HEAT PUMPS

TOP 10 INSTALLATION FAILS

HEAT PUMP NATION

ABOUT

- **2005:** Began selling heat pumps in homes
- **2009:** Sales manager for a heat pump manufacturer
- **2011:** Owner of USA's largest "Ductless Heat Pump Only" contracting company
- **Now:** Heat pump business consultant

JONATHAN
MOSCATELLO

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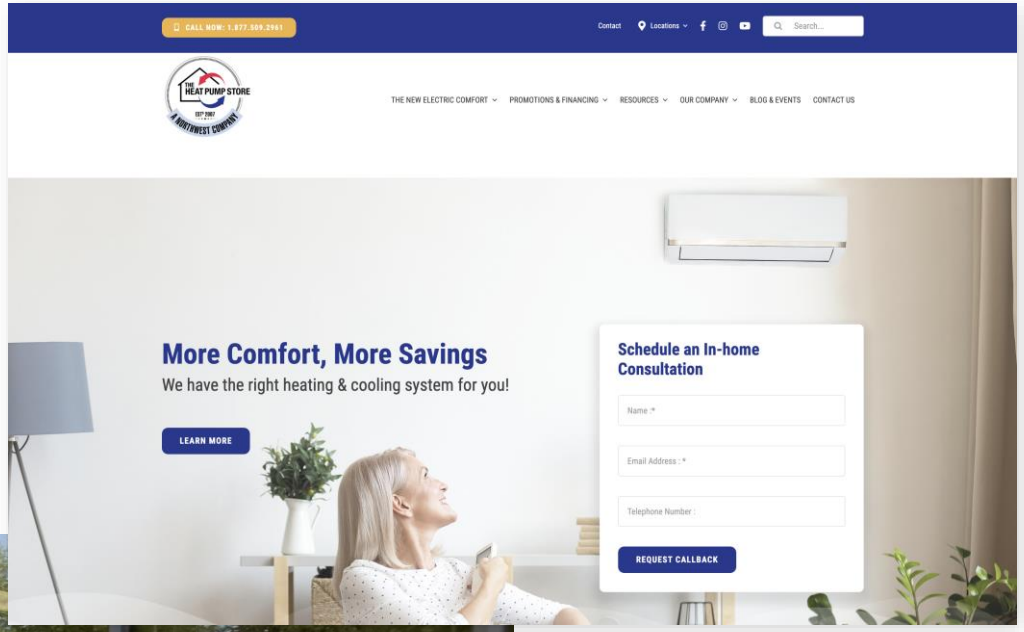
LOTS & LOTS OF HEAT PUMPS!

Jonathan's Contracting Business Locations & Service Area



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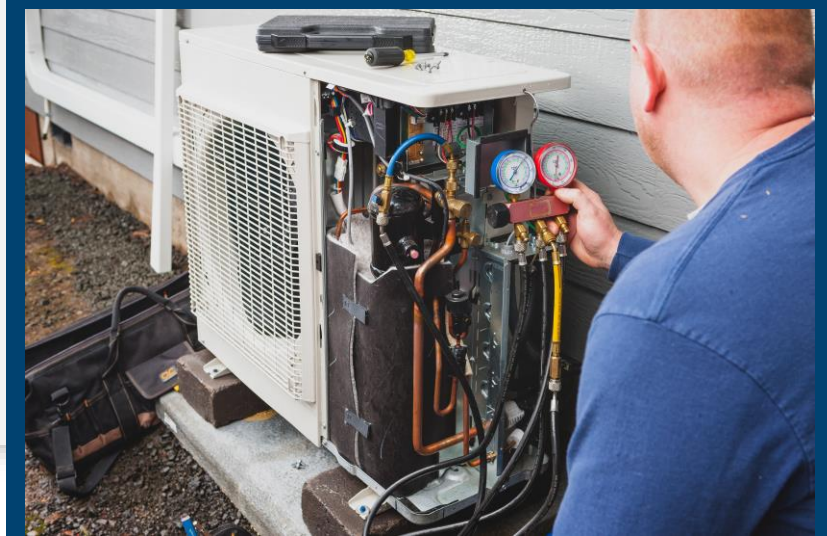
Special thanks for the support from

DAIKIN

IN THIS PRESENTATION...

TOP 10 INSTALLATION FAILS

Learn how a heat pump installation can **FAIL** to save energy and satisfy customers by not operating at peak performance.



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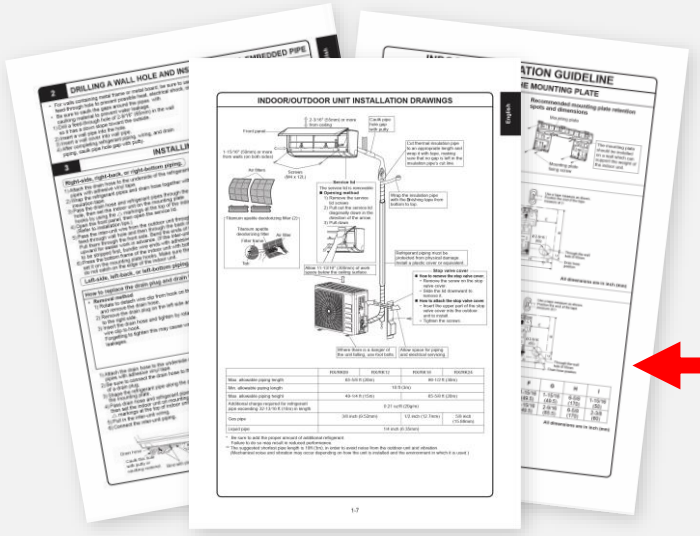
IMPORTANT DISCLAIMER

