Certification Program for Structural Plate Corrugated Steel Pipe Products and Deep Corrugated Structural Plate Products

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Certification Program for Structural Plate Corrugated Steel Pipe Products and Deep Corrugated Structural Plate Products

1 – Preface

This Program has been written and developed by the CSPI (Corrugated Steel Pipe Institute) to support members and stakeholders and has been audited by CWB. Use outside of CSPI membership is strictly prohibited.

The Corrugated Steel Pipe Institute, or CSPI, is a federally chartered industrial trade association of corrugated steel pipe (CSP) and structural plate corrugated steel pipe (SPCSP) manufacturers, steel producers, and suppliers to the CSP industry.

This is the first version of the Program for SPCSP, to reflect the current version of CSA standard G401 and the MTO Performance Based Specification for Design and Construction of Structural Culverts.

2 – Scope

2.1 This Program prescribes requirements for the certification to CSA G401 - Corrugated Steel Pipe and Structures of:
- Structural Plate Corrugated Steel Pipe products and Deep Corrugated Structural Plate products.

2.2 Certification of SPCSP and DCSP to this Program is plant and product specific.

2.3 This Program is limited to:
SPCSP and DCSP of all shapes and sizes.

3 – Definitions

3.1 Certification Body (CB)
A third party agency approved by CSPI and accredited by the Standards Council of Canada (SCC) to Guide 65. See Appendix D.

3.2 Conformance
Compliance with specified requirements.

3.3 Control
To exercise authority over and regulate.

3.4 Corrective Action
Action(s) taken to prevent the recurrence of a nonconformity.

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3 – Definitions

3.5 Day or Days

In measuring time, the term “day” or “days”, as used in this Program, refers to calendar and not business days.

3.6 Disposition

Immediate correction of a nonconformity, typically:

a) scrap;
b) rework;
c) repair;
d) use as is, with concession; and,
e) reclassify for alternate use.

3.7 Documentation

Recorded information.

3.8 Inspection

Random audit, testing, and evaluation

3.9 Manufacturer

Any CSPI member (manufacturer) producing SPCSP and DCSP for certification under this Program.

3.10 Mark

Refers to a permanent labeling, printing, or stamping on a plate indicating the plate is certified under this Program. The Mark may also be used in promotional literature.

3.11 Material Finishes

Plate finishes include black (uncoated), galvanized and thermoplastic copolymer coated steel.

3.12 Nonconformity

Non-fulfillment of a specified requirement.

Nonconformities are classified into two categories:

Minor:

a) A lapse in the Manufacturer’s Quality Program, which is not likely to impact the quality of product (e.g. identification of an obsolete document in use, or one piece of measuring equipment out of calibration)

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3 – Definitions

Major:

a) A lapse which is likely to, or has impacted the quality of product.
b) Systemic lapses in the Manufacturer's Quality Program (e.g. identification of a series of obsolete documents in use, or when the majority sample of measuring equipment is out of calibration).
c) A previously identified Minor, which has not been corrected.

3.13 Structure Geometry
SPCSP and DCSP – all shapes.

3.14 Product
Any of the various types of product as described in section 2.1 and 2.3, as applicable.

3.15 Quality Assurance
Those planned, systematic, and preventive actions that are required to ensure materials and products will meet specified requirements.

3.16 Quality Control
Inspection, testing, or examination to ensure materials and products were produced to conform to specified requirements.

3.17 Quality Program
Manufacturer's facility specific, established, documented system to ensure quality.

3.18 Program
Refers to this CSPI Certification Program for Structural Plate Corrugated Steel Pipe (SPCSP) and Deep Corrugated Structural Plate (DCSP).

Other definitions as applicable may be found in Section 3, CSA G401, Corrugated steel pipe and structures.

4 – Reference Publications

CSA G401
Corrugated Steel Pipe and Structures
MTO DBSP-3271
Performance Based Specification For Design and Construction of Structural Culverts

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5 – General

5.1 CSPI performs an oversight role in the administration of the programs, CB's and Manufacturers.

5.2 CSPI shall maintain a list of Manufacturers' certified Products, approved CB's and the CB Mark(s). CSPI shall promptly advise the participating Manufacturers when revisions or changes have been made to the Program, and the effective date of implementation under this Program.

5.3 A diligent effort has been made to select appropriate standards. However, CSPI makes no representation, warranty or guarantee in connection with the standard or the program and expressly disclaims any liability or responsibility for loss or damage resulting from participation, for any violation of federal, provincial, or municipal regulation with which the underlying CSA standard may conflict, or for the infringement of any patent resulting from the use of the CSA standard.

