

# SEMBIT2-18 - SQA Unit Code F9JK 04

## Contributing to the application of measurement systems analysis (MSA)



### Overview

This unit covers the competences required for contributing to the application of measurement systems analysis (MSA). You will contribute to the selection of an appropriate measurement system on which to carry out the analysis, and to the obtaining of all the necessary data in order to carry out the measurement systems analysis. You will be expected to contribute to the application of the principles and processes of measurement system analysis, which will include such things as completing a calibration study on a gauge, conducting a gauge linearity study, completing either an attribute or a variable gauge repeatability and reproducibility study, and conducting a metrology study on a measurement system which includes either a variable or attribute gauge repeatability and reproducibility study.

You will be required to contribute to the analysis, using the appropriate techniques and recording the results of the analysis in the appropriate format. From this information, you will contribute to determining the percentage gauge repeatability and reproducibility of the measurement system under study, and to producing a detail report suggesting ways in which the measurement system might be improved.

Your responsibilities will require you to comply with organisational policy and procedures for the activities undertaken, and to report any problems with the activities that you cannot solve, or that are outside your responsibility, to the relevant authority. You will need to ensure that all the necessary documentation is completed accurately and legibly. You will be expected to take responsibility for your own actions within the activity, and for the quality and accuracy of the work that you produce.

Your underpinning knowledge will provide a good understanding of measurement systems analysis, and will provide an informed approach to the techniques and procedures used. You will need to understand the principles and application of MSA, in adequate depth to provide a sound basis for carrying out the activities to the required criteria.

Applying safe working practices will be a key issue throughout.

### Specific Unit Requirements

The word 'contribute' is used throughout this unit. This means that, although the outcomes of this unit may be carried out and achieved as part of a team, in order to prove consistent competent performance you must be able to demonstrate:

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1. specific, quantifiable and auditable personal contributions in the achievement of this unit
2. competence in all the areas required by the standard
3. your ability to combine the performance statements specified when contributing to the application of the principles and processes of this unit.

### Performance criteria

*You must be able to:*

- P1 work safely at all times, complying with health and safety and other relevant regulations and guidelines
- P2 contribute to the selection of an appropriate measurement system on which to carry out the analysis
- P3 contribute to obtaining all the necessary data in order to carry out the measurement systems analysis
- P4 contribute to the analysis, using the appropriate techniques
- P5 record the results of the analysis in the appropriate format
- P6 contribute to determining the percentage gauge repeatability and reproducibility of the measurement system under study, and to suggesting ways of improving the measurement system
- P7 contribute to the production of a measurement systems analysis report, detailing ways of improving the measurement system under study

### Knowledge and understanding

*You need to know and understand:*

- K1 the health and safety requirements of the area in which you are carrying out the measurement systems analysis
- K2 why we should study our measurement systems
- K3 how to select a measurement system for analysis
- K4 the possible sources of measurement system variation
- K5 how measurement systems analysis be used in a Six Sigma improvement project
- K6 the meaning of 'repeatability and reproducibility study'
- K7 the terminology used in measurement systems analysis (such as bias, linearity, stability, accuracy, repeatability, discrimination, resolution, reproducibility)
- K8 how to conduct a measurement systems analysis study
- K9 the calculation for gauge repeatability and reproducibility
- K10 the calculation for gauge precision and tolerance
- K11 the industry rules for repeatability and reproducibility results
- K12 the extent of your own authority within the project, and to whom you should report in the event of problems that you cannot resolve

## Additional Information

### Scope/range related to performance criteria

You must be able to:

1. contribute to a measurement system analysis, which includes **two** from the following:
  - 1.1. completing a calibration study on a gauge
  - 1.2. conducting a gauge linearity study
  - 1.3. completing either an attribute or a variable gauge repeatability and reproducibility study
  - 1.4. conducting a metrology study on a measurement system, which includes either a variable or attribute gauge repeatability and reproducibility
2. determine the type of measurement system variation, to include **two** of the following:
  - 2.1. bias
  - 2.2. linearity
  - 2.3. stability
  - 2.4. accuracy
  - 2.5. repeatability
  - 2.6. reproducibility

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