Specifications For Manufactured Materials

Section: FENCING PRODUCTS

Subject: CHAIN LINK FENCING

1. SCOPE

1.1. This specification identifies all of the material requirements for the installation of industrial chain link fencing, including all ferrous and aluminum materials; chain link fabrics; posts; post tops; ties; bands; bars; cables and all other necessary fittings and hardware, for the Saskatchewan Highways & Transportation.

2. REFERENCES

2.1. This specification may refer to the following Standards; the latest issues, amendments and supplements shall apply, unless otherwise indicated in the purchasing documents. The following publications may be referenced within this specification:

2.1.1. Canadian General Standards Board (CGSB)

Standard CAN/CGSB-138.1-M - Fence, Chain Link, Fabric
Standard CAN/CGSB-138.4-M - Fence, Chain Link, Gates

2.1.2. American Society for Testing and Materials (ASTM)

Standard A 53 -	Pipe, Steel, Black and Hot-Dipped Zinc-coated Welded and Seamless
Standard A 90 -	Test Method for Weight of Coating on Zinc-coated (galvanized) Iron or Steel Articles
Standard A 121 -	Zinc-coated (galvanized) Steel Barbed Wire
Standard A 569 -	Steel, Carbon (0.15 maximum, percent), Hot-rolled Sheet and Strip Commercial Quality
Standard B 117 -	Salt Spray (Fog) Testing
Standard D 2247 -	Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
Standard F 626 -	Fence Fittings
Standard F 669 -	Strength Requirements
Standard F 934 -	Standard Colours for Poly (Vinyl Chloride) (PVC) Coated Chain Link Fence
Standard F 1234 -	Protective Coatings
Standard G 23 -	Practice for Operating Light and Water Exposure Apparatus (Carbon-Arc Type) for Exposure of Non-metallic Materials

Standard G 26 - Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) with or without Water for Exposure of Non-metallic Materials.

3. QUALITY ASSURANCE

3.1. The supplier is responsible to ensure all materials conform to these specifications. A certificate of compliance with these specifications may be requested by Saskatchewan Highways and Transportation.

Samples may be requested and all materials must meet the dimensions shown on the standard plans:

Material acceptance will be satisfied if the average of all samples tested meet the minimum requirements.

4. MATERIALS SPECIFICATIONS

4.1. Materials Required

Posts, Post Tops, Braces and Tension Bars

- All posts and rails must be of Type 'A' (Steel Butt Weld Pile) or Type 'B' (Steel Pipe).
- All posts must be fitted with water tight tops designed to fit securely over the posts.
- All posts are to be pre-drilled 10 cm from the top, to allow the use of post clips, if specified.

Type 'A' (Steel Butt Weld Pipe):

- The base metal for the manufacturing of posts, post tops, braces and tension bars must conform to the ASTM F669.81 requirements, except the carbon content of steel posts must not be more than 0.40 percent.
- Posts and braces must be galvanized after the largest practical sections have been fabricated. Fabrication must include all operations such as shearing, cutting, drilling, milling, bending, welding, etc. Galvanizing must conform to the CGSB specification CAN/CGSB-138.2-M.
- Posts and braces must conform to the dimensions shown in the tender or purchase order. They must be either a) 60 mm outside diameter with a minimum weight of

5.6 kg/m; or b) 47 mm outside diameter with a minimum weight of 4.4 kg/m. Both must have a minimum zinc coating of 490 g/m^2.

- The terminal posts must be 89 mm outside diameter with a minimum weight of 11.24 kg/m, with a minimum zinc coating of 490 g/m^2.

- The brace pipes and top rails, if required, must be 42 mm outside diameter with a minimum weight of 3.5 kg/m, with a minimum zinc coating of 490 g/m^2.

Type 'B' (Steel Pipe):

- The steel strips used to manufacture Type B pipes and rails, must meet ASTM Standard A-569, and the resulting pipe must have a minimum yield strength of 350 MPa. The pipe's yield strength and section modulus must be greater than or equal to pipe meeting the requirements for Type A posts and rails.
  Materials Required (continued)

- The outer surface must have the following protective coatings:

  1) hot dip zinc coating, conforming to ASTM Standard B-6, High Grade or Special High Grade applied at an average weight of 305 g/m^2 and at a minimum weight of 275 g/m^2 as determined by ASTM A-90's test method.

  2) chromate conversion coating, with a weight of 30 micrograms/square inch ± 15 micrograms/square inch as determined by a strip and weight method for zinc and chromate and by determining the percentage of each by an atomic absorption spectrophotometer.

  3) clear acrylic polyurethane coating with a minimum thickness of 0.100 mm ± 0.025 mm.

- The resulting coating must have the ability to resist:

  1) 1,000 hours of exposure to salt fog with a maximum 5% red rust when tested in accordance with ASTM B117, and

  2) 500 hours of exposure to 100% relative humidity without blistering and peeling when tested in accordance with ASTM D2247, and

  3) 500 hours of exposure in a weatherometer without film cracking of the clear coat when tested in accordance with ASTM G23, Type E or EH carbon arc, or ASTM, Type B or BH xenon arc.

- The inner surface must have either a zinc coating as per ASTM F1234, Type B, applied at an average rate of 305 g/m^2 or an ASTM F1234 Type D zinc coating with a minimum zinc powder loading of 91% by weight and a minimum thickness of 0.075 mm. The inner coating must be able to resist 650 hours of exposure to salt fog with a maximum 5% red rust when tested in accordance with ASTM B117.

Chain Link Fence Fabric

- Chain link fence fabric must be galvanized steel fabric conforming to CGSB's CAN/CGSB-138.1-M Grade 1 specification. The fabric must be hot-dipped galvanized after weaving. The mesh size must be 50 mm. The wire used in the manufacturing of the fabric must have a nominal diameter of 3.0-3.5 mm. The minimum zinc coating must be 490 g/m^2 on the surface area.

4.2. Miscellaneous

The bottom tension wire must be single strand galvanized wire with a nominal diameter of 5.0 mm. The top tension wire must be either a single strand galvanized wire with a nominal diameter of 5.0 mm or, a galvanized 7 strand guy wire with a nominal diameter of 6.4 mm.

The minimum average mass per unit area of zinc coating for both top and bottom tension wire is 490 g/m^2, for two or more samples. For only one sample, the minimum is 440 g/m^2.

5. DELIVERY

5.1. Must be within 15 calendar days after receipt of order.

5.2. The supplier must deliver and unload the product to the location specified in the tender. No unloading assistance or equipment will be provided by the Department.

5.3. The deliver must comply with all laws, including laws protecting the environment.

APPROVAL SHEET

New __ Revision _X_ Date of Previous Document _- -_
Effective Date: _- -_

Description of Revision (Reason for Revision):
- Included Type 'B' steel as alternative.
- Was initiated by the US manufacturer and has been adopted by the majority of State or Provincial Highway agencies in North America.

Review/Implementation Process:

- Reviewed by the Materials Section of the Technical Standards and Policies Branch.

Other Manuals/Policies Affected:

Nil

Follow Up/Training Required:

Forward to all District Design and Construction Engineers.

Comments/Concerns/Implications (Budget/Environment/Stakeholders):

Nil

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Update Mailed _- -_