6 – Manufacturer requirements

6.1 General

The Manufacturer must be a CSPI member and shall establish, implement and maintain a quality system that conforms to this Program and manufacture certified product(s) to the requirements of CSA G401 (see Appendix A).

6.2 The Manufacturer shall establish and maintain a documented Quality Control Plan (QCP) to assure certified product(s) meet or exceed the requirements of G401.

6.3 The QCP shall detail the processes for (see Appendix A):

a) Materials control (such as material specifications, purchasing practices, sourcing, receiving, storage, inventory, and stocking methods)
b) Fabrication ensuring consistent quality of product
c) Identification and traceability
d) Handling, Storage and Transportation
e) Inspection
f) Testing (Product Test Reports – Appendix B)
g) Control of Records
h) Self-Assessment of Plant Standards
i) Nonconforming product and processes
j) Control and use of Marks

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6 – Manufacturer requirements

Note:

1 Testing includes the methods and frequency of sampling and testing for all raw materials and products purchased or manufactured at that location.
2 Quality Control and Quality Assurance data shall be retained by the Manufacturer for not less than two years and made available to the specifying agency upon request.
3 Quality Control test reports shall include the lot identification.
4 Unless specified in a contract, test reports do not have to be filed for specific projects.
5 Manufacturer Quality Control samples shall be uniquely identified by each producing plant.

6.4 The Manufacturer shall label conforming, fully assembled structure with the certification Mark and Manufacturer name or logo, traceable to the facility of manufacture. Labeling options include either a name plate on the entire structure at both ends, or individual marks on each plate.

6.5 The Manufacturer is responsible to contact and arrange for the CB audit and testing for the initial and annual plant(s) and product audits. The CB shall execute a valid Agreement with a Certification Body under this Program in order to conduct such audits and testing.

6.6 The Manufacturer shall provide the QCP to the CB for review. The following information shall be included with this quality control plan:

a) a list of manufacturing facilities and location of plants;
b) a list of the applicable Product(s) produced at each plant; and
c) the name and title of the individual responsible for the quality control program at each plant.

6.7 Changes at the Manufacturer

The Manufacturer shall notify the CB of any subsequent change in manufacturing conditions that impact on the quality of the system or product. The CB may require partial or complete requalification based on the evidence submitted to it, as to the nature and effect of the changes.

6.8 Any change in the point of manufacture shall require re-certification.

6.9 Modification of Certified Products

6.9.1 When design changes are made in a certified Product and the Manufacturer believes that this change will still result in a Product equivalent to the certified Product(s), Manufacturer shall notify the CB in writing prior to shipment. Manufacturer shall submit a summary of properties to the CB to demonstrate compliance.

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6 – Manufacturer requirements

6.9.2 This process also applies to changes in Product formulation (raw materials). Equivalency can be established by supplier technical data, plate producer testing, or generally recognized industry practices.

6.9.3 The legal responsibility for the authenticity of submitted data rests on the Manufacturer.

6.9.4 This procedure is only intended for use in cases of design changes or Product formulation changes deemed not to affect compliance.

6.9.5 The CB may require partial or complete requalification based on the evidence submitted to it, as to the nature and effect of the changes.

6.10 If a nonconformity is identified, the Manufacturer shall:

a) identify and implement disposition and corrective action(s),
b) determine the extent of nonconformity and the impact on Product(s) in inventory to determine what action(s) should be taken,
c) report shipments of possible nonconforming products to their clients,
d) document the nonconformity, disposition and corrective actions(s).

7 – Certification Body Requirements

7.1 The CB provides Certification to this Program.

7.2 Initial Certification Activities

The CB shall:

a) Perform initial plant inspection/audit based on the list of plate products to be certified.
b) Identify and document nonconformity, where required.
c) Issue a product certification to the plant upon successful completion of the investigation.

7.3 Inspection testing shall be performed on a sample or samples, selected at random, by CB from the Product line either in production or in inventory at the Manufacturer's facility.

7.4 CB's inspector shall select test samples, appropriately mark them, and see they are prepared for testing without alteration.

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7 – Certification Body Requirements

Note: Products with similar attributes that can logically be placed in a Product attribute group may be certified based on the testing of a representative Product or Products from the Product attribute grouping. Plate samples shall be made available upon request to the CB in a sufficient quantity to conduct all testing.

