SECTION 620 - PRECAST CONCRETE UNITS

~~##This section cross-references Sections 610, 611 and 614.~~
~~If any of the above sections are relevant, they should be included in the specification.~~
~~If any of the above sections are not included in the specification, all references to those sections should be struck out, ensuring that the remaining text is still coherent:~~

620.01 GENERAL

This section covers the manufacture, storage, handling and delivery of precast concrete units.

Concrete for these units shall be in accordance with Section 610 'Structural Concrete' and reinforcement shall be in accordance with Section 611 'Steel Reinforcement'.

620.02 FORMS

Forms shall be manufactured from steel, except where otherwise approved by ~~the Superintendent~~ Council.

The formwork shall be constructed so as to produce the finished concrete to the shape, lines and dimensions shown on the drawings, and in accordance with the surface finish and tolerances specified in Section 610 'Structural Concrete'.

Void formers shall be securely restrained in position vertically against the action of placing concrete and subsequent flotation under vibration. The void former shall likewise be laterally restrained against forces arising from differential pressures during placing of concrete. Void formers shall comply with the requirements of Section 614.

The use of wires or bolts extended to the surface of the concrete will not be permitted except where shown on the drawings. Any embedded ties shall remain embedded and shall terminate not less than the specified concrete cover. All recesses shall be filled in accordance with the surface finish provisions of Section 610.

620.03 REMOVAL OF UNITS FROM FORMS

Individual precast units with mass of five tonnes or less shall have a minimum concrete compressive strength of 10 MPa for removal of units from forms. For individual precast units of mass greater that five tonnes, the minimum concrete compressive strength shall be 20 MPa for removal of units from forms.

Lifting of precast units at a minimum concrete compressive strength other than that specified in this clause shall be supported with structural calculations and maturity testing for estimating the in situ strength of concrete in accordance with the requirements of Clause 610.16(l). The structural calculations shall be certified by an Engineer who has qualifications admitting to Corporate Membership of the Institution of Engineers, Australia, with a minimum of five years experience in structural design.

620.04 PROJECTING REINFORCEMENT

Where shown on the drawings, steel reinforcement shall be left projecting for the purpose of bonding on subsequent work. Care shall be taken to avoid disturbing the bars during the specified period for curing of the concrete. Projecting reinforcement which has been damaged or dislodged or which is loose in the concrete will be cause for rejecting of the units.

Continuity bars shall be positioned within 3 mm of the positions shown on the drawings. The relative deviation of any two bars cross sections, taken at right angles to the longitudinal centreline of the unit over the projecting length of bar, shall be within 3 mm.

620.05 SOLE PLATES AND BEARING RETAINERS

Material for sole plates and bearing retainers shall be of structural grade steel complying with the requirements of AS 3678. All surfaces and edges of sole plates shall be finished smooth and bearing surfaces shall have a maximum out of flatness of 0.4 mm unless otherwise specified on the drawings. Prior to galvanizing, the surface finish on edges shall be equivalent to a Class 1 flame cut surface as specified by the Australian Welding Research Association. Welding shall comply with the requirements of AS/NZS 1554, Part 1.

Unless otherwise specified, steel sole plates shall be galvanized in accordance with the requirements of AS/NZS 4680. The minimum mass of zinc coating shall be 0.6 kg/m2 of surface.

Sole plates shall be set to the required grades shown on the drawings, or as specified by ~~the Superintendent~~ Council. They shall be arranged so that the bearing surfaces are at right angles to the vertical axis of the unit.

620.06 MARKING

The identification number, date of casting, the manufacturer's name or registered mark and the maximum mass shall be marked on every precast unit.

Temporary identification shall be made on the top surface of the unit near an end, except for parapet units. Final marking shall be made by indelible marking material, using letters approximately 40 mm high.

For parapet units, temporary identification shall be made on the broomed surface of the parapet as shown on the drawings. Final markings shall be made on one end of each unit.

Piles shall be marked and numbered at 500 mm increments starting from the toe with an indelible marking material.

620.07 HANDLING AND STORAGE

Units shall not be stored in areas subject to flooding.

Units shall not be stored within 10 m of existing or proposed overhead power or telephone lines, or over service conduits, drainage pipes or uncompacted fill.

The units shall be supported on bearers clear of the ground. Bearers shall support the units over their full width and be placed perpendicular to the longitudinal axis of the unit. Unless specified otherwise, bearers shall be placed beneath the specified or approved lifting points clear of any sole plates. The ground or space between the bearers supporting the units shall be carefully cleared and levelled so as to prevent the unit from being supported other than on the bearers. The bearers shall rest on a firm foundation, and adequate precautions shall be taken to prevent subsidence from occurring and to prevent the units bearing other than at the specified support positions.

Any units damaged or distorted in excess of the specified tolerances prior or during installation shall be replaced at the Contractor's expense.

Where the method of handling and supporting is not specified, the Contractor shall submit, for review by ~~the Superintendent~~ Council, details of ~~his~~ its proposals 14 days prior to lifting and supporting the units.

Unless otherwise specified, precast units shall be lifted using the lifting points provided and supported with the top surface uppermost at all times. The angle subtended by the slings and the longitudinal axis of the unit shall be not less than 60°.

Beams shall be stored and handled with webs vertical at all times.

All beams shall be laterally supported. The lateral bracing shall be designed for 10% of the dead load of the beam at the mid height of the beam.

Beams and parapet units shall not be stored in stacks.

Slabs, planks and piles may be stored in separate stacks of identical units up to a maximum height of 2 m, or two units high, whichever is greater. Crown units may be stored in separate stacks of identical units up to a maximum height of 3 m. The upper layers shall be separated from the lower layers by suitable timber bearers in line vertically at the specified supporting points. Timber supports for upper layers shall be placed directly above the supports of the layer below.

620.08 TRANSPORTING

Units shall not be transported from the precast yard until specified 28 day concrete compressive strength has been achieved, and not before 7 days after casting.

Units shall be securely fixed to the transporter and provision shall be made to protect the units from damage caused by lashings.

During transport of beam units the Contractor shall provide end bracing and, if necessary, top flange bracing. Bearings and supports shall allow for longitudinal rotation of the unit in transport and have adequate width and bearing capacity.

No beam shall be transported and erected if it has a bow in excess of 1 in 400 of the length or 75 mm whichever is the lesser. Should the bow at any time exceed the maximum allowable limit steps shall be taken to ensure the safety of the unit throughout the journey.

620.09 TRACEABILITY OF PRECAST CONCRETE UNITS

All manufactured precast concrete units shall be traced from the completion of manufacture to their final location by a unique identification number.