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SUPPLY AND INSTALLATION OF VOID FORMERS

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IC-DC-B170
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FOREWORD

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BASE SPECIFICATION

This document is based on Specification RMS B170 Edition 4 Revision 0.
RMS SPECIFICATION D&C B170
SUPPLY AND INSTALLATION OF VOID FORMERS

1 GENERAL

1.1 SCOPE

This Specification sets out the requirements for the supply and installation of the following formers
for the purpose of forming voids in concrete members:

(a) Prefabricated formers, including associated end caps and anchorages, for circular voids.

(b) Solid formers made of a light weight material, including associated anchorages, for voids with
irregular shapes.

1.2 STRUCTURE OF THE SPECIFICATION

This Specification includes a series of annexures that detail additional requirements.

1.2.1 Schedules of HOLD POINTS and Identified Records

The schedules in Annexure B170/C list the HOLD POINTS that must be observed. Refer to
Specification RMS D&C Q6 for the definition of HOLD POINTS.

The records listed in Annexure B170/C are Identified Records for the purposes of RMS D&C Q6
Annexure Q/E.

1.2.2 Referenced Documents

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 2350). For
convenience, the full titles are given in Annexure B170/M.

1.3 INFORMATION TO BE SUPPLIED BY CONTRACTOR

1.3.1 PROJECT QUALITY PLAN

Submit as part of the PROJECT QUALITY PLAN, a full technical description of the proposed
former, including its development and use, material, form of construction and method of installation.

The PROJECT QUALITY PLAN must include details of the proposed concreting operation,
including type and spacing of anchors or supports, maximum pressure head and maximum height
differential between the two sides of the former. These values must be consistent with the most
adverse conditions which could exist during the actual concreting operation.

1.3.2 Manufacturer's Certificate

Obtain a certificate from the manufacturer to show that the former is capable of withstanding the
pressures and conditions proposed in the PROJECT QUALITY PLAN.
1.3.3 Certification

Prefabricated formers must be held down by anchors.

Calculations in support of your proposed anchor or support arrangement must be carried out and certified as complying with Clause 5.3.1 by an Engineer who is eligible for Corporate Membership of Engineers Australia.

**HOLD POINT**

<table>
<thead>
<tr>
<th>Process Held:</th>
<th>Placing of concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submission Details:</td>
<td>Calculations in support of the Contractor’s proposed anchor or support arrangement at least two (2) weeks prior to placement of concrete.</td>
</tr>
<tr>
<td>Release of Hold Point:</td>
<td>The Nominated Authority will consider the submitted documents prior to authorising the release of the Hold Point.</td>
</tr>
</tbody>
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2 MATERIAL REQUIREMENTS

2.1 GENERAL

Formers and end caps, if any, must consist of material that is:

(a) non-absorbent and impermeable and is not softened or otherwise altered physically or chemically by contact with moisture and cement;

(b) dimensionally stable and retains its physical properties over the following ranges of temperature:

(i) normal curing: −5°C to 50°C
(ii) steam curing: −5°C to 80°C;

(c) of sufficient strength and toughness to withstand handling during transport, storage, installation and placing of concrete, including bruising from concrete vibrators, without detrimental damage;

(d) suitably formulated so as not to cause staining or discolouration from moisture discharged from the formers;

(e) resistant to fire.

2.2 PREFABRICATED FORMERS AND END CAPS

For prefabricated formers and end caps, detrimental damage shall mean holes, cracks or sprung seams causing leaks, and dents or depressions sufficient to cause local instability of the former under pressure from wet concrete.

Prefabricated formers and end caps may have a protective coating, which must not be altered physically or chemically by contact with moisture and cement.
2.3 **SOLID FORMERS**

The minimum requirement for solid formers is a rigid cellular polystyrene complying to Class S of AS 1366.3 and coated with a minimum 2 mm thick rapid curing, solventless, aromatic urethane coating or approved equivalent.

For solid formers, detrimental damage shall include holes, dents and cracks.

3 **(NOT USED)**

4 **FABRICATION REQUIREMENTS**

4.1 **GENERAL**

Fabricate the formers to achieve, after concreting the specified dimensions, levels and alignment of the completed Project Works and within the specified tolerances, making due allowances of any deflections of the formers which may occur before and during concreting.

4.2 **PREFABRICATED FORMERS AND END CAPS**

4.2.1 **Tolerance**

Fabricate prefabricated formers to the following tolerances:

(a) outside diameter must be accurate to within $+2$ mm to $-3$ mm; and

(b) overall length, with end caps in place, must be accurate to within $+0$ to $-20$ mm.

4.2.2 **Measurement of Dimensions**

Measure the outside diameter to the outer surface of the prefabricated former away from any seams or stiffening ribs.

4.2.3 **Surface Profile**

The outer surface of the prefabricated former must be free of any projections or ridges.

Form any stiffening ribs in such a way as to project inwards, with the outer surface of the former between the ribs forming a smooth cylinder. The depth of such stiffening ribs must not exceed 20 mm.

4.2.4 **Seams**

Seams in prefabricated formers must be:

(a) watertight;

(b) recessed to present a smooth outer surface; and

(c) mechanically overlocked when fabricated from spirally-wound strip material.
4.2.5 End Caps

End caps must overlap the former by minimum 20 mm. The joint must be sealed and watertight.

