

VIBRATION ISOLATION

INTRODUCTION

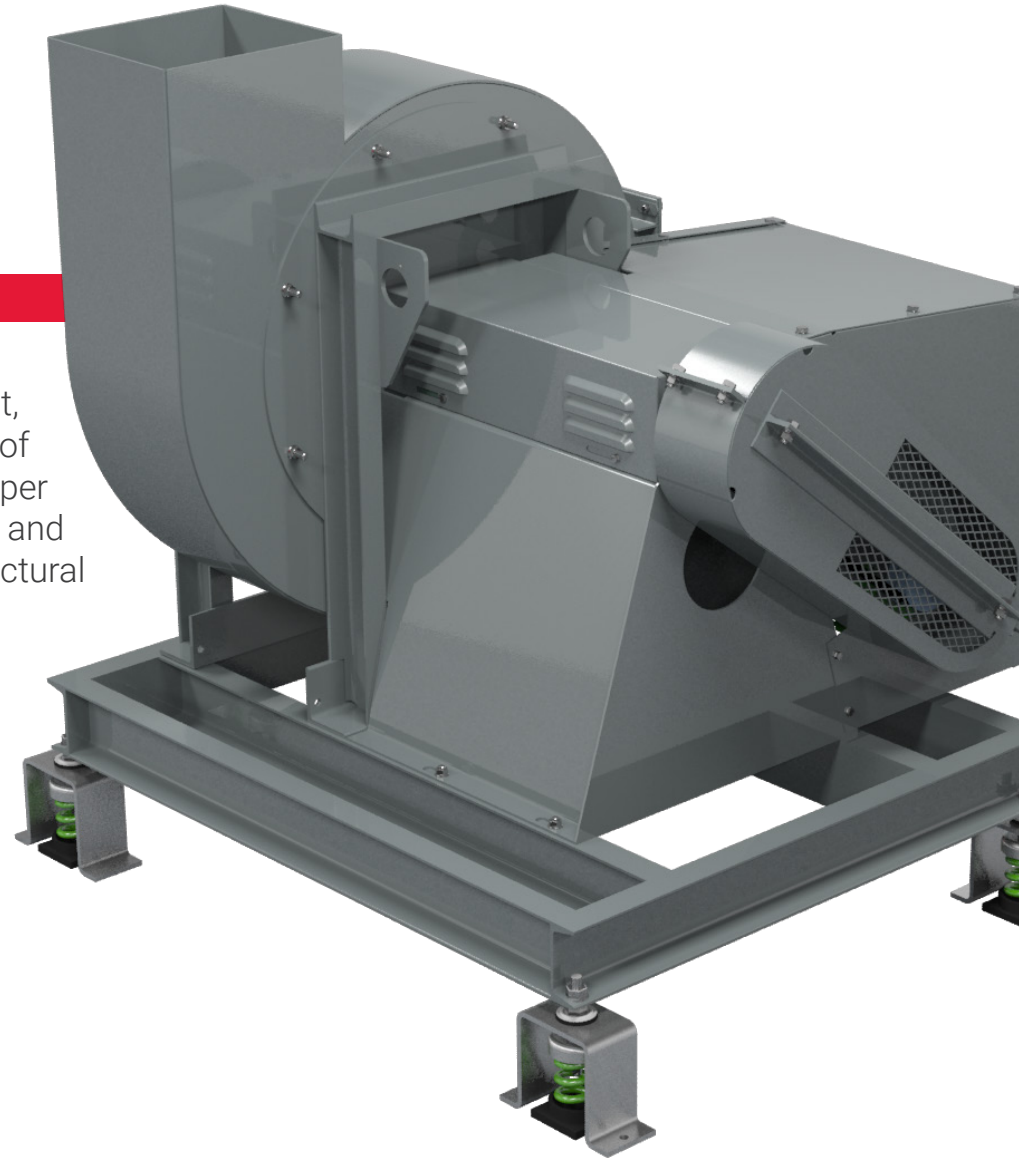


Loren Cook Company offers a full line of vibration isolation accessories to meet all your installation demands.

ISOLATION & VIBRATION

As society has become more sensitive to noise in the environment, reducing noise and vibration has become a critical component of design. Since all mechanical equipment produces vibration, proper isolation is necessary to minimize the transmission of this noise and vibration to the building structure and to limit the excitement of structural component frequencies.

