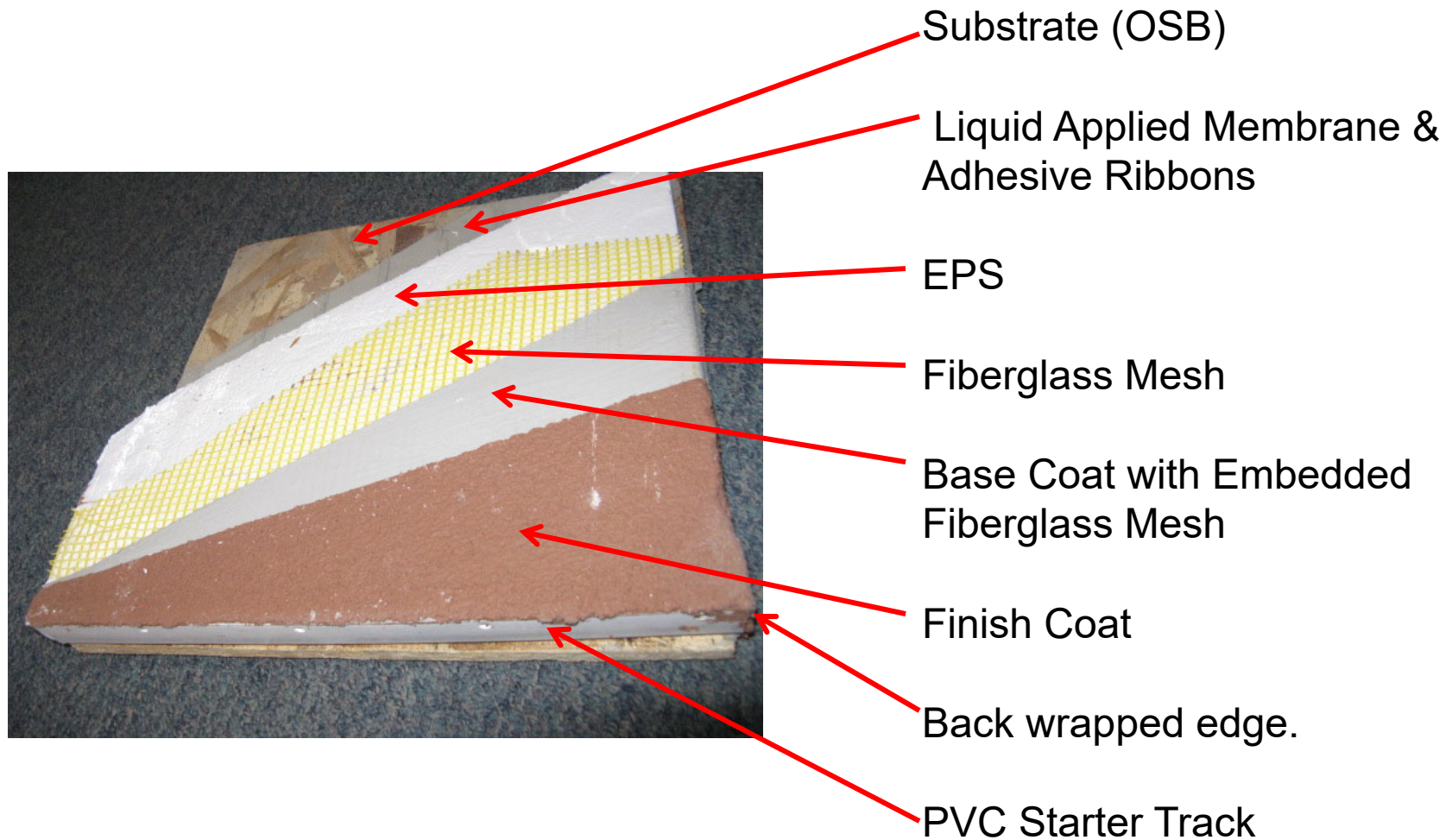
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This is Wall Type 3.b. MD-EIFS

