

Spinout for Control

In auto racing a spinout results from loss of control and usually leads to driver discomfort and racecar repair costs. Likewise, when air distribution is out of control, it can lead to worker discomfort and rising fuel bills. The **new Temprite Industries 5R four way and 8R two way revolving discharge arrays** spinout to control distribution.



Within open-space buildings, such as warehouses and manufacturing facilities, even air distribution from rooftop HVAC equipment is critical for worker comfort and energy cost control. Drafts, stratification, and dead spots are all results of poor air dispersal within a building. Each of these affects worker comfort which robs worker productivity. Stratification is also a costly side effect of bad air distribution. Hot air above the occupied zone becomes unused energy. This often results in higher thermostat set points, as workers seek comfortable work-zone temperatures and relief from cold drafts. Raising set points only leads to more stratification and greater heating cost. In a typical building the greatest heat loss is through the roof. Because heat loss is directly proportional to the difference between the air temperature outside and the air temperature inside the building, hotter air at the ceiling means high fuel costs for heating. With productivity and utility costs affecting profitability building air distribution should be a primary concern for building owners. Yet air dispersal is often neglected in the building design or given only superficial consideration.

There are several means available for improving air distribution from rooftop HVAC units. Duct socks, splash plates, and fixed directional devices are some examples. All have limitations that don't address worker comfort and energy usage. Duct socks distribute air horizontally and have limited throw capability. Because they are mounted near the ceiling and discharge air along the ceiling, they do nothing to reduce stratification. Splash plates and fixed directional devices, such as grilles and vanes, leave dead spots within the comfort zone.

Most rooftop HVAC manufacturers offer some sort of supply air distribution array in the form of a nozzle, plenum, or splash plate. Whether the array is a 1, 2, 3, or 4 directional delivery system, they all have deficiencies in total area coverage. Certainly, the more directions the air is delivered the better the coverage, but even 4 way arrays leave dead spots within the heater's coverage zone. Figures 1 – 4 demonstrate where dead spots can occur within a coverage area.

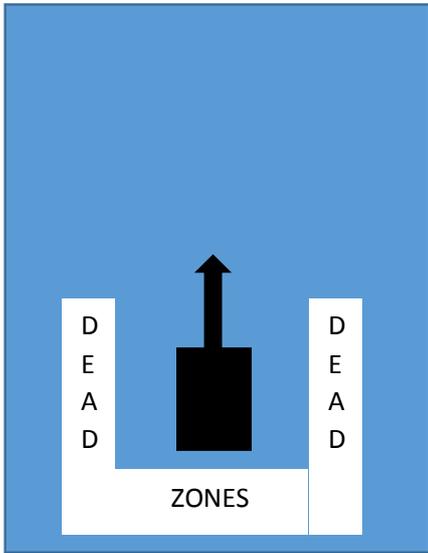


Figure 1 – One Way

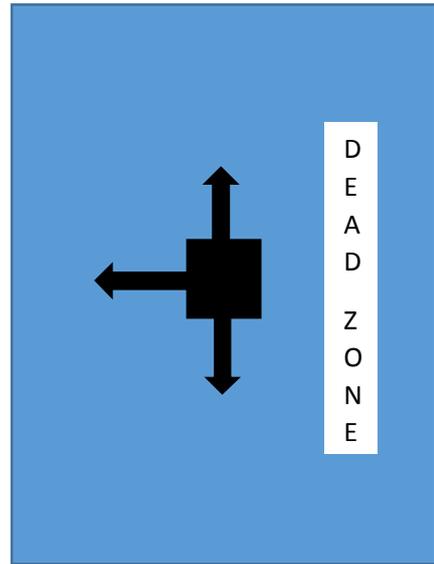


Figure 3 – Three Way

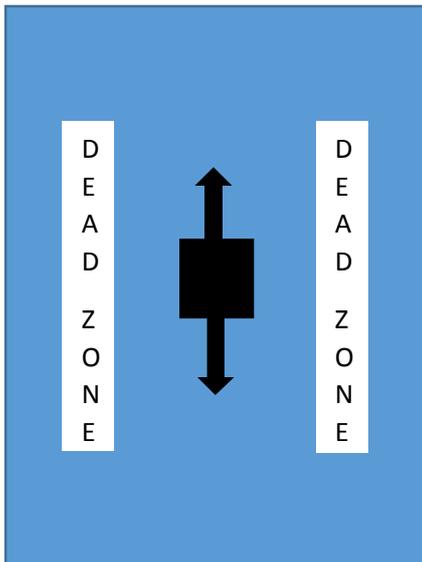


Figure 2 – Two Way

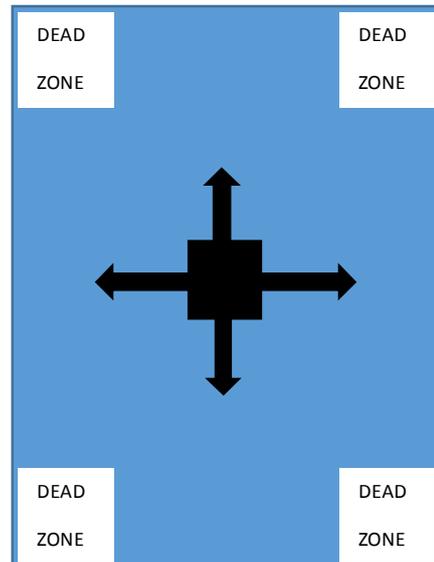


Figure 4 – Four Way

The figures above show where dead zones can occur when the discharge from the array is fixed. It's obvious to see that what they all lack is 360° of coverage. This could be corrected by adding more sides of delivery. A simpler means to achieve 360° of coverage is to spin

