

Unit ID: 902

**Domain FOUNDATION ENGINEERING SCIENCE
 AND DRAWING SKILLS**

**Title: Apply knowledge of advanced engineering
 drawing in different contexts**

Level: 4

Credits: 6

Purpose

This unit standard specifies the competencies required to apply knowledge of advanced engineering drawing in different contexts. It includes apply advanced knowledge of engineering drawing fundamentals, produce advanced free-hand drawings of engineering components, produce perspective drawings, isometric projection and isometric drawings, produce advanced sectional drawings, demonstrate knowledge of assembly of components and draw assembly drawings and produce detailed drawings. This unit standard is intended for people requiring advanced engineering drawing skills as applied in different contexts.

Special Notes

1. This unit standard gives users exposure to a holistic approach of study and world of work to gain an understanding of the world as a set of related systems, by recognizing that problem solving contexts do not exist in isolation but that they may differ from context to context according to the area of application.
2. This unit standard may be assessed in any context of operation and may be assessed in conjunction with other relevant technical unit standards selected from a particular domain that has a thematic link to this unit standard.
3. Glossary of terms:
 - 'SABS' refers to South Africa Bureau of Standards.
 - 'ISO' refers to International Standards Organization.
 - 'SANS' refers to South Africa National Standards.
4. Assessment evidence may be collected at any realistic place where logical collection of such evidence can be achieved.
5. The correct use of the suitable technical terminology must be stressed, especially in formulating definitions and principles.
6. All diagrams and graphs should be drawn in pencil and must be supplied with the necessary subtitles (labels in ink).
7. All drawings must be done with drawing instruments, the only exceptions being printing, free-hand drawing and the C-type line and break line.
8. All drawings must be numbered, showing the title and scale, and where applicable drawings must show centre lines and the projection system symbol.
9. All printing must be done free-hand in pencil according to the SABS 0111-1 Code of Practice for Engineering Drawing.

10. Scales of drawing to be used: 1:1, 1:2, 1:10, 2:1 and 5:1
11. All work must comply with legislation and all subsequent amendments.
12. Regulations and legislation relevant to this unit standard include the following:
 - Labour Act, No. 11, 2007.
 - Occupational Health and Safety Regulations No. 18, 1997 and all subsequent amendments
 - SABS 0111-1: 1993, Code of practice for engineering drawing, part 1. - General principles.
 - ISO-origin standards
 - SABS 0111-1: 1993, Code of practice for engineering drawing, part 1. - General principles.
 - SANS 10044-1: 2004, Code of Practice for Welding: Part 1 – Glossary of Terms
 - SANS 10044-2: 2004, Code of Practice for Welding: Part 2 – Symbols

Quality Assurance Requirements

This unit standard and others within this subfield may be awarded by institutions which meet the accreditation requirements set by the Namibia Qualifications Authority and the Namibia Training Authority and which comply with the national assessment and moderation requirements. Details of specific accreditation requirements and the national assessment arrangements are available from the Namibia Qualifications Authority and the Namibia Training Authority on www.nta.com.na.

Elements and Performance Criteria

Element 1: Apply advanced knowledge of engineering drawing fundamentals.

Performance Criteria

- 1.1 Various geometrical drawings and/or views of different objects and shapes are constructed to required scale.
- 1.2 Designation of views and the two projection systems in orthographic projection are recognised, explained and applied to draw various views in the first-angle and third-angle of orthographic projection according to the latest edition of the Code of Practice.
- 1.3 The purpose of machining symbols and processes are explained and applied to detailed workshop drawings.
- 1.4 The production methods, treatment and/or coating for producing a specific surface are specified.
- 1.5 The purpose of instruction notes on drawings is described.
- 1.6 Free hand drawings, illustrating various machining instructions, are drawn and instruction notes are printed.

- 1.7 The ISO system and terminologies are interpreted in terms of tolerances, fundamentals deviations and symbols, and calculations of limits of sizes are carried out.
- 1.8 Types of plotters, printers and storing devices (including back up systems) used for Computer-Aided Draughting (CAD) are explained.
- 1.9 The basic functions for hard and software used in CAD are stated.

Element 2: Produce advanced free-hand drawings of engineering components.

Performance Criteria

- 2.1 Guidelines and requirements of line work for free hand drawings are described and applied.
- 2.2 Views of various engineering components are drawn free hand, in good proportion.

Element 3: Produce perspective drawings, isometric projections and isometric drawings.

Performance Criteria

- 3.1 Isometric projections of a single item of which at least two views are given, either in first-angle or third-angle orthographic projection is drawn.
- 3.2 Isometric drawings of a single item of which at least two views are given, either in first-angle or third-angle orthographic projection is drawn.
- 3.3 Points and distances in perspective drawings are identified and described.
- 3.4 A one-point and two-point perspective view of a single component or item is drawn.

Element 4: Produce advanced sectional drawings.

Performance Criteria

- 4.1 Advanced sectional views are identified and their functions explained.
- 4.2 The guidelines laid down for hatching are applied.
- 4.3 The primary orthographic views of machine parts and components are drawn according to scale in first- or third-angle orthographic projection.
- 4.4 Hexagonal-head bolts and nuts, screws, studs and stud assemblies are constructed according to conventional representation.

- 4.5 Sectional views or assemblies are drawn according to the principles of sectional drawings of single components.

Element 5: Demonstrate knowledge of assembly of components and draw assembly drawings.

Performance Criteria

- 5.1 Assembly drawings, item numbers and parts lists are identified and interpreted.
- 5.2 Primary views of an assembly is drawn according to scale in the either first-angle or third-angle orthographic projection.
- 5.3 Sectional and outside views of assemblies of various objects are drawn.
- 5.4 Item numbers, parts lists, hidden details, and conventional representation of various items on assembly drawings are correctly used.

Element 6: Produce detailed drawings.

Performance Criteria

- 6.1 An assembly is dismantled and the required detailed parts are drawn.
- 6.2 The primary views of various parts are drawn in the first angle and third angle orthographic projection.

Registration Data

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