

Sampling Solutions for Semiconductor Wafer Fabrication Unit Workplaces

Introduction

Semiconductors are formed on wafers in wafer fabrication units called "fabs." In the processes required to build the semiconductors and clean the fab, workers may be exposed to several hazardous chemical agents. These agents include acids, bases, metal particulates, organic compounds, and molecular dopants based on phosphorous, arsenic, and boron compounds.



SKC offers active and passive sampling solutions for sampling these compounds. SKC active samplers require an air sample pump to collect hazardous gases, vapours, and particulates in air; passive samplers collect hazardous vapours by diffusion without the use of an air sample pump.

SKC Sampling Solutions

For over 50 years, SKC has led the research, design, and manufacture of quality sampling equipment and media to aid health and safety professionals in the evaluation of occupational and environmental hazards.

SKC method-based sampling solutions for fab workplaces include air sample pumps, active and passive samplers, sorbent tubes and filter cassettes, following agency methods and established protocols

Air Sample Pumps



Samplers



Sampling Media



Sample Collection

Active Air Sampling Solutions

| Target Compound | Select Methods* | SKC Sample Collection Media and Part No. | SKC Sample Pump and Part No. | Notes |
|--------------------------------------|---|---|---|---|
| Amines, aliphatic and aromatic | NIOSH 2010 NIOSH 2002 | Sorbent tube 226-10 | Pocket Pump TOUCH 220-1000TC | |
| Ammonia | NIOSH 6015 NIOSH 6016 | Sorbent tube 226-10-06 | AirChek TOUCH 220-5000TC | |
| | OSHA ID 188 | Sorbent tube 226-29 | | |
| Chromic acid | NIOSH 7600 | Preloaded PVC filter cassette 225-803 | AirChek TOUCH 220-5000TC | |
| | OSHA ID 215 (V.2) | Preloaded PVC filter cassette 225-802 | | |
| Diethylamine | OSHA 41 | Sorbent tube 226-96 | Pocket Pump TOUCH 220-1000TC | |
| Dimethylacetamide | NIOSH 2004 | Sorbent tube 226-10 | Pocket Pump TOUCH 220-1000TC | |
| Hexachlorethane | OSHA 07 | Sorbent tube 226-01 | Pocket Pump TOUCH 220-1000TC | |
| Hydrochloric acid | OSHA ID 174SG | Sorbent tube 226-10-03 | AirChek TOUCH 220-5000TC | |
| Hydrofluoric acid | ASTM D4765 NIOSH 7902 OSHA ID 110 | Preloaded coated filter cassette 225-9001 | AirChek TOUCH 220-5000TC | |
| Hydrogen chloride | NIOSH 7907 | Preloaded coated filter cassette 225-9032 | AirChek TOUCH 220-5000TC | One uncoated pre-filter and one coated filter |
| Hydrogen fluoride, hydrofluoric acid | NIOSH 7906 | Preloaded coated filter cassette 225-9031 | | |
| Metal particulates | NIOSH 7300 OSHA ID 121 OSHA ID 125G | Preloaded MCE filter cassette 225-3-01 | AirChek TOUCH 220-5000TC | |
| | NIOSH 7306 | Preloaded Solu-CAP cassette insert 225-8517 | | |
| Methanol | OSHA 91 | Sorbent tube 226-82 | Pocket Pump TOUCH 220-1000TC | Two tubes in series |
| Molecular dopants | NIOSH 6001 (arsine) | Sorbent tube 226-01 | Pocket Pump TOUCH 220-1000TC | |
| | NIOSH 6002 (phosphine) | Sorbent tube 226-165A | | |
| | OSHA 1003 (phosphine) | Preloaded coated filter cassette 225-9018 | AirChek TOUCH 220-5000TC | |
| Nitric acid | NIOSH 7907 | Preloaded coated filter cassette 225-9032 | AirChek TOUCH 220-5000TC | |
| | OSHA ID 165SG | Sorbent tube 226-10-03 | AirChek TOUCH 220-5000TC | |

* Other methods may apply. SKC recommends those listed.

Active Air Sampling Solutions (cont.)

| Target Compound | Select Methods* | SKC Sample Collection Media and Part No. | SKC Sample Pump and Part No. | Notes |
|-------------------|--|--|---|-------------------------|
| Organic compounds | EPA TO-17 and IP-1B | Thermal desorption tube 226-300 Series , constant pressure controller 224-26CPC-10 , and dual low flow tube holder 224-26-02 | Pocket Pump TOUCH 220-1000TC | Side-by-side dual flows |
| | OSHA 91 (methanol) | Sorbent tube 226-82 | Pocket Pump TOUCH 220-1000TC | Two tubes in series |
| | OSHA 07 (xylene, hexachlorethane) | Sorbent tube 226-01 | Pocket Pump TOUCH 220-1000TC | |
| Phosphoric acid | OSHA ID 111 | Preloaded MCE filter cassette 225-3-01 | AirChek TOUCH 220-5000TC | |
| | OSHA ID 165SG | Sorbent tube 226-10-03 | | |
| | NIOSH 7908 | Preloaded filter cassette 225-9033 | | |
| Sulphuric acid | OSHA 113 | Preloaded Parallel Particle Impactor 225-3861 | AirChek TOUCH 220-5000TC | |
| | | Preloaded MCE filter cassette 225-3-01 | | |
| | OSHA ID 215 | Preloaded PVC filter cassette 225-802 | | |
| Xylene | OSHA 07 OSHA 1002 | Sorbent tube 226-01 | Pocket Pump TOUCH 220-1000TC | |

* Other methods may apply. SKC recommends those listed.

Passive Air Sampling Solutions

| Target Compound | Select Methods* / SKC Validation | SKC Sample Collection Media and Part No. | Notes |
|-----------------|--|--|------------------------------------|
| Organic vapours | EPA TO-17 / Research Report 1812 | ULTRA[®] 690 Series , choice of four sorbents | Thermal desorption and GC analysis |
| | OSHA 07 , OSHA 91 / Research Reports 1812 , 1895 | VOC Chek[®] 575 Series | Solvent extraction and GC analysis |

* Other methods may apply. SKC recommends those listed.