Certification Training

Small Duct High Velocity System

SPACE PAK®

FAQs

I'm having problems with the audio, what should I do?

- If you joined this webinar using **Computer/Internet Mode**, you should **dial in by phone** with the number and access code **provided in the invitation email**.
- Call Technical Support: (855) 352-9002

Will I receive the recording of this webinar?

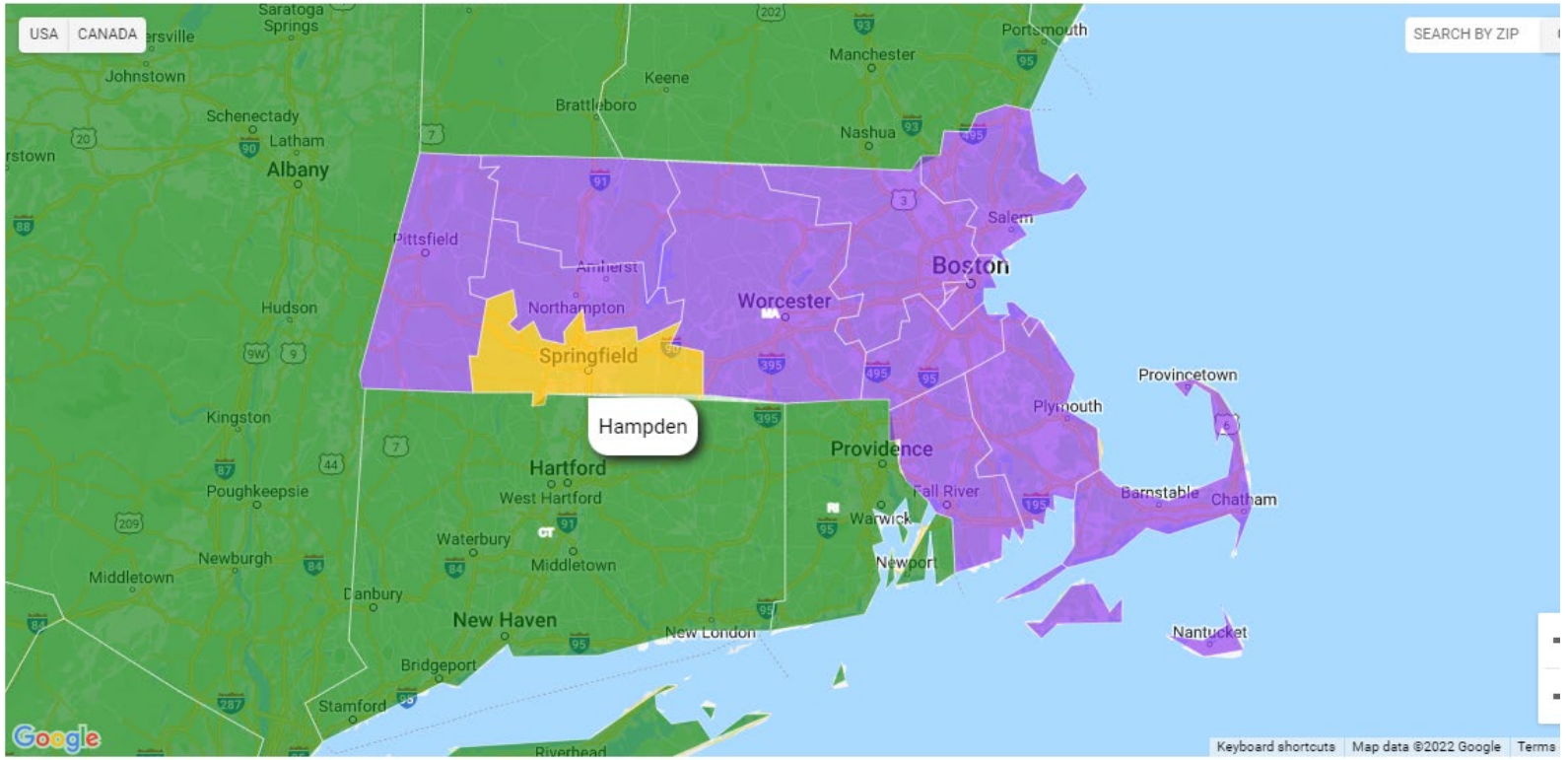
- Yes, one hour after this webinar has ended you will receive an **email with a link** to the recorded video.

Can I receive a PDF copy of today's presentation?

- Yes! Select **YES** in the **post-webinar survey**.

FAQs

For all **pricing and availability questions**, please contact your local SpacePak Representative. For contact information visit: www.spacepak.com/RepLocator



General House Keeping

Please make sure your **audio is kept on MUTE** unless you have been called on to ask a question.

During Q&A sessions; please **raise your hand** and wait to be called on before you unmute and speak via mic.

Questions typed into the chat bar will be answered via written reply or by our trainer during the Q&A sessions, or throughout the presentation.

Handouts to Download

- All Products Brochure
- Project Design Form
- Tips & Tricks Book
- SpacePak High-Res Logos

SPACE PAK®

SDHV Virtual Certification

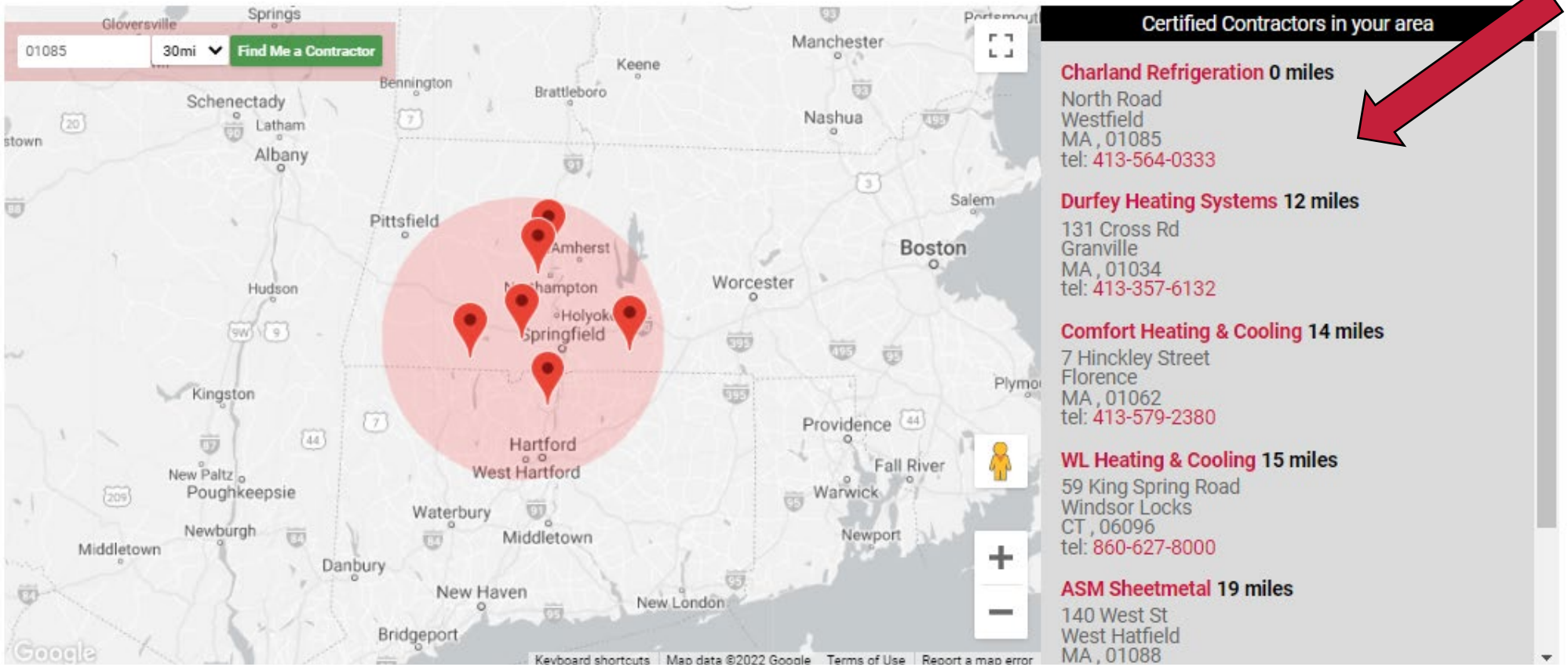
SDHV Certified Contractor Benefits

- Local Leads via Lead Generation System
- Listed on SpacePak Website Contractor Map
- Pre-Sale Application Support, Load Calculations, Priority Tech Support
- Marketing Support
- Extended Warranty *with Product Registration*

Contractor Locator Map Lead Generation

NOTICE

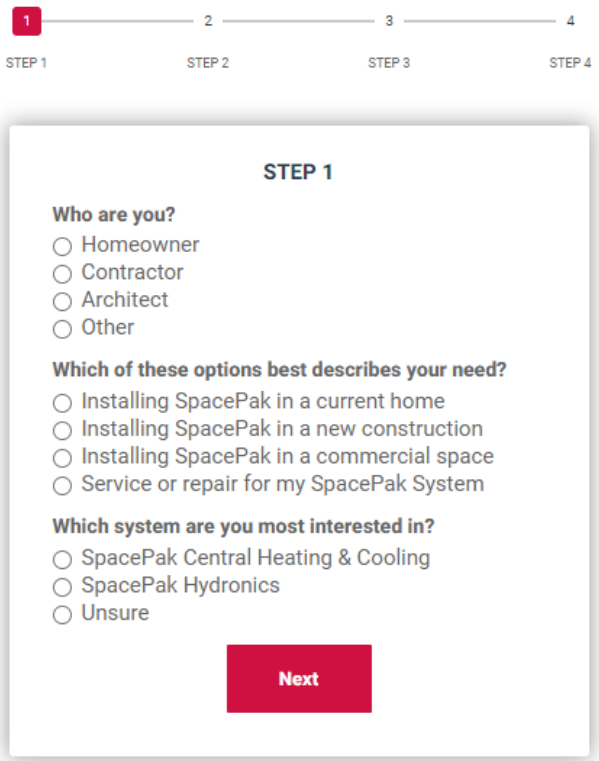
Your Company Here



Homeowner Jobs Emailed Directly to YOU as a Lead

Find a Certified Contractor

Are you interested in installing a SpacePak system in your home? Get the process started by requesting a free, no-commitment consultation. Once you've submitted your request, you'll receive contact information for local SpacePak certified contractors.



NOTICE

Extensive form guarantees only serious inquiries.

Warranty & Product Registration

To be eligible for extended warranties:

- Must be a SpacePak Certified Contractor
- Project/equipment must be registered at https://www.spacepak.com/warranty

SpacePak Air-to-Water (inverter series only)

- A NON-CERTIFIED contractor will receive a two (2) year parts and five (5) year compressor warranty
- A CERTIFIED contractor will receive a five (5) year parts and a ten (10) year compressor warranty

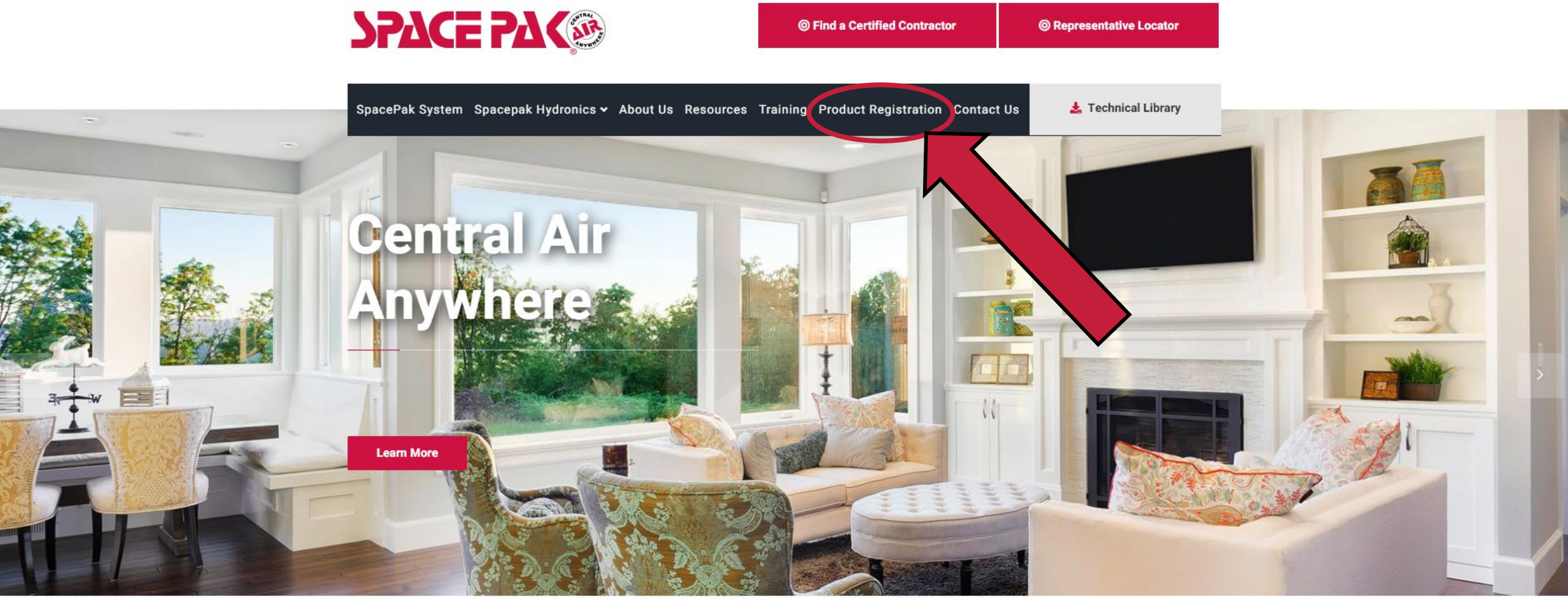
SpacePak SDHV, hydronic fan coils and associated equipment

- A NON-CERTIFIED contractor will receive a one (1) year parts warranty
- A CERTIFIED contractor will receive a five (5) year parts warranty

SpacePak Buffer Tanks

- A standard ten (10) year warranty will be issued on all buffer tanks

Must Register Equipment for Extended Warranty



◎ Find a Certified Contractor

◎ Representative Locator

SpacePak System | Spacepak Hydronics | About Us | Resources | Training | Product Registration | Contact Us | Technical Library

Warranty Registration

1 Who are you? — 2 Contractor Info — 3 End-User Info — 4 Equipment Registration

Who are you?

- ○ Homeowner/End-user
- ○ Installing Contractor

Next

FOR INSTALLING CONTRACTORS

If your company is an installing contractor seeking:

- Factory-authorized certification status
- Extended warranty
- Added to Contractor Locator Map on Website
- Local Leads form Homeowners

The please select YES in the post-webinar survey and we will email you the registration form.

Form Submissions Emailed Directly to YOU as a Lead

Find a Certified Contractor

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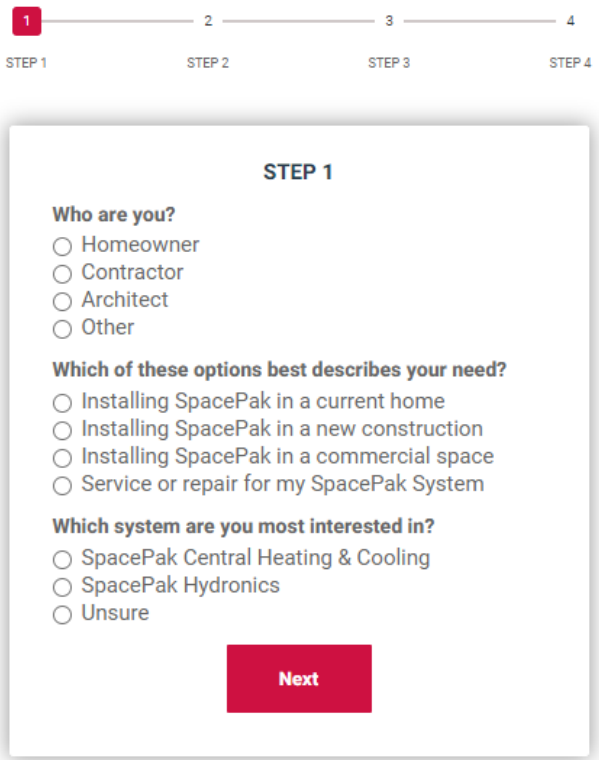

NOTICE

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SpacePak Team Provides Pre-Sale Support

PreSaleSupport@SpacePak.com

Pre-Sale Support is a team of application engineers who provide optimal turnaround in answering your questions regarding system design and layout as well as assistance in equipment selection and job quoting.

- Available to Representatives, Wholesalers and Contractors
- Any questions regarding equipment already shipped should be directed to: (413) 564-5530
- TechnicalService@SpacePak.com: (413) 564 - 5530

MESTEK, INC.

HVAC Division

Beacon Morris

RBI
RELIABLE. BOLD. INNOVATIVE.

ATH
ADVANCED THERMAL HYDRONICS

KN SERIES

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SPACE PAK

EMBASSY INDUSTRIES Inc.

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Argo
BASEBOARD

Vulcan
RADIATOR

BOYERTOWN FOUNDRY COMPANY

STERLING

KOLDWAVE

LJ ING

awv

L&D

AIRLINE™
LOUVERS

King

ARROW UNITED INDUSTRIES

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feel the difference™

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INDUSTRIES

AZTEC

CESCO
PRODUCTS

abi

Applied Air

Sierra
FRESH AIR SYSTEMS

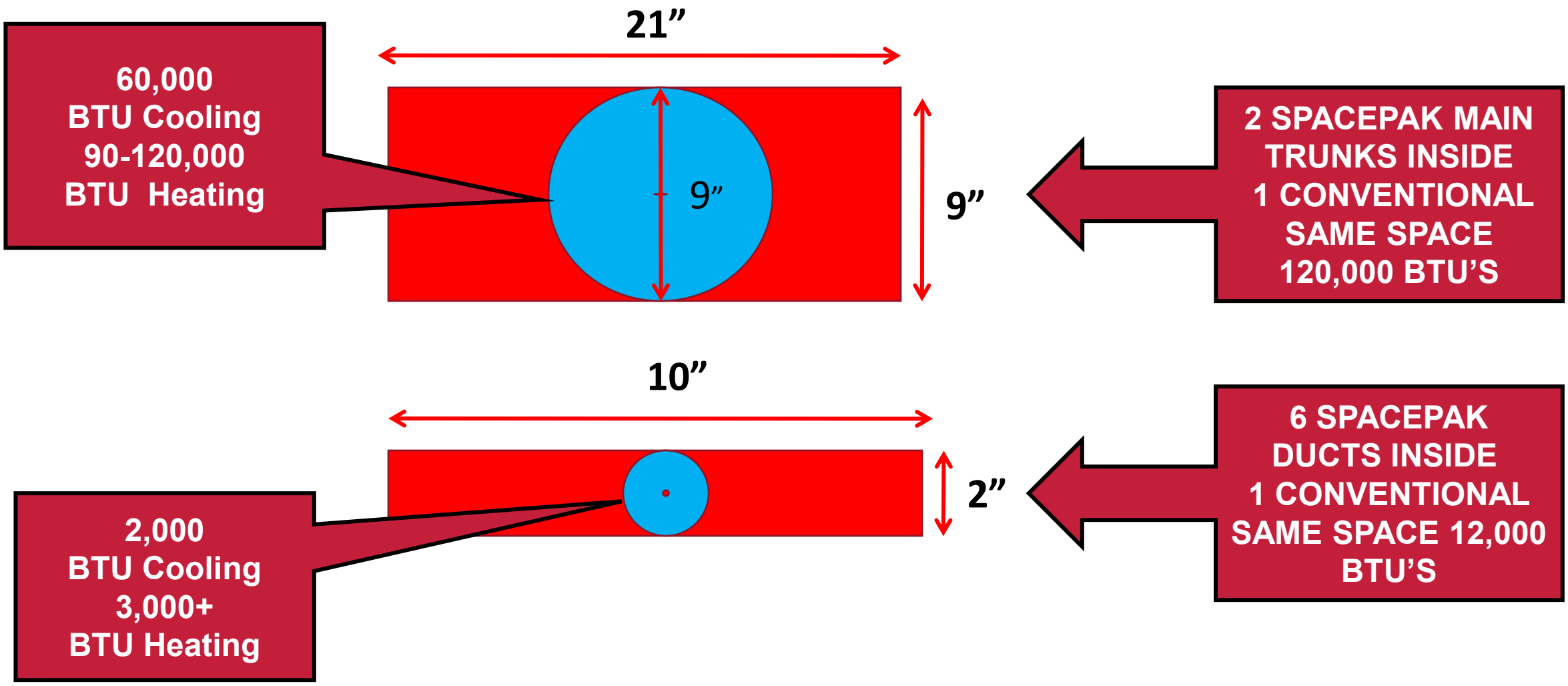
SpacePak: Innovator of Small Duct High Velocity (SDHV) Heating & Cooling

SpacePak delivers uniform, year-round comfort, with fewer of the unwanted challenges common to other central heating and air-conditioning systems. Making sure there are:

- **No** Major Renovations
- **No** Loss of Usable Floor Space
- **No** High Energy Bills
- **No** Unsightly Components

- Simply quiet, cost-effective comfort for virtually any home or building, regardless of the structure's design, age, size, or construction type.
- SpacePak is an air distribution system which uses a principle known as aspiration - as the air stream enters the room, it creates a gentle mixing of air in the room to provide thorough, comfortable draft-free air circulation.
- SpacePak eliminates stratification with a minimum floor-to-ceiling temperature difference.

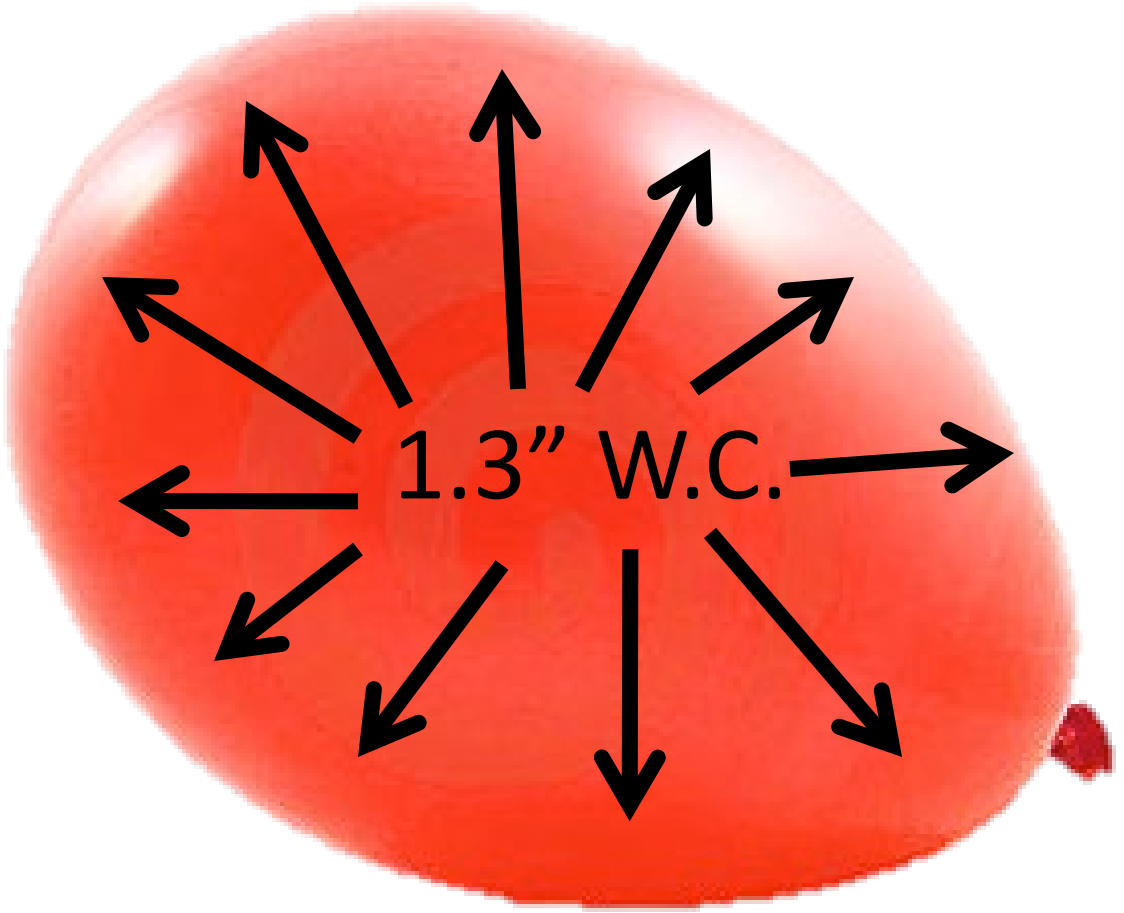
System Principles Of Operation SDHV



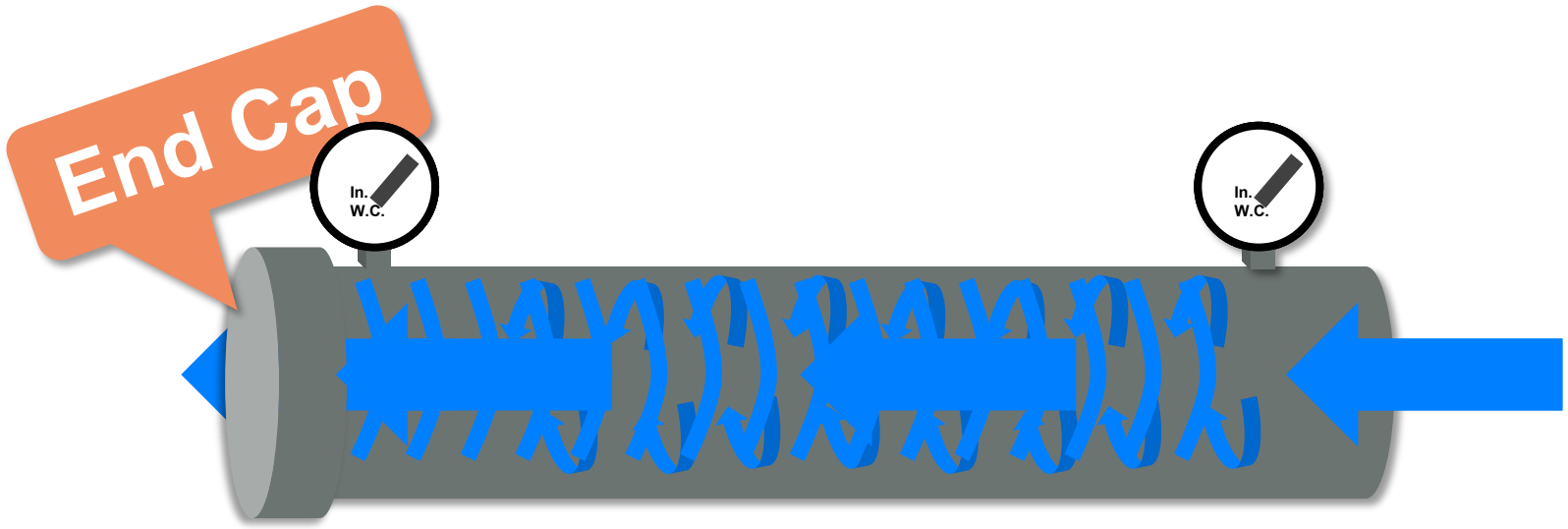
Motor & Blower

SPACEPAK	CONVENTIONAL
1.2 -1.8 + INCHES WC STATIC PRESSURE	**.5 INCHES** WC STATIC PRESSURE
220 TO 250 CFM PER NOMINAL TON	**350 TO 400 CFM** PER NOMINAL TON

Static= EQUAL PRESSURE ON ALL INSIDE SURFACES

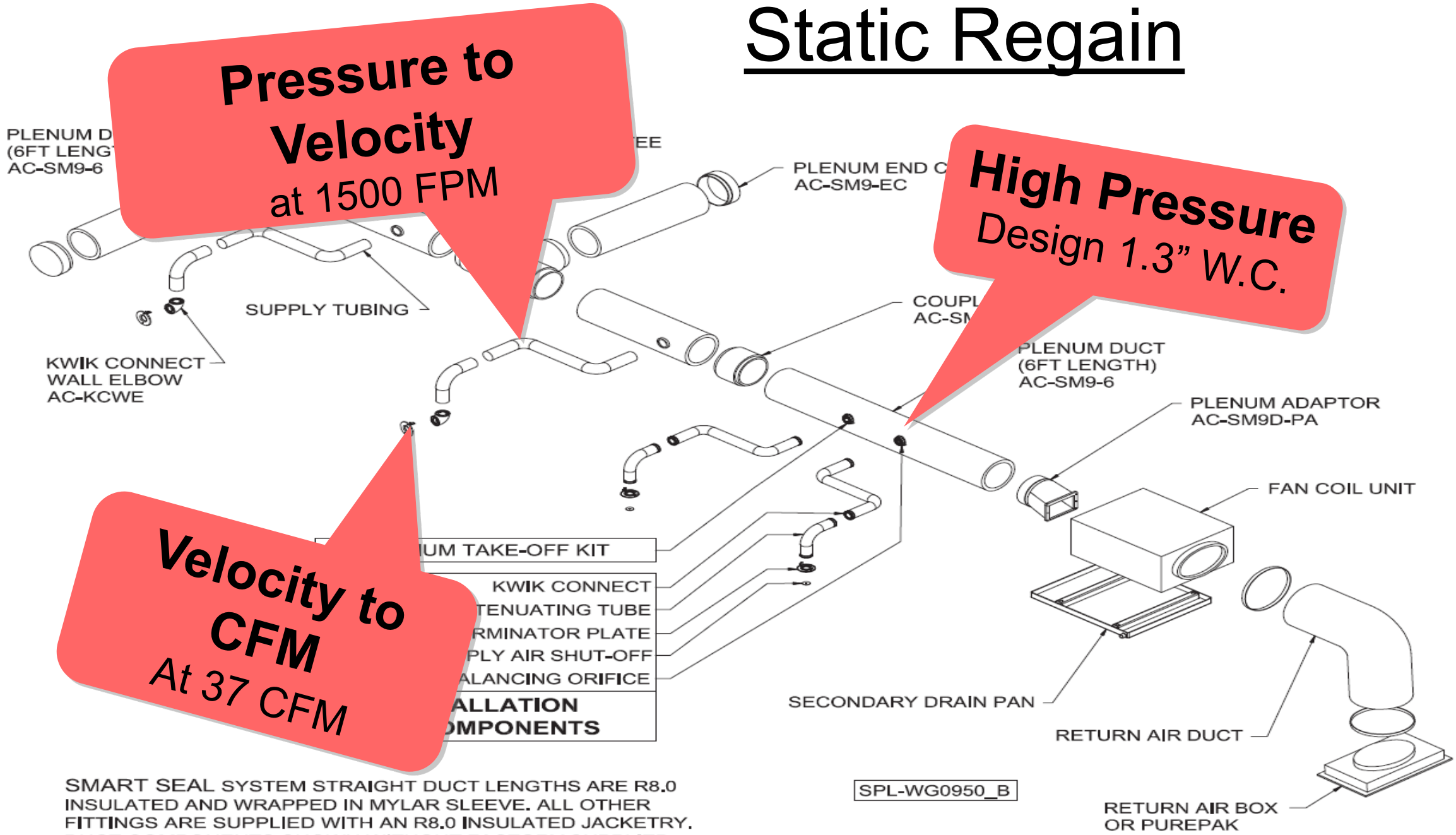


The Process of Static Regain (Its about the pressure)



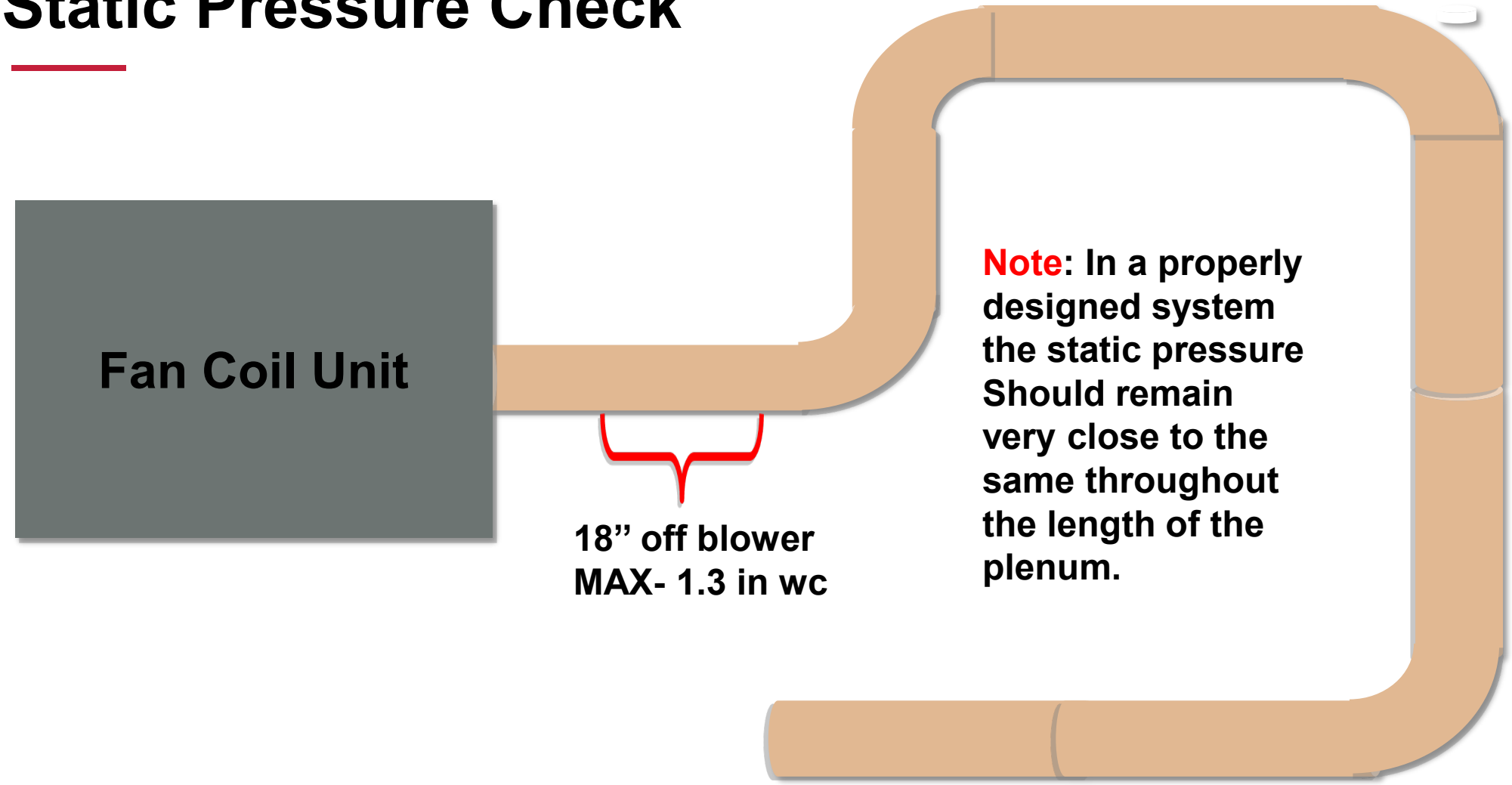
MAIN PLENUM

Static Regain



SMART SEAL SYSTEM STRAIGHT DUCT LENGTHS ARE R8.0 INSULATED AND WRAPPED IN MYLAR SLEEVE. ALL OTHER FITTINGS ARE SUPPLIED WITH AN R8.0 INSULATED JACKETRY. DUCT COMPONENTS SHOWN WITHOUT FACTORY SUPPLIED R8.0 INSULATED JACKETRY.

