

# **TENDER DOCUMENTS**

## **SUBSECTION 6.85 SAFETY ELEMENTS**

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## SUBSECTION 6.85 SAFETY ELEMENTS

### 6.85.1 GENERAL

- 6.85.1.1 This subsection describes the requirements relating to the work carried out on the safety elements covered by this Contract.
- 6.85.1.2 Any specific requirements pertaining to the work carried out on the safety elements covered by this Contract are set out on the drawings and in Section 4 *Special Technical Conditions*.
- 6.85.1.3 The barrier installation shall be carried out in accordance with the drawings.

### 6.85.2 MEASUREMENT UNITS

- 6.85.2.1 The measurement units and respective symbols thereof used in this subsection are described as follows:

Measurement Unit	Designation	Symbol
length	meter	m
length	centimeter	cm
length	millimeter	mm
area	square meter	m <sup>2</sup>
volume	cubic meter	m <sup>3</sup>
volume	litre	L
mass	kilogram	kg
pressure	megapascal	MPa
force	newton meter	N m
temperature	Celsius degree	°C

### 6.85.3 REFERENCE STANDARDS

- 6.85.3.1 The **Contractor** shall carry out all work on the safety elements in accordance with the requirements of the following standards and documents to which the provisions of this Contract are added:
- 6.85.3.2 (ASTM) ASTM International:
- ASTM A36/A36M *Standard Specification for Carbon Structural Steel;*
  - ASTM A123/A123M *Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products;*
  - ASTM A153/A153M *Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware;*
  - ASTM C309 *Standard Specifications for Liquid Membrane Forming Compounds for Curing Concrete;*

- ASTM C360 *Test Method for Ball Penetration in Freshly Mixed Hydraulic Cement Concrete.*

6.85.3.3 (CSA) Canadian Standards Association:

- CAN/CSA G40.21 – *Structural Quality Steel*;
- CAN/CSA-A23.1/A23.2 – *Concrete Materials and Methods of Concrete Construction/ Methods of Test and Standard Practices for Concrete.*

6.85.3.4 (BNQ) Bureau de normalisation du Québec:

- BNQ 2560-114 *Travaux de génie civil – Granulats – Partie II: Fondation, sous-fondation, couche de roulement et accotement.*

6.85.3.5 (MTQ) Ministère des Transports du Québec:

- MTQ – *Cahier des charges et devis généraux (CCDG)*;
- MTQ – *Normes – Ouvrages routiers – Tome II – Construction routière*;
- MTQ – *Normes – Ouvrages routiers – Tome III – Ouvrages d’art*;
- MTQ – *Normes – Ouvrages routiers – Tome VII – Matériaux*;
- MTQ’s Approval program and list of approved products (*Programme d’homologation et liste des produits homologués du MTQ*).

## 6.85.4 MATERIALS

### 6.85.4.1 CONCRETE FOR RIGID CONCRETE BARRIERS

6.85.4.1.1 The concrete of a cast-in-place or molded-in-place rigid barrier shall comply with MTQ standard 3101.

### 6.85.4.2 BACKFILL CONCRETE BETWEEN RIGID BARRIERS

6.85.4.2.1 The backfill concrete shall have a compressive strength with a precision of 0.4 MPa at twenty-eight (28) days. The strength shall at no time exceed 1.0 MPa. The cement used shall be Type 10 Portland cement and the minimum dosage shall be 25 kg/m<sup>3</sup>. The compressive strength of the non-shrink backfill concrete shall be determined according to test method CSA-A23.2.2-9C.

6.85.4.2.2 The slump shall be measured in accordance with test method CSA A23.2-5C and shall be of at least 150 mm.

6.85.4.2.3 The materials used in the manufacture of the backfill concrete shall comply with standard CSA A23.1. The coarse aggregate shall comply with Group 1 and of the 20-5 nominal dimension of Table 5 of standard CSA A23.1. Half (50%) of the total weight of the aggregate shall be represented by coarse aggregate.

