June 14th, 2022

Using Ingenii™ Flashing to Reduce the Cost of Lineset Damage Caused by Copper Thieves or Trades

I. Overview

HVAC systems are increasingly targeted for theft because they include valuable metals that thieves can readily sell and in most sites are easily accessible. The compressor units and linesets are located outdoors and are often placed in plain sight, especially in multi-family units and commercial buildings. In new construction, while the buildings are vacant, it is very easy for thieves to access these systems without drawing attention to themselves. Builders are increasingly under pressure to put in place expensive security measures, whether it be motion sensors and cameras, or onsite security staff.

Copper Linesets Cut by Thieves and Damaged by Trades at Seattle Area Construction Sites:

HVAC systems are especially vulnerable as they contain copper, which is a bonanza for thieves. Stolen copper can be sold to scrap yards for 80% to 90% of current value. The U.S. Department of Energy estimates that this has boomed into a $1 billion per year 'industry' as thieves target construction sites, looking for commercial and residential heating and air conditioning units. The price of copper is near an all-time high, rising in the past year to $4.39 per pound (December, 2021).

When a thief is stealing copper pipe or the outdoor compressor, they will have to cut the lineset(s) that connects the outdoor compressor to the indoor evaporator(s). For new construction, the linesets themselves present a significant target. Furthermore, if the lineset is left open, moisture and

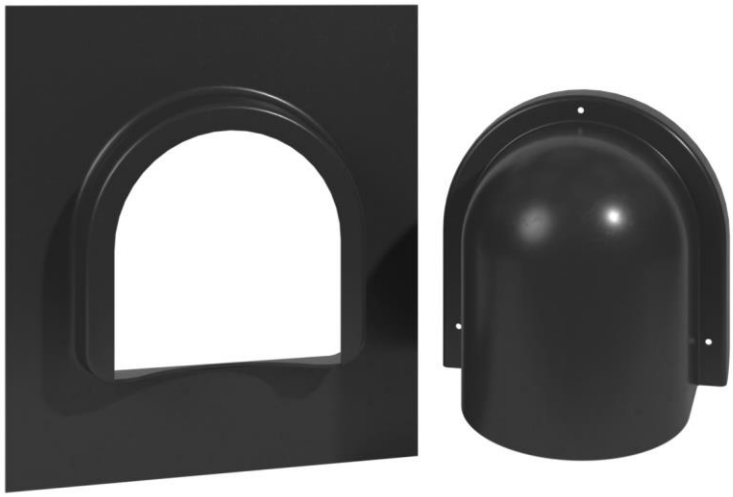
contaminants can enter the refrigerant loop and lead to major repairs or replacement. With new construction, even if the lineset does not have refrigerant, once cut, the linesets need to have any moisture removed during the repair.

II. How Ingenii's Flashing Line Can Mitigate This Risk

Ingenii designs and manufactures innovative HVAC components, focusing on protecting HVAC system components. Our GEN2 BOX™ is used to protect linesets, high and low voltage wiring and ancillary devices at the site of evaporator installation. Our line of Flashing is designed to protect linesets and high voltage wiring as they leave the building envelope, where copper thieves are most likely to strike during new construction.

After having several construction sites hit by copper thieves in late 2021, Innovative Comfort Systems (ICS), a leading Seattle-based HVAC installation company, has implemented use of the Ingenii Flashing system to eliminate the risk and cost of copper theft on its projects.

Ingenii Flashing: Base and Large Cover (up to 5 linesets)



Ingenii's Flashing line is unique in that it incorporates a two-piece system:

- A base plate that is attached to the structure between the building cladding and siding;
- An easily removable cover, available in two sizes (accommodating up to 3 or 5 lineset pairs), which attaches to the cover with three screws.

At one of the construction sites pictured previously, ICS and the contractor considered themselves fortunate due to the thieves hitting the site prior to the buildings being sided, as the flashing used at the site was a single-piece unit. If the thieves had visited after the siding had been installed, the siding and flashing would have required removal, significantly increasing the repair cost. Unfortunately, at the second site (rooftop deck), where the linesets were damaged by the painters, the building was nearing completion.

