



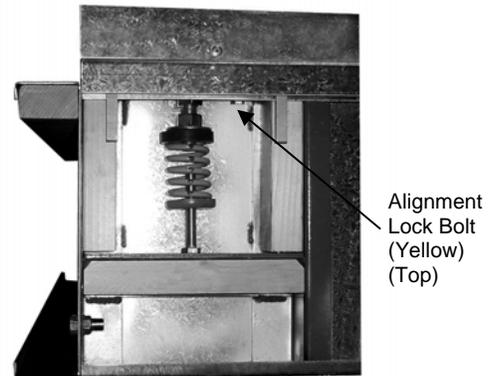
NOVIA

A DIVISION OF CARPENTER & PATERSON

There are several manufacturers of roof curbs, each of which manufactures their products differently. This comparison will attempt to illuminate the differences with the best information available, typically from websites. Some of the major differences are:

Vibration control:

One is better than four. A necessary feature of a spring curb is to have the top isolated or floating rail be attached in some manner to the fixed lower portion of the curb without short circuiting or bridging between the two. Four of the six manufacturer's have chosen to use a single restraining bolt or threaded rod of sufficient size to withstand the applied wind & / or seismic forces at each spring pack location. Mason's design uses two bolts, Amber Booth uses up to four. Practically speaking it is much easier to locate (center) one bolt during production as opposed to four. The significance gets clearer when you think about the total bolts required in a six pocket curb. 1 each = 6, 2 each = 12, 4 each = 24.



If all of the restraining bolts are not precisely aligned with the clearance hole in the fixed portion of the curb, then the bolts will rub against the neoprene grommets or worse have metal to metal contact. We feel that this is so important that we install an alignment bolt before connecting the floating to non-floating parts. This guarantees perfect centering of the restraining bolts.

The efficiency of a spring curb is based on the deflection of the spring isolator. Most well designed curbs have a feature to transfer the load of the equipment to the springs without affecting the overall height of the curb and to allow for the removal and replacement of the springs should the actual loads not be as predicted at design time. When curbs are designed without this load transfer feature, the entire floating portion of the curb simply deflects under the imposed load. When the equipment is not level under the load, manufacturers of this type of curb provide "additional" springs for leveling purposes. What this means in reality is that the unit would have to be rigged off the curb and through trial and error, additional springs would be added to the lowest side to bring the unit back up to level. This is all done in the field and there is typically no consideration whatsoever given to the effect on the isolation efficiency of the system. The singular goal is to level the unit and *get the crane off the job!* These curbs are typically called "insert" type curbs where the spring portion is mounted on top of a standard manufacturer's curb or in some cases can be provided as a package. We have chosen not to manufacture this type of curb because the economy of construction is not justified due to the potential installation problems and lack of ability to provide the deflection and efficiency of the system as specified.

Weather proofing & air seal:

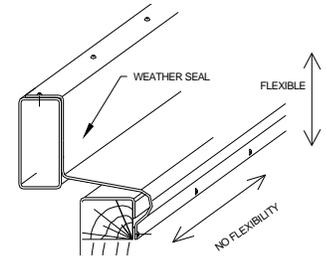
The spring curb must keep the weather out and any airflow in. The weather seal must not have the ability to fail and allow water into the building. Only Novia & Mason have a fail safe approach to these two problems. Although Mason's approach may cause other issues. (More on this later.)

Amber Booth, Kinetics & ThyCurb use exposed exterior neoprene or some other elastomer material to seal the top floating rail from the base of the curb. We have never liked this concept for several reasons;

- a) If the seal was penetrated, water could leak directly into the building. I've observed one installation where the contractor forgot to adjust the springs and instead of releasing the entire neoprene gasket which would have been a lot of work, simply cut through the gasket, adjusted the springs and siliconed the cut-out back in place. While I admit this is an extreme case, why even have it on the table?
- b) These seals require contractors in the field, in all sorts of weather conditions to glue two ends together typically in the four corners and at any splices along sides or ends.

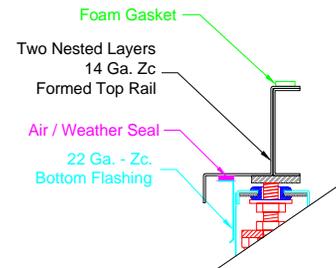
- c) Replacement is very difficult because the flex is part of the top metal flashing that is trapped by the RTU.
- d) These external elastomer air seals are problematic when a curb is used to separate supply and return air. Consider that in addition to a plenum divider sealing one air stream from another within the curb, the seal has to be made to the outermost part of the air / weather seal also. The inherent flexibility in an elastomer seal makes it almost impossible to seal air tight.

Mason bridges the floating top rail and the base of the curb with a galvanized rolled sheet metal exterior flashing and molded neoprene corner caps. The belief is that the design of the flashing allows it to *act* like a spring so any short circuiting of the vibration isolation is minimal. Consider that the flashing *may* in fact act like a spring vertically, but horizontally (along the axis of the flashing) it's nothing more than, well, a piece steel that can't flex at all. The floating portion of this curb is effectively snubbed out by this flashing design. While this concept does in fact make the seal air & watertight if installed properly, the degradation of the vibration isolation feature of the curb is in our opinion unnecessary. One more point, Mason's installation instructions require 1/8" drive screws 8" on center to attach the top flashing to the top rail – the RTU rides on these screw heads, not the top rail!