THIS VIDEO DOES NOT REPLACE…



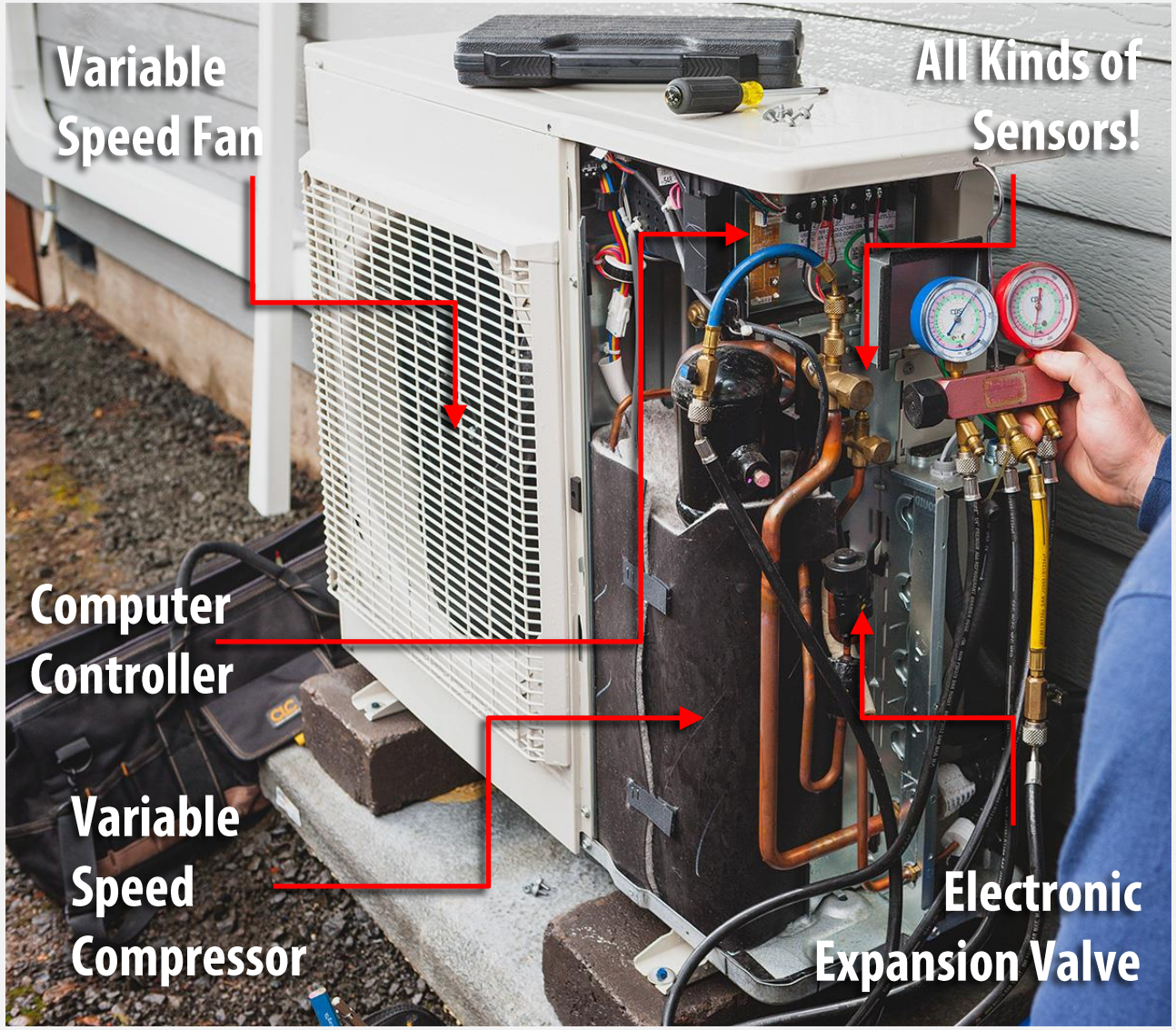
Manufacturer Installation Instructions

These are
CORE CONTENT
incorporated into
mechanical code

Installation Training Classes

Not Your Father's

HEAT PUMP



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AS YOU THINK ABOUT HEAT PUMPS IN YOUR BUSINESS…

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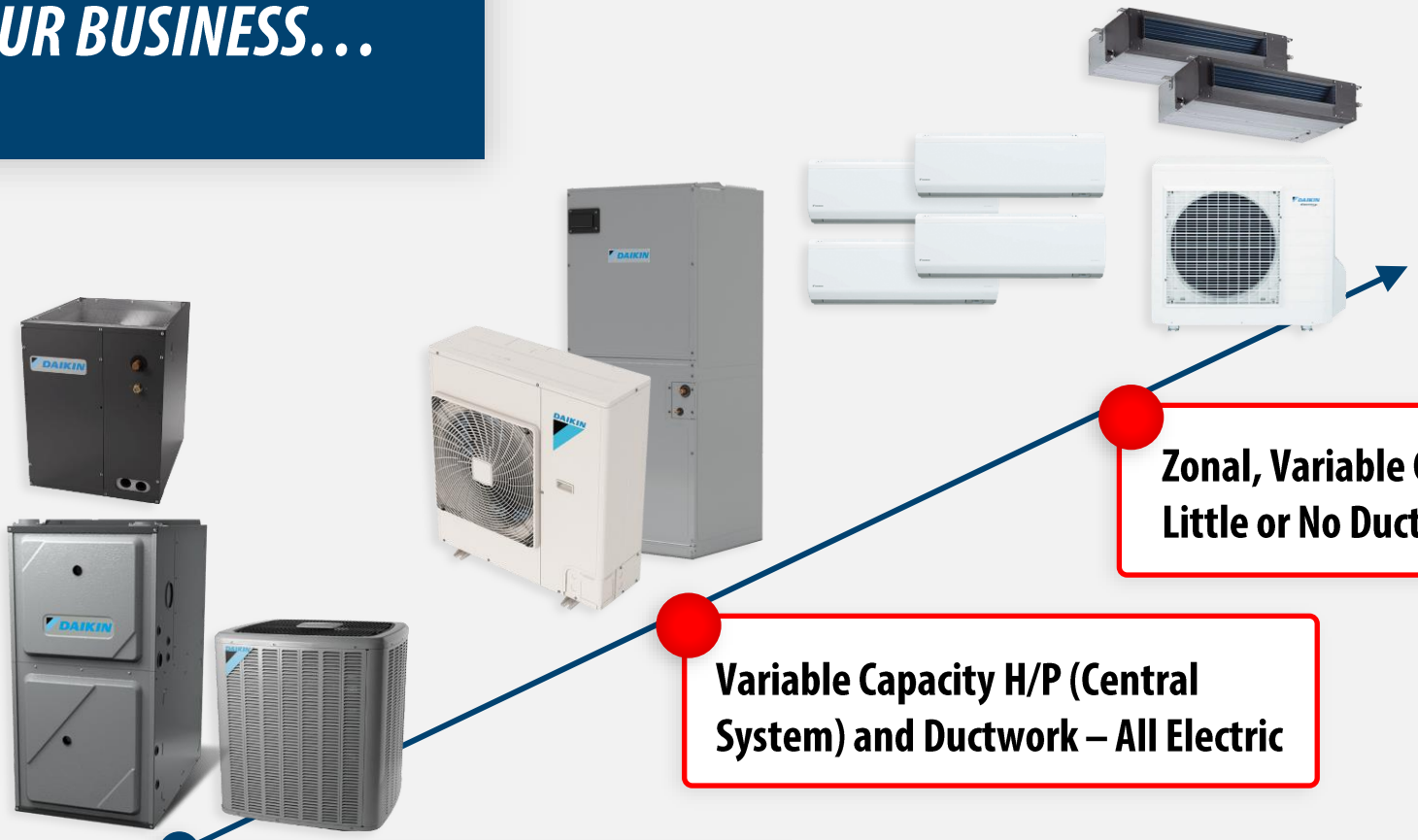

