

## **SECTION 660**

### **SUPPLY AND INSTALLATION OF CHAIN LINK FENCE**

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## **660.01 SCOPE**

This specification covers the requirements for the construction of chain link fence of the fabric full height type, with no barbed wire on top. See Form 1213 and Form 1214 for details.

## **660.02 DEFINITIONS**

For the purpose of this specification, the following definitions shall apply:

Fence Post - An upright tubular or fabricated steel member for supporting fencing material.

Line Posts - Fence posts spaced at regular intervals between terminal posts throughout each stretch of fence.

Terminal Posts - Fence posts which include end, gate, corner and straining posts.

End Posts - Fence posts positioned at the ends of a stretch of fence.

Gate Posts - The two fence posts forming a gateway.

Corner Posts - Fence posts positioned at corners, and changes of direction greater than ten degrees.

Straining Posts - Fence posts positioned at changes in grade greater than thirty degrees.

Top Rail - A tubular or fabricated steel section continuously joined by means of sleeves or couplings throughout each stretch of fence extending between terminal posts.

Brace Rail - A tubular or fabricated steel section used for bracing terminal posts.

Bottom Wire - Wire installed at the bottom of the fence and extending through each stretch of fence between terminal posts.

Fittings - Mechanical connections of various designs, shapes and metals to join fence components into an integral structure.

Wire Ties - Wire that is used to tie chain link fence fabric to the line posts, bottom wires and top rails or top wires.

Knuckled - The type of selvage obtained by interlocking adjacent wire ends, in pairs, and then bending the wire ends back into a closed loop.

## **660.03 MATERIALS**

### **660.03.01 Fence Fabric**

The steel wire for chain link fence fabric shall conform to Canadian General Standards Board CAN/CGSB-138.1.

The fabric shall be of the width as specified in the drawings, or as specified in the unit price table. Typical widths are 1200 millimetres and 1800 millimetres.

The chain link fence fabric shall be industrial quality, Type 1 Steel Fabric 9 gauge with galvanized wire mesh. The mesh shall be a uniform 50 millimetre diamond pattern.

### **660.03.02 Line Posts**

Line posts shall be 60.3 millimetre O.D., standard continuous weld schedule 40 galvanized steel pipe, and shall conform to Canadian General Standards Board CAN/CGSB-138.2. The minimum weight per metre shall be not less than 5.45 kilograms. The length shall be 838 millimetres longer than the height of the fabric.

### **660.03.03 End, Corner and Straining Posts**

End and Straining posts shall be 88.9 millimetre O.D., standard continuous weld schedule 40 galvanized steel pipe, and shall conform to Canadian General Standards Board CAN/CGSB-138.2. The minimum weight per metre shall be not less than 11.22 kilograms. The length shall be 1067 millimetres longer than the height of the fabric.

### **660.03.04 Gate Posts**

For gates of up to 2.4 metres in height, the following shall apply for the posts. The length shall be 1067 millimetres longer than the height of the fabric.

Gate posts shall comprise standard continuous weld schedule 40 galvanized steel pipe conforming to Canadian General Standards Board CAN/CGSB-138.2. The length shall be 1067 millimetres longer than the height of the fabric.

For gate posts for use with single gates of span up to 3.6 metres, and double gates of span up to 7.3 metres. The post O.D. shall be 88.9 millimetres. The minimum weight per metre shall be not less than 11.22 kilograms.

For gate posts for use with single gates of span of over 3.6 metres and to up to 4.6 metres, and double gates of span of over 7.3 metres and to up to 9.1 metres, the post O.D. shall be 114.9 millimetres. The minimum weight per metre shall be not less than 15.92 kilograms.

For gate posts for use with single gates of span of over 4.6 metres and to up to 7.6 metres, and double gates of span of over 9.1 metres and to up to 15.2 metres, the post O.D. shall be 168.3 millimetres. The minimum weight per metre shall be not less than 28.3 kilograms.

#### **660.03.05 Top Rails and Brace Rails**

Top Rails and Brace Rails shall comprise standard continuous weld schedule 40 galvanized steel pipe of 42.9 millimetre O.D. with plain ends, conforming to CAN/CGSB-138.2. The lengths shall be random lengths.

#### **660.03.06 Bottom Wire**

The diameter of the wire shall be 5.0 millimetres. The wire shall be zinc-coated with not less than 610 grams per square metre. The mass per unit area of zinc coating shall conform to CSA G162.1.

#### **660.03.07 Gates**

Gates shall be in sizes defined as the distance between the inside faces of the gate posts.