Purchasing isolation equipment and the fan directly from Cook ensures proper selection, fit and coordinated delivery. Isolation bases purchased with the fan are normally tested and shipped with the fan pre-mounted. Isolators are shipped loose for installation in the field.

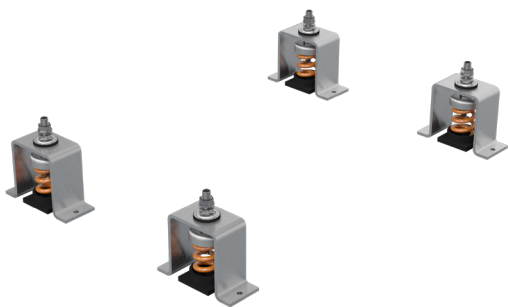


MOUNTING OPTIONS



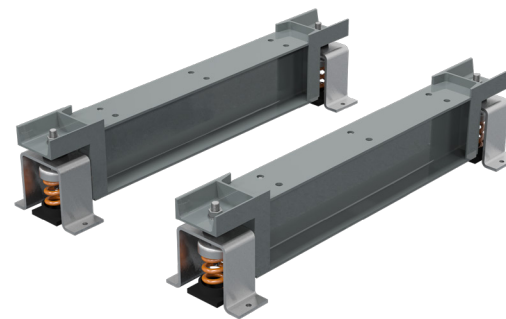
This section depicts components associated with various isolation mounting methods. See Section “Mounting Selection” for further information on proper rail or base selections for your specific application.

DIRECT ISOLATION



- ▶ **ASHRAE Type A**
- ▶ Also known as direct isolation.
- ▶ Used when equipment is unitary, ridge and does not require additional mass or support.
- ▶ Lowest first cost option

ISOLATION RAILS



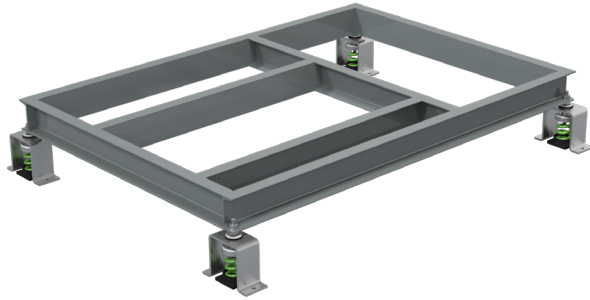
- ▶ **ASHRAE Type B1**
- ▶ Isolation rails are required for any Arrangement 9 or 10 fan with a centrifugal wheel diameter of 30 inches or more unless the fan is supplied with an isolation or inertia base.
- ▶ Smaller fans may benefit from isolation rails if fan attachment points do not coincide with desired mounting locations.
- ▶ Isolation rails, supplied in pairs, are designed to run the full length of the supported equipment and can only be used on fans where the motor is an integral part of the fan.
- ▶ Each rail is constructed of rigid structural steel components coated with the standard factory finish, and are intended to be used in conjunction with two RIS Floor, Spring Floor, or Restrained Spring isolators depending on the needs of the applications.
- ▶ Rails can also be used in ceiling mount applications with RIS Ceiling or Spring Ceiling Isolators. (**Isolators are not included with the rails unless otherwise specified.**)
- ▶ Optional seismic type isolators are also available; consult factory representative for more information.

MOUNTING OPTIONS



This section depicts components associated with various isolation mounting methods. See Section “Mounting Selection” for further information on proper rail or base selections for your specific application.