HEAT PUMP TECHNOLOGY EVOLUTION

IMAGINE A

HEAT PUMP INSTALLATION

It's a very busy day!

Arrive **ON-TIME** and in a clean uniform!

Start-up & commission

Installation

EVALUATE:

- ✓ Equipment Locations
- ✓ System Layout

SEVERAL INSTALLATION **FAILS** RELATED TO:

INSTALLATION LOCATION & SYSTEM LAYOUT

Factors to consider:

1 Patios, Hardscaping & Decks

2 Bedroom Walls

3 Roof Driplines

4 Dominant Wind Direction

5 Snow Depths

6 Indoor Unit Obstructions

AVOID INSTALLING OUTDOOR UNITS

ON PATIOS, HARDSCAPING & DECKS

FAIL

1

Defrost cycle melt water can re-freeze on ground surfaces and create a *dangerous slip hazard.*

If you cannot locate the outdoor unit to a flower bed or other helpful area, a drain pan heater and heat tape can allow for the melt water to be piped away.

1 Patios, Hardscaping & Decks

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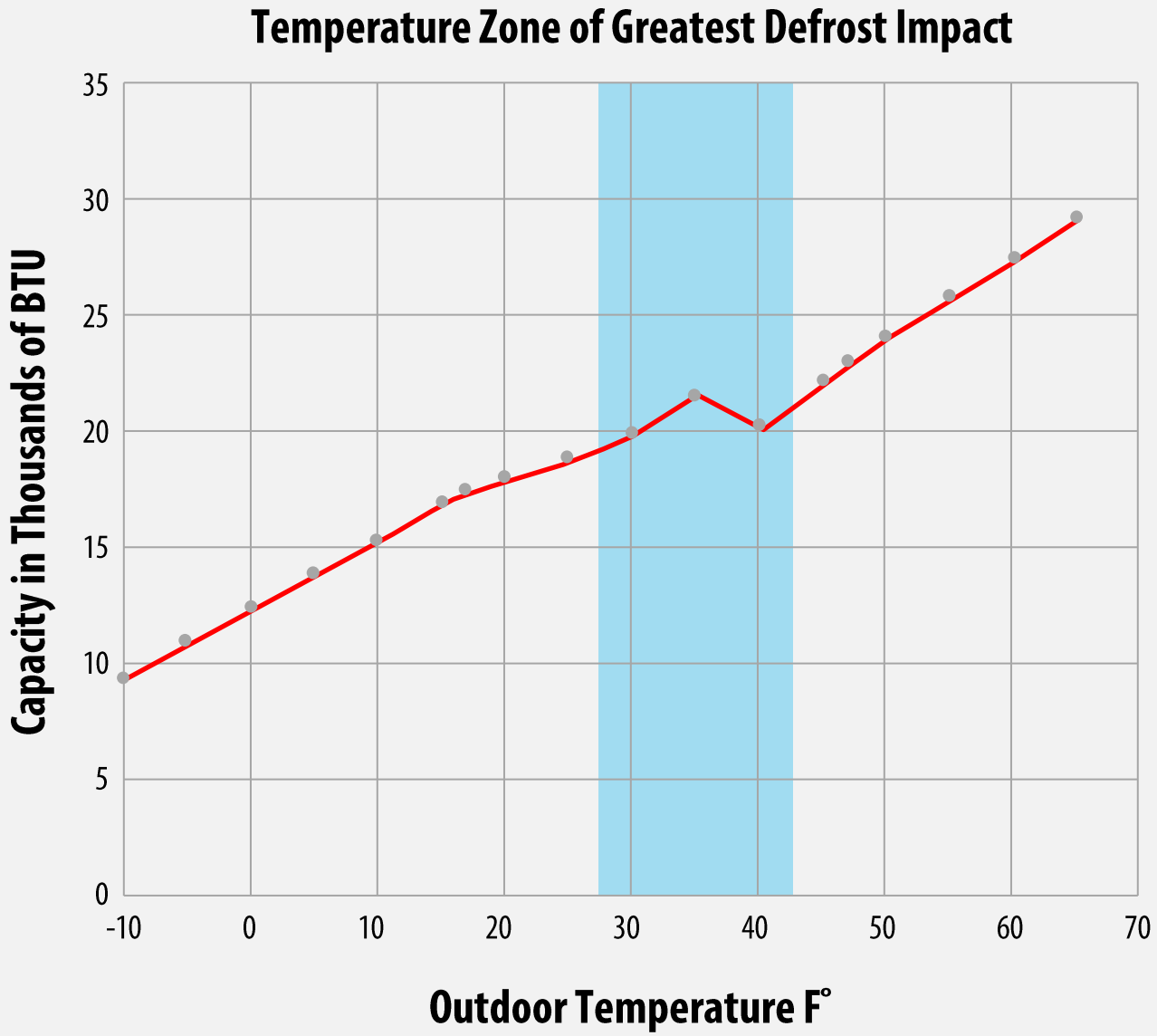
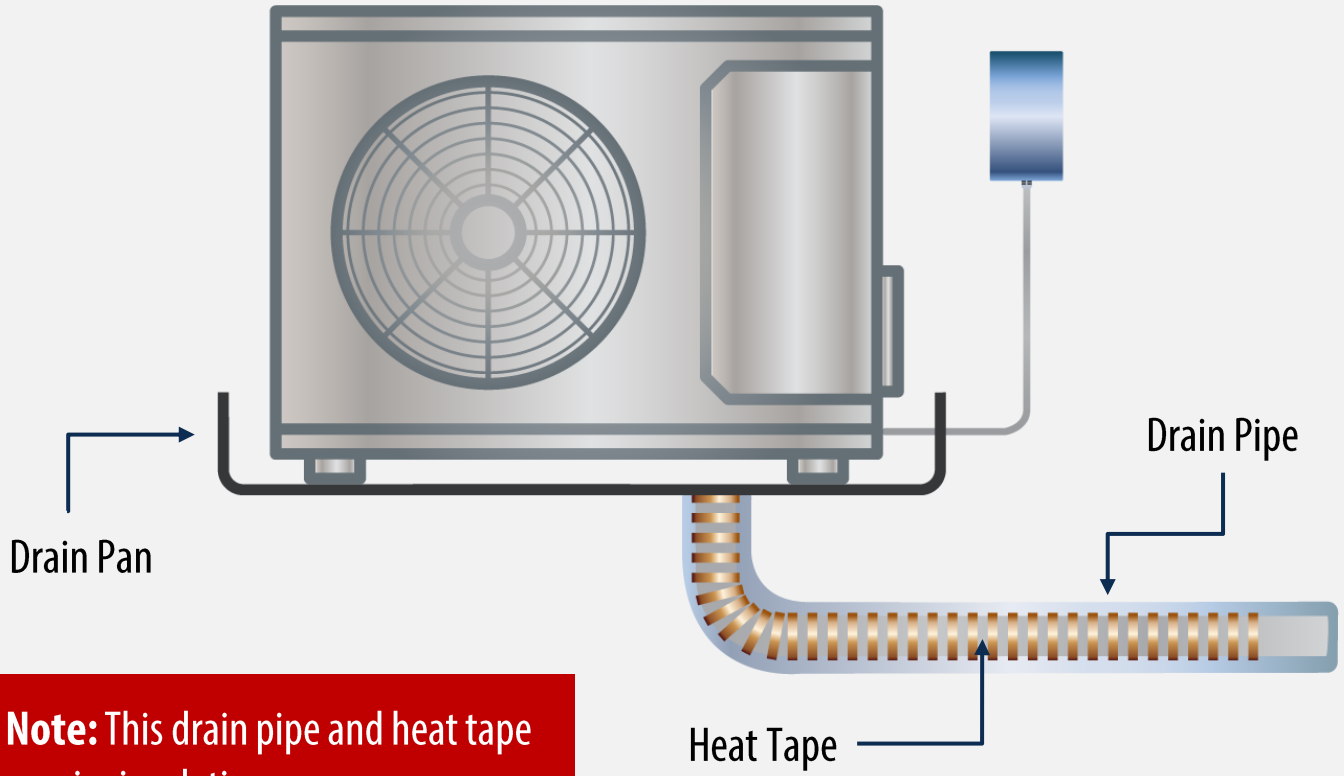
ABOUT

