

FORM 481



GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
Department of Transportation and Works
Highway Design Division

SECTION 481

ROCK EMBEDDED CONCRETE GUTTER

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481.01 SCOPE

This specification covers the requirements for the construction of rock embedded concrete gutter on a prepared bed of granular base course.

The width, length and cross section of the gutter shall be as shown on the drawings.

481.02 MATERIALS

481.02.01 Concrete

Concrete for use in constructing the rock embedded gutter shall conform to the following specific requirements:

CLASS OF CONCRETE	40MPa AT 28 DAYS
AGGREGATE	20mm MAXIMUM SIZE
AIR CONTENT	6% ± 1%
SLUMP	60mm ± 20mm

Where gutter is to be placed on slopes it may be necessary for the concrete to have a slump of 20 mm in order for the wet concrete to stay in the forms while the concrete is setting.

All concrete shall conform with Section 904 "Concrete Structures".

481.02.02 Rock

Stones for embedding in the gutter shall consist of slab shaped clean, hard durable rock, free of cracks. Rock subject to marked deterioration by water or weather will not be accepted.

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The thickness of the individual stones shall not be less than 70 mm or greater than 130 mm and the maximum dimension shall not exceed 250 mm.

481.02.03 Joints

Material for forming isolation joints shall be 12 mm thick bituminous fibre material of depth equal to the depth of the gutter.

Material for forming control joints shall be 12 mm thick bituminous fibre material for the set-in-place type, or a bituminous filler material for the groove or saw-cut type.

All materials including formwork shall be supplied by the Contractor.

481.03 PREPARATION WORK

Should excavation be required prior to placing the bed for the gutter, then such work shall be carried out and paid for in accordance with Section 403 "Excavation for Foundations".

When fill is required prior to placing the bed for the gutter, then this work shall be carried out in accordance with Section 204 "Grading of Fill".

After the site has been graded, as described above, a bed shall be laid composed of Selected Granular Base Course Granular "B", or Granular "A" should the Engineer so require. The bed shall be laid to the lines and grades as staked by the Engineer.

The compacted depth of the bed should not be less than 100 mm. The bed shall be compacted to not less than 95% of the Standard Proctor Density (ASTM D698-78).

481.04 FORMWORK

Formwork shall conform to the requirements of Section 907 "Formwork and Falsework".

Forms shall be set to provide a gutter of the required cross section, to the grades and lines as staked by the Engineer.

481.05 PLACING THE CONCRETE AND ROCKS

Concrete shall be placed in accordance with the requirements of Section 904 "Concrete Structures".

As soon as the concrete has been placed and consolidated, it shall be struck off true to grade and required cross section by an oscillating movement of a template.

The surface shall then be floated with a wooden float until the mortar flushes to the top, and the entire surface presents a tight and compact appearance and the divisions between each block shall be marked, rounded and tooled with proper finishing tools in the neatest possible manner and to the approval of the Engineer. The jointing tool shall have a radius of 12 mm.

Immediately following finishing, the stones shall be moistened in water and placed in the concrete. The stones shall be placed in the concrete at a spacing as stipulated on the drawings, and with the thickness dimension into the concrete leaving about 20 mm of stone exposed above the concrete. When the stones are pushed into the concrete, any resulting depression in the surface of the concrete next to the sides of the stones shall be filled and trimmed by means of hand work with a trowel, or other suitable tool.

Should the Contractor choose to use the groove or saw-cut type of control joint, as opposed to the bituminous fibre type, then at those places where control joints are to be made, care shall be taken to ensure that no stones are placed in the path of a joint.

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The Contractor shall take care in placing the stones in the concrete to ensure that the exposed parts of the stones are not smeared with concrete. Should stones become smeared during placing, they shall be immediately removed, thoroughly washed and then placed back in the concrete before it sets.

481.06 JOINTS

When the rock embedded concrete gutter is to be constructed abutting another structure such as concrete pavement, concrete sidewalk, concrete retaining wall, or catch basin frame, then the Contractor shall construct a full length isolation joint, of depth equal to the depth of the gutter. When abutting asphaltic pavement no joint is necessary.

Isolation joints shall consist of a 12 mm thick bituminous fibre panel cut to such size so as to provide a full depth joint extending for the full width. The bituminous fibre panels shall be set vertical in the forms before the concrete is poured.

Panels shall be pre-cut to the shape of the joint so as to provide a 6 mm recess on the exposed surface. The Contractor has the option of either providing a 6 mm deep, 12 mm wide cap strip, to be removed after the concrete has hardened and not edging the joints, or carefully removing all concrete immediately above the filler material to form a 6 mm deep, 12 mm wide recess then finishing both edges of each joint to 6 mm radius with a suitable short edging tool.

Control joints shall be placed at intervals of not greater than 6 m.

Control joints may be formed using a 12 mm thick bituminous fibre panel cut to such size so as to provide a joint extending not less than one quarter the depth of the gutter for the full width. The bituminous fibre panel control joints shall be set vertical in the forms before the concrete is poured.

Panels shall be pre-cut to the shape of the joint so as to provide a 6 mm recess on the exposed surface. The methods of obtaining these 6 mm recesses shall be as previously stipulated for isolation joints.

Alternatively control joints may be formed by the use of a "guillotine" knife in fresh concrete or saw cutting the hardened concrete with a sufficient time of placing to prevent uncontrolled cracking. Groove or saw-cut control joints shall be of thickness between 3 and 5 mm, depth not less than one quarter the depth of the gutter, and width the full width of the gutter. When the concrete is dry the control joints shall be completely filled with a bituminous filler material. Immediately prior to the filling, the joint shall be thoroughly cleansed of all dust, and particles of foreign matter.

Construction joints shall be built at convenient stopping places in the placement of the concrete. They may be either butt type or isolation joints and they shall be the full depth and width of the gutter. They shall be built at the end of each day's construction or when there is a delay in the supply of concrete and cold joints might develop.

481.07 CURING THE CONCRETE

Concrete shall be cured in conformity with the requirements of Section 904 "Concrete Structures". Consideration will be given to the use of white pigmented curing compounds applied in accordance with the manufacturer's recommendations.

481.08 TRIMMING

After the removal of the forms and after the initial curing of the concrete, the Contractor shall grade and tamp adjacent other material against the exposed edges of the gutter to form stable shoulders for the gutter. These shoulders shall be made trim to sightly proportions.

481.09 MEASUREMENT FOR PAYMENT

Measurement for payment will be by the length and width as laid according to the instructions of the Engineer and such measurements will be computed into square metres, rounded to one decimal place.

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481.10 BASIS OF PAYMENT

Payment at the contract price for rock embedded concrete gutter shall be compensation for labour, materials and equipment-use to supply and place form work, reinforcing steel, concrete and stones, to construct joints, to provide and place joint filler, to cure the concrete, to remove the forms, to shoulder the exposed edges of the gutter with adjacent other material, and to tamp the other material shoulders of the gutter. Granular base course for providing the bed shall be paid for in accordance with the contract unit price for Selected Granular Base Course Granular "B", or Granular "A" as appropriate, but any additional labour required to place this bed as specified shall be considered compensated for in the contract price for rock embedded concrete gutter.