

**MEASURED ROAD TUNNEL AIR CONCENTRATIONS USED TO VERIFY MOBILE SOURCE
EMISSION FACTORS EMBEDDED IN
THE IPIECA TOOLKIT AND TO SPECIATE TOTAL HYDROCARBONS**

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Mobile source pollutant emissions are increasingly significant in developing countries. Standard methods used for estimating vehicle emission rates involve the use of emission factors (EFs) and vehicle activity rates. In developed countries emission factors are measured using vehicle population sampling and standardized dynamometer testing. These emission factors, combined with vehicle population and activity data, are used to estimate total vehicle emissions. This method is expensive and requires resources not usually available in developing countries, including South Africa. But emission factors measured in Europe and North America are not necessarily valid elsewhere due to differences in fuel quality, vehicle fleet and maintenance standards. Road tunnel studies (e.g. the Gubrist Tunnel Study) provide an alternate and evolving method for estimating mission factors. A spreadsheet model (IPIECA Toolkit) was used to estimate the pollutant emissions (CO, SO₂, NO_x, VOCs and PM) for the City of Cape Town. Verification of the emission factors embedded in this model involves measurement of pollutant concentrations (speciated VOCs, CO, PM₁₀, PM_{2.5}) in the 4-kilometer Huguenot road tunnel, about 50km from Cape Town. A recently established method, stainless steel sorbent tubes, was used for sampling. Analysis of target hydrocarbons is by auto-thermal desorption /GC/MS. The measured pollutant concentrations, an airflow model and observed traffic flow are used to determine vehicle emission factors.