

PART 1 - GENERAL

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM A 53/A 53M-10, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A 90/A 90M-09, Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
 - .3 A653/A653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM C 618-08a, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
 - .5 ASTM A 123/A 123M-09, Standard Specification for Zinc (Hot Dip Galvanized) coatings on Iron and Steel Products.
- .2 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-138.1-96, Fabric for Chain Link Fence.
 - .2 CAN/CGSB-138.2-96, Steel Framework for Chain Link Fence.
 - .3 CAN/CGSB-138.3-96, Installation of Chain Link Fence.
 - .4 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

1.2 ACTION AND
INFORMATIONAL
SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for concrete mixes, fences, posts and gates and include product characteristics, performance
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1.2 ACTION AND
INFORMATIONAL
SUBMITTALS
(Cont'd)

- .2 Product Data: (Cont'd)
 - .1 (Cont'd)
criteria, physical size, finish and limitations.
- .3 Sustainable Design Submittals:
 - .1 LEED Canada Submittals: in accordance with Section 01 35 21 - LEED Requirements.
 - .2 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.
 - .3 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
 - .2 Submit evidence, when Supplementary Cementing Materials (SCMs) are used, to certify reduction in cement from Base Mix to Actual SCMs Mix, as percentage.
 - .4 Regional Materials: submit evidence that project incorporates required percentage 20% of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.3 DELIVERY,
STORAGE AND
HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
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1.3 DELIVERY,
STORAGE AND
HANDLING
(Cont'd)

- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations.
 - .2 Store and protect fence and gate materials from damage.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 21 - LEED Requirements.
- .5 Packaging Waste Management: remove for reuse or return of pallets, crates, padding, banding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.
 - .1 Compressive strength: 20 MPa minimum at 28 days.
 - .2 Additives: fly ash to ASTM C 618.
 - .3 Recycled content: 10% in accordance with Section 01 35 21 - LEED Requirements.
 - .2 Chain-link fence fabric: to CAN/CGSB-138.1.
 - .1 Fabric: 3.8 mm with 50 mm mesh.
 - .2 Height of fabric: as indicated.
 - .3 Posts, braces and rails: to CAN/CGSB-138.2, galvanized steel pipe. Dimensions as indicated.
 - .4 Tie wire fasteners: galvanized steel wire.
 - .5 Tension bar: to ASTM A 653/A 653M, 5 x 20 mm minimum galvanized steel.
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2.1 MATERIALS
(Cont'd)

- .6 Gate frames: to ASTM A 53/A 53M, galvanized steel pipe, standard weight 45 mm outside diameter pipe for outside frame, 33 and 42 mm outside diameter pipe for interior bracing as indicated.
 - .1 Fabricate gates as indicated with electrically welded joints, and hot-dip galvanized after welding.
 - .2 Fasten fence fabric to gate with twisted selvage at top.
 - .3 Furnish gates with galvanized malleable iron hinges, latch and latch catch with provision for padlock which can be attached and operated from either side of installed gate.
 - .4 Furnish double gates with chain hook to hold gates open and centre rest with drop bolt for closed position.
- .7 Fittings and hardware: to CAN/CGSB-138.2, galvanized steel.
 - .1 Tension bar bands: 3 x 20 mm minimum galvanized steel or 5 x 20 mm minimum aluminum.
 - .2 Post caps to provide waterproof fit, to fasten securely over posts and to carry top rail.
 - .3 Overhang tops to provide waterproof fit, to hold top rails and an outward projection to hold barbed wire overhang.
 - .4 Include projection with clips or recesses to hold 3 strands of barbed wire spaced 100 mm apart.
 - .5 Projection of approximately 300 mm long to project from fence at 45 degrees above horizontal.
 - .6 Turnbuckles to be drop forged.
- .8 Organic zinc rich coating: to CAN/CGSB-1.181.
- .9 Barbed wire: to CAN/CGSB-138.2, 2.5 mm diameter.

2.2 FINISHES

- .1 Galvanizing:
 - .1 For chain link fabric: to CAN/CGSB-138.1 Grade 2.
 - .2 For pipe: 550 g/m² minimum to ASTM A 90.
 - .3 For barbed wire: to CAN/CGSB-138.2.

- 2.2 FINISHES (Cont'd)
- .1 Galvanizing: (Cont'd)
- .4 For other fittings: to
ASTM A 123/A 123M.

PART 3 - EXECUTION

- 3.1 EXAMINATION
- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for fence and gate installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

- 3.2 PREPARATION
- .1 Grading:
- .1 Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts.
- .1 Provide clearance between bottom of fence and ground surface of 30 mm to 50 mm.

- 3.3 ERECTION OF FENCE
- .1 Erect fence along lines as indicated and to CAN/CGSB-138.3.
- .2 Excavate post holes to dimensions as indicated.
- .3 Space line posts 3 m apart, measured parallel to ground surface.
- .4 Space straining posts at equal intervals not to exceed 150 m if distance between end or corner posts on straight continuous lengths of fence over reasonably smooth grade, is greater than 150 m.
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3.3 ERECTION OF
FENCE
(Cont'd)

- .5 Install additional straining posts at sharp changes in grade and where directed by Departmental Representative.
 - .6 Install corner post where change in alignment exceeds 10 degrees.
 - .7 Install end posts at end of fence and at buildings.
 - .1 Install gate posts on both sides of gate openings.
 - .8 Place concrete in post holes then embed posts into concrete to depths indicated.
 - .1 Extend concrete 50 mm above ground level and slope to drain away from posts.
 - .2 Brace to hold posts in plumb position and true to alignment and elevation until concrete has set.
 - .9 Install fence fabric after concrete has cured, minimum of 5 days.
 - .10 Install brace between end and gate posts and nearest line post, placed in centre of panel and parallel to ground surface.
 - .1 Install braces on both sides of corner and straining posts in similar manner.
 - .11 Install overhang tops and caps.
 - .12 Install top rail between posts and fasten securely to posts and secure waterproof caps and overhang tops.
 - .13 Lay out fence fabric. Stretch tightly to tension recommended by manufacturer and fasten to end, corner, gate and straining posts with tension bar secured to post with tension bar bands spaced at 300 mm intervals.
 - .1 Knuckled selvedge at bottom.
 - .2 Twisted selvedge at top.
 - .14 Secure fabric to top rails, line posts and bottom rail with tie wires at 450 mm intervals.
 - .1 Give tie wires minimum two twists.
 - .15 Install barbed wire strands and clip securely to lugs of each projection.
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- 3.4 INSTALLATION OF GATES
- .1 Install gates in locations as indicated.
 - .2 Level ground between gate posts and set gate bottom approximately 40 mm above ground surface.
 - .3 Determine position of centre gate rest for double gate.
 - .1 Cast gate rest in concrete as indicated.
 - .2 Dome concrete above ground level to shed water.
 - .4 Install gate stops where indicated.
- 3.5 TOUCH UP
- .1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two coats of organic zinc-rich paint to damaged areas.
 - .1 Pre-treat damaged surfaces according to manufacturers' instructions for zinc-rich paint.
- 3.6 CLEANING
- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.