

REGISTERED NATIONAL STANDARD

UNIT OF COMPETENCY



Title:	Construct brick and block curved walls ¹				
TQF Level:	4	Credits:	5	Version:	1
National standard code:	NS160-04				
Associated qualification (and code):	National Certificate in Bricklaying and Blocklaying Level 4 QR-04-NQ-028-02-1005-26-01				
Approval date:	10 September 2026		Review date:	10 September 2031	
Purpose:	This unit describes the skills and knowledge required to construct brick and block curved walls, including the ability to use geometry for calculating and setting out curves. It applies to bricklayers and blocklayers working on both new and existing structures, operating with responsibility for organising and completing their work. The unit covers preparing the work area, setting out curved and serpentine walls using trammels and trammel heads, laying brickwork to maintain gauge, bonding pattern and alignment, and finishing brick joints to plans, specifications and Tonga National Building Code. This unit emphasises precision in geometry, accurate layout techniques, and high-quality workmanship to ensure structurally sound and aesthetically correct curved brick and block construction. This unit supports bricklayers who are expected to take responsibility for assigned brick or block curved wall construction tasks and complete work independently while meeting Tonga National Building Code requirements. In successfully completing this unit standard, learners are able to: • Interpret construction drawings, specifications, and standards to determine brick and block curved wall construction requirements • Plan and organise work tasks, materials, and sequencing to achieve efficient bricklaying operations • Prepare the worksite, materials, tools, and equipment while following OHS and environmental procedures. • Identify and control hazards associated with brick and block work • Calculate curves, radii, and material quantities using geometry and formulas • Select and prepare tools, equipment, and materials for curved wall construction				

¹ Due to safety issues inherent in working with electricity and combustible substances, all training and assessment activities must be in accordance with Tonga National Building Code.

	• Set out curved walls accurately using trammels, templates, and geometric methods • Establish correct wall dimensions, including height, length, and curvature • Mix and apply mortar to specified quality and consistency • Lay first course level and aligned with the curve set-out • Construct curved walls maintaining bonding pattern, gauge, and alignment with consistent joints • Form serpentine and circular wall shapes using accurate cutting and placement techniques • Cut and shape bricks where required to maintain uniform joint spacing • Finish joints to specified profile and clean brick and block surfaces • Apply finishing techniques such as raking or ruling joints and cleaning surfaces to achieve required finish • Ensure work meets required tolerances and quality standards • Clean up work area and dispose of, reuse, or recycle materials according to environmental procedures • Maintain and store tools and equipment in safe and serviceable condition • Apply finishing techniques and ensure compliance with Tonga National Building Code. • Carry out clean-up and maintenance of tools, equipment, and work area
Learning Outcome 1 (LO1)	Prepare and organise work to construct brick and block curved walls
Performance standards	1.1 Read, interpret and apply curved wall construction requirements from plans, specifications, standards and codes; 1.2 Follow requirements in workplace safety and environmental procedures; 1.3 Calculate material quantities required for the task; 1.4 Determine job priorities and sequence job tasks in consultation with others on site; 1.5 Identify potential hazards and determine and implement control measures; 1.6 Select and use personal protective equipment (PPE) appropriate for job; 1.7 Select equipment and tools and report damage or faults; 1.8 Check conformity of materials against the specifications and place materials in preparation for work.
Learning Outcome 2 (LO2)	Set out and lay brick and block curved wall

Performance Standards	2.1 Identify wall shape from job drawings and calculate curve using geometry; 2.2 Locate and set out curved wall using a trammel. 2.3 Set out wall length and height maintaining brickwork gauge and bonding pattern; 2.4 Mix mortar quality and consistency to job specifications; 2.5 Lay first course level and in line with curve set out; 2.6 Lay wall maintaining gauge, bonding pattern and alignment with vertical face maintaining a constant 'V' shape perpend joint; 2.7 Remove mortar residue and rake or rule joints to specified profile and depth; 2.8 Brush down face brickwork prior to mortar drying.
Learning Outcome 3 (LO3)	Set out and lay brick and block serpentine wall
Performance standards	3.1 Identify wall shape from job drawings and calculate curves using geometry; 3.2 Locate and set out serpentine wall curves using trammel heads and trammel arm; 3.3 Set out length and height of wall maintaining brickwork gauge and bonding pattern; 3.4 Mark and cut required bricks to maintain equal perpend joints; 3.5 Lay bricks to curve set out, maintain bonding pattern, gauge and alignment with vertical face; 3.6 Remove mortar residue and finish jointing to meet the current industry standards.
Learning Outcome 4 (LO4)	Clean up curved wall work area
Performance standards	4.1 Clear the work area and dispose waste following environmental requirements; 4.2 Clean tools and equipment; 4.3 Check for serviceability and report damage or faults; 4.4 Store and secure tools and equipment following workplace procedures.
Pre-requisites	NS133-03 Apply <i>Occupational Health and Safety</i> (OHS) requirements, policies and procedures
Co-requisites	N/A

Underpinning skill and knowledge

The following skills and knowledge underpin this unit standard:

Skills:

Work Planning and Preparation

- Selecting, fitting and using appropriate PPE.
- Reading, interpreting and applying curved wall construction requirements from plans, specifications, standards and codes.
- Identifying hazards and applying safety and environmental procedures.
- Sequencing tasks and organising work activities with others on site.
- Checking tools, equipment and materials for compliance and serviceability.

