Particle generation

Generation & Injection Techniques

IN AIR: smoke & fog (gaseous) (liquid)

A) Smoke = soot, carbon particles
often accompanied by heat

Smoke wires
- dip oil, NAP

OR

Generate incense, sandalwood

Tubes: incense

Cigarettes

TiO₂: Titanium dioxide
Start with titanium tetrachloride - liquid

+ H₂O vapor → TiO₂ smog + dense cloud
1 μm particle

+ Hydrochloric acid vapor toxic and hard on equipment

B) FOG = Aerosols of liquids

Water fog:
- Ultrasonic humidifier
- Medical nebulizer
- Dry ice (solid CO₂)

Provides cold mistible droplets like H₂O
Condensed from air or surrounding water

Evaporates fast but is non-toxic, no residues
Cornsilk stains

Stage fog:
Water + glycerin or propylene glycol
Various recipes online

Slows evaporation

Fog machine

Tank → Pump → Tube → Heater
Hot vapor condenses

Small machines: heater too small to run continuously
$20 Target, 1 month before Halloween ~3.16

- Large machines. Ronco, Le Maître mfg ~20,000
  $1000 can run continuously. 1 gallon ~4hrs
  Health effects minimal, except to mathematicians (singers)

Fog-on-ground CHILLER

Fogger

Dry ice

→ Cold fog

C) OIL AEROSOLS

Won't evaporate unless burned
Oil = low vapor pressure

Oil aerosol - can cause lung death

Use medical or other Bernoulli atomizer

D) DUSTS

Al₂O₃ = Alumina. Polishing powder. Inexpensive

Won't burn so already fully oxidized

For imaging individual particles through flames

Inject air at tangent

Seed

Cyclone seeder

Large particles centrifuge to wall

Only small particles allowed to exit

Fluidized bed

Air flows through Seed bed

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