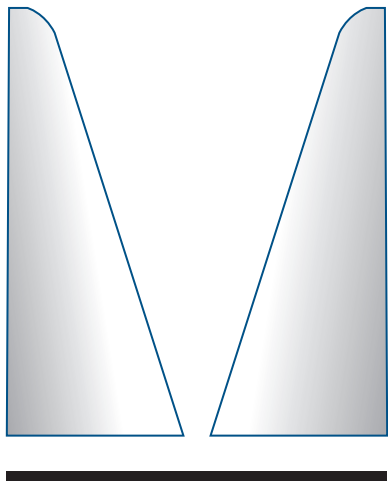


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INERTIAL IMPACTION/COLLECTION EFFICIENCY

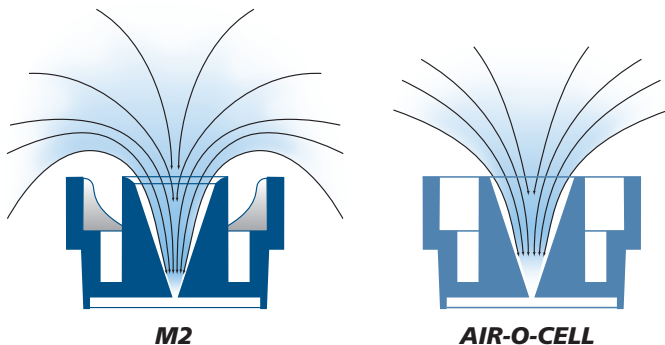
- Standard nozzle dimensions for inlet opening and exit slit
- Standard distance between collection plate and exit slit
- Smaller particles are collected when exit slit velocity increases
- $d_{50} = 50\%$ particle cut-size diameter (for a given size particle, 50% of the particles are collected and 50% pass through and are not collected)
- $d_{50} = 2.3$ microns at 15 lpm with an exit slit velocity of 35 mph (calculated by a numerical solution of the Navier-Stokes equations and of the equation of motion of particles)

References

DJ Rader and BA Marple (1985). *Aerosol Science and Technology* 4:141-156.

K Willeke (1978). *Am. Ind. Hyg. Assoc. J.* 39, 371-321.

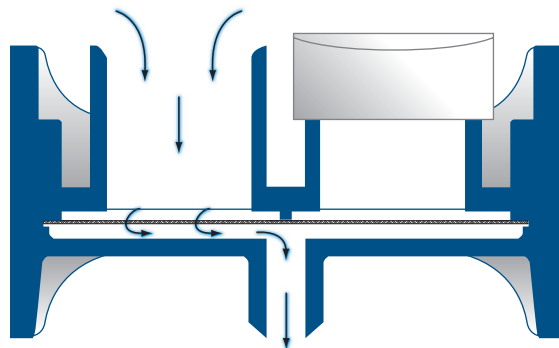
RH Perry, DW Green and JO Maloney (editors, McGraw-Hill) (1984). *Perry's Chemical Engineering Handbook, Chapters Sections 5-40 Fluid Particle Mechanics and 18-65 Gas-in-Liquid Dispersions.*



PHYSICAL FLUID DYNAMICS (LAMINAR FLOW)

The M2 and Air-0-Cell cassettes were placed in a water chamber. A submersible water pump was used to continuously draw water through the cassettes at a constant rate. Red dye was continuously dispensed at numerous positions around the inlet opening. The dye streams that demonstrated regular, continuous and non turbulent flow were noted.

Both the M2 and Air-0-Cell showed laminar flow in and around the inlet opening; however, the M2 showed a larger area of laminar flow around the sides of the inlet opening. The M2 draws from a wider area due to the inlet opening radius.



PHYSICAL FLUID DYNAMICS (SAMPLE INTEGRITY)

The M2 and a pump were set up and operated in a test chamber and then exposed to an air flow indicator smoke generating tube. The M2 was carefully disassembled and evaluated for trace discoloration (indicating exposure to smoke).

There was no cross contamination between side A and side B. When side A was evaluated, only the side A nozzle, side A collection slide and the vacuum port showed trace discoloration; the side B nozzle and collection slide showed no discoloration. In addition, there was no other internal evidence of trace discoloration indicating the M2 is leak proof.