

## Bag Deflation Rates for BAAQMD Bag Test

The water-filled internal volume of a 12 inches by 20 inches bag is approximately 3.2 gallons, or 0.428 cubic feet. Placing a nozzle into a bag filled with air will typically provide an air volume in the bag of between 2 gallons (0.267 cubic feet) and 2.8 gallons (0.374 cubic feet). Allowing for the maximum leak rate through the vapor recovery components of the nozzle (0.005 cfh at 27.69 inches of water column allowable through the check valve), the maximum allowable deflation time is as follows:

### Maximum Deflation Time – Non-Compliance with Maximum Allowable Leakrate

$$Q_{AIR} = 0.005 \text{ cfh}$$
$$\text{Time} = 0.267 \text{ cubic feet} / 0.005 \text{cfh} = 53.4 \text{ hours (using smallest expected air volume)}$$
$$= .374 \text{cubic feet} / 0.005 \text{cfh} = 74.8 \text{ hours (using largest expected air volume)}$$

**Therefore, any verifiable bag deflation during a re-fueling would indicate that the nozzle is out of compliance with CARB allowable leakrate standards.**

### Maximum Deflation Time – Non-Compliance with A/L Standards

If the dispensing rate is at its maximum of 10 gallons per minute, the maximum allowable deflation time of a bag will be as follows:

Assumptions: Nozzle without leaks at maximum allowable change in the A/L would be .21 (from 1.20 to 0.99 or 1.10 to 0.89)

$$Q_{AIR} = 10 \text{ gpm} (.21) / (7.4805) = 0.281 \text{ cfm}$$
$$\text{Time to Deflate Bag Fully} = 57 \text{ seconds (using smallest expected air volume)}$$
$$= 80 \text{ seconds (using largest expected air volume)}$$

### Minimum Deflation Time – Non-Compliance with A/L Standards

If the dispensing rate is at its minimum of 6 gallons per minute, the maximum deflation time of a bag will be as follows:

Assumptions: Nozzle without leaks at a minimum allowable change in the A/L would be 0.01 (from 1.00 to 0.99 or 0.90 to 0.89)

$$Q_{AIR} = 6 \text{ gpm} (0.01) / (7.4805) = 0.00802 \text{ cfm}$$
$$\text{Time to Deflate Bag Fully} = 47 \text{ minutes (using largest expected air volume)}$$
$$= 33 \text{ minutes (using smallest expected air volume)}$$

Of course, the actual deflation time will depend on flow rate and actual A/L. Average A/L values were 0.93 for 921 tested Dresser/Wayne Type nozzles.