7.5 The Product sample(s) selected may be transported to the CB's laboratory. If Manufacturer has its own test facilities that are acceptable to CB, testing of Manufacturer's plate at its own facility is permissible provided that CB's inspector or representative witnesses it.

7.6 The cost of all inspection tests will be borne by Manufacturer.

7.7 Annual Certification Activities

A surveillance inspection of the plant operations will be performed annually. Typically the surveillance audit will randomly sample the elements covered in the initial certification. Each product will be tested at least twice within the certification period (once at initial and at least once in years 1 to 4).

7.8 Re-Certification Activities:

Prior to expiration of the certification (five years from the date of granting certification), or at the discretion of the CB an inspection similar to the initial shall be performed.

7.9 Additional inspections and testing, if required, to renew the plant's certification status is at the CB's discretion.

7.10 The CB will make publicly available the list of certified products.

7.11 In addition, the CB will notify program participants as to how it will manage re-testing of certified Product(s) and validation of new Product(s).

7.12 Notice of Product Certification

7.12.1 A notice shall be issued to Manufacturer stating the date on which certification has been granted and the Product designation.

7.12.2 The Notice of Product Certification shall contain the following information:

a) manufacturer's name, plant location, plate type and all appropriate classes,
b) report number and certification and expiry dates,
c) certification Program

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7 – Certification Body Requirements

7.13 Notice of Product Failure to Certify:

7.13.1 If the tested Product(s) does not comply with all the requirements of the Program, a written notice will be sent to Manufacturer stating that its Product(s) did not certify to this Program. De-certification based on unsatisfactory inspection is addressed separately.

7.13.2 The notice will include:

a) manufacturer's name, plant location, plate type and all appropriate classes,
b) report number and date; and,
c) the specific test failure or failures on which nonconformity is based.

7.14 Recognition of Prior Tests

At the discretion of CB, results from tests conducted before this Program became effective, or tests conducted before a revision to CSA G401 is published, may be deemed to satisfy the applicable testing requirement provided that:

a) The tests and reports fully comply with the Product Certification Requirements of Appendix B and provide the information needed by CB to validate Manufacturer's certification under CSA G401;
b) CB deems the testing laboratory to be certified to perform the tests conducted;
c) Manufacturer certifies that there has been no change in the Product(s) or production processes that would affect the Product's compliance, and;
d) The CB may request additional information or evidence supporting the request for recognition of prior test results.

7.15 Nonconformity and Corrective Action:

CB will completely describe and document the class of nonconformity and evidence for nonconformity and inform the Manufacturer.

7.16 If the CB determines that a Product is nonconforming during a plant inspection, the Manufacturer will be given the opportunity to correct it immediately (disposition and corrective action).

7.17 For a Minor nonconformity that cannot be immediately corrected:

a) The Manufacturer shall identify disposition and determine corrective action and submit to the CB within thirty days of the inspection.
b) If the CB does not approve the response, the CB will notify and discuss with the Manufacturer.
c) If the Manufacturer does not notify the CB within thirty (30) days, the CB will escalate the nonconformity to a Major.

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7 – Certification Body Requirements

7.18 For a Major nonconformity,

a) The Manufacturer shall take action without undue delay to prevent the production of product that may be affected by the nonconformity and shall provide the CB with evidence of implementation of this action within seven (7) days of the nonconformity being raised.

b) If the CB does not approve the response, the CB will notify and discuss with the Manufacturer.

7.19 If a Major nonconformity is not resolved to the satisfaction of the CB within thirty days, or within such time as the Manufacturer and CB agree to extend the period of the response time,

a) The Manufacturer shall immediately cease applying Mark(s) to the Product listed in the nonconformity, as applicable.

b) The Manufacturer shall suspend the use of literature that represents the Product(s) as certified under this Program.

c) To resume participation in the program, the Manufacturer shall confirm to the CB that corrective action has been implemented.

d) In addition, a retest for Product(s) identified shall be scheduled within thirty (30) days submission of the corrective action. All costs for this extra Product(s) testing will be borne by the Manufacturer.

e) The Manufacturer shall not resume marking Product(s) as certified under this Program until the CB approves the corrective action and the retest is in compliance. Any Product manufactured before this occurs shall not be marked as certified.

f) If any of the required timelines are not met, or the CB does not approve the disposition and corrective action, or if the retest still results in nonconformity, the CB shall proceed with de-certification.

g) The CB shall inform the Manufacturer and CSPI of de-certification. CSPI will remove that Product(s) from the certified Product(s) list.