Static Pressure Check

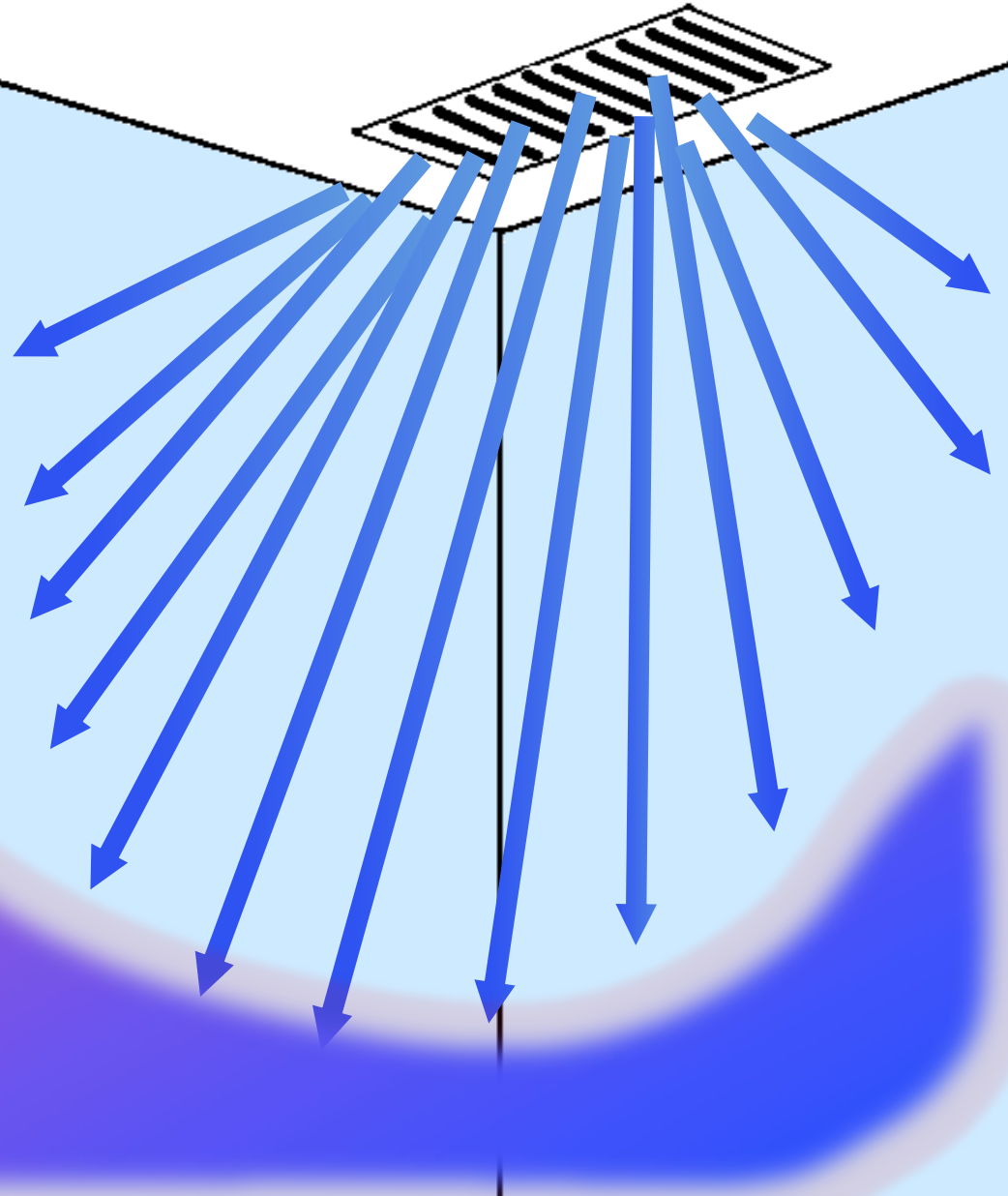


Note: This is the first place to start during commissioning then we will move on to delivered CFM

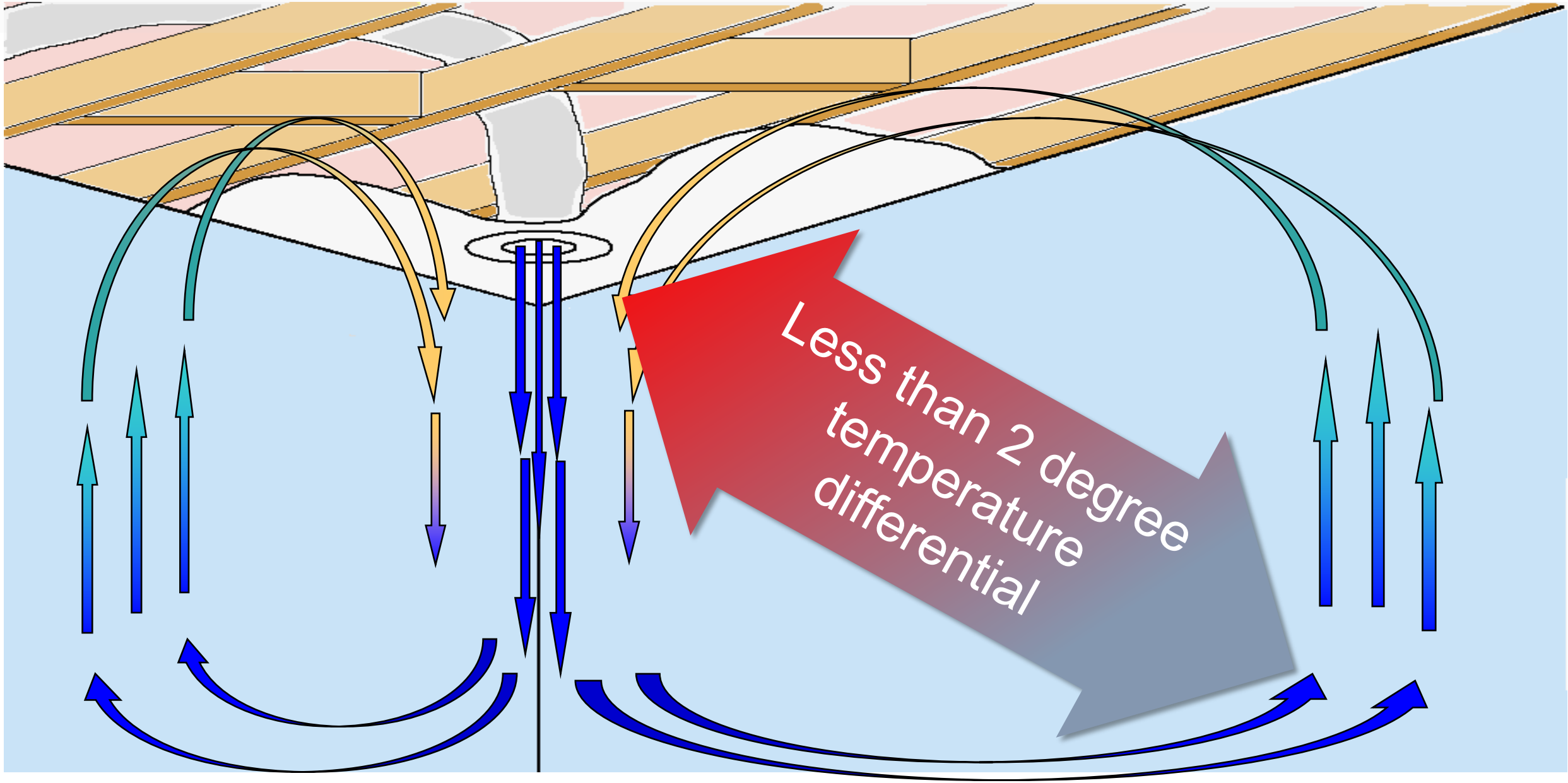
Conventional Air Systems

- Supply & Returns per room are needed for proper operation
- Needs complete air change
- Works for and is generally designed for heating or cooling applications

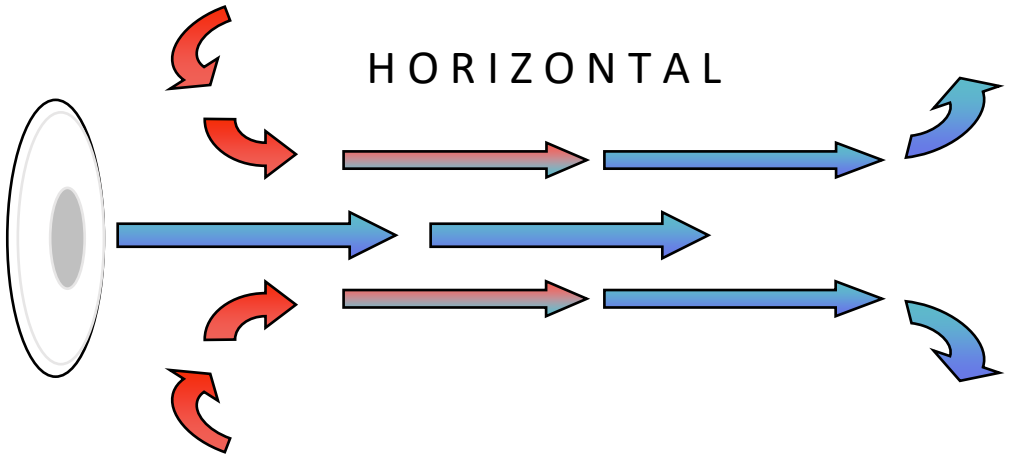
NOT BOTH

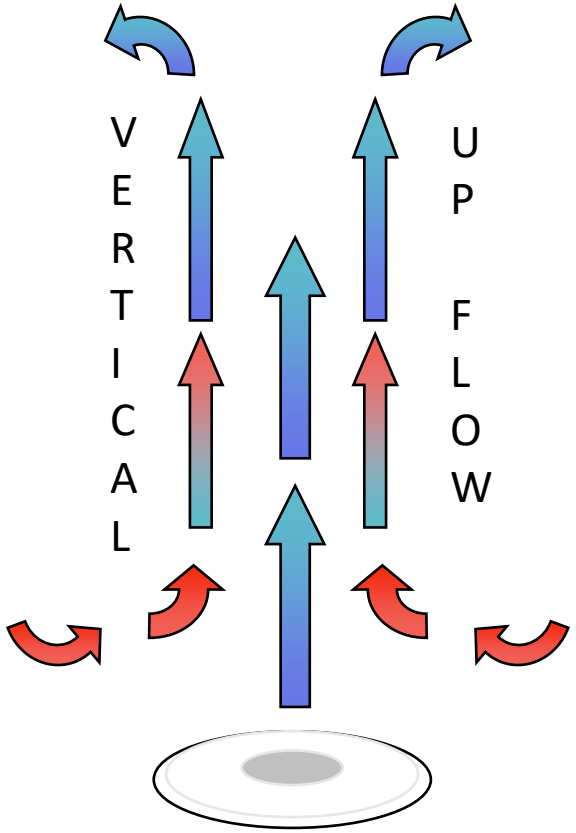


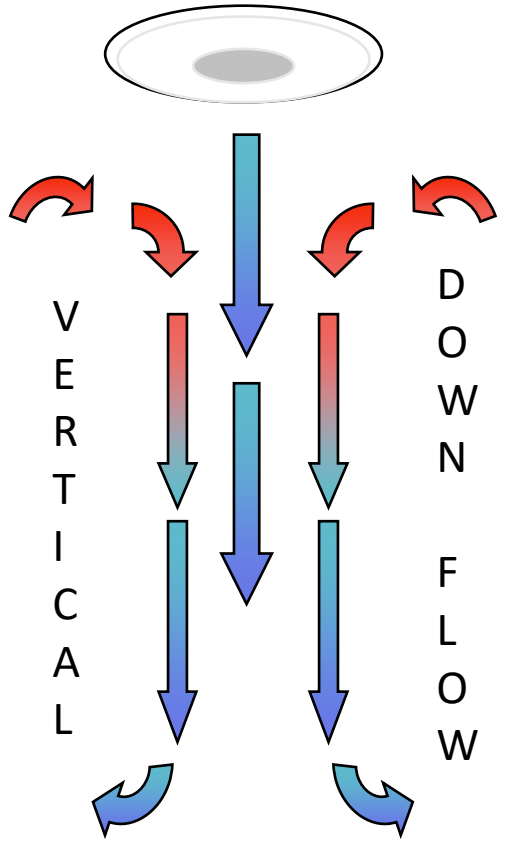
SpacePak's Process of Aspiration



Outlet Orientation: Where will aspiration work?



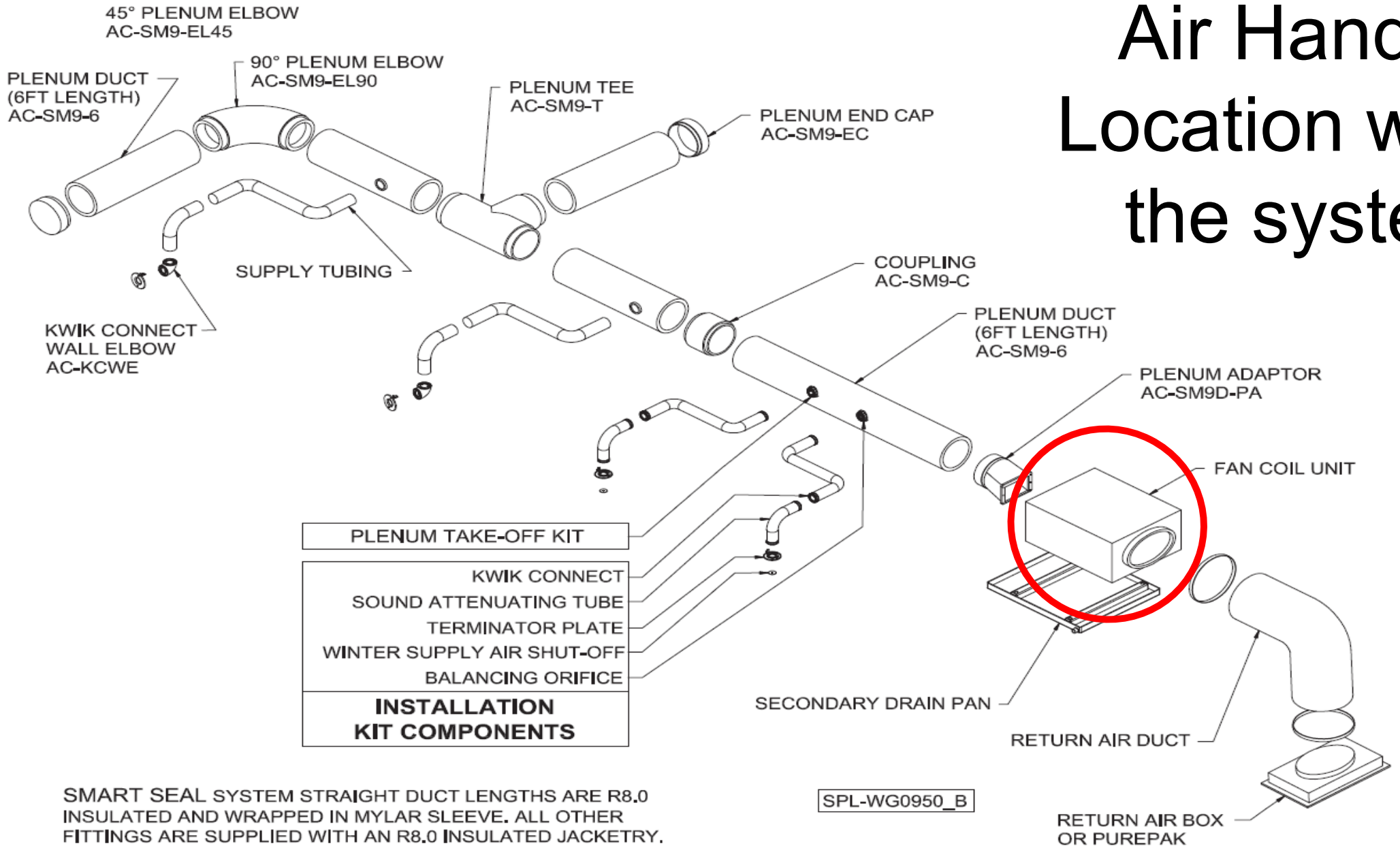




Are there any Questions?

Let's Start with the J-Series Air Handler

Air Handler Location within the system



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SpacePak Air Handlers- J Series Available Sizes

Available in 3 sizes:

- **2430 – 2 – 2 ½ Tons**
- **3642 – 3 – 3 ½ Tons**
- **4860 – 4 – 5 Tons**

*Available in Horizontal or Vertical configuration

Note: **Units are not field convertible and will have to be ordered in either vertical or horizontal orientation**

*Also available with Hot or Chilled water coil

J-Series Specifications

FIGURE 2.1: MODEL ESP-J SPECIFICATIONS

Model	System capacity (Nom. Tons)	Electrical Characteristics*	Connections				Recommended Condensing Unit	
			Suction Line (O.D.)	Liquid Line (O.D.)	Cond. Drain (FPT)	Return Inlet (Dia.)	Nominal Capacity (MBH)	Min SEER
ESP-2430J-V	2 - 2-1/2	230/60/1	7/8"	3/8"	3/4"	15"	24 to 30	13+
ESP-3642J-V	3 - 3-1/2	230/60/1	7/8"	3/8"	3/4"	19"	36 to 42	13+
ESP-4860J-V	4 - 5	230/60/1	7/8"	3/8"	3/4"	24"	48 to 60	13+

*Unit includes optional conversion kit to 115V.

Model	System capacity (Nom. Tons)	Blower				Coil		Ship. Wt. (lbs)	
		Std. CFM @ 1.2" W.C.	Wheel Dia. and Width	Motor HP	115V/230V F.L. Amps*	No. of Rows Deep	Flow Control Device	J	JV
ESP-2430J-V	2 - 2-1/2	440, 550	10" x 6"	3/4	5.6/2.8	6	TXV	105	135
ESP-3642J-V	3 - 3-1/2	660, 850	10" x 6"	3/4	7.6/4	6	TXV	123	170
ESP-4860J-V	4 - 5	880, 1150	10" x 6"	3/4	10.6/5.4	6	TXV	144	210

*Unit includes optional conversion kit to 115V.

The J-Series and your favorite outside condenser matched up!!!!!

Certified by AHRI

AHRI CERTIFIED

www.ahridirectory.org

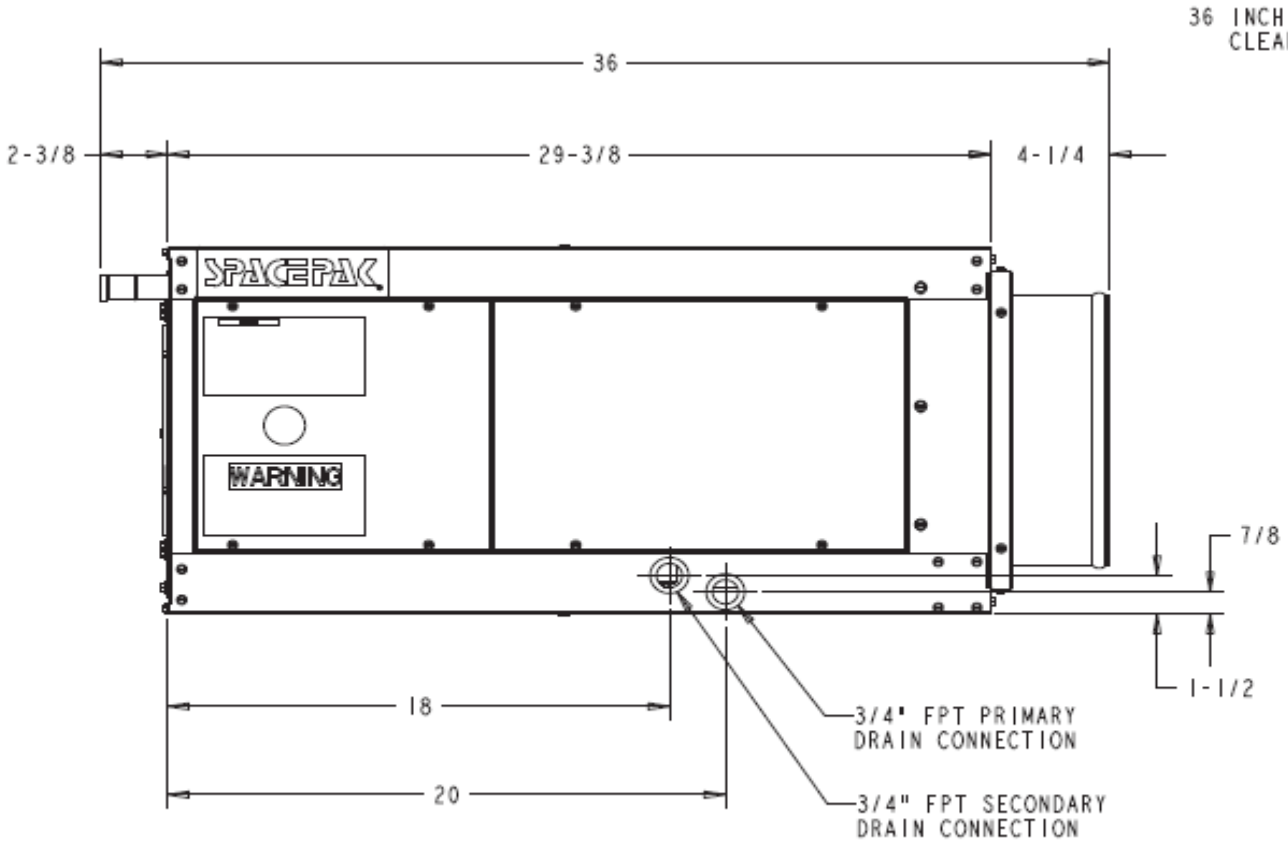
Check the AHRI website frequently to see the growing list of certified matches

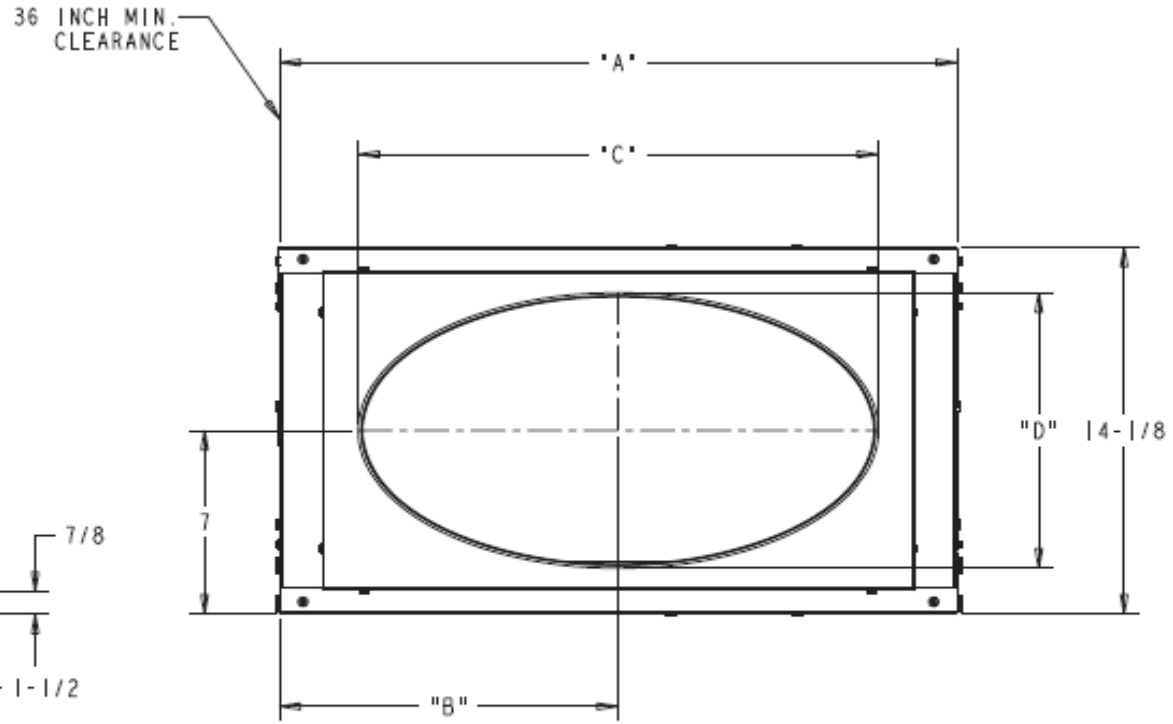
ESP- J Series DX Horizontal Air Handler

Standard Features

- J+ Advanced Control
- 2 Line Display for Easier Setup
- High Efficiency EC Integrated Motor/Blower Assembly
- Mode Specific Adjustable Speed Control
- Heat Pump Compatible
- Chatleff Thermal Expansion Valve
- 6-Row Copper/Aluminum Evaporator Coil
- Slide Out Blower
- Sweat-Type Refrigerant Connections
- 24V 50/60hz Transformer
- Insulated Grey Cabinet
- Float Switch
- Mold Resistant Primary Drain Pan
- Anti-Vibration Foam Strips

J-Series Horizontal Dimensions





MODEL	A	B	C	D
2430J	24-1/4	12	18-1/2	10-1/2
3642J	33-1/4	16-1/2	25-3/4	10
4860J	43-1/4	21-1/2	34-1/4	10-1/4

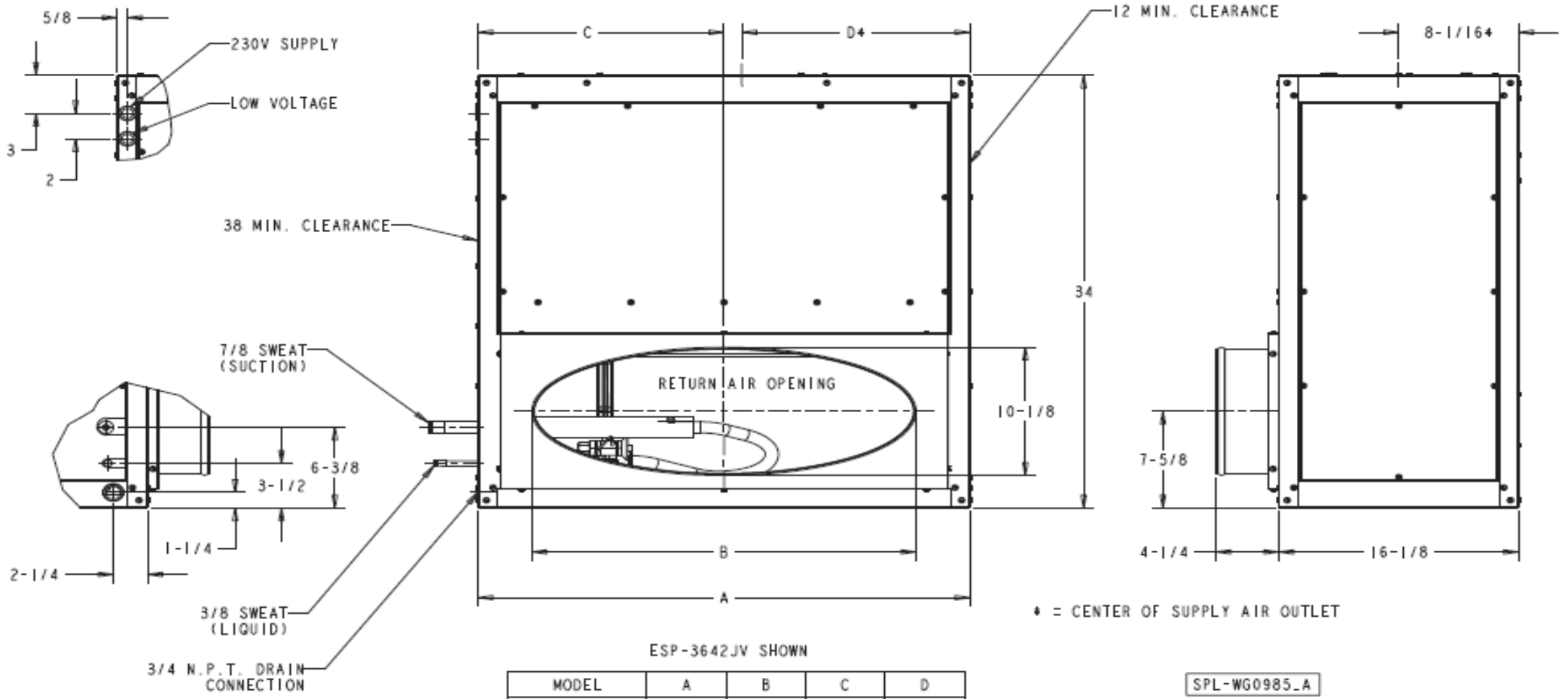
SPL-WG0958_A

ESP-JV DX Vertical Fan Coil Units

Standard Features

- J+ Advanced Control
- 2 Line Display for Easier Setup
- High Efficiency EC Integrated Motor/Blower Assembly
- Mode Specific Adjustable Speed Control
- Heat Pump Compatible
- Chatleff Thermal Expansion Valve
- 6-Row Copper/Aluminum Evaporator Coil
- Slide Out Blower
- Sweat-Type Refrigerant Connections
- 24V 50/60hz Transformer
- Insulated Grey Cabinet
- Float Switch
- Mold Resistant Primary Drain Pan
- Anti-Vibration Foam Strips
- Stainless Steel Primary Drain Pan