- 6.85.4.2.4 The backfill concrete shall be sufficiently waterproof to allow the rapid drainage of the water contained in the mixture and offer, in the short term, a high bearing capacity. The measurement of the penetration at the backfill concrete surface shall be taken in accordance with standard ASTM C360 and shall be less than 25 mm after five (5) minutes following the end of the backfill concrete placement.
- 6.85.4.3 RIGID BARRIERS REINFORCING STEEL
- 6.85.4.3.1 The reinforcing steel and anchor bars shall comply with MTQ standard 5101.
- 6.85.4.3.2 The steel grade shall be 400W.
- 6.85.4.3.3 The reinforcing steel, ribbed bars and anchor bars shall be hot-dip galvanized in accordance with standard ASTM A123/A123M or standard ASTM A153.
- 6.85.4.4 CURING COMPOUND
- 6.85.4.4.1 The curing compound shall comply with MTQ standard 3501.
- 6.85.4.4.2 When a membrane-forming curing compound is used, it shall be of Type 2 white pigmented.
- 6.85.4.4.3 The water used for curing the concrete shall comply with MTQ standard 3101 regarding the mixing water. The water temperature shall not be below 10°C.
- 6.85.4.5 GRANULAR MATERIALS
- 6.85.4.5.1 The granular materials for the filling between the two (2) lateral rigid barriers making up a median rigid barrier shall be MG112 and comply with standard BNQ 2560-114.
- 6.85.4.6 TREATED WOOD POSTS AND SPACER BLOCKS
- 6.85.4.6.1 The treated wood posts and spacer blocks of a double wave steel section semi-rigid barrier shall comply with MTQ standard 11101.
- 6.85.4.6.2 The reused wood, exclusively from utility poles, that was initially treated with chromated copper arsenate (CCA) or with pentachlorophenol (PCP) and treated again with CCA, may be used only as posts for safety barriers and spacer blocks, excluding bridge barriers.
- 6.85.4.6.3 The wood pieces gorged with PCP shall not be used.
- 6.85.4.6.4 The pieces of reused wood may not have more than one (1) hole per 20 cm section. The hole shall not exceed 25 mm in diameter. In such a case, the pieces are automatically considered as being N° 2 grade. The pieces with one or more holes of a diameter exceeding 25 mm cannot be used.
- 6.85.4.6.5 The classification of the reused wood shall be made according to the Standard Grading Rules for Canadian Lumber (NLGA).

#### 6.85.4.7 STEEL POSTS

6.85.4.7.1 The steel posts of a double wave steel section semi-rigid barrier shall consist of Type W W150 x 13 or W150 x 14 steel sections, compliant with standard CSA G40.21, with a minimum elastic limit of 26 MPa or compliant with standard ASTM A36/A36M.

6.85.4.7.2 The steel posts shall consist of one (1) single piece. The abutment of parts by welding is prohibited.

6.85.4.7.3 The steel posts shall be hot-dip galvanized, in accordance with standard ASTM A123/A123M or standard ASTM A153.

6.85.4.7.4 At the time of installation of the steel posts, the **Contractor** is fully responsible for ensuring that there is no white rust on the materials supplied.

#### 6.85.4.8 RAILING COMPONENTS AND ACCESSORIES

6.85.4.8.1 The railing components, such as the anchoring device double wave steel sections or steel pipes, the end pieces and the accessories shall comply with MTQ standard 6301.

6.85.4.8.2 The railing components shall consist of one (1) single piece. The butting of parts by welding is prohibited.

6.85.4.8.3 For all installations of railing components, end pieces and accessories, of an anchor section, transition and connection to be carried out from September 1 to December 31, the **Contractor** shall only use parts that have been galvanized prior to September 1. For all installations of these elements, end pieces and accessories that must be carried out from January 1 to April 30, the **Contractor** shall only use parts that have been galvanized at least three (3) months prior to installation thereof.

6.85.4.8.4 At the time of installation of the railing components, end pieces and accessories, the **Contractor** is fully responsible for ensuring that there is no white rust on the materials supplied.

#### 6.85.4.9 BOLTS, NUTS AND WASHERS

6.85.4.9.1 The bolts, nuts, washers and anchor rods shall comply with MTQ standard 6201.

#### 6.85.4.10 RETROREFLECTIVE FILMS

6.85.4.10.1 The retroreflective films shall comply with MTQ standard 14101. If a plate is required for installation, it shall be made of aluminum.

6.85.4.10.2 The marker's upper end shall be equipped with a high-intensity red or green retroreflective film rectangle, 60 mm wide x 150 mm high. The end of the safety barriers shall be indicated with a green marker while all other markers shall be red. The markers shall be placed along the semi-rigid barrier, spaced at a minimum distance of 60 m from each other and facing traffic.

