

Specification of Competency Standards
for the Testing, Inspection and Certification Industry
Unit of Competency

Functional Area - Testing Operations

Title	Apply mass spectrometric and hyphenated techniques to chemical testing
Code	105780L5
Range	This unit of competency (UoC) covers the abilities to optimise and operate hyphenated instruments associated with mass spectrometer independently, record accurate test data, and interpret mass spectrometric data for chemical analysis by applying the mass spectrometric principles and concepts in testing laboratories.
Level	5
Credit	6 (For Reference Only)
Competency	<p>Performance Requirements</p> <p>1. Possess knowledge of hyphenated techniques with mass spectrometer</p> <ul style="list-style-type: none"> • Employ the principles and concepts of hyphenated techniques. • Apply the principles and concepts of mass spectrometric techniques and their applications to chemical testing. • Describe the construction and explain the functions of key components of hyphenated instruments associated with mass spectrometer including: <ul style="list-style-type: none"> ○ gas chromatography-mass spectrometer (GC-MS), ○ liquid chromatography-mass spectrometer (LC-MS). • Describe the operation, interface, selectivity, sensitivity, linear range, typical applications and interferences (e.g. spectral interferences) of hyphenated mass spectrometric instruments. • Explain the routine performance check and mass tuning of hyphenated mass spectrometric instruments. • Outline the steps of applying hyphenated mass spectrometric techniques for identifying and quantifying analytes to give results in appropriate accuracy, precision, uncertainty and units. • Differentiate the applications of various types of hyphenated techniques for qualitative and quantitative analyses according to the nature and characteristics of samples and analytes. • Apply the concepts of uncertainty and instrument calibration to mass spectrometric analysis. <p>2. Apply and operate hyphenated mass spectrometric instruments for chemical analysis</p> <ul style="list-style-type: none"> • Determine the test request and identify sample characteristics that may affect the chemical analysis. • Select appropriate test method and hyphenated mass spectrometric instrument in compliance with test requirements. • Carry out routine performance check of the selected hyphenated mass spectrometric instrument according to manufacturer's instruction and/or relevant standard to ensure it is ready for chemical analysis. • Set up the hyphenated mass spectrometric instrument and optimise its performance by using appropriate calibration standards and adjusting instrumental operating parameters. • Carry out hyphenated mass spectrometric analysis on the sample independently according to the test method by measuring analyte responses for standards, validation and quality control checks, and the sample. • Record accurate and reliable mass spectrometric data by conducting sufficient measurements. • Interpret mass spectrometric data for chemical analysis.

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	<p>3.Exhibit professionalism</p> <ul style="list-style-type: none">• Troubleshoot analytical procedures or hyphenated mass spectrometric instruments in case of any atypical observations/data/results being identified during sample analysis or performance check.• Ensure integrity and confidentiality of laboratory data and information by observing the code of conduct of the laboratory.
Assessment Criteria	<p>The integrated outcome requirements of this UoC are the abilities to:</p> <ul style="list-style-type: none">• apply, optimise and operate the hyphenated mass spectrometric instrument independently to carry out chemical analysis of the sample according to the test method and sample characteristics,• record and verify mass spectrometric data by conducting sufficient measurements and analysing validation and quality control check data,• interpret mass spectrometric data for chemical analysis.
Remark	<p>Practitioners are required to have prior knowledge of the following UoC:</p> <ul style="list-style-type: none">• Apply chromatographic techniques