J-Series Vertical Dimensions



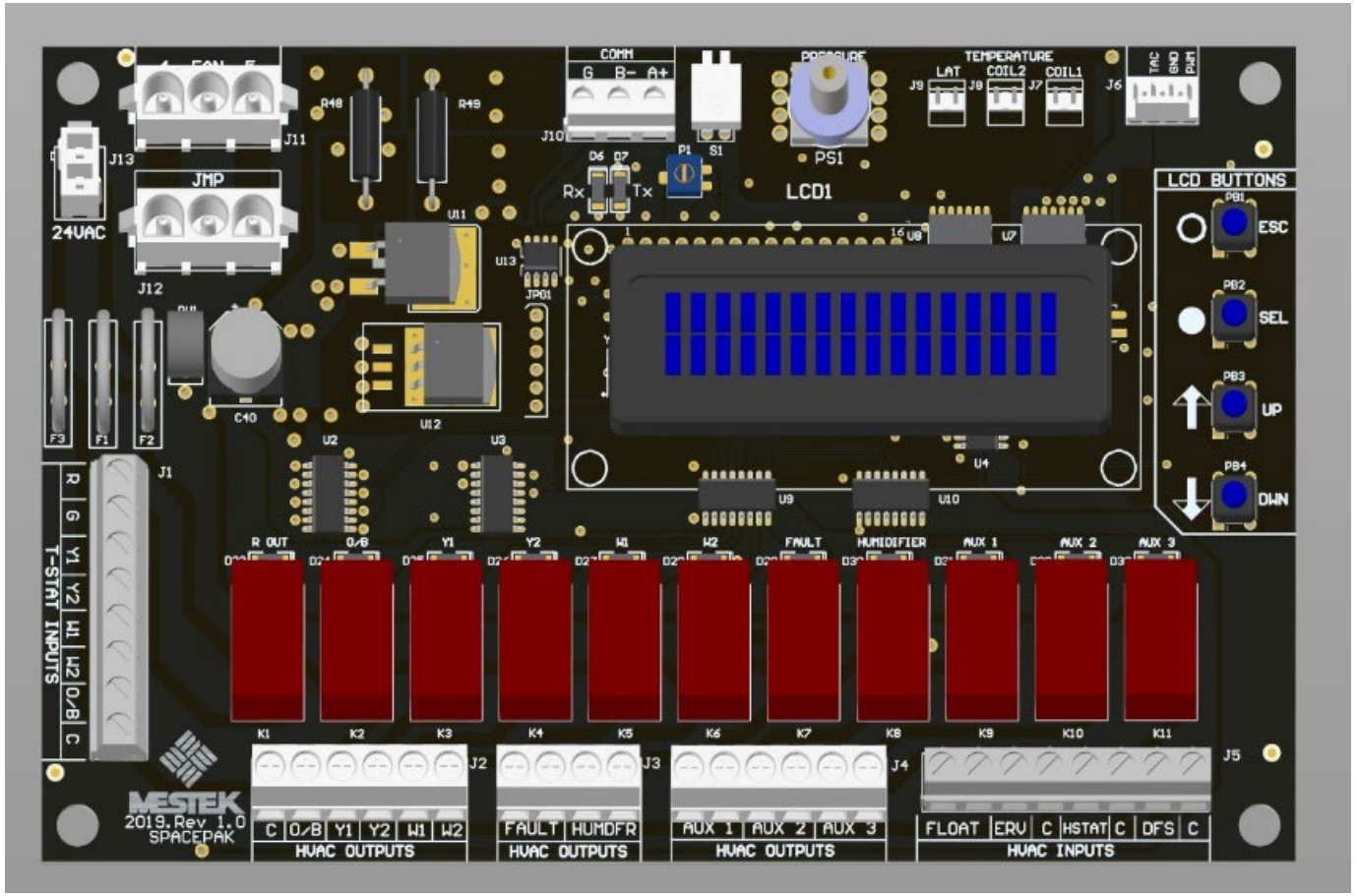
ESP-3642JV SHOWN

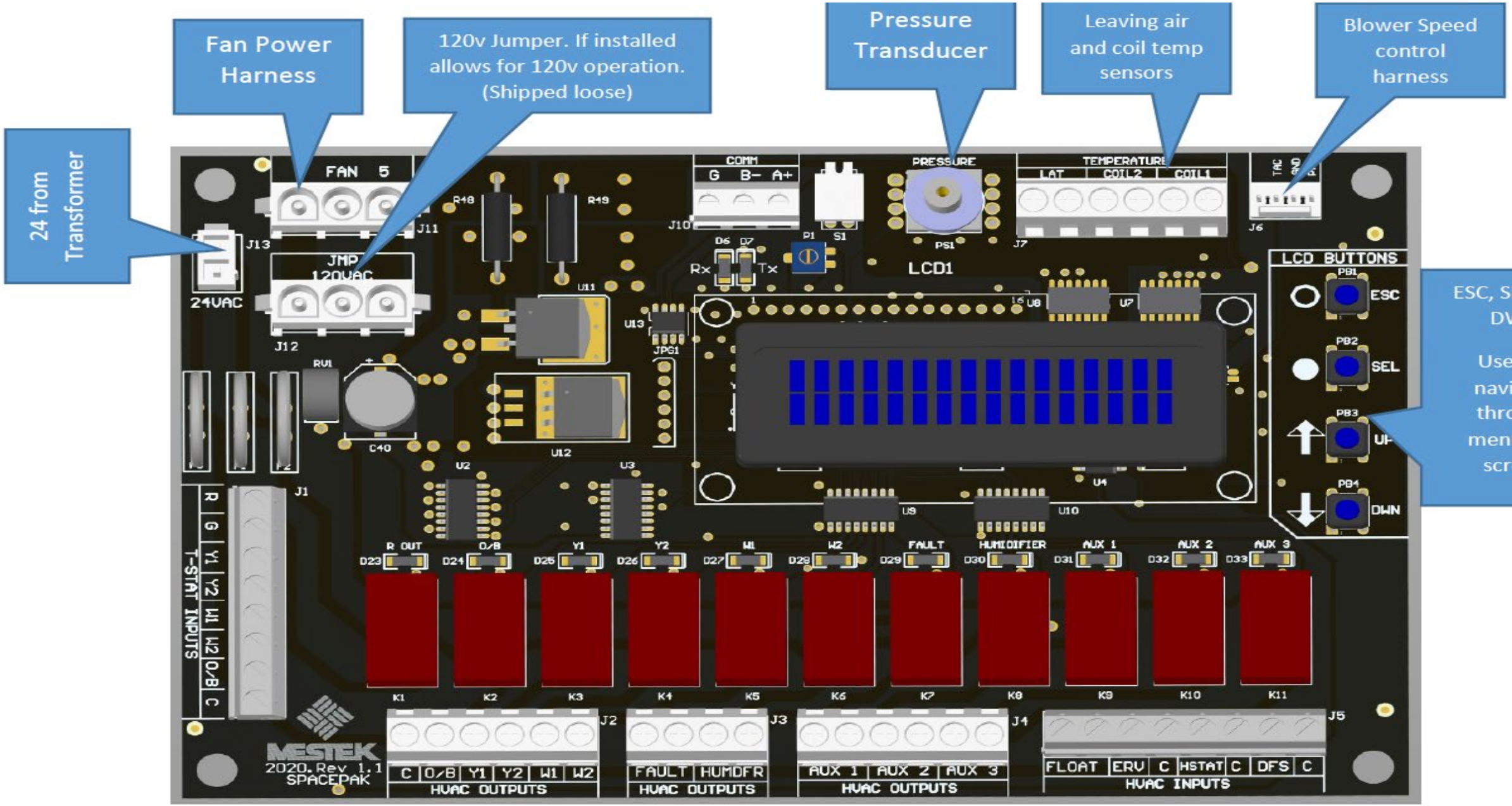
MODEL	A	B	C	D
ESP-2430JV	24	18-5/8	12	10-7/8
ESP-3642JV	33	25-7/8	16-1/2	15-3/8
ESP-4860JV	43	34-1/4	21-1/2	20-3/8

SPL-WG0985_A

The New J+ Control Board

- **More features and benefits for the contractor**
- **Digital display screen**
- **Screen displays (**operating mode, cfm, %speed, S.P.**)**
- **Speed is controlled by a static pressure tap on the blower**
- **Simpler wiring with less components**
- **Infinite speed variation**
- **Easy load matching**
- **Temperature sensors allow for delayed fan operation**
- **IAQ FRIENDLY!!!!!**





J-+ Board Wiring Call outs

T-STAT INPUTS:

R- 24v

G- Fan

Y1- 1st Stage Cooling

Y2- 2nd Stage Cooling

W1- 1st Stage Heating

W2- 2nd Stage Heating

O/B- Reversing Valve

C- Common

HVAC Outputs:

C- Common

O/B- Reversing Valve

Y1- 1st Stage Cooling

Y2- 2nd Stage Cooling

W1- 1st Stage Heating

W2- 2nd Stage Heating

Fault- Closes on a fault

HUMDFR- Closes on call

AUX 1-

AUX 2-

AUX 3-

HVAC Inputs:

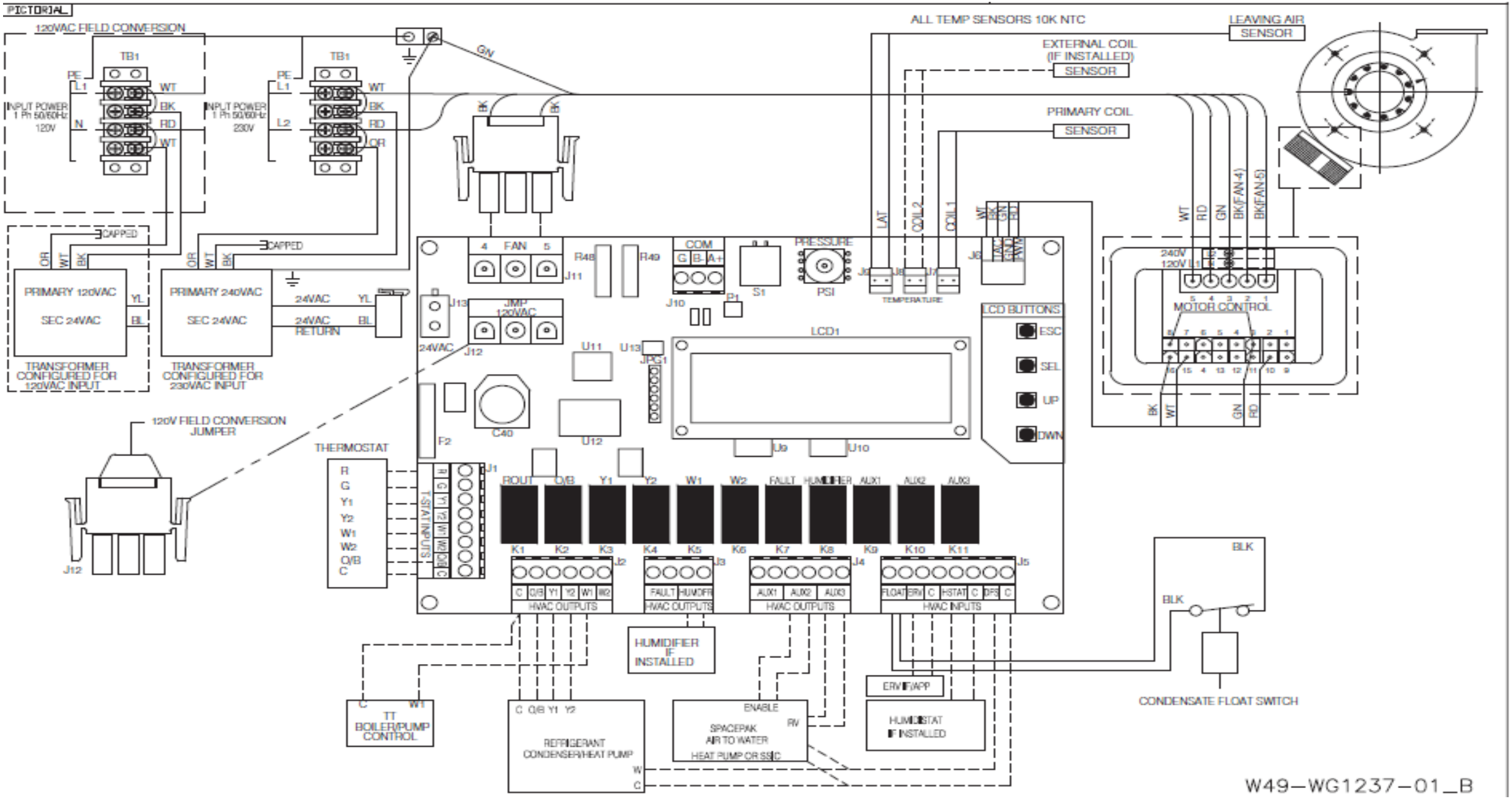
Float- Float Switch (factory)

ERV- Receives call from ERV

HSTAT- Receives call from Humidistat

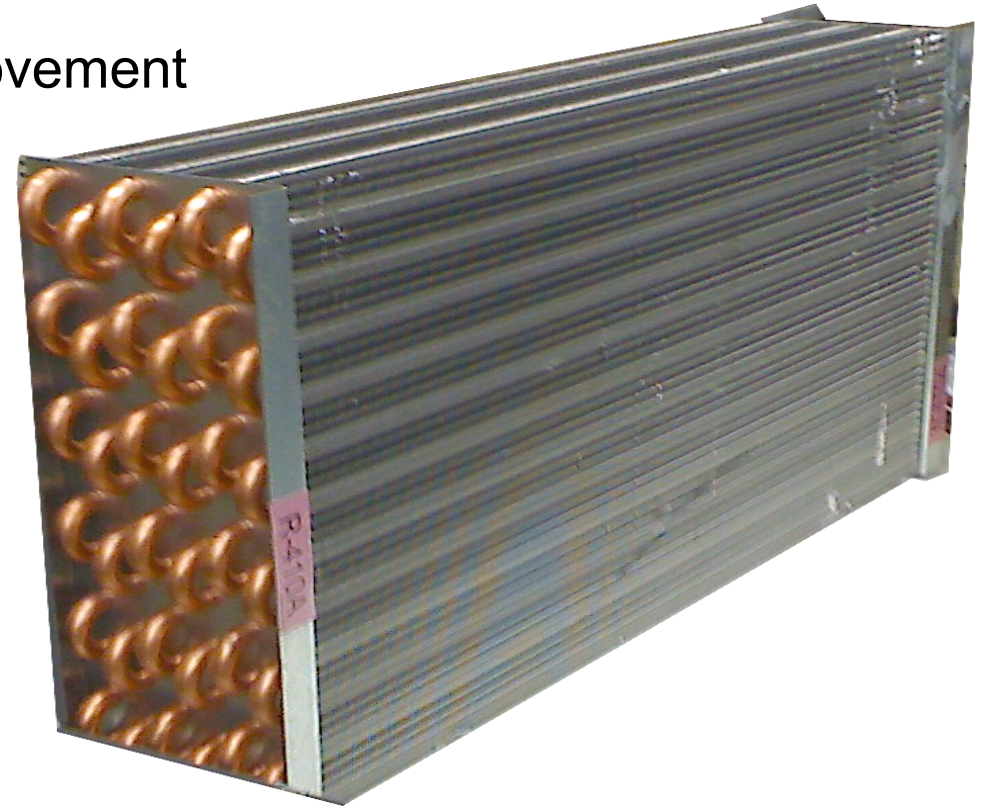
DFS- Defrost from outdoor Heat Pump

SPACE PAK CENTRAL AIR ANYWHERE



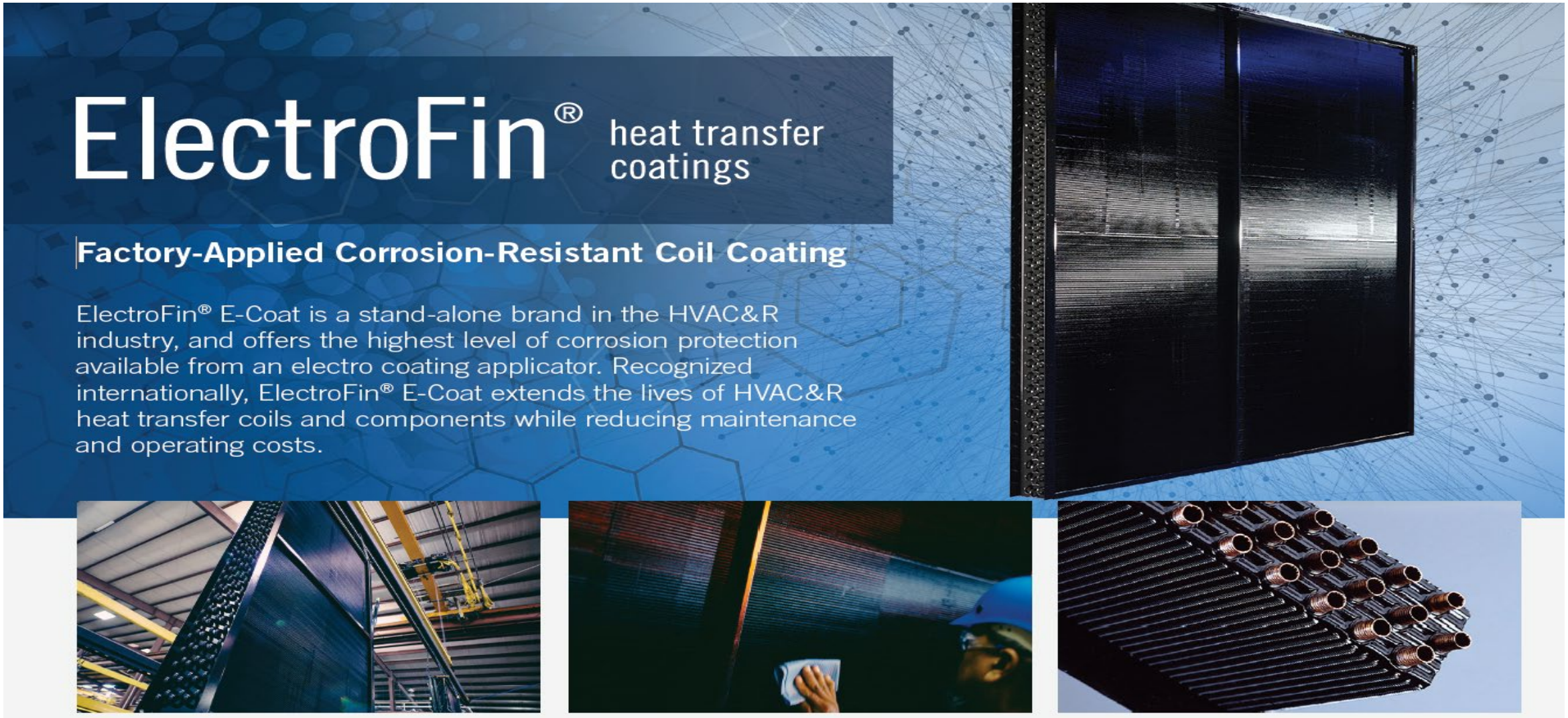
J- Series DX Coil

- More BTU’s at lower CFMs
- Up to a 28 degree air delta across the coil
- Colder discharge allows for lower volumes of air movement
- More coil surface = greater humidity removal
- 30% more moisture removed
- Suitable for R-410A refrigerants
- With more moisture removed a higher temperature set point will feel “Cooler”

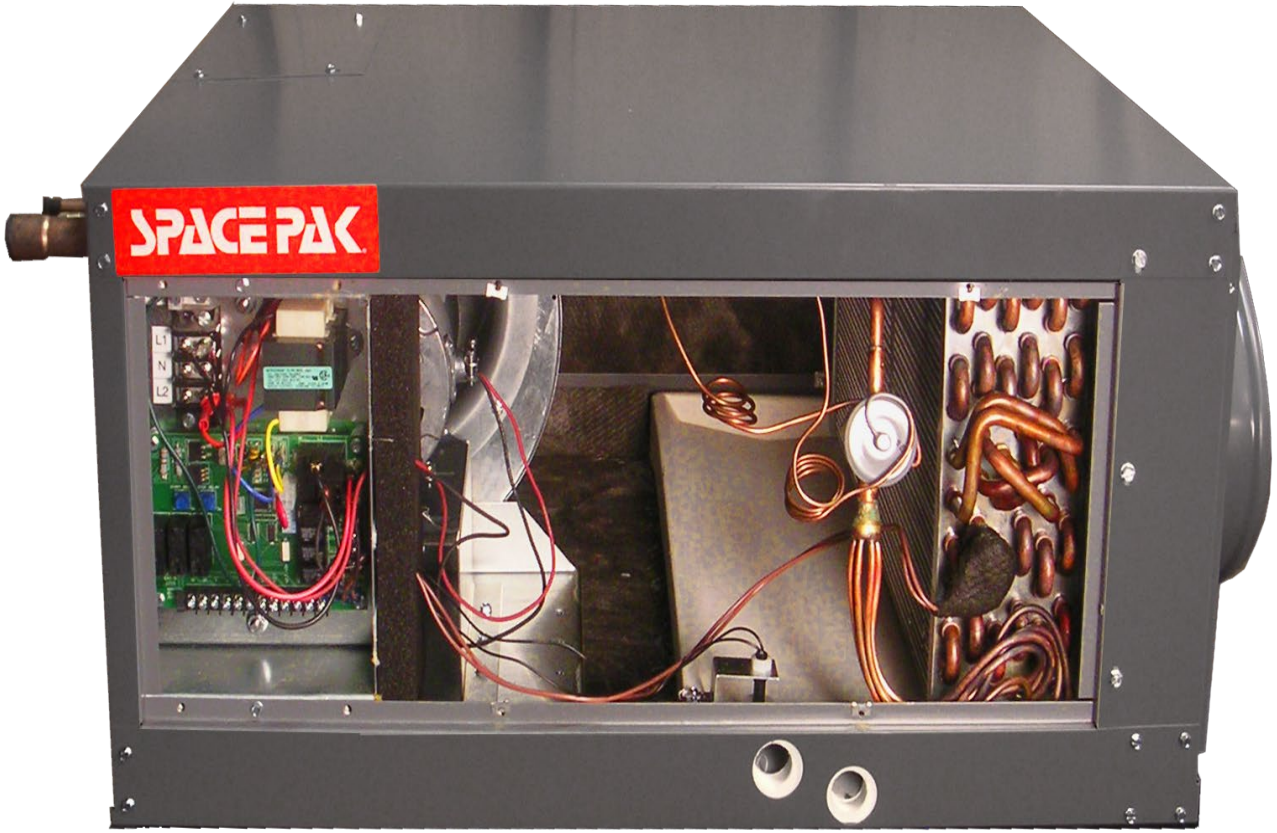


Note: Replacement coils will be received with electro-fin coating

Coated Replacement Coils (all replacement coils/all sizes)

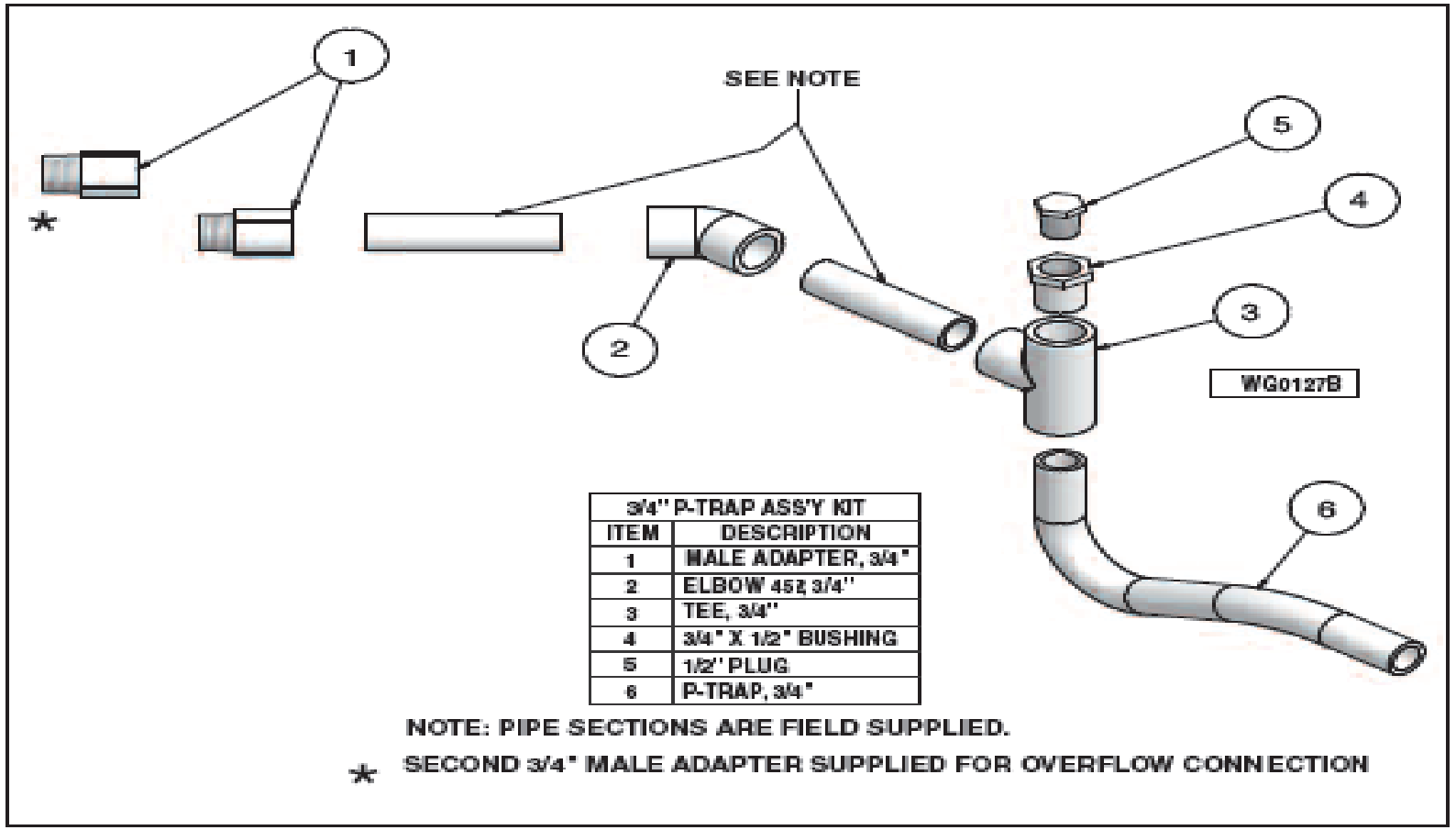


TXV's: Then and Now



Note: **Our current chatliff TXV has NO internal check valves, so it is suitable for use in air-to-air heat pump applications.**

Condensate Trap Assembly (We Supply)



3/4" P-TRAP ASS'Y KIT	
ITEM	DESCRIPTION
1	MALE ADAPTER, 3/4"
2	ELBOW 45‡ 3/4"
3	TEE, 3/4"
4	3/4" X 1/2" BUSHING
5	1/2" PLUG
6	P-TRAP, 3/4"

NOTE: PIPE SECTIONS ARE FIELD SUPPLIED.

* SECOND 3/4" MALE ADAPTER SUPPLIED FOR OVERFLOW CONNECTION

Note: The proper installation of the trap is critical to the correct operation of the system!

