Australian/New Zealand Standard™

Methods for sampling and analysis of ambient air

Method 18: Measurement of road tunnel air quality

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EV-007, Methods for Examination of Air.

The objective of this Standard is to provide regulatory and testing bodies with standard methods for continuously monitoring air in road tunnels for air velocity, carbon monoxide (CO), nitric oxide (NO) and nitrogen dioxide (NO_2) concentrations and visibility.

This Standard has been developed as a performance based Standard that allows for use of a number of direct-reading instrumental methods.

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard.

FOREWORD

In order to improve traffic flow in central business districts and through sensitive environments, road tunnels are increasingly being used in Australia and New Zealand to achieve the desired outcomes. There are a significant number of tunnels in operation, with a number of others in the planning stages.

Road tunnel projects are subject to environmental and/or planning approval conditions by regulatory authorities that specify the parameters to be monitored in-tunnel, typically including air velocity, CO, NO, NO_2 and visibility, with a requirement that the tunnel ventilation system be controlled to—

(a) reduce public exposure to CO and NO_2 concentrations within the tunnel, enabling conformity with criteria for various averaging periods;

(b) prevent or reduce portal emissions and resultant environmental impacts; and

(c) ensure appropriate visibility for different tunnel operating conditions.

The first requirement is typically determined by averaging measured CO and NO_2 concentrations from a number of instruments located on possible travel paths throughout the tunnel system.

METHOD

1 SCOPE

This Standard describes methods for determining air velocity and flow direction, carbon monoxide (CO), nitric oxide (NO) and nitrogen dioxide (NO_2) concentrations and visibility in road tunnels using direct-reading instruments.

This Standard applies to the measurement of air quality and air velocity inside road tunnels.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS	
3580	Methods for sampling and analysis of ambient air
3580.5.1	Method 5.1: Determination of oxides of nitrogen—Direct-reading instrumental method
3580.7.1	Method 7.1: Determination of carbon monoxide—Direct-reading instrumental method
AS/NZS	
3580	Methods for sampling and analysis of ambient air
3580.2.2	Method 2.2: Preparation of reference test atmospheres—Compressed gas method
ISO/IEC	
Guide 98	Uncertainty of measurement
Guide 98-3: 2008	Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)
EN	
14211	Ambient air. Standard method for the measurement of the concentration of nitrogen dioxide and nitrogen monoxide by chemiluminescence
14626	Ambient air. Standard method for the measurement of the concentration of carbon monoxide by non-dispersive infrared spectroscopy
Austroads	Guide to Road Tunnels, 2010
NZ Transport Agency	Guide to Road Tunnels, December 2013
National Environment Protection Council	National Environment Protection (Ambient Air Quality) Measure, Technical Paper No. 5, Data Collection and Handling.

3 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

3.1 Accuracy

The degree of closeness of measurements of a quantity to its actual (true) value.

3.2 Certified reference material

Reference material, characterized by a metrologically valid procedure for one or more specified properties, accompanied by a reference material certificate that provides the value of the specified property, its associated uncertainty, and a statement of metrological traceability.