

# FORM 541



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

## SECTION 541

### PRECAST CONCRETE TRAFFIC BARRIER

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#### 541.01 SCOPE

This item consists of the supply and installation of precast concrete median barrier elements in accordance with the plans and specifications.

#### 541.02 MATERIALS

##### 541.02.01 Concrete

Concrete shall meet the requirements outlined in Section 904 of the Specifications Book. Concrete Structures and shall have a 28 day compressive strength of 40 MPa, with a minimum cement content of 400 kg/m<sup>3</sup>. The maximum size of coarse aggregate shall be 19mm. The entrained air content shall be 6.5% (plus 1% or minus 0.5%). The concrete slump shall be 75mm (plus 12.5mm or minus 50mm).

##### 541.02.02 Welded Steel Wire Fabric

The welded wire fabric shall conform to "Specifications for Welded Steel Wire Fabric for Concrete Reinforcement" (A.S.T.M. A-185).

#### 541.03 CONSTRUCTION

##### 541.03.01 Welded Wire Mesh

The reinforcing steel may be tack welded to the welded wire mesh. The bar cover tolerance for the reinforcing steel shall be plus 12.5mm and minus 6mm.

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Supporting chairs for welded steel wire fabric shall be heavy plastic tipped, approved by the Engineer. The bar cover tolerance of the wire mesh shall be plus 1.5mm and minus 6mm.

### 541.03.02 Forms

Only steel side forms and steel bottom forms shall be used. Forms shall be clean and of a configuration to ensure compliance with the tolerances outlined in this particular specification. Forms previously used shall be thoroughly cleaned of all mortar and foreign material before being re-used. Inside formwork shall be, coated with a commercial quality form varnish or other equivalent coating before concrete is placed which will permit the ready release of the forms and will not discolour the concrete.

The Engineer shall be informed of the time and location of the concrete pour for the precast barrier elements.

### 541.03.03 Curing

Exposed sharp edges shall be chamfered with triangular fillets, 12.5mm by 12.5mm, to prevent mortar runs and to preserve smooth straight lines. Triangular fillets or chamfer strips shall be made of steel, plastic or milled from clear, straight grain lumber planed on the side exposed to concrete.

Curing shall be carried out naturally or artificially accelerated by the use of heat. When curing naturally, the methods outlined under "Curing" in Section 904.05 of the Specifications Book shall be followed.

Forms may be removed and no further curing required when the concrete has obtained 80% of its specified 28 day strength. When curing is artificially accelerated, the following methods shall be used for precast barrier elements.

Immediately after the concrete in each element is placed, the element shall be covered with an approved enclosure. During the initial curing period, which is from 4 to 5 hours after completion of casting, the temperature within the enclosure shall be maintained at approximately 20° C, with a maximum moisture content in the air. The element shall be kept wet by the application of sufficient water at the same temperature as the air within the enclosure. Condensate from steam will be an acceptable source of water.

During the next stage of curing, the temperature within the enclosure shall be raised to a minimum of 40°C and a maximum of 70° C at a rate not exceeding 15°C per hour. This temperature, combined with maximum moisture content in the air, shall be maintained until the required concrete strength is reached. Throughout the curing time, the element shall be kept wet by applying water of the same temperature as the air within the enclosure. Condensate from steam will be an acceptable source of water.

After the required strength has been reached the temperature shall be lowered at a rate of 15°C per hour until the element is at air temperature. The elements shall not be exposed to temperatures below freezing until they have undergone two days of drying in warm temperatures following the above curing. After drying, such elements shall be cooled at not more than 5°C per hour until the outside air temperature is reached.

When forms are removed during the curing period, particular care shall be taken to maintain the required temperature. Steam jets shall be directed so that the steam does not strike directly on the forms or concrete surfaces.

### 541.03.04 Finishing

In general the bottom surface (top surface when pouring) of the precast section shall be a smooth wood float finish.

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The permanently exposed surfaces shall be true, smooth and free from honeycomb. Small surface voids due to entrapped air shall be filled with an approved cement mixture. All ridges occurring at junctions of form panels and all bottom edges shall be ground smooth.

The Engineer's permission must be received before patching any defects other than minor surface imperfections.

### **541.03.05 Tolerances**

The barrier element surfaces shall be true line and dimensions within the following tolerances.

Overall Depth of Elements =  $\pm 5$  mm

Width of Elements =  $\pm 3$  mm

Exposed Element End Deviation from Square (Measured where Element is 762mm in width) Horizontal = 6mm

Exposed Element End Deviation from Square Vertical = 6mm

### **541.03.06 Handling**

Elements shall not be shipped until the concrete in the elements has reached the specified 28 day strength.

Elements shall be stored and transported in the final upright position only and shall be supported on a dry firm base as required by the Engineer.

Elements shall not be placed on other elements unless otherwise approved by the Engineer.

Elements damaged by improper handling, storage or transportation by the Contractor will not be acceptable to the Department of Works, Services and Transportation until acceptable repairs have been made by the Contractor.

### **541.03.07 Installation**

Barrier sections shall be installed at locations as directed by the Engineer. The barrier shall become the property of the Department.

## **541.04 MEASUREMENT FOR PAYMENT**

The quantities to be measured for payment shall be the number of linear metres, rounded to the nearest 0.1 metre, of traffic barrier acceptably built, delivered to the job site and installed according to the plans and specifications.

## **541.05 BASIS FOR PAYMENT**

Payment at the contract price per linear metre of barrier shall be full compensation for all plant, labour, equipment and materials used to construct formwork, supply and place reinforcing steel and wire mesh, supply, place and compact the concrete, cure the concrete, remove formwork, load, transport and unload the barrier at the work site and place the barrier at the line and grade established by the Engineer.