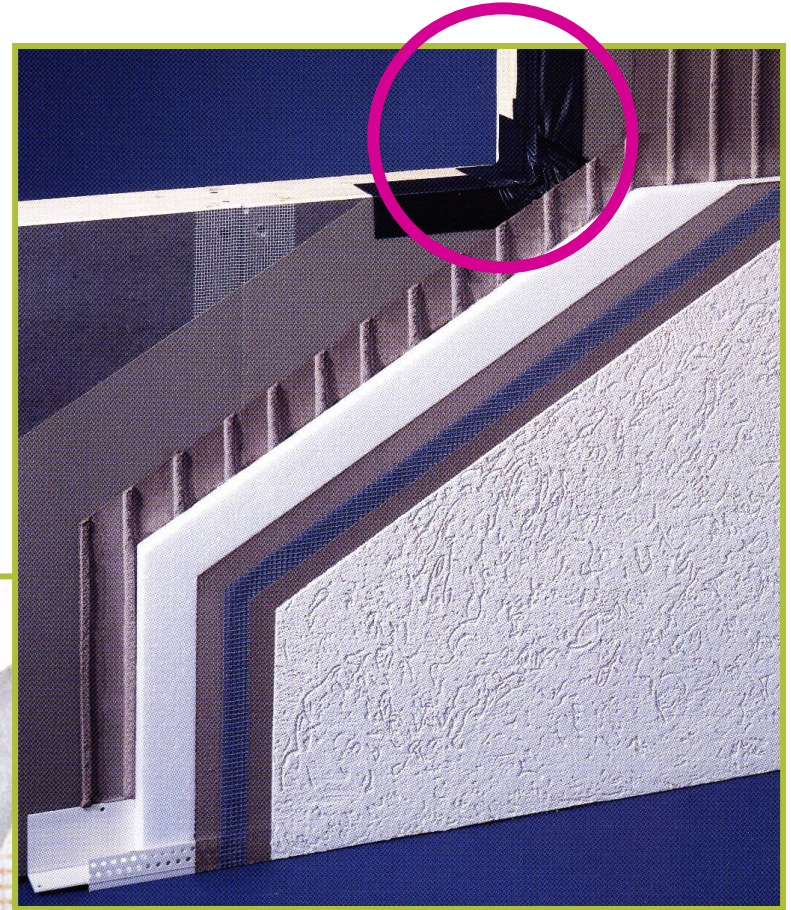
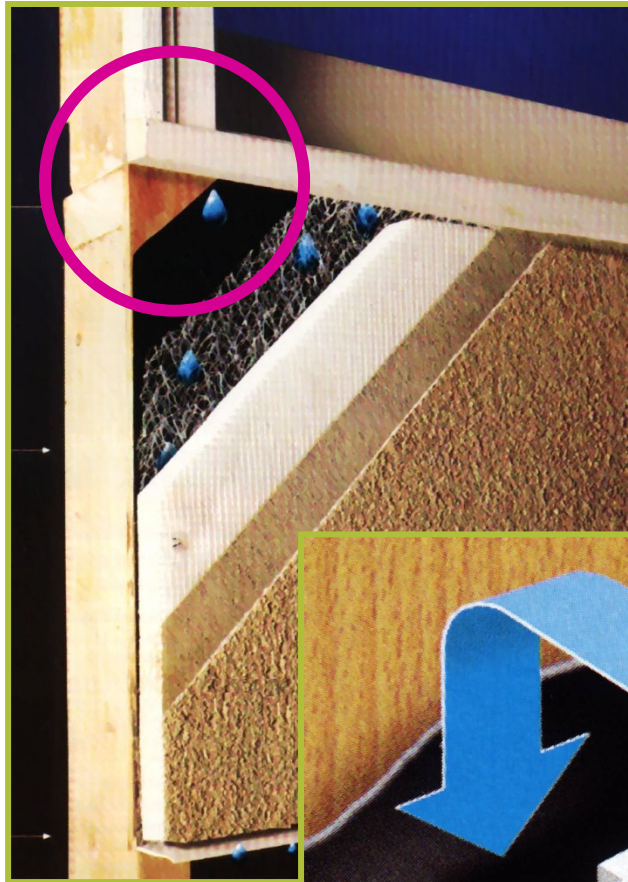
3.b. MD-EIFS Clad Home:

- The basic installation appears very similar to Face Sealed or Barrier PB EIFS with one additional component.
- There will be a moisture barrier over the moisture sensitive substrates.
- EPS foam insulation (by itself EPS does not mean the cladding is EIFS).
- Fiberglass mesh.
- Thin lamina; about 1/16 inch.
- The wall surface gives slightly to hand pressure
- There may be accessories such as PVC starter tracks or other drainage provision at bottom of wall.
- Sounds hollow when tapped.
- Evolution of MD EIFS:
 - The first MD EIFS systems were mechanically attached to substrate (OSB, plywood, etc.).
 - The newer systems again can be adhesively attached, however they must have a liquid applied membrane.