Additional Heating & Cooling

New EEH Direct Mount Electric Heater Sizes and Install locations

Duct Heater

6 Sizes Available

2kw

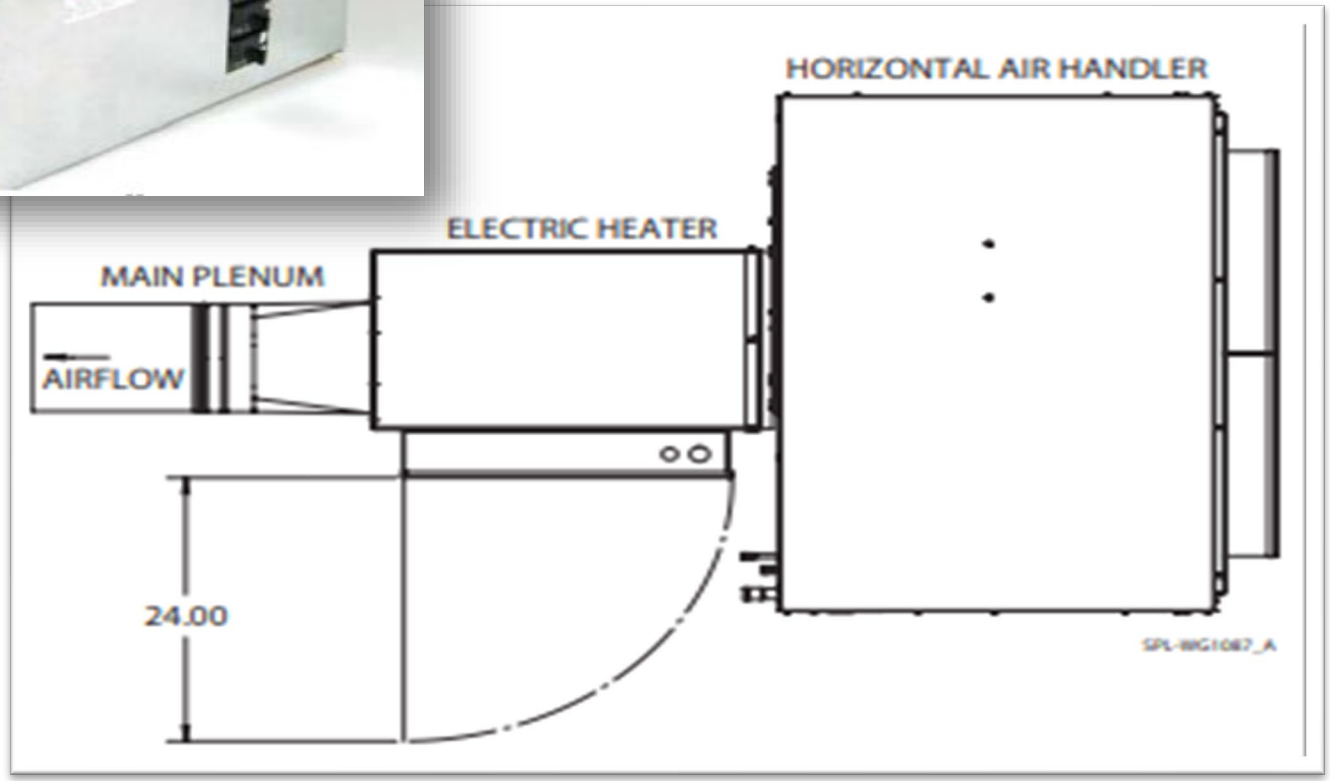
5kw

7.5kw

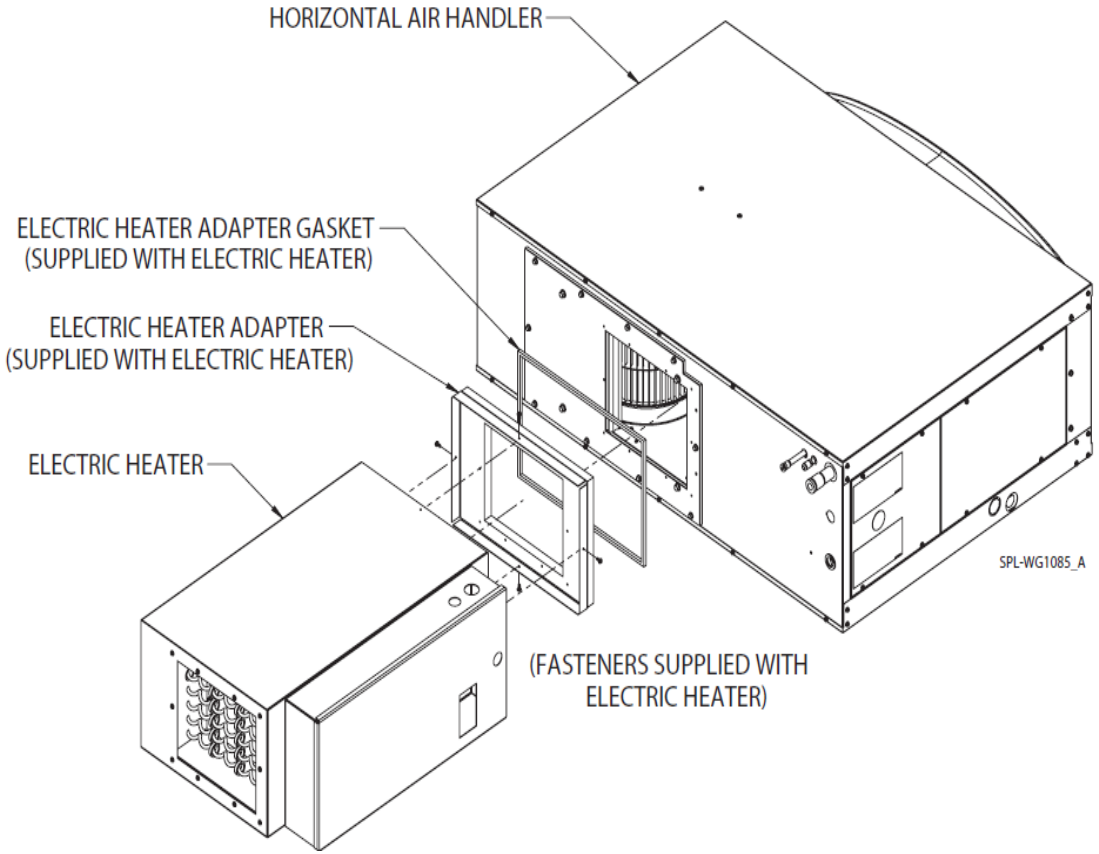
10kw

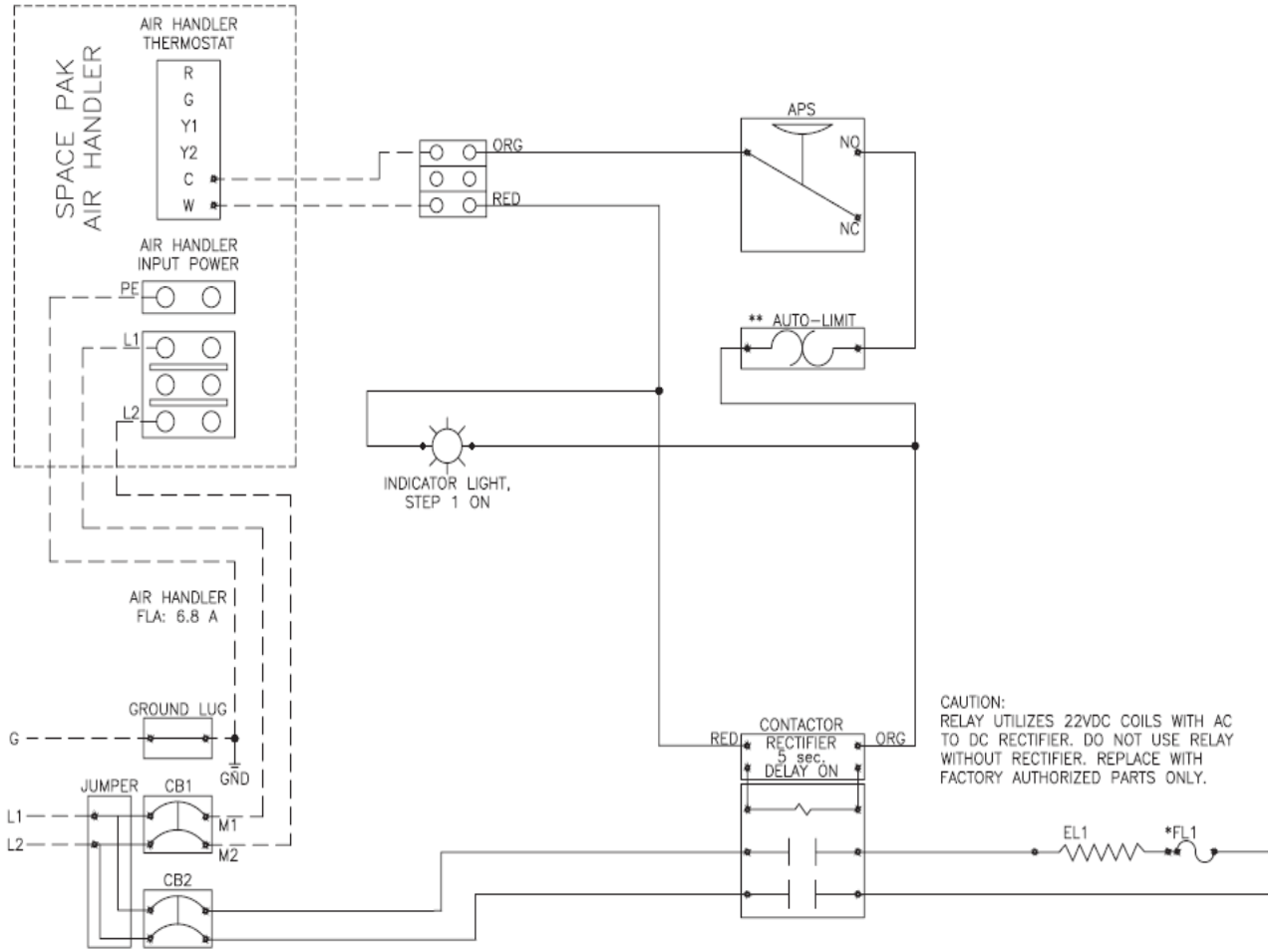
15kw

20kw

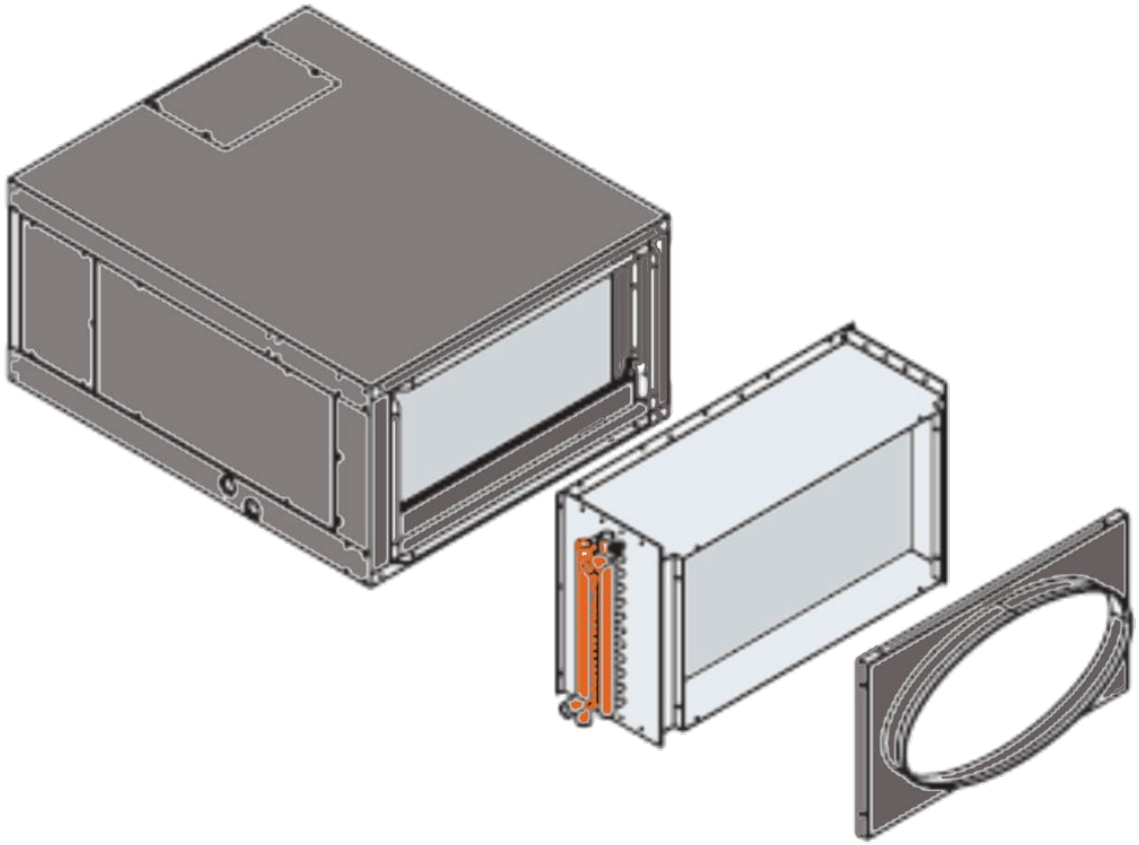


EEH Electric Heater Mounting and Wiring





Hot Water Coil



Model AC-WPAK-60 for ESP 2430

	Entering Water Temperature °F				
GPM	120	140	160	180	200
2	20.5	30.0	39.1	48.1	57.2
4	25.2	35.6	46.1	56.6	67.1
6	26.6	37.4	48.3	59.2	70.2
8	27.2	38.2	49.3	60.4	71.6
10	27.5	38.7	49.9	61.1	72.3

At 550 CFM and 70°F Entering Air Temperature*

Model AC-WPAK-90 for ESP 3642

	Entering Water Temperature °F				
GPM	120	140	160	180	200
2	28.8	39.2	51.6	63.4	75.2
4	36.0	50.8	65.7	80.8	95.8
6	39.0	54.9	70.9	87.0	103.1
8	40.4	56.8	73.3	89.9	106.5
10	41.2	57.9	74.7	91.5	108.4

At 850 CFM and 70°F Entering Air Temperature*

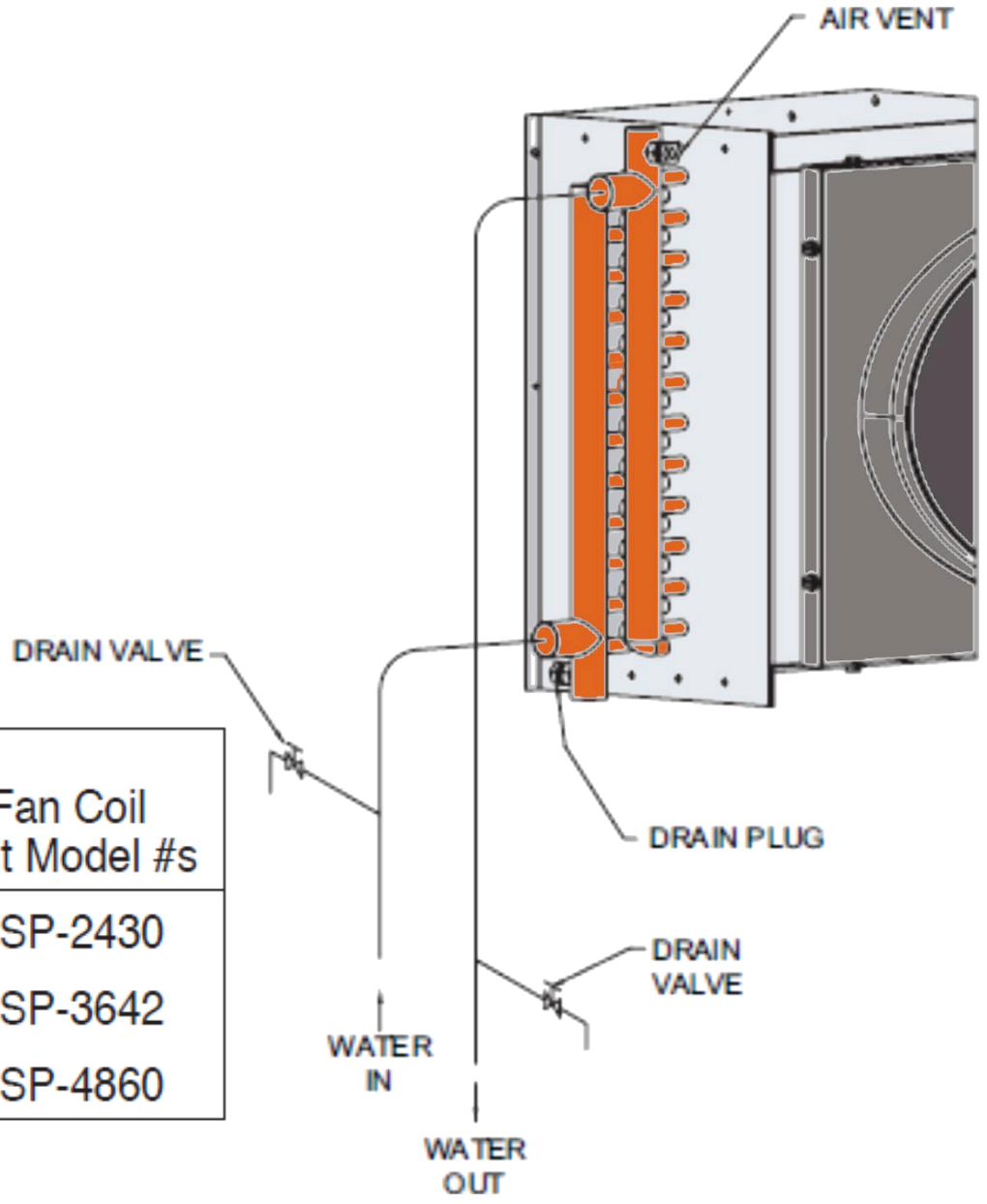
Model AC-WPAK-120 for ESP 4860

	Entering Water Temperature °F				
GPM	120	140	160	180	200
2	31.7	46.2	61.2	75.1	89.0
4	45.6	64.2	83.0	102.0	120.9
6	50.6	71.2	92.0	112.9	133.8
8	53.1	74.7	96.4	118.2	140.1
10	54.6	76.7	98.9	121.2	143.6

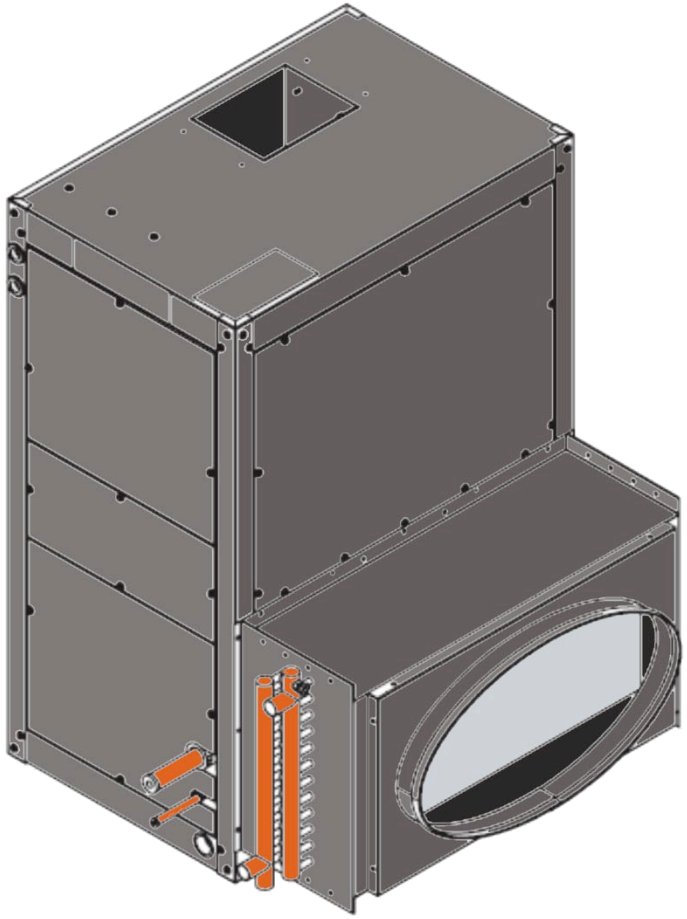
At 1150 CFM and 70°F Entering Air Temperature*

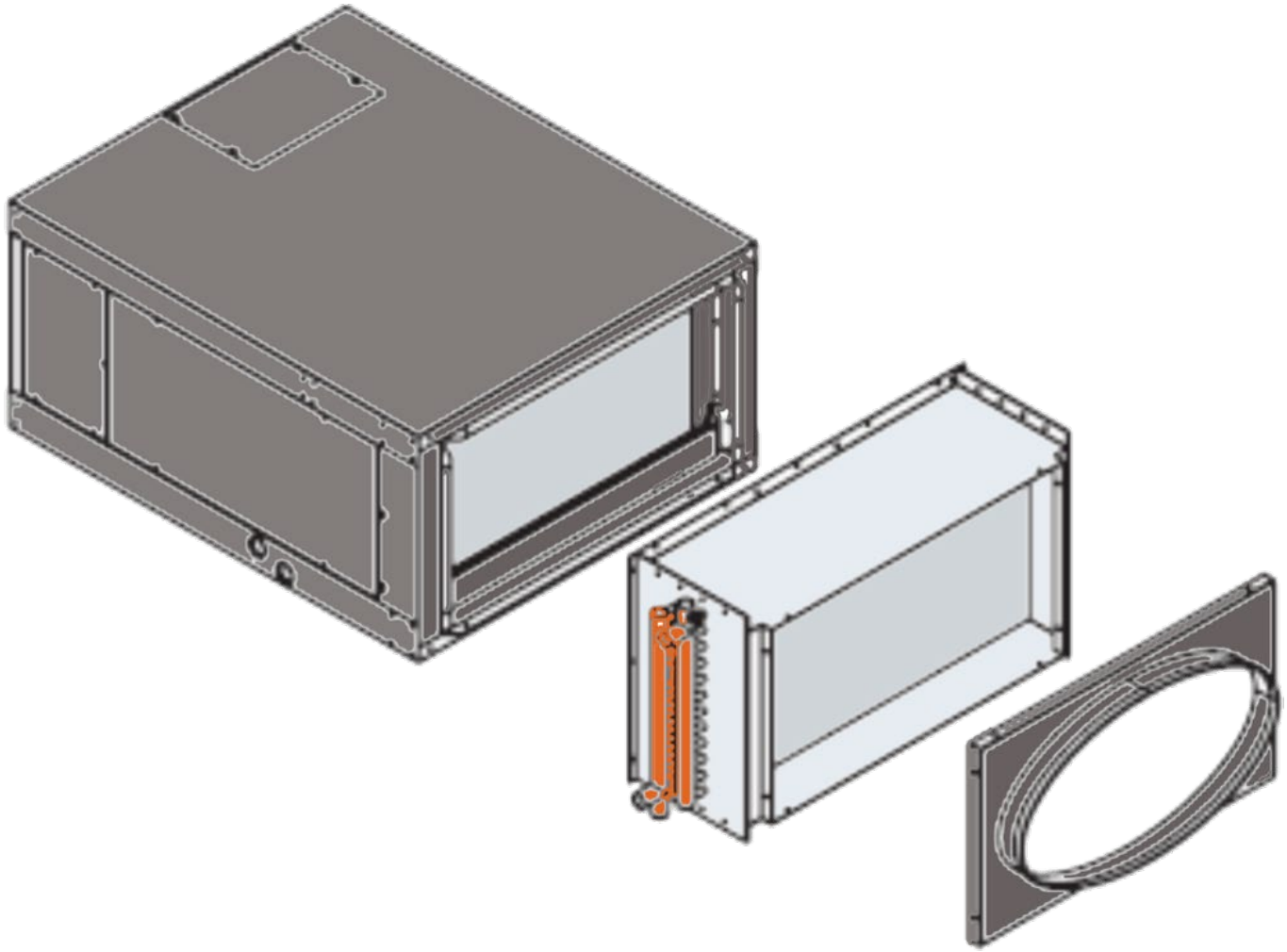
Hot Water Coil Installation

Hot Water Coil Model #	BTUH Capacity (Nominal)	Return Air Duct Adaptor* Model #	Fan Coil Unit Model #s
AC-WPAK-60	60,000	AC-WRDA-60	ESP-2430
AC-WPAK-90	90,000	AC-WRDA-90	ESP-3642
AC-WPAK-120	120,000	AC-WRDA-120	ESP-4860



Hot Water Coil Installation location

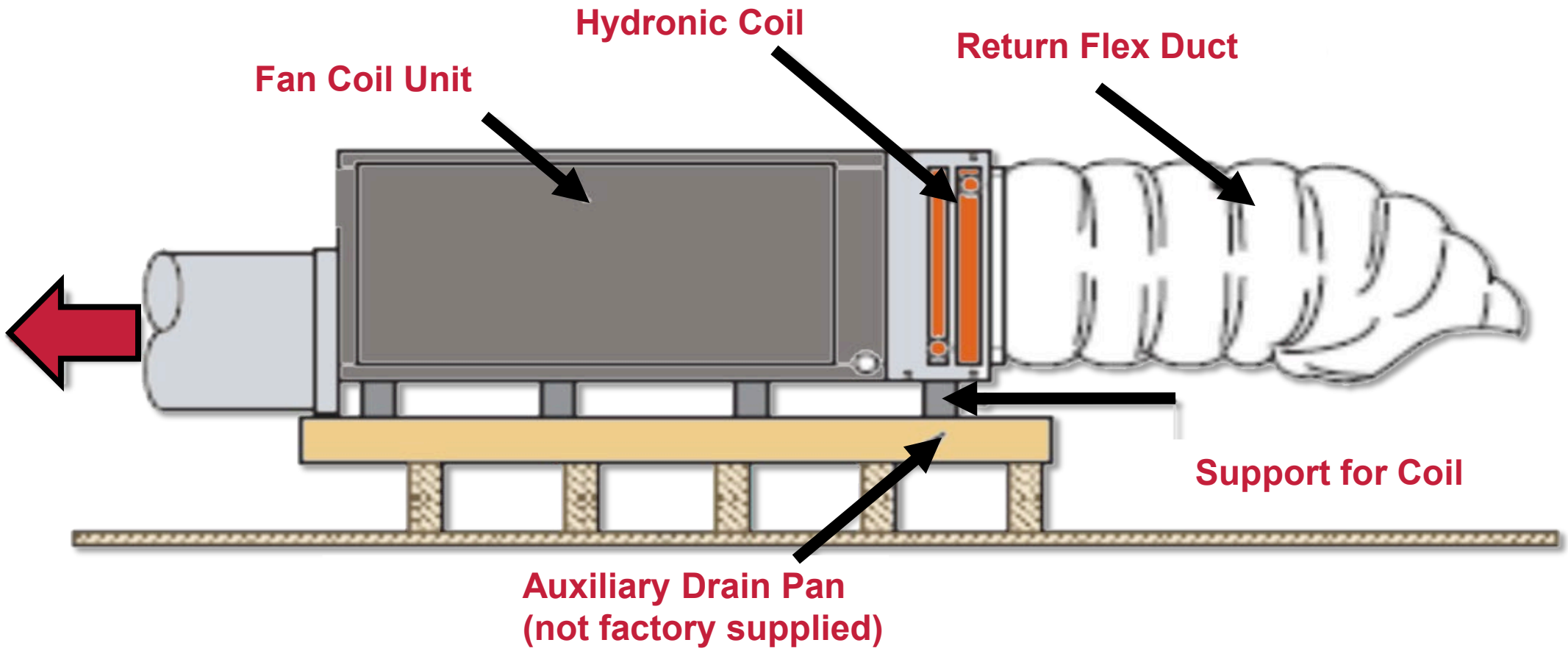




BASE PAK SECONDARY DRAIN PANS FOR HORIZONTAL FAN COIL UNITS

- Durable Polyethylene will not Rust
- Resistant to Mold Growth
- UL Recognized Material
- Integral, Multi-Function Support Channels
- Supports Unit when Suspended with Threaded Rod
- Fits Through Hole Cut-Out used for Return Air Box
- Threaded 3/4" Drain Connection
- Meets International Mechanical Code 307.2.3

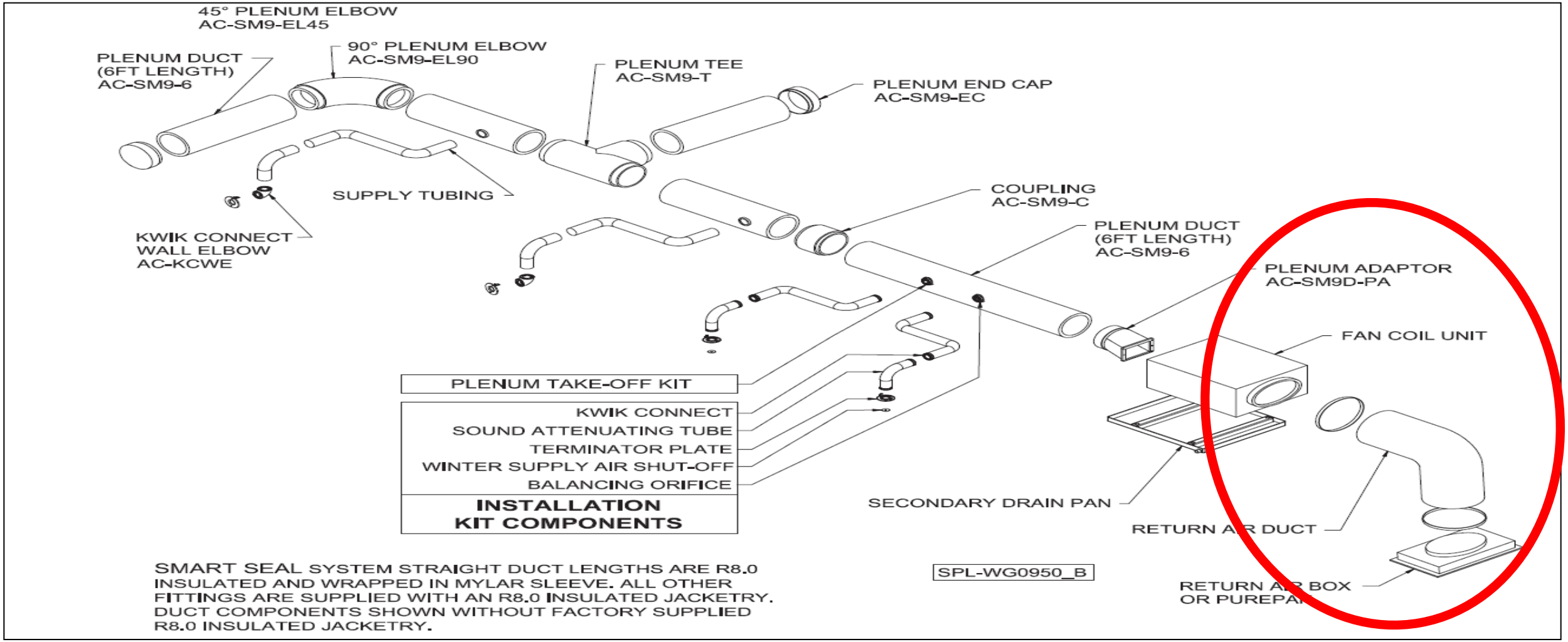
Hot Water Installation with Drain Pan



Note: Be sure that the drain pan installed is large enough to protect anything that may drip, this is cheap insurance!

Are there any Questions?

The Return (Central or Multiple)



Locate and Roughing in the Return

- Central Location (Hallway/Foyer)
- All Equipment Can Fit through the Return Hole Cut Including the Air Handler
- Be Sure to Have More than Enough Return Air for the System
- Do Not “Skimp” On Return Air-You Cannot Have too Much

Return Basics

- Air Mixing vs. Air Change
- Less Return Air Volume
- Cooling And Heating By Temperature, Not Volume
- One Central Return Is Sufficient
- Multiple Returns Are Okay
- Smaller Return Air Duct Than Conventional
- You can never have too much return air!!!!

Rules for Sizing Returns

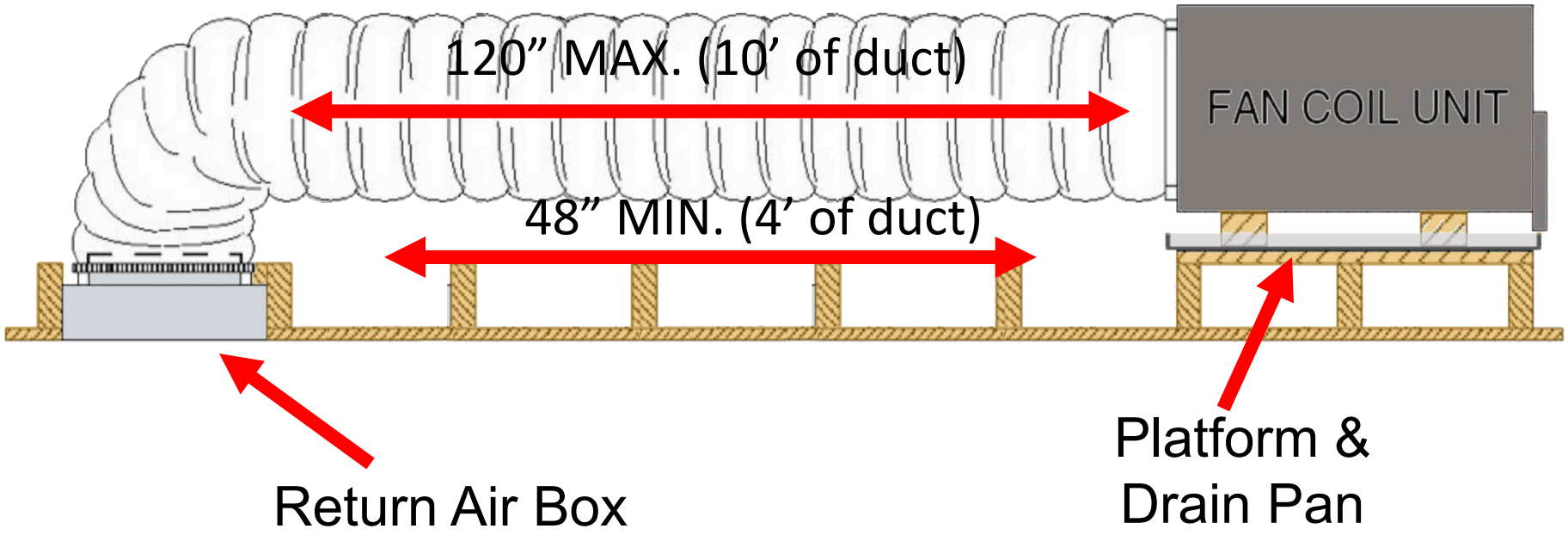
- Size Return in each location for less than 500 FPM (similar to conventional)
- Size Return in each location for total -.25” static or less including the filter
- Install at least One 90 degree elbow (this will aid in the abatement of unwanted noise)
- Return Box must be lined with sound attenuation material (also for noise abatement)
- Size transfer grills for the CFM and Free Area (use standard duct sizing chart)

Note: If return creates to much “suction” over -.5”wc this suggests the lack of return air and creates the potential to cause issues with proper condensate draining resulting in faults or water damage.

Return Minimums

Model	Return Duct
ESP-2430	15”
ESP-3642	19”
ESP-4860	24”

Flexible Return Duct
(90˚ bend)



Central Floor Return

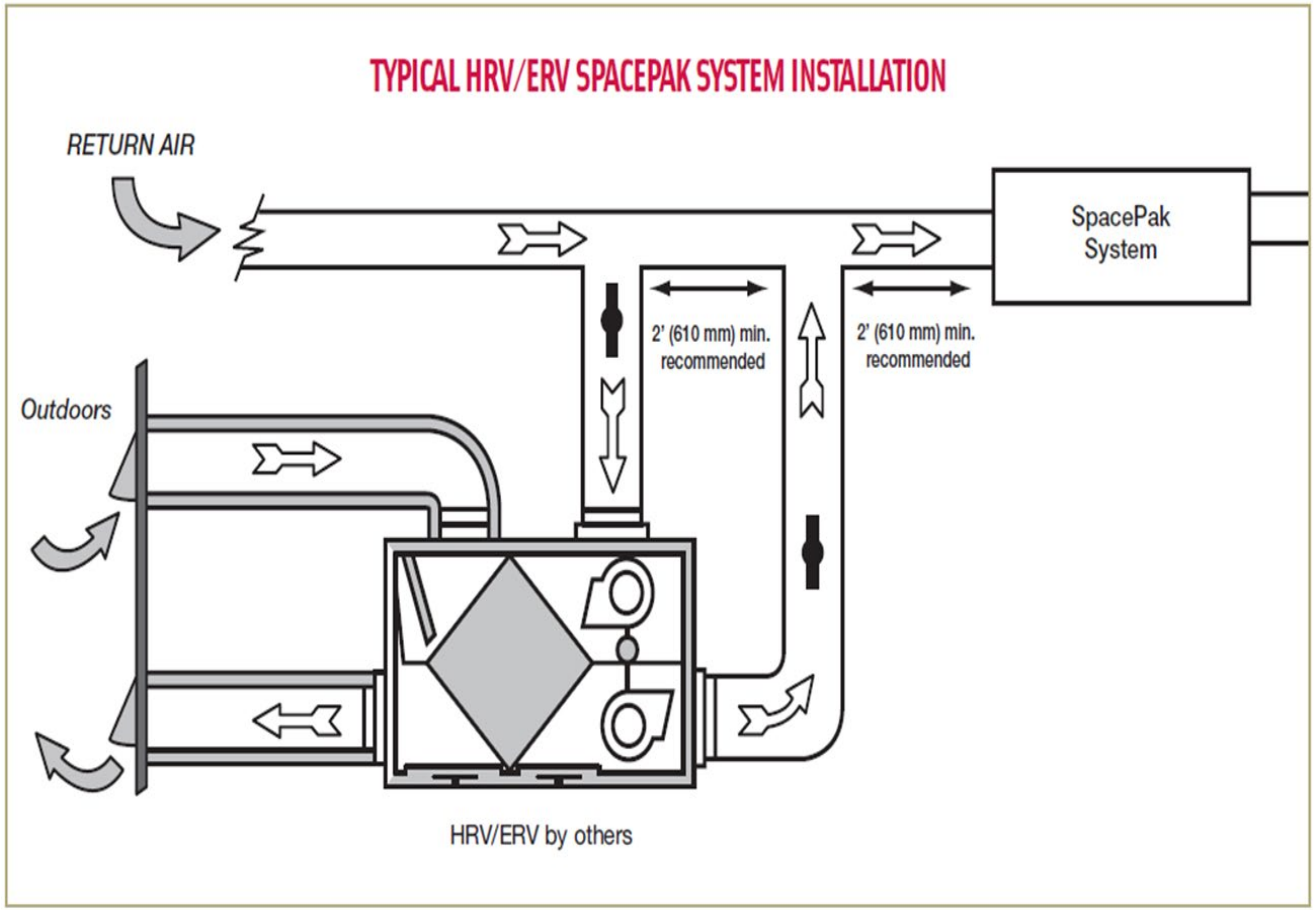
Note: This was a central return for (1) 5-ton heating and cooling system (approx. 30”x30”)

Multiple Returns- Although 1 return is sufficient if you can run multiple, please feel free to do so.