Table1: Estimated Repair Costs

	Required Repair	Post Siding Unit Cost	Post Siding Cost with Ingenii
1.	Flashing Replacement & Lineset Repair	$350.00[1]	$150.00[2]
2.	Siding Repair	$300.00	n/a
3.	Copper fittings (4)	$35.00	$35.00
4.	Siding Paint	$125.00	n/a
5.	Supervisor Time	$85.00	$45.00
6.	Schedule Impact	$500.00[3]	n/a
	Total	**$1,360.00**	**$230.00**

1. Includes labor and trip expenses
2. Lineset repair only
3. Schedule impact varies due to timing and coordination issues with subs, interest fees, etc.

What the above table really makes clear, especially with the post siding example, is that by using the Ingenii flashing, even if thieves hit the site, much of the repair and additional costs are mitigated. Essentially what remains is the cost of repairing the lineset, blowing out the moisture and getting the various trade supervisors involved.

Using Ingenii's Flashing

In order to eliminate the cost and hassle of potential theft on worksites that are at risk, the team at ICS created an alternate process, relying upon Ingenii's Flashing line's unique advantages:

- Linesets are installed inside the structure, with the interior terminations stored in the GEN2 BOX for protection during the rough-in stage.
- Linesets are pulled through the exterior wall and then cut within the Flashing cover. With the cover attached, no linesets are visible to the casual observer (i.e., thieves).
- At the time of compressor installation, the cover is removed, with the required lengths of copper tubing grafted onto existing linesets. The lineset connections are then protected within the Flashing cover. Installation then can proceed as usual.

Table2: ICS Solution Cost

	ICS Process	Cost
1.	Ingenii GEN2 Box*	$44.99
2.	Ingenii Flashing Cost*	$54.99
3.	Copper Fittings	$35.00
4.	Labor (at $50 hour)	$62.50
	Total	**$199.48**

*Prices may vary. Flashing cost represents a small incremental cost.

While this process does incur a small additional cost (perhaps 30 minutes of labor per lineset and the cost of the copper fittings), the avoided cost and hassle associated with lineset damage caused by theft is significant:

- No additional cost associated with replacing the stolen portion of the linesets;

- Reduction of the incentive for thieves to visit construction site;
- Elimination of the frustration associated with being victimized by thieves;
- Elimination of the risk associated with lineset damage from the various trades;
- With significant thefts occurring at multi-family housing sits, elimination of the need to hassle with insurance companies – saving time and reducing insurance costs.

III. Other Considerations

Linesets that have been left open to the environment (i.e., that have been cut) take substantially longer for the HVAC contractor to vacuum test properly. This adds an unknown number of labor hours to the scope of work, which can affect the profitability to the HVAC contractor and their overall schedule.

The project can be impacted by the need to coordinate multiple sub-contractors for an unanticipated event/theft. As mentioned previously, the overall cost, while significant, is difficult to calculate and quantify. In the best-case scenario, in a large project, all subs are onsite and can do the work, though this is at the expense of work that's already scheduled. Worse case, all the subs have to be called back, or entirely different work crews have to be scheduled, which significantly increases overall cost and usually results in a delay in project completion/delivery.

IV. Conclusion

In a perfect world, concerns like thieves stealing linesets for their copper shouldn't be an issue. But alas, the world isn't perfect, and strategies must be put into place to mitigate such risks.

Using the Ingenii Flashing line, ICS has implemented a process that, while increasing HVAC installation cost slightly, eliminates the risk of incurring significant cost from theft, as well as ensuring that the entire process will occur within the scheduled time. As their contractor partners attest, the piece of mind that comes with this new process is more than worth the slight increase in cost.

The Ingenii Flashing line is now available for purchase. While this white paper is mostly focused on damage due to theft, linesets are also subject to significant risk of damage from the various trades working on the project's interior and exterior. In addition to protecting linesets from damage due to thieves, the following benefits can also be realized:

- Protect linesets from the various trades involved in new construction;
- Improve installation efficiency;
- Prevent building envelope air leakage and eliminate risk of moisture damage;
- Ingenii Flashing is the only solution that can accommodate more than two linesets:
    - The FLASH5™ cover can accommodate up to three pairs of refrigeration lines with 1-inch insulation.
    - The FLASH8™ cover can accommodate up to five pairs of refrigeration lines with 1-inch insulation.
- Can easily fit and protect required electrical wiring;
- Ingenii Flashing is made from tough ABS, which is easily painted, and should last the life of the HVAC system.