3.b. MD-EIFS



3.b. Some Variations on Moisture Drainage EIFS



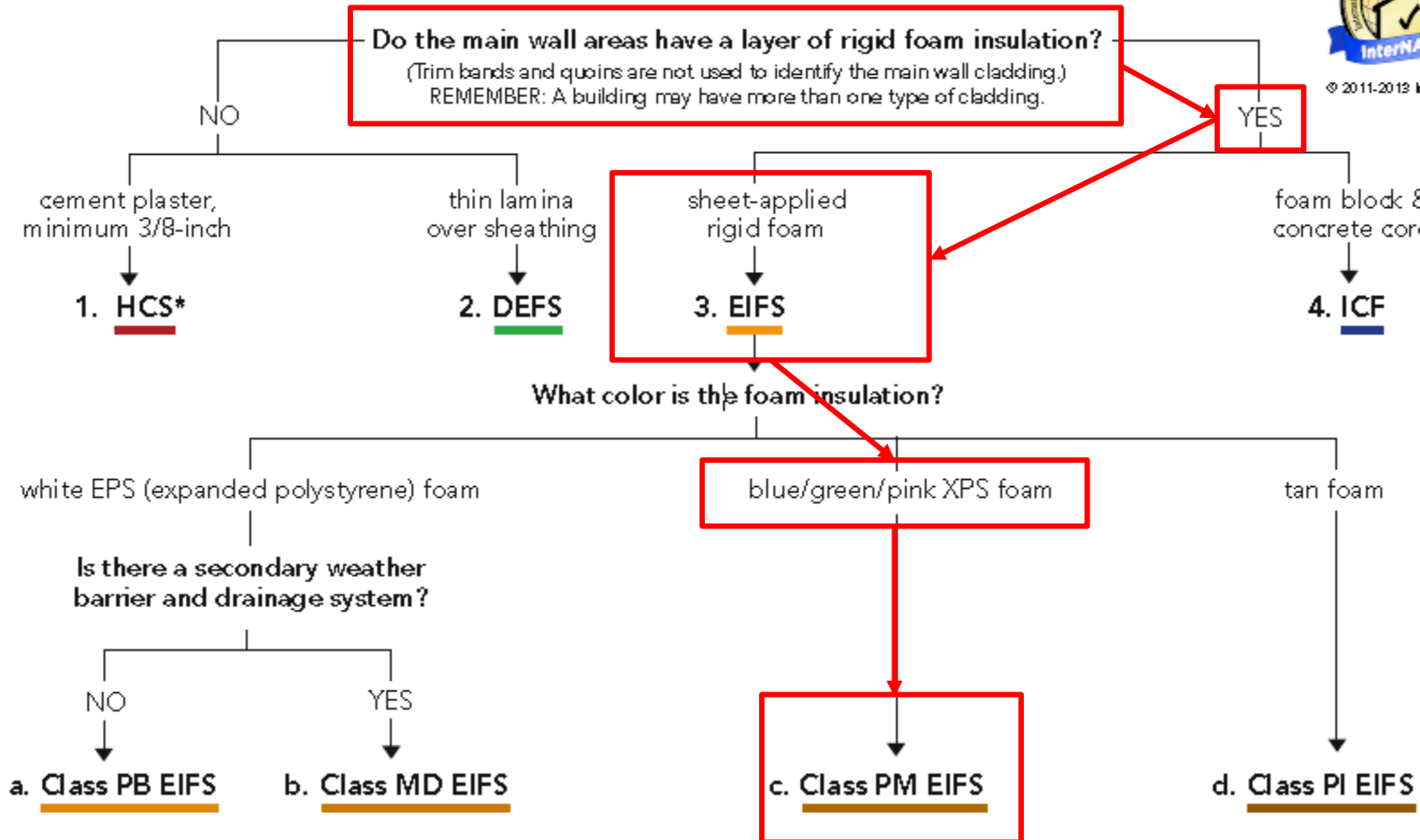
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From: Robert Kudder, SE, PhD.

Observed: Layer of rigid blue, green or pink foam insulation.