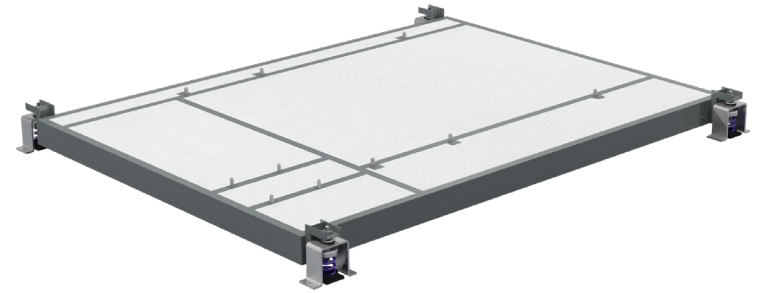
ISOLATION BASE



▶ ASHRAE Type B2

- ▶ An isolation base provides a unitary support structure for the fan.
- ▶ A base is required in cases where the motor is not an integral part of the fan such as Arrangement 1 & 3.
- ▶ Isolation bases are designed to run the full length of the supported equipment and motor.
- ▶ The base is constructed of structural steel channel (ASTM-A36) sized to resist belt pull and maintain proper alignment between the fan and motor.
- ▶ All connections are fully welded.
- ▶ An adjustable motor slide base is required for motor mounting on Arr. 1 and 3 fans.
- ▶ Isolation bases are provided with mounting holes at each of the four corners and are available with optional rubber-in-shear (RF), spring floor (SF) or housed spring floor isolators (set of four required.) **(Isolators are not included with the base unless otherwise specified.)**
- ▶ Optional height saving brackets and seismic type isolators are also available; consult factory representative for more information.

INERTIA BASE



▶ ASHRAE Type C

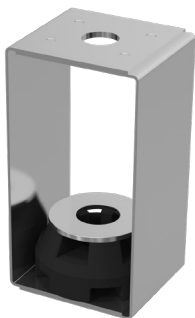
- ▶ Inertia bases are used where additional mass is required to help dampen and dissipate vibration on large or high velocity fan equipment.
- ▶ The added weight allows the use of stiffer springs which further limits movement.
- ▶ The base is designed as a form for concrete which is poured on-site.
- ▶ The base consists of structural steel channel perimeter frame, with angle stiffeners on the interior of the base running in two directions.
- ▶ An adjustable motor slide base is required for motor mounting on Arr. 1 and 3 fans.
- ▶ Isolation bases are provided height savings bracket at each of the four corners and are available with optional spring floor (SF) or housed spring floor isolators (set of four required.) **(Isolators are not included with the base unless otherwise specified.)**
- ▶ Optional seismic type isolators are also available; consult factory representative for more information.

ISOLATOR OPTIONS

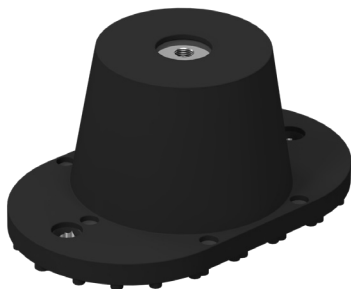


There are many different isolator styles, each suited for specific applications. See section "Mounting Selection" for selection guidance on proper isolator type and deflection for your specific installation

RUBBER-IN-SHEAR



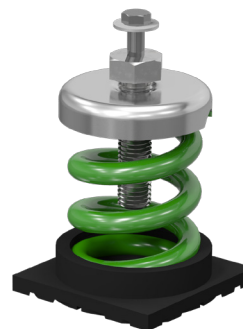
Hanger/Ceiling Mount (RC)



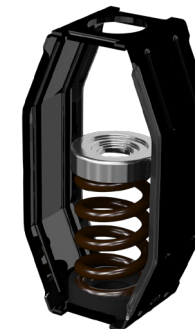
Floor Mount (RF)

- ▶ **ASHRAE Type 2 isolators.**
- ▶ RIS isolators are available in floor (RF) or ceiling (RC) configuration and are generally used for smaller diameter fans (up to 27") and speeds above 1500 RPM.
- ▶ These isolators provide excellent damping qualities and sound absorption and do not require adjustment.
- ▶ Standard RIS isolators are rated for .25" of deflection which is sufficient for most all cases.
- ▶ For critical installations, special .5" deflection isolators are available.

OPEN SPRING ISOLATORS



Floor Mount (SF)



Hanger/Ceiling Mount (SC)

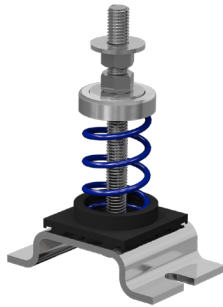
- ▶ **ASHRAE Type 3 isolators.**
- ▶ Open type spring isolators are available in floor (SF) or ceiling (SC) configuration and are generally used in larger diameter fans (above 27").
- ▶ These isolators provide additional deflection that is needed for larger, slower RPM applications.
- ▶ Open spring isolators provide minimal lateral support and should not be used in outdoor applications where wind loads or other lateral forces are present.
- ▶ Open spring isolators include rubber mounting for additional sound isolation as well as leveling bolts to compensate for variations in load and deflection.
- ▶ Standard spring isolators are rated for 1" of deflection which is sufficient for most all cases.
- ▶ For critical applications and fans running slower than 400 RPM, special 2" and higher deflection isolators are available.

