Bin Vents

Grain storage bins usually have vents near the top circling around the bin. The flow rate from the vents is usually a function of the fill rate of the grain into the bin. Thus it is displacement-induced. These may be termed “free” vents, as opposed to “power” vents.

The ring of vents may be modeled as a ring of point sources around the bin with the emissions evenly divided among the vents. However, *it is the usual and preferred procedure* to model the emissions as one equivalent point source centered on the top of the bin—the height of the source being defined as the average height of the vents. The “effective diameter” of the stack is based on the total area of all the vents combined. The single point source approach is more conservative and results in faster model run times.

If a flow rate has been provided and emissions are vented horizontally, model the equivalent point source as a POINTHOR source type. If no flow rate is provided, model the equivalent point source with an exit velocity of 0.001 m/sec regardless of the mode of venting.

Volume or area sources are not recommended when modeling vents. The point source approach is more realistic, since volume or area sources are not subject to downwash. Also, the initial pollutant concentration is higher for a point source, and therefore the approach is more conservative.

If the bin vent emissions are at the ambient (outside) air temperature, the exit temperature should be allowed to match the ambient air on an hour-by-hour basis. This feature can be enabled in AERMOD by setting the exit temperature at zero degrees Kelvin (-459.67 ºF).[1]

[1] User’s Guide for the AMS/EPA Regulatory Model – AERMOD