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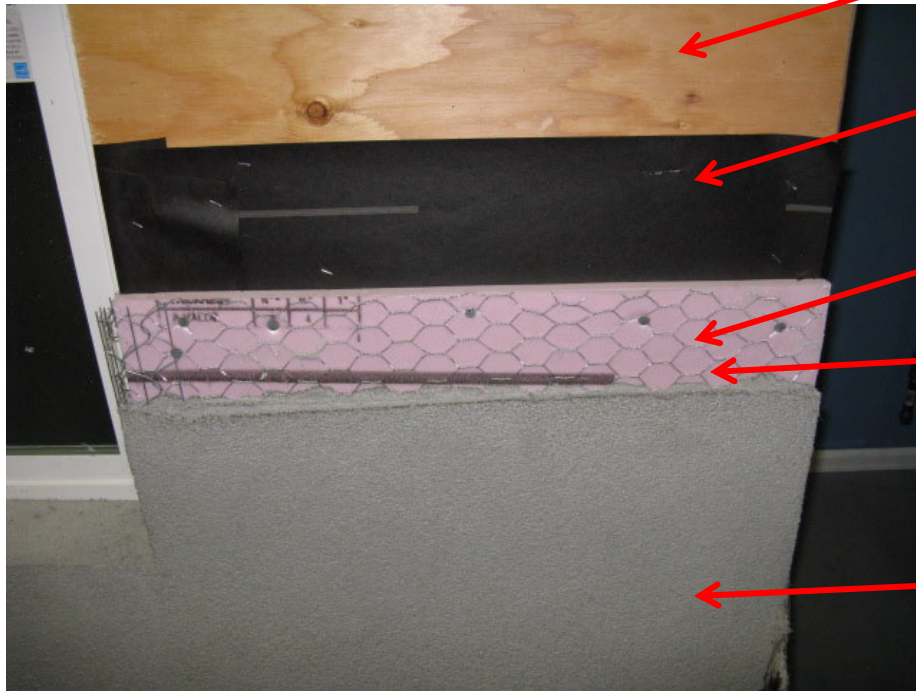
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This is Wall Type 3.c. PM EIFS

3.c. Polymer Modified, PM - EIFS

- **PM components include:**
 - Extruded Polystyrene (XPS) mechanically attached.
 - Heavy open weave fiberglass mesh, mechanically attached.
 - Thicker basecoat $\frac{1}{4}$ to $\frac{3}{8}$ of an inch.
 - Control and expansion joints; limit 144 sq. ft.
 - Plastic or metal trim accessories
 - Wall surface is hard and firm
 - Wall sounds solid when tapped
- **PM Moisture Barriers**
 - Original systems did not have a drainage plane or WRB
 - Current systems require a drainage plane or WRB.

3.c. Polymer Modified PM – EIFS (Photo is an Early Version of a PM-EIFS System)



Substrate (Plywood)

Moisture Resistive Barrier
(Paper)

Extruded Polystyrene (XPS)

Heavy Open Weave Fiberglass
Mesh or Stucco Netting over
XPS.

Base Coat with Embedded
Fiberglass Mesh

Finish Coat (Not Shown)

Are there Sheets of Insulation?



What color is insulation?



