



CONSTRUCTION SPECIFICATION FOR CHAIN-LINK FENCE

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541.01 SCOPE

This specification covers the requirements for the installation of chain-link fence.

541.01.01 Significance and Use of Appendices

Appendices are not a mandatory part of this specification unless invoked by the Owner.

Appendix 541-A is a commentary appendix to provide designers with information on the use of this specification in a Contract.

541.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

Ontario Provincial Standard Specifications, Construction

OPSS 904 Concrete Structures

Ontario Provincial Standard Specifications, Material

OPSS 1541 Chain-Link Fence Components

Canadian Standards Association

W59-03 Welded Steel Construction (Metal Arc Welding)

ASTM International

A 780-01 Standard Practice for Repair of Damaged and Uncoated Areas of Hot Dip Galvanized Coatings

541.03 DEFINITIONS

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

Barbed Wire means the twisted longitudinal wires, termed line wires, to which the barbs are attached.

Barbed Wire Arm means the metal arm to support the barbed wire.

Bottom Wire means the wire installed at the bottom of fence and fastened to the bottom of the fence fabric and extending throughout each section of fence between terminal posts.

Brace Rail means a tubular or fabricated steel section used for bracing terminal posts.

Diagonal Brace Wire means the wire used for bracing terminal posts.

End Post means the fence post positioned at the ends of a section of fence.

Fence Post means an upright tubular or fabricated steel member for supporting fencing material.

Fitting means the mechanical connection of various designs, shapes, and metals to join fence components into an integral structure.

Gatepost means a terminal post on each side of a gate forming a gateway.

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

Line Post means the fence post spaced at regular intervals between terminal posts throughout each section of fence.

Selvage means the edge finish on woven chain-link fabric joining pairs of pickets. The selvage may be knuckled or twisted.

Terminal Post means end, gate, corner, and straining posts.

Top Rail means a tubular or fabricated steel section continuously joined by means of sleeves or couplings throughout all sections of fence extending between terminal posts.

Top Wire means the wire installed at the top of fence and extending continuously throughout all sections of fence between terminal posts.

Twisted means the type of selvage obtained by interlocking adjacent wire ends in pairs and then twisting the wire at least two turns with the wire ends above the twist.

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

541.05 MATERIALS

541.05.01 Chain-Link Fence

Fence fabric, posts and rails, diagonal wire braces, top and bottom wires, gates, fittings and accessories, turnbuckles, and barbed wires shall be according to OPSS 1541.

541.05.02 Fasteners

Fasteners for attaching fence fabric to posts, top rails or wires, and bottom wires shall be made with the same material as the fence fabric. However, stainless steel fasteners may be used with any fence fabric.

541.05.03 Concrete

Concrete shall have a nominal minimum 28-Day compressive strength of 20 MPa.

541.07 CONSTRUCTION

541.07.01 Site Preparation

Prior to the commencement of fencing operations, remove any debris and correct ground undulations to obtain a smooth and uniform gradient.

All trees, stumps, and brush along the fence line shall be cut off at ground level and all logs and overhanging branches that would interfere with the erection of the fence shall be removed.

541.07.02 Chain-Link Fence

541.07.02.01 Post Installation

541.07.02.01.01 General

All posts shall be placed plumb and set accurately in line and position.

Posts shall be cut to the required height above the ground to present a smooth and uniform profile.

Line post spacing shall be in equal horizontal distances with a maximum of 3,000 mm between line posts.

All posts shall be fitted with waterproof metal caps designed to fit and fasten securely over the posts. All line post caps shall carry either the top rail or top wire as specified in the Contract Documents.

Corner posts shall be installed at horizontal deflections in the fence line of 10 degrees or more.

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

541.07.02.01.02 Posts On Concrete Barrier

All posts installed on a concrete barrier shall be fastened to the concrete barrier using 12.7 mm Hilti HIT RE 500 anchors using HAS threaded rods or equivalent installed according to manufacturer's specifications with lock washers.

Each post shall be fabricated with a welded steel base plate grade 300 W and according to the Contract Documents. All welds shall be to a low hydrogen classification according to CSA W59-M. Manual electrodes shall be E7015, E7016, or E7018. All welds shall be continuous.

541.07.02.01.03 Concrete Footings

All posts set in earth, loose or friable rock, or where overburden on solid rock is 450 mm or greater shall be set in concrete footings that are rough cast in the ground and domed above grade to shed water and to the dimensions shown in the Contract Documents. Where the size of hole exceeds the minimum dimensions of the footings, place the footing against undisturbed ground or backfill the hole with suitable earth material compacted to a density of 95% of maximum dry density and then bore a hole to the required minimum dimensions.

Concrete placing, curing, and protection from the elements shall be according to OPSS 904.