ISOLATOR OPTIONS



There are many different isolator styles, each suited for specific applications. See section “Mounting Selection” for selection guidance on proper isolator type and deflection for your specific installation

RESTRAINED SPRING



Floor Mount (RS)

- ▶ **ASHRAE Type 4**
- ▶ Restrained spring isolators are used in applications similar to open spring isolators but when upward travel due to periodic forces outside the system, such as wind loading, must be limited.
- ▶ They accomplish vertical restraint by means of a long bolt, which extends through the center of the spring and is anchored to the spring base plate.
- ▶ The restraining bolt is also used for leveling. Restrained isolators have the same lateral stability as open springs (80% of the vertical rating), and provide a minimum of 50% overload capacity

SEISMIC ISOLATORS



Floor Mount (SRS)

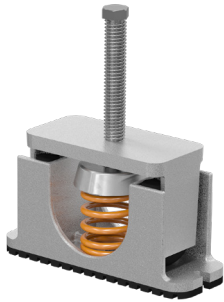
- ▶ **ASHRAE Type 4**
- ▶ Seismic spring isolator are specifically design for installation where there is a possibility that the equipment will be subject to external lateral and vertical forces associated with an earthquake.
- ▶ The restraint of these force is achieved by a combination of neoprene snubber with steel cage that houses the restraining bolt and spring. The assembly is designed to limit the equipment motion in any direction, during an earthquake.
- ▶ The restraining bolt, within the housing, is used for leveling. Seismic isolators incorporate the same open spring having all the characteristics for deflection and overload as the restrained spring.
- ▶ Seismic isolators are required in extreme wind areas, such hurricane zones, to resist high uplift forces.

ISOLATOR OPTIONS



There are many different isolator styles, each suited for specific applications. See section “Mounting Selection” for selection guidance on proper isolator type and deflection for your specific installation

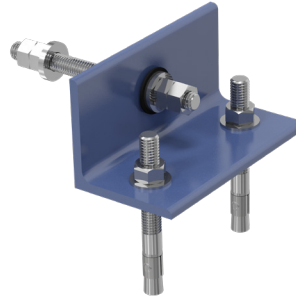
HOUSED SPRING



Floor Mount (HF)

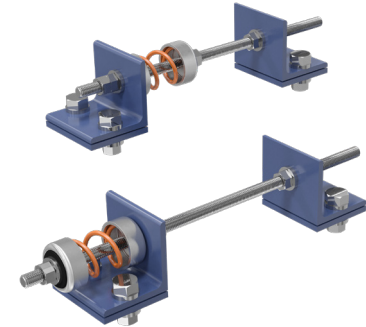
- ▶ **ASHRAE Type 4 isolator.**
- ▶ Housed type spring isolators are available in floor mounted (HF) configuration only and are used in applications similar to open type spring isolators but where additional lateral support is required.
- ▶ These isolators incorporate built-in restraints to resist lateral forces, but do not restrain vertical movement.
- ▶ Housed spring isolators are rated for 1" deflection. Special isolators are available which incorporate vertical restraints and additional deflection. Seismic isolators are also available. Consult factory for more information.

Snubbers



- ▶ Used in conjunction with other isolation or resilient mounts to limit the motion of equipment either due to earthquake or thrust loads from floor mounted axial equipment.
- ▶ Snubbers are attached to the building structure and use a neoprene pad to reduce shock loads by cushioning impacts.
- ▶ Typically installed in sets of four. Contact factory for more information leveling.

Thrust Restraints



- ▶ Used to prevent axial movement in ceiling hung units due to axial thrust.
- ▶ Typically installed in pairs and recommended for any axial unit where the system static pressure is greater than 2 in. wg

MOUNTING SELECTION



The following chart shows the mounting options based on the fan type, size and speed subject on the location. Minimum base and isolator type are shown for each location along with the minimum deflection. The mass and stiffness of the installed location may dictate higher levels of isolation than what is shown in the chart. Adapted from ASHRAE 2015 HVAC Application, Chapter 48