For gates of up to 2.4 metres in height, the gate frames shall be made from 42.9 millimetre O.D. galvanized pipe. Gates shall be constructed from galvanized steel pipe frames and braces, conforming to CAN2-138.4. All joints shall be electrically welded and hot-dip galvanized after welding.

All gates shall be supplied with galvanized malleable iron hinges, latch and latch catch, and shall be capable of opening approximately 180 degrees. Gate latches shall be

suitable for the use of padlocks, which may be attached and operated from either side of the gate.

Gates shall be supplied completely assembled, including the fabric. Gate fabrics shall be similar to adjacent fence fabric.

Double gates shall have a centre rest with iron foot for closed position and chain hold open when open. The double gates shall have braces comprising 33.3 millimetre O.D. galvanized steel pipe.

### **660.03.08 Fittings and Accessories**

All required fittings, accessories, and galvanizing of such material shall conform to CAN2-138.4.

All posts shall be fitted with waterproof galvanized metal caps designed to fit and fasten securely over the posts and carry the top rail in a horizontal position.

Fasteners for attaching fence fabric to posts, bottom wire, and top rail shall be 3.5 millimetre aluminum or galvanized steel wire.

Stretch bars shall consist of 5 millimetre x 20 millimetre galvanized steel.

Stretch bar fastening bands shall be fabricated from 3 millimetre x 20 millimetre galvanized steel or 5 millimetre x 20 millimetre aluminum.

Top rail sleeve couplers shall be galvanized, be of the outside sleeve type, and be at least 178 millimetres in length.

Touch-up paint shall be zinc pigmented paint conforming to CGSB 1-GP-178Ma.

### **660.03.09 Concrete**

Concrete for post holes shall have a compressive strength of at least 15 MPa at 28 days.

## **660.04 CONSTRUCTION**

The fence shall be installed at the location indicated in the drawing, and to the lines designated by the Owner's Representative.

The work shall be carried out in accordance with CAN2-138.3.

#### **660.04.01 Site Preparation**

Prior to the installation of the fence, the Contractor shall remove any debris, and trim and contour the ground to correct ground undulations, so as to obtain a smooth uniform gradient for the fence.

The Contractor shall cut off at ground level, such trees, stumps and brush and remove and dispose of such logs, debris and overhanging branches that would interfere with the installation of the fence.

#### **660.04.02 Post Installation**

Post spacing shall be equal horizontal distances. The spacing shall not be greater than 2400 millimetres. All posts shall be placed in a vertical position and set accurately in line and position, as required by the Owner's Representative.

All posts shall be cut to the required height above the ground so as to present a smooth and uniform profile.

Straining posts shall be installed at equal intervals not exceeding 150 metres. Additional straining posts shall be installed where changes in vertical alignment exceed 30 degrees.

Horizontal deflections in the fence alignment of 10 degrees or more shall be considered as corners, and corner posts shall be installed.

End posts shall be installed at each end.

All posts set in Other Material, or loose rock, or where overburden to solid rock is 450 millimetres or greater, shall be set in concrete footings. The concrete footings shall be domed above ground to shed water.

Concrete footings for line posts shall be at least 250 millimetres wide and at least 1067 millimetres deep.

Concrete footings for terminal posts shall be at least 300 millimetres wide and at least 1220 millimetres deep.

Where the size of the hole exceeds the minimum dimensions of the footings, the Contractor shall; place the footing against undisturbed ground, or shall backfill the hole with suitable Other Material in layers, compact each layer to 95% of Proctor Density, and then excavate the hole to the required minimum dimensions.

For posts in solid rock or where overburden is less than 450 millimetres, holes for the posts shall be drilled in the rock to a minimum depth of 380 millimetres with a diameter 25 millimetres greater than the outside diameter of the post. The annular space around the post shall be filled with non shrink cement grout.

Posts shall be set in the ground so as to give the required height above ground.

Concrete placing, curing and protection from the elements shall conform to the requirements of Section 904

### **660.04.03 Rail, Brace and Gate Installation**

Rails, braces, gates, or fence fabric shall not be placed until the footings have cured a minimum of 5 days.

Top rails shall be fastened securely to line post tops using waterproof line post caps. In sag locations, it may be necessary to drill the post and cap, and fasten with a bolt, to ensure a secure fit.

Install brace rails between all terminal posts and the nearest line post on each side. The brace rails shall be placed in the centre of the panel and parallel to the ground.

Gates shall be installed with the fabric on the side farthest from the roadway, and with the barbed edge at the top. Double gates shall have a steel gate centre rest installed.

Gates shall be installed such that when closed, the bottom of the gates are 40 millimetres above the finished grade.

The Contractor shall perform such grading as may be necessary to ensure that the surface grade, within the required gate sweep area, shall be low enough to permit free movement of the gate.