7.20 The Manufacturer may appeal a decision of the CB in accordance to the CB's appeal process.

7.21 Re-certification

To re-certify Product(s) following decertification under the requirements of section 7.19, the Manufacturer shall reapply and submit to the Initial Certification process.

7.22 Inspection Reports:

CB shall communicate with Manufacturer regarding any matters requiring clarification or other action on the part of Manufacturer. All official comments or decisions with respect to conformity of certified Product(s) will be confirmed in writing from the CB within thirty (30) days of the site visit.

The inspection report is confidential and is submitted only to the Manufacturer or designated representative.

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7 – Certification Body Requirements

7.23 General

The CB shall:

a) Invoke certification limitations or cancellations on a plant where an inspection has noted deficiencies, which has compromised the quality of plate production. Limitations would apply to certain plate products while cancellations would apply to all plate products produced at the plant. The limitations or cancellations will be in place while the plant undertakes efforts to correct the noted deficiencies;

b) Issue interim certificates, unless each plate product produced is covered under one certificate, to the plant and only for those pipe products not affected by the plant operational deficiencies;

c) Revoke or cancel plant certificates where the plant is not in compliance with the certificate requirements and has failed to demonstrate satisfactory correction of the deficiencies noted during an inspection.

d) Apply the conditions for re-instatement of certification due to cancellation of certificate or lapsing of certificate as outlined in their certification procedures or program.

e) Inform CSPI of a plate production plant's limited or cancelled certification status.

f) Provide inspection/audit reports to the Manufacturer after each certification activity.

7.24 The Manufacturer shall, prior to the installation of a structure provide the customer's Contract Administration with a copy of the Certificate provided by the CB.

8 – Revisions to Program

8.1 When CSA publishes a revision to the Program, the CB shall notify program participants of how they will handle testing and validation of Products.

8.2 The Manufacturer shall revise its quality system and processes for compliance with any revision to the Program.

8.3 Testing to the previous specifications or most recent prior revision will be accepted for a period of ninety (90) days after publication of the revision. All certifying Products shall be produced in compliance with the latest revision of the Program within six (6) months of the publication of the revision unless the CB notifies participants that a longer period is needed for testing. The CB can waive re-testing under the revised Program when previous test results adequately demonstrate compliance with the revised Program or if the revised Program establishes less stringent criteria.

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9 – Certification Mark

9.1 The Manufacturer shall use the Mark provided by the CB with its certified product(s). See Appendix C.

9.2 The Certification Mark represents that the plate Manufacturer is producing a product that is a faithful representation of the tested product. The CB does not represent, warrant or guarantee that products bearing the Program Mark do in fact conform to CSA G401 requirements.

9.3 The Certification Mark shall be in form to that noted in Appendix C, Exhibit A. The Mark shall be legible and affixed to the product structure or individual plate in a manner that is resistant to environmental conditions for two years beyond the point of its installation.

9.4 The Certification Mark may not be modified and shall not be used or placed in such a manner as to imply any other endorsements or certifications by the CB.

9.5 The plate Manufacturer shall not knowingly release a product for sale with the Certification Mark affixed to an order that does not meet the requirements of CSA G401. If a Manufacturer knowingly releases an order that does not comply with the requirements of CSA G401, all previously certified products in the non-compliant facility will be automatically de-listed pending inspection and re-certification.

9.6 Plate Manufacturers are permitted to use the Certification Mark in their promotional materials and literature only after an appropriate agreement of the CB.

9.7 To avoid misunderstanding, references to certification in Manufacturer literature shall specify the particular products that are certified, unless all of the products mentioned in the literature or advertising are certified under this Program.

9.8 Marking on the plate shall include the approved marks of the certification body and of CSPI.

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9.9 – Product Categories

Figure I: Plate

Corrugation	Type	Group A Galvanized	Group B Thermoplastic Copolymer
152mm x 51mm	Corrugated Structural Plate (With or without flange connections)	•	•
230mm x 64mm	Corrugated Structural Plate (With or without flange connections)	•	•
381mm x 140mm	Deep Corrugated Structural (With or without flange connections)	•	•
400mm x 150mm	Deep Corrugated Structural	•	•
500mm x 237mm	Deep Corrugated Structural (With or without flange connections)	•	•
300π - 400π wide	Tunnel Liner Plate I	•	•
304.8π - 406.4π wide	Tunnel Liner Plate II	•	•

10 – Miscellaneous

10.1 Use of Non-participating Products: This program is not intended in any way to inhibit the sale, purchase or use of Products not approved to use the Program Mark.

