



## Stop The Cold With A “Dead Air Gap”

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A blast of arctic cold roared through the Southeast Region from Jan. 6-9, 2017. Air temperatures dipped into the mid to low teens in many locations, and even into the single digits in others. Often, turf covers are deployed on bermudagrass putting greens when low temperatures occur to prevent winter injury. Sometimes, superintendents also create a “dead air gap” under the covers for extra protection during extremely cold weather events.

Creating a space for stationary air between a cover and turfgrass improves the effectiveness of the cover because the air acts as an insulator. Using a turf cover alone allows heat to directly move from the root zone to the colder turf cover. Trapping a pocket of air under the turf cover will keep the putting green surfaces warmer than covers alone. However, the gap between cover and turf shouldn't be more than 1/2 inch; otherwise the air will



*Using drainage pipe to create a “dead air gap” is an effective strategy for maintaining higher root zone temperatures during cold weather.*

circulate and become a less-effective insulator.

Jared Nemitz, superintendent at The Peninsula Club in Cornelius, North Carolina, experimented with using two different materials to create air gaps between covers and turf during recent cold weather. The tests were conducted on putting green sites prone to colder conditions such as greens that were shaded or in north-facing locations. In one test, Nemitz placed 20-foot sections of 4-inch diameter drainage pipe on a green at 5-foot intervals before covering the green to create an air gap under the cover. The pipes were secured with sod staples at both ends. In another test, Nemitz placed 1-2 inches of pine straw between the turf and cover. Both the drainage pipe and pine straw effectively created an air gap that helped insulate the greens. Soil temperatures at a depth of 2 inches were recorded and consistently measured 5-6 degrees warmer with the air gap than with a cover alone.



*Pine straw is an effective but labor-intensive way to create an air gap.*

Temperatures at the ninth and 12th putting greens during a period of cold temperature between Jan. 6-9, 2017 at The Peninsula Club in Cornelius, North Carolina.

**9<sup>th</sup> Green**

	Treatment	Jan. 6, 2017	Jan. 7, 2017	Jan. 8, 2017	Jan. 9, 2017
<b>Low Air Temp.</b>		28.9	21.4	16.7	17.4
<b>Soil Temp.</b>	Cover Only	44	*	36	35
<b>Soil Temp.</b>	Cover + Pine Straw	44	*	41	41
<b>Soil Temp.</b>	Cover + Drain Pipe	44	*	41	40

All temperatures in Fahrenheit, soil temperatures measured at 2-inch depth, \* No measurement

## 12<sup>th</sup> Green

	Treatment	Jan. 6, 2017	Jan. 7, 2017	Jan. 8, 2017	Jan. 9, 2017
Low Air Temp.		28.9	21.4	16.7	17.4
Soil Temp.	Cover Only	44.8	*	38	36
Soil Temp.	Cover + Drain Pipe	45.2	*	40	40

All temperatures in Fahrenheit, soil temperatures measured at 2-inch depth, \* No measurement

- Soil temperatures never dropped below 35 degrees at any putting green site, even with the turf cover alone.
- It takes about the same amount of time and labor to place the pine straw or drainage pipe onto the putting greens.
- It is much easier to remove the drainage pipe. It took eight hours to remove the pine straw; it only took four hours to remove the drainage pipe.

Turf covers are an effective tool to help prevent cold weather injury to bermudagrass putting greens. The protection provided by covers can be enhanced by creating an air gap between the cover and turf. New ideas are on the way that may make these programs even more successful, stay tuned for further updates on this topic.

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