Geometry and Setting-out

- Calculating material quantities using measurements and formulas.
- Using geometry to calculate curve parameters (radius, arc length, rise).
- Setting out curved and serpentine walls using trammels, trammel arms and plotted points.

Construction Techniques

- Mixing mortar to correct quality and consistency.
- Laying bricks to curved set-outs while maintaining gauge, bonding pattern, alignment and correct perpendicular joints.
- Cutting bricks to maintain equal joints in serpentine walls.
- Raking, ruling or finishing joints to required profiles.
- Finishing curved and serpentine walls to required height, radius, rise and tolerances.

Technology and Communication

- Using digital tools and devices to source job information and communicate.

Workplace Housekeeping

- Cleaning work areas and managing waste responsibly.
- Cleaning, maintaining and storing tools and equipment.

	<u>Knowledge:</u> Materials Selection • Characteristics, applications and limitations of materials used in curved wall construction. Construction Techniques • Techniques for calculating and setting out curves of various sizes. • Construction methods for curved and serpentine walls. • Use of geometry, measurements and formulas for calculating quantities and curve properties. • Facets generated in curved walls and factors affecting stability, accuracy and aesthetics. • Bonding patterns, movement joints and wall types relevant to curved walls. Terminology and Documentation • Construction terminology associated with curved wall construction. • Features and interpretation of working drawings and specifications. Tools and Equipment • Operational features of plant, hand tools and power tools used in curved wall construction. Occupational Health and Safety • Job Safety and Environmental Analysis (JSEA). • Hazardous manual handling. • Exposure to silica and loud noise. Regulatory and Environmental Requirements • Relevant standards for constructing curved walls. • Key National Building Codes requirements relating to curved masonry wall construction. • Environmental and waste management requirements associated with construction.
Assessment requirements	<u>Assessment methods</u> may include more than one of the following: Direct Observation Assessment of learners while they are performing tasks in real time in a real simulated environment.

	• The learner performs practical tasks. • The assessor watches the learner complete these tasks against a checklist or performance standards. Assessor Requirements • Use a structured observation checklist aligned to performance standards • Observe multiple occasions to ensure consistency of competence. • Record evidence of safe work practices, correct use of equipment, etc. • Provide immediate feedback where appropriate. • Ensure conditions reflect real workplace standards. Oral Questioning Verbal questions asked to assess the learner's understanding of knowledge and reasoning. • Conducted during or after practical tasks. • Can be structured (planned questions) or informal (follow-up probing). Assessor Requirements • Ask questions that test underpinning knowledge • Use open-ended questions • Confirm learner understanding where practical performance is not enough. • Record responses clearly (notes or checklist). • Adjust language to suit learner literacy levels. Written Test A structured assessment requiring learners to provide written responses. • Short-answer questions, multiple choice, or case scenarios. • Typically conducted off-site or in a classroom environment. Assessor Requirements • Design questions that assess knowledge. • Ensure the test is clear, aligned to unit requirements and appropriate for language, literacy, numeracy levels • Mark responses using a marking guide or model answers. • Provide feedback and identify gaps in knowledge. • Ensure results reflect the learner's independent performance.
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	Work-Based Activity Assessment conducted in a real workplace while the learner performs actual job tasks. • Learners complete normal workplace duties. • Evidence is collected over time. Assessor Requirements • Coordinate with workplace supervisors. • Gather evidence such as - Observation reports, Supervisor feedback, etc. • Verify that tasks meet unit performance standards. • Ensure authenticity (learner's own work). • Confirm competence across different situations and timeframes. Assessment should use a combination of the above methods to ensure sufficient, valid, authentic, and current evidence of competence in both skills and knowledge, in line with unit requirements. <u>Context of Assessment:</u> Competency is to be assessed in the workplace or a simulated workplace environment that accurately reflects a real workplace setting. Assessment is to comply with relevant regulatory or relevant standards' requirements. Assessment of essential knowledge will usually be conducted in an off-site situation.
Moderation arrangements	1. Training providers must have their own moderation system approved by TNQAB before accreditation is granted: a) Relevant internal moderation processes are documented; b) Assessment is planned for each unit, and moderation processes are integrated into such plan. 2. Unless specified elsewhere, external moderation is conducted by the National Qualifications unit of TNQAB for all unit components of a national qualification: a) Samples of assessed activities are submitted for moderation; b) Moderation (external) forms are available on request.
Resource requirements	1. Power point presentations