10.2 Nothing contained in this program is to be construed as granting any rights, by implication or otherwise, for the manufacture, sale, or use in connection with any method, apparatus, or Product covered by patents, nor as insuring anyone against liability for infringement of patents.

Appendix A: Plate Product Manufacturing Process QC/QA Fundamentals

The following information is provided as an aid to the Plate Product Manufacturers in developing QA/QC (QAP) procedures to obtain certification status from an accepted Certification Body (CB). The information provided should not be construed as being all inclusive to meet the expectations of the certifying body or group. The actual informational requirements, quality documentation needs, tests and other certification aspects required is dependent on the plate product being manufactured. All actual requirements shall be dictated by the accepted Certification Body undertaking the

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audit of the production plant for the purpose of certifying plate product(s). The following is a list of consideration areas in the production of plate products beginning with the raw materials, throughout the manufacturing operations and finally ending with the finished product produced conforming to specification. In all cases the CSA G401 specification will govern.

Appendix A: Plate Product Manufacturing Process QC/QA Fundamentals

1. Raw Materials

1.1 Receiving Considerations:

Checks and/or tests to determine if the raw material composition is as required to manufacture the specified product. Checks and/or tests to assess may include, but are not limited to:

- Plate quality (chemistry report, gauge report, measurements verification);
- Conformance of nuts and bolts to quality and dimensional requirements of G401,
- Document matching to product marking (mill test certificates).

1.2 Storage Considerations:

Suitable facilities to store raw material to prevent or retard:

- Physical damage to plate and/or coating;
- Formation of wet storage stain

1.3 Handling Considerations:

Suitable equipment to move raw material to the manufacturing line to prevent:

- Damage to the raw material and final product;

2. Forming or Manufacturing Process Considerations relative to:

- Corrugating and punching of steel plates;
- Curving of steel plate;
- Welding of Flanges, shear studs to steel plates
- Hot dip galvanizing of steel plate; or
- Bonding of protective coatings.

3. Testing and Measuring Considerations (Table 1)

- For finished products (i.e. dimensions); and/or
- During different stages of production (i.e. dimensions).

4. Equipment Calibration Considerations for:

- Tests done at different production plants of the same products produce the same results; or
- Tests conducted at different production plants of the same products are reflective of the type of material used.

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Appendix B: Product Test Reports and Traceability

The Product test report will include the following information:

a) Manufacturer's Name and Address

b) Product Identification
(1) Product name
(2) Product series, part number or model number

c) Product Description
(1) Product Type
(2) Product dimensions

d) Test Results
(1) For each test contained in the specification, the specification paragraph number, the test description, the reference paragraph number, the reference test method, the applicable criteria measurement for the specification, and the test results are to be listed.
(2) The following is the list of properties to be tested. The test report shall verify compliance achieved (pass/fail), or that the test was not performed where the laboratory does not complete the test.

Structural Plate Products

- Plate thickness and Dimensions
- Corrugation Depth and Pitch
- Bolt Hole Patterns
- Plate arc width and curvature
- Bolts and nuts
- Shear studs
- Flange Connections

e) Related documentation submitted by Manufacturer.

f) An authorized laboratory representative signature.

Each test report and its related documentation constitute the basic reference material for validation by the CB, through in-plant inspection of subsequent manufacture of the Product that such production is a faithful reproduction in all respects of the certifying specimen and in compliance with the applicable specifications.

