An Overview of Air Purification Technologies

Technology	Active or Passive	Where Air Is Treated	Primary Contaminants Addressed	Effectiveness in Occupied Space	Energy Impact	Maintenance Burden	Standards & Framework Alignment
DBD Bi-Polar Ionization (AtmosAir)	Active	Occupied space + surfaces	PM (incl. sub-micron), VOCs, bacteria, viruses, odours	High – treats air where people breathe	Low – supports reduced outside air	Low (tube replacement)	ASHRAE IAQP, WELL, LEED, ESG
Needlepoint Ionization (NBPI)	Active (limited)	Near emitter only	PM agglomeration, limited VOCs	Moderate in small spaces	Low–moderate	Medium (fouling risk)	Partial ASHRAE alignment
HEPA / High-MERV Filtration	Passive	Inside HVAC duct	Particulates only	Low (depends on airflow)	High – pressure drop	High (frequent replacement)	ASHRAE, LEED
UV-C (In-Duct / AHU)	Passive	Coil / duct only	Microorganisms	Low in occupied space	Low–moderate	Medium (lamp replacement)	ASHRAE
Electrostatic Precipitators (EP)	Passive	Inside HVAC unit	Particulates	Low	Low	High (cleaning critical)	Limited
Sorbent / Carbon Filtration	Passive	Inside HVAC unit	VOCs only	Low	High – airflow restrictive	High (disposal)	Limited
Photo Catalytic Oxidation (PCO/PHI)	Active (limited)	Near device	Microbial only	Low–moderate (short radical life)	Low	Medium	Limited
Dry Hydrogen Peroxide (DHP)	Active (emerging)	Occupied space	Microbial only	Uncertain (limited data)	Low	Medium	Limited