Model	Arr.	Slab-on-Grade						Up to 20 ft (6 m)			20-30 ft (6-9 m)			30 - 40 ft (9-12 m)			
		Fan Class	Size	Fan RPM	Min. Base Type	Isolator Type	Isolator Deflection	Min. Base Type	Isolator Type	Isolator Deflection	Min. Base Type	Isolator Type	Isolator Deflection	Min. Base Type	Isolator Type	Isolator Deflection	
CPS, CPV, CPA	4, 10	1	60-270	All	A	2*	1/4" (6)	B1	3	1" (25)	B1	3	1" (25)	B1	3	2" (51)	
		1	300-490	<=300	B1	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)	
				300 - 500			2" (51)			2" (51)			2" (51)				
				501+			1" (25)			1" (25)			1" (25)				
CASW, CF	1, 3	1	All	<=300	B2	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)	
				300 - 500			2" (51)			2" (51)			2" (51)				
				501+			1" (25)			1" (25)			1" (25)				
		2	All	501+	B2	3	1" (25)	C	3	1" (25)	C	3	3	1" (25)	C	3	1" (25)
				501+			1" (25)			1" (25)				1" (25)			
				501+			1" (25)			1" (25)				1" (25)			
	4, 8, 9, 10	1	120-270	<=300	A	3*	4" (102)	B1	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)	
				300 - 500			2" (51)			2" (51)			2" (51)				
				501+			1" (25)			1" (25)			1" (25)				
		2	120-270	501+	B2	3	1" (25)	C	3	1" (25)	C	3	3	1" (25)	C	3	1" (25)
				501+			1" (25)			1" (25)				1" (25)			
		3	120-270	501+	C	3	1" (25)	C	3	1" (25)	C	3	3	1" (25)	C	3	1" (25)
				501+			1" (25)			1" (25)				1" (25)			
1	300-730	<=300	B1	3	4" (102)	B1	3	4" (102)	B1	3	3	4" (102)	B1	3	4" (102)		
		301 - 500			2" (51)			2" (51)				2" (51)					
		501+			1" (25)			1" (25)				1" (25)					
		501+			1" (25)			1" (25)				1" (25)					
2	300-730	501+	B2	3	1" (25)	C	3	1" (25)	C	3	3	1" (25)	C	3	1" (25)		
		501+			1" (25)			1" (25)				1" (25)					
3	300-730	501+	C	3	1" (25)	C	3	1" (25)	C	3	3	1" (25)	C	3	1" (25)		
		501+			1" (25)			1" (25)				1" (25)					

*Requires 6 isolators

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Model	Arr.	Fan Class	Size	Slab-on-Grade				Up to 20 ft (6 m)			20-30 ft (6-9 m)			30 - 40 ft (9-12 m)					
				Fan RPM	Min. Base Type	Isolator Type	Isolator Deflection	Min. Base Type	Isolator Type	Isolator Deflection	Min. Base Type	Isolator Type	Isolator Deflection	Min. Base Type	Isolator Type	Isolator Deflection			
IMH	1	All	70-130	501+	B2	3	1" (25)	B1	3	1" (25)	B1	3	1" (25)	B1	3	1" (25)			
			150-290	<=500	B2	3	1" (25)	C	3	1" (25)	C	3	1" (25)	C	3	1" (25)			
			150-290	501+	C	3	1" (25)	C	3	1" (25)	C	3	1" (25)	C	3	1" (25)			
	9, 10	All	70-130	<=300	A	3*	4" (102)	B1	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)			
				301-500			2" (51)			2" (51)			2" (51)						
				501+			1" (25)			1" (25)			1" (25)						
		All	150-290	<=300	B1	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)			
				301-500			2" (51)			2" (51)			2" (51)						
				501+			1" (25)			1" (25)			1" (25)						
	CADW	3	1	All	<=300	B2	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)		
301 - 500					2" (51)			2" (51)			2" (51)								
501+					1" (25)			1" (25)			1" (25)								
2		All	501+	B2	3	1" (25)	C	3	1" (25)	C	3	1" (25)	C	3	1" (25)				
				3		All			501+			C			1" (25)	C	1" (25)	C	1" (25)
												1" (25)			1" (25)	1" (25)			
TCN	9H, 9V	All	All	<=300	A	3**	4" (102)	B1	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)			
				301 - 500			2" (51)			2" (51)			2" (51)						
				501+			1" (25)			1" (25)			1" (25)						

*Requires 6 isolators

**Requires 4 isolators

MOUNTING SELECTION



The following chart shows the mounting options based on the fan type, size and speed subject on the location. Minimum base and isolator type are shown for each location along with the minimum deflection. The mass and stiffness of the installed location may dictate higher levels of isolation than what is shown in the chart. Adapted from ASHRAE 2015 HVAC Application, Chapter 48