#### 6.85.4.11 SEMI-RIGID BARRIER END DEVICES (L-W/B-1, L-W/B-2 AND MEDIAN)

##### 6.85.4.11.1 Posts, railing components and accessories

6.85.4.11.1.1 The metal components of the approved semi-rigid barrier end devices shall be hot-dip galvanized, in accordance with standard ASTM A123/A123M or standard ASTM A153.

6.85.4.11.1.2 Where semi-rigid barrier steel posts, wooden spacer blocks, railing components and accessories are required to reach the above-mentioned theoretical length, they shall meet the requirements indicated in Article 6.85.4 *Materials*.

6.85.4.11.1.3 The components of the approved semi-rigid barrier end device shall be free of any commercial identification visible from the road.

##### 6.85.4.12 TL-2 OR TL-3 IMPACT ATTENUATOR

6.85.4.12.1 The dimensions and characteristics shall be as indicated on the drawings.

##### 6.85.4.13 FENCES AND CHAIN LINK BARRIERS

6.85.4.13.1 The fences and chain link barriers shall comply with MTQ standard 6601 and the fences shall be of the height indicated on the drawings with posts spaced at a maximum distance of 2.4 m c/c from each other.

### 6.85.5 EXECUTION OF WORK

#### 6.85.5.1 CONCRETE

6.85.5.1.1 The implementation requirements for concrete structures of subsection 6.33 *Cast-in-Place Concrete* of this Contract apply to the cast-in-place rigid concrete barriers, except with regard to curing.

6.85.5.1.2 The molded-in-place or cast-in-place rigid concrete barriers shall not deviate from the alignment and profile indicated on the drawings by more than 6 mm. Any section that presents irregularities exceeding 10 mm within 3 m shall be resumed at the **Contractor's** expense.

#### 6.85.5.2 REINFORCING STEEL

6.85.5.2.1 The placement requirements of subsection 6.31 *Reinforcing Steel for Concrete* of this Contract apply to the molded-in-place or cast-in-place rigid barriers.

#### 6.85.5.3 CURING OF CONCRETE

6.85.5.3.1 The curing of concrete shall start immediately after the surface finishing, but shall not damage the surface.

6.85.5.3.2 The curing of the concrete surfaces shall be carried out during seven (7) consecutive days at a minimum temperature of 10°C or during the period required to reach 70% of the required compressive strength at twenty-eight (28) days.

6.85.5.3.3 At least one of the following methods shall be used, alone or in combination with the others for the curing of the concrete:

6.85.5.3.3.1 absorbent fabric: the surface shall be completely covered and the fabric shall be kept continuously damp;

6.85.5.3.3.2 waterproof sheeting: the sheets used shall overlap on 100 mm, be well sealed to each other and completely cover the surfaces;

6.85.5.3.3.3 curing compound: the membrane-forming curing compound shall be applied at the rate recommended by the manufacturer, without however being less than 0.2 L/m<sup>2</sup> on all surfaces of the concrete. The curing compound shall be shaken prior to application thereof in order to obtain a homogeneous film on the entire surface.

#### 6.85.5.4 CRACK INITIATION

6.85.5.4.1 The crack initiation of the transversal contraction joints shall be carried out by means of a saw cut. The saw cut shall be made as soon as concrete setting allows it without unsettling the aggregate or causing spalling.

#### 6.85.5.5 GRANULAR MATERIALS

6.85.5.5.1 The granular materials for the filling between the two (2) lateral rigid barriers making up a median rigid barrier shall be placed in uniform layers of a maximum thickness of 200 mm densified to a maximum of 90% of the maximum dry density, using hand tools whose compaction energy will not damage or displace the rigid barriers.

#### 6.85.5.6 INSTALLATION OF THE SEMI-RIGID BARRIER POSTS

6.85.5.6.1 The **Contractor** shall provide for the use of the equipment needed to carry out the Class 2 excavation on the worksite. The area excavated around the posts shall be backfilled with granular materials compliant with standard NQ 2560-114 for a granular sub-base material after implementation of the materials, then densified in 150 mm thick layers. The **Contractor** shall dispose of the surplus excavated materials according to subsection 6.13 *Environmental Protection*.

#### 6.85.5.6.2 Alignment

6.85.5.6.2.1 The posts shall be installed vertically according to the transversal profile. They shall be installed perpendicularly, according to the longitudinal profile of the roadway when the slope is less than 2%, and in a vertical position when the slope is equal to or greater than 2%.