### **660.04.04 Tension Wire and Fence Fabric Installation**

Install bottom tension wire, stretch tightly to the tension recommended by the manufacturer and fasten securely to terminal posts with turnbuckles and tension bar bands. The fence fabric shall be stretched tight and fastened with tension bars secured to terminal posts. Tension bars shall be secured to terminal posts at 300 millimetre intervals. The fabric shall be installed on the side of the post nearest the roadway, with the barbed edge at the top.

The fabric shall be securely fastened to the line posts, bottom wire and top rail with tie wires. The tie wires shall be placed at 250 millimetre intervals. The tie wires shall be secured with a minimum of two twists.

#### **660.04.05 Paint Touch-up**

Damaged parts shall not be used in the work. However, surface scratches may be painted.

Surfaces to be treated with paint shall be thoroughly cleaned with a wire brush to remove loose and cracked coatings. The scratched area shall be painted with two coats of zinc pigmented paint.

#### **660.04.06 Clean-up**

After fence installation, the Contractor shall clean and trim the site, and restore the ground to a neat condition.

### **660.05 MEASUREMENT FOR PAYMENT**

#### **660.05.01 Total Composite Fence Structure Measurement**

Measurement for payment will be made in units of each; for each completed chain link fencing structure comprising all specified fence fabric, posts and gates, all as specified in the drawings.

#### **660.05.02 Fence Item Measurement**

##### **660.05.02.01 Chain link Fence**

Measurement will be made of the actual length of the fence fabric installed, following the contour of the ground. Gate openings will not be included in this measurement.

The measurement shall be calculated in metres, rounded to one decimal place.

##### **660.05.02.02 Terminal Posts for Chain Link Fence**

Measurement will be made in units for each end post, gate post, corner post, and straining post installed, as required by the Owner's Representative.

##### **660.05.02.03 Gate for Chain Link Fence**

Measurement will be made in units for each type and size of gate installed, as required by the Owner's Representative. The two gates comprising a set of double gates shall be counted as one double gate.



**660.06 BASIS OF PAYMENT****660.06.01 Basis of Payment for Composite Fence Structure**

Payment at the lump sum contract price for the supply and installation of the chain link fence specified in the drawings, shall be compensation in full for all materials, labour and use of equipment: to prepare the fence line for fence installation, to supply all fence posts, fence fabric, rails, wire, gates, fittings and accessories, together with concrete and grout for the footings, to excavate post holes, to install the posts, fence, gates, and fittings according to the drawings, to provide paint touch-up to minor scratches, and to clean up the site on completion of the fence installation.

**660.06.02 Basis of Payment for Fence Items****660.06.02.01 Basis of Payment for Chain Link Fence**

Payment at the contract price for the supply and installation of the chain link fence of the specified height, shall be compensation in full for all materials, labour and use of equipment: to prepare the fence line for fence installation, to supply all line posts, fence fabric, rails, wire, fittings and accessories, together with concrete and grout for the footings, to excavate the line post holes, to install the line posts, fence, and fittings according to the Owner's Representatives requirements, to provide paint touch-up to minor scratches, and to clean up the site on completion of the fence installation.

Payment for the end, straining, corner and gate posts, shall be compensated for separately under terminal posts for chain link fence.

Payment for the supply and installation of gates, if any, will be compensated for separately, under an item for the gates.

**660.06.02.02 Basis of Payment for Terminal Posts**

Payment at the contract price for the supply and installation of the required terminal posts, shall be compensation in full for all materials, labour and use of equipment: to supply the terminal posts of the required height for the fabric, and to supply post caps, and concrete and grout for the footings, to excavate post holes, to install the posts and post caps according to the Owner's Representatives requirements, to provide paint touch-up to minor scratches, and to clean up the site on completion of the post installation.

### **660.06.02.03 Basis of Payment for Gate for Chain Link Fence**

Payment at the contract price for the supply and installation of a chain link fence gate of the specified type, height and gate opening width, shall be compensation in full for all materials, labour and use of equipment: to prepare the gate opening for the gate, to supply the completed gate, hinges, latch, latch catch, and fittings, to install the gate according to the Owner's Representatives requirements, to provide paint touch-up to minor scratches, and to clean up the site on completion of the gate installation.

In the case of a double gate, payment at the contract price for the supply and installation of the gate, shall also include compensation in full for all materials, labour, and use of materials: to supply a centre rest together with concrete and grout for the centre rest footing, to excavate the hole for the centre rest, and to install the centre rest.

Payment for the gate posts, shall be compensated for separately under terminal posts for chain link fence.