Fuel Marketing

Ohio has two types of fuel dispensed at service stations, unleaded gasoline and diesel. As a result of the low volatility of diesel fuel, the evaporative emissions from diesel fuel at service stations are very small and considered negligible. However, the evaporative emissions from gasoline fuel are significant and are calculated by category as indicated below:

1. Delivery **trucks in transit (SCC 2505030120)**
2. **Stage I** (transfer of gasoline from tank trucks to storage tanks at service stations) **(SCC 2501050120 & 2501060053)**
3. **Stage II** (transfer of gasoline from storage tanks at service stations to the vehicle gasoline tank) **(SCC 2501060100)**
4. Gasoline station storage tanks; and
5. Spillage.

Truck Transit

Emissions of gasoline vapor occur (1) from loaded tank trucks during the transportation of gasoline from the bulk terminals/plants to the gasoline service stations, and (2) from empty tank trucks returning from service stations to bulk terminals/plants. This category consists of the VOC losses during the transit of gasoline in the trucks.

The county-level fuel sales statistics needed to calculate these emissions are not available for Ohio. Therefore, the state total fuel sales data obtained through Ohio Department of Taxation was used. These sales figures were apportioned to the county level based on VMT county data obtained from Ohio Department of Transportation.

The total gasoline transported is multiplied with an emissions factor of 5.5 E-03 lb/1000 gallon transported for tank transit under loaded conditions and 5.5 E-02 lb/1000 gallon transported for tank transit under unloaded conditions.

Gasoline Distribution Stage 1

Filling Losses

Stage I fueling is defined as the gas retail operations from the truck delivery drop losses and underground tank breathing. This category consists of the VOC loading losses from underground storage tanks during the transfer of fuel from the trucks. VOC calculations are based on ninety-five (95) percent submerged fill and five (5) percent splash for all counties. The VOC emissions calculation is also based on a ninety (90) percent rule effectiveness and a hundred (100) percent rule penetration for controlled counties.

Standing Losses

Breathing emissions losses from storage tanks occur during diurnal changes in barometric pressure, temperature and from gasoline evaporation. To calculate VOC emissions from the storage or breathing losses, an EF of 1.000E+00 lb per 1000 gallons of gas throughput is used for all counties except for the 16 Ohio counties which are non-attainment for ozone. The EF used for those 16 counties, is 1.000E-01 lb/1000 gallons of gas throughput.

Gasoline Distribution Stage 2

Vehicles refueling at service stations are the source of VOC emissions as vapors are displaced from automobile tanks during filling and from spillage of gasoline. The quantity of displaced vapors is based on gasoline throughput and is affected by gasoline temperature, gasoline volatility and by the presence of vapor recovery equipment. Stage II vapor recovery equipment is required at all service stations in the 16 non-attainment Ohio counties for ozone that market in excess of 10,000 gallons per month.

The VOC emissions factor for filling operations is 1.0E+01 lbs/1000 gallons. For the 16 counties that are subject to controls, a control efficiency of ninety-five (95) percent with ninety (90) percent rule effectiveness and a ninety (90) percent rule penetration is used in the calculation of emissions. The VOC emissions factor for spillage is 0.7 lbs/1000 gallons of gasoline for the 72 unregulated counties and 0.4 lbs/1000 gallons of gasoline for the controlled counties.

References:

Motor Vehicle Fuel Tax. Ohio Department of Taxation.

Daily Vehicle Miles Traveled Reports. Ohio Department of Transportation, Office of Technical Services