6.85.5.6.2.2 The **Contractor** shall install the posts so that the top of the posts follows a regular line. The vertical alignment of the posts shall not reproduce the imperfections of the road and shoulders.



- 6.85.5.6.3 Retroreflective films
- 6.85.5.6.3.1 The **Contractor** shall install the retroreflective plates and films indicated on the drawings. The galvanized steel surfaces to receive the retroreflective films shall be cleaned using a swab soaked with a phosphoric acid solution with a concentration between 5% and 8%, then rinsed with clean water. On wood, the aluminum plates on which the films are fixed shall be installed by means of galvanized nails.
- 6.85.5.6.3.2 The **Contractor** shall, before undertaking the installation, ensure that it has all the barrier elements, including the semi-rigid barrier end devices.
- 6.85.5.6.3.3 Every workday, the **Contractor** shall limit the installation of the posts in order to ensure that, at the end of the day, the installation of the barrier, end devices, anchoring devices or other accessories on each of them is complete. If it proves impossible for the **Contractor** to complete the installation of a barrier at the end of a workday, it shall provide for the installation of a temporary round end at the end thereof.
- 6.85.5.6.4 Installation tolerances of the barrier
- 6.85.5.6.4.1 The tolerance limits within which the installation of the barrier shall be carried out are the following:
- 6.85.5.6.4.1.1 a height of  $\pm 25$  mm with respect to the final profile of the covered platform, measured in line with the face of the railing component;
- 6.85.5.6.4.1.2 a height of  $\pm 50$  mm with respect to the profile of the gravel platform, measured in line with the face of the railing component;
- 6.85.5.6.4.1.3 a transversal deviation at the top of the post of  $\pm 25$  mm with respect to the position of the line staked by the **Contractor**;
- 6.85.5.6.4.1.4 a deviation of the axis of the post of  $\pm 15$  mm with respect to the position of the base of the post indicated on the drawings.
- 6.85.5.7 INSTALLATION OF THE RAILING COMPONENTS AND ACCESSORIES
- 6.85.5.7.1 In the case of railing components of the double wave steel section and the accessories, the bolts shall be tightened with a key, manual or other, so as to obtain a tightening torque of a least 100 N•m, without however deforming the elements to be assembled.
- 6.85.5.7.2 After tightening, the threaded end of the bolts and anchor rods shall extend beyond the nut by at least 3 mm.
- 6.85.5.8 SEMI-RIGID BARRIER END DEVICES (L-W/B-1, L-W/B-2 AND MEDIAN)
- 6.85.5.8.1 Where semi-rigid barrier steel posts, wooden spacer blocks, railing components and semi-rigid barrier accessories are required to reach the specified theoretical length, they shall comply with the drawings and comply with the Engineer's instructions.

- 6.85.5.8.2 The approved semi-rigid barrier end devices shall be installed according to the manufacturer's installation manual.
- 6.85.5.8.3 No modification to the approved semi-rigid barrier end device is allowed.
- 6.85.5.8.4 The **Contractor** shall provide the Engineer, within twenty-four (24) hours of installation, with a written notice attesting that each approved semi-rigid barrier end device has been installed in accordance with the assembly drawing and the manufacturer's recommendations. The notice shall be signed by the **Contractor**, and shall contain the following information, without however being limited thereto:
- 6.85.5.8.4.1 the location of the end device;
  - 6.85.5.8.4.2 the model;
  - 6.85.5.8.4.3 the inspection date;
  - 6.85.5.8.4.4 the list of checks carried out during the installation.
- 6.85.5.9 TL-2 AND TL-3 IMPACT ATTENUATOR
- 6.85.5.9.1 Prior to the installation, a meeting involving the representative of the **Contractor** and the Engineer shall be held at the projected location of installation of the approved impact attenuator to validate the alignment, distance and height of the installation.
- 6.85.5.9.2 The **Contractor** shall prepare the granular base or leveling slab according to the manufacturer's recommendations. Where a ground anchoring is required, it shall comply with the manufacturer's recommendations.
- 6.85.5.9.3 The approved impact attenuator shall be installed in accordance with the manufacturer's recommendations.
- 6.85.5.9.4 The installation of the transition pieces and connections thereof shall be carried out in accordance with the manufacturer's recommendations.
- 6.85.5.9.5 No modification to the approved impact attenuator is allowed.
- 6.85.5.9.6 The **Contractor** shall provide the Engineer, within twenty-four (24) hours of installation, with a written notice attesting that each approved impact attenuator has been installed in accordance with the assembly drawing and the manufacturer's recommendations and that the inertial systems have been installed in accordance with the drawings. The notice shall be signed by the **Contractor**, and shall contain the following information, without however being limited thereto:
- 6.85.5.9.6.1 the location of the impact attenuator;
  - 6.85.5.9.6.2 the model;
  - 6.85.5.9.6.3 the inspection date;

6.85.5.9.6.4 the list of checks carried out during the installation.