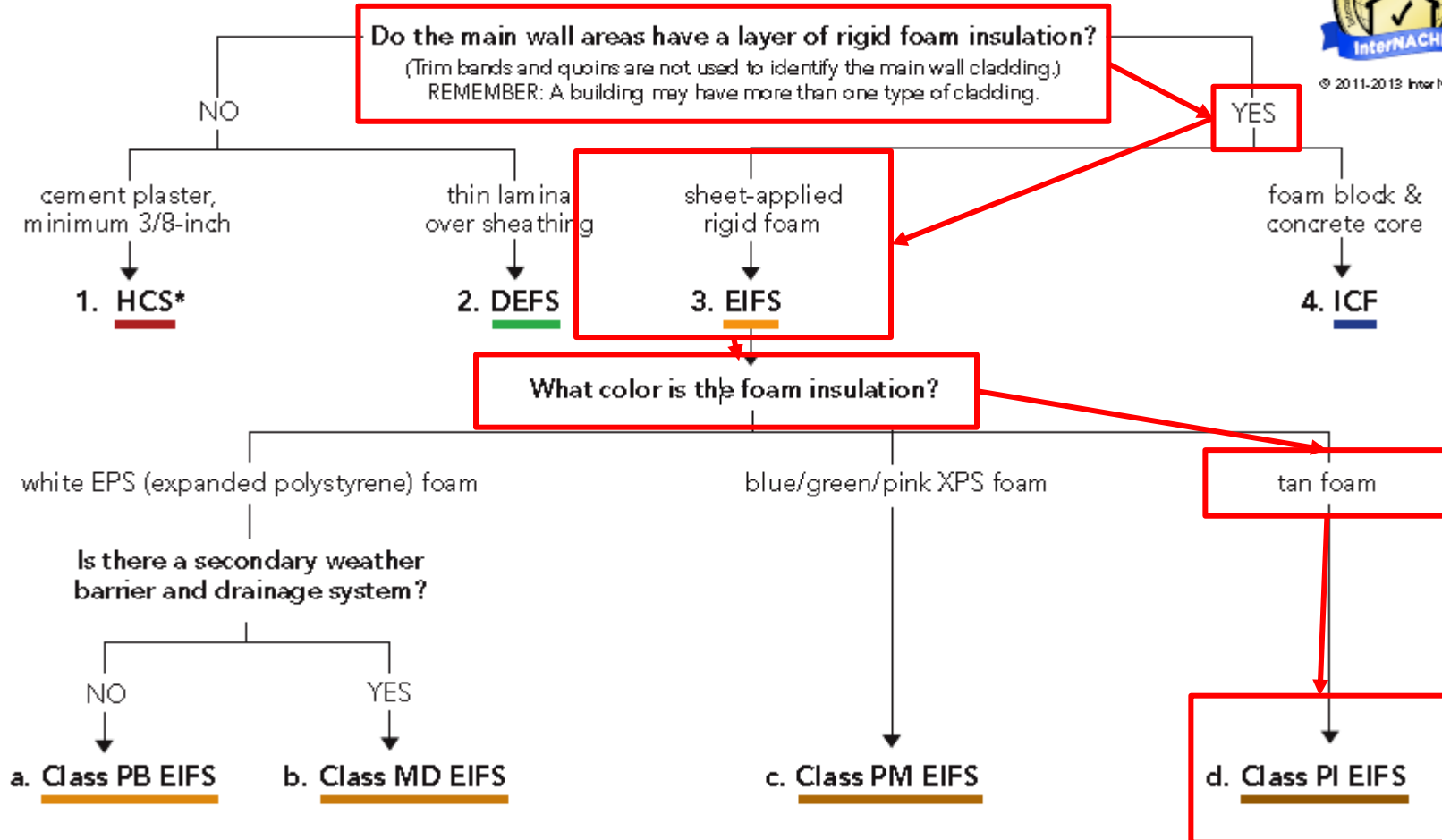


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Observed: Layer of rigid tan foam insulation.

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This is a Wall Type 3.d. PI EIFS

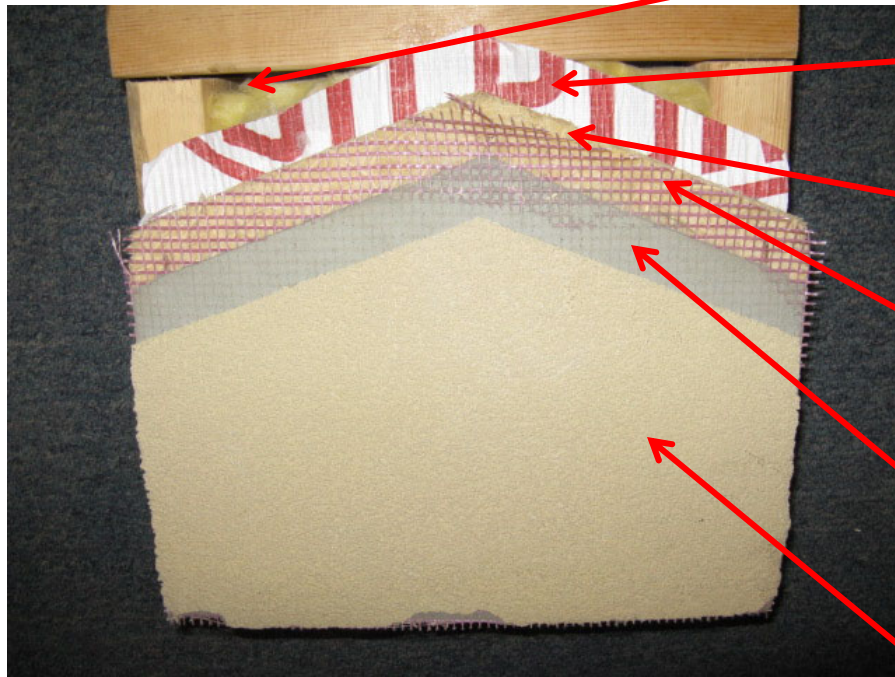
3.d. Original Polyisocyanurate (PI) EIFS