541.07.02.02 Bracing

A pipe or wire brace shall be placed diagonally across the panel at all end and gateposts. Corner and straining posts shall be supported with diagonal braces placed on both sides of the post. The higher end of the diagonal brace shall be connected at the terminal post.

End fittings for pipe braces shall be secured by a 6 mm bolt placed through the fitting and brace at both ends of the brace.

541.07.02.03 Top Rails, Top Wires, and Bottom Wires

Top rails or top wires shall be installed as specified in the Contract Documents.

Top rails or top wires shall be fastened securely to line post tops using waterproof caps.

In sag locations, drill the post and cap and fasten with a self-tapping screw to ensure a secure fit.

Top rails shall be fastened to terminal posts with centre bands.

Top and bottom wires shall be stretched tight and securely fastened to terminal posts with turnbuckles and centre bands.

One turnbuckle is to be used between terminal posts.

541.07.02.04 Fence Fabric

Fence fabric shall not be installed until the concrete footings have cured for a minimum of 5 Days.

The fabric shall be stretched tight and securely fastened to terminal posts with steel tension bars and steel or aluminum tension bands. The longitudinal axis of the diamond pattern shall be perpendicular to the slope of the top rail.

The fabric shall be placed on the side of the post nearest the roadway with the barbed edge at the top, except that on curves of 50 m or smaller radius, the fabric shall be placed on the side of the post away from the centre of the curve.

The fabric shall be securely fastened to the line posts, bottom wire, and top rail or top wire with wire ties. The wire ties on the top and bottom wire shall have a minimum of two twists. The fabric shall not be fastened to any diagonal braces.

541.07.02.05 Barbed Wire

Barbed wire shall be installed when specified in the Contract Documents. Barbed wire arms to support the barbed wire shall be installed with the arm pointing away from the roadway.

541.07.03 Gates

Gates shall be installed in locations and of the type and size as specified in the Contract Documents.

541.07.03.01 Gate Installation

Gates shall be constructed with the fabric on the side furthest from the roadway with the barbed edge at the top.

All gates shall have a chain hook to hold gates open and double gates shall have a steel gate centre rest with a drop bolt for the closed position.

The surface grade within the required gate sweep area shall be low enough to permit free movement of the gate.

541.07.04 Zinc Coating Repairs

Cut ends, field drilled holes, and damaged areas of hot dip galvanized coatings on galvanized components shall be repaired according to ASTM A 780.

541.07.05 Site Restoration

After fence erection, the site shall be cleaned and trimmed and the ground restored to a neat and original condition existent prior to fencing operations.

541.07.06 Management of Excess Material

Management of excess material shall be according to the Contract Documents.

541.08 QUALITY ASSURANCE

541.08.01 Construction

The Contract Administrator may perform a spot visual inspection to determine conformance with the workmanship, design, and dimensional requirements of this specification.

Failure to conform to the specifications may result in a partial or complete inspection of the installation and removal and replacement of all defective workmanship or materials.

541.09 MEASUREMENT FOR PAYMENT

541.09.01 Actual Measurement

541.09.01.01 Chain-Link Fence

Measurement of chain-link fence is along the contour of the ground for the actual length of fence erected and shall include gate openings.

541.09.01.02 Gates

For measurement purposes, a count shall be made of the gates installed, regardless of the size and type. Double gates shall be counted as one gate.

541.09.02 Plan Quantity Measurement

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clauses under Actual Measurement.

541.10 BASIS OF PAYMENT

**541.10.01 Chain-Link Fence - Item
Gates - Item**

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material required to do the work.

541.10.02 Removals and Replacements

Costs associated with any required removals and replacements of defective workmanship or materials shall be the Contractor's responsibility at no cost to the Owner.

Appendix 541-A, Commentary for OPSS 541, November 2005

Note: This appendix does not form part of the standard specification. It is intended to provide information to the designer on the use of this specification in a Contract.

Designer Action/Considerations

The designer should specify the following in the Contract Documents:

- Locations of top rail or top wire to be used. (541.07.02.01.01)
- Barbed wire locations. (541.07.02.05)
- Gate locations, type, and size. (541.07.03)

The designer should consider the placement of the fence fabric in relation to the post, where the fence is located between two roadways and where snow loading from ploughing operations could separate the fence fabric from the post, e.g., freeway and service road.

The designer should ensure that the Ontario Provincial Standards General Conditions of Contract and the 100 Series General Specifications are included in the Contract Documents.

Related Ontario Provincial Standard Drawings

OPSD 972.101	Fence, Chain-Link, Component - Barbed Wire
OPSD 972.102	Fence, Chain-Link, Component - Gate
OPSD 972.130	Fence, Chain-Link, Installation - Roadway
OPSD 972.131	Fence, Chain-Link, Installation - Concrete Barrier