#### 6.85.5.10 CHAIN LINK FENCES

6.85.5.10.1 Where transversal fencing must be re-installed, it shall be attached to posts that are adjacent to the new fence and independent therefrom.

6.85.5.10.2 The ground under the fence shall be leveled so as to obtain an opening under the fence that is less than or equal to 50 mm, as indicated on the drawings.

6.85.5.10.3 The chain link fences shall be installed in accordance with the drawings.

#### 6.85.5.11 CHAIN LINK BARRIERS

6.85.5.11.1 The chain link barriers shall be installed in accordance with the drawings and as indicated by the Engineer.

### 6.85.6 QUALITY CONTROL

#### 6.85.6.1 CONCRETE

6.85.6.1.1 The concrete used for the molded-in-place or cast-in-place rigid barriers shall comply with subsection 6.33 *Cast-in-Place Concrete* of this Contract.

#### 6.85.6.2 REINFORCING STEEL

6.85.6.2.1 The reinforcing steel, ribbed bars and anchor bars used for the cast-in-place rigid barriers shall comply with subsection 6.31 *Reinforcing Steel for Concrete* of this Contract.

#### 6.85.6.3 CURING COMPOUNDS

6.85.6.3.1 For each delivery of membrane-forming curing compounds, the **Contractor** shall, for each production batch, provide the Engineer with a certificate of conformity containing the following information, without however being limited thereto:

6.85.6.3.1.1 the product class according to standard ASTM C309;

6.85.6.3.1.2 the production batch number;

6.85.6.3.1.3 the application rate (L/m<sup>2</sup>);

6.85.6.3.1.4 the water loss (kg/m<sup>2</sup>) at seventy-two (72) hours.

6.85.6.3.2 A production batch corresponds to a specific quantity of product with the same physico-chemical characteristics, manufactured according to the same recipe, from the same source of supply and during an uninterrupted production period.

#### 6.85.6.4 GRANULAR MATERIALS

##### 6.85.6.4.1 Certificate of conformity

6.85.6.4.1.1 For each source of granular materials and at least seven (7) days prior to the first delivery, the **Contractor** shall provide the Engineer with a certificate of conformity containing the following information, without however being limited thereto:

6.85.6.4.1.1.1 the name and address of the manufacturer;

6.85.6.4.1.1.2 the place and date of manufacture;

6.85.6.4.1.1.3 the complete results of the sieve analyses;

6.85.6.4.1.1.4 the results of the control tests of the intrinsic, manufacturing and complementary properties;

6.85.6.4.1.1.5 The name of laboratory member of *Association des firmes de genie-conseil - Québec* (AFG), responsible for performing these analyses and conducting these tests.

##### 6.85.6.4.2 Delivery control

6.85.6.4.2.1 When a delivery control is conducted by the Engineer, it consists in collecting samples for the performance of the sieve analyses and the conduct of the control tests of the intrinsic, manufacturing and complementary properties.

##### 6.85.6.4.3 Stones

6.85.6.4.3.1 For each source of stones, the **Contractor** shall provide the Engineer, at least seven (7) days prior to the first delivery, with a certificate of conformity containing the following information, without however being limited thereto:

6.85.6.4.3.1.1 the complete results of the qualitative analysis of the stones, where such analysis is required, and of the control tests of the properties indicated in MTQ standard 14501;

6.85.6.4.3.1.2 the name of laboratory member of AFG, responsible for performing the qualitative analysis of the stones, where such analysis is required, and for conducting the control tests;

6.85.6.4.3.1.3 the location of the stockpile and of the area to be exploited.

#### 6.85.6.5 TREATED WOOD POSTS AND SPACER BLOCKS

##### 6.85.6.5.1 ISO compliant quality system

6.85.6.5.1.1 The wood pressure treatment shall be carried out by a company whose plant holds a registration certificate attesting that the quality system complies with standard ISO 9001 *Quality Management System*.