- Original PI systems were an economical EIFS installation:
 - it was permitted to be installed over open framing.
 - PI boards were 4 feet wide and 8 or 9 feet tall.
 - Only required joints to be meshed.
- Popular in some locations around country.
- Original PI systems were prone to failure due to the lack of substrate, drainage plane and limited use of mesh.

3.d. Modern Polyisocyanurate (PI) EIFS

- Most current PI systems require:
 - Substrate.
 - Moisture Resistive Barrier
 - Joints must be base coated and meshed.
 - Then PI insulation board must be fully meshed and base coated.
- These systems perform much better but have lost the economy that they originally had.

3.d. Polyisocyanurate (PI) EIFS over Open Framing



No Substrate

Moisture Resistive Barrier
(Tyvek Stucco Wrap)

Polyisocyanurate Insulation
Board

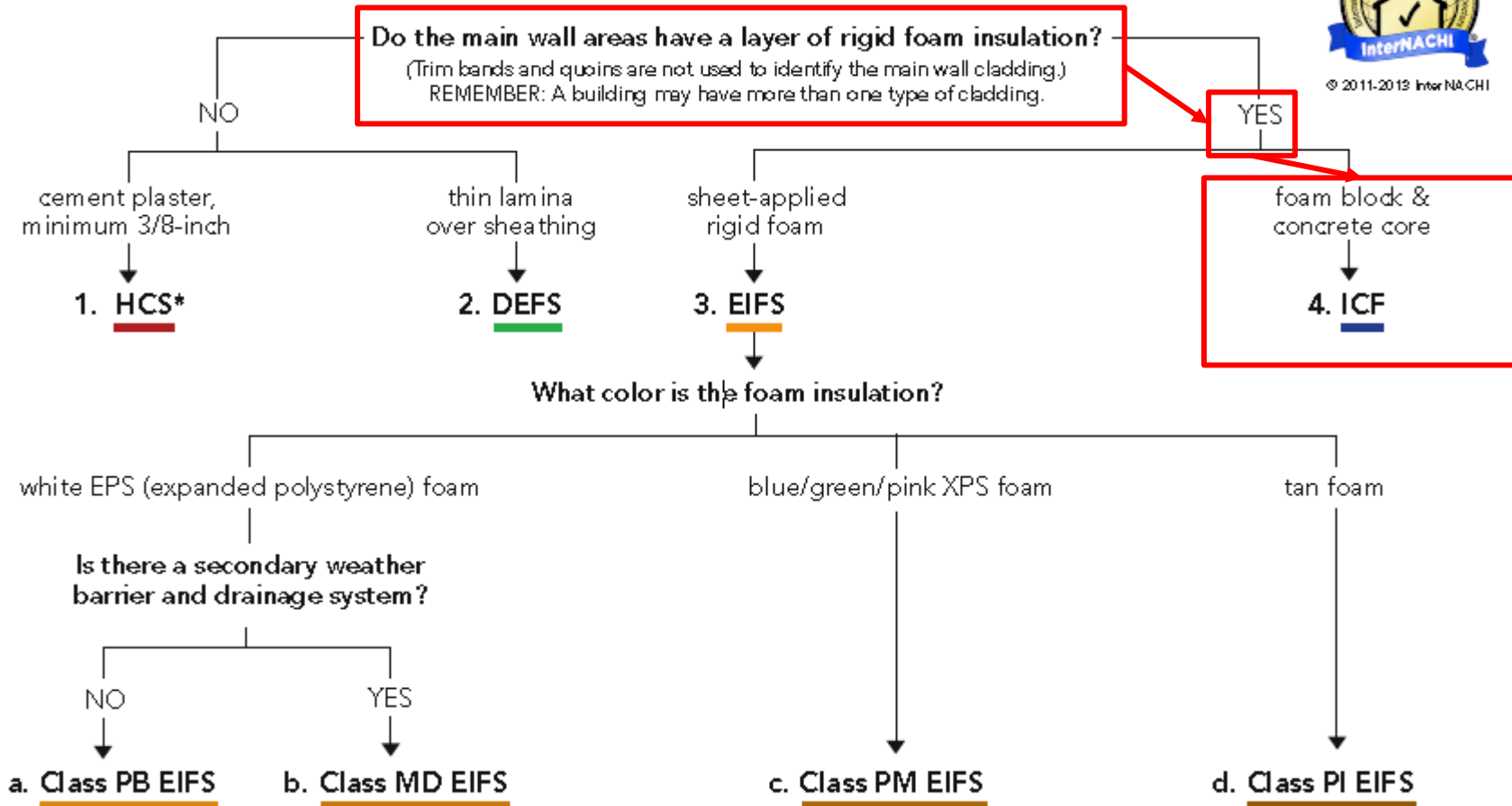
Fiberglass Mesh over full PI
board.