Vibration Mountings use a rubber gasket covered by formed galvanized sheet metal top flashing that overhangs the top wood nailer and galvanized bottom flashing. The overlapping effectively covers the rubber gasket so it is protected from the elements. Replacement is a problem as the gasket is trapped by the RTU.

Novia's concept is simple and effective. Our top flashing / support rail is 14 ga. G60–Zc steel formed with 90° bends that extend down to the wood nailer. We provide a counter flashing member with a sponge gasket attached that simply gets pressed up against the horizontal bend. (See sketch). The seal is replaceable, and protected from the elements and easy to install. As another insurance, when curbs are used as plenums, we provide a continuous internal perimeter flex connectors to seal off the plenum.



Curb side material:

Four of the six manufacturers reviewed in this report use galvanized steel in the construction of the curb sides and ends. We use 12 Ga. G60 galvanized steel which is the thickest of the bunch. This is preferable to painted steel as the preparation required for a good bond on raw steel is beyond the capacity of at least two of the manufacturers – (From personal observation) I've never seen a roof top manufacturer provide anything other than a galvanized curb as their standard. When there is airflow within the curb, there is moisture, galvanized material seems the best choice to me. **Vibration Mountings** does not provide solid sheet metal sides of any kind, instead they use expanded metal.

Structural Capability:

In many installations the curbs are installed directly on metal decking and it is important to distribute the load, also when curbs are used plenums, the side material must be capable of handling the static pressure developed by the fans and not 'oil can'. Our 12 gauge material makes a very strong curb. Spanning bar joists is not a problem with our curbs, even when the spring pockets are center span. A continuous bottom tube steel member or side material of sufficient strength is better than pedestal spring supports with light weight sides which concentrate the loads over the length of the typical 12" spring pocket. Our curbs have been described as "Battleships" and rightly so.

Potential to fully insulate the sides of the curb:

Amber Booth, Kinetics, Vibration Mountings & Thybar all have un-insulated space around the entire perimeter of the curb of 4" to 7-13/16". This issue should not be overlooked. All spring curbs need a space between the floating and non-floating parts, but there are tremendous differences between the manufacturers on how this is accomplished. This is quite significant considering that all year long the inside curb and duct temperature will be affected by this heat gain or loss. The RTU's will have to compensate forever! This is unnecessary wasted energy due to poor curb design - for the life of the units and perhaps beyond should future equipment be retrofitted onto these curbs. THINK GREEN - Our standard spec calls for 3 1/2" R22 faced Polyisocyanurate foam insulation to minimize heat gain or loss through the curb.

Novia & Mason have the minimum space required for operating clearances. Note; We have not considered the top rail height in any of these comparisons but with our formed top rail / flashing design it is easy for us to insulate there as well. This factory insulation is included in our standard spec. Not as simple for **Mason & Vibration Mountings** as they both use tube steel for their top rails.

More differences

- * Any time our curbs have factory installed internal or external insulation they are completely shrink-wrapped.
- * We manufacture our curbs in Salem, NH. When a problem does arise, we can respond quickly with factory technicians on site or by teleconference.
- * Factory direct means no middle man – which is why we can provide high quality at a very competitive price.



**VibCurb
With Pipe Enclosure Pedestal**

ROOF CURB COMPARISON						
ITEM	NOVIA	AMBER-BOOTH	MASON	KINETICS	VIBRATION MOUNTINGS	THYBAR
Model	VIBCURB	RTIC-ER-1	RSC	ESR	P6100	Vibro-Curb II
Sides & ends	12 Ga.G60-Zc	16 Ga.-Zc	Heavy sheet metal - painted	Heavy galv. sheet metal	Expanded metal - painted	18 Ga.-Zc
Top Rail	Two Thicknesses of 14 ga.G60-Zc Nested	One Thickness of 16 Ga. Zc	TS 3" X 1-1/2" – 11 Ga.	Structural channel	TS 3" X 1-1/2" – 11 Ga.	Steel channel
Bottom Tube	None	None	None	None	Tube steel	None
Spring Pockets	Custom formed steel – tested to 6,000# @48" high - welded to sides	Welded Steel Isolator	Sheet metal "Z" section pedestals - painted	Sheet metal pedestal	Tube steel sections welded to T.S. bottom rail - painted	14ga. Sheet metal pedestal
Top Flashing	Galvanized 22 Ga.- sheet metal	16 Ga.-Zc	Galvanized 22 Ga. sheet metal	Exposed elastomeric	Galvanized sheet metal	Exposed elastomeric

Air seal	Exterior replaceable closed cell neoprene sponge. Interior flex connector for plenum curbs	Exposed elastomeric material Difficult profile to blank off for plenum curbs	Metal top flashing overlaps & is nailed to wood nailer (short circuiting spring isolators) Difficult profile to blank off for plenum curbs	material Difficult profile to blank off for plenum curbs	Flexible membrane – outside curb. An additional full height internal <i>flexible membrane</i> is required for plenum curbs	Exposed elastomeric material
Lifting lugs	Yes	No	No	Yes	No	Yes
Duct Supports	Formed Galvanized sheet metal	Formed Galvanized sheet metal	Steel angles – painted	Formed Galvanized sheet metal	Steel angles – painted	Formed Galvanized sheet metal
Approx. Un-insulated Height around full perimeter	3/4"	7-13/16"	5/8"	6"	5"	4"
Local Factory	Yes	No	No	No	No	No
Factory Assembled	Yes	?	?	?	?	Yes