- 6.85.6.5.1.2 The **Contractor** shall, at the first delivery of every one of its suppliers, provide the Engineer with a copy of the ISO 9001 certification.
- 6.85.6.5.2 Certificate of conformity
- 6.85.6.5.2.1 For each delivery of treated wood posts and spacer blocks, the **Contractor** shall, for each production batch, provide the Engineer, at least seven (7) days prior to implementation, with a certificate of conformity containing the following information, without however being limited thereto:
- 6.85.6.5.2.1.1 wood species and density (kg/m<sup>3</sup>);
- 6.85.6.5.2.1.2 distinctive stamping marks used to differentiate grades N°1 and N°2 of the pieces of wood;
- 6.85.6.5.2.1.3 proportion of heartwood/sapwood;
- 6.85.6.5.2.1.4 membership number of the recognized classification organization;
- 6.85.6.5.2.1.5 name of the treatment plant;
- 6.85.6.5.2.1.6 type of preservative product;
- 6.85.6.5.2.1.7 date of treatment and sampling date;
- 6.85.6.5.2.1.8 production batch number;
- 6.85.6.5.2.1.9 volume in m<sup>3</sup> of treated wood in the production batch;
- 6.85.6.5.2.1.10 nominal dimensions in mm and quantity of pieces in the production batch;
- 6.85.6.5.2.1.11 retention test results (kg/m<sup>3</sup>) and corresponding requirement of standard CAN/CSA O80 *Wood Preservation*;
- 6.85.6.5.2.1.12 penetration test results (%) and corresponding requirement of standard CAN/CSA O80 *Wood Preservation*;
- 6.85.6.5.2.1.13 storage site or shipping site.
- 6.85.6.5.2.2 A production batch corresponds to a given quantity of pieces of the same dimensions and same species, and having been treated under the same conditions and at the same time.
- 6.85.6.6 RAILING COMPONENTS AND ACCESSORIES
- 6.85.6.6.1 ISO compliant quality system
- 6.85.6.6.1.1 The double wave steel section railing components shall be manufactured by a manufacturer whose plant holds a registration certificate attesting that the quality system complies with the ISO 9001 standard.

- 6.85.6.6.1.2 The end pieces shall be manufactured by a manufacturer whose plant holds a registration certificate attesting that the quality system complies with the ISO 9001 standard.
- 6.85.6.6.1.3 The **Contractor** shall, at the first delivery of every one of its suppliers, provide the Engineer with a copy of the ISO 9001 *Quality Management System* registration certificate.
- 6.85.6.6.2 Certificate of conformity
- 6.85.6.6.2.1 For each delivery of double wave steel section railing components and of steel end pieces, the **Contractor** shall, for each production batch, provide the Engineer with a certificate of conformity containing the following information, without however being limited thereto:
- 6.85.6.6.2.1.1 name of the galvanizing company;
- 6.85.6.6.2.1.2 place and date of galvanizing;
- 6.85.6.6.2.1.3 steel grade;
- 6.85.6.6.2.1.4 heat number;
- 6.85.6.6.2.1.5 mechanical properties;
- 6.85.6.6.2.1.6 chemical composition;
- 6.85.6.6.2.1.7 coating thickness;
- 6.85.6.6.2.1.8 production batch number.
- 6.85.6.6.2.2 A production batch consists of structural steel parts of the same grade, same resilience and same dimensions, and from the same heat.
- 6.85.6.6.3 Delivery control
- 6.85.6.6.3.1 When a delivery control is conducted by the Engineer, the sampling consists of one (1) 250 mm long railing component and one (1) end piece per production batch, on which the direction of rolling is indicated.
- 6.85.6.7 BOLTS, NUTS AND WASHERS
- 6.85.6.7.1 Certificate of conformity
- 6.85.6.7.1.1 For each delivery of bolts, nuts and washers, the **Contractor** shall provide the Engineer with a certificate of conformity containing the following information, without however being limited thereto:
- 6.85.6.7.1.1.1 name and address of the manufacturer;
- 6.85.6.7.1.1.2 place and date of manufacture;

