

Domain**SOLAR INSTALLATION****Title:****Design basic Solar Home System****Level: 3****Credits: 3****Purpose**

This unit standard specifies the competencies required to design basic Solar Home System (Smaller than or equal to 500 Watts). It includes the following elements: perform site assessments; determine cable sizes calculating battery sizes, calculate module or collector sizes, determine regulators and inverter sizes and determine control units. This unit is intended for those who work as solar technicians.

Special Notes

1. Entry information:

Prerequisites

- *1642: Demonstrate basic knowledge of electricity*
- *1647: Draw and interpret basic technical drawings*
- *1649: Perform basic estimations, measurements and calculations*
- *1655: Develop and interpret intermediate technical drawings*
- *1643: Demonstrate basic knowledge of environmental issues relating to solar energy installations.*

2. To demonstrate competency, at a minimum, evidence is required of calculating correct sizes of modules, storage, cables and control units as well as drawing and interpreting schematic drawings of complete systems using common and standard symbols including labelling all components and connections correctly.

3. Tools, equipment, accessories and materials may include but are not limited to removing/fixing tools, calculators, pencil/pen, manufacturers' manuals and guides.

4. Assessment evidence may be collected from drawings, real workplace or an appropriate simulated realistic environment in which system designs are carried out.

5. Performance of all elements in this unit standard must comply with all relevant workplace requirements and manufacturers' specifications.

6. Glossary of terms:

- 'SHS' refer to Solar Home System.
- 'AC' refers to Alternating Current.
- 'DC' refers to Direct Current.

7. Regulations and legislation relevant to this unit standard include the following:

- Labour Act No. 11 of 2007.

- Occupational Health and Safety Regulations No. 18, 1997 and all subsequent amendments.
- ISO 14001 (Environmental Management Standard) and all subsequent amendments to any of the above.

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 on www.namqa.org and the Namibia Training Authority on www.nta.com.na.

Elements and Performance Criteria

Element 1: Perform site assessment

Range

Site assessment may include but is not limited to workplace inspection, equipment defect identification, assessment of conditions and hazards and determination of work requirements.

Performance Criteria

- 1.1. Angle of the roof is determined.
- 1.2. Factors affecting solar power generation are determined.
- 1.3. Integration of SHS with the existing grid is determined.
- 1.4. Condition of the roof is determined.

Element 2: Determine cable size

Range

This include the cable length, thickness (diameter), total ampere and nominal voltage but not limited to the permissible standard drop of 5% maximum of supply voltage.

Performance Criteria

- 2.1. Nominal voltage for the system is determined.
- 2.2. Total amperes flowing in the cable is determined.
- 2.3. The length of the cable in meters is determined.
- 2.4. The thickness (diameter) of the cable in mm² is determined.

Element 3: Calculate the size of storage

Range

Storage includes but not limited to chemical batteries.

Performance Criteria

- 3.1 Energy demand determined.
- 3.2 Days of autonomy are determined.
- 3.3 Nominal voltage of the battery is determined.
- 3.4 Maximum charging level of the battery is determined.
- 3.5 Minimum discharge level of the battery is determined.

Element 4: Calculate the size of the modules or collectors

Range

Modules or collectors' sizes are calculated but are not limited to 500 watts.

Performance Criteria

- 4.1 Appliance demand is determined.
- 4.2 Module wattage is determined.
- 4.3 Average hours per day are determined.

Element 5: Determine regulators and inverter size

Performance Criteria

- 5.1 Power load is determined.
- 5.2 Nominal voltage of the system is determined.
- 5.3 Maximum "I" short circuit current (Isc) is determined.

Element 6: Determine the control units

Performance Criteria

- 6.1 Power demand determined.
- 6.3 Type of system AC or DC determined.
- 6.4 Factors affecting control units are determined.

Registration Data

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