DEFROST CYCLE



MATERIALS SOLUTIONS & CORRECTIVE ACTIONS



Note: This drain pipe and heat tape require insulation.

These materials and corrective actions:

- Add cost
- Use up scarce labor
- Consume lots of energy

AVOID needing it!

As always, preventing this **FAIL** from occurring is best. Make your team is aware of it!

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LOCATE OUTDOOR UNITS

AWAY FROM BEDROOMS

FAIL

2

In colder climates, defrost cycle and full power operations occur frequently and run at higher decibels than typical operations. In homes with little or no insulation or single pane windows, these sounds may bother occupants.

2 Bedroom Walls

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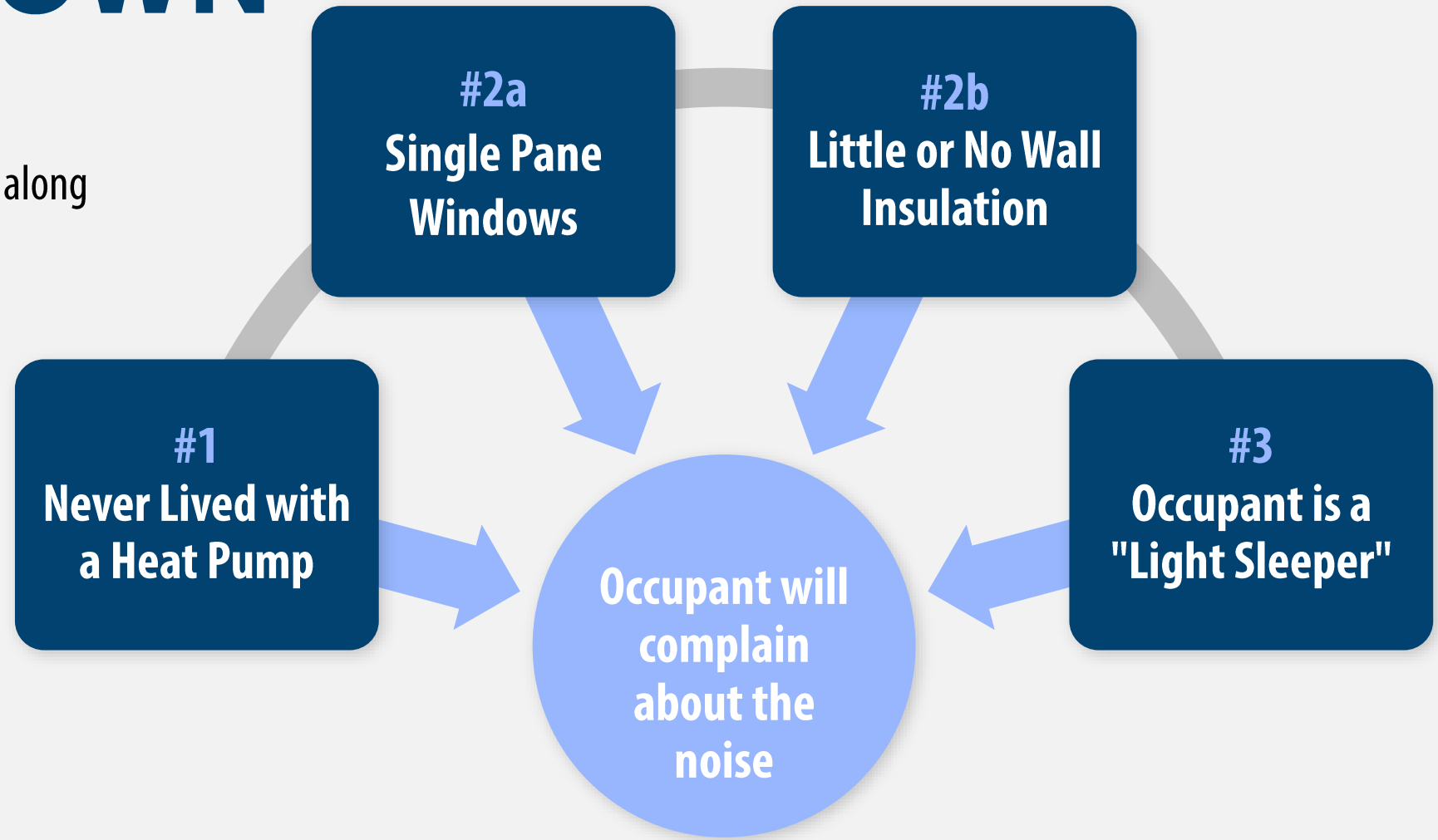
BREAKDOWN