- 6.85.6.7.1.1.3 identification of the marking;
- 6.85.6.7.1.1.4 nominal dimensions;
- 6.85.6.7.1.1.5 steel grade;
- 6.85.6.7.1.1.6 heat number;
- 6.85.6.7.1.1.7 mechanical properties;
- 6.85.6.7.1.1.8 chemical composition;
- 6.85.6.7.1.1.9 coating information;
- 6.85.6.7.1.1.10 production batch number.
- 6.85.6.7.1.2 A production batch consists of parts of the same dimensions from the same heat of steel.
- 6.85.6.7.2 Delivery control
  - 6.85.6.7.2.1 When a delivery control is conducted by the Engineer, the sampling consists of three (3) parts of same dimensions of each type per production batch.
- 6.85.6.8 SEMI-RIGID BARRIER END DEVICES (L-W/B-1, L-W/B-2 AND MEDIAN)
  - 6.85.6.8.1 Where semi-rigid barrier steel posts, wooden spacer blocks, railing components and accessories are required to reach the above-mentioned theoretical length, they shall comply with Article 6.85.6 *Quality Control*.
  - 6.85.6.8.2 Certification
    - 6.85.6.8.2.1 The semi-rigid barrier end devices shall be approved according to MTQ "Programme d'homologation HOM-5660-101" – "*Dispositifs d'extrémité de glissière de sécurité semi-rigide*".
  - 6.85.6.8.3 Certificate of conformity
    - 6.85.6.8.3.1 For each delivery of approved semi-rigid barrier end devices of a given model, the **Contractor** shall provide the Engineer with a certificate of conformity issued by the manufacturer containing the following information, without however being limited thereto:
      - 6.85.6.8.3.1.1 name and address of the manufacturer;
      - 6.85.6.8.3.1.2 **Contractor's** purchase order number;
      - 6.85.6.8.3.1.3 designation of the end device model;
      - 6.85.6.8.3.1.4 date and place of manufacture;
      - 6.85.6.8.3.1.5 list of the parts, components and the quantities;

6.85.6.8.3.1.6 a certificate indicating that the semi-rigid barrier end device is, in terms of materials and design, identical to the product approved under MTQ “Programme d’homologation HOM-5660-101” – “*Dispositifs d’extrémité de glissière de sécurité semi-rigide*”.

6.85.6.8.3.2 Every certificate of conformity shall be accompanied by the assembly drawing and by the installation, inspection and maintenance manual that are specific to each approved semi-rigid barrier end device model to be installed, as well as by the certificate of conformity issued by the manufacturer.

#### 6.85.6.9 TL-2 OR TL-3 IMPACT ATTENUATOR

##### 6.85.6.9.1 Certification

6.85.6.9.1.1 The impact attenuators shall be approved according to MTQ “Programme d’homologation HOM-5660-101” – “*Dispositifs d’extrémité de glissière de sécurité semi-rigide*”.

##### 6.85.6.9.2 Certificate of conformity

6.85.6.9.2.1 For each delivery of an approved impact attenuator, the **Contractor** shall provide the Engineer with a certificate of conformity issued by the manufacturer containing the following information, without however being limited thereto:

6.85.6.9.2.1.1 name and address of the manufacturer;

6.85.6.9.2.1.2 **Contractor’s** purchase order number;

6.85.6.9.2.1.3 designation of the impact attenuator model;

6.85.6.9.2.1.4 place and date of manufacture;

6.85.6.9.2.1.5 list of the parts, components and the quantities;

6.85.6.9.2.1.6 a certificate indicating that the materials and design of the impact attenuator comply with the product approved under MTQ “Programme d’homologation HOM-5660-102 *Atténuateurs d’impact*”.

6.85.6.9.2.2 Every certificate of conformity shall be accompanied by the assembly drawing and by the installation, inspection and maintenance manual that are specific to each approved impact attenuator model to be installed.

#### 6.85.6.10 CHAIN LINK FENCES AND BARRIERS

##### 6.85.6.10.1 Certificate of conformity

6.85.6.10.1.1 For each delivery of chain link and barriers, the **Contractor** shall provide the Engineer with a statement of certificate containing the following information, without however being limited thereto:



6.85.6.10.1.1.1 name and address of the manufacturer;

6.85.6.10.1.1.2 production batch number;

6.85.6.10.1.1.3 technical data sheet of the material.

6.85.6.10.2 Delivery control

6.85.6.10.2.1 When a delivery control is conducted by the Engineer, the sampling for the chain link fence consists of one (1) 0.25 m<sup>2</sup> section.

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**END OF SUBSECTION**