MULTIPLE RETURN ACCEPTABLE DUCT SIZE BY TONNAGE						
ROUND DUCT SIZE, THESE SIZES WILL INSURE A QUIET AIR SPEED OF LESS THAN 500 FPM						
	2 TON	**2.5 TON**	**3 TON**	**3.5 TON**	**4 TON**	**5 TON**
AIR FLOW	440	550	660	770	880	1100
2 Returns	2 RETURN DUCTS / EQUAL AIR FLOW					
10' OR LESS	9”	10”	11”	12”	13”	15”
10' TO 20'	10”	11”	12”	13”	13”	15”
30' TO 40'	11”	12”	13”	13”	14”	16”
3 Returns	3 RETURN DUCTS / EQUAL AIR FLOW					
10' OR LESS	8”	9”	9”	10”	12”	12”
10' TO 20'	8”	9”	10”	11”	12”	12”
30' TO 40'	9”	10”	11”	12”	13”	13”

Multiple Returns example (Former G Series)

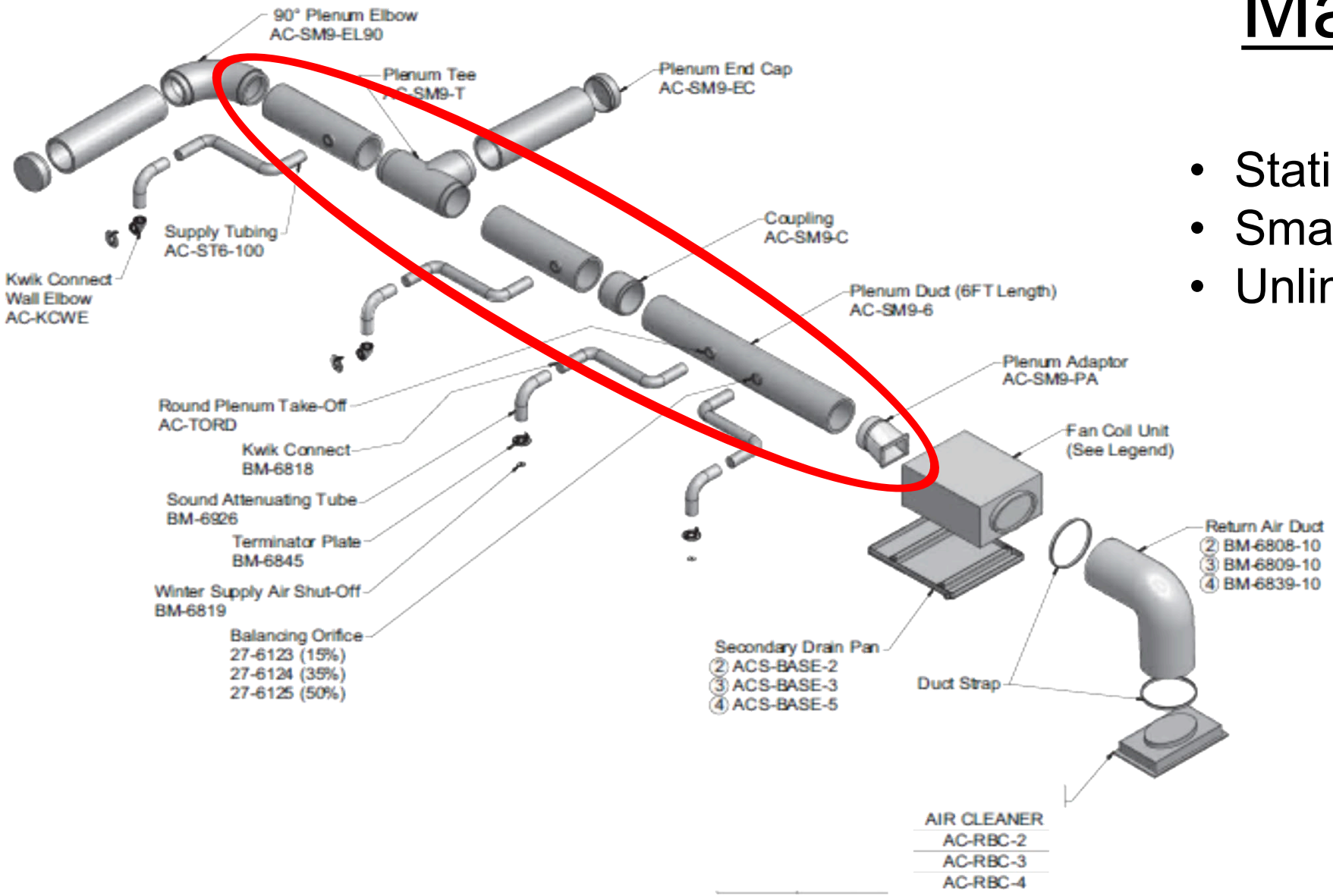
There are IAQ Options (J+ Series Control Board)



Note: **Aftermarket air cleaners/equipment are ok to use, but please be sure that the correct amount of return air is maintained, and the 3rd party product is certified for use with SDHV**

Are there any Questions?

Main Trunk



- Static Regain
- Smart Seal
- Unlimited possibilities

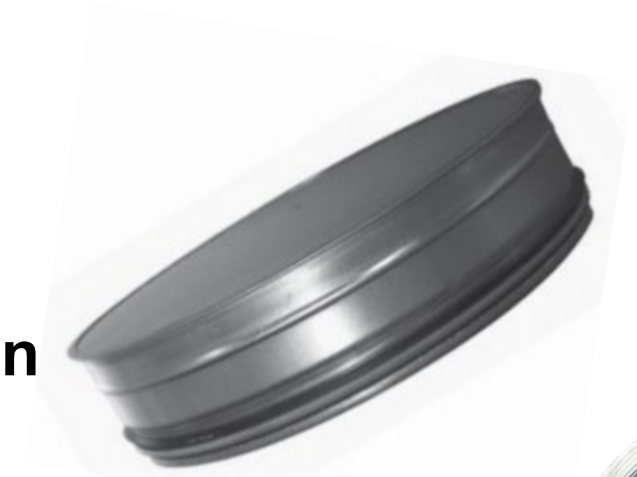
Maximum Allowable Plenum Length?

250 feet of equivalent length of 9” round IF:

- All fittings are long radius
- The system is sealed to stop duct leakage “**completely**”
- Fittings reduce the length by:
- 30 feet for tee’s
- 15 feet for elbow’s

Main Trunk Line “Topics”

- Static Regain replaces Static Reduction
- Allows simpler rules for design
- Easier installation practices
- Less energy loss
- More plenum/Less duct=$$



Plenum Rules and Topics

- Plenum requirements and allowances
- Round, Rectangular and Square will work
- Minimum and Maximum allowable run lengths
- Fittings (tees, elbows, couplings and endcaps)
- Most Common Mistakes

Size of Plenum

9-inch round = 64 square inches

8 X 8-inch square

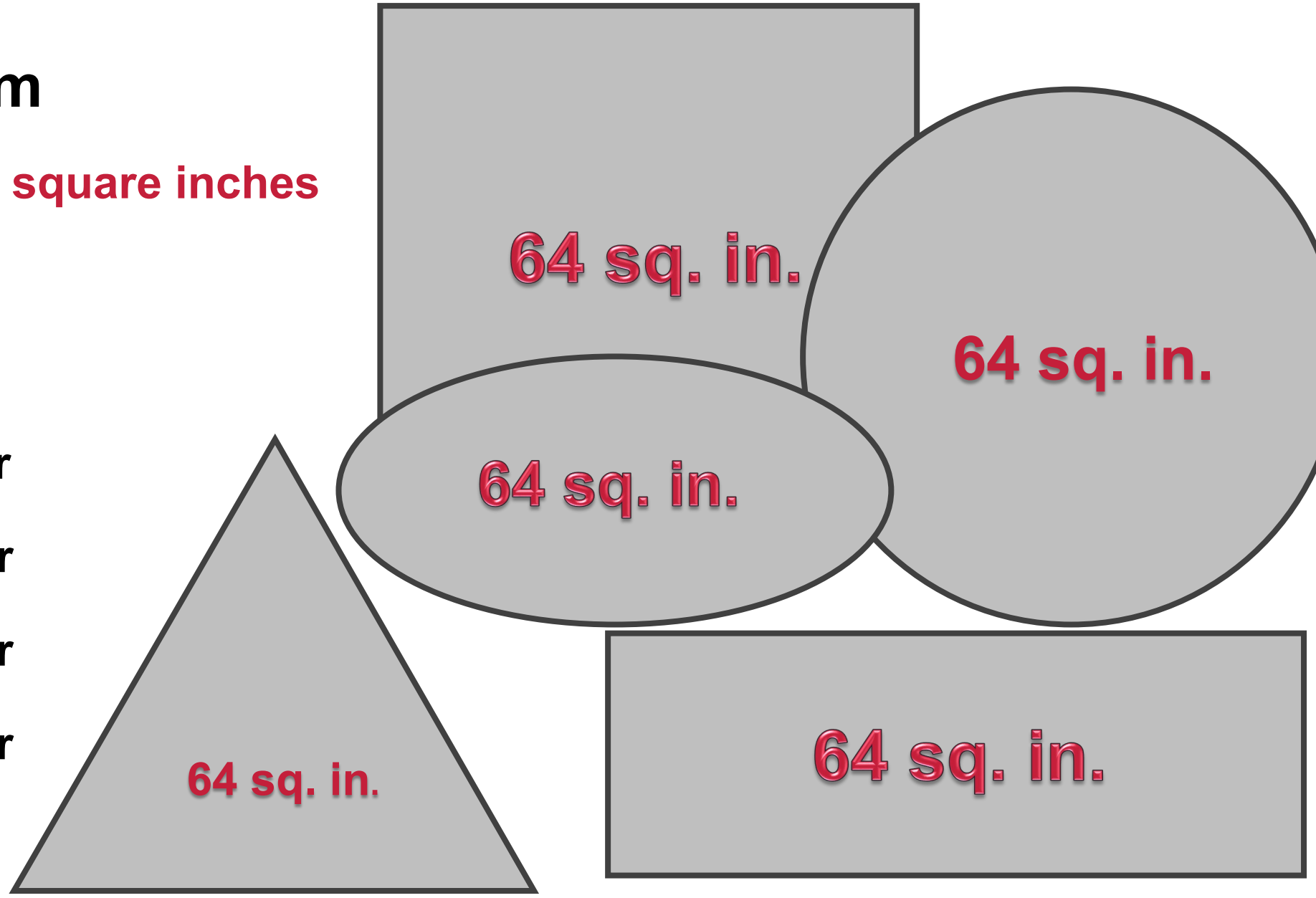
7 X 9 rectangular

6 X 11 rectangular

5 X 13 rectangular

4 X 16 rectangular

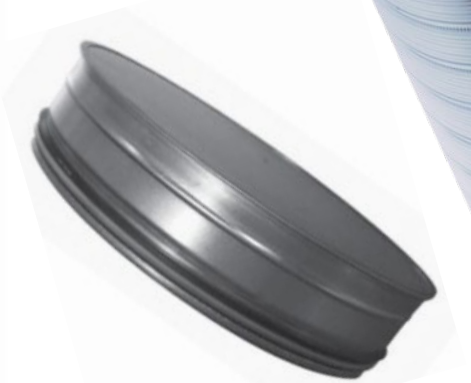
3 X 21 rectangular



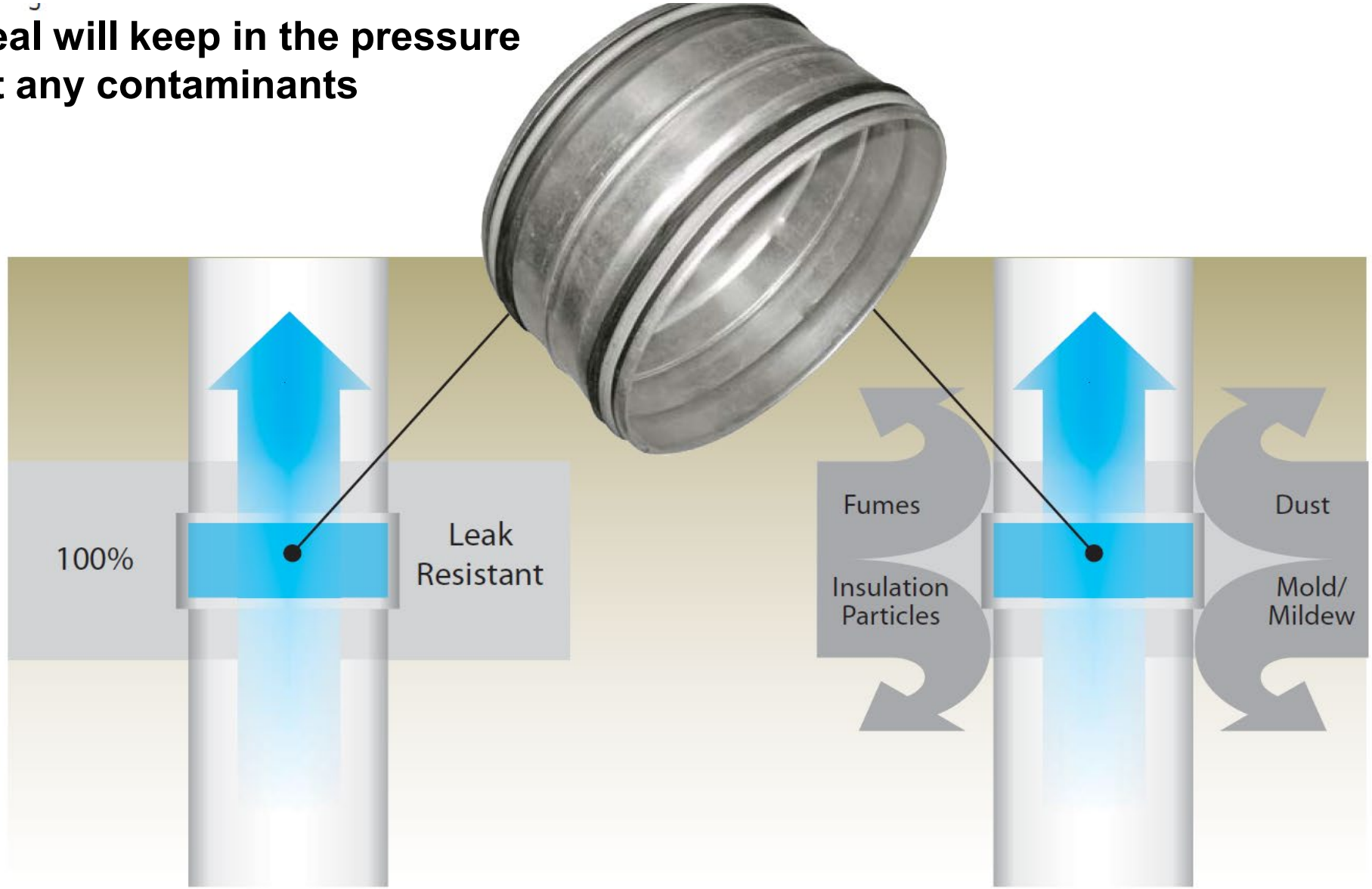
Smart Seal Pipe and Fittings

Standard Smart Seal System Duct Features

- Approved to SMACNA Duct Construction Standards and Leakage Class 3
- 100% Leak Resistant (to 10" W.C.)
- Fittings & Couplings Have Factory Installed Gasket
- Operating Temperature Range -20°F to 212°F
- Gasket is on Leading Edge of Fittings, Allowing Substantial Space for Screw Insertion
- Recyclable Material
- Contains up to 58% Recycled Materials
- Eligible for LEED Points
- Significantly Reduced Installation Time

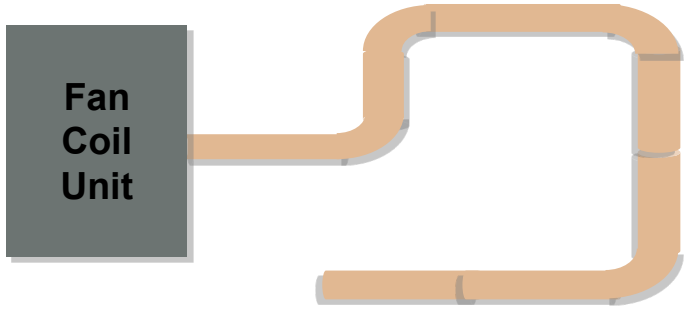


The Smart seal will keep in the pressure and keep out any contaminants

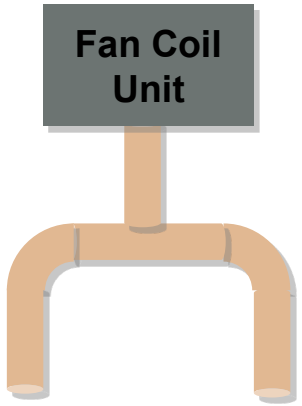


Four Main Plenum Configurations

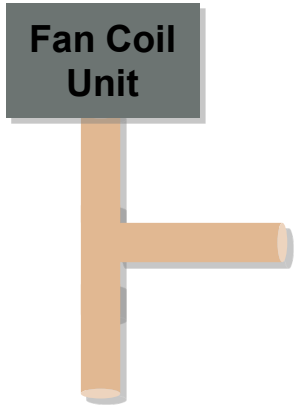
The Shotgun



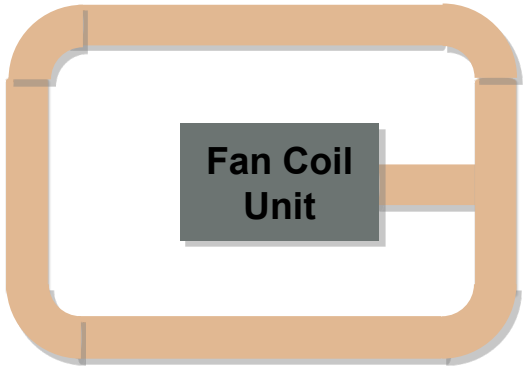
Horseshoe



Side Branch

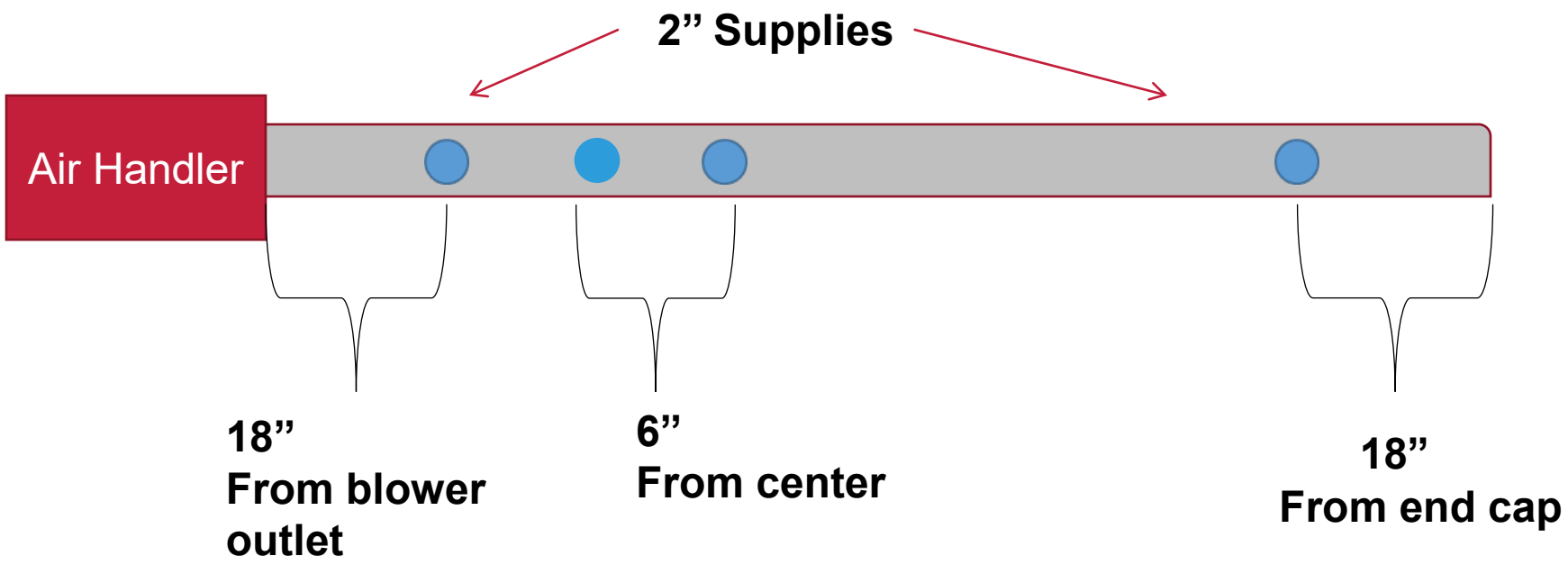


Perimeter Loop

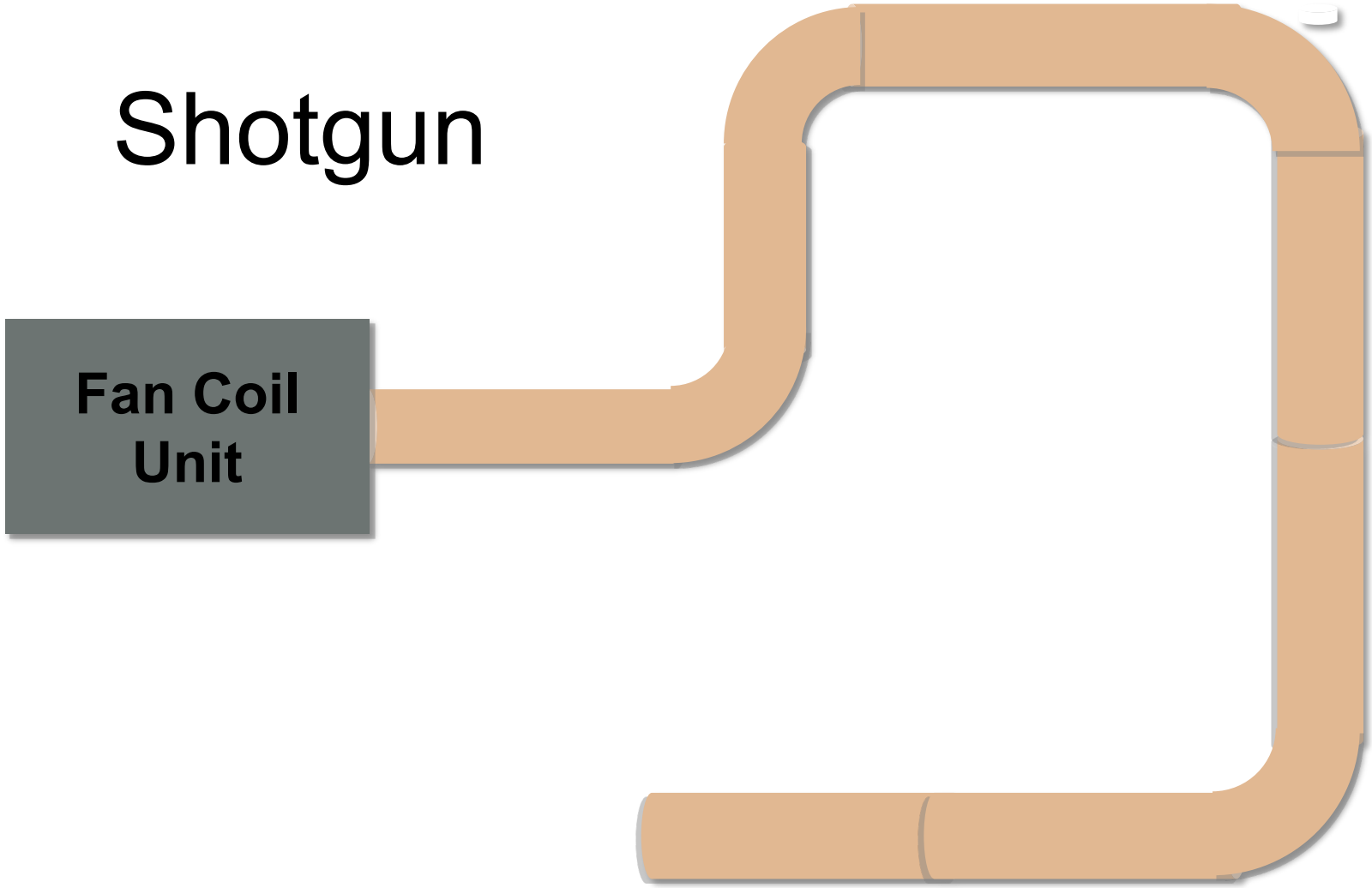


Minimum Plenum Length determined by:

- 18 inches from outlet of the blower before a 2” take off
- 18 inches from a fitting before a 2” take off
- 18 inches from the end cap before a 2” take off
- 6 inches off center between take offs “minimum”
- So with straight pipe you can have a “short” plenum even at larger tonnage outputs

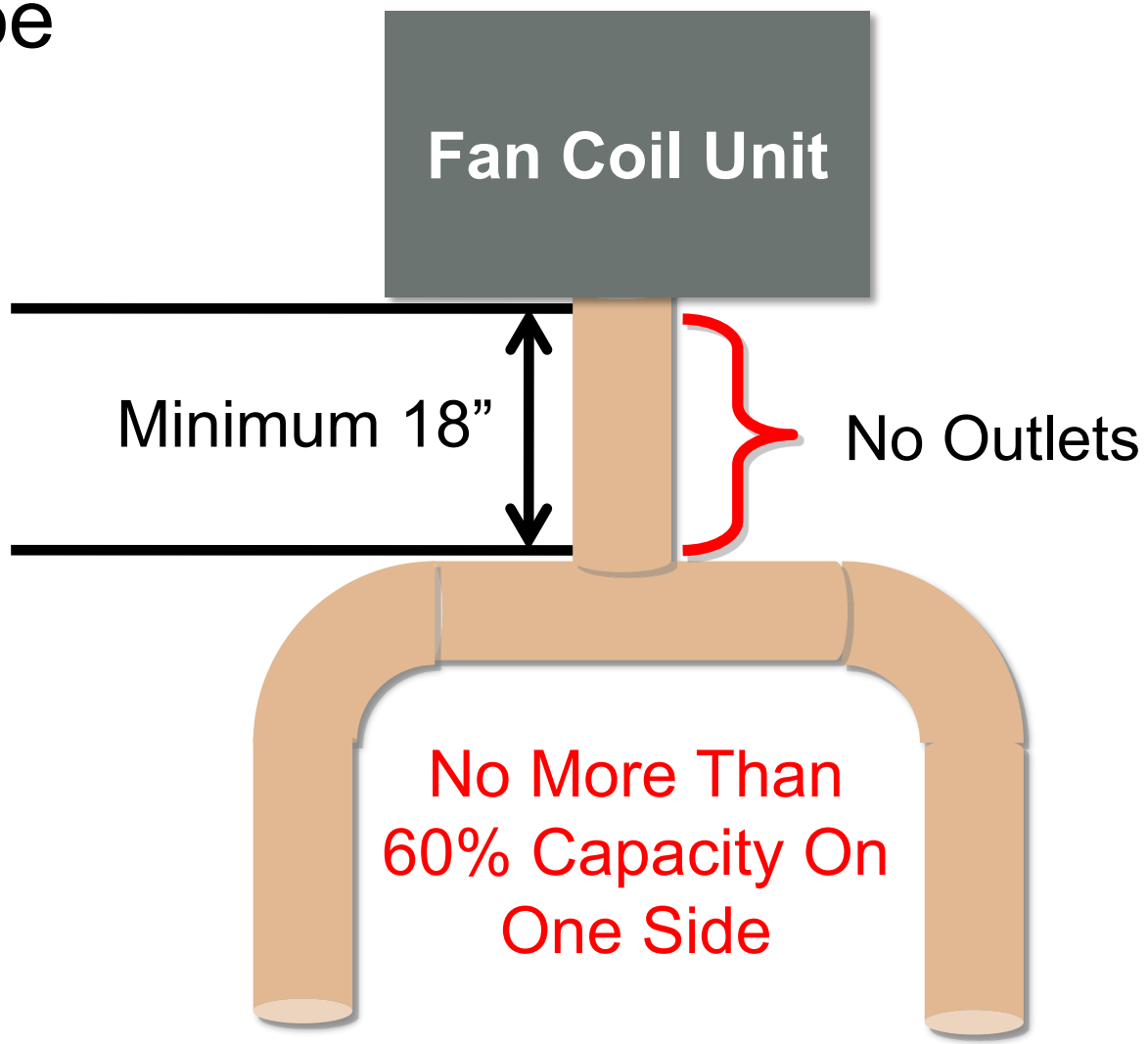


Shotgun

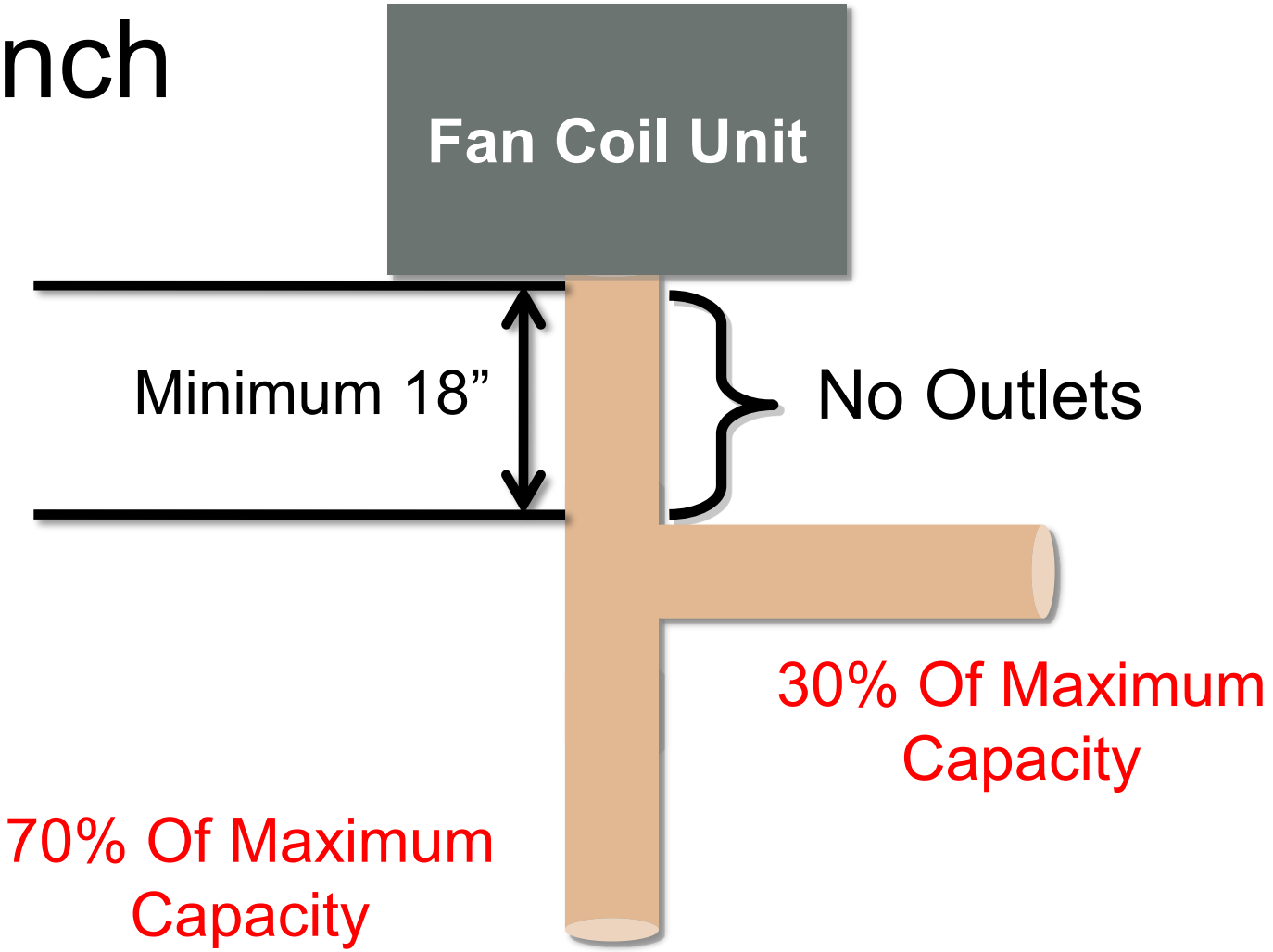


Note: **A straight run of duct is also considered a shotgun and could reach lengths up to 250’**