4.2.6 Drains

Unless shown otherwise on the Design Documentation drawings, provide each prefabricated former with a UPVC drainpipe at each end. Where a former is curved vertically, provide additional drains at all other low points of the former soffit. Provide an additional drain on each side of a joint in a prefabricated former.

Unless shown otherwise on the Design Documentation drawings, the drain must be a minimum of 50 mm inside diameter and must be perpendicular to the bridge soffit and, unless otherwise shown on the Design Documentation drawings, extend 10 mm below the soffit of the member.

Extend drains through the former soffit and finish flush with the internal surface of the former.

4.2.7 Damaged Materials

Do not use in the Project Works prefabricated formers and end caps, which are dented, otherwise damaged or exhibiting signs of corrosion.

4.3 SOLID FORMERS

4.3.1 Tolerance

Fabricate solid formers to the following tolerances:

(a) outside dimensions must be accurate to within $+2$ mm to $-3$ mm;
(b) diagonal dimensions must be accurate to within $+3$ mm to $-3$ mm;
(c) overall length must be accurate to within $+0$ to $-20$ mm; and
(d) horizontal bow must be within the greater of 0.06% of length or $\pm 8$ mm.

4.3.2 Surface Profile

The outer surface of the solid former must be free of any projections or ridges.

4.3.3 Damaged Materials

Solid formers, which are cracked, spalled and porous must not be used in the Project Works.

5 INSTALLATION REQUIREMENTS

5.1 General

Secure formers in position so that:

(a) the tolerance on position of the former at any location is $\pm 7$ mm;
(b) uplift caused by buoyancy is resisted without distortion of the former;
(c) joints between former segments are watertight;
(d) deflection under buoyancy effects does not exceed 3 mm; and
(e) there must be no significant local deformation and movement of the former during and after concreting operations.

5.2 JOINTS IN FORMERS

Minimise the number of joints in formers.

If the length of void required is too large to be satisfied by a single former, joints will be permitted if constructed as follows:

(a) form joints by butting two lengths of former;
(b) provide anchors or supports on each side of the joint at a distance from the joint not greater than 100 mm;
(c) for prefabricated formers, provide a stiff sleeve around the joint to prevent relative lateral displacement of the formers; fabricate such sleeve from a material similar to, and with a wall thickness not less than, that of the formers, and must have an internal corrugation on its circumference complying with Clause 4.2.3 to maintain the sleeve central to the joint;
(d) for solid formers, butt the joining ends so that the gap does not exceed 1mm and provide a stiff sleeve around the joint to limit the relative lateral displacements of the former ends to 1mm, with the sleeve being recessed into the formers so that the external surface of the joint is flush with the former; and
(e) the joint must be watertight.

5.3 ANCHORS AND SUPPORTS

5.3.1 General

Prefabricated formers must be held down by anchors.

Restrain solid formers from lateral movement and uplift by supports at the top and/or sides of the void.

Each anchor or support must be capable of resisting 1.5 times the full buoyancy force calculated on the assumption that the former is fully immersed in plastic concrete producing full hydrostatic pressure and is simply supported between anchors or supports.

Vertical deflection of the anchor or support under the buoyancy force must not exceed 2 mm. In addition, the lateral movement of the former must not exceed 2 mm under 1.5 times the full lateral force of plastic concrete acting on one side of the void.

5.3.2 Prefabricated Formers

Each anchor must consist of a hot dip galvanized steel rod or strip, shaped to closely fit the curve of the former, firmly held down on each side of the former. The two legs of the anchor may be normal to the soffit or splayed apart.

Connect anchors directly to the supporting framework of the soffit formwork.

For pretensioned voided planks, connect anchors directly to the top of the supporting formwork.
Unless stated specifically otherwise on the Design Documentation drawings, keep the anchor clear of any reinforcement by a minimum of 30 mm.

Where bars are used for support, the distance measured along the bar, from the point of contact with the former to the point of contact with the deck reinforcement, must not be less than 150 mm. Galvanize all support bars.

Take effective measures to prevent staining or spalling of the soffit concrete at the anchor positions.

### 5.3.3 Solid Formers

The supports to the solid formers must prevent uplift from buoyancy loads and both lateral and longitudinal movements associated with the concreting operation. Do not connect the supports to the reinforcement. Attach the supports directly to a supporting frame above the former.

Unless stated specifically otherwise on the Design Documentation drawings the supports must be clear of any reinforcement to give a minimum cover of 30 mm.

Take effective measures to ensure that the cover of the reinforcement to the void is maintained at all times during the concreting operation.

Fill the cores on the top surface slab, resulting from removal of the supporting members, with concrete complying with the requirements of the Specification.
ANNEXURES B170/A AND B170/B – (NOT USED)

ANNEXURE B170/C – SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS

Refer to Clause 1.2.1.

C1 SCHEDULE OF HOLD POINTS

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<tr>
<th>Clause</th>
<th>Description</th>
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<tr>
<td>1.3.3</td>
<td>Calculations for anchors or supports</td>
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C2 SCHEDULE OF IDENTIFIED RECORDS

The records listed below are Identified Records for the purposes of RMS D&C Q6 Annexure Q/E.

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ANNEXURES B170/D TO B170/L – (NOT USED)

ANNEXURE B170/M – REFERENCED DOCUMENTS

Refer to Clause 1.2.2.

RMS Specifications

- RMS D&C Q6 Quality Management System (Type 6)

Australian Standards

- AS 1366.3 Rigid cellular polystyrene – Moulded