

46ESS-30: Engine Emissions Measurement Techniques

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The rapid growth of air transport, along with more stringent environmental protection regulations, have increased the concerns regarding aircraft engine emissions, due to their noxious effect on human health and their detrimental impact on environment. In view of this situation, engine testing has become crucial to limit and control exhaust emissions. This paper provides a compilation of the most widely used and recent instrumentation and techniques for particulate and gaseous emissions measurement. There are basically four methods in current use for measuring smoke emissions: opacimeters, smoke meters, particulate samplers and 'microsoot' devices to detect very low soot concentration. As for gaseous emissions, different techniques are used depending on the nature of the molecules that are to be measured: Non-dispersive infrared analysers (NDIR) for CO and CO₂, Flame ionization detectors (FID) for unburnt hydrocarbons, and Chemiluminescence detectors (CLD) for NO and NO₂. Also, mass spectrometer devices are considered as they may represent the future technology for general emission measurement.