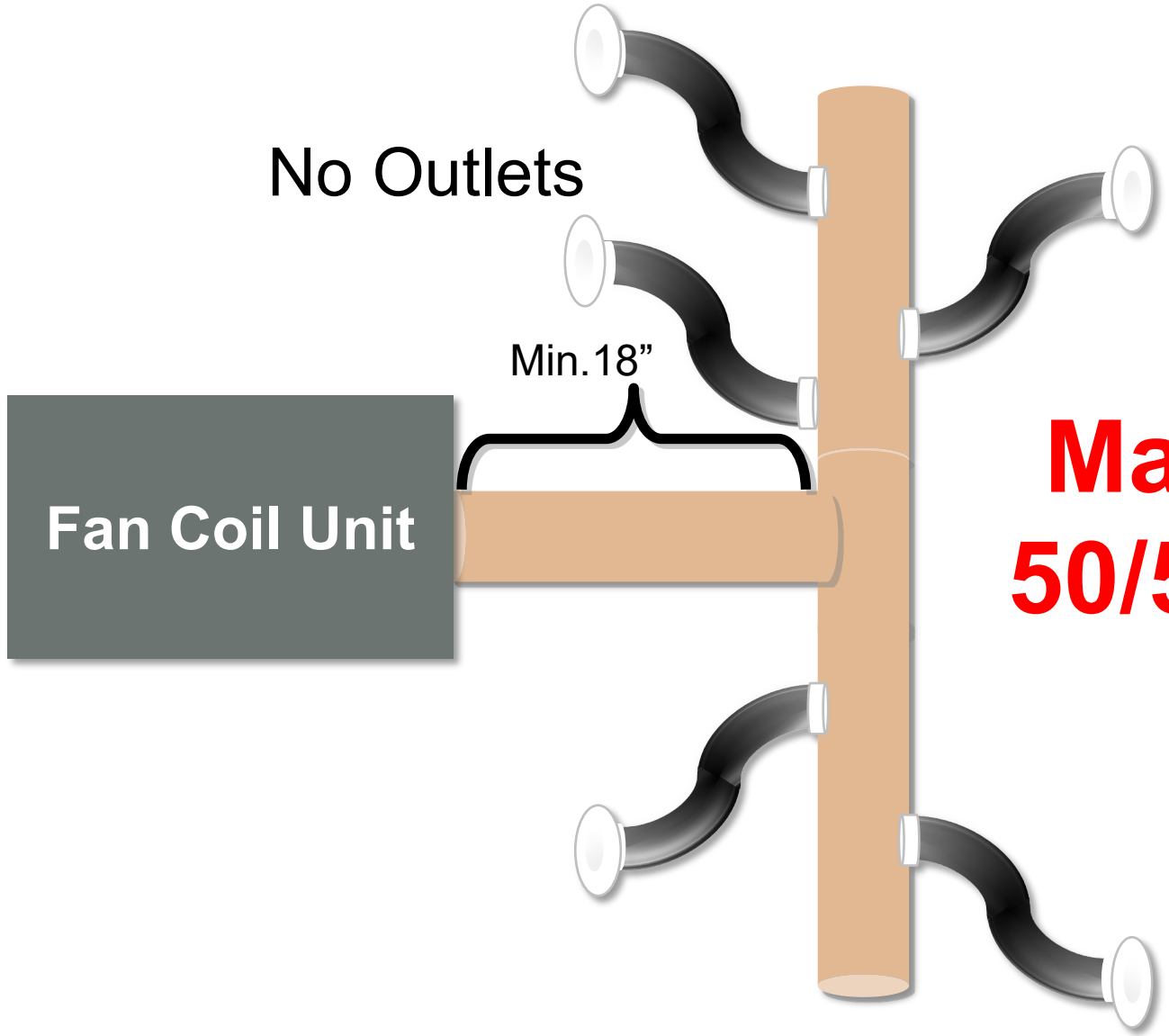
Horseshoe



Side Branch

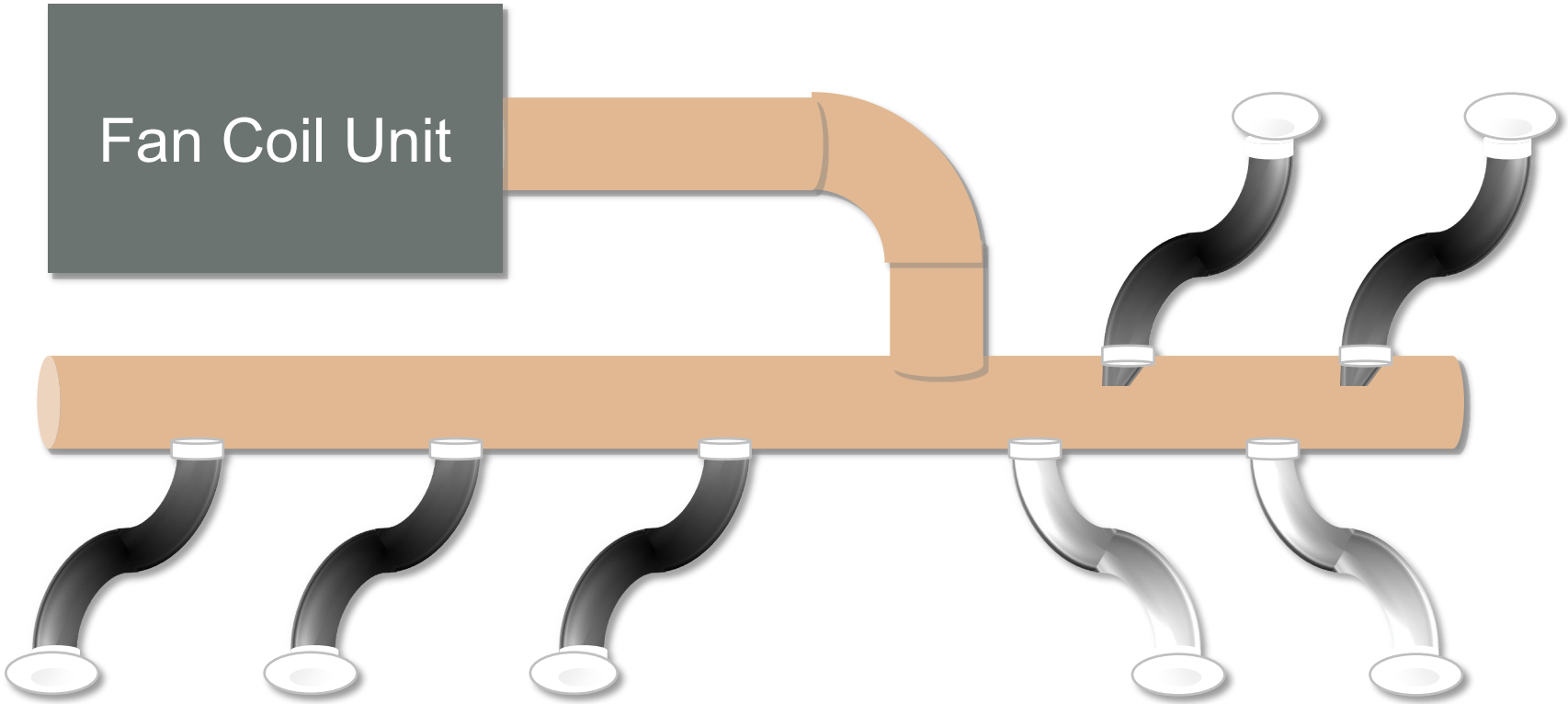


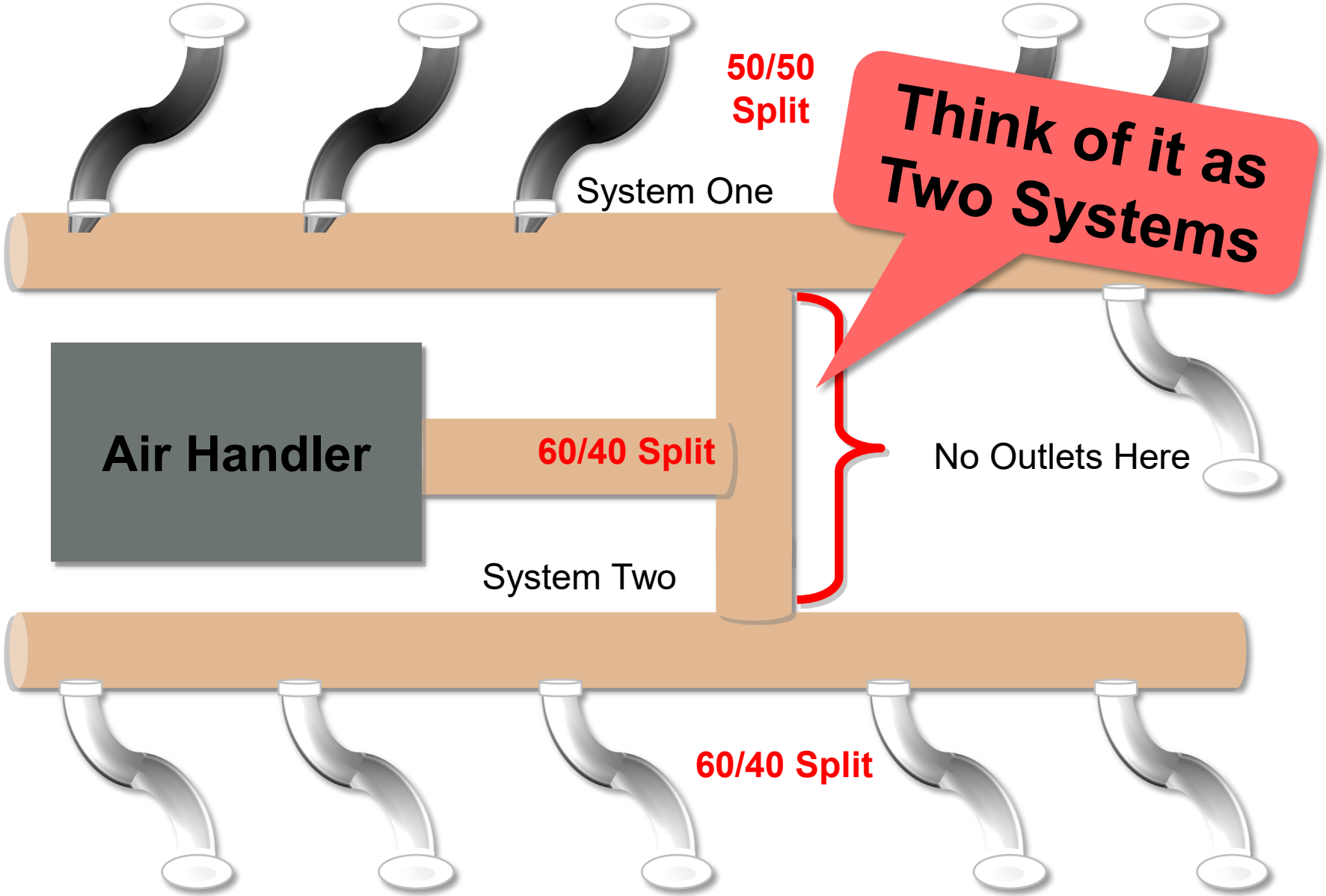
Example of a side branch tee (Former G Series)



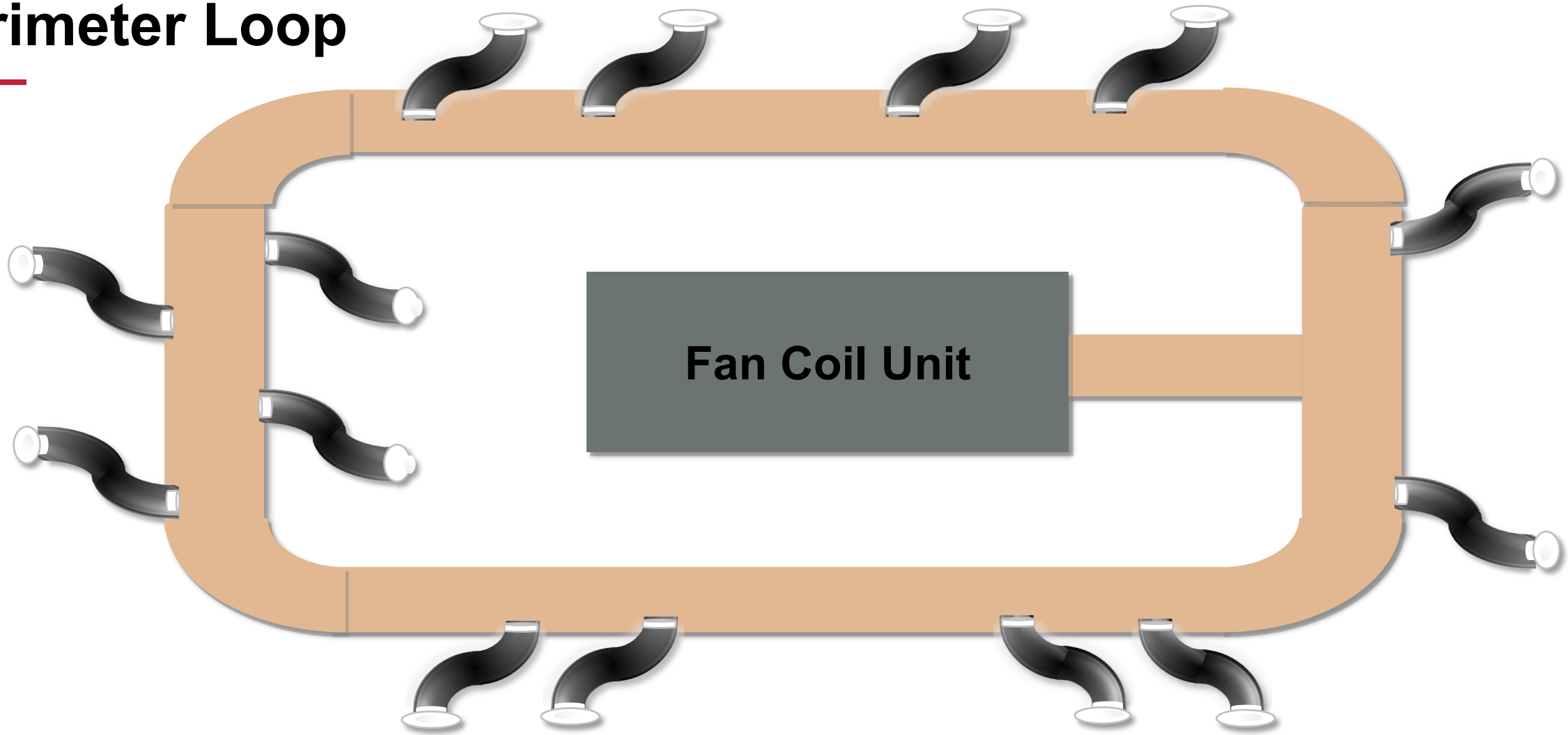
Maintain the 50/50 or 60/40 Split

Shotgun layout with a Tee (Remember to follow the rules)





Perimeter Loop



Note: **Takeoffs can be evenly spaced or mostly one side or the other, the 50/50 rules do not apply when dealing with a perimeter loop. This set up will balance regardless of the layout.**

Please do NOT do the following:

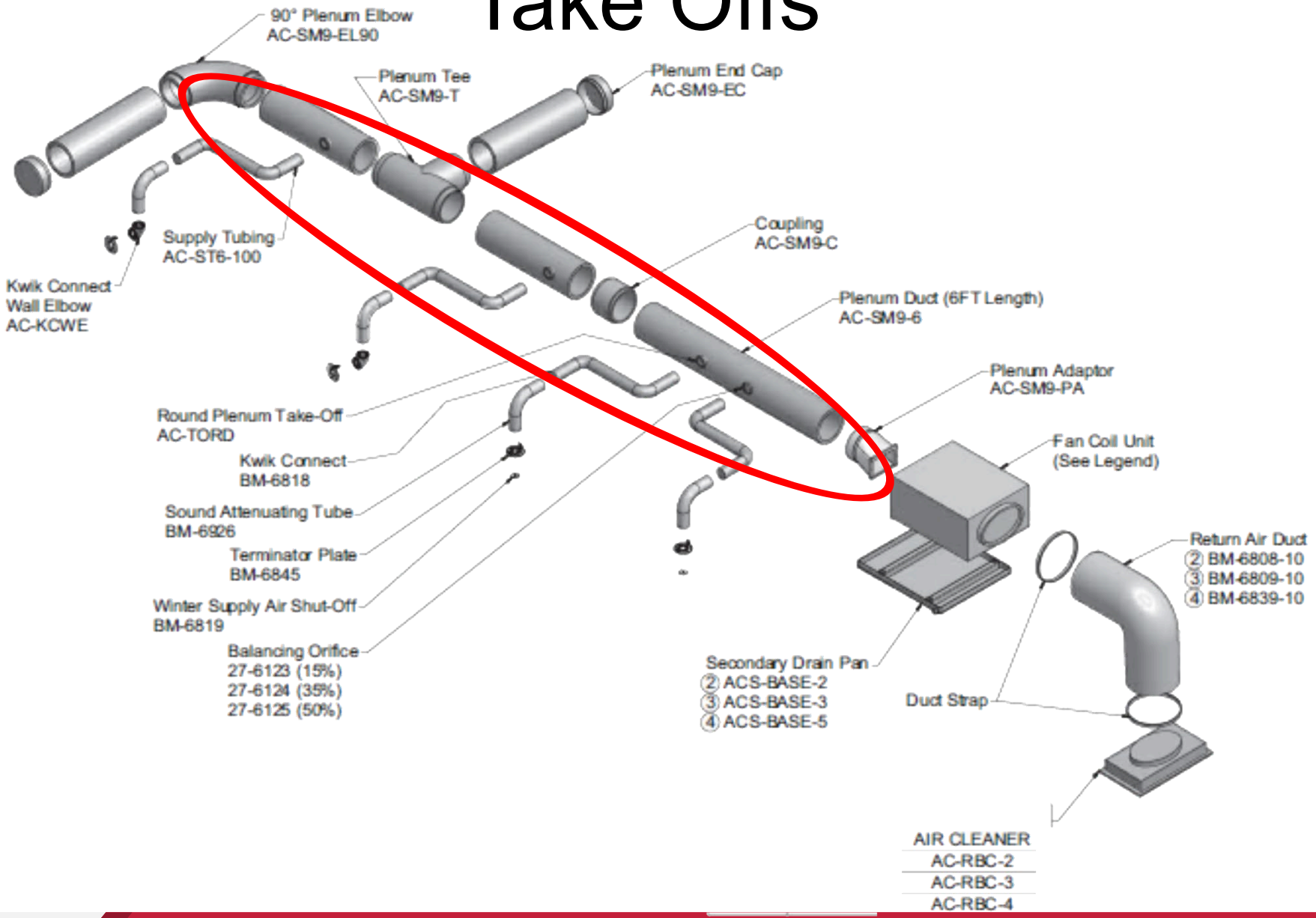
What else can we see wrong ?

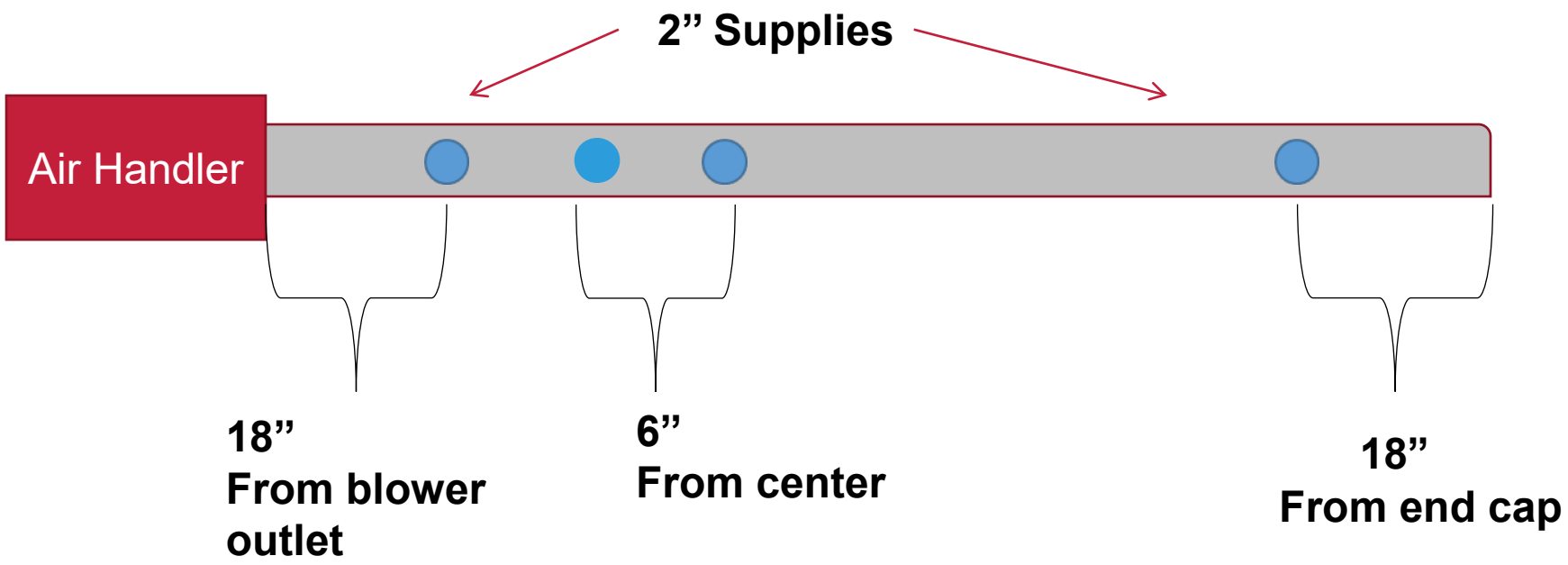
What do we see wrong with these pictures?

Are there any Questions?

Are there any Questions?

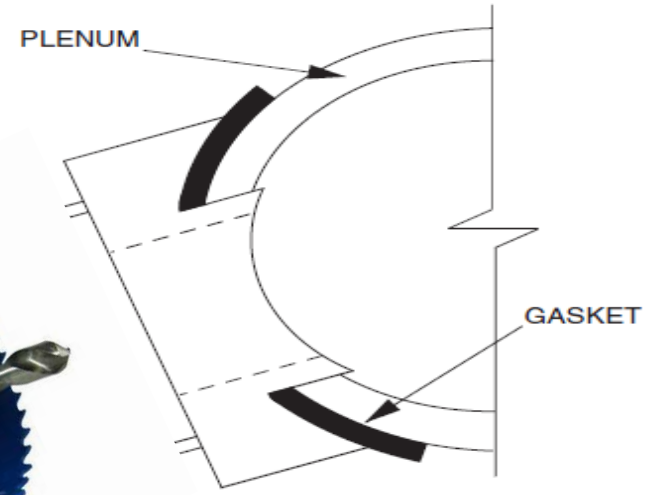
Take Offs

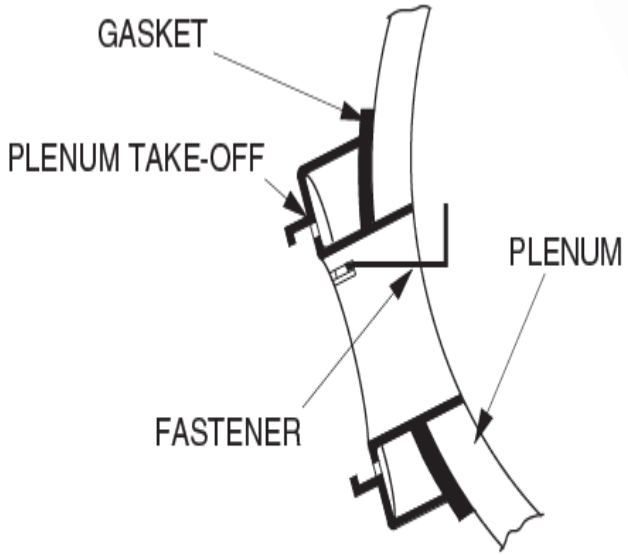




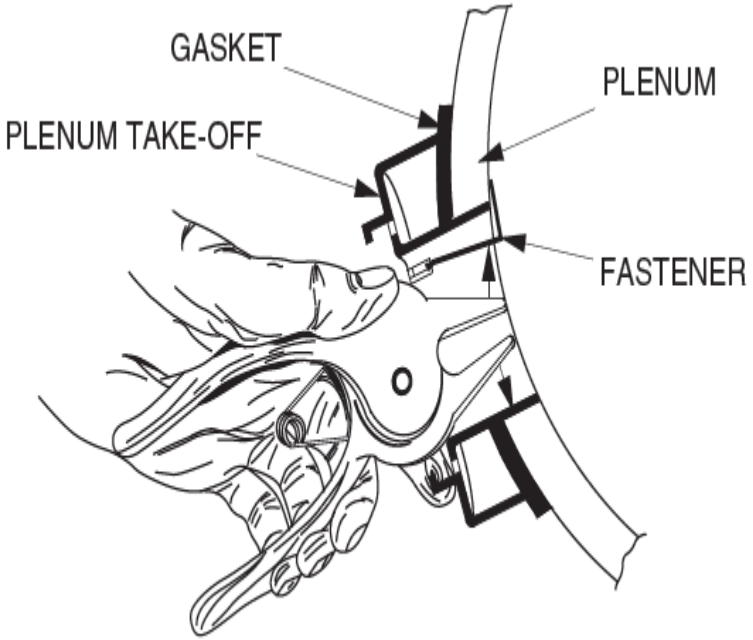
Take-off Installation

2 1/8”
Hole saw





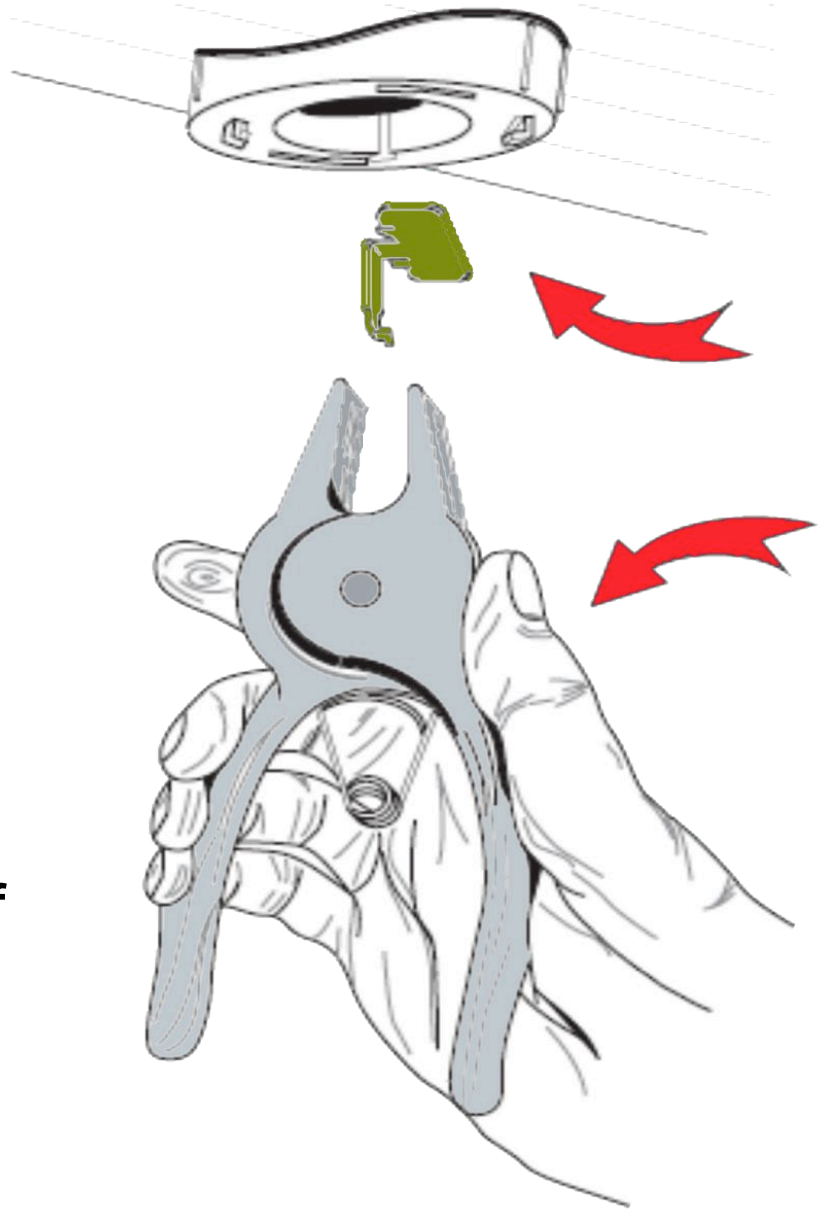
1. HAND INSERT FASTENER INTO PLENUM TAKE-OFF



2. WITH PLIERS, SNAP FASTENER INTO PLACE UNTIL IT LOCKS IN PLACE

Pliers

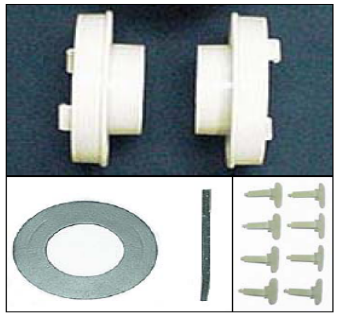
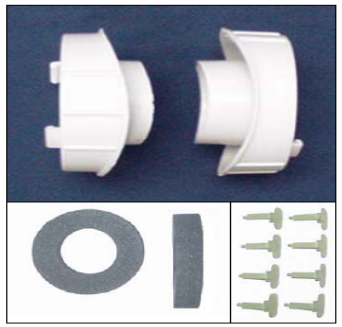
2 1/8” Hole saw



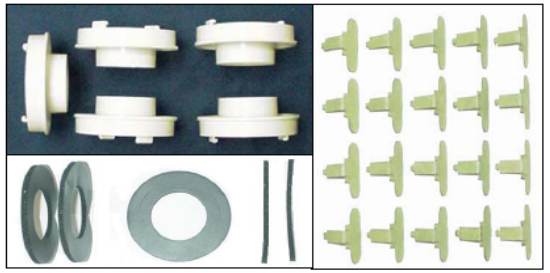
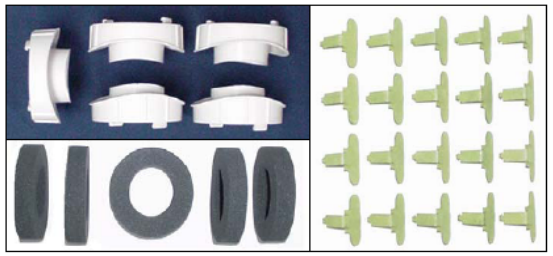
Note: **Be sure to install ALL 4 retainer clips on each takeoff to maintain a good seal**