the array. The **new Temprite Industries 5R four way and 8R two way revolving discharge arrays** do exactly that. The **new Temprite Industries 8R two way revolving discharge**, affords 360° of distribution with each half revolution. The **new Temprite Industries 5R four way revolving discharge**, affords 360° of distribution with each quarter revolution. Providing 360° of coverage has several benefits.



**Temprite Industries 5R Four Way
Revolving Discharge**



**Temprite Industries 8R Two Way
Revolving Discharge**

BENEFITS

Comfort

Dead spots in the air distribution system lead to hot or cold areas within the conditioned space. These dead zones are commonly found in corners and along exterior walls where drafts are most likely to occur. Workers in these areas may experience discomfort which can negatively affect productivity. The **new Temprite Industries 5R four way and 8R two way revolving discharge arrays** eliminate dead spots and increase worker comfort.

Destratification

Direct fired heaters provide comfort heating by injecting warm air into the spaces they serve. This heated air is warmer than the existing air within the space, and as such, tends to rise above the existing air and stratify near the ceiling. The **new Temprite Industries 5R four way and 8R two way revolving discharge arrays** propel the heated air toward the floor and the room walls. The high velocity air from the supply fan is easily driven to the floor, mitigating the possibility of stratification. Once the air splashes on the floor, it then migrates to the wall much in the same way an ocean wave reaches the shore, thus, eradicating any dead zones. At the wall the air washes the wall with warm air which minimizes drafts and increases worker comfort.

Integrated Design

Another means of reducing stratification is by employing high velocity low speed (HVLS) fans. Big Ass Fans has popularized these air movers for just this purpose. The **new**

Temprite Industries 5R four way or 8R two way revolving discharge arrays is integrated with the Temprite Industries direct fired heater and provides the same effect as an HVLS at a fraction of the cost. The heater/array combination thus eliminates any need for HVLS fans. Mounted 30' in the air and moving 40,000cfm of air, the **Temprite Industries 5R four way revolving discharge array** will easily cover 125,000ft². For extra high ceilings the **Temprite Industries 8R two way revolving discharge array** can be mounted at heights exceeding 100'. Moving 40,000cfm of air the 8R obtains the same 125,000 ft² coverage while still propelling the heated air to the floor. In tall buildings, such as aircraft hangars, railcar and bus maintenance facilities, and warehouses, the ability to get the warm air to the floor is especially important for worker comfort fuel cost control.

Reduced Installed Cost

The typical installed cost for one HVLS fan is about \$8,700. Along with one or two direct fired heating units, a 100,000ft² building will require 6 – 10 24' diameter HVLS fans for good air circulation. By utilizing **new Temprite Industries direct fired heaters with the integrated arrays**, the need for the HVLS fans is eliminated. The typical installed cost for an Temprite Industries revolving discharge for these direct fired heaters will be about \$2,700. That's a savings of nearly \$50,000 over 6 HVLS fans and \$80,000 in savings over 10 HVLS fans.

Reduced Electrical Usage

The **new Temprite Industries 5R four way and 8R two way revolving discharge arrays** consume 42W of electrical energy. There are several factors that determine the motor size for a 24' HVLS fan, but they range from ½ - 2 horsepower or 373 – 1492W each. The **new Temprite Industries revolving discharge arrays** use between 8 and 35 times less energy than an HVLS fan.

Reduced Fuel Usage

Recirculating rooftop direct fired heaters can all but eliminate stratification by pulling warm air from the ceiling and returning it to the space through a **new Temprite Industries revolving discharge array**. This also aids in reducing energy usage in three ways. First, by ingesting the warm ceiling air, the differential is lessened between the indoor ceiling temperature and the outdoor winter ambient temperature. As mentioned prior, heat loss is directly proportional to the temperature difference. Second, the recirculated warm ceiling air tempers any outside air being delivered by the heater, thus decreasing the fuel required to heat the discharge air to its desired temperature. Third, rather than wasting heat through the roof, the recirculating rooftop direct fired heater reuses the BTUs previously released into the space.

Spinning out of control can be an unpleasant experience for a racecar driver and his entire team. Building owners can control spiraling costs due to lack of worker productivity and excessive fuel usage by installing a **new Temprite Industries revolving discharge array**.