Base Coat with Embedded
Fiberglass Mesh

Finish Coat.

Observed: Foam block insulation with concrete core.

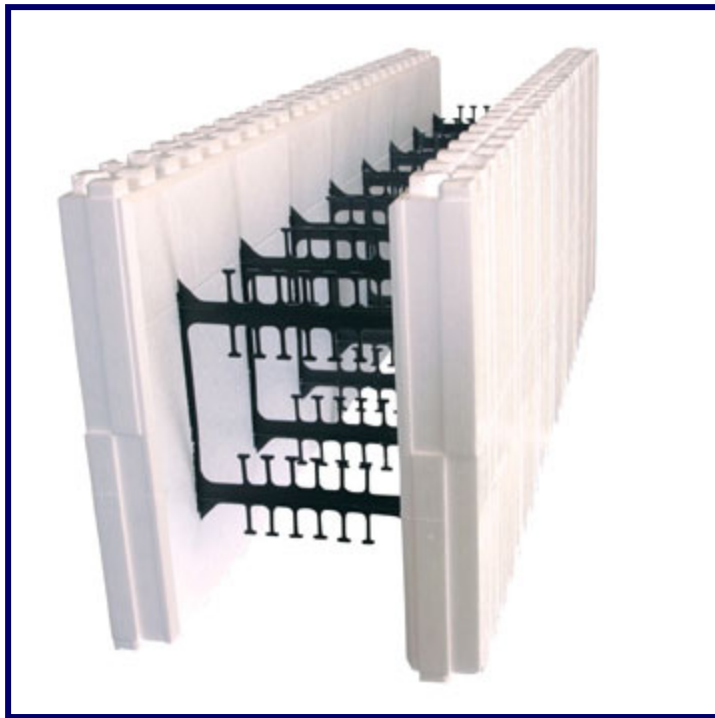
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This is Wall Type 4. Insulating Concrete Forms

4. The most common configuration:



- Two pieces of expanded polystyrene (EPS)
- Held together with plastic ties.
- Stacked like building blocks, aligned and braced
- Reinforced with steel rebar and filled with concrete

Stucco Exterior Finishes on ICF

EIFS Lamina

Pluses

- Integrally colored
- standard mesh
- Easiest to apply
- Easiest to repair
- Most versatile

Minuses

- Low impact res.
- Insurance Issues
- Environmental Issues - rasping

Hard Coat Stucco

Pluses

- Most effective at hiding deflections
- Not an EIFS?
- No rasping
- High impact res.

Minuses

- Mechanical attachment
- Trim and Lath or netting
- Highest skill level
- High RMC and labor
- Hard but may crack
- Harder to repair

Combined Systems

- There are many homes with full Traditional Stucco systems with “EIFS” bands; these bands are EPS Plant-On bands. These are proper installations; *Please do not call these systems EIFS!*
- EPS bands with no basecoat or fiberglass reinforcing of lamina are improper.
- Some sections of a home may be EIFS and other sections may be traditional stucco, DEFS or another system.
- One Coat Stucco systems may or may not have rigid foam insulation behind stucco; Evaluation Reports allow either EPS or XPS insulation. Relocation Companies often refer to this as a Hybrid Stucco.

About this Presentation:

- This presentation does not address all conditions or local standards. Check with manufacturer's technical department or local building officials for clarification of unique conditions.
- This presentation is only intended to provide information for proper Stucco Identification and recognizing common problems.