PART CC30

PRECAST CONCRETE UNITS

CONTENTS

[1. GENERAL](#_Toc484078916)

[2. QUALITY REQUIREMENTS](#_Toc484078917)

[3. MANUFACTURE](#_Toc484078918)

[4. CURING](#_Toc484078919)

[5. MARKING](#_Toc484078920)

[6. LIFTING, HANDLING AND STORAGE](#_Toc484078921)

[7. TRANSPORTATION](#_Toc484078922)

[8. SPECIFIC REQUIREMENTS FOR PRECAST PRESTRESSED UNITS](#_Toc484078923)

[9. HOLD POINTS](#_Toc484078924)

GENERAL

This Part specifies the requirements for the manufacture of precast concrete units.

The units must be manufactured in accordance with Part CC05 "Steel Reinforcement", Part CC10 "Formwork" and Part CC20 "Supply of Concrete" and Part CC25 “Placement of Concrete” except where amended or added to in this Part.

When prestressed, the units must comply with Part S24 "Pre-tensioned Concrete" and Part S25 "Post-tensioned Concrete" as applicable.

QUALITY REQUIREMENTS

At a minimum, the Contractor’s Quality Plan must include the following documents, procedures and/or instructions:

lifting methods (where not shown on the drawings);

minimum concrete strength requirements prior to lifting (where not shown on the drawings); and

where it is proposed to stack units, evidence to demonstrate the strength and stability of the stack.

If not submitted beforehand, this documentation must be submitted at least 28 days prior to the commencement of site work.

Provision of the procedures listed in this Clause shall constitute a **hold point.**

MANUFACTURE

Formwork must be of rigid construction and concrete vibration must be such that intense concrete compaction will be achieved. This may require the use of form vibrators or vibrating tables on some large and/or complex shaped units.

Formwork and embedded items must not restrain movements nor damage precast units within the formwork due to the effects of shrinkage or steam curing. The Principal encourages the use of water based mould release agents.

The casting of the precast units must be carried out on specially prepared casting beds which will prevent any distortion or misalignment of the forms during and after concreting. Each precast unit must be cast in one continuous operation with no construction joints.

If the batch volume is less than 2 cubic metres, the sampling rate in Clause CC20.5 "Sampling and Testing" must be reduced as follows:

Less than 2 cubic metres per batch: 50% rounded up

Less than 0.5 cubic metres per batch: 30% rounded up.

In any case a minimum of 1 test representing each member must be undertaken. Test specimens, for the purpose of determination of adequate unit strength for lifting and handling, must be subjected to the same curing regime as the unit they represent. The Contractor must ensure that sufficient cylinders are provided to enable the required testing to be undertaken.

CURING

Concrete must be:

moist cured in accordance with Part CC25 "Placement of Concrete";

steam cured in accordance with Part CC35 "Low Pressure Steam Curing of Precast Units"; or

hot water cured in accordance with Part CC36 "Heat Accelerated Curing”.

MARKING

For the purposes of unit curing, testing, location and orientation within the final structure, each batch of units, or if continuous production methods are used, each day’s production, must be clearly identified and indelibly marked to show:

unit identification

date of manufacture.

Each unit must be marked on a surface which is unseen in the final structure.

LIFTING, HANDLING AND STORAGE

Precast units must not be lifted or handled before the concrete has attained a compressive strength of 10 MPa or as specified on the drawings, whichever is greater.

The Contractor must detail in the Quality Plan the measures to be taken to minimise handling stresses, in particular those due to demoulding.

The Contractor must carefully handle precast units by methods that will not damage them or their connections. Units must be handled from the approved lifting points shown on the drawings. Beams and slabs must be lifted and supported with the top surfaces uppermost at all times, unless shown otherwise on the drawings.

Units must be stored clear of the ground and supported on non-staining timber bearers only at approved bearing points. The thickness and width of the bearers must be compatible with the strength group of the timber used, the type of precast unit and the site. The bearers must support the units over their full width at the specified lifting points. The ground or space between the bearers supporting the units must be carefully cleared and levelled to prevent the unit from being supported at positions other than on the bearers. The bearers must rest on a firm foundation and adequate precautions must be taken to prevent subsidence.

If units are stacked in tiers, the bearers must be placed directly over each other. The lowest unit must not be overstressed.

TRANSPORTATION

Unless stated otherwise on the drawings, units must not be transported until the concrete has reached its 28 day characteristic compressive strength and is at least 7 days old*.* Additional requirements are specified for post-tensioned units in Part S25 “Post-tensioned Concrete”.

No unit must be removed from the casting yard until a lot conformance package has been completed.

Submission of the lot conformance package prior to removal from the yard shall constitute a **HOLD POINT**.

Units must be securely fixed to the transporter by ties fitted with suitable tensioners. Provision must be made to protect the units from damage caused by these ties.

SPECIFIC REQUIREMENTS FOR PRECAST PRESTRESSED UNITS

The hog of the units be as uniform as practicable. The Contractor must ensure that:

the concrete in the units is uniform in composition, consistency, compaction and strength;

the curing conditions are as uniform as practicable;

the concrete in each unit is approximately the same age when prestressed; and

the units are cast within as short a period of time as is reasonably practicable.

The units must comply with the following tolerances:

|  |  |
| --- | --- |
| **PROPERTY** | **MAXIMUM PERMISSIBLE VALUE** |
| Twist: | 1/2° per length of unit |
| Variation in hog between units: | 20 mm |
| Deviation from the specified profile in the horizontal plane: |  7 mm or  0.06% of the length of the unit, whichever is the greater |

Refer to Part S24 “Pre-tensioned Concrete” for requirements for cutting of tendons.

HOLD POINTS

The following is a summary of Hold Points referenced in this Part:

|  |  |  |
| --- | --- | --- |
| **CLAUSE REF.** | **HOLD POINT** | **RESPONSE TIME** |
| 2.3 | Submission of Procedures. | 7 days |
| 7.3 | Completion of lot conformance package prior to transportation. | 6 hours |

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