

Authors: Don Yeaman, Martin Schottler, Andreas Neuber

Integration of AMC concepts into future wafer fabs

Nanoprocessing of semiconductor will present new challenges to wafer environment contamination control. The focus will shift from particulate contamination to molecular contamination; trace metals and molecular organics. In the past, organics have frequently been considered by sum parameters which do not reflect the level of risk different organic materials pose to wafer processing. The medium level organics (for example, the C5...C30 fraction for compressed air) provides the highest risk to the wafer according to production experience and research results. Sources of these types of organics are many:

- Chemicals/Ultraclean water: Liquids come in contact with many polymers during distribution which may leach-out monomers and additives.
- Cleanroom air: Organics in the environmental air are mainly methane and other hydrocarbon gases. Industrial activities also contribute a lot of other contaminants.

The risk to the wafer is certainly higher in the cases where it is in close vicinity to outgassing materials (such as the FOUP), but the overall facility needs to be improved as well to create the required environment in today's fab. Another challenge might be immersion lithography, where contaminations on the interface between wafer and environment become more important. A factory integration concept of AMC control needs to consider both investment and operational costs.