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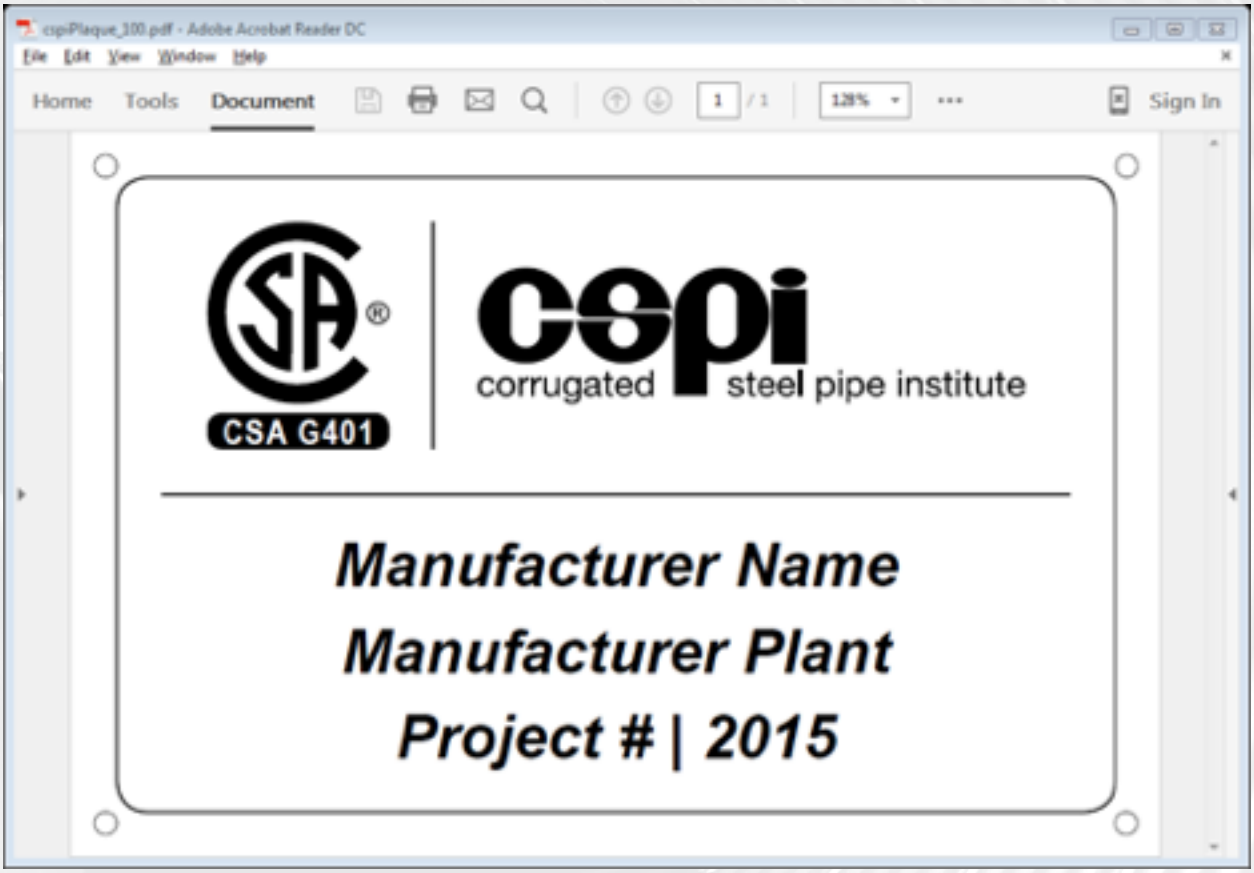
Appendix C: The Mark

Two identifier plates attached to both upper ends of the structure or individual plates containing, CB mark, CSA logo, CSPI mark, manufacturer name and location, serial/project number and supply year.

Exhibit A:

Similar to:



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Appendix D: Approved CB's by the Standard Council of Canada

Bureau de normalisation du Québec

Canadian Standards Association

Canadian Welding Bureau

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Table 1

SPCSP & DCSP Inspection and Testing Plan During Fabrication (Standard CSA G401)

	Test	Frequency	Dimensional/Visual
Machine set up	corrugation depth & pitch	once per shift	dimensional
	bolt hole patterns	once per shift	visual
	arc width and curvature	once per shift	dimensional
New Plate	plate thickness	once per shift	dimensional
	plate dimensions	once per shift	dimensional
	Mill tag markings: • country of origin • thickness • CSA G401 or applicable std. • plate count • heat number • plate dimensions	once per plate stack	visual
Bolts & Nuts	inspect tag to certification requirement	Every Box	visual
Corrugations	check depth & pitch	1st plate of run	dimensional
Bolt Hole patterns	inspect patterns	1st plate of run	visual
Arc Width & Curvature	inspect dimensions	1st plate of run	dimensional
Weld of Shear Studs	Inspect weld	all welds	visual
Weld of Flange Connections	Inspect weld	all welds	visual
Coating Thickness	Galvanized Polymer Coated	every batch	dimensional / visual
Quality of work	appearance	every plate	visual
	manufacturer Identification Mark	entire structure	visual
	certification Mark	entire structure	visual
Quality of Repair	appearance	every repaired plate	visual