Plenum Take Off Kits (what you will receive in the box)

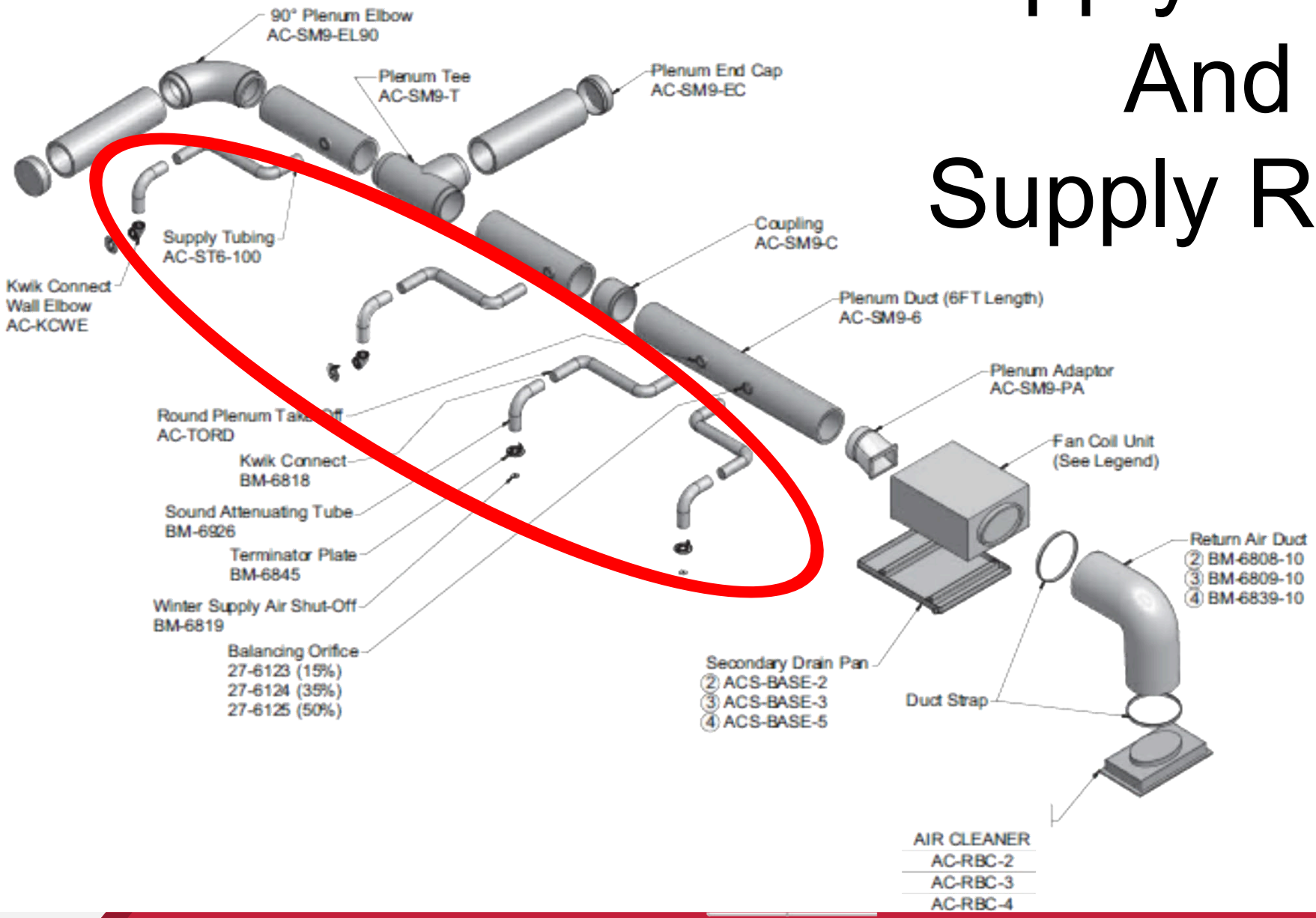
Take-off Kits for (2) outlets

DUCT SYSTEM TYPE		NEW ORDER CODE
Square Fiberboard Plenum Duct (FS)		AC-TKFS-2
Round Sheet Metal (MR)		AC-TKMR-2

Take-off Kits for (5) outlets

DUCT SYSTEM TYPE		NEW ORDER CODE
Square Fiberboard Plenum Duct (FS)		AC-TKFS-5
Round Sheet Metal (MR)		AC-TKMR-5

Supply Tubing And Supply Rules



Supply Tubing

R-6 is ordered in boxes of 100 Feet
R-8 is ordered in boxes of 75 Feet

Available in R-6 and R-8 Values

Note: **Local building codes will be the deciding factor in your R-Value required for installation**

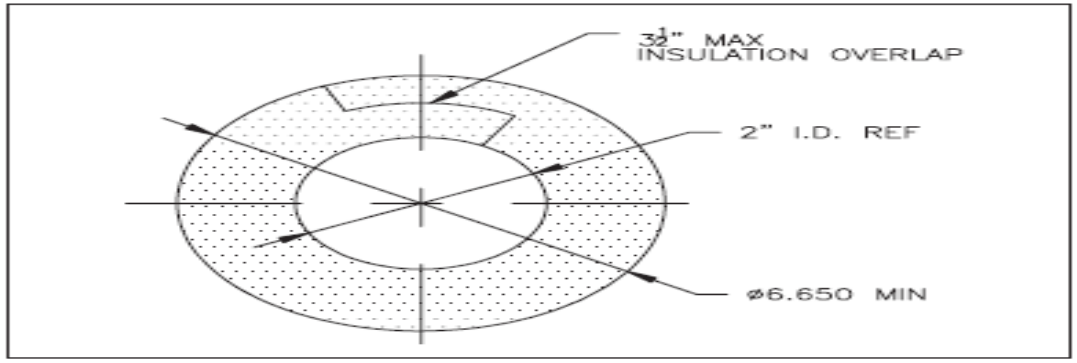
SUPPLY TUBING

SpacePak's pre-insulated, 2" inside diameter flexible supply tubing is listed by Intertek (ETL), conforming to UL 181 "Factory Made Air Ducts and Connectors, 10th Edition."

UL 181 requirements apply to materials for the fabrication of air duct and air connector systems for use in accordance with the Standards of the National Fire Protection Association for the installation of Air-Conditioning and Ventilating Systems, NFPA No. 90A, and the Installation of Warm Air Heating and Air-Conditioning Systems, NFPA NO. 90B.

Under UL 181, SpacePak supply tubing carries a minimum Class 1 status with a 25/50 flame/smoke spread index. In addition to UL 181, SpacePak supply tubing is compliant with Duct Requirements as identified in the International Building Code.

Manufactured in Farmville, NC at the SpacePak plant, the fully assembled supply tubing is available in insulation R-values of R6.0 and R8.0, as rated by ASHRAE Fundamentals 2005. The core is made up of a three-ply, corrugated flexible aluminum, resulting in a 2" inside diameter. The insulation surrounding the core is Flex-Glas PC formaldehyde-free, lightweight, highly resilient, blanket-type material that provides excellent thermal and acoustical performance. Insulation and core are cleanly contained in a Mylar sheath that is secured with a duct closure tape rated (UL 181B-FX) for operation in a wide range of temperatures and humidity conditions.



R8 shown.

- Listed by ETL; conforms to UL 181
- Rated Pressure: 0.0 – 2.5" W.C.
- Rated Velocity: Maximum 2,500 F.P.M
- Available in R6 and R8 insulation values
- R6 approx. total diameter: 3.75"
- R8 approx. total diameter: 7"
- Resistant to fungi growth
- Class 1, 25/50 flame/smoke spread
- Insulation meets Surface Burning Characteristics & Limited Combustibility per UL 723, NFPA 90A & 90B, ASTM E84, CAN/ULC S102-1188
- Max. Operating Temperature: 250°F
- Meets "Buy American Act" standards for ARRA 2009
- Manufactured and assembled in USA
- Duct closure tape min to max temperature range: -37°F to 260°F
- SCS Certified for Green Building Recycled Content

Tubing Machine, Farmville NC

Supply Rules and Topics

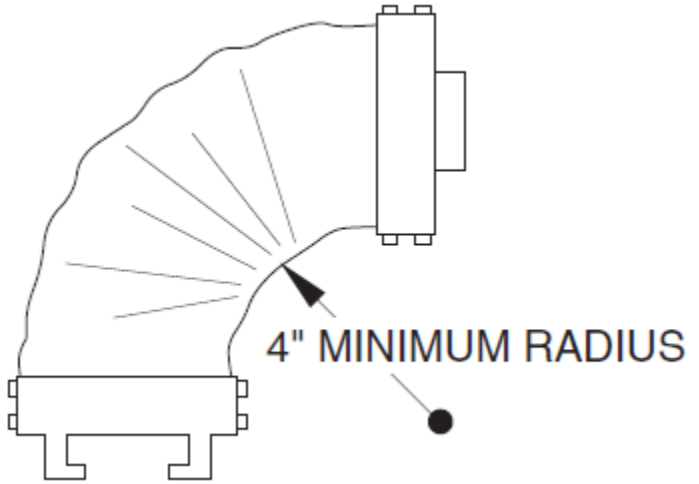
- 6-7 outlets minimum per Ton on an AC only
- In cooling only above 5000’ use 8 outlets per ton and above 6500’ use 9 outlets per ton
- 7-8 outlets minimum per Ton on a Heat Pump System (due to higher coil pressures)
- 2,000 BTUs per outlet (fully rated) in Cooling at 37 cfm
- 3,000 BTUs per outlet (fully rated) in Heating at 37 cfm
- Outlet placement in a room
- Room by room load Calculations to assure the number of outlets in a room
- Best length of a duct run (includes sound attenuator)
- Maximum length of a duct run (9’ to 15’ this length includes the 3’ sound attenuator)
- If termination “hole” is closer to the trunk then 9 feet you can also loosely coil the supply (not tight)

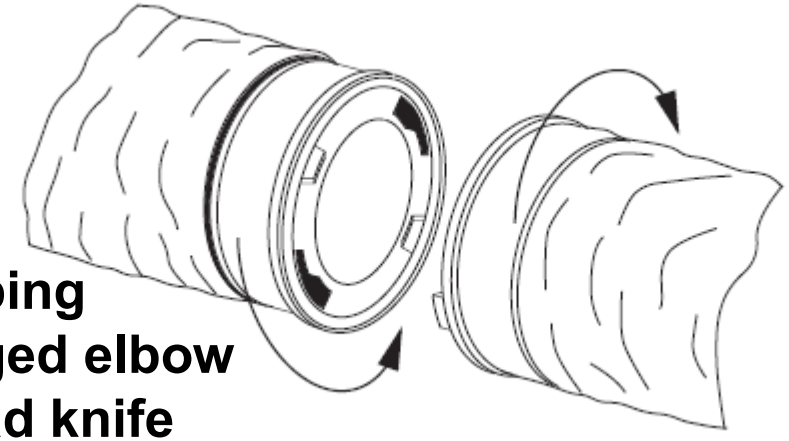
Best Length of Duct Run

- **Best length to balance the outlets run: 9 to 15 feet (with attenuator)**
- **Shorter than 9 feet works with duct orifice balancers.**
- **Longer runs work if more runs are added to make up for the CFM lost.**
- **10% rule (after 15' 0f supply run you lose 10% for every additional 5') Loss of CFM and BTU's**
- **CFMs directly affect the amount of Btu's delivered**

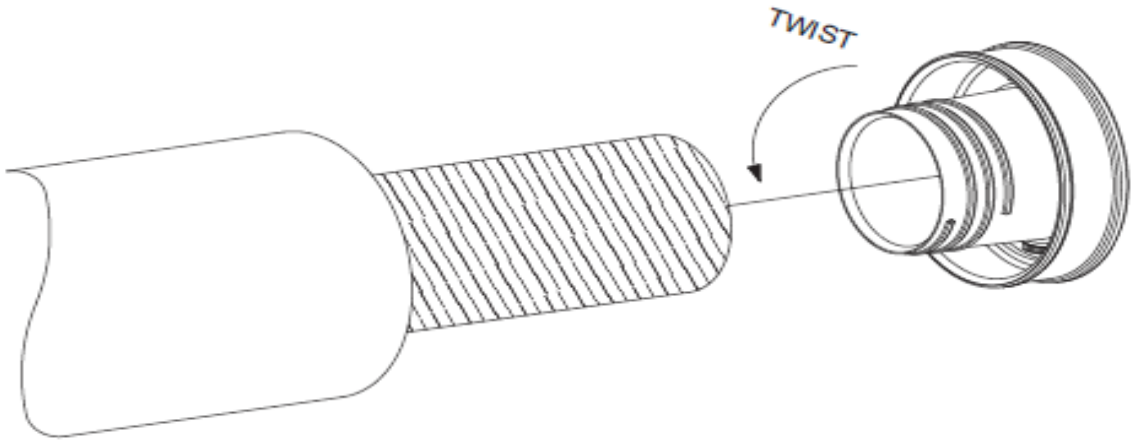
2" SUPPLY TUBING LENGTH ADJUSTMENT FACTOR CHART								
RUN	6'	8'	10'	12'	15'	20'	25'	30'
FACTOR	1.18	1.14	1.11	1.06	1.0	.9	.8	.66

Kwik Connects/Radius





- Minimum 4” radius for tubing
- For tighter radius use ridged elbow
- Tube cuts easily with bread knife or similar
- “crunch” down 2” of aluminum core before twisting in quick connect
- No need to overtighten
- Tuck remaining insulation under twist collar
- Tape connection



Shown a finished internal connection no need to screw or fasten beyond tape, No need to overtighten.

Sound Attenuator

- 3-foot standard section
- Pre-assembled connectors
- Reduces velocity noise/ cloth lined
- End of every run
- Included in the total run length

6 Outlets Per Ton Minimum (notice the cfm)

System Size	System CFM	Number Of Outlets	Average CFM	BTU's Per outlet in cooling	BTU's Per outlet in Heating
2 Ton	440	12	37	2000	3000
2.5 Ton	550	15	37	2000	3000
3 Ton	660	18	37	2000	3000
3.5 Ton	770	21	37	2000	3000
4 Ton	880	24	37	2000	3000
5 Ton	1100	30	37	2000	3000

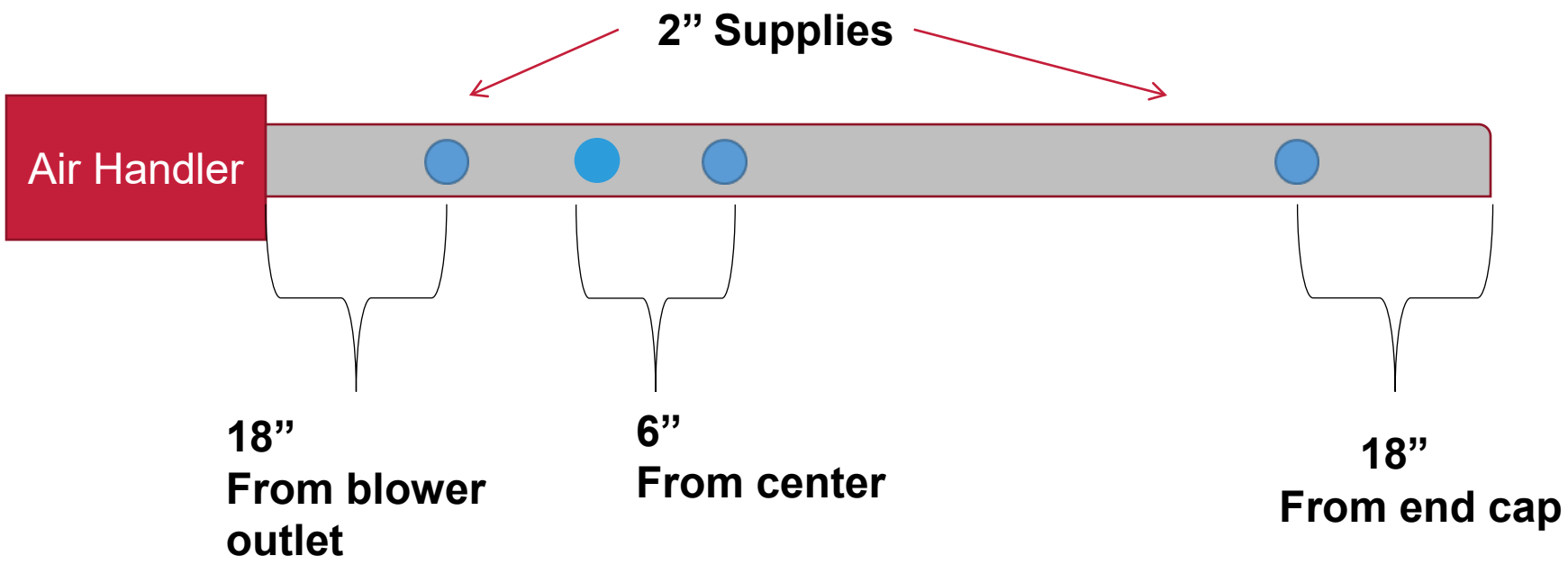
10 Outlets Per Ton Max (notice the cfm)

System Size	System CFM	Number Of Outlets	Average CFM	BTU's per outlet in cooling	BTU's per outlet in Heating
2 Ton	440	20	22	1200	1800
2.5 Ton	550	25	22	1200	1800
3 Ton	660	30	22	1200	1800
3.5 Ton	770	35	22	1200	1800
4 Ton	880	40	22	1200	1800
5 Ton	1100	50	22	1200	1800

CFM Per Outlet

	CFM Per Outlet				
	Plenum Static Pressure "WC				
Supply Tube Length	1.8	1.5	1.2	1	0.5
10	45	40	36	33	22
15	37	33	30	27	18
20	32	28	26	23	15
25	29	25	23	21	14
30	26	23	21	19	13
35	24	22	19	18	12
40	23	20	18	16	11

Note: **When delivered CFMs are low additional supplies may have to be added in a room to achieve required Btus**



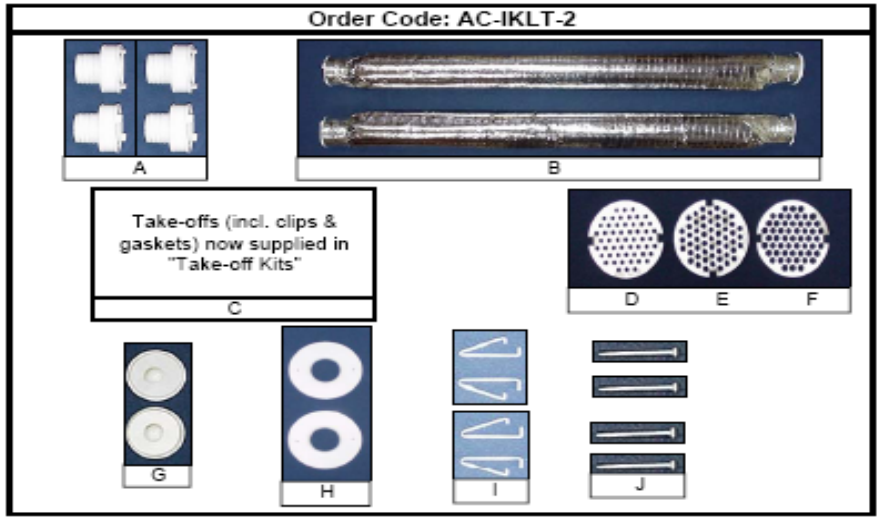
Installation Kits (what you will receive in the box)

SPACE PAK

Installation Kit (Less Take-offs) for (2) outlets

~ Common Parts Box - used for all duct system types~

Order Code: AC-IKLT-2



All Components Included in **AC-IKLT-2** (as shown above)			
Item	Part No.	Description	Qty. per Kit
A	BM-6818	Kwik Connect	4
B	BM-6926	Sound Attenuating Tube	2
C	Select Duct System Type (FS or MR) to Determine Take-off Kit Part Number		
D	27-6125	Balance Orifice (50% Red.)	1
E	27-6124	Balance Orifice (35% Red.)	1
F	27-6123	Balance Orifice (15% Red.)	1
G	BM-6819	Winter Supply Air Shut-Off	2
H	BM-6845	Terminator Plate	2
I	27-1128	Terminator Plate Clip	4
J	27-1072	Terminator Plate Screw	4

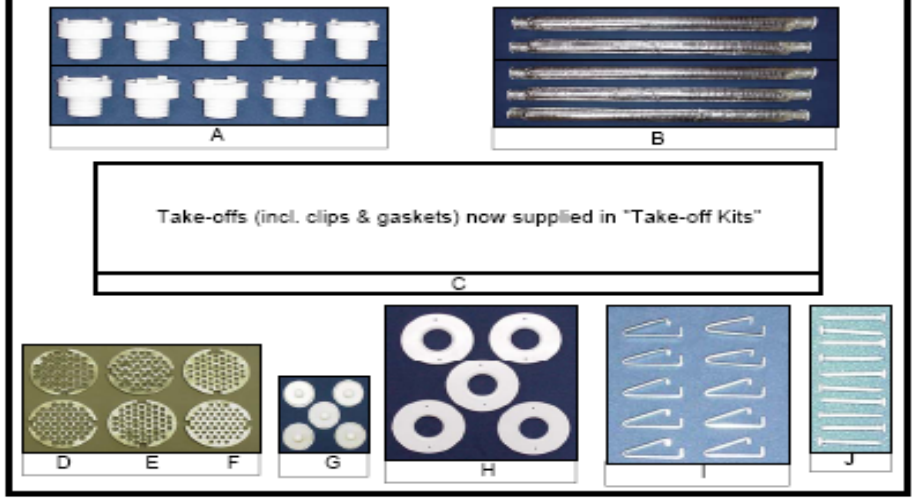
Duct System Type	Old Model #	Old Order Codes		New Order Codes
Square Fiberboard Plenum Duct (FS)	SPS-KIT-2	BM-3020	-	AC-IKLT-2 AC-TKFS-2
Round Sheet Metal (MR)	AC-IKMR-2	AC-IKMR-2	-	AC-IKLT-2 AC-TKMR-2

SPACE PAK

Installation Kit (Less Take-offs) for (5) outlets

~ Common Parts Box - used for all duct system types ~

Part Number: AC-IKLT-5

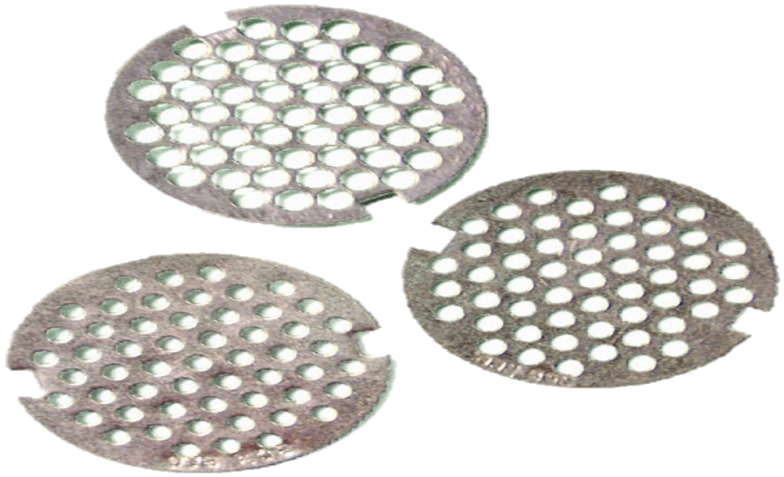


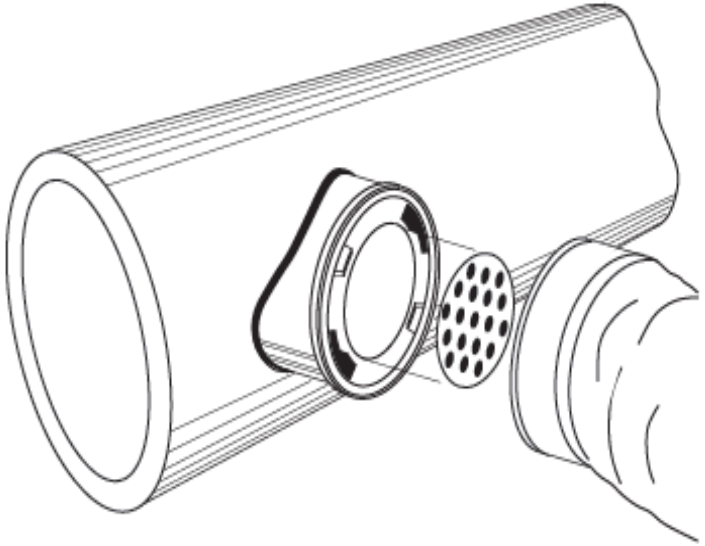
All Components Included in **AC-IKLT-5** (as shown above)			
Item	Part No.	Description	Qty. per Kit
A	BM-6818	Kwik Connect	10
B	BM-6926	Sound Attenuating Tube	5
C	Select Duct System Type (FS or MR) to Determine Take-off Kit Part Number		
D	27-6125	Balance Orifice (50% Red.)	2
E	27-6124	Balance Orifice (35% Red.)	2
F	27-6123	Balance Orifice (15% Red.)	2
G	BM-6819	Winter Supply Air Shut-Off	5
H	BM-6845	Terminator Plate	5
I	27-1128	Terminator Plate Clip	10
J	27-1072	Terminator Plate Screw	10

Duct System Type	Old Model #	Old Order Codes		New Order Codes
Square Fiberboard Plenum Duct (FS)	SPS-KIT-5	BM-3050	-	AC-IKLT-5 AC-TKFS-5
Round Sheet Metal (MR)	AC-IKMR-5	AC-IKMR-5	-	AC-IKLT-5 AC-TKMR-5

Balancing Orifices

- Install ONLY in the Plenum
- Available in 3 sizes 15, 35, 50% (restriction)
- Only used for balancing or areas that need reduced BTUs
- Do NOT install in the room side termination
- Most commonly used for small room/ bathroom supplies
- If installed please mark plenum and make a note for future service.



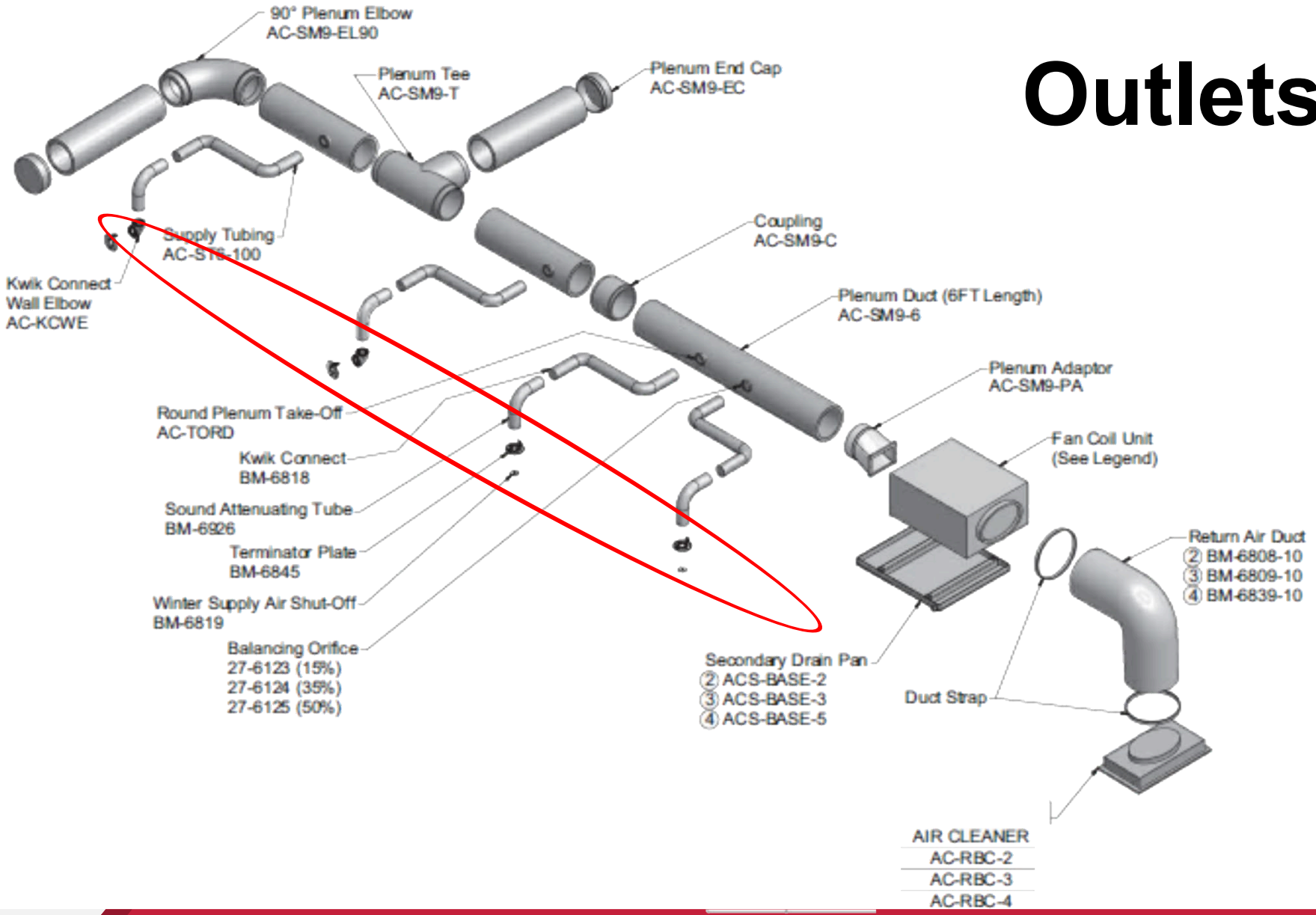


Do not install here!

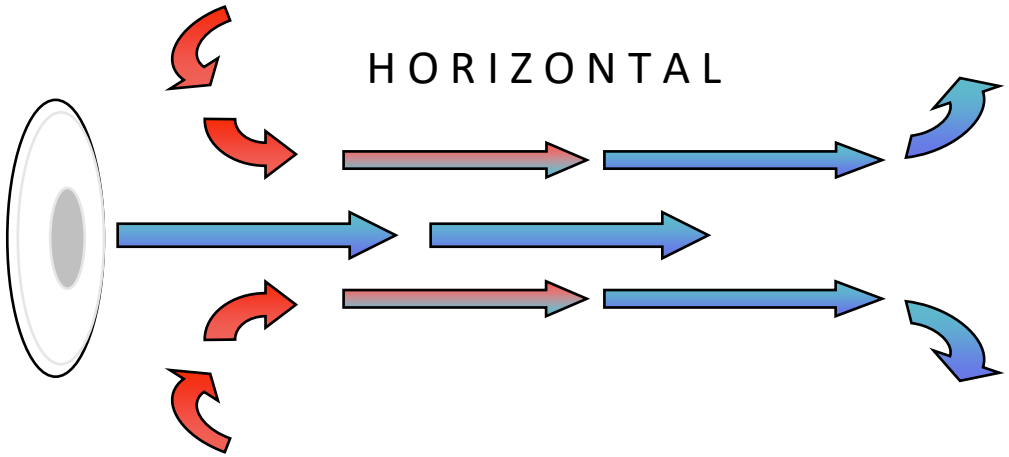
- WILL result in unwanted noise and reduction of output
- If mounted on the floor ¼“” screen can be used to prevent the introduction foreign objects in to the system
- Only to be installed at the plenum and only used for balancing and BTU reduction

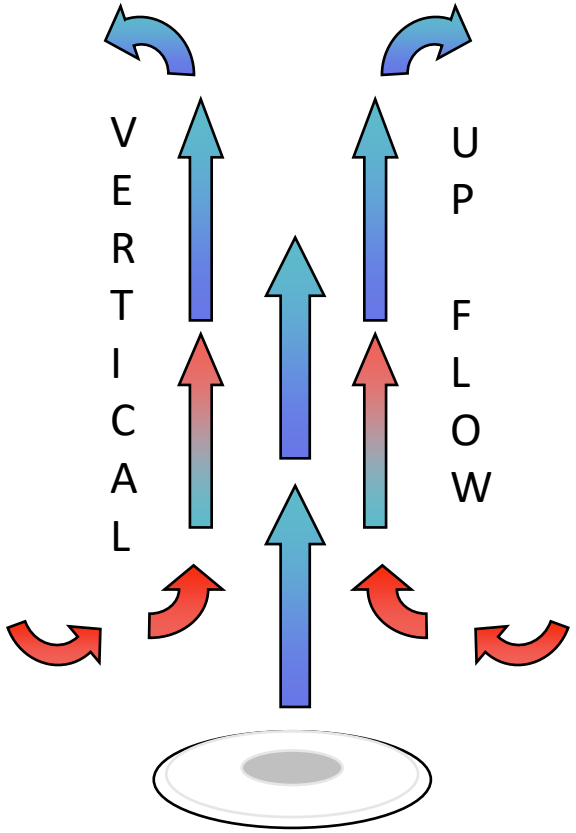
Are there any Questions?