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PLC	1, 3	1	All	<=300	B2	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)
				301 - 500			2" (51)			2" (51)			2" (51)			
				501+			1" (25)			1" (25)			1" (25)			
		2	All	501+	B2	3	1" (25)	C	3	1" (25)	C	3	1" (25)	C	3	1" (25)
				501+	C	3	1" (25)	C	3	1" (25)	C	3	1" (25)			
		3V	1	All	<=300	A	3**	4" (102)	B1	3	4" (102)	B1	3	4" (102)	B1	3
	301 - 500				2" (51)			2" (51)			2" (51)					
	501+				1" (25)			1" (25)			1" (25)					
	2		All	501+	B2	3	1" (25)	C	3	1" (25)	C	3	1" (25)	C	3	1" (25)
	3S, 4	1	All	<=300	A	3**	4" (102)	B1	3	4" (102)	B1	3	4" (102)	B1	3	4" (102)
				301 - 500			2" (51)			2" (51)			2" (51)			
				501+			1" (25)			1" (25)			1" (25)			
		2	All	501+	B2	3	1" (25)	C	3	1" (25)	C	3	1" (25)	C	3	1" (25)
				501+	B2	3	1" (25)	C	3	1" (25)	C	3	1" (25)			
		3T	1	All	<=300	A	3**	4" (102)	B1	3	4" (102)	B1	3	4" (102)	B1	3
	310 - 500				2" (51)			2" (51)			2" (51)					
	501+				1" (25)			1" (25)			1" (25)					
	QMX/ TMX	3, 4, 9H, 9V	All	All	<=300	A	3**	4" (102)	B1	3	4" (102)	B1	3	4" (102)	B1	3
301 - 500					2" (51)			2" (51)			2" (51)					
501+					1" (25)			1" (25)			1" (25)					

**Requires 4 isolators

MOUNTING SELECTION



The following chart shows the mounting options based on the fan type, size and speed based on the location. Minimum base and isolator type are show for each location along with the minimum deflection. The mass and stiffness of the installed location may dictate higher levels of isolation than what is shown in the chart. Adapted from ASHRAE 2015 HVAC Application, Chapter 48

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		Fan Class	Size	Fan RPM	Min. Base Type	Isolator Type	Isolator Deflection	Min. Base Type	Isolator Type	Isolator Deflection	Min. Base Type	Isolator Type	Isolator Deflection	Min. Base Type	Isolator Type	Isolator Deflection
AI	4	All	31-54	All	A	2	1/4" (6)	A	3	1" (25)	A	3	1" (25)	C	3	1" (25)
		All	63-160	<= 1200	A	3	1" (25)	A	3	2" (51)	A	3	2" (51)	B1	3	2" (51)
		All	63-160	>1200	B1	3	1" (25)	B1	3	2" (51)	B1	3	2" (51)	C	3	4" (102)
AVA	4, 9	All	35-79	<= 300	A	3	4" (102)	A	3	4" (102)	A	3	4" (102)	B1	3	4" (102)
		All	35-79	301 - 500	A	3	1" (25)	A	3	2" (51)	A	3	4" (102)	B1	3	4" (102)
		All	35-79	501+	B1	3	1" (25)	B1	3	2" (51)	B1	3	2" (51)	C	3	2" (51)
AF, VA,	4, 9	All	12-24	All	A	2	1/4" (6)	A	3	1" (25)	A	3	1" (25)	C	3	1" (25)
		All	26-60	<= 300	A	3	4" (102)	A	3	4" (102)	A	3	4" (102)	C	3	4" (102)
		All	26-60	301 - 500	A	3	1" (25)	A	3	2" (51)	A	3	4" (102)	C	3	4" (102)
		All	26-60	501+	B1	3	1" (25)	B1	3	2" (51)	B1	3	2" (51)	B1	3	2" (51)
AD, ED	4, 9	All	12-24	All	A	2	1/4" (6)	A	3	1" (25)	A	3	1" (25)	C	3	1" (25)
		All	26-60	<= 300	A	3	4" (102)	A	3	4" (102)	A	3	4" (102)	B1	3	4" (102)
		All	26-60	301 - 500	A	3	1" (25)	A	3	2" (51)	A	3	4" (102)	B1	3	4" (102)
		All	26-60	501+	B1	3	1" (25)	B1	3	2" (51)	B1	3	2" (51)	B1	3	2" (51)

