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Air quality — Determination of the uncertainty of the time average of air quality measurements

Qualité de l'air — Détermination de l'incertitude de mesure de la moyenne temporelle de mesurages de la qualité de l'air

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Foreword

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ISO 11222 was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 4, *General aspects*.

Annex A of this International Standard is for information only.

Introduction

Measurands in the field of air quality monitoring can be highly varying functions of time. Special considerations are-required when estimating measurement uncertainties of time averages of air quality monitoring data. The approach [3], using the standard deviation of the recorded measurement results divided by the square root of the number of measurement, is applicable only to measurands that do not change with time and to measuring systems that do not exhibit systematic uncertainties.

The statistical treatment of random and systematic deviations of measurement results has been harmonized by the concept of measurement uncertainty introduced by the *Guide to the expression of uncertainty in measurement* in 1993 (GUM). This approach is based on the general application of the rule of uncertainty propagation. Although not addressed explicitly by the GUM, the concept of uncertainty propagation and measurement uncertainty can also be applied to measurands exhibiting distinct time structure.

Standard uncertainty may be required as a measure of data quality to be provided when reporting a time average of air quality monitoring data. If appropriate, data quality objectives can be defined separately for:

a) the uncertainty of the time average induced by the measuring system,

b) the uncertainty of the time average induced by incomplete time coverage of the monitoring data,

c) the uncertainty of the time average due to limited spatial coverage of monitoring data.

These influences make up independent contributions to the mean square uncertainty of a time average. In this International Standard, a time average of measured air quality data is intended to describe the air quality at a specified location or within a specified stack within a given time period. The uncertainty of the time average due to spatial coverage of monitoring data is not considered.