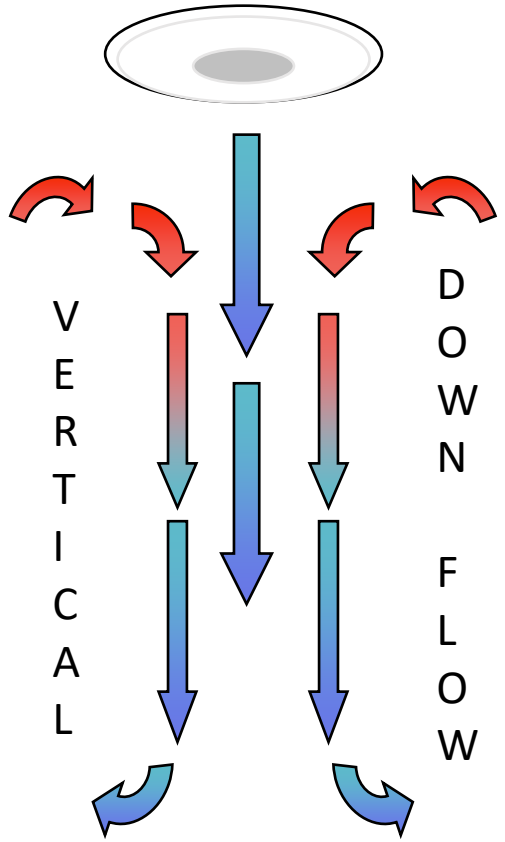
Outlets



Outlet Orientation: Where will aspiration work?







Outlet Placement Rules and Suggestions:

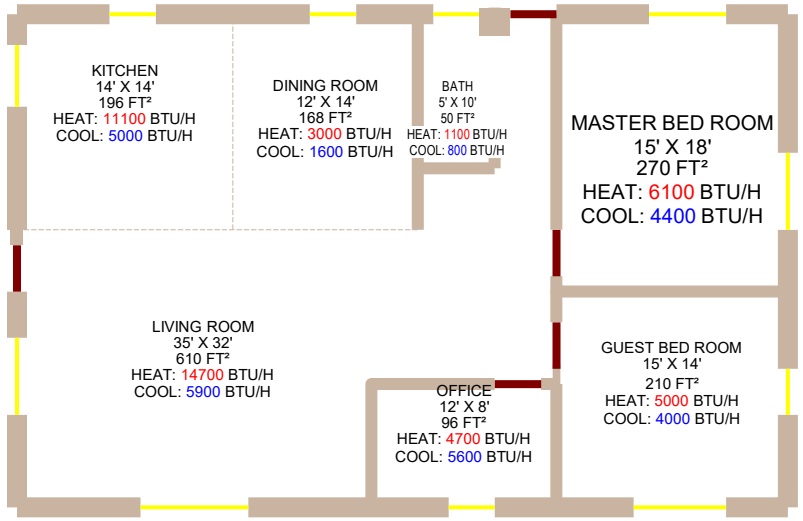
- Place outlets out of traffic patterns (room corners, behind door swings are ideal)
- Never put an outlet where it will blow on someone (air can travel 15+ Feet)
- Never put an outlet where it will blow on something that will move (curtain etc.)
- Never block an outlet (reduction of air flow can reduce system performance)
- Have at least 6 inches from the center of an outlet to a wall
- Ceiling, sidewall or floor are all ok!
- Aspiration will work anywhere!!!

The number of outlets in a room is determined by:

- A proper Room by Room Load Calculation
- The BTU’S required in the room based on the load
- CFM per outlet based on supply run and trunk layout
- Length of the run
- Spacepak offers presale support to help with Load calculations

Basic System overview

Project: Spacepak House Albany N.Y.



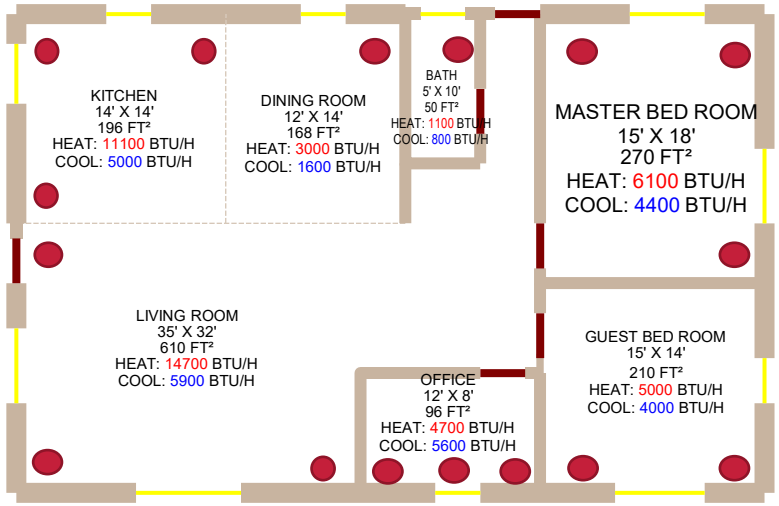
)

The total heating load of the home is 45,700 btu
The total cooling load of the home is 27,300 btu

Heating 45,700/ 3000 (btu per full rated outlet) = 15.2 outlets MINIMUM
Cooling 27,300/ 2000 (btu per full rated outlet) = 13.6 outlets MINIMUM

Note: This is a good way to get an approximate system size however a full room by room load calculation should be done to insure that the individual rooms are supplied properly.

DX COIL COOLING ONLY



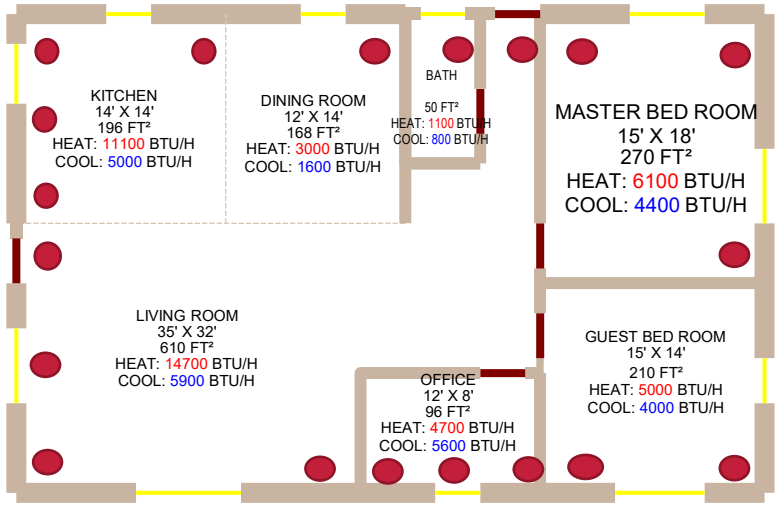
Kitchen
5,000 Btuh Cooling
÷ 2,000 = 2.5

How Many outlets ?

3 Outlets

- **Dining Room 1, Bath Room 1, Master Bed 3, Guest Bed 2, Office 3, Living Room 3**
- **Our Cooling Load is 27, 300 BTUH ÷ 2000 = 13.65 outlets.**
- **The unit we would use is an ESP-2430JH4MB DX FAN COIL with a 2.5 ton Condenser, 30,000 BTUH ÷ 2000 requires 15 Outlets we have 16 so your good to go !**

DX COIL OPTION WITH HYDRONIC COIL FOR HEATING



Kitchen
11,100 Btuh
Heating
÷ 3,000 = 3.7

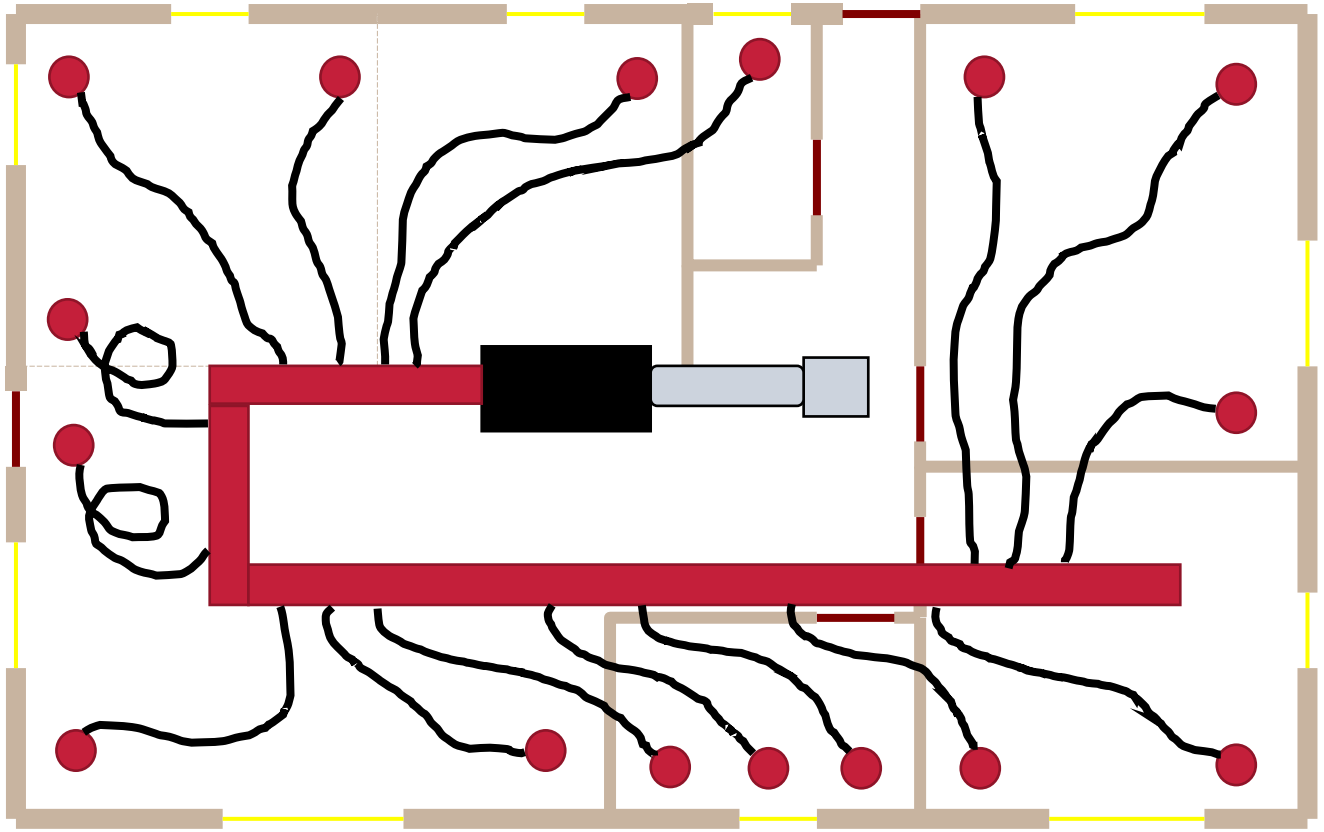
5,000 Btuh Cooling
÷ 2,000 = 2.5

How Many outlets ?

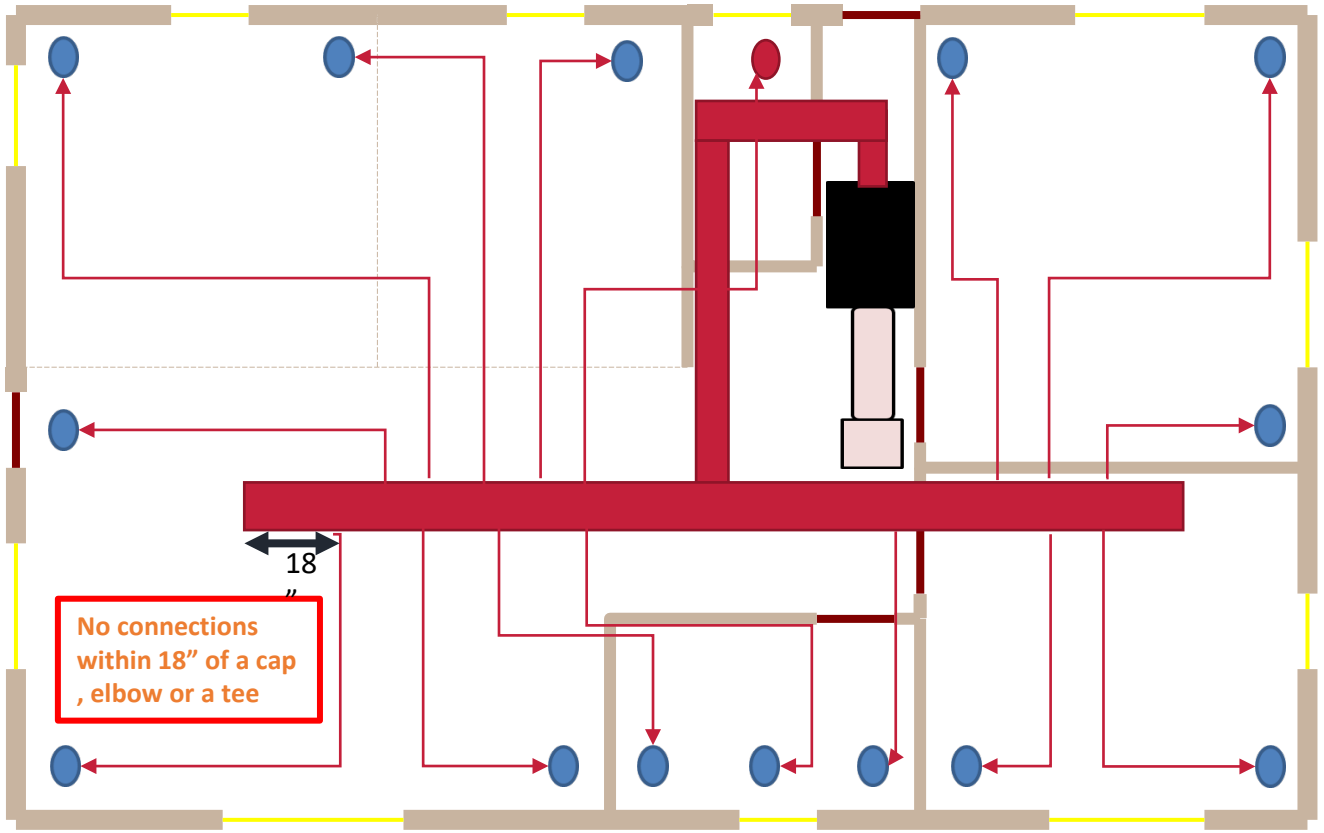
4 Outlets

- **Dining Room 1, Bathroom 1, Master Bed 3, Guest Bed 2, Office 3, Living Room 5**
- **Our Largest Load is the Heating Load of 45,700 BTUH ÷ 3000 = 15.2 outlets.**
- **The unit we would use is an ESP-3642JH4MB DX FAN COIL combined with a 2.5-ton Condenser, add an AC-WPAK-90 Hydronic Coil requiring 16 Outlets we have 19 so your good to go !**

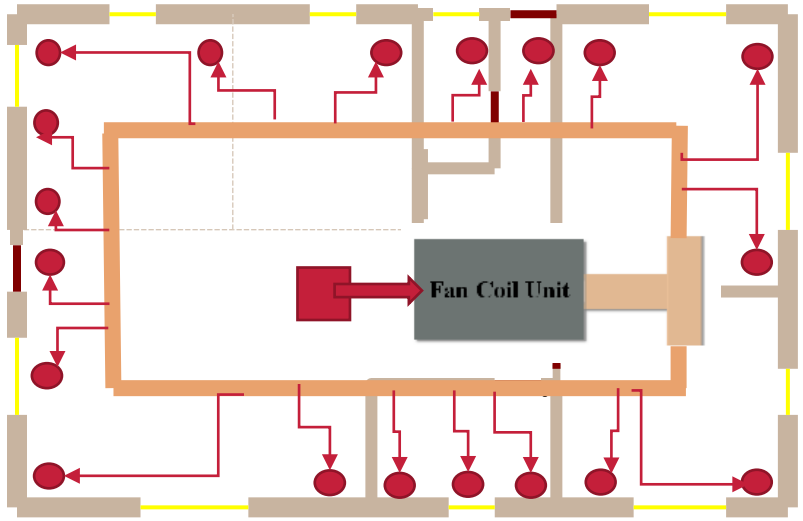
The Shotgun Duct System



The Shotgun with a Tee (be sure to follow the “TEE” rules)

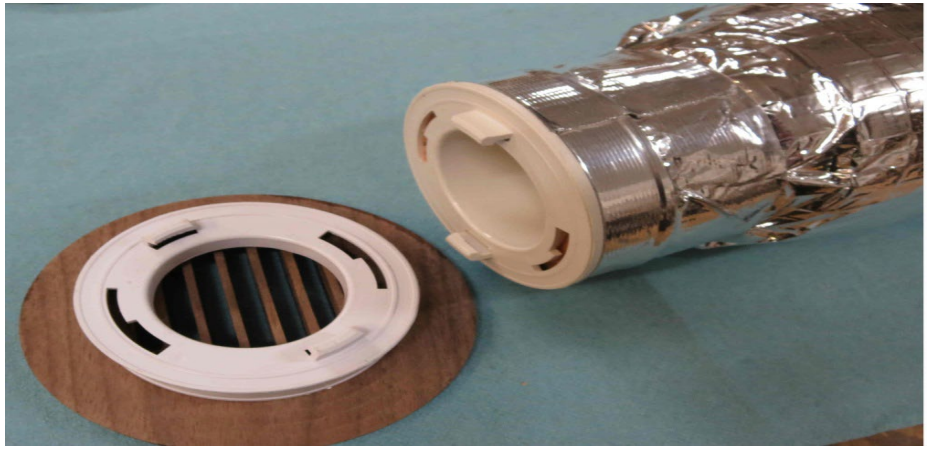


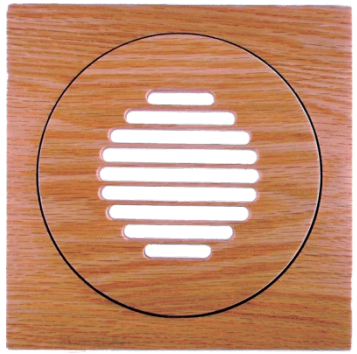
Example: Perimeter loop layout with at centrally located return, this system would need no “extra balancing” based on our load calculations and duct design chosen.



Notes: Since this is a heating and cooling system resulting in being slightly oversized for one setting you can use the variable speed blower to ensure the air flow match and btu delivery without the concern of unwanted noise.

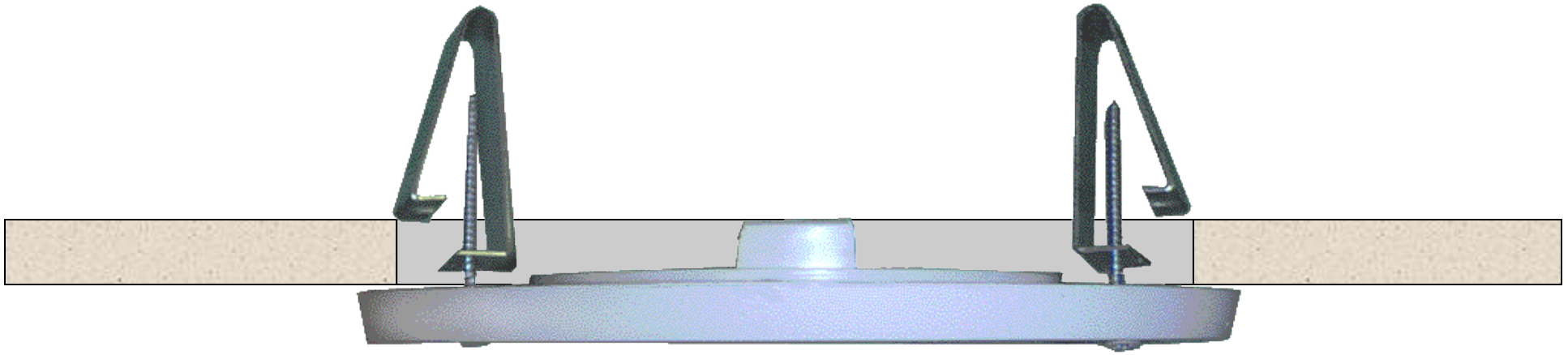
Supply Outlets and Terminations





When installing in a standard sheetrock ceiling be sure to use a 4” hole saw other ceiling and floor material may require a slightly different installation processes.

Installation of termination plate and mounting clips



Notes:

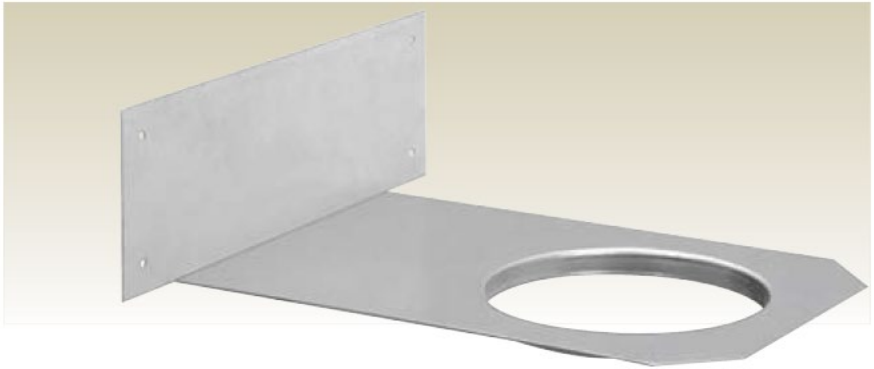
- **The sound attenuator is usually attached to the termination plate at this time**
- **Altering the clips or hole size may be required in some applications for proper fastening as different installation may require adjustments this is all considered ok and as long as you are not restricting air flow should not have any effect on system performance**

Additional Installation Parts

KWIK CONNECT WALL ELBOW

Kwik Connect wall elbows simply snap into place for fast, easy installation.

ROUGH-IN BRACKET



Serves as a reference point for sheetrock outlet locations during the framing portion of new construction.

KWIK CONNECT EXTENSION

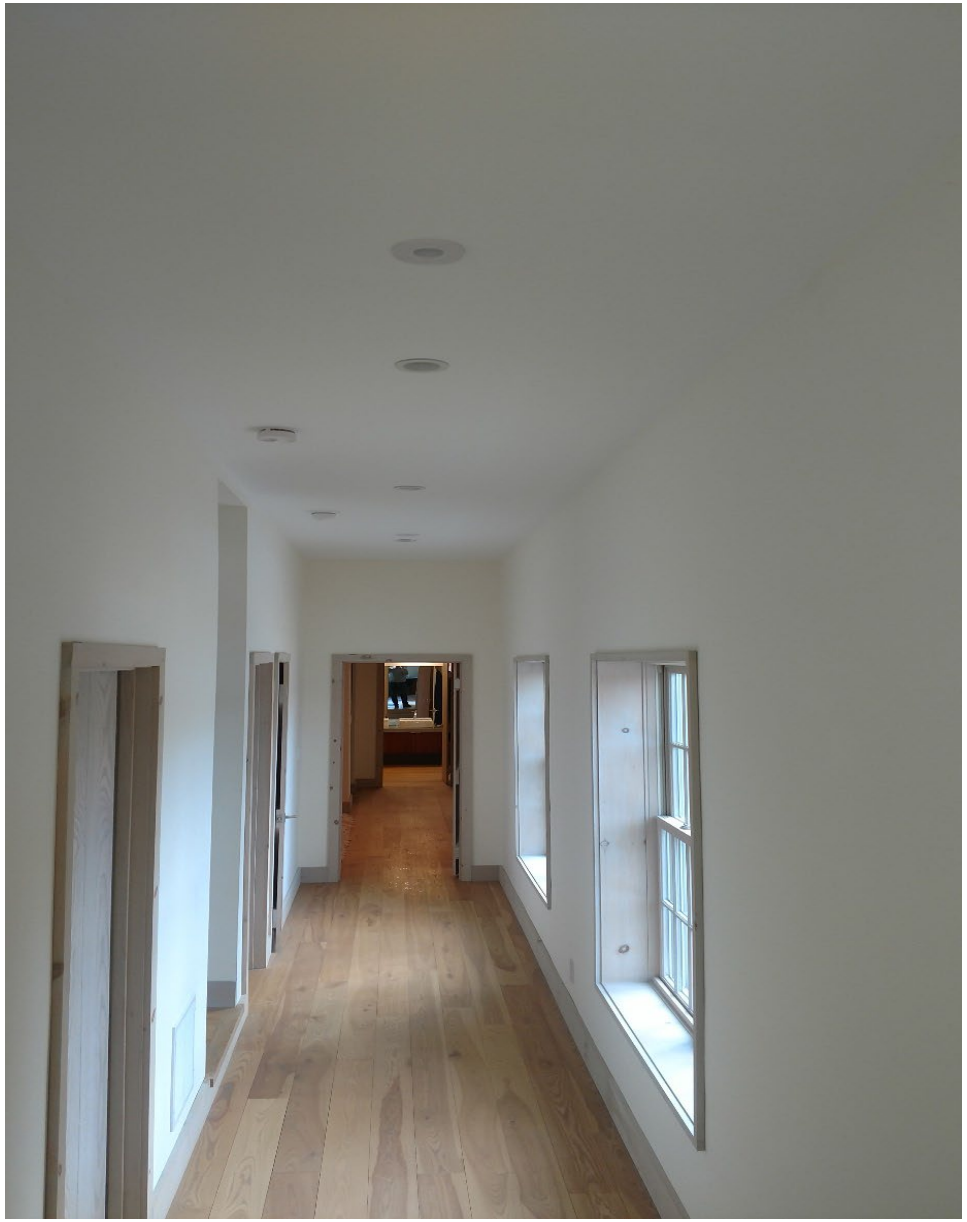
Designed for installations using wall thicknesses above 1/2".

Showing a common supply wall and common return air, if we were standing in this picture we there would be all windows at our back.

Showing linear slots in a kitchen

Hallway installation

- Notice the best place for outlet termination is in the center of the hall
- Rough in plates were used in this installation to ensure proper locations of the supply terminations



Showing horizontal wall terminations

This installation shows ceiling terminations, there were 9-10 runs per ton used in this installation to insure that air noise would not be an issue due to the lack of natural sound deadening material (full carpets, low ceilings etc.).

This install used exterior wall terminations, the main trunk was actually rectangle and located in the floor. The supplies were run up the outside walls between the windows and out creating a thermal curtain. This rooms cooling load was 42kbtu.

This install shows the use of no termination plates, the cabinet maker made holes and the contractor attached to the back of the top plate. Notice the slight angle to the top plate this will allow the air to travel under the timbers and across the room.

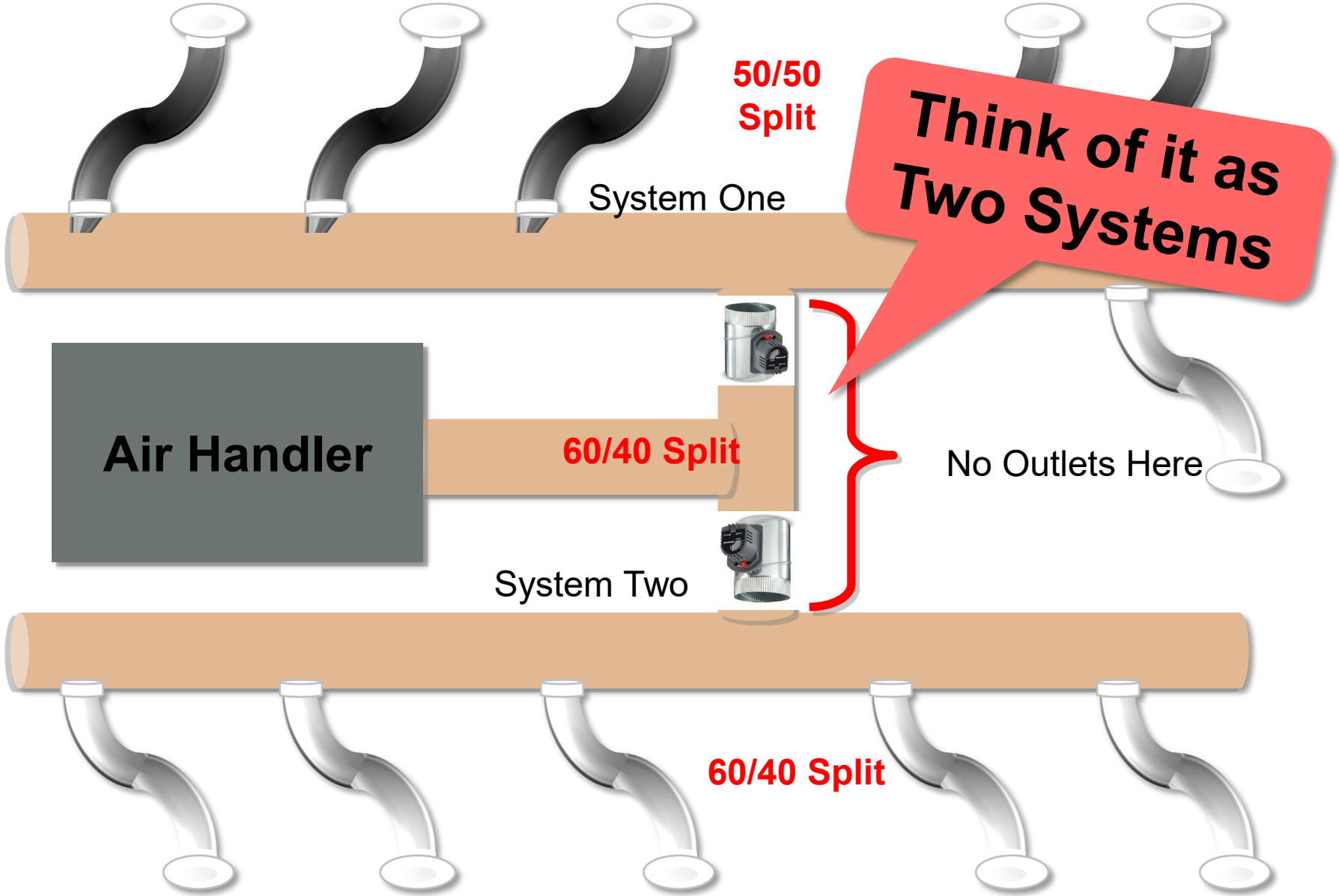
Spot conditioning applications:

- Great for areas where it would be financially exhausting to condition the entire space
- Great for kitchen prep lines
- Assembly lines
- Gives a great commercial look
- You can run fewer outlets per ton due to the loss of restriction applied by the normally installed supply tubing
- Generally 4-5 outlets per ton will work here

Zoning Basics

Zoning Basics

- **When zoning with SpacePak a staged or fully inverter condenser MUST be used.**
- **In a multi zone system the smallest zone must be of the same size or larger output then the lowest turned down capacity of the compressor being used (ex: if the inverter condenser turns down to 12kbtu then the smallest zone on the system must be capable of handling that capacity 1-Ton)**
- **When using multiple zones, the controls on the J-Series air handler will allow you to match the air flow to the specific needs of the system.**
- **During zoned system installation and layout be sure to follow all duct design rules.**
- **DO NOT UNDER ANY CIRCUMSTANCES USE AN AIR BYPASS OF AN CONFIGURATION IN ANY SPACEPAK SYSTEM!**



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- Extended warranty
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- Local Leads form Homeowners

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PreSaleSupport@SpacePak.com

Pre-Sale Support is a team of application engineers who provide optimal turnaround in answering your questions regarding system design and layout as well as assistance in equipment selection and job quoting.

- Available to Representatives, Wholesalers and Contractors
- Any questions regarding equipment already shipped should be directed to: (413) 564-5530
- TechnicalService@SpacePak.com: (413) 564 - 5530

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Thank You!