



**CONSTRUCTION SPECIFICATION FOR
CONNECTICUT IMPACT ATTENUATION SYSTEM (CIAS)**

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753.01 SCOPE

This specification covers the requirements for the installation of Connecticut Impact Attenuation Systems (CIAS).

753.02 REFERENCES

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

Ontario Provincial Standard Specifications, Construction

OPSS 314 Untreated Granular, Subbase, Base, Surface, Shoulder, and Stockpiling
OPSS 904 Concrete Structures

Ontario Provincial Standard Specifications, Material

OPSS 1010 Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
OPSS 1350 Concrete - Materials and Production
OPSS 1440 Steel Reinforcement for Concrete

CSA Standards

G40.20-04/G40.21-04 (R2009) Rolled or Welded Structural Quality Steel/Structural Quality Steel
W47.1-03 (R2008) Certification of Companies for Fusion Welding of Steel
W59-03 (R2008) Welded Steel Construction (Metal Arc Welding)

ASTM International

A53 / A53M - 07 Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
A123 / A123M - 09 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
A153 / A153M - 03 Zinc Coating (Hot-Dip) on Iron and Steel Hardware
A307 - 07 Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength

753.05 MATERIALS

753.05.01 Concrete

Concrete shall be according to OPSS 1350 with a nominal minimum 28-Day compressive strength of 30 MPa.

753.05.02 Granular Base

Granular base shall be Granular A according to OPSS 1010.

753.05.03 Reinforcing Steel Bars

Reinforcing steel bars for concrete backwall shall be according to OPSS 1440.

753.05.04 Fasteners

Bolts, nuts, washers, and spacers shall be according to ASTM A307 and hot dip galvanized according to ASTM A153.

753.05.05 Steel Cylinders

Cylinders shall be fabricated from steel according to CSA G40.21, Grade 300W, and hot dip galvanized after fabrication to provide a zinc coating not less than 610 g/m² according to ASTM A123.

Cylinders shall be cut square and seamless or electric welded. The finished cylinder shall be within 15 mm of true round. Each cylinder shall be labelled at the top with the designated A to N alphabetical character.

All edges shall be machined and free of burrs and sharp edges.

753.05.06 Steel Rails

Steel rails shall be fabricated as specified in the Contract Documents from flat stock steel according to CSA G40.21, Grade 300W, and hot dip galvanized after fabrication to provide a zinc coating not less than 610 g/m² according to ASTM A123.

753.05.07 Steel Straps, Lid Support Angles, and Lifting Devices

Steel straps, lid support angles, and lifting devices shall be steel according to CSA G40.21, Grade 300W. All straps shall be cut to the width and length and welded to the cylinder as specified in the Contract Documents.

753.05.08 Steel Pipes

Steel pipes shall be 48.3 mm OD, standard weight, Schedule 40 steel pipe according to ASTM A53 and welded to one side of the cylinder as specified in the Contract Documents.

753.05.09 Steel Pipe Retainers

Steel pipe retainers shall be 50 mm by 32 mm OD, standard weight, Schedule 40 steel pipe according to ASTM A53 and welded to the side of the cylinder as specified in the Contract Documents.

753.05.10 Lids

Lids shall be fabricated from low-density polyethylene composed of 25% recycled plastic materials. Lids shall be black in colour and UV stabilized to a minimum rating of UV8D. The lid shall be of sufficient strength to support a centred point load having a mass of 60 kg producing a maximum deflection of 100 mm.

Each lid shall have a steel restraining chain for attachment of the lid to the cylinder.

Associated metal hardware for the lids, such as washers, eye bolts, chains, and screws shall be hot dip galvanized according to ASTM A153 or equivalent electroplated or anodized treated.

753.05.11 Welds

All welding shall be according to CSA W47.1 and CSA W59.

753.07 CONSTRUCTION

753.07.01 General

Connecticut Impact Attenuation Systems shall be installed according to and at locations specified in the Contract Documents.

753.07.02 Concrete Pads and Backwalls

Levelling and site preparation required for the existing granular base shall be performed prior to placing the concrete pad and backwall.

Concrete pads and backwalls shall be constructed as specified in the Contract Documents. Concrete shall be placed, cured, and finished according to OPSS 904. Cross fall of the concrete pad is desirably 6% or less and shall not exceed 10%. All exposed edges of the backwall shall have a 25 mm chamfer. Drilling of anchor holes shall commence a minimum of five days after concrete has been placed.

753.07.03 Granular Base

The granular base below the concrete pad shall be a minimum depth of 150 mm and shall be placed according to OPSS 314. The granular material shall be compacted to 95% of the maximum dry density.

753.07.04 Connection to Barriers

The concrete backwall shall be connected to the barrier as specified in the Contract Documents.

753.07.05 Delineation

Delineation shall be provided as specified in the Contract Documents.

753.07.06 Management of Excess Material

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

753.09 MEASUREMENT FOR PAYMENT

753.09.01 Actual Measurement

753.09.01.01 Connecticut Impact Attenuation System (CIAS)

For measurement purposes, a count shall be made of the number of complete Connecticut Impact Attenuation Systems installed.

753.09.02 Plan Quantity Measurement

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

753.10 BASIS OF PAYMENT

753.10.01 Connecticut Impact Attenuation System (CIAS) - Item

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