	2. Trainer's Guide 3. Learner's Guide 4. Tonga National Building Code 5. Videos on brick or block curved wall construction 6. Plans and Specifications 7. Clay bricks and concrete blocks 8. Mortar materials (cement, sand, lime, water) 9. Additives for mortar (plasticisers, bonding agents) 10. Cleaning materials (e.g., acid solution for masonry cleaning) 11. Trowels 12. Brick hammer 13. Bolster 14. Jointing tools 15. Tape measures 16. Levels (spirit level) 17. Squares 18. String lines and line pins 19. Bricklayers' profiles 20. Set-out rods or brickies' tape 21. Mixing equipment (manual or mechanical mixer) 22. Hand and power tools (including battery-operated tools) 23. PPE's 24. Site safety signage and barriers 25. JSEA (Job Safety and Environmental Analysis) 26. Structured assessment and evidence-collection tools 27. Trammel 28. Calculator (standard: fx82 and fx100)
Requirements to complete this unit	There are four (4) Learning outcomes and twenty-six (26) Performance Standards to measure competence. To demonstrate competence, the person studying this unit is: a. Required to demonstrate all LOs to the expected standards; b. Required to attain an Achieved Grade (Competent) to fulfil the requirements of the Unit Standard;

	c. Eligible to three (3) attempts to achieve the required competency within 14 days of the first attempt. Failure to achieve the required competency after three (3) attempts on the specific part of the assessment will require the person studying this Unit to re-enrol for the same Unit.
Important notes and definitions	<u>Notes:</u> 1. All training and assessment activities must be in accordance with Tonga National Building Code. 2. Assessors must comply with the Tonga national assessment and moderation requirements. <u>Definitions:</u> 1. <i>Bonding pattern</i> refers to the pattern in which bricks are laid to ensure strength and stability. 2. <i>Brickwork Tolerances</i> refer to acceptable limits of variation in masonry work 3. <i>Capping</i> refers to the finishing material applied to the top of a wall for protection and appearance. 4. <i>Curve Set-Out</i> refers to the process of marking out a curved path using geometric methods and tools. 5. <i>Curved Wall</i> refers to the wall constructed to follow a circular or varying curved path rather than a straight alignment. 6. <i>Faceting</i> refers to the appearance of flat surfaces forming a curve when bricks are laid in straight segments. 7. <i>Gauge</i> refers to the vertical spacing of brick courses to maintain consistent height. 8. <i>Hierarchy of Control</i> refers to system used to minimise workplace hazards, ranked from elimination to PPE. 9. <i>Jointing</i> refers to finishing the mortar joints to a specified shape and depth for structural and aesthetic purposes. 10. <i>JSEA (Job Safety and Environmental Analysis)</i> refers to risk assessment process. 11. <i>Level</i> refers to perfect horizontal alignment 12. <i>Line</i> refers to straight alignment along a length

13. *Loadbearing Wall* refers to a wall that supports structural loads from floors, roofs, or other elements.
14. *Mortar* refers to mixture used for bonding masonry units.
15. **OHS (Occupational Health and Safety)** refers to workplace safety regulations and practices.
16. *Perpend Joint* refers to the vertical joint between bricks; in curved walls, often forms a 'V' shape to follow the curve.
17. *Plumb* refers to perfect vertical alignment
18. *PPE* (Personal Protective Equipment) refers to safety equipment such as helmets, boots, gloves, and high-visibility clothing.
19. *Profile* refers to a temporary vertical support used to guide accurate bricklaying and maintain alignment.
20. *Radius* refers to the distance from the centre point of a curve to its outer edge.
21. *Raking joints* refers to removing mortar to create joint profile.
22. *Residue* refers to removing of unwanted mortar.
23. *Serpentine Wall* refers to a wall with alternating curves, creating a wave-like pattern that provides structural stability with minimal thickness.
24. *Setting-Out Instruments* refer to tools used to measure and align structures (e.g., tape measures, spirit levels, automatic and laser levels)
25. *Silica dust* refers to hazardous dust produced during cutting masonry materials.
26. *Template* refer to a guide used to assist in setting out or maintaining a consistent curve shape.
27. *Tonga National Building Code* refers to a set of technical provisions for the design and construction of buildings and structures in Tonga.
28. *Trammel* refers to a tool used to mark arcs or circles by rotating around a fixed point.
29. *Work area* refers to the particular section where tasks are performed at the work site.

Public comments on unit

Please contact TNQAB National Qualifications Unit (email EnquireNQ@tnqab.to or Telephone 28136) if you like to discuss or suggest changes to the details of this unit.