OF THE PROBLEM

When a heat pump is installed along a bedroom wall…



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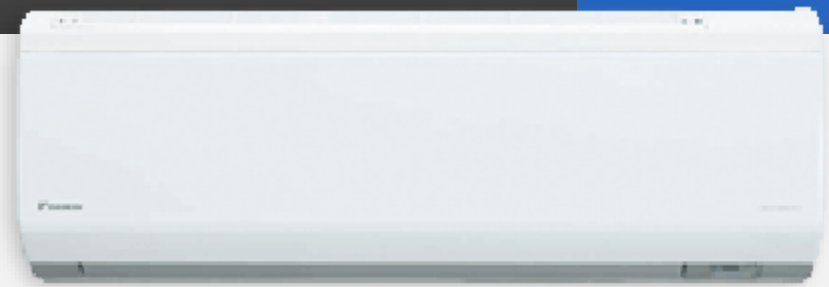
CONSIDER THIS:



If a homeowner has never lived with a heat pump before, they will notice new and different sounds.

If a homeowner is not prepared for the new sounds, they will call you to say, **“I think my heat pump is broken.”**

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CONSIDER THIS

WHEN REPLACING AN OLD AC UNIT

- In these cases, you will likely be reusing the installation location (converting the AC to a H/P)
- If the walls are well insulated, and the windows are double pane, you will be okay. Just be sure to educate the customer on the "new sounds" to expect.
- If the walls are not well insulated and the windows are single pane — look out! Strongly consider relocating the location.

CONSIDER THIS

FOR NEW INSTALLATION LOCATIONS

Most bedrooms have a closet or nearby bathroom.

Move the outdoor unit just a few feet along the wall so it is opposite of a closet or bathroom.

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CONSIDER THIS

WHEN ALL OTHER FACTORS ARE PRESENT

Be sure to spend time educating and orienting the homeowner on the new sounds to expect with a heat pump.

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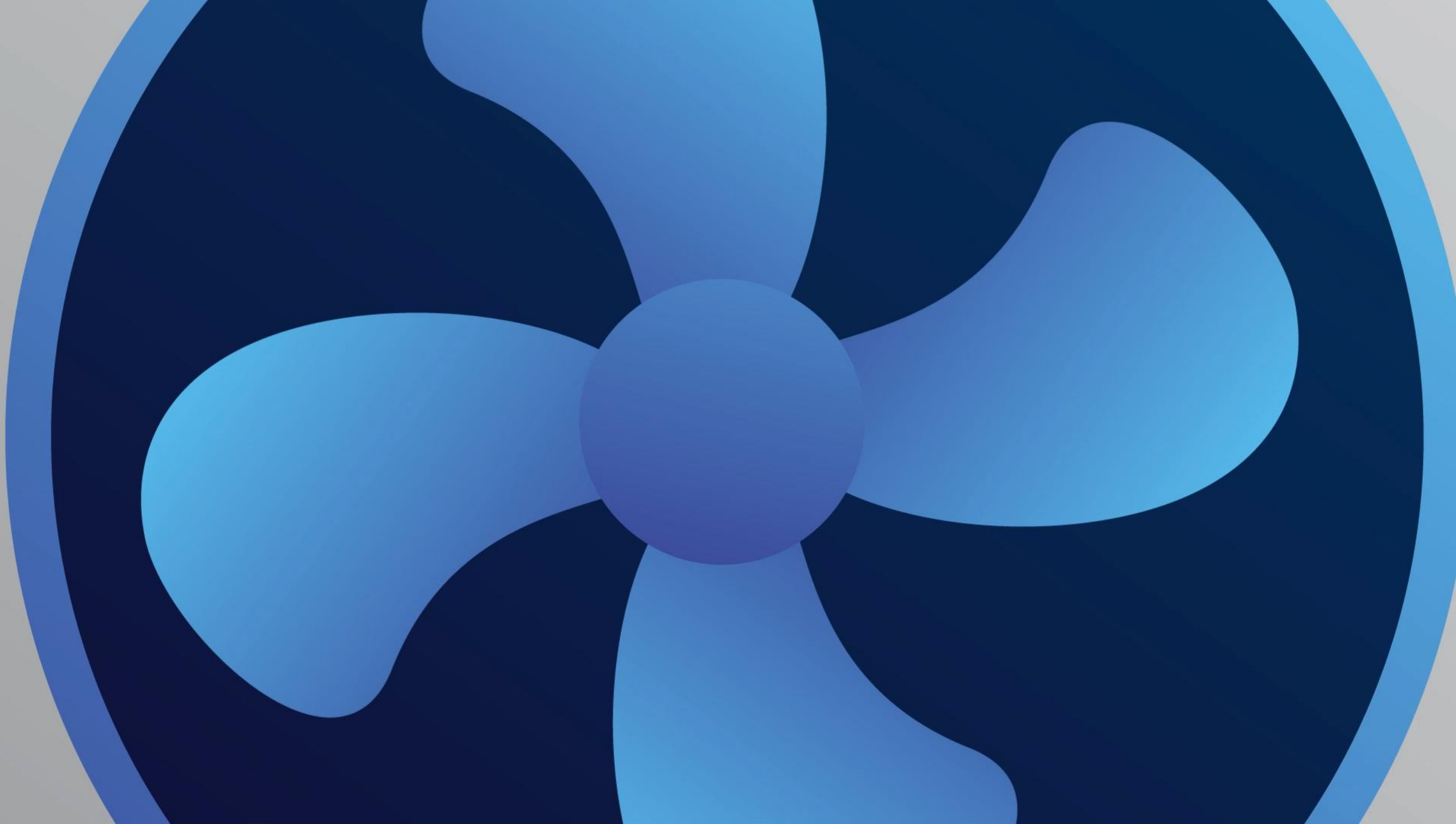

FAIL

3

DO NOT INSTALL OUTDOOR UNITS

UNDER A ROOF'S DRIPLINES

Rain, ice fall and snow melt from roof overhangs and driplines can re-freeze on the compressor's coil surface and overwhelm the unit's defrost cycle.

As always, preventing this ***FAIL*** from occurring is best. Make your team is aware of it!

3 Roof Driplines

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PREVENT THIS FAIL

There are several materials solutions to prevent drips from hitting the outdoor unit.

Shed Roof *to protect the unit*

Where possible, **install heat pump INSIDE of the roof's drip line**

Cap *to protect the unit*

DO NOT INSTALL OUTDOOR UNITS

FACING THE DOMINANT WIND

FAIL 4

If the outdoor unit is facing into dominant wind direction, this could cause counter-rotation of the outdoor fan and lead to failure of the fan motor, fan circuit board, or both.

If you cannot avoid the dominant wind direction:

- ✓ **TIP 1:** Install an optional wind baffle offered by the manufacturer
- ✓ **TIP 2:** Relocate or Reorient the outdoor unit

4 Dominant Wind Direction

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As always, preventing this ***FAIL*** from occurring is best. Make your team is aware of it!

INSTALL OUTDOOR UNITS

ABOVE AVERAGE SNOWFALL DEPTHS

FAIL

5

Outdoor units need free-flowing air at all times. Install using wall brackets or an equipment stand that will raise the outdoor unit above average snow levels.

5 Snow Depths

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MATERIALS SOLUTIONS & CORRECTIVE ACTIONS

- ✓ **TIP 1:** Install vibration absorbers when mounting the unit using wall brackets. Use double-ended vibration absorbers to reduce noise from transmitting through the wall.
- ✓ **TIP 2:** If ground clearance allows, use brackets designed to attach to the foundation wall.
- ✓ **TIP 3:** Remind the homeowner to regularly clear snow away from their outdoor unit, and to keep an eye on the unit during extreme weather.

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Brackets that attach to foundations reduce or eliminate noise and vibration!

INSTALL INDOOR UNITS

WITHOUT OBSTRUCTIONS IN FRONT

FAIL

6

Conditioned air being discharged out of the front the unit can bounce off the obstruction and get sucked right back into the indoor unit. When this conditioned air comes in contact with the return air temperature sensor inside the indoor unit, it leads the system to believe that the room is satisfied.

6 Indoor Unit Obstructions

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CORRECTIVE ACTIONS

Adjust the air vanes to push air away from obstruction

Relocate the obstruction or the indoor unit

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As always, preventing this ***FAIL*** from occurring is best.
Make your team is aware of it!

SEVERAL INSTALLATION **FAILS** RELATED TO:

INSTALLATION TECHNIQUES

Factors to consider:

- 7 Outdoor Units NOT Level
- 8 Linesets Partially Kinked
- 9 Wall Penetration NOT Sealed
- 10 Lineset NOT Completely Insulated & UV Protected

OUTDOOR UNITS

SHIFT & BECOME UNLEVEL

FAIL

7

The outdoor unit must be level (front-to-back and side-to-side) and remain so for its useful life. This is important for allowing the defrost cycle to work properly and to prevent ice buildup in the outdoor unit.

7 Outdoor Units NOT Level

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PREVENTATIVE ACTIONS & MATERIAL SOLUTIONS

TIP:

For ground pad-secured units with snow-level risers, create a strong, long-lasting foundation by following this process:

1. Remove mulch and topsoil
2. Pack and level base soil
3. Add 2 buckets of ¼" + minus gravel (or use 2 bags of dry cement mix)
4. Wet and tamp the gravel
5. Level ground pad

FAIL

8

AVOID ANY

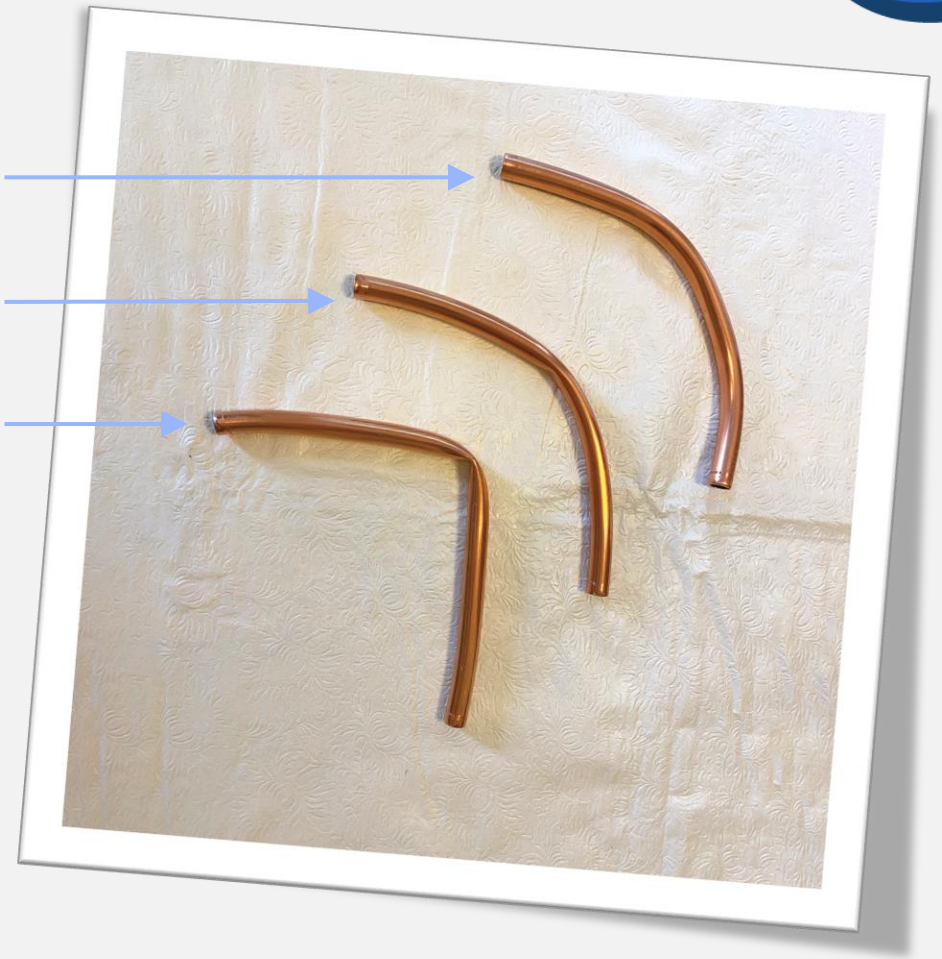
KINKS OR PARTIAL KINKS IN THE LINESET

Even a partial kink can result in reduced capacity in low temperatures and may result in a callback. This can be a very difficult problem to diagnose.

Okay

Partially Kinked (bad)

Kinked (bad)



8 Linesets Partially Kinked

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IDEAS FOR DIAGNOSIS

TIP:

For ground pad-secured units with snow-level risers, create a strong, long-lasting foundation by following this process:

1. Remove all the lineset covers from the system
2. Feel along the lineset for a **HOT SPOT**
3. Replace the tube (or section using couplers)

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BE SURE TO

AIR-SEAL & INSULATE THE WALL PENETRATIONS

Unsealed holes cause internal temp sensor to misread the room temperature. This leads to serious performance issues and discomfort when it is cold outside.

FAIL

9

9 Wall Penetration NOT Sealed

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TIP:

CREATE AN INSTALLATION CHECKLIST!

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During a busy installation day, this is one small detail that can get missed. Provide installers with an installation "Quality Control" checklist and make them "sign-off" on each item's completion.

Include items such as:

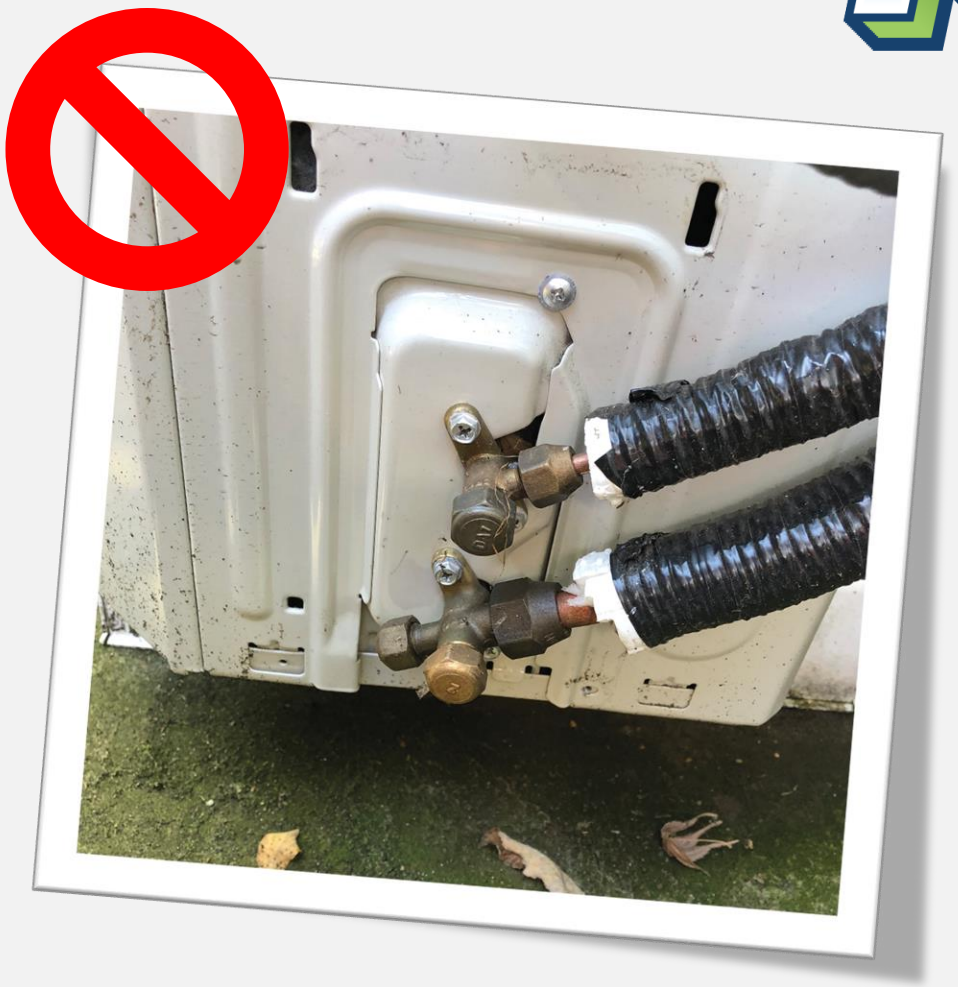
- ❑ Pressure test
- ❑ Vacuum test
- ❑ Seal wall penetrations
- ❑ Insulate and UV protect lineset
- ❑ Test condensate drains
- ❑ Start-up test

FAIL 10

ENSURE INSULATION COVERS THE

ENTIRE LINESET INCLUDING FLARE FITTINGS

Make sure insulation covers the flare nuts, as well as the entire lineset length. This ensures liquid or frost will not develop under the flare nut and cause cracks. Full insulation coverage also retains heat and improves system efficiency.



10 Lineset NOT Completely Insulated & UV Protected

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TIP:

USE UV FILMS & LINESET COVERS TO PROTECT THE ENTIRE LENGTH

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NOTE: The insulation covers the flare nut, too!

10 RECOMMENDED "COLD-CLIMATE" INSTALLATION PRACTICES

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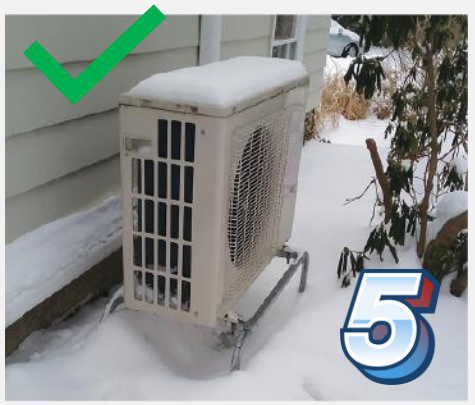

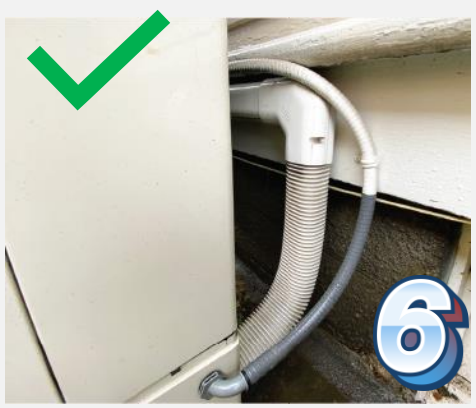

YOU CAN DO THIS!

1. Make your people **AWARE** of these fails!
2. Always work to improve your installation's energy efficiency and performance.

START NOW *And build your heat pump expertise!*

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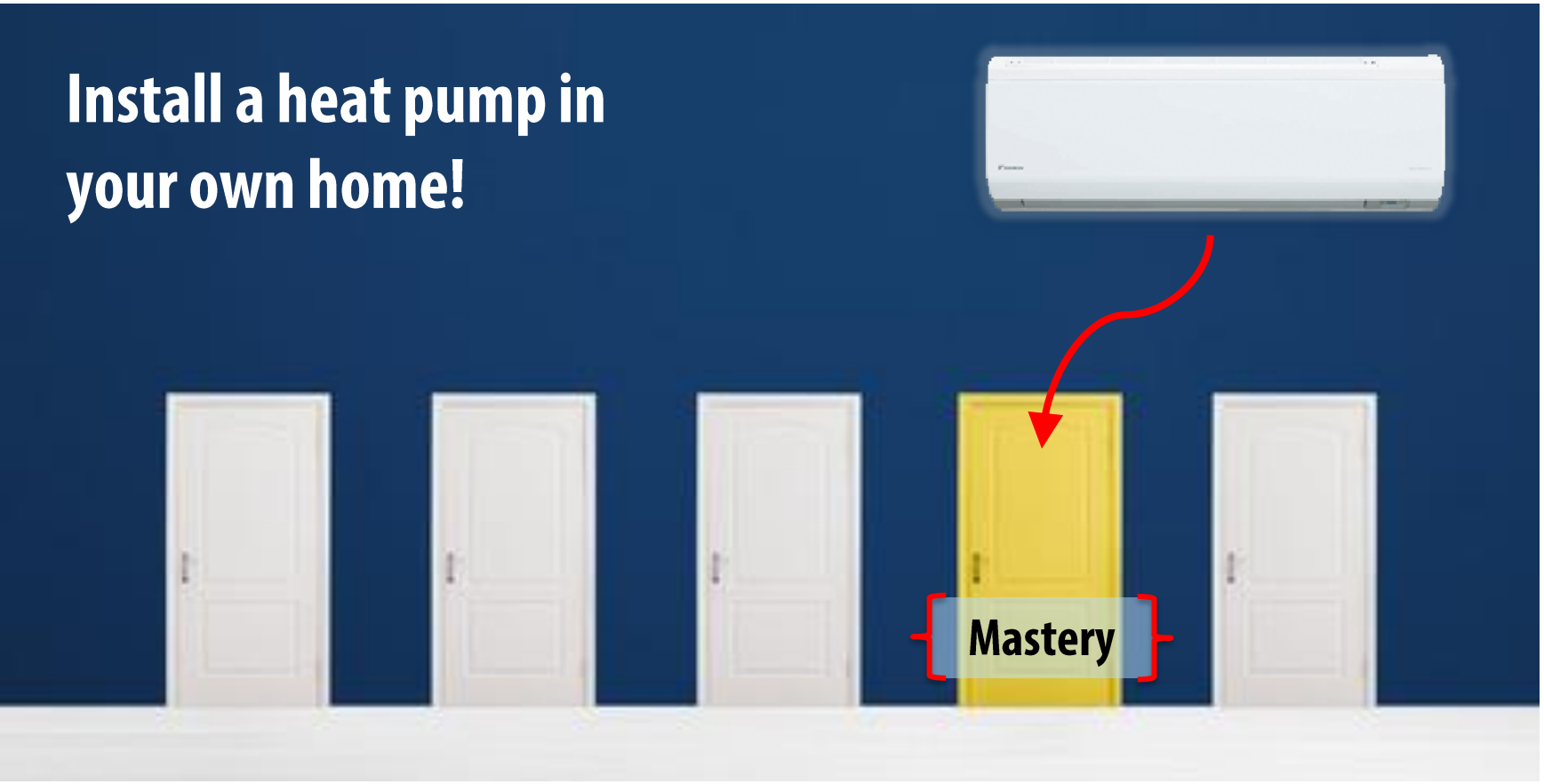
PATH TO MASTERY



There is no better statement than, ***"I installed one in my home."***

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THANK YOU!